ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

INSTITUTE FOR PEACE AND SECURITY STUDIES (IPSS)

THE EFFECTS OF ENVIRONMENTAL DEGRADATION ON HUMAN SECURITY: THE CASE OF *EROB WEREDA*, EASTERN TIGRAY ZONE REGIONAL STATE, ETHIOPIA

BY:

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List of Acronyms

APA	American Psychological Association
AAU	Addis Ababa University
CFC	Chloro Fluoro Carbons
CHS	Commission on Human Security
EFJ	Environmental Justice Foundation
ES	Environmental Security
FGD	Focus Group Discussion
GDP	Gross Domestic Product
IISD	International Institute for Sustainable Development
IES	Institute for Environmental Studies
IGAD	Intergovernmental Authority on Development
IFAD	Institute for Food and Agricultural Development
III	In-depth Informant Interview
IMLZ	Irob Mountains Livelihood Zone
IPSS	Institute for Peace and Security Studies
KII	Key Informant Interview
OPEC	Organization of the Petroleum Exporting Countries
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Program
UNEP	United Nations Environment Policy
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNRISD	United Nations Research for Social Development
UN	United Nations

ABSTRACT

The overall objective is, to study the effects of environmental degradation on human security with special emphasis on food, economic, health, social and personal security in Erob Wereda. To achieve this objective, the study employed fundamentally qualitative with limited quantitative methods to collect relevant data. It used both primary and secondary sources of data. The primary data was collected from 55 participants via in-depth informant interview, focus group discussants representing the grass root societies such as smallholder farmers, local residents and other key informants selected based on purposeful sampling. Secondary data was obtained through critical review and analysis of related literatures and appropriate documents. The methods were In-depth Informants Interview (III), Focus Group Discussions (FGDs), Key Informants Interview (KII) and personal observations and employed qualitative analysis with limited quantitative analysis. Based on the study, the causes of environmental degradation in Erob Wereda are several intertwined and conglomeration factors. The core finding of the study displayed that, environmental degradation has actual, unprecedented and multitudinous effect on human security which undermine food, economic, health, social and personal security of farmers and environmental dependent peoples of Erob Wereda. Each household is prevalently faced inter-household conflict, food shortage, economic deterioration and misery due to declining of their agricultural, cattle and honey production from time to time. Moreover, diminishing in land, bushes/forest and water resources has significant impact on weakening of socio-economic values; undermine means of production and livelihood and may extend as major threat to the future generation. The study also proclaimed that single environmental problem can have many threats starting from the household to the national and international level. Thus, the results indicate that extensive environmental degradation poses multiple challenges to human security. So, to solve repercussion of environmental risks, environmental issues should be critically dealt with. The study also revealed that the adverse effect of environmental degradation in Erob Wereda is exodus migration which threat personal security and social disintegration. Generally, resource degradation is serious problem and poses myriad challenge in the study area. The environment in the area has become more fragile than ever resulting decline in agricultural production and productivity, frequent food deficiency, health problems, drought and famines that severely impair human security. Finally, the study set-forth that there is interactive and vicious causality-effect correlation between environmental degradation and human security.

Key words; *Environment, Environmental Degradation, Human security.*

CHAPTER ONE

1.1.Background

Environmental issue as a phenomenon was first developed at the beginning of 1960s (Carson, 1963). It was particularly driven by Rachel Carson's book which is entitled silent spring and at this time become a global issue like other popular and scientific studies in that time; it focused on the environmental hazards caused by one economic sector, which is agriculture (Pretty et al., 2007).

Obviously, the thin layer of soil which covers the earth's surface is necessarily for human survival. Without it, there would be no plants, crops, animals, forests and people (IFAD, 2001). This implies that, every organism on earth is dependent on the suitability of the surrounding environment. However, due to almost 40% of the earth's surface degradation and declining, the lives of about one billion people are seriously affected (*Ibid)*. Besides, degraded lands are home of the poorest segments of the rural population and victim to food insecurity and health challenges (IFAD, 2001; FAO, 2011).

Literally speaking, environment can be defined as the surrounding and everything that could influence any organism or living being during its lifetime. In another words, environment is the sum total of water, air and land interrelationships among themselves and also the constant interaction with the human being, other living organisms and property (Carson, 1963). It includes all the physical and biological surroundings and their interactions. Each and every body of whatever occupation someone possesses is affected by environmental factors for instance, global warming, the depletion of ozone layer, dwindling forest and energy resources, loss of global biodiversity etc. Environmental study deals with the analysis of the processes in water, air, land, soil and organisms which could pollute or degrade environment while, security studies emphasized as a threat to human security (UNEP, 2008).

The idea of environmental degradation and change as a major threat to human wellbeing was emerged since the late of 1960s. Nowadays, it has become increasingly popular in academic and policy circles. However, the relationship between environmental change, conflict and human security has been one of the major themes of security studies only since 1989 when at least ten articles on the subject were published. The year 1989 was significant in both international

security and global environmental politics which opened the pave concerning environmental degradation, development and sustainability (Lonergan, 2002).

Initially, environmental degradation is above all, the process by which our environment i.e., air, water and land, are progressively contaminated, overexploited and eventually destroyed. When environment become less valuable or damaged, environmental degradation is an inevitable situation to occur. In a specific term, environmental degradation is the ultimate deterioration of the environment through depletion of resources such as air, water, soil and forest; the destruction of eco-systems and the extinction of wildlife ultimately put a risk for human survival (Nellemann, 2009; Carvalho, 2012).

Currently, natural disasters are increasing in both number and frequency as a major threat to human security, in different parts of the world. Environmental degradation is caused due to unsustainable human practices and activities. Nowadays, this is seriously endangering the entire production platform of the earth. Land degradation and conversion of cropland for non-food production including biofuels, cotton and others are major threats that could reduce the available cropland by 8%–20% by 2050 (*Ibid).* Desertification, soil erosion and depletion as well as climate change may reduce current yields by at least an additional 5%– 25% by 2050, in the absence of policy intervention. These factors entail only a portion of the environment covering direct effects. The indirect effects, including socio-economic responses, may be considerably larger. Parallel to this, African countries also severely affected by environmental calamity (*Ibid).*

At regional level, Southern, Central and the Horn of Africa are permanently remaining vulnerable to various environmental challenges such as social instability, persistent drought, famine and painting a bleak scenario for food insecurity. At the same time, environmental degradation manifested in desertification, deforestation, soil erosion, pollution and depleting fish and game stocks have negative impact on the people. The ecological problems in Africa are compounded by the inability of African governments to realize a credible environmental regimes and their willingness to protect the environmental issues (Nellemann, 2009). The combination of all these disconcerting developments presents the Sub-Saharan African region as an indisputable region and high rate human insecurity (Jhon, 2007; Mersie, 2008).

Coming to Sub- Saharan Africa context, it is one of the most harshly affected areas of the world. For instance, in 2008, there were 96 disasters recorded and among these 44 are floods and 9 droughts that affected 16.3 million people and incurred economic losses estimated at some 1 billion dollars (Ndaruzaniye et al., 2011). Similarly, three of the five regions across the globe that are at risk of flooding in coastal and deltaic areas of the world are those located in Africa above all in North Africa, West Africa, and Southern Africa. It is true that a high proportion of African populations inhibit in coastal areas. One-quarter of the population resides within 100 kilometres of a sea coast. The Sahelian countries, which are some of the poorest in the world with the most degraded environments, are among those that are the most vulnerable to the estimated effects of climate change and environmental hazards (*Ibid*).

Environmental change can affect security through changes in provisioning services, which could food supply, population health and other goods. Scarcity of shared resources becomes a source of conflict and social instability for instance the Sudan case (Sombre and Barkin, 2002). Disputes over the quantity and quality of water are ongoing in many parts of the world which hinder human security.

Coming to the Ethiopia's, context of environment and ecological system are fragile and vulnerable to various environmental obstacles and climate change. Environmental challenges in Ethiopia are basically climate change, soil degradation, deforestation, loss of biodiversity and ecosystem services, and pollution of land, air and water. Ethiopia's economy is also highly dependent on natural resources (Sisay Asefa and Tesfaye Zegeye, 2003). Exploitation of these natural resources may generate large economic benefits in the short term but threat to human security in long run. Therefore, in the long period unsustainable use of these natural resources increases not only environmental degradation, but decreases economic growth and livelihood opportunities. In short it has negative consequences on human security (Cesar, 2013; Adugnaw, 2014; Christian et al., 2012).

According to UNDP human development report (1994) more specifically, the assurance of human security is freedom from the economic, food, health, environmental, personal, community, and political security in which they are very interdependent each other.

The relation between environment and human security are certainly close to each other and become further complex as well. A great deal of human security is quite tied to peoples' access to

natural resources and freedom from the vulnerabilities of environmental change. Different scholars have presented that environmental change affects directly or indirectly to human security. For instance, conflicts and ethnic tension are some prevalent over scarce resources (Khagramet et al., 2003).

1.2.Statement of Problem

Environmental change has direct and immediate effects on the wellbeing of livelihoods. For instance, land degradation, soil erosion, drought and water scarcity may cause and become source of conflict. It also engenders insecurity by contributing to dehydration-related death, reducing food production, and undermining livelihood opportunities. The degraded environment has negative impacts on human survival and source of income. Environmental change could generate diverse impacts ranging from food insufficiency, health challenges, declining of economic productivity and political instability. Environmental threats can further affect diversity of subjects ranging from individuals, families, households, communities, social organizations and various identity groups such as women, children, ethnic, etc(Duraiappah, 1996; Khagramet et al., 2003).

The vulnerability of environmental degradation is frequent drought, extreme poverty, and stagnant production, desperate among people due to these. Besides, lack of potable water, variable and unseasonal rainfall, prevalent hunger and lack of infrastructures are some threat posed by environmental deprivation and ultimately impinge on human security. Furthermore, environmental calamity like climate change, deteriorating of plants, flood, and desertification could easily affect the production and livelihood. Therefore, these difficulties are the risks against human security both at individual and social levels.

There is serious controversial concern over the relationship among human well-being, environmental degradation, the potential for conflict and human security (Mathew, et al., 2010). As stated in the back ground of the study, environmental degradation could affect and further exacerbates the human insecurity and being a major threat in *Erob Wereda* is not peculiar. Thus, failing to meet some basic human needs, shortage of arable land, diminishing of production, high population migration, health related risks, economic misery and social disruption are some of the main challenges for the *Erob* community (IMLZ, 2007).

In order to substantiate with other related findings, this study made an effort to review the existing literatures and serious researches which focused on environmental degradation and the related problems standing against human security. Accordingly, there are few research findings related to environmental change and human security. To list some of them are; the impact of conflict and environmental degradation on human security Michael, (2012) and climate change, human security and violent conflict Barnett and Adger, (2007). International migration and its effects on socio economic wellbeing of migrant sending households: evidence from *Erob Woreda*, Eastern Zone, Tigray Regional State Bisrat, (2014). The effects of cross border irregular migration on human Security: the case of *Erob Wereda* eastern Tigray, Ethiopia Geberejwergis, (2015).However, the finding of Barnett and Adger, (2007) is mostly stressed on single environmental problem i.e. climate change, that recognizes climate change which has direct and indirect impact on fueling conflict and affects for human security but they fail to encompasses environmental degradation and the different environmental challenges, that so lacks eclectic conclusion. Furthermore, finding of Micheal, (2012) is generally focused on relationship of the environmental degradation and conflict concluding their relation is influencing each other. He states that conflict could exacerbate environmental degradation, pose risk for human security and vice versa. Therefore, his argument is based on the premise of conflict. Nevertheless, it does not recognize in the absence of conflict in clear and precise manner, the effect of the environmental degradation on the human security. Concerning to Bisrat, (2014) he did not raise the relation of environmental problem and human security rather he mentioned environmental challenge has negative effect on international migration. Similarly Geberejwergis, (2015) pointed that environmental challenge as a cause for irregular migration but none of them deals about the effect of environmental degradation on human security. Therefore, there is a lacuna in knowledge that the research strives to investigate thoroughly this gap.

More surprising is also, the absence of any research in the *Erob Wereda*, until recently, regarding the effects of environmental change on human security. Coming to the study area, it is experiencing high rates of desertification and deforestation causing serious environmental challenges such as continual droughts, water scarcity and land degradation are the main threat to human security. Concomitant with this, the *Erob* people are entirely depending on different scarce resources to lead for their livelihood. As a result, the level of environmental degradation in this area was severely affects human security exposing such as persistent drought, extreme

poverty, low level income and poor agricultural production, water scarcity. Unemployment, diminishing of arable and grazing land, high rate of population migration, disruption of family life, household hostility, social instability and starvation are significantly the major threat of *Erob Wereda* caused by environmental degradation.

In addition, the effects of environmental degradation on human security, in Tigray Region specifically in *Erob Wereda* have not addressed. Being basically ignored by scholars and other researchers the contemporary issue i.e. environmental change is harshly affecting the socio-economic, food, personal and health security of the *Erob* people (IMLZ, 2007). This challenge against human security, particularly in the study area there is a clear gap in knowledge which is, not properly addressed.

1.2. Objectives of the Study

1.2.1. General Objective

The overall objective is to study the effects of environmental degradation on human security with the special emphasis on food, economic, health, social and personal security of the people of *Erob Wereda* of Eastern Tigray.

1.2.2. Specific Objectives

- To explore the basic causes of environmental degradation in *Erob Wereda.*
- To analyze the effects of environmental degradation on human security with the special emphasis on food, economic, health, social and personal security of *Erob c*ommunity.
- To identify the awareness level of *Erob Wereda* people concerning about the effect of environmental degradation on human security.
- To point out the measurement taken by government and public in minimizing of environmental degradation.

1.3.Research Questions

- What are the basic causes of environmental degradation in *Erob Wereda*?
- What are the effects of environmental degradation on human security with the special emphasis on food, economic, health, social and personal security of *Erob* people?
- What is the awareness level of the *Erob Wereda* people concerning the effect of environmental degradation on their human security?

- ❖ What governmental and public actions are undertaken to overcome the environmental degradation?

1.4. Scope of the Study

The study is delimited to the effects of environmental degradation on human security with the special emphasis on food, economic, social and personal security of *Erob Wereda* of Eastern Tigray. In addition to this the effects on family and the society are also part of the study. The study acknowledged the broad and multiple basic concepts of environment, environmental degradation, environmental pollution and human security as well as their relationship. In line with this, the concept of human security is mainly focused on environment, food, economic, health, social and personal security of environmental degradation in connection to the risks and threats emerged from environmental hazardous. This study present in detail the effects of environmental degradation on human security of the *Erob* community; driving forces of environmental humiliation of the study area and even out of the area will discuss; awareness level of the society regarding the adverse effects of environmental degradation are also component of the study. Furthermore, the study also covers the government and societal actions in combating environmental degradation as well as the contemporary trend and future prospects of the environmental degradation in *Erob Wereda*. In terms of geographical coverage, the study is delimited to *Erob Wereda*.

1.5.Significance of the Study

Recently, environmental degradation is directly or indirectly a major threat against human security particularly in economic, food, and environment, health and personal senses if so in the future unless mitigated at rudimentary level. It has also adverse impact on the environment dependent community. It is also a threat to the whole world since currently the world environment is polluted and contaminated which is danger for living organisms specially to human-beings. Therefore, investigating of the problem and searching of sustainable remedy for the major against human security is one task of academic institutions such as Institute for Peace and Security Studies (IPSS). This study seeks to mitigate challenges of environmental degradation that have affected human security. Thus, as an additional contribution to the few

works that had been already done on the general spectrum of the environmental degradation, this study can served as one of the basic materials for researchers. Lastly, the research can be also basis for policy references of the *Wereda* administration and community and other scholars who want to do further research on this contemporary pervasive issue.

1.6.Ethical Considerations

According to the manual of the APA (2010), there must be ethical and legal principles which guide all research and scholarly works. As a result of this, from the beginning up to the final doing of this study the social researcher were followed ethical guidelines and rules in order to not to contravene with the costumes, traditional and cultural values and obligations of the community under investigation. Succinctly, while conducting the field study, the researcher was taking due care of rules on ethical issues. Data collection was adhering to the willingness of source generators. With respect to the secondary sources, the study appropriately acknowledged and duly notifies the work of other researchers.

1.7.Organization of the Study

This study is organized in to five chapters. The first chapter is about the back ground of the study, statement of the problem, general objective, specific objective, research questions, and scope of the study, significance, ethical consideration, and organization of the study. The second chapter deals with literatures, theories and concepts. Chapter three also present research methodology, design, and method of data collection, analysis and limitations of the study. Besides, chapter four also present data findings and analysis of the obtained data. The fifth chapter provides summary and brief conclusion along side of the suggested recommendations. At the end list of reference materials used for conducting the study, interview and FGD guide lines, participants and the environment of the study area are annexed.

CHAPTER TWO

2. Review of Related Literature: Conceptual and Theoretical Framework

This chapter looks in to some related literatures concerning the conceptual definitions, meanings and theoretical frameworks associated to the broad spectrum of the effect of environmental degradation on human security. For the appropriateness of the study, this section encompasses environmental degradation associated concepts and literatures that related with human security. In relation to the central objective of this study, all the published and unpublished books are reviewed and investigated.

In short, this chapter deals with the results and findings of other studies that are very closely related to the topic of this study. It provides framework a benchmark for triangulation and intensification of the results of this study with other familiar findings.

2.1. Conceptual Definition

The main conceptual definition is related to, some significant key terms and phrases to be included in this study. To mention some of them are environment, environmental degradation, pollution and environmental related issues such as environmental security and climate change. Here, the conceptual framework of environmental degradation and human security is also discussed.

2.1.1. Conceptualizing and Defining of Environmental Degradation

2.1.1.1. The Subject Matter of Environment

Literally, the word environment is derived from the French word "*Environ*" which means the "surrounding". Basically, it includes biotic factors like human beings, plants, animals, microbes, etc and abiotic factors such as light, air, water, soil, etc. Environment is a set of many variables, which surrounds man as well as the living organisms. Environment includes water, air and land and the interrelation ships which exist among and between water, air and land and human beings and other living creatures such as plants, animals and micro organisms (Alam, 2010). Accordingly, the environment consists an inseparable whole system constituted physical,

chemical, biological, social and cultural elements, which are interlinked individually that could affect the development and survival of all species particularly to human beings(Mersie, 2008).

The issue of the environment is increasingly becoming a focus and great concern of the world leaders, human security schools, environmentalists, stakeholders, and the general public. Such great concern has led to the organization of high profile conferences and summits geared towards addressing the horrifying implication of the unsustainable use of the world natural resources. This change of attitude can be adduced to a number of factors. Firstly, human beings are increasingly realizing that threats from environmentally induced problems are as serious as nuclear threats if not more serious. Secondly, they are also beginning to realize that the conventional conceptualization of security which equates it with military induced threats is fast becoming dependent on the environment. Hence, there is need to broaden the scope of security to include environmental related issues as these have been found to be the underlying causes of most regional conflicts that eventually developed to be a global problem and threat (Sagay et al.,2011).

2.1.2. Classification of Environment

Environment can be classified in many ways based on various factors. It is also clear that; environment can be divided in to social, political, literary and school environment based on the specific contexts. However, based on the process of its creation or evolution of the environment is classified in to two broad categories. These are: natural environment and human-made environment (Gunter, 2002).

2.1.2.1. Natural Environment: It includes, all living and non-living things that occur naturally on earth. It comprises the nature of the living space such as land, sea, soil and water. It also includes the chemical constituents and physical properties of the living space, the climate, and a variety of organisms *(Ibid).* It also includes both biotic and abiotic components as these have been evolved through a natural process. The creation of these components has been done by nature, and not by any human intervention or support. It is true that human beings live in an environment where both biotic and abiotic factors influence them and they learn to adapt themselves to these in several ways. However, human beings have no role to play in the creation and evolution of natural environment (*Ibid*). So, one basic idea in this case, environment determines human being.

