

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATES
INSTITUTE OF GENDER STUDIES

**Assessment of Household Energy Project from a Gender Perspective:
The Case of GTZ-supported Mirt Dissemination Project in Bahir Dar City**

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ADDIS ABABA

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An Assessment of Household Energy Project from a Gender Perspective:
The Case of GTZ-supported Mirt Dissemination Project in Bahir Dar City

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TABLE OF CONTENTS

TITLE	PAGES
LIST OF ATTACHMENTS	
ACKNOWLEDGEMENTS	I
LIST OF TABLES, GRAPHS AND PICTURES	II
ABBRIVIATIONS	III
GLOSSARY OF TERMS	IV
ABSTRACT	V
CHAPTER ONE	
1. INTRODUCTION	
1.1 Background	1
1.2 Problem Statements	4
1.3 Fuel Wood Crisis, HHE Strategies and Gender Division of Labor	7
1.4 Research Questions	8
1.5 Objective of the study	8
1.6 Significance of the Study	9
1.7 Structure of the Thesis	9
1.8 Scope and Limitations	9
1.9 Definition of Terms	10
CHAPTER TWO	
2. RESEARCH DESIGN AND STUDY AREA	
2.1 The Study Area; Bahir Dar City	12

TABLE OF CONTENTS

TITLE	PAGES
2.1 Methodology	12
2.2.1 Sampling	13
2.2.2 Data Collection Tools and Methods	14
2.2.3 Data Collection and Data analysis methods	15
2.3 Ethical Consideration	16
 CHAPTER THREE	
 3. LITRATURE REVIEW AND THEORETICAL FRAMEWORK	
3.1 Literature Review	17
3.1.1 Environment and Gender	17
3.1.2 Gender Roles and