2.1.2.2. Human-Made Environment: this refers to all those things which are created by humans for their use. Human beings construct these surroundings, as these are needed for providing the required setting for human activity. These things could range from the large-scale civic surroundings to personal places. For example, houses, roads, schools, hospitals, railway lines, bridges and parks are components of human-made environment. (Duraiappah, 1996).

2.2. The Concept of Environmental Degradation

Different scholars, institutions, researchers and environmentalist define the meaning of environmental degradation based on their analysis in different ways. As a result of this, there are various meanings of environmental degradation. Nevertheless the researcher makes endeavor to review the relevant literatures which are suitable to the study.

Defining environmental degradation poses a much more difficult task. Literally, environmental degradation is the deterioration of the natural environment through human activities and natural process. According to the International Strategy for Disaster Reduction environmental degradation is the reduction in value of the environment to meet its ecological and socio-economic needs. It includes issues such as land degradation, deforestation, desertification, loss of biodiversity, land, water and air pollution, climate change, sea level rise and ozone depletion (UN, 1997; Duraiappah, 1996).

Conceptually, environmental degradation refers to a situation of declining resources of a given environment. It is the process or a situation of depreciation in quantity and quality of the resources of the environment such as air, water resources, mineral resources, land, flora and fauna, as a result of harsh climatic factors, pollution and/or unsustainable exploitation by man *(Ibid)*. In general, the environment provides all life support systems of every human society. These life support systems are built and sustained by the natural resources found in air, land and water. These resources include fresh/safe water, fish, arable land, plants and animals, mineral resources, air, are among others. These resources often come in variable quantity and quality. Therefore, human exploit these resources for survival and sustenance. The misuse or over-use of these resources affects their quality and quantity in comparison with their pristine availability in the environment. Therefore, the issue of environmental degradation comes into play when these

resources diminish in quantity and quality that become a serious challenge to human security (Onuoha, 2008; Spillman and Bacher, 1995).

One notable implication of environmental degradation for social existence is that it usually disrupts the socio-economic life of the human population who are immediately dependent on natural resources for sustenance (Harte, 2007). In most social contexts where there are weak regulatory mechanisms in a society, it can exacerbate the level of competition amongst the dependent population, and may engender conflicts, tensions and destabilizes security.

Thus, issues like deforestation and desertification, the result of an ever increasing population in search of land for food and energy, which logically leads to the destruction of the food generating capacity of rural areas and intensifies resource competition and accelerates the movement of people to urban centers, fueling social upheaval, should as a matter of fact enter into the conventional analysis of political instability (Sagay, 2011).

The problem of environmental degradation has attracted local, national and global attention. While international environmental concerns are usually couched in broad terms like climatic change and desertification, the environmental problem of concern to local settings and vulnerable groups is generally localized in nature, revolving around immediate issues that threaten their livelihood and survival. Examples include deterioration of rangeland, deforestation, degradation of topsoil, inappropriate disposal of waste, depletion of fresh water, pollution of air and water systems, and animals facing extinction. These problems directly or indirectly could impact on human well-being. For example, declining soil fertility leads to poor crop yields while rangeland depletion reduces animal productivity, and any deterioration in water quality adversely affects the fish fauna that worsen food security (*Ibid)*.

2.2.1. Factors Behind of Environmental Degradation

Concerning the causes of environmental degradation is multifaceted. There are various causes of environmental degradation which overlap with each other. This means causes of environmental degradation are difficult to separate independently rather they are interdependent with each other.

Societies everywhere are closely and inextricably linked to the natural environment in which they are embedded. Human productive, social activities, social structures and their relations are shaped

to a significant degree by the natural resource mix available, by physical geography, weather patterns, the amenability of natural conditions to transformation, and by a variety of other characteristics of the environment (UNRISD, 1994).

It is true that healthy environment is essential for the very existence of human society and other living organisms. But now a day, environmental degradation is going on unabated and become top agenda at international level. The deterioration in the environment has its negative consequences like global warming, changing climatic conditions, impending water crisis, decreasing fertility of agricultural land and increasing health problems. Having this scenario, environmental degradation can be caused by various and compounded factors. It can be natural or man-made factors. The following are some basic factors focused on man-made issues while the natural cause has its own impact (Alam, 2010).

2.2.1.1. Social Factors

The following are the basic causes for environmental degradation that can be taken as social factors;

Demographic Factor: Population growth is a frequently cited culprit of environmental change. Population is the greatest resource of any country and a major contributory factor for development, and yet it is a major cause of environmental degradation. Rapid population growth has led to the excessive utilization of natural resources. Huge population also, leads to huge production of wastes. The resultant outcomes are loss of biodiversity, pollution of air, water and soil and increased pressure on arable land. All these have been putting great stress on the environment (Malthus, 1798; Bremner, et al., 2010; Suhrke, 1993).

As aforementioned, overcrowded population started encroaching into the foothills for more cropland and into the high mountains for grazing, hence degrading these fragile marginal lands. Growing people led to cut down the trees to build more shelter and opened up more croplands exposing these fragile marginal lands to further degradation. These cycles were repeated, resulting in deforestation and overgrazing, and leading to complete devegetation of the areas. Therefore, as it rained on bare steep slopes, soil erosion set in. The steep slopes and generally rugged terrain exacerbated the erosion process (Donohoe, 2002).

Africa, Asia, and Latin America environment is more affected by overpopulation. As a result challenges are include poverty, impaired access to reproductive health care services, and the social, legal, educational, economic and political marginalization of women (*Ibid).*

2.2.1.2. Economic Factors

Agricultural Development: agricultural development is so important for any country. But this has been affecting the environment adversely. Various kinds of farming activities especially directed towards increasing agricultural production have a direct impact on environment. These activities have been contributing to soil erosion, land salination, alkalization and loss of nutrients. For instance in India, the green revolution has led to over exploitation of land and water resources. Extensive use of fertilizers and pesticides has been a major source of contamination of water bodies and land degradation (*Ibid*).

Urbanization: large number of poor people moves from villages to towns, cities and mega cities to earn their livelihood. This has led to unplanned and rapid expansion of cities, creating enormous pressure on the infrastructural facilities (Donohoe, 2002).

Industrialization: rapid industrialization has been the foremost contributor to environmental degradation. Most of the industries adopt the technologies that place a heavy load on environment. These technologies lead to intensive use of resources and energy. The current pace of industrialization therefore is resulting in the depletion of natural resources like fossil fuel, minerals and timber, and contamination of water, air and land. All these are causing immense damage to ecosystems and leading to health hazards (*Ibid*).

Natural causes: are natural disasters occurs by natural phenomenon for instance, earthquake, tidal waves and storms are some among others that have direct or indirect impact on human life (Urdal, 2008).

2.2.2. Environmental Degradation in Ethiopia

As many scholars and researchers argued that, environmental degradation is very extensive and wide in Ethiopia. But not all areas of the country are equally suffering. Both the extent and severity of the problem manifest spatial variations depending on difference in forest, relief, ecology, rainfall, land use, land cover and soil types. For instance, land degradation in Ethiopia is

common especially severe in the highlands where the average soil loss from farmland is estimated to be 100 tons/hectare/year (FAO, cited in Audgnaw, 2014; Christina et al., 2012; Shibru and Kifle, 1998).

The above idea stated that the amount of soil erosion and land degradation mixed with deforestation and desertification become a major threat to rural peoples and resources dependent societies. It poses economic deprivation, food shortage and health related risk and challenges.

Basically, environmental degradation in Ethiopia replicated in the form land degradation, deforestation and degradation of water resources as well as loss of biodiversity. Some forms of land degradation are the result of normal natural processes of physical shaping of the landscape and high intensity of rainfall. The scale of the problem, however, dramatically increased due to the increase in deforestation, overgrazing, over cultivation, inappropriate farming practices, and increasing human population. Removing vegetative cover on steep slopes (slopes ranging between 15 and 50 percent) for agricultural expansion, firewood and other wood requirements as well as for grazing space has paved the way to massive soil erosion (Adugnaw, 2014).

Environmental degradation in Ethiopia threatens physical and economic survival as well as human security. It reduces the environment's ability to produce biomass for food, feed and household energy and consumption. It also undermines prospects for fighting poverty, famine and achieving sustainable development. On the other hand, poor people are often blamed for environmental degradation. However, where poor communities are degrading the environment through unsustainable practices, it is often the case that they have been denied the opportunity to access goods and services that promote their use of resources in sustainable ways (UNEP, 2008).

Generally, Ethiopia is a country where natural resource degradation has been going on for centuries. At the present time it is facing a serious ecological imbalance which hampered human life triggered mainly by the fast increment of its population size (Shibru and Kifle, 1998). This has led to a destructive cycle of land use pattern, involving deforestation followed by continuous cropping and grazing with little or no investment on the soil. This pattern leaves few opportunities for the natural vegetation to regenerate, making the land more susceptible to

erosion, affecting the hydrological cycle and altering the regimes of the rivers ultimately affect for human security. Changing this situation calls for better management of the natural resources including putting appropriate policies and regulations in place to facilitate better environmental management(Shibru and Kifle, 1998).

2.3. Environmental Degradation and other Related Topics

2.3.1. Environmental Security

The challenging of traditional security paradigm i.e. narrow perspective by using the environmental sector has as one of its main outcomes for the emergence of the environmental security concept which is highly related with the environmental degradation (López, 2000).

Accordingly, many definitions of environmental security exist in the world as one part of human security. Like Rita (2008), environmental security explains as “the freedom from environmental destruction and resource scarcity often in the form of the consequences of environmental disaster and diminishing.”

Environmental Security (ES) can be defined as, the relationship to established security and sustainability of those environmental factors such as land, water, soil, vegetation, climate, and whatever others are prime components of a nation's environmental foundations that ultimately underpin all our socio-economic activities and hence our human and political stability (Myers, 2002; Ranjan, 2011).

Contrary to the above paragraph, environmental insecurity is a state or condition in which the environmental becomes a threat to individual, community, or national welfare and survival in case of degradation, stress or scarcity. Individuals and communities become environmentally insecure when they have limited or no access to the very resources (e.g., agricultural land, pasture, fuel wood, and water) from which they derive livelihoods or when the land fails to produce enough to enable a family to survive (Mersie, 2008).

The absolute or relative lack of access to resources and increased vulnerability breeds insecurity that can eventually result in food crisis, migration and conflict. However, neither the abundance nor the lack of access to resources, nor the misuse of resources, results directly and automatically in societal conflict which hurdle human security. It is rather the perception (accurate or not) and

actual feelings of threat, insecurity, and hopelessness arising from deprivation that trigger and cause conflict (*Ibid*).

2.3.2. Climate Change or Variability

It is clear that, environmental degradation can impact in seasonal and variable climate conditions which have negative effect on human security Barnett and Adger, (2007). Due to this reason, over the last three decades, climate change has emerged as a concept and a reality with strong socioeconomic ramifications. The United Nations Framework Convention on Climate Change (UNFCCC) announced that climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is, in addition to natural climate variability, observed over comparable time periods. Human activity in general can be seen as the main cause of climate change leading to wide- ranging and complex effects (Lozet and Edou, 2013).

Worldwide, climate change risks making the most volatile places even more combustible as a result of environmental stress and disruption. It injects a major new source of chaos, tension, and human insecurity into an already volatile world. It threatens to bring more famine and drought, worse pandemics, more natural disasters, more resource scarcity, and human displacement on a staggering scale. Climate change has harmful effects on agriculture, settlement patterns, natural disasters, disease, and economic activity more generally; many have begun to speculate about future scenarios and potential human impacts. Different scholars, policy planners, and activists have suggested that climate change will exacerbate resource scarcity, create mass population dislocations and ultimately fuel violent conflicts (Ellen, 2010; Salehyan, 2008).

Climate change is not an isolated phenomenon, but can be better understood as a web of interlinked issues from melting glaciers, natural disasters, rising sea levels, floods and droughts to health and economic deterioration. Understanding these complexities and the variability of climate change today is crucial for any adaptive and mitigation strategies. This is especially the case in vulnerable regions across the world. The current environmental challenges of Sub-Saharan Africa, aggravated by climate change trends, may become a source of future environmental insecurity leads to social and political conflict and pioneered human insecurity (*Ibid*).

According to Environmental Justice Foundation (EJF) (2014), climate change poses a major threat to both human and national security. The UK government has described climate change as potentially constituting the greatest challenge to global stability and security, and therefore to national security and ultimately put a risk for human security.

Africa is considered the most vulnerable region in the world in terms of climate change because of its physical and socioeconomic characteristics. Sub-Saharan Africa includes the mixed arid, semi-arid systems in the Sahel, arid to semi-arid rangeland systems and coastal areas of eastern Africa, and many of the drier zones of Southern Africa. A large part of the population is engaged in subsistence agriculture and farm marginal lands under rain-fed conditions with relatively limited access to productive assets, inputs, technology, and services. Because of the fragility of its economy and poor environment Africa is disproportionately affected by adverse effects of climate change which depressed human security (Ndaruzaniye et al., 2011).

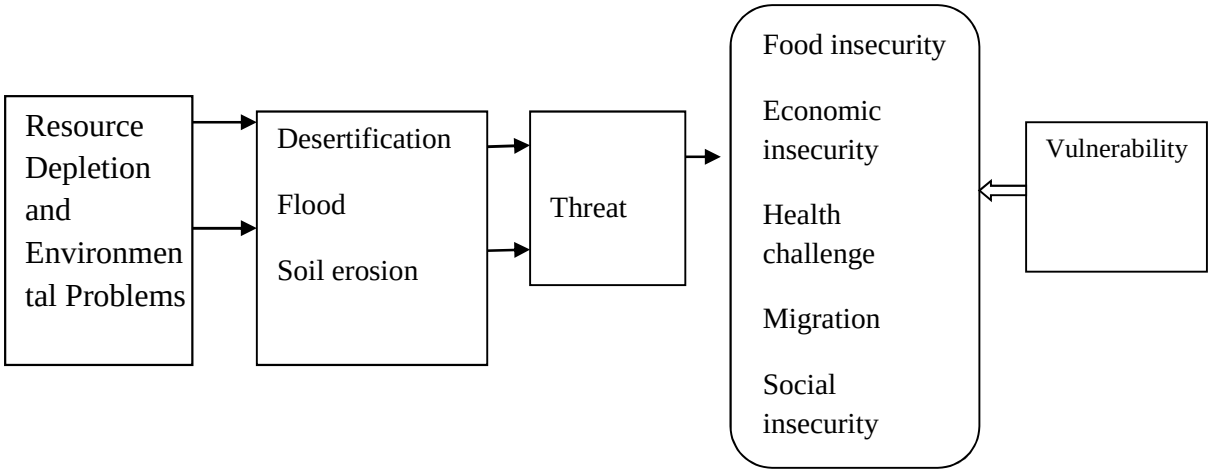
In Africa, climate models warn especially about changing rainfall patterns and their immediate impact on grain yields, runoffs, water availability, and the survival of plant and animal species. Long-term changes in the patterns of temperature and precipitation, that are part of climate change, are expected to shift production seasons, alter productivities, and modify the set of feasible crops. Where these impacts encounter limited adaptive capacity and unsustainable resource management practices, the consequences are wider and more persistent food insecurity. Currently, most African countries are net importers, with over 50% and between 25 and 50% of the food requirement of North Africa and sub- Saharan Africa imported (Messer, 2010; Barnett and Adger, 2007).

Eventual climate change is increasingly referred to as a “security threat” associated with political destabilization, which undermines state capacity to cope in response to severe weather, flooding, drought and land degradation, or other climate-related changes. Anticipated and unanticipated long-term climate cycles involving shifts in the winds and the rains, which are known to have occurred in antiquity, and to have brought with them environmental, economic, social, and political disruptions and put pressure on human security (Issar cited in Messer,2010; Petter, 2011).

2.4. Environmental Degradation, Threat and Vulnerability

Underprivileged environment poses various and legion threats to human life. In this expression, the environment, threat and vulnerability nexus plays a vital role in proving that degraded environment is a real human security threat and broaden vulnerabilities. In this condition there are two aspects that illustrate this nexus which are very significant. First, ecosystem integrity is crucial for the population‘s sustainable livelihood. Therefore, certain environmental conditions often resulting free from environmental change, such as pollution, overutilization, depletion, or natural disasters can not pose an acute threat to security (Ranjan, 2011). Secondly, environmental degradation reinforced by climate change work together to increase an individual‘s vulnerability and threat. Moreover, currently environmental issue is linked with international security as it becomes evident that national solutions to environmental problems would not be sustainable in the long-run without international cooperation (Lars and Ruth cited in Ranjan, 2011).

Figure 1: A Conceptualization of Links of Environmental Change, Threat and Vulnerability



Source: Derived from Brown et al., (2008).

2.4.1. Some Experiences of Environmental Degradation Induced Conflicts in Africa

The African continent is facing a series of interconnected environmental and economic challenges which, if not resolved, will disrupt the basic life support systems, contribute to the degradation of institutional structures and perpetuate environment and underdevelopment. Evidence from soil scientists, agronomists, meteorologists, and economists indicates that continued overuse of biological systems and environment can set in motion changes that are self-reinforcing. Each stage of deterioration hastens the onset of the next. When destructive change is

coupled with rapid population growth and subsistence economies, the stage for human tragedy is set (Shibru and Kifle, 1998; Michael, 2012).

Indeed, in many African countries, including IGAD member countries, land occupies a central place in cultural and political history, social organization, and the economic well-being of the population. Fertile land and adequate water are associated with socio-economic stability, while declining soil fertility, fragmentation of farm lands, lack of or limited access to land resources, and drought easily threatens people's socioeconomic existence and human security. In turn, this means more insecurity and more tension. Indeed, many grievances, family and societal disputes, court cases, and conflicts are associated with the scarcity of arable land in particular and the environment in general (Diamond, 2005).

Current environmental challenges of Sub-Saharan Africa may be a source of future environmental insecurity leading to social and political conflict and ultimately hinder human security. With a changing environment and resources such as water becoming scarcer, there is a risk for greater competition over natural resources.

Many IGAD member countries experience environmentally induced conflicts in one way or another that affects thousands of human lives. For example, at the outset of the 1990s, (Hutchison cited in Diamond, 2005) argued that the conflict in Somalia, which rendered the country stateless, was the continuation of a 100-year-old movement of major Somali clans South-ward into agricultural areas from nomadic grazing areas that have been becoming more and more overpopulated and unproductive. The competition and search for scarce resources have resulted devastating effect on human security posed by totally diminishing of the resource due to destructive conflict (*Ibid*).

According to University for Peace (2004), revealed that in Sudan, mechanized large-scale commercial farming and ranching projects in the early 1980s displaced peasants and pastoralists, bred confrontation, and contributed to the civil war. According to this institution suggested that, global warming and resulting desertification as major causes of the conflict between Janjaweed pastoralists and Darfur farmers. In its post-conflict assessment study of Sudan, expresses that there is a strong linkages among land degradation, desertification, and conflict in Darfur. It

argues that exponential population growth and resulting environmental stresses created conditions for conflict and threat for human security nurtured by ethnic politics (Ejigu, 2008).

Similarly, in Kenya also has seen environmentally induced conflicts. For example, in the North rift and Northeastern regions, the competition to control and access to natural resources such as pasture and water, land issues, and increasing levels of poverty, along with other factors like diminishing role of traditional governance systems, have caused and triggered violent pastoralist–pastoralist and pastoralist–cultivator conflicts that endangered human security (Pkalya et al., 2003).

In Northern and Southern part of Ethiopia, the contraction of dry season grazing land in particular has been the source of violent armed conflicts among herders and farmers in Borana (the Oromo located in southern Ethiopia close to the Kenyan border) and Somalia Zones. These conflicts have been aggravated because of the deteriorating of environment associated with other factors (Forsyth and Schomerus, 2013).

2.5. Emergence of Environmental Problems as a Threat to Human Security

Environmental change reveals the connections as well as the frictions between the security of individuals and communities. It also makes down the security and sustainability of ecosystems and species, including humanity. The broad field that is known as environmental security studies emerges from the intersection of two powerful political concerns for security and for the environment (Richard, 2010).

Since the late 1960s, the idea that environmental change is a cause of violent conflict has become increasingly popular in academic and policy circles. However, the relationship between environmental change and conflict has been a major theme of security studies only since 1989 when at least ten articles on the subject were published. The year 1989 was significant in both international security and global environmental politics that recognized environmental change is new threat to human security (*Ibid*).

The environment and security movement was born from a deepening public concern in the late 1960s and beginning of 1970s over environmental degradation and pollution. This growing environmental awareness resonated against the nerve-wracking backdrop of Cold War

uncertainty and the real-time televised violence of the Vietnam War. The OPEC oil crisis in the 1970s fuelled the debate over the political ramifications of disputes over scarce resources and the ecological carrying-capacity of the earth. Meanwhile, the toxic chemical gas leak in Bhopal in 1984 and the 1986 nuclear meltdown of Chernobyl, to pick just two examples, graphically illustrated the environmental dangers of a modern changing economy (Brown, et al., 2008).

The growing realization of the importance of environmental degradation has emerged repeatedly in many international conferences on human and his environment as result of miserable consequences on human security. The United Nations Conference on Human Environment convened in Stockholm in 1972 and the first of its kind on the issue of the environment brought into focus the realization that the environment has limited assimilative and carrying capacity and that control measures should be instituted to safeguard the environment for quality of human life. The Earth Summit in 1992 (20 years after the Stockholm 1972 conference) had environmental degradation as one of its major themes. One of the main functions assigned to the Governing Council of the United Nations Environmental Programme is to keep under review the world environmental situation in order to ensure that emerging environmental problems receive appropriate and adequate attention by government of member states (Essam and Manzur, cited in Agyemang, 2013).

In the1990s, scholars and security experts began to rethink the concepts of security and peace in order to incorporate environmental variables into their analysis. At about the same time, international development institutions began to put in place programs and projects that frame environment and development within the context of security and peace. As a result of such a convergence of perspectives, in natural resource-dependent economies, including IGAD countries, security and peace-building have been increasingly linked with the process of managing competition over scarce natural resources, notably agricultural land, pasture, water and environmental degradation in general(Mersie, 2008).

It was also two years after the publication of the influential World Commission on Environment and Development's report Our Common Future, when planning for the landmark 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro was well under way. This led to a flood of information about climate change, biodiversity loss, deforestation, and land degradation, with much of it channeled into preparatory studies and

reports. These initiatives resulted in considerable political and societal attention to issues of environmental change in the early 1990s influenced for human security (Richard, 2010).

At about the same time of the release of the UNDP *1994 Human Development Report* with its listing heralded that environmental change as one of the seven main threats to human security; similarly the work of (Homer-Dixon 1994; 1999) conceptualized and documented the strong link between environmental degradation, conflict, and societal survival. Homer-Dixon identifies three ways that humans cause "environmental scarcity." The first, which he referred to as “supply-induced scarcity,” arises from the decreasing quality and quantity of renewable resources at rates higher than they are naturally renewed. The second, “demand-induced scarcity,” refers to increased population growth or per capita consumption, while the third, “structural scarcity,” relates to environmental scarcity arising from unequal access to resources. These three sources of environmental scarcity operate singly or in combination to create conditions for political instability and conflict which destabilized human security.

The World Summit in 2004 that took place in Johannesburg, South Africa, was purposed to assess the outcome of the declarations of the Earth Summit and the possible implementation of the Agenda 21 by member states. Despite these efforts to safeguard the natural environment and prevent further environmental degradation and the depletion of natural resources, there is still unprecedented global increase in environmental and related problems evident as new face to human security (Zhao cited in Agyemang, 2013).

2.6. Theoretical Framework: Theories of Environmental Degradation and Human Security

2.6.1. Theories of Environmental Degradation

Apparently, there is no single, coherent and dominant theory of environmental degradation, rather arguments and point of view taken from the dominant theories of international relations and other social sciences as well as fragmented set of theories often segmented by few academic disciplanries from economic perspective. Moreover, the theories are broad and wide which talks more ideas about various concepts. However, the researcher made endeavor only to present the arguments of the theories what they portray regarding of environmental degradation.

2.6.1.1. The Neo-Malthusian Theory

According to this theory, environmental degradation is diminishing of resources when there is population growth throughout the world. It suggested that high fertility rate and population growth lead to ecological overshoot, in terms of over cultivation, excessive use of fertilizer, desertification and soil erosion. As a result of these problems agricultural production would be diminished and environmental degradation is inescapable (Shandra, et al., 2003).

Malthus envisioned an impending doomsday scenario where excessive human population growth would overtax a limited supply of natural resources (Malthus, 1798). He argued that agricultural production grows geometrically and arable land is finite while population growth is exponential. He hypothesised that as human numbers grew, food supplies would be insufficient to feed humankind and human numbers would be pushed back below the carrying capacity of agricultural systems by "positive and preventative checks." Positive checks would encompass increases in mortality due to outbreaks of disease, famine, higher infant mortality, malnutrition, and war. Preventative checks would include lowering of fertility through delays in marriage, contraception, abortion, and infanticide.

Therefore, according to this theory, population growth due to high fertility may exacerbate resource scarcity in areas where a large proportion of the population already relies on natural resource-based livelihoods including, agriculture, grazing, forest products, and fishing for income and subsistence on marginal lands and less productive natural ecosystems. In clear manner, high population growth resulted sever environmental degradation and pollution which hamper human security.

2.6.1.2. The Resource Scarcity Model

According to the politics of scarcity model, scarcity may develop into huge environmental degradation. When there is restricted access to vital non-renewable and renewable natural resources such as land, coal, water as well as food overutilization and depletion is inescapable. Thomas Homer-Dixion is representative of this school of thought (Homer-Dixon 1991, 1994). According to (Homer-Dixon, 1999) decreases in the quality and quantity of renewable resources, population growth, and unequal resource access act singly or in various combinations to increase the scarcity, for certain population groups, of cropland, water, forests, and fish. This can reduce economic productivity, both for the local groups experiencing the scarcity and for the larger

regional and national economies. The affected people may migrate or be expelled to new lands. Migrating groups often trigger environmental problems when they move to new areas, while decreases in wealth can cause deprivation conflicts.

The fundamental ideas of this model is that, resource scarcity is the product of an insufficient supply, too much demand or an unequal distribution of a resource that forces some sector of a society into a condition of environmental deprivation and over utilized. These three sources of scarcity are in turn caused by variables such as population growth, economic development and pollution. Thus, environmental resource scarcity will constrain agricultural and economic productivity, further inducing the disruption of economic livelihoods, poverty and migration. As a result of this desertification, degradation and lose of soil quality could be prevalent (Onuoha, 2002:286; Urdal, 2008).

2.6.1.3. The Environmental Kuznets Curve

Basically this approach is elaborated by Russian American Harvard economist, Simon Kuznets, the curve is a graphic representation predicting that as countries underdevelopment and societies become poorer, the pollution per unit of production will increase. According to this model, environmental degradation will increase because money becomes unavailable for developing countries to spend on environmental mitigation. In short this theory insisted that, economic backwardness and impoverishments of society will inevitable to lead to environment degradation and overuse since no other opportunity is existed (Carvalho, 2012).

2.6.1.4. The Neoliberal Perspective

For this theory, claiming that environmental degradation is not a by-product of economic growth, rather being a phenomenon directly related to poverty. At a World Bank meeting, economists have publicly stressed their concerns regarding the relationship between the environment and poverty: “A world free of poverty is critical for the long-term effect of the planet. The struggle of the poor to survive is a core cause of problems such as deforestation, desertification, and unsanitary water. The poor exhaust nearby natural resources, such as fresh water, seafood, and

wildlife. They cultivate unsuitable land to grow food and earn income. And they despoil local environment and waterways with rubbish and sewage (*Ibid*).

2.6.1.5. The Dependencies Theory

According to this theory environmental degradation is occurred due inimical policy of the external and international factors exerted on the developing countries. It argued that various unequal international economic linkage, multinational corporations and foreign direct investment posed by the neo-liberal sentiments are the basic factors of environmental problems (Shandra, et al., 2003).

Dependencies argue that straight forwardly, one of the major consequences of the worldwide shift towards neo-liberalization since the 1980's is the significant increase in environmental degradation and marginalization. Both at a local and global level, the introduction of neoliberal economic policies have been placing considerable stress upon the environment (Carvalho, 2012).

For dependencies theory, capitalist world systems perpetuate the global environment and distorted and undermined local environment. The overexploitations of natural resources are caused by unbalanced economic relationship of the developed countries with the developing. The influence of capitalist system resulted in diminishing of environmental resources and depletion (Shandra, et al., 2003).

Explicitly this theory argued that developed countries, social movements in regards to the environment have for long exerted a restraining influence on governments and corporations, the status of the environment as an issue on developing country agendas remains significantly modest. Ever-growing global economic activity, enhanced by neo-liberalization, directly affects the environment (Carvalho, 2012; Bremner et al., 2010).

2.7. Human Security

2.7.1. Human Security as an International Issue

The concept of human security was elaborated on the basis of empirical research conducted after the end of the post-Cold War period. Respect for sovereignty was shaken by too many examples

where states themselves became perpetuators of insecurities, not only failing to fulfill their obligations toward their subjects but threatening their very existence (Tadjbakhsh, 2005).

With the end of the Cold War in 1990, the study of international security added a new dimension. New conceptions of security i.e. human security considered that the traditional notion of state-centric security, typically defined by military aspects, was insufficient to explain emerging threats *(Ibid)*. As an alternative to the conventional understanding of security affairs, human security discourse incorporated poverty, environmental problems and intra-state conflict as threats to an individual‘s life. Thus, the security discourse experienced a shift from traditional to nontraditional security. The traditionalists, backed by political realism, define security in terms of power (Brinkestam, 2014). In realism, security is closely linked to the military capability of a state. This state-centric and conventional concept of security has been challenged by the post-realist security scholarship. This is the reason why redefining the concept of national security has been a prime target of numerous research agendas since the 1980‘s. Non-traditional security is a significant shift from the conventional idea of security to a new paradigm of security that includes poverty, environment, health and social instability as threat factors (Ranjan, 2011).

As argued by the Commission on Human Security (CHS, 2003), the need for a new paradigm of security is associated with two sets of dynamics as follows below:

First, human security is needed in response to the complexity and interrelatedness of both old and new security threats from chronic and persistent poverty to ethnic violence, environmental challenge, climate change, health pandemics, international terrorism, and sudden economic and financial downturns. Such threats tend to acquire transnational dimensions and move beyond traditional notions of security that focus on external military aggressions alone and become sufficient reason to bear the concept of human security.

Second, human security is required as a comprehensive approach that utilizes the wide range of new opportunities to tackle such threats in an integrated manner. Human security threats cannot be tackled through conventional mechanisms alone. Instead, they require a new consensus that acknowledges the linkages and the interdependencies between environment, development, human rights and national security.

The first departure statement for human security was appeared in the 1994 Human Development Report, an annual publication of the United Nations Development Programme (UNDP).

2.7.2. The Concept of Human Security

To begin with, there is no unanimous definition of human security. It is contested, huge, growing and often confusing which has been referred to in various terms: as a new theory or concept, as a starting point for analysis, a world view, a political agenda, or as a policy framework. Although, the definition of human security remains an open question, there is consensus among its advocates that there should be a shift of attention from a state-centered to a people-centered approach security that concern with the security of state borders should give way to concern with the security of the people who live within those borders (Tadjbakhsh, 2005; Brinkestam, 2014; UNESCO, 2004; 2008). Essentially, human security is about creating the conditions or conducive environment for individuals, peoples and communities to live in 'freedom from want' and 'freedom from fear'. The first refers to the absence or protection against hunger, natural disaster, torture and so on. The second refers to the opportunities that individuals should have to develop their potential as much as possible and to enjoy life to the fullest (Bajpai, 2000; Langenhove, 2004).

The simplest definition of human security is absence of insecurity and threats. To be secure is to be free from both fear (of environmental, physical, sexual or psychological abuse, violence, persecution, or death) and from want (of gainful employment, sustainable environment, food, and health). Human security therefore deals with the capacity to identify threats, to avoid them when possible, and to mitigate their effects when they do occur. Human security is defined as: first, safety from such chronic threats as hunger, disease and repression. And second, it means protection from sudden and hurtful disruptions in the patterns of daily life whether in homes, in jobs or in communities. Virtually any kind of unexpected or irregular discomfort could conceivably constitute a threat to one's human security. Such threats can exist at all levels of national income and development (UNDP, 1994: 23; Tadjbakhsh, 2005).

The CHS (2003), in its final report, defined human security as:

> *"To protect the vital core of all human lives in ways that enhances human freedoms and human fulfillment. Human security means protecting*

> *fundamental freedoms – freedoms that are the essence of life. It means protecting people from critical (severe) and pervasive (widespread) threats and situations. It means using processes that build on people's strengths and aspirations. It means creating political, social, environmental, economic, military and cultural systems that together give people the building blocks of survival, livelihood and dignity."* (CHS: 2003: 4)

In brief manner, UNDP human development report (1994) more specifically, human security can be understand in seven main elements in which they are interdependent and inseparable each other. To mention: Economic, food, health, environmental, personal, community, and political security. Economic security requires jobs to secure an assured basic income. Food security means that all people at all times have both physical and economic access to basic foods. Health security is to provide healthy environment and health services to meet the challenges of poor nutrition, infectious diseases, and so on. Environmental security is concerned with lack of access to clean water, deforestation, salinization, air pollution and natural disasters. It also includes early warning and response mechanisms for natural hazards or man-made disasters at all levels. Personal security is to protect human lives from threats of various kinds of violence by states and environmental risks. This includes categories like crimes, industrial and traffic accidents, threats to women, abuse of children. Community security is about threats like oppressive practices and ethnic clashes in traditional communities. Political security means the protection of human rights and democratization, civil and political rights, and freedom from political oppression.

2.8. Theory of Human Security

2.8.1. The Human Security Approach

Human security approach differentiates itself from traditional state-centric approaches by putting the individual as the referent object of security, thus basing its definition of security on human-centric arguments (Brinkestam, 2014; Buzzan, 1983).

The human security approach argues that threats and challenges to security transcend national defense, and law and order to encompass all environmental challenges, political, economic and social issues that guarantee a life free from risk and fear. The focus has shifted from the State to the security of persons (Karim et al., 2004; Buzzan and Waever, 2003).

The human security approach insisted that the nature of the threat stems from the dangers of long-term environmental degradation, such as global warming, ozone depletion, species extinction, pollution of air and water, and loss of biodiversity which are non-violent in character have direct and indirect impact on individual and human security (Rita, 2008).

In effect, human security approach is about creating and enhancing access, protection and empowerment of people and individuals to the material or quantitative dimensions of human existence, i.e. environment, food, shelter, clothing, education and health care; and the non-material or qualitative conditions of human existence, i.e. freedom, liberty and participation in the decisions of the community that affect their lives (Langenhove, 2004).

This approach concentrates on direct threats emerged from environmental challenges affects to individuals' safety and to their physical integrity such as abject poverty, food inadequacy, water scarcity and health related problems. This broad approach is adopted by the UNDP, by the Government of Japan, and by the Commission on Human Security (2003) and concentrates on threats, both direct and indirect, both objective and subjective, which come from environmental insecurity and under-development. The broad approach insists on integrated solution for multifaceted issue raised from environmental threats (Tadjbakhsh, 2009).

According to this approach, environmental nuisance and degradation are the basic threat of individual, families, communities and at climax level to national and global. For instance, destructive loggings of forests, overgrazing and over-cropping of arable lands are the few. This may be extended to include oil exploitation, industrialization, improper disposal of domestic solid waste and human excretal including liquid waste, over-utilization of non-degradable materials for packaging among others. Political, economic, social threats are posed by environmental threats, which are the main threat to human-being which intensifies human insecurity (Kesiena, 2009).

2.9. Nexus of Environmental Degradation and Human Security

Even though there are various and complex meaning of human security, but for the sake of this study and its delimitation, the basic focus of the study is concomitant with the effects of environmental degradation on human security emphasized on economic, social, food and

personal security which are the basic elements of human security. Therefore, it is vital to look at literatures pertinent to the correlation of environmental degradation and human security.

Traditionally, the realist understanding of security does not include the environment as a matter human security threat. However, post-realist scholars do include the environment as an important security concern (Ranjan, 2011). The challenging of the traditional security paradigm narrow perspective by using the environmental sector has as one of its main outcomes the emergence of the environmental security and relation with aspects of human security (López, 2000).

Different scholars stated that environment is basic cause for conflict, war and perpetuates human security hence competing for scarce resources and unevenly distribution is inevitable. But there are also many opponent scholars like Alan Dupont cited in (Ranjan, 2011) argues that environmental difficulties are unlikely to be the primary cause of major conflict between states and societies. However for the convenient of this study the first idea i.e. environmental degradation have direct and indirect influence upon human security will consider.

With the end of the Cold War in 1990, the study of international security added a new dimension. New conceptions of security i.e. human security considered that the traditional notion of state-centric security, typically defined by military aspects, was insufficient to explain emerging threats. As an alternative to the conventional understanding of security affairs, human security discourse incorporated poverty, environmental problems, and intra-state conflict as threats to an individual‘s life (Gasper and Gómez, 2014).

Environmental factors such as water, soil, vegetation, climate, and whatever others are prime components of environmental foundations are degraded or otherwise depleted, so our human security declines too(Ranjan, 2011). This idea pointed that reduction of environment has direct or indirect effect on human security which threats food, economic and health security of individuals.

Environmental change reduces economic opportunities for a country by causing demographic displacement within states and across international borders. An unexpected movement of population across the international border raises political tension between neighboring countries. Environmental stress can also cause an affected sub-national group to shift its allegiance from the centre to the periphery, increasing the possibilities of political disorder, civil strife, and even insurgency. The deteriorating of environment due different causes will lead to economic

deprivation, food insecurity and social instability. Economic deficiency, water scarcity, shortage of arable and grazing land led to decreasing cattle breeding and finally to poverty and famine (López, 2000).

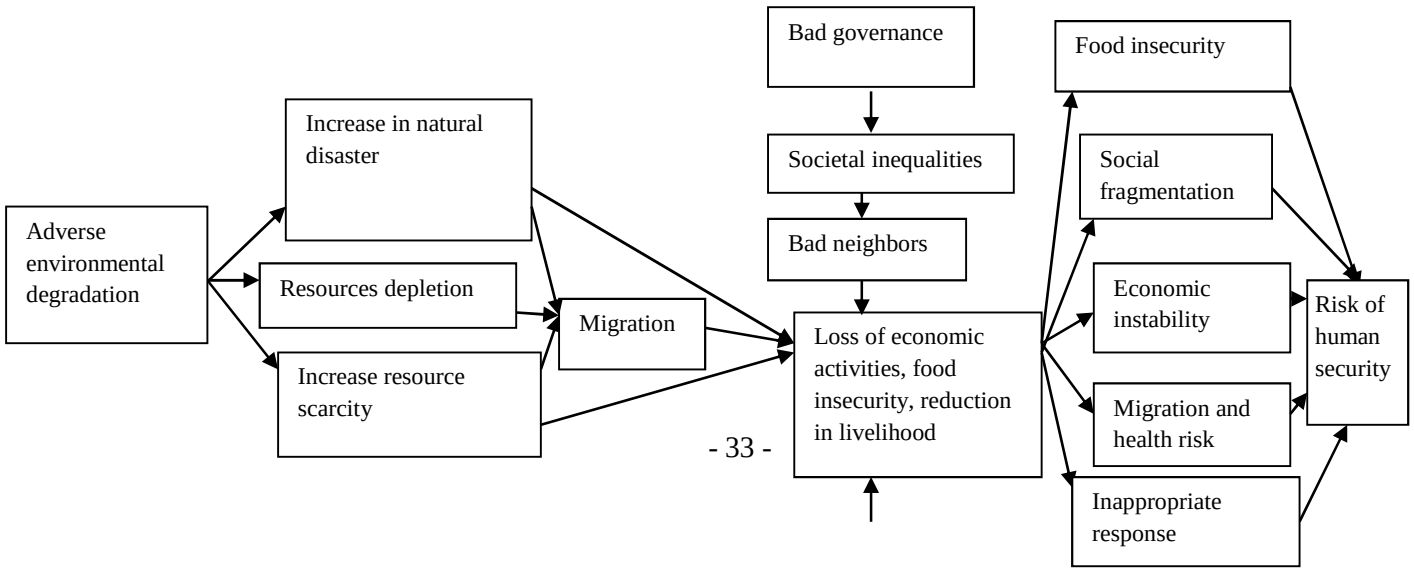
Environmental threats are linked to their overall impact on human survival, well-being and productivity in other words, aspects of human security. Human beings and social relationships become the objects, or preferably subjects, that are to be secured from environmental threats not states (Khagram et al., 2003).

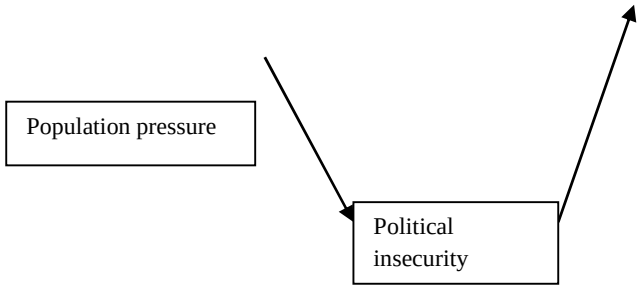
As aforementioned, it is clear that human security and environmental protection are mutually dependent. On the one hand, the depletion of natural resources undermines livelihoods, increases vulnerability to disaster and puts human security at risk and vice versa(Adano and Futama, 2012).

Single environmental threat can potentially have adverse effects at multiple scales from the household to the planetary. While many environmental problems are localized, others are widespread and trans-scale in nature (i.e. climate change). Finally, all these types of impacts also have a temporal dimension. Environmental change can have a significant impact on the lives of people today which could also extend into the future to impact the lives of generations to come. Protecting and enhancing the environment can have very positive consequences for people's livelihoods, well-being and opportunities for fulfillment (*Ibid*).

An environmental change hampers individual security by affecting livelihoods and promotes transnational security crises for states and regions. Hence, environmental degradation is a significant threat to human security for both at individuals and nation-states level (Ranjan, 2011).

Figure 2. Link of Environmental Degradation and Human Security





Source: Derived from (Halvard, et al., 2008)

CHAPTER THREE

3.1. Research Methodology and Design

To achieve the objective the study used mainly qualitative approach with limited/supplement quantitative approach owing to the effects of environmental degradation on human security with special emphasis on economic, food, health, social and personal security of *Erob Wereda.*

The rationale behind using such mixed approach methodology is derived from the fact that investigating the effects of environmental degradation on human security needs a multi-disciplinary approach. It also reduces the limitation of applying single methodology and appreciates philosophical foundation of the study with both pragmatic perspectives. In addition, the advantage of employing qualitative and quantitative methods in research is to getting

recognition among researchers. It also enables to take advantage of deeper insight of the study when used in combination. Moreover, the more effective evaluation research is the one that combines qualitative and quantitative components.

As (Hancock, 2002; Berg, 2001), qualitative approach is concerned with developing explanations of social phenomena. It seeks to describe various aspects about behavior and other factors studied in social science and humanities and seek to answer questions about why, how and in what way. The study used qualitative approach intentionally to capture the informants' idea on causes and effects of environmental change on human security. Besides, qualitative approach is concerned with the opinions, experiences and feelings of individuals to produce subjective data.

As aforementioned, qualitative approach is associated with studies that do not attempt to quantify their results through statistical summary or analysis. It typically involves in-depth interviews, group discussions, and observations without formal measurement. In addition, the impact of environmental degradation on human security is better to describe and understood in words than numbers.

Concerning to the qualitative research design, the study used phenomenology as one approach of qualitative research inquiry in which the phenomenon under investigation is best when understood and narrated thoroughly by the people who have lived and affected. Hence, it is significant to the objective of the study since it strives to explore and describe as a phenomenon.

Lastly, the study used quantitative approach to limited extent to fill the gap of qualitative method and generate quantitative data so as to explain reported results such as the amount of people affected by the issue; percent coverage of natural resources, amount of degradation and current availability resources in number. Thus, limited quantitative data was taken to show statistical size of land, bushes and water resources. Most of the collected quantitative information was triangulated to strengthen and substantiate the information gathered via in-depth informant interview and secondary sources.

3.1.1. Sources of Data

The study used both primary and secondary sources to generate appropriate data. The central focus of this study is *Erob Wereda*. Most of the data required to answer and validate the study

questions were collected from primary sources accompanied with secondary sources. So, primary sources were collected from the farmers and households who live in *Erob* specifically the more affected and vulnerable areas of that *Wereda.* Accordingly, data was collected mainly from the local peoples that have different role like the experts of environmental conservation and protection, farmers who work on rehabilitation and preserving of natural resources, victims of environmental degradation and local authorities who are responsible for environmental issues via in-depth informant and key informants interview.

Secondary sources were collected, from official documents and relevant related literatures via prudently and careful analysis. Cognizant, with these secondary sources were also include journals, academically relevant books and documents, monographs, published and unpublished documents and internet sources.. Finally, the researcher was triangulated, schematized, analyzed and present the data depending on their nature and convenient to the study.

3.1.2. Sample Size and Sampling Techniques

According to Dawson (2002), sampling is selecting or taking of some number of people to contact in the research, not possible to contact everyone population. So due to, the difficulty to cover all population in this study the researcher was select 55 participants for in-depth informants' interview, key informant interview and focus group discussion

For Berg (2001), purposive sampling which is non-probability sampling is also known as deliberate sampling. Therefore, to select the participants the researcher used purposeful/judgmental sampling technique. This type of sampling techniques is appropriate to access easily the participants and collect data. From the 55 participants the researcher was categorize 16 participants for in-depth informants interview, 14 participants for key informants interview which represent different relevant classes of society and the remain 25 participants are for focus group discussions which were conducted in *Erob Wereda* from three *Tabias* (namely *Alitena, Endalgeda,* and *Wera'atle*).

3.1.3. Data Collection Instruments

To collect convenient and relevant first hand data, the researcher used various instruments of data collection. Depending on the adopted methodology, significant data collection tools were

developed and subsequently used to gather information from primary and secondary sources of data. The methods were In-depth Informants Interview (III), Focus Group Discussions (FGDs), Key Informants Interview (KII) and personal observations. Semi- structured interview having open ended were employed. Employing such different data collection tools could help the researcher to reinforce, triangulate and substantiate the obtained data from the different sources of information.

3.1.4. In-depth Informants Interview (III)

The researcher used extensively in-depth interview to gather deep and profound first hand information from the informants. In this condition semi- structured interview was conducted for 16 participants mainly concerned with environmental degradation and human security. Basically, the participants were smallholder farmers, natural resources dependent households and local residents. The interview question was translated from English to local language Tigrigna to be clear and understandable to the participants. During the interview time the researcher had explain the objective of the study to the participants and respect the status and privilege of the informants.

3.1.5. Focus Group Discussions (FGD)

As stated in the above, data collection instruments, the researcher also used focus group discussions to gather reliable information from the local community thus, this encouraged and stimulate dialogue and discussion among the group members in vis-a-vis of the objective of the study. FGD were conducted to enrich the first hand data obtained through interview. Accordingly, the researcher conducted three focus group discussions (FGD) in three *Tabias* (namely *Alitena, Endalgeda,* and *Wera'atle*), each having 8, 8 and 9 participants so as to collect qualitative information concerning the effect of environmental degradation on human security in *Erob Wereda*. In developing each group the researcher was try to consider sex, social status and age for ensuring of fairness of the discussants and arranged based on these factors. This method was facilitated to gather primary information regarding the thinking and perception of the community on threat of human security i.e. environmental degradation. The role of the researcher in the group discussion was as a moderator help to follow their ideas and feelings. The researcher also poses the questions such as causes, factors and effects of environmental degradation on their

life and security. The mode of communication was Tigrigna language which is common in the study area though their indigenous language is *Erob.*

3.1.6. Key Informants Interview (KII)

Key informants interview were conducted with 14 informants that have different positions and responsibilities related to the issue of environmental degradation and its effect on human security. The informants were consisting of *Wereda* and *Tabia* officials, local household works in environment and natural resources, local authorities and communities. In addition, rural agricultural agents, concerned bodies of environmental protection and natural resources are encompassed.

3.1.7. Personal Observations

Having the valuable information obtained from the participants in different ways now, the researcher also gathered data from the nature of the environment, the existing socio-economic conditions, perception and attitudes of the society towards environmental degradation and carefully attend how the residents are suffering from this challenge since the researcher is proximate and know the problem. Thus, the researcher made a field trip to the area and critically grasps the nature of environment as well as its impact on the people's life that can be valuable and supportive information.

3.1.8. Analysis of Secondary Sources

Specifically, this tool was used to gather secondary data. For that reason, the researcher reviewed and gathered necessary and appropriate sources from available documents of relevant books about environmental degradation, challenge, deterioration and human security from research, study reports of various institutions and organizations. Related books of environmental degradation nexus human security have critically analyzed.

Table1: Summary of the Total Participants of the Study Reached During the Primary Data Collection Process

Data Collection Methods	Informants /cases (No.)

In-depth Informants Interview	16
Key Informants Interview	14
Focus Group Discussions	25
Total	**55**

3.2. Method of Data Analysis and Interpretation

Primarily, analysis is very significant stage where the raw data is cooked to produce organized information there by valid conclusions and recommendations of the study are made. Thus, in doing this task the researcher categorized and schematized both secondary and primary sources in to they belong. Consequently, qualitative data were organized, summarized and interpreted by the researcher manually, which then employed exhaustively qualitative description of analysis such as discourse analysis, description, citation and narration of the informants and theoretical analysis of events via creating themes. Besides, using limited quantitative interpretation, quantitative data is examined in descriptive statistics like tables, frequencies, percentages and averages related to frequency of environmental degradation to strengthen and support the qualitative description of analysis.

3.3. Limitations of the Study

The following are some limitations of the study;

1. Reluctance of some respondents in giving information during interview time.
2. Some ill -feeling and fear of some *Wereda* workers not to expose their bad governance.
3. Geographical challenge of the *Wereda* to the researcher while doing in data collection from *Tabia* to *Tabia*.

CHAPTER FOUR

4. 1. Data Presentation and Analysis

Contextually, this chapter dedicated to data analysis and interpretation. The data collected from informants, through in-depth interview, key informants interview, FGDs, personal observation and document analysis are presented and analyzed pertinent to the objective of this study. Though, this chapter dwells mainly on primary data, which has been collected via the selected methods, however relevant findings of related studies have also taken to substantiate and enhance the triangulation and analysis procedures of the study. Thus, most of the data required to answer and validate the research questions were gathered from primary sources.

Concerning the content, this chapter mainly focuses on the effects of environmental degradation on human security, especially on economic, food and health security of households, family and society in the study area. Besides to this, driving forces of environmental degradation of *Erob* community; awareness level of society regarding the effects of environmental degradation on human security; in case of food security and availability, economic livelihood and health condition are included. The governmental and societal measures to minimize or fully combat environmental degradation and risks, the contemporary trend as well as future prospects environmental sustainability of *Erob* community are also discussed. As a context, before dealing with these central objectives of the study, let as first describe the environmental situation, demographic character and socio- economic situation of the study area in detail.

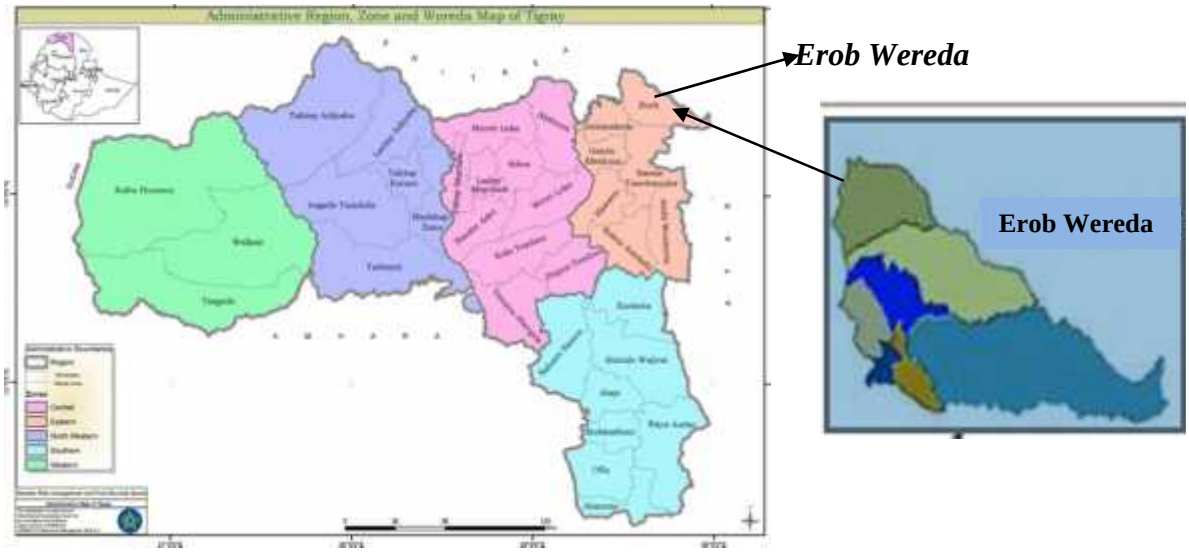
4.1.1. Description of the Study Area (*Erob Wereda*)

4.1.1. 2. The Study Site Selection

Erob Wereda is one *Wereda's* located in Eastern Zone of Tigray Northern Region which is in Northern part of Ethiopia, nearly 1003Kilometres North of Addis Ababa. This *Wereda* is named after the *Erob* people, who constitute predominant one ethnic groups living at the eastern escarpments of the Ethiopian highlands bordering the Afar Region to the South ward. *Erob Wereda* is particularly situated in Northern tip of Eastern zone of Tigray National Regional state, its center being 42 Kms far to the North East of *Adigrat*. It is surrounded by *Gulomekeda Wereda* in the West, Eritrea in the North and North East, Afar National Regional State in the East as well

as *Sae-sie Tsa'eda Emba Wereda* in South. Its absolute location properly lies between $14^0 7'$ to $14^0 10'$N latitude and $39^0 30'$ to $40^0 00'$ E longitude. The capital city is, *Dowhan* which is situated at162km north of the Tigray Regional administrative capital city Mekelle (IMLZ, 2007).

Erob Woreda is selected as focus of this study for many reasons. First, there is frequent and continuous environmental degradation there which severely affect food, health and economic security of the inhabitants and people (*Ibid)*. Second, it is prolonged drought-prone area, where agriculture based livelihood strategies are proving to be insufficient due to the recurrent drought and infertile land. Besides, rugged topography of the area and lack of infrastructure facilities along with the no-war-no peace situation between Ethiopia and Eritrea have hindered the non-farm and off-farm activities. As a result, environmental harm becomes pervasive threat to human security in that area. The real consequences of environmental degradation on households security, is however, not systematically investigated. The other factor is the social researcher's familiarity with and prior knowledge of the study area, which in turn, helped to capture the information easily.



Source: http://WWW.dppc.gov.et/downloadable/map/administrative/2005/Tigray.pdf

Retrieved on March, 1, 2016.

4.1.2. Topography and Agro-Ecology

While its altitude consists the lowest in *Endeli*(1200m) and the highest in mountain *Assimba* (3249m) above sea level, *Erob* includes *Kolla, Woina dega* and *Dega* climatic zones. The area is mostly dominated by a rugged topography and dust bowl. The *Woreda* office of agriculture and rural development data shows that the annual temperature and rainfall range from 12 to 30^0C and 250 mm to 300 mm respectively. *Erob Woreda* has an area of 128.71km^2 (IMLZ, 2007).

4.1.3. Administrative Structure and Demographic Setting of the Study Area

According to *Erob Wereda* PSNP data of 2012, *Erob Wereda* has total population of 31,031 scattered in 7 *Tabias* namely: *Ara'e, Alitena, Endalgeda, Hagere Lekuma, Harze Sebaeta, Wera'atle and Endamos* and 28 *Kushets.*, with respective proportion of 51.38percent and 48.62percent of female and males as well as an average annual growth rate of 2.5percent. Regarding the religious composition of the study area, as (Bisrat, 2012) pointed out that Orthodox *Tewahdo,* Catholic, and Muslim take 55.6 percent, 42.3 percent and 2.1 percent respectively.

4.2. Socio-Economic Profile of the Study Area

4.2.1. Livelihood

The main economic activity of the *Erob* community is livestock production particularly for the lowlanders and agricultural cultivation for the highlanders. Thus, the main economic life is depending on subsistence agricultural production and cattle breeding. As Bisrat (2014), *Erob Wereda* is one of the 31 drought-prone and at the same time one of 22 drought prone and chronically food insecure *Wereda* in Tigray Regional State. He further mentions that animal husbandry coupled with limited crop production make the main economic activities of the study area, states the inadequacy as follows; still due to erratic nature of rainfall, protracted drought and environmental degradation both livestock and crop production in the district are significantly low there happens to be an intricate lock-step relationship among rapid population growth, lack of non-agricultural sectors of employment, including landless labor, environmental degradation and resultant resource depletion, and growing poverty and food insecurity.

Erob Wereda has for ages, suffered from low agricultural production due to its prolonged environmental degradation, topographic unsuitability, further restrained by rain fed nature of the agricultural practice and recurrent drought. Even *Erob Wereda* terrain would be suitable for livestock (cattle's and shoats) production as well as bee keeping as the products of these activities; mainly butter and honey have very high demand in the zonal and regional markets. These practices too are again hampered by the recurrent drought and variable rainfall (*Ibid*).

The Ethio-Eritrean war is another cause, in which *Erob* community's livelihood bases mainly, livestock resource (cattle, shoats and beehive) were destroyed irreversibly. Generally, the agricultural production has been dropping while there is no or little on/off farm activities. On the other hand, the current "*no-war no-peace*" scenario has closed other potential inward economic windows in the surrounding areas (*Ibid*).

4.3. An Overview of the *Erob* Environment

The landscape of *Erob* is mainly stark rugged mountains and hills, particularly spanning the *Dega, Woina dega* and *Kolla* altitudes. Notable geographical features of the *Wereda* are *Assimba* and *Ayga* mountains. The area was previously covered with dense forest but the continuous deforestations over the last 30 years has left the place only with sparse forestry, cactus and bush scrub. Temperature reach maximum of 12 -30°c while, mean annual rainfall is 250 to 300 mm during the rainy months of June and August, nevertheless characterized with high irregular rain from year to year (IMLZ, 2007).

There is a severe shortage of farm and cultivatable land, as, the terrain is quite mountainous and has many cliffs. Farmers in this *Wereda*, held an average of 0.19 hectares of land but the available land for crop production is very limited since the area is more of mountainous and hills. To supplement the available cultivable land, residents also cultivate on the beds of small seasonal rivers. Agriculture is 100% dependent on summer rains which occur between the months June and August. But the rainfall is very inconsistent and variable. The main crops grown are barley, wheat, maize and pulses. The soil is not fertile because of the igneous, metaphoric and sandstone geologic land formations. Most residents try to enhance soil fertility by using animal manure and compost, while very few farmers use artificial fertilizers. Further, the Ethio-Eritrea war fought between the periods 1998-2000 and the subsequent military

presence of the Ethiopian troops in the area has degraded the sustainability of the environment and affected the amount of productivity of the land (Bisrat, 2014; Gebrejwergis, 2015).

Substantial in-depth informants have pointed out that, *Erob* is a drought prone *Wereda* that has historically suffered from acute and chronic food insecurity, regardless of rainfall patterns. Drought, desertification/deforestation, have unanimously affected the area war with Eritrea, over ploughed of land, infertile soil, inadequate rainfall, naked and rugged mountainous are the main features of the environment. The geographical difficulties such as abyssal, terrible terrain and the rift valley affected for *Erob* community not to expand infrastructure, market and water availability. Therefore, the combination of man-made and natural environmental problems and hazards threaten and impeded the economic well-being and environmental sustainability of the *Erob* community. Frost and hail are also such intermittent calamities that occur occasionally in *Erob Wereda* which are shocking as the sedentary people for life existence of their cattle's and even personal security (Gebrejwergis, 2015).

4.4. Major Factors for Environmental Degradation in the *Erob Wereda*

For Alam, (2010; Adugnaw, (2014); Christian et al., (2012) environmental degradation can be caused by various and compounded factors. Generally, it can be categorized under two main factors with various sub categories. The main causes are man-made and natural causes. The man-made factors occur with different features combined each other for instance social, economic and cultural aspects while, the natural factors happen beyond the control of the society. In broad way, land degradation coupled with desertification, deforestation, soil erosion, over exploitation, over grazing, climate change, inappropriate use of resources; water scarcity and rapid population growth are the main environmental problems that occurred prevalently. More specifically, the main causes are man-made factors which take the largest ratio even natural factor have its own role.

From theoretical perspective, resource scarcity model is best approach that can elaborate the causes of environmental degradation in *Erob Wereda.* According to this theory, scarcity may develop and aggravated environmental degradation. When there is restricted access to vital non-renewable and renewable natural resources such as forest, cropland, coal, and water as well as food utilization, depletion of environment is inescapable (Homer-Dixon 1991, 1994). In short

explanation, limitation and strained of natural resources lead to massive environmental deterioration and pollution.

According to all participants of key and in-depth informants, *Erob* environment is scarce and limited in case of cultivable, grazing land, fertile land which has no source of water; scarce of flora and forests which heightened massive environmental degradation that threatens each household. Indeed, the resource scarcity model is suitable theoretical idea that pertinent to what is happening in *Erob* as cause of environmental degradation.

More importantly, almost all participants illustrated that, the scarcity and strained quantity of natural resources led to vast environmental degradation and pollution. This means the concept of resource scarcity is best model that can illustrate in *Erob Wereda* as major cause.

In the same vein already stated, interviewed key informants and the document accessed from the *Erob Werda* reveal that, the basic causes of environmental degradation are depletion of forests and degradation of farm and pasture land (Adugnaw, 2014; Christian et al., 2012) pointed. Similarly, according to respondents the causes are related with the man-made factors such as land degradation, weak soil fertility and erosion, deforestation, desertification, erratic rainfall, climate change, traditional plough on steep areas, the 1998-2000 of Ethio-Eritrea War, expanding of infrastructures without compromising of the environment prospect and persistent drought albeit, there is no universal agreement among the respondents regarding of sole cause of environmental degradation. So from this view it is important to know there is no mono-causal of environmental degradation. Having this scenario, as the respondents view and some reviewed documents reveal that the main causes of environmental degradation in *Erob Wereda* are discussed below;

4.4.1. War

Laconically, all in-depth informants demonstrated that the 1998-2000 Ethio-Eritrea war which were battled in *Erob* has drastically change the environmental situation for further degradation and declining of quality.

As Mwanki cited in Tsegay, (2009; and Michael, (2012) notes war, conflict and civil strife are some causes of environmental degradation. With this line, key informants and focus group

discussants have divulged their knowledge it seems that that *Erob Wereda* was comparatively with some bushes/forests and plants which covered the area before the devastating effect of Ethio-Eritrea War on the environment particularly the *Alitena Tabia* that was the battle. However, after the waging of war all the forests were cleared severely for military purpose to build military camps, for transporting of military weapons, clearing wood for cooking food of soldiers and materials with huge military truck that annihilated the nature of environment and become easily sensitive to degradation. The key informants and focus group discussants also further stated the impact of war on the environment in this condition.

> *The war was not only impacted in deforestation and land degradation but also put a scar on the environment not comfortable for reforestation and planting new forests which aggravated still for continuous environmental degradation*. (Quoted from Focus Group Discussants Narrated in Tigrigna Language but Translated in to English Language by the Researcher, February, 2016).

A study by Bisrat, (2014) also intensifies the effect of Ethio-Eritrea War on the environment that results destroying of forests, environmental pollution due to explosion military weapons which are inimical to the land surface, soil fertility and losing of biodiversity. In general, he put vividly the war destructed the environmental condition which impacted on organisms and human well-being. The landscape was wrecking and it totally almost changed the terrain of environment which becomes easily susceptible to deforestation, massive soil erosion and depletion of biodiversity.

Picture 1: Source Gebregwergis (2015) Military Presence of the Ethiopian Troops and their Camp in *Tabia Alitena*

4.4.2. Deforestation, Persistent Drought and Inconsistent Climatic Change

According to in-depth informant's interview stated that, the main causes of environmental degradation are very complicated and mutually dependent as Alam, (2010) also refer. In line with this, the informants disclose that, the vivid causes are pervasive drought, deforestation and desertification. Since *Erob* society is peripheral it does not have opportunities to use modern energy therefore the only energy to use for daily consumption is environmental resources irregularly. For instance, cooking of food and building of houses is completely depending on forests and for firewood in case of fuel, charcoal and other livelihood activities inconsistently that contributed for vast deforestation. Even there are wider cultural ceremonies like marriage and *Tezcar* the only resource used for cooking and building tent is from forests. Besides to this, the other major cause according to the discussants is the frequent drought which combined with climate change and variation that disclose in this manner;

> *Throughout every year we received only a week or two week consistent rainfalls during the summer peak months July and August at about 140mm unless irregular rainfall come that is pernicious for our crop production, environment moisture and moisture. So due to, this shortage or destructive of rainfall the environment becomes dearth even we plant every year it does not grow rather disappear and even we participate in building cheek dams in the bare environment though drought mostly influence for our environmental humidity. Nonetheless, our environment is dry, waterless, arid, dust bowl and desiccated that exacerbated declining the quality of soil fertility and dwindling of forests. Besides to this, our climate is also seasonal and variable which can observe in high temperature, dry wind and irregular condition that resulted shortage of rainfall. In short way, these three causes are usually occurs jointly or separately that have profound effect on environment*. (Quoted from Focus Group Discussants Narrated in Tigrigna Language but Translated in to English Language by the Researcher, February, 2016).

According to Ndaruzaniye et al,.(2010), bolstered the above view of discussants, climate change will likely lead to substantial changes in precipitation patterns, including more infrequent droughts, floods, and storms which have direct and indirect impact on environmental diminishing. Similarly, some participants added that extreme wind fluctuation, high temperature and unconditional weather have contributed for environmental degradation.

4.4.3. Expanding of Agricultural Land and Infrastructure

Some key informants insist that, over exploitation of arable land, traditional way of farming which increased loss of soil fertility and erosion are major causes of environmental degradation. They further insist that, soil is eroded due to monsoon and dry wind coupled with huge vehicles assigned to construct *Adigrat-Erob* road. In this issue the researcher observed that, constructing road become one cause for the deteriorating of environment because the contractors are escalated for degradation by machineries to complete the road in short period of time for business profit without compromising and considering environmental sustainability. To recapitulate, the reckless and hasty actions of the contractor strongly impede the environment of *Erob* which further create loss of upper soil and water sources.

With regards to expanding of infrastructure, one key informant points in this case;

> *The contractors come to build roads, but they did not consider the fate of environment rather aggravated deforestation, soil erosion and open another way for further degradation. In short, their impact is overlooked and there is no critical assessment. There is no cooperative work with the environmental experts of Wereda since they are reluctant regarding of environment management. Finally, expanding of arable land and infrastructures collectively has large impact on disturbance of environmental conditions and emergent disasters.* (Quoted from Key Informants Narrated in Tigrigna Language but Translated in to English Language by the Researcher, January, 2016).

Similar to the above idea (Adugnaw, 2014), summarizes practices of cultivation that exacerbate the problem of soil erosion in Ethiopia is as a result of agricultural activities and expanding of infrastructures have their own impact on environment.

4.4.4. Flood

According to Suhrke, (1993), flood has been one of the natural causes of environmental degradation. Heavy and unseasonal rainfall degraded the fertile soil. It makes mountains and hills to remain without forest and soil. During heavy rainfall, the rain comes down to plain areas from the hills and slopes. The water level of the rivers and rivulets increases. With the increase in population, the problems of deforestation, soil erosion and overgrazing arise. It makes soil weak. The land cannot absorb the rainwater. It also helps the flood to rise. The flood transports the soil from the naked hills it also transports the alluvial and fertile soil. Consequently, problem of soil erosion and land slide increases in which environmental degradation occurred.

In much the same vein with the idea, key informants and in-depth informants interview substantiate that in *Erob Wereda* heavy and irregular rainfall occur intermittently which the flood flow from maintains and hills speedily cleared away all the external and internal nutrients of land surface such as fertile soil, forests and aridity of sources of water. The flood also exacerbated contamination of soil, deforestation and which distorted drought hardiness of the environment. Moreover, key informants and the in-depth informant's interview further elaborated the severity of flood on the environment in this situation;

> *We are always afraid of unconditional rainfall because its disadvantage exceeds than its advantage on the environment. Sudden heavy rains can change the environment into destructive torrents within short period which washed thousand hectares of farmland. The flood damaged our environmental resources like fertility of arable land, forests are totally cleared, it smash and crack the land surface which resulted land slide, it destroy cereals, potentiality of the land to sustain its components like moisture and become easily vulnerable for extreme temperature due to naked and bare environment. It also washes well of water, dyke and diminished the grazing land that contributed for environmental bankruptcy.* (Quoted From Key and In-depth Informants Narrated in Tigrigna Language but Translated in to English Language by the Researcher, January, 2016).

More importantly key informant added that, some natural causes have like hurricanes and awesome storm have occurred intermittently which have deleterious effect on the environmental hospitability.

4.4.5. Population Growth

As Shandra, et al., (2003; Cesar, (2013); Giessen, (2011) underscore fast population growth is fundamental agent for environmental degradation. In the same view, key informants also demonstrated that, demographic factor is one basic cause of environmental degradation in *Erob*. The ever increasing of population over the limited cultivable land aggravated the reckless exploitation of resource which consequence severs environmental pollution and humiliation. Rapid pace of population growth has led to the excessive utilization of natural resources. When this cause is critically taken in to account from the theoretical aspect, it is very close to the neo-Malthusian perspective. This perspective claimed that accelerated population growth exerted pressure on the environment and in the over-stretched recourses. Thus, annual growth rate of 2.5percent of *Erob* population over the scarce and limited (less than 0.18 hectare per family) led to eventual environmental stress.

Source: (Shandra, et al., 2003).

4.4.6. Poverty

The multidimensional nature and meaning of poverty is widely recognized, but for the significant of this study; it limited on income and consumption which remain the most common measurements of poverty. According to Bremner et al., (2010; Myers, (2002); Adugnaw, (2014); Bisrat, (2014), poverty is major cause for environmental degradation. On marginal lands rural poor often find themselves pushed to over-exploit the existing natural resource through low-input and low productivity agricultural practices such as deforestation, overgrazing, and soil-mining, which contribute to land degradation. Impoverished people feel driven by their plight to overwork their croplands, to clear forests and cultivate dry lands and mountain slopes for additional croplands, all of which trigger soil erosion and other environmental ills.

For UNRISD, (1994) also vindicated poverty as, main cause of environmental degradation since the poor are forced into marginal resource areas: they are driven out of the best agricultural lands, for instance, into fragile and unproductive ecosystems. In addition, the poor do not have sufficient security to invest in the maintenance activities necessary for long-term environmental health: their need for sufficient agricultural yields in the current season means that, they cannot afford to undertake soil conservation works, which are labor intensive and reduce short-term land productivity.

Concomitant with the above idea, key informants and in-depth informants ascertain that, each family livelihood is solely rely on natural resources for every activities since there is no another opportunity of generating sufficient income. So there is greater leaning among every household

to expand its arable land for agricultural production to fulfill food availability and reduce poverty. More importantly one in-depth informant set-forth in this situation;

> *We farmers plough on steep mountains, cut bushes/forests for cooking food and livestock food supplies, over exploitation of land for an extended period of time and practicing of traditional agricultural which spoil the environment are accustomed. These all accumulative factors together pressurized on the environment in case of soil erosion, drought and deforestation. The fundamental reason, for these activities is our poverty, low income and impoverishment. Therefore, according to the informant persistent poverty causes and exacerbated environmental degradation.* (Quoted from In-depth Informant Narrated in Tigrigna Language but Translated in to English Language by the Researcher, January, 2016).

Likewise (Carvalho, 2012) authenticates that, environmental degradation is not a something by-product of economic growth, rather it is a phenomenon directly related to poverty. Basically this suggestion is resembled to the neo-liberal perspective of environmental degradation. Accordingly, it assured that for pervasive environmental degradation, economic deficiency is culprit. Poor people who could exercise economic hardship can force to use the environmental resources to realize their economic livelihood which results massive environmental degradation. In short, environmental degradation becomes a result and cause of economic stagnation and decline, which is provoked by absolute poverty pooled with food insecurity.

Average informants share the view of above author in which impoverished life, poverty and lack of another economic gain posed to over utilize the environment irreversibly that resulted environmental stress. Accordingly, respondents argued that poverty is one basic factor for environmental degradation.

Moreover, Sisay and Tesfaye, (2003;8) also vindicated the above idea, in this case, in order to survive in a subsistence economy, farmers are forced to mine soils, search cultivable land and to cut down trees leading to land degradation and deforestation. Thus, environmental degradation becomes a result and cause of economic stagnation and decline, which is aggravated by absolute poverty and food insecurity.

4.4.7. Soil Erosion and Landslide

Almost all FGDs and in-depth informants, have pointed that due to suddenly and heavy flood; the amount of losing of upper soil is common. The fertile land is cleared away every year and cracking of the land is prevalently occurred. Besides, some key informants verify that, during rainy season high flow of flood from steep hill speedily results massive soil erosion and susceptible to landslide.

4.5. Driving/Triggering Factors Behind Environmental Degradation in the Study Area

According to focus groups discussants informed that, driving/trigger causes of environmental degradation are various and interconnected although, the most factors are traditional or subsistence and unproductive practices of farming. This includes vertical plough over the steep mountains and hills which open the way for flood flow speedily. In addition to this, uninterrupted exploitation of land whether in case searching grazing land or expanding of agricultural land is one factor. The other is excessive using of artificial fertilizers and pesticides. Fertilizers, herbicides and pesticides are given from the government to use on the arable land to boost crop production. In fact, fertilizers have a positive contribution to increase the agricultural production but, one thing in this manner according to focus group discussants explains the negative effect of this artificial fertilizer in this way:

> *We do not now the amount and size of inorganic fertilizer to sow in our arable land and so excessive using of this fertilizer damaged the cropland fertility and moisture even for cereals during the shortage of rainfall*(Quoted from Focus Group Discussants Narrated in Tigrigna Language but Translated in to English Language by the Researcher, February, 2016).

As IMLZ, (2007) reinforced the above view of respondents with regard to trigger factors of environmental degradation in *Erob* by this case; to supplement the available cultivable land, residents also cultivate on the beds of small seasonal rivers. Plowing is done using oxen and on the steep hillsides, rift and acute cliffs. Plowing is done by hand and using of subsistence tools which aggravated way for sudden rainfall and flooding.

Furthermore, to the above idea key informants also substantiate that driving factors are related to poor management of land use on steep hillside and poor farming practices in flood vulnerable areas which increases water runoff resulting in loss of topsoil and reduction in land fertility. Shifting agriculture on fragile soils and forest clearing in erosion prone are also among the few

others. Besides to this, cutting bushes/forest for household consumption like cooking food, boiling water, for producing heat and light intensified for environmental degradation.

Another key informant pointed additional trigger factor i.e. single cropping and rare traditional mining activities like searching gold. There is accustomed feature using one crop for long period of time than intercropping that aggravates favorable condition for erosion. Besides to this, use of dung and crop residue as fuel also diminishes the amount of organic matter in the land surface. It leads to a progressive deterioration in soil structure, infiltration capacity, moisture storage and fertility, resulting in a massive decrease of productivity. In addition to this, it may be a basic cause but also it can take as driving factor i.e. shifting cultivation which systematically reduce the fertility of the land within a short period of time, further extends environmental degradation.

Here one important point regarding driving factors, the above listed can't be take totally as independently since there is scene of overlapping with basic causes.

4.6. The Effects of Environmental Degradation on Human Security

Even though there are various and contested meaning of human security as discussed in chapter two but for the relevance of the study, it is better to present the definition given by the UNDP human development report (1994) which received general consensus and pertinent to the study. Therefore, more generally, human security can be understood as "freedom from fear and freedom from want". In specific manner it means, protection from such chronic threats such as environmental hazards and vulnerability, hunger, poverty, starvation, disease and repression, as well as, protection from sudden, harmful upheavals of daily existence, touching on housing, employment and community life.

The UNDP 1994 human development report breaks down in to seven main elements for precision of the concept, in which they are interdependent, each other. To mention: economic, food, health, environmental, personal, community, and political security. Economic security requires jobs to secure an assured basic income. Food security means that all people at all times have both physical and economic access to basic foods. Health security is to provide healthy environment and health services to meet the challenges of poor nutrition, infectious diseases, and so on. Environmental security is concerned with lack of access to clean water, deforestation, salinization, air pollution and natural disasters. It also includes early warning and response

mechanisms for natural hazards or man-made disasters at all levels. Personal security is to protect human lives from threats of various kinds of violence by states and other groups and environmental hazards. This includes categories like crimes, industrial and traffic accidents, threats to women, abuse of children. Community security is about threats like oppressive practices and ethnic clashes in traditional communities. Political security means the protection of human rights and democratization, civil and political rights, and freedom from political oppression.

So, depending on the above new conception of human security without ensuring of secured environment it is difficult to advance and realize human security. Having this meaning of human security, now environmental degradation affects for human security in different conditions for instance Akokpari, (2007; Ranjan, (2011), argued that environmental degradation and change poses real and serious risks to human security: fundamentally it undermines access to basic needs such as productive soils, clean water, and food; it puts at risk the enshrined human, due to land degradation, deforestation, water scarcity and climate change induced by environmental problems. It also undermine the provision of economic, food and social opportunities required to foster human security; and in these and other ways it can undermine people's ability to pursue the kinds of lives they value. It may also, indirect factor in the generation of violent conflicts and threat human security. Laconically, environmental degradation is major threat to human society however, it also significant to assess its impact on each elements of human security for fully understanding.

On the other hand, human security is quite complex to understand without critical assessing of the seven very interdependent elements, so it is appropriate to evaluate the effects of environmental degradation on major elements of human security. In clear manner, the study presents how environmental degradation undermines food, economic, health, social and personal security in detail. Therefore, per the objective the study is aimed to analyze the effects of environmental degradation on human security with special emphasis on the food, economic, health, social and personal security of the households, families and the society at large in *Erob Wereda*.

4.6.1. Effects of Environmental Degradation on Food Security and Availability

According to FAO, (2011); UNDP (1994) food security has been defined as 'when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Thus, these all aspects of food are directly or indirectly related to suitable environment unless it is difficult to realize. Essentially, food has always been linked to environmental conditions with accessing, production, storage and distribution, and markets all sensitive to weather extremes and climate fluctuations.

According to Akokpari, (2007); Clay, (2002); Ingram et al.,(2010), revealed that environmental degradation have devastating effect on food security always reflected in growing of chronic hunger, undernourishments, famine and malnutrition caused by combination of internal, external and unpredictable environmental catastrophes. Hence, prolonged environmental degradation has miscellaneous impact on food accessing/realizing that threaten ultimately human security.

Similar to the above idea, key and in-depth informants also asserts that, environmental degradation have negative impact on assuring food self sufficiency. The pre-dominant crops in *Erob Wereda* which serve as source of staple food are barely, wheat and maize. So, accessing to food availability and security is dependent on these crop productions. But the proportion of production that receives from these crops is not sufficient due to diverse environmental problems like inadequate rainfall and protracted drought manifested every year. The soil fertility is decreasing from time to time as a result of soil erosion in particular and environmental diminishing in general. Every year the crops are affected by soil erosion, poor quality of the land and water availability that caused deficiency of food. Thus, depletion in soil fertility creates reduction of valuable staple crops results food deficiency. With regard to this here is view of one smallholder who is taken as in-depth informant interview from *Tabia Wera'atle*;

> *I sow last year all my farmland wheat and maize in the last summer season. Unfortunately, I did not reap as my expectation from the crops since rain started late and stopped when the crops found at vegetative growth. Besides, lose of top soil and low nutrients of the land did not give sufficient yield. Subsequently, hunger and starvation is not new in our surrounding. In my opinion this occurs due to dearth and unsustainable environment. Always we are relying on governmental donation and aid for food. Surely what I can tell you is every household is dependent on governmental aid either in the case of safety net programme or direct donation. Our environment is over utilized and overexploited which is very much poor to produce adequate agricultural production. The deforested and deserted environment has negatively impaired our farm land not to propagate our staple foods. There is no irrigation system*

that helps for crop production when rainfall discontinue because the environment is dry and arid. In this case, household food insecurity persistently occurred every year. Moreover, the degraded environment is not only affected for crops and food access but also for our animal husbandry and dairy farming. Since, food supplies for our animals are directly attached with crop production in case of usufruct. So, victim of food insecurity is frequent. In short, environmental problems vehemently hinder food accessing, securing and production. (Quoted from In-depth Informant Interview, Narrated in Tigrigna Language but Translated in to English Language by the Researcher, January, 2016).

Picture 2: Food Store in *Dawhan* to Solve threaten of Food security of the *Erob* Society, Photo taken by the Researcher in January, 2016

A research by Gebregwergis, (2015; Tsegay, (2009) reinforced the above idea of informant, by pointing that, environmental degradation have direct and indirect impact on food security in *Erob*. Moreover, the respondent stated that, in *Erob Wereda* arable land is very scarce and over ploughed. There is no enough fertile piece of land to be given for farmers and households rather depend on governmental aid. Production of agricultural cultivation is not sufficient enough for house hold consumption and the government provides 15kg of wheat per person per month though it is not sufficient. Agricultural activities, which require a serene environment are damaged by deforestation, desertification, soil erosion and flood which have devastated impact on food self-sufficiency. So, environmental problem has put plight condition for food access, availability and security that severely affect for human survival and security.

Key informants interview also share the above idea. Accordingly, the *Erob Wereda* is always victim of acute and chronic food insecurity due to shortage of cultivable land and fertile soil. Thus, environmental degradation coupled with mountainous and many cliffs enormously impacted on crop production. Available land for crop production is affected by soil erosion and degradation which undermine household food consumption. Crop disease like stalk borer, army worm, blight and powdery mildew are prevalent because of persistent drought, erratic rainfall, extreme weather condition and low resistance of the land to prevent crop diseases which reduced agricultural production. Consequently, residents are found in abject poverty and famine though the government and some NGOs such as Catholic missionaries and red cross donate food and cash materials to solve food threaten and risk in that area for the past many years.

As IMLZ, (2007) reinforced the view of informants; the main constraints to food security are directly connected to the diminishing of environmental quality such as lack of cultivable land, overexploited farmland and resources depletion combined with rugged terrain, infertile soils, lack of markets, and recurrent drought conditions. The document stated that, if NGOs and government of Ethiopia stopped their donation of food and cash to *Erob* people without any hesitation the people suffer food problem and finally threaten their human survival.

Concerning the food and cash donation from Ethiopian government, it distributed from the months of January to June in the name of PSNP since, this period is the acute and sensitive period of chronic hunger and food crisis. This implies that, *Erob* people are highly depending on governmental food aid to lead their life. They have no any confident over their land since they are hopelessness with regard to the environment.

In addition to the above view, threat to food shortage is ordinary in *Erob Wereda*, FGD discussants from localities of *Alitena, Wera'atle,* and *Endalgeda* have pointed out that, dry and arid land coupled with limited cultivable land is not enough for house hold consumption. So shocking and threat to food availability is common in *Erob Wereda*. Fear, anxiety and vulnerability of shortage of food are knocking in every mind of house hold, spouse and society at large level. Therefore, poor quality of environment has devastating impact on food production and self sustaining that threat their survival and life. Deteriorating of environment has diverse impact on food deprivation now become a threat to human survival and life existence in that

area. In addition, evidence from key informants as of 605 hectare land of the above three *Tabias* about 65% is degraded that results in declining of agricultural production.

A study by Tagel, (2008) strengthen the above opinion of informants by arguing that, natural resources like fertile soil and forests are vital resource bases upon which rural farmers depends for realizing of their food and survival. However, these resources are getting depleted over time at alarming rate and affects farmers' agricultural production and productivity which imposed a real risk for food security. He also build up, the key informants view in this case, the effects of environmental degradation on food security is manifested always in threat of losing to achieve household food consumption, which hinder for the overall agricultural production.

Key and in-depth informants also substantiate, in *Tabia Alitena* and *Endalgeda* the severe environmental degradation intertwined with low soil fertility, inadequate and erratic rain fall, vulnerability to pests, lack of appropriate technology, small size and fragmentation of land holdings, lack of diversification, lack of oxen for draft power and little use of modern inputs that results structural food deficiency. Additionally, key informant interview insisted that, deteriorating in environmental nutrients resulted seasonal and chronic hunger or starvation. The environment strongly affected for household in case of low productivity of cereals during harvest time as the result of limited and stagnant cropland, poor moisture of the soil and fragile natural resource. Depleted soil increases risks of malnutrition for small holder farmers. So, key informants concluded that both depth and severity of food insecurity is higher in *Erob Wereda* which becomes threat to the people.

Informant of in-depth interview also asserted that for many of people in *Erob* land, water, forests and other natural resources are vital for their livelihoods. However, lack of access to land and other natural resources are the key constraint to improved livelihood opportunities and aggravated hunger. Poor environmental quality and unsustainable management of natural resources play important roles for the people of *Erob's* to morass in poverty, not to enhance welfare and sustain economic growth. Key environment challenges linkages in *Erob* are mainly related to natural disasters (e.g. drought), deforestation and decreasing resilience of ecosystems, unreliable access to food and water, and climate change that consequences declining in agricultural production and posed food insecurity.

All in all, according to *Wereda* file of food production indicated that decreasing of the overall agricultural production is directly related to reduction of the environmental resources which intensify food security risk and crisis.

Name of the sample *Tabias*	Agricultural production per year in quintals											
	1990 E.C	1998 E.C	1999 E.C	2000 E.C	2001 E.C	2002 E.C	2003 E.C	2004 E.C	2005 E.C	2006 E.C	2007 E.C	2008 E.C
Endalged a	100	120	140	150	130	120	110	100	115	120	90	45
Alitena	90	130	155	163	140	100	95	85	110	120	85	40
Wera'atle	130	150	130	145	110	95	95	90	100	120	95	55

Table 2: Declining of Agricultural Production which Threaten Food Security in these Three *Tabias* (Stations)

Source: IMLZ, (2007) and *Erob's Wereda* office of agriculture (Accessed in January, 2016).

From the above table it is possible to deduce the amount of agricultural production is decreasing from year to year in 20% that threatens food security in the *Wereda.* Thus, poverty, famine and starvation are prevalently occurred in which every household is shocked for life existence. As the table implies that, still considerable people's in *Erob* are undernourished and hungry and who do not have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. All in all, the fundamental factor that undermine food security is environmental degradation and its consequences finally which threatens human security.

Regarding to this, one in-depth informant authenticates this threat as follow;

> *My yield is now approaching to end since I have not reaped/ harvested passable crops in September and October. I have no enough cereals to feed my children's. The reason for this is the degraded environment. The crops are affected by drought and low soil fertility. Now with my 6 children we are found in food deficiency. I think the government will provide food to solve this misery unless extreme food deficiency and hunger is coming up. Moreover, daunting poverty and food insecurity challenges are common that are worsening over time due to environmental degradation.* (Quoted from In-depth Informant Narrated in Tigrigna Language but Translated in to English Language by the Researcher, January, 2016).

Overall combined effect of land based resources degradation like deforestation, soil erosion, flooding and loss of agricultural and pasture land leads to production decline. Recurrent drought and climate change are one of the important elements of environmental predicaments that negatively affect food security status of rural households. In addition, inadequate and erratic rainfall is one of the environmental phenomena, causing serious food crisis as (Getachew cited in Tsegay, 2009).

4.6.2. Effects of Environmental Degradation on Economic Security

Under definition of human security by UNDP human development report (1994), economic security clearly put, it entails that having access to basic income, job opportunity usually from productive environment and remunerative work, or in the last resort from some publicly financed safety net.

According to focus group discussants; the main foundation of economic income and source in *Erob Wereda* is subsistence agriculture and livestock breeding and rearing. So that, source of economic income is depend on crop production, livestock owning, bee production and limited traditional marketing system. The existence of fertile, sufficient grazing land, denser forests and water availability are mandatory for generating of income and livelihood. However, degrading of productive soil, dwindling of forest and biodiversity, shortage of water profoundly affects their basis of income. As discussant noted that bee production and selling of honey play a crucial role for purchasing power of goods and leading of livelihood. But the miserable effect of environmental pressure express in this condition;

> *Water and vegetations are very significant for bees to produce honey which is highly demanded in market as well as fore-front source of income. Unfortunately, the*

> *environment has no bee plant, adequate water and vegetation for bee to get in near of their home. As a result of this, bees move long distance in searching of water and vegetations though; most of the bees are died in the journey and sometimes completely disappear the bees from home. Essentiality of water for bees is obviously known but the environment is dry and waterless. At this situation, honey production enormously decreased that have direct implication on income gained from honey and bee production. This indicated that there is high economic insecurity since we lost our economic income from bees not only income but also food production. One important thing in this issue is our environment is poor in flora, vegetation and water availability. The environment is basic challenge for survival and production of bee since it is dry and arid caused by erratic rainfall, unconditional climate, desertification and weak biodiversity. In short, deficiency, rugged and degraded environment have devastated impact on generating income that hamper for purchasing power to covering our family and children's requirements like cloth, educational and health expenditures.* (Quoted from Focus Group Discussants Narrated in Tigrigna Language but Translated in to English Language by the Researcher, February, 2016).

A study by Hais, (2011); IMLZ, (2007) enriches the above view of FGD, by arguing that environmental degradation has devastating impact on economic income and wealth of the *Erob* community. He elaborated that, until a few decades ago, *Erob* land was a source of the best quality of honey, livestock and dairy products that used to dominate the regional markets and sources of economic expenditure for households. However, during the last three decades or so, because of drought and environmental risks, the region rapidly became one of the poorest spots and economically unsecured. The problem is, rooted mainly in ecological and environmental conditions. Deforestation is almost complete in this mountainous region combined with rare and unreliable rainfalls, which usually come in the form of sudden heavy downpours, the irregularities of the surfaces and centuries of poor farming practices have combined to facilitate erosion and depletion of soil. Rainfalls and floods have carved much of the topography, changing it into rows of hollows and hills. The gravel, sand and topsoil have been washed away, exposing the bedrock to the surface in many parts. Besides the degradation of the terrain, holdings of cultivated land per household are very small and unproductive. Consequently, income which gained from livestock, bee honey and butter production are enormously reduced that put in to precipitate of economic misery. In short, the unsecured environment of *Erob* nullifies economic livelihood of the people which is challenge for human survival since economic activity is determined by the suitability of the environment.

Environmental changes has immediate impact on changing climate and rainfall patterns and damaged grain yields, runoffs, water availability, and the survival of plant and animal species that are expected to shift production seasons, damage productivity set of feasible crops and livestock feed. In *Erob Wereda* large part of the population is engaged in subsistence agriculture and farm marginal lands under rain-fed conditions that make the population particularly vulnerable to economic income, livelihood and productivity that imposed by these adverse effects of environmental decline and change.

Similarly, Tsegay, (2009), argued climate change is one of the important elements of environmental problem that negatively affects the economic status of rural households. Moreover, inadequate and erratic rainfall is one of the environmental phenomena, causing economic impoverishment.

Informants of in-depth interview attested that, livestock production and owning is another base of income. Livestock production includes oxen, cows, sheep, goats, shoats and hens which directly related with valuable environment. For covering food buying such as pulse and oil and household materials selling of these animals is inevitable for earning of money. Unfortunately, since the livestock's are damaged due to shortage of grazing land, usufruct, plant species and water availability they are sold at low price. The livestock's are not much competent in the market to sell in high price so the opportunity is selling at cheap price. In another words, the environment is not comfortable to breed cattle's. Therefore, economic income is decreased that can be gained from livestock's profit. Besides, some amounts of animals are died suddenly because of unpleasant environment, shortage of water, lack of local veterinary and extreme conditional variability of climate. In fact, environmental problems tremendously affect first for animals food, crops yield which resulted economic deprivation and finally a threat for human being survival, life existence and living free from poverty trap, chronic hunger, health risks and unsecured economy.

Picture 3: Degraded and Ruined Environment of *Erob,* which have Devastated Impact on Cattle Breading and Bee Production that Threatens Economic Security Photo taken by the Researcher in January, 2016.

Likewise to the above ideas, key informant assured that, degraded environment has negative influence for the income of households. Many farmers were owners of paired oxen and cows with a lot of goats before few years and the farmers are confident in their economic revenue and livelihood income. However, as a result of protracted drought, unpredictable rainfall, overgrazing land, poor in vegetation and scarcity of water in particular and diminishing of the whole environmental value in general undermine number of livestock's in dramatized way. Consequently, the amount of revenue or profit that gets from animal husbandry and selling is at losing ground from time to time which develops into economic precipitate. In brief situation, poor and destabilized environment negatively affect the quality of life in terms of basic human needs such as food, water, shelter, toilet, health and education that resulted economic hardship.

As IMLZ, (2007; Bisrat, (2014) hold up the view of informants regarding of the impact of deforestation, soil erosion, water scarcity and depletion of environment in general on economic livelihood in this situation. Fundamentally, livestock productions mixed with crop cultivation are the main economic activity in *Erob Wereda*. Cattle, sheep, goat and shoats are the central

livestock types. Livestock's are kept primarily as a store of wealth and economic security which are sold when the need for income arises. The main livestock market is outside of the livelihood zone in *Adigrat* via travelling of about 40km. There is a shortage of animal feed and drinking water for animals due to dry land. Available water for livestock consumption is from minor rivers and seasonal pools during the wet season and in perennial minor rivers, springs and shallow wells during the dry season. Unfortunately, as a result of the unsecured environment and drought all theses source of water totally dried starting from months November to June. Consequently, because of shortage of water and pasture availability, started to decline milk and livestock production which resulted immense economic lose and livelihood that threaten human security.

All in all, in-depth informants interview confirm that, the main causes of low output from livestock sector which determine income is occurrence of infectious and parasitic diseases which reduces production and productivity of the animals through morbidity and mortality. For animal breeding grasses, potable water and vegetations are fundamental that consume from environment but dryness, low water retaining capacity and hoarfrost of the land are the basic features of the environment affected by desertification, drought and soil erosion. Without any doubt according to informants revealed that, environmental degradation brought threat and risks on their economic livelihood. Here, is view of one in-depth informant from *Tabia Endalgeda*;

> *In fact, environmental degradation is widespread in Erob area specially land degradation, soil erosion, deforestation, and loss of ground cover. This has augmented losses of top soil and ground water, which has a significant problem for both humans and livestock. This has profound effect on diminishing of economic activity, subsequently it created pervasive hunger and famine as a result of food insecurity, abject poverty trap due to economic lose and health risks combined with lack of portable water and food nutrition.* (Quoted from In-depth Informant Interview Narrated in Tigrigna Language but Translated in to English Language by the Researcher, January, 2016).

Similarly Tagel, (2008) revealed that, environmental calamities generate chronic vulnerability in several ways. It is exact that, people living in areas where the natural resource base is deprived or deteriorating often have limited opportunities for earning their livelihood that restricted their source of income. Their situation is worsened if they are found in marginal and environmental degradation. Variable climatic and geophysical conditions and biological threats create additional risks and threat. Availability of arable land per smallholders usually declines coupled

with economic reduction, as more and more land is dedicated to unusable land in the case of desertification, degradation and soil erosion ultimately foster vulnerability of low level of economic progress.

As key informants pointed also, not only that environmental degradation undermine their livelihood income but also the people make unable to protect themselves adequately against environmental hazards and accidents such as drought, afford to take sufficient remedial actions, to engage in alternative livelihoods which can protect them from the environmental risks, or to provide themselves with alternative sources of income and employment. Thus, it weakens the capacity of household to resist challenges emerge from the unsecured environment due to low economic income and livelihood opportunities. So, the societies are under the mercy of their domestic or abroad migrant relatives (remittances) to promote the economic income and leading their life since the environment is poor.

Generally, informants and UNRISD, (1994) authenticated that; environmental decline adversely affects the income, health, well-being and livelihood opportunities of the individuals and households affected by pollution or natural resource depletion. For instance, soil erosion, deforestation and loss or depletion of animal and plant species limit the productive opportunities and source of income of vast numbers of people and ultimately influences human security.

4.6.3. Effects of Environmental Degradation on Health Security

According to Donohoe, (2002); Cesar, (2013), environmental degradation poses a major risk to human health security where the pollution and natural resource depletion are prevalent. This clearly indicates that, scarcity in quality of environment have greatest effects on the health of individuals and populations. The most devastating effect includes increased abject poverty, overcrowding, famine, weather extremes, species loss, acute and chronic medical illnesses. Furthermore, lack of access to safe drinking water, sanitation, and health services negatively affects people's health. There are strong links between environment and health concerns, particularly related to malnutrition, indoor air pollution and water-related diseases.

Informants of in-depth interview and key informants display that, degraded environment have put pressure on our health status and condition. Potable water is essential for life but the environment is deprived. The government is now providing water for the household by

transportation of vehicles since there is no source of water in the area. For instance, unsanitary and unsafe housing is take place due to scarce of water for drinking, washing clothes and for food preparation. According to key informant's view, currently about 25 children's are faced skin related health problem like psoriasis due to lack of potable water and sanitation. About 500 people are affected by chronic illness like malaria, diarrhea and unconditional health problems that are spread among the society due to unsafe environment. The indirect threat of environmental degradation becomes an obstacle in accessing and establishing of health centers and employs professionals. The rugged and bad terrain of the environment also affects in providing of infrastructures, which are very important for protecting and curing of pandemic/seasonal diseases like transportation of ambulance and medical materials. In short, the degree of vulnerability to human health is very high due to continuous environmental degradation.

A document accessed from health bureau of *Erob Wereda* shows that due to lack of clean water and sanitation every year about 200 mothers and children's are suffers from different health problem disease like typhoid and diarrhea. Thus, deepening in nutritional insufficiency and sever poverty placed by environmental degradation facilitates health risks and victims.

According to focus group discussants, since the environment is poor in availability of resources, women are forced to travel long distance, for fetching of water and searching of energy for cooking of food and other home activities. So, these heavy loads damage the spine and cause problems with child bearing and nurturing. The backbreaking work of cutting, collecting and transporting wood, exhibited by poor nutrition, further undermines health problems like headache and tiredness. So it describes that, where women are always involved in these time-consuming economic activities, the environmental problem involved affects women's health; it encourages high mortality and morbidity rate in women. In this case, women's are victim of water thirsty and hunger directly affected for their health well-being. In addition to this, wasting of time and energy is common due to travelling of long distance for searching water. Therefore, the more time living in environmental degradable areas, the lower health standard associated with deficient socio-economic status become a threat to human life and survival.

In short, the predominance of food insecurity reinforced by low economic income and impoverishment has immediate, situational and indirect impact on health security of the *Erob*

societies. They are found at risk either the ability to prevent the diseases or expense for curing which are posed by environmental degradation.

4.6.4. Effects of Environmental Degradation on Social and Personal Security

The human security approach conceptualizes security as emancipation of human beings from all threats of survival, livelihood and dignity. The human security approach recognizes also long term environmental degradation and problems as one critical threat to security and well being of every society and person (Langenhove, 2004).

According to the focus group discussant; environmental degradation has negative impact on social and traditional values, norms and customs. Since the environment is poor, competition over scarce and remnant resources is predictable. Every household is struggling for searching of farmland, wood collecting and grazing land. Controlling and possessing of limited natural endowment is as a matter of survival in the area through everyday activity. Consequently, neighbored farmers enter into dispute and conflict manifestation resulted inter-household rivalry. Breaking and violation of traditional institutions is now high since the disputants are deviant to abide by the cultural laws and norms. In this situation the occurrence of land based conflict and resource case opposition weaken the social integration and harmonization which lead to social disintegration, division and family faction. According to informant idea, that societal standards and morals such as the habit of eating and solving problems together, collective food preparation, cultural ceremonies and festivals are impeded from time to time due to environmental degradation induced causes. Thus, break downing of social standards and institutions as a result of environmental degradation is the precursor of threat and risk to human security.

As Harte, (2007) reinforced the above suggestion of informants; environmental decline impacts upon social structures and institutions. Social groups are affected in different way due to resources depletion. More commonly, environmental decline adversely affects societal and cultural rules. When there is high soil erosion, deforestation, loss or depletion of animal and plant species led to social crisis since competition over the existed resource between the households and neighbor people is inescapable.

One in-depth informant III#9 similarly supports the above idea in this pattern;

> *It is known that Erob societies are closely and inextricably linked to the natural environment in which we are embedded for life existence. We have strong social relation in helping each other. The society is dedicated to work together and prevent any problem. However, due to resultant of environmental degradation, scarcity of resource putting pressure on the existing natural resources is common. At this condition member of the society enter in to expanding/ incorporating of perimeter of arable land and searching of new farmland among the neighborhood farmers that created collision. Thus, this clash of farmers has negative impact on our social solidarity and resulted social disruption and disintegration. So, the pristine culture of social structure and harmony is faded due to environmental distress.* (Quoted from In-depth Informants Interview Narrated in Tigrigna Language but Translated in to English Language by the Researcher, January, 2016).

A study by Mayer, (2002) pointed out concerning of the effect of environmental degradation on personal security stated that; it has direct and indirect consequence which damage personal security. Environmental degradation impairs human security and ultimately forces people to leave their homes and migrate to places more conducive to their wellbeing either regularly or irregularly. Thus, during migration the people suffer famine and hunger, health related risks, torture, imprison and mental problem.

In addition to the above paragraph, key and in-depth informants interview KII#9noted that, the risky environment have a snide role for seasonal and permanent migration of people for searching of better life, though migrants face various threat and risks during journey. In line to this one FGD discussant has stated the environmental issue as following:

> *Basically, in our community arable land is very scarce (0.19 hectare per household), not only limited but also depleted and over ploughed. There is no enough fertile piece of land to be given for the individuals especially youths to farm on it. Even when land is available, it is continuously affected by degradation and drought. So the youths are always in seek of other means of livelihood like employment opportunities and business activities but this is also very difficult since the area is a closed periphery, not a business areas as well as the environment can not invite to work. This makes the peoples in the community to be hopeless of achieving personal economic development being residing in the degraded environment of Erob. Thus, they prefer to migrate elsewhere, but the migrants specially the irregular migrants face security threat and risks like financial exploitations, detention and physical punishment.* (Quoted from FGD Narrated in Tigrigna Language butt translated in to English Language by the Researcher, February, 2016).

A finding by Gebregwergis, (2015) articulated the above idea of FGD in this case; the degraded environment of *Erob Wereda* have direct and indirect effect on personal security of irregular

migrants when individuals migrate irregularly due to environmental stress, they commonly face envisaged and actual challenges to their security mainly economic, personal and physical aspect of human security. The actual predicament of life occurs starting from the beginning of the journey up to the arrival in the destination country. Challenges to human security particularly to health situation of the irregular migrants can also sustain while the migrants are living within the destination countries or while returned back to their home country being a victim of smuggling or possibly trafficking.

One participant of in-depth interview display that the decline of environmental value also impedes personal security of each farmer and stated in his view as follows;

> *We are competitive over the scarce resources in case of supplement agricultural land, searching of wood and grazing land. As a result, farmers enter into an act of abusiveness even physical fighting in the degraded farm land or other case which resulted accusing to the police and waiting for vendetta type. So, combatant farmers are always threat of their families or animals because of the neighbor enemy may reprisal to farmer elsewhere as a result of reduction of arable land. This is caused by shortage of cultivatable land. Therefore, there is high frequency of personal insecurity among the farmers and herders due to resource depletion. In short, unsecured environment bounded by unsecured households.* (Quoted from In-depth Interview Narrated in Tigrigna Language but Translated in to English Language by the Researcher, January, 2016).

Generally, according to participants view (FGD#1, 2, 3,), environmental change like resource degradation, desertification, water scarcity, soil erosion, and frequent natural disasters is already profoundly affecting farmers to farmer's harmony/security which produced adversary and threat among themselves. It alters the neighborhood relation in to sort of tense and bellicose situation.

4.7. Overall Effect of Environmental Degradation on Human Security

As set-forth in this chapter, demolishment of environment has direct and indirect impact on major elements of human security. Various scholars Ranjan, (2011); Michael, (2012); (Bajpai, 2000) and the selected informants represent that declining and diminishing of quality of environment become serious threat and risk to human life. It is plausible that, due to reduction agricultural production, food insecurity occurred in the form of sever and chronic hunger which impeded the health life of individual and society. Economic insecurity affects the community

when losing of their sources of income, declining of living standards and livelihood which further, exacerbated social and personal insecurity and vulnerability to forced migration. In terse manner, hunger people is economically unsecured and at the same susceptible to various health related problems and miseries posed by environmental degradation and challenges. Moreover, poor and polluted environment has actual, potential and unanticipated effect that thwart human security. The results of this study validated that, both sudden-onset, long and gradual term environmental events, such as deforestation, land degradation, floods and droughts, have significant effect on human security. As Mathew et al., (2010) depict concisely in this pattern, environmental change poses serious risks to human security and so occurs in the future.

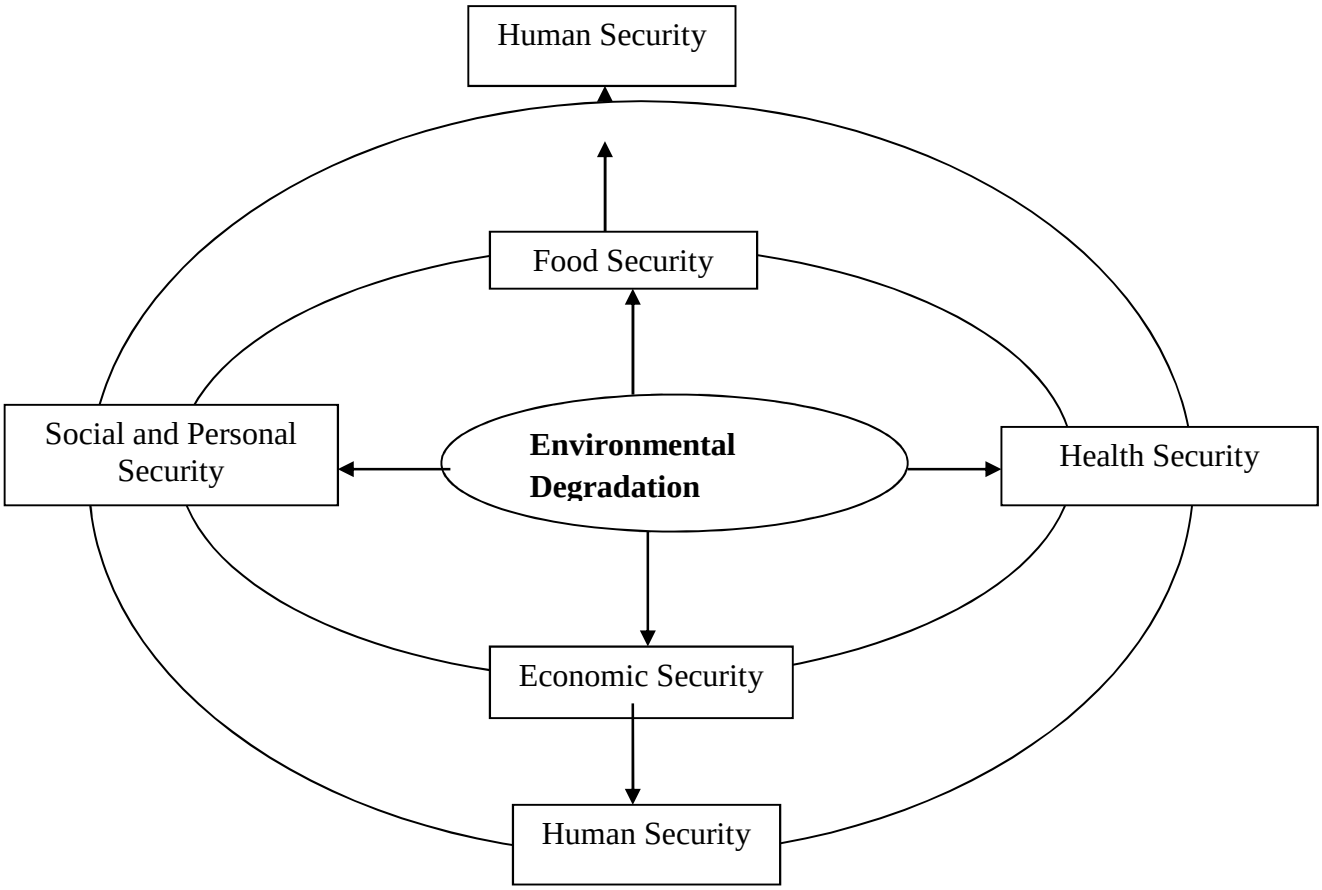
Similar to the above idea, the human security approach ascertained that, environmental nuisance and degradation is the basic threat of individual, families and communities which threat human security (Kesiena, 2009; Rita, 2008).

All in all, the respondents asserted that, environmental problems posed a multiple effect on their wants and needs. Hence, food insecurity, health problem and economic impoverishment are caused by environmental degradation and changes.

In pinpoint, environmental degradation hampers individual security by affecting livelihoods, food utilization and promotes transnational security crises for states and regions. Hence, environmental degradation is a significant threat to human security for individuals, societies and states Ranjan, (2011; 1). Furthermore, the ability to utilize food, drive economic income, to lead healthy life and social integration is mostly dependent on secured and sustainable environment; unless human survival will be threaten due to legion impact of environmental problems and challenges. In a nutshell, unsecured environment cloud not live secured individuals, communities and peoples.

Figure 3; The Overall Effect of Environmental Degradation on Human Security.

Source; Depicted from the Researcher



4.7.1. Awareness Level of the Community Concerning the Effect of Environmental Degradation on Human Security

Parallel to the causes of environmental degradation, key informants and participants of FGD displayed different response regarding the awareness level of the society on effects and threats of environmental degradation on household and society security.

As highlighted in socio-cultural cause of environmental degradation, most interviewed key informants argued that, while *Erob* society witness various types of reported human security challenges emanated from the severity environmental degradation every time, nevertheless still there is low public perception towards the threaten and risk of environmental degradation. The society fails to take lesson of experience from the suffering of environmental degradation. Thus, even there is some segment of society are aware but not fully represent the whole societies.

Local key informants argued (KII#1, KII#3, KII#11) that, for daily life activities we use and over cultivate the environment without thinking its effect for our future fate. Sustainable utilization of environment is not aware among the farmers and societies. Furthermore the respondents pointed, everyday cutting of forests for fuel purpose like charcoal and to sell for economic income in town of *Dowhan* and *Adigrat* is common either lawfully or illegally. Therefore, as informants noted, some parts of the society have low awareness on how to protect and ensure sustainable environment.

Similar to the above thought; in-depth informant (III#3) added that, even the environment is degraded and over cultivated, but still the society is not refrained from exacerbating of environmental degradation. Sometimes the society tried to cut the remnant bushes/forest completely, uninterested in campaign of government policy for conservation of environment and natural resources and unwillingness to promote and protect the environment. This indicates that there is understatement on the effect of environmental degradation over their life and livelihood.

In contrast, almost key informants view (KII#10); some of FGD discussants argued that, our community is attentive and worried about the environment. To enhance productivity and enrich environment the peoples are actively participate in government policies like rehabilitation of environment, conserving of resources, building of cheek dams, changing of traditional farming system, selecting of energy consumer materials and individual responsibility for protecting

environment. The community is aware of the resultant effect environmental degradation on their food, economic and health security. Thus, the society is aware of the severe effects of environmental degradation on human security. But in concluding, regarding of the awareness level about 73% of the respondents suggested that the societies are not fully well informed and aware the severity of this risk and blow. Albeit, some segments of society are cognitional about the miserable effect. Therefore, the level of awareness is rudimentary which need strong effort to develop this low awareness and perception.

4.7.2. Societal and Governmental Efforts to Halt or Minimize the Environmental Degradation in *Erob Wereda*

It is not deniable that, societies and government are working different actions in minimizing of this problem but the bone of contention is in its adequacy, full and persistent efforts to reduce this challenge. Subsequently, informants disclose that the efforts take by government and people are less than as the rapid degradation are persisting. This occurs because of influx people leaving the environment, governmental fiasco and gaps as well as reluctance of the people to conserve the environment.

Regarding to the devised societal measures to stop or minimize the massive environmental degradation from the side of given community in particular and the *Wereda* in general; almost all local key informants reveal that there is small societal mechanism of dealing with problem of environment in *Erob* community. Thus, at family level, FGD discussants and interviewed informants reveal with one outcome i.e. there are strides taken by the society and government though their effectiveness is not sufficient.

According to key informants in order to curtail the enormous environmental degradation in the *Wereda*; different action and measurements are taken starting from each household up to the *Wereda* level. The peoples are cooperating with each other in campaign of conservation of water and soil. For promoting of suitable and sustainable environment the society is engaged in protecting of irregular cutting of bushes/forests and actively participated in reforestation and a forestation. Thus, every year at about 10,000 seedlings are planted on the degraded environment though checking and maintenance is low. In addition to this, movement for cheek dams and building of drained basin in river bed in the case 20 days or (*Easra Mealti in Tigrigna)*name for

environmental rehabilitation and conservation are the basic action taken by the society continuously. Thus, about 500 cheek dams built every year however; their consistency is weak since they are flooded and destructive by the unconditional rainfall.

More importantly, in-depth informants also demonstrated that protecting and ensuring of suitable environment is a responsibility of every individual and society minimally in principle. Planting the overgrazed land and bare land, preservation of natural resources and terracing in the mountainous and cliff areas are the major dominant actions taken by the society. Thus, the society hopefully to implement the policies declared from the government for accomplishment. The government also participates in safeguarding of the environment via providing environmental experts and materials which are important for building cheek dams and terrace.

Almost all FDG discussants verified that, there are few societal and governmental measurements in the *Wereda* starting from the policy level up to the practical ground but they are not adequate and sufficient. The societies participate in promoting of sustainable environment which is free from deforestation, soil erosion, desertification and expanding of stride overgrazing. One typical example is the *Aiaga-Alitena* cheek dam built as a center of model which helps for the environment to develop potential for water retaining and soil fertility. Besides to this, the government also provides some renewable resource consuming energy technologies such as solar energy to replace the non-renewable resource based energy. It also hired couple of farmers to each local forestation to control and administer the environment from illegal deforestation and overgrazing activities. Therefore, societies and government jointly have eminent role in managing of environment to protect environmental hazards with plenty failures from both sides. However, the actions taken from both sides are not quite sufficient to halt or minimize with various challenges. Basically, institutional failures, poverty and low attention by the regional government towards the *Wereda's* environment are among the few that hinder for mitigating the problem.

4.7.3. Contemporary Trend and Future Prospect of Environmental Degradation in *Erob Wereda*

According to participants of key informants, in-depth and FGD discussants, there is modest doubt about the escalating of environmental degradation in *Erob Wereda*. In fact, the participants

acknowledged that environmental degradation is a threat to human security since the society is land and forest dependent for livelihood. The extent of environmental decay is obviously known in which the land is plagued by rapid deforestation, desertification, soil erosion, climate change, drought and famine. But there is no universal consensus of view in the issue of escalating and deescalating of this threat.

Accordingly, average of the respondents put forward in this case, people jointly with the government are in campaign and make an endeavor to halt/minimize environmental degradation and to ensure sustainable environment. Being free from food, health, economic and personal insecurity is closely linked with healthy environment that announced by the government nevertheless it is not sufficient. Thus, the scope of environmental degradation is not totally stopped rather happening every time. In this case, there is high intensity condition to escalate environmental degradation since due attention of the government regarding the environment is not adequate. In another hand, there is indication of continues environmental degradation in *Erob Wereda* due to limited governmental action to mitigate this threat and low concern of the people. Consequently, the respondents argued that, frequency, patterns and dynamics of environmental degradation is widespread in the *Erob* area especially land degradation, soil erosion, deforestation, and loss of ground are swiftly ongoing. This has augmented the losses of top soil and ground water that causing further environmental degradation. Therefore, the dynamics and intensity of environmental degradation and pollution is transformed in to weighty problems. In addition to this, hard work of terracing or maintaining the hillside lands has been failed especially post Ethio-Eritrea war.

Contradict to the above view, few respondents on the other hand argued that, though the environment is degraded, but the societies are aware of their environment. The people are encouraging to build strong environmental regime. The communities fully participate in preventing of environmental degradation and promoting of health and sustain environment. To strength this view practical actions are taken to construct serene environment; for instance the building of *Aregekoma* and *Aiaga-Alitena* check dams and terracing that have a crucial role for protecting of environmental collapse. Planting of bare environment and digging of dams that can retain water are every summer season activities of the societies in which the government provide new plants that are suitable for the environment. Almost all households are participating in soil

and resources conservation to see clean environment and to halt this problem. The people and government are cooperatively works extensively to enhance and prolong the environment. Therefore, environmental degradation is decreasing in that area in which it will also stop in the future.

More importantly, the respondents informed that actual environmental degradation is at alarming time though; environmental rehabilitation and treat are takes place. The government also put suitable condition to the society either in policy or giving awareness to the society but it is not adequate. Albeit, the societies undertake different protection measures to mitigate the wide-ranging of environmental degradation; the intensity and rate is increasing through time. Therefore, there is high risk of environmental degradation and will exacerbated in the future in the area even though, some environmental recover and reconstruction is the motto of the people and government to ensure better life and economically achieved society. This can be enrich by witness of the researcher that, massive land degradation, soil erosion, deforestation and extreme climate fluctuation is going on and so in the future. So from personal observation the researcher pointed that the fate of environment is found at risky and there is high tendency for further environmental decay.

In short, based on the informants view and personal observation can be displayed that, the intensity of environmental degradation will occur and so high potential to increase in future which can sternly influence for human survival and sustainability of bio-diversity.

CHAPTER FIVE

5. Conclusion and Recommendations

5.1. Conclusion

The study concludes that massive environmental degradation has devastating influence on human security that undermine economic, food, health and personal security of the family and society in *Erob Wereda*. Substantive environmental degradation has overwhelmingly impact on enhancing of agricultural and livestock production that determine every household's livelihood and health which harness the potential of improving of income and affect human security. Environmental degradation, natural resource degradation and recurrent drought are occurring every time that makes households vulnerable to food shortages and economic deprivation.

Currently, environmental degradation becomes a burning global issue. Across the world, the prospects for human security are deeply and severely affected by local and global processes of environmental degradation and change. The occurrence of massive environmental degradation and deprivation enormously affected millions of lives in case of chronic hunger and famine which resulted food insecurity and forced migration. Fundamentally, the study signifies causes of environmental degradation are complex and multifaceted in nature and uneasy to comprehend independently but to mention some of them; land degradation, climatic change, soil erosion, deforestation, pervasive drought, desertification, water scarcity and pollution of flora and fauna are the major. Thus, these factor which posited unprecedented, immediate, conditional and indirect threat to human being. Today, environmental degradation becomes the national and local concern of Ethiopia since millions of Ethiopian agrarian societies and resource dependent peoples face myriad security challenges, risks and miserable life with soil erosion estimated to average 42 tons per hectare per year on cultivated land.

One critical conclusion, which can be ascertained from this study, is that the enormous environmental degradation posed various and multitudinous threat to human security further hampered food, economic, health and social security in *Erob Wereda*. In a nutshell, it has adverse effect on individual, family and community lives by undermining water availability, agricultural and livestock production that heightened human insecurity.

As to the analysis, the causes of environmental degradation in *Erob Wereda* are several intertwined and conglomeration factors. But all factors categorized as man-made and natural causes. Additionally, socio-cultural factors like land degradation coupled with desertification, deforestation, soil erosion, over exploitation, over grazing, climate change, inappropriate use of resources; water scarcity and rapid population growth are the vivid environmental problems that occurred prevalently. Besides the Ethio-Eritrean war, deforestation, persistent drought, flood, expanding of agricultural land and infrastructure and extreme poverty are the main culprit of environmental degradation. Furthermore, subsistence practice of farming, prolonged exploitation of arable and grazing land, excessive use of fertilizer, increasing demand for wood, illegal resource extraction and single cropping are also the triggering causes of environmental degradation.

The study also scrutinized the reckless and overexploitation of wood, farm lands and grazing lands can thus lead to tremendous forest degradation, soil erosion, biodiversity loss, land degradation and resource scarcity that exacerbates acute food, economic and water insecurity ultimately hinder human security in the study area. On the other hand, smallholders are faced with declining amounts of water and grazing land for their cattle, especially during periods of extreme drought. Moreover, according to the findings, as a result of the vulnerability situation of environmental degradation starts from terrible household food insecurity like abject poverty and starvation, health problem, reducing of economic livelihood and social unrest up to human insecurity. In tersely, extensive environmental degradation pose multiple and sever threat to food, economic and health security which vehemently undermine human security.

Based on the analysis, *Erob Wereda* environmental degradation poses new, unidirectional and situational threat to human security which hampers the main elements of human security either separately or jointly. Natural resource dependent peoples are always in the trap of threat and risk as depletion of resources is ubiquitous. It transcend from chronic hunger, famine and starvation to economic and social insecurity. On the other hand, pervasive environmental degradation causes potential and actual threat to environmentally dependent society. For instance, the people most reliant on natural resources are easily susceptible to food insecurity due to diminishing of soil fertility and nutrients, declining of ground water strongly undermine health status of children

and mothers. Dramatized in deepening poverty, food and nutritional insufficiency, declining of income are other threats posed by environmental bankruptcy which heightened human insecurity.

All in all, the entire theme of the study concluded that, there is interactive and vicious causality-effect relationship between environmental degradation and human security. The human security approach and its proponent scholars propose that both domestic and global environmental degradation leads to human insecurity. This is evident in the study that since peoples in *Erob* feels insecure in terms of economic livelihood and food due to environmental problem in their origin of place, they decide to do the treadmill activity on environment resulted high risks of food, economic prospect and dismantle social cohesion that are the predicaments and deterioration of human security. Thus, the study concludes that the existence of tremendous environmental degradation poses actual and envisaged threat: to the economic, food, health and physical security of households and families of the area as well as devastating effect at the community level. This study argued that there is continuous environmental degradation in *Erob* which undermines human security in the present day and will increasingly continue in the future reducing people's access to natural resources that are crucial to sustain their livelihood thereby increased susceptibility to new environmental problems and hazards.

5.2. Recommendations

Indeed, findings of the study show that, the challenge of environmental degradation and troubles is still weighty-problems in the society. Thus, it is widely recognized that tackling the problem of environmental degradation requires comprehensive, coordinated and integrated action of both the government and people at local level. Therefore, based on the findings the study put some recommendation to mitigate the serious problem which listed below;

- **Improving of the Life of Community**; basically the *Erob* society is poor and economically impoverished as a result, the only source of livelihood is cultivation of the resources irrationally. Thus, extricating of the community from poverty and famine via different mechanisms has significant role in minimizing of environmental degradation. For instance, providing and innovating of some off-farm jobs, commerce activities, local financial business and some investments to transform the society from environmental dependence. Besides, introducing of modern agricultural practices that can replace the subsistence farming system to manage the environment from unwanted degradation. Indeed, poverty is a major cause of environmental problems and amelioration of poverty is a

necessary and central condition of any effective programmes addressing the environment of problems and challenges. Therefore, eradicating of poverty is prerequisite for ensuring sustainable environment.

- **Developing Awareness Level of the Society**; educating of the society about the deadly effect of continuous environmental degradation on their life and futurity. Therefore, each household and the community at larger should increase their awareness level regarding of disadvantage of environmental degradation and advantage of promoting of the environment. Therefore, awareness creation initiatives can encourage for insuring of sustainable environment. So, giving continues awareness and educating about environmental conservation at grass root level is very important to mitigate this pervasive problem. In addition to this, conservation of natural resources and primary environmental care measures should be taken effectively.
- **Governmental and Societal Actions**; to halt this problem, government and society of that *Wereda* should actively participate in taking actions cooperatively. Widely the people should campaign in environmental rehabilitation programs like forestation, soil conservation, building dams and proper utilization of resources. The government also works assiduously to takes its own role cooperatively with the community by providing of materials and budget. As, the *Wereda* is periphery the regional government does not give high focus to this serious problem so it should be pay special emphasis.
- **Providing of Modern Energy Technologies and Introducing Modern Farming Practice**; deforestation is mainly caused due to high demand of firewood and other home activities however, by distribution of the modern energy to society at low price will decrease the amount of deforestation rate. Another point is changing of the traditional and backward system of farming in to modern way that can minimize massive soil erosion and resources depletion.
- **Establishing of Strong Institution Body and Ensure Sustainable Management of Resources**; this is basically related with wise and sustainable utilization and management of resources. Effective and efficient authorized bodies should be created to monitor, regulate and to protect enormous environmental depletion. Additionally, this authorized institution should work jointly with the community interest. The Ministry of Environment & Forests (MoEF) in the Government should take the forefront responsible for protection,

conservation and development of environment. The Ministry works in close collaboration with other Ministries, State Governments, Pollution Control Boards and a number of scientific and technical institutions universities, non-Governmental organizations etc.

- **Giving of Proper Attention in Expanding of Infrastructure**; in fact infrastructures are vital for development but some contractors are irresponsible regarding of fate of the environment. They aggravated the environmental problem in order to attain profit without considering the environment. Thus, addressing the problem and effective controlling of the contractors is very necessary to pursue consistent environment.
- **Implementing of Suitable Environmental Policy**. It is known that Ethiopia has not clear and brief policy of environment. Though it has weak policy it lacks effective implementation. So vivid and strong policy should be draft and implemented to ensure sustainable environment. Long-term environmental policy should be drafted from the federal government up to the local community.
- **Global Cooperation towards the Environment of the Planet**; promoting and ensuring of healthy environment is not only belongs to one government or some segment of society rather it concerned to all nations and peoples of the world. World governments, International institutions, NGOs and community should strive in common to fight environmental challenges and problems. Thus, environmental adaptation strategies today should be formed and implemented collectively by different stakeholders: governments, nongovernment organizations (NGOs), international donor community, and experts from Ethiopia and abroad. They should act together in innovating strategies to ensure environmental security in the form of 21st century new idea “collective security”.

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Appendix I: A Guide Line for In-depth Informant Interview, Key Informant Interview and Focus Group Discussion

NB. The original language that the researcher used to develop this guide line for gathering data is Tigrigna which is also spoken in *Erob* community besides their ordinary language of *Erob* is *Erob.* In case when there is language barrier the researcher was employ language translator.

A. Interview guide for In-depth Informant Interview (III) of the participants including the farmers, resources dependent families and communities.

Good Morning/Afternoon! You Are Welcomed to This In-depth Informant Interview

My name is Gebrehiwot Hailemariam and I come from Addis Ababa University, Institute for Peace and Security Studies (IPPS) for academic study. Today my objective is, to gather information and ideas about the effect of environmental degradation on human security; with particular focus on food, economic, health and social security of the society/households of *Erob Wereda*. Concerning these issues please express your ideas, feeling, experiences, awareness and attitudes without any fear or suspicion. To tell you frankly, this study depends upon your genuine participation and any comments or opinions which are related to this issue are welcomed. All the information's and opinions will kept confidentially and only will be use only for academic research purpose. So any suggestions' and ideas are based on voluntary participation since your name and other personal information will not record and documented. You are very welcome to ask any questions for any sort clarification and explanation about the aim of this study.

Research site identification

Site name: Tabia/ Wereda_____

Personal information for individual In-depth Interview Participants (III)

Sex_____

Age_____

Educational level_____

Position/job in the community_____

List of Questions

1. What are the main causes/ factors of environmental degradation in this area? Please elucidate.
2. What are the driving/ triggering causes of environmental degradation in this area?
3. Have you accessed to fertile cultivable land? If no why?
4. Is the environment is resource full to lead your livelihood?
5. Do your land composition is sufficient to boost your agricultural production?
6. What seem food security and availability in the *Wereda* in relating to the environment?
7. Do the environment is prone to water availability? If no why
8. How much time will take to get water availability for household consumptions and your cattle feeding?
9. Have you full grazing land for your animal production?
10. Do you think that environmental degradation will cause massive migration? If yes clarify
11. Is your environment causing any health related problems? If yes please elaborated and is conducive to access health centers
12. What are the effects of environmental degradation on human security particularly on food, economic, health and social security? Please, note in detail
13. What is the awareness level of the community regarding the effect of environmental degradation on human security especially on food, economic and health security?
14. Have you challenged any problems due to environmental difficulty? If yes, list them
15. Who are the first victims of this problem?
16. Have you faced any dispute or sort of disagreement with your neighbors' or any ethnic groups as a result of resource scarcity? If yes how and when
17. Does your environment influence for expanding of these infrastructures?
18. Do you have accessible infrastructures in your locality?
19. Does any governmental or public action are taken to halt/minimize the problem? If no why please mention the challenges
20. Do you have any additional or related opinion on this issue?

Thank you a lot for your Indispensable Information!!!!

B. Key Informant Interviewee (KII); local authorities and *Wereda* officials who responsible for environmental related issues

Good Morning/Afternoon! You Are Welcomed to This In-Depth Informant Interview

My name is Gebrehiwot Hailemariam and I come from Addis Ababa University, Institute for Peace and Security Studies (IPPS) for academic study. Today my objective is, to gather information and ideas about the effect of environmental degradation on human security; with particular focus on food, economic, health and social security of the society/households of *Erob Wereda*. In relation to this there are questions to be answer according to your knowledge and relevance or responsibility. All the information's and opinions will kept confidentially and only will be use only for academic research purpose. So any suggestions' and ideas are based on voluntary participation since your name and other personal information will not record and documented.

Research site identification

Site name: *Tabia/ Wereda*_____

Personal information for individual in-depth interview participants

Sex_____

Age_____

Educational level_____

List of Questions

1. What are the most common causes of environmental degradation in *Erob Wereda*?
2. What do you think the triggering causes environmental degradation in *Erob Wereda*?
3. What is the awareness level of the society of regarding the risk or threat of environmental diminished?
4. Does the society have another opportunity to lead their livelihood without obsessing in the environment?

5. What are the main human security threats that face due to dearth of environment?
6. How does environmental threat impact human security?
7. Do government give due attention to this problem (environmental degradation)? If no what it should?
8. The environment is deteriorated what do you think that the human security of future generation? For instance food, health and economic security
9. Do the societies have capability to challenge any environmental threat?
10. Do there is any manifestation conflict among household neighbors or other clans due environmental factor?
11. Do you have any additional suggestion or comments on the issue?

Thank you a lot for your Indispensable Information!!!!

B. A guide line for Focus Group Discussants which consists local households, farmers, community and religious elders.

Good Morning/Afternoon! You Are Welcomed to This Focus Group Discussion (FGD)

My name is Gebrehiwot Hailemariam and I come from Addis Ababa University, Institute for Peace and Security Studies (IPPS) for academic study. Today my objective is, to gather information and ideas about the effect of environmental degradation on human security; with particular focus on food, economic, health and social security of the society/households of *Erob Wereda*. Therefore, this FGD is designed to obtain information concerning of the effects of environmental degradation on human security with special emphasis on food, economic, health and social security. Since the ultimate purpose of this FDG is to generate evidence and information from the nearest of the concerned bodies. All comments, opinions and suggestions gained from this FGD are confidential that are only use for academic purpose. While the discussion is going if there is any need of assistance please ask me and questions are welcome.

Here the responsibility of the researcher is act as observer-as- participant who identifies himself as a researcher and interacts with the participants in the group discussion. So that facilitation, coordination and posing and answering questions are the jobs of the researcher.

Research site identification

Site name: *Tabia/ Wereda*_____

Personal information for individual In-depth Interview Participants

Sex_____

Age_____

Educational level_____

Position/job in the community_____

List of Questions

1. What seems the condition of environmental degradation in your area?
2. How is your environmental sustainability?
3. What are the basic challenges of environmental degradation in your livelihood and life?
4. Do you think that deprived environment can influence your food or agricultural production? If yes how?
5. Are you stratified with your agricultural production receiving from arable land?
6. What are the basic and triggering causes of environmental degradation in *Erob Wereda*?
7. What are the major threat and risk/vulnerability of environmental degradation?
8. Does government take any measurement to minimize this problem? If no why
9. Do any health related problems in your locality caused by environmental problems?
10. Do rain is available for your crop production and animal breeding?
11. What is the effect of drought and water scarcity on your food and water security?
12. Does environmental degradation cause migration?
13. Is your climate condition is convenient for agricultural production?
14. Does any environmental induced conflict or tension in *Erob*, even inter-household or any ethnic group?
15. If you have any supportive or additional suggestion or opinions related to this issue?

Thank you a lot for your Indispensable Information!!!!

Appendix II: Profile of the selected Respondents of the Study

A. The Profile of In-depth Informant Interview Participants(III)

NB. Fundamentally, III# is a code number given to participants to refer to a given in-depth informant interviewee anonymously.

No	Code of Informant	Sex	Age	Title	Position in the Community	Educational Status	Place of Interview	Date of Interview
1	III#1	Male	50	Ato	Smallholder	Illiterate	*Alitena*	19/1/2016
2	III#2	Male	65	Ato	Smallholder	Illiterate	*Alitena*	19/1/2016
3	III#3	Male	31	Youth	Resident	8th	*Wera'atle*	19/1/2016
4	III#4	Female	28	W/ro	Resident	1th	*Alitena*	25/1/2016
5	III#5	Male	48	Ato	Resident	5th	*Endalgeda*	20/1/2016
6	III#6	Male	67	Ato	Resident	Literate	*Wera'atle*	24/1/2016
7	III#7	Male	49	Ato	Resident	4th	*Endalgeda*	20/1/2016
8	III#8	Female	42	W/ro	Resident	Literate	*Wera'atle*	20/1/2016
9	III#9	Male	55	Ato	Resident	Illiterate	*Alitena*	20/1/2016
10	III#10	Male	79	Haleka	Elder	Literate	*Wera'atle*	21/1/2016
11	III#11	Female	53	W/ro	Resident	Illiterate	*Endalgeda*	22/1/2016
12	III#12	Female	39	Youth	Resident	4th	*Endalgeda*	21/1/2016
13	III#13	Male	70	Priest	Religious father	Literate	*Endalgeda*	22/1/2016
14	III#14	Male	58	Ato	Resident	Illiterate	*Alitena*	25/1/2016
15	III#15	Male	47	Ato	Resident	Illiterate	*Wera'atle*	24/1/2016
16	III#16	Male	65	Ato	Farmer	Illiterate	*Alitena*	25/1/2016

B. Profile of Key Informants Interview Participants (KII).

NB. **KII#** *is a code number given to participants to refer to individual key informant anonymously*

No	Code of Informant	Sex	Age	Title	Position in the Community	Educational Status	Place of Interview	Date of Interview
1	KII#1	Male	45	Expert in environmental issue	Authorized for prevention of environment	BA	*Wereda Erob*	26/01/2016
2	KII#2	Male	35	Officer of food security	Authorized for environmental disaster	BA	*Wereda Erob*	26/1/2016
3	KII#3	Male	29	Officer of rural development	Acting rural and agricultural development officer	BA	*Wereda Erob*	27/1/2016
4	KII#4	Male	41	Ato	Leader for environmental Building	8th	*Tabia Alitena*	01/02/2016
5	KII#5	Male	28	Youth	Expert for Prevention an preparedness of environmental problem	BA	*Wereda Erob*	03/02/2016
6	KII#6	Male	33	Ato	*Tabia* Manager	BA	*Tabia Endalgeda*	22/01/2016
7	KII#7	Female	43	W/ro	Net work leader	5th	*Tabia Wera'atle*	20/01/2016
8	KII#8	Male	37	Youth	Natural resource conservation	BA	*Wereda Erob*	04/02/2016
9	KII#9	Male	56	Ato	Expert of food security	BA	*Wereda Erob*	07/02/2016
10	KII#10	Male	29	Ato	Expert in crops	diploma	*Erob Wereda*	07/02/2016
11	KII#11	Male	40	Ato	Farmer	4th	*Tabia Alitena*	22/01/2016

12	KII#12	Male	44	Ato	Expert in PSNP	4th	*Wereda Erob*	06/02/2015
13	KII#13	Male	51	Expert in environmental protection and problem	Officer for prevention of environmental problem	4th	*Wereda Erob*	06/02 2016
14	KII#14	Male	43	Expert in health center	Rural health assistance		*Tabia Endalgeda*	22/1/2016

C. Profile of FGD Discussants (FGD)

NB. **FGD#** *is a code number given to partakers to refer to individual focus group discussant anonymously.*

No	Code of FGD Discussants	Sex	Age	Title	Position in the Community	Educational Status	Place of Discussion	Date of FGD
1	FGD#1	Male	49	Ato	Tabia leader	5th	*Alitena*	February, 07, 2016
2	FGD#2	Male	59	Ato	Farmer	Illiterate	"	
3	FGD#3	Male	53	Ato	Rural health center assistance	Literate	"	
4	FGD#4	Male	67	Ato	Farmer	4th	"	
5	FGD#5	Male	42	Ato	Resident	Literate	"	
6	FGD#6	Female	42	W/ro	Farmer	Literate	"	
7	FGD#7	Female	27	Youth	Resident	8th	"	
8	FGD#8	Male	34	Ato	Farmer Militia	Literate	"	
9	FGD#9	Male	47	Ato	Tabia Leader	7th	*Wera'atle*	February, 09, 2016
10	FGD#10	Male	38	Ato	Net work leader	BA	"	
11	FGD#11	Female	33	W/ro	Resident	7th	"	
12	FGD#12	Male	56	Ato	Resident	Illiterate	"	
13	FGD#13	Male	63	Priest	Religious father	Literate	"	

14	FGD#14	Male	81	*Aboy*	Elder	Illiterate	"	
15	FGD#15	Male	27	Teacher	Resident	BA	"	
16	FGD#16	Male	51	Ato	Tabia leader	6th	"	
17	FGD#17	Male	33	Ato	Kushet leader	10th	"	
18	FGD#18	Male	19	Student	Resident	10+2	*Endalgeda*	February, 11,2016
19	FGD#19	Female	38	W/ro	Resident	Literate	"	
20	FGD#20	Male	55	Ato	Resident	Literate	"	
21	FGD#21	Male	44	Ato	Militia	Literate	"	
22	FGD#22	Male	50	Ato	Farmer	Literate	"	
23	FGD#23	Female	35	W/ro	Farmer	Literate	"	
24	FDG#24	Male	67	Ato	Farmer	Literate	"	
25	FGD#25	Male	78	Ato	Farmer	Illiterate	"	

Appendix III: Some Pictures of Key Informant Interview: January, 2016

Appendix IV: Profile of the Ruined *Erob* Environment Field Observation: January, 2016

Signed Declaration

I the under signed declare that this thesis is my original work and that all sources of the materials used for the thesis have been duly acknowledged.

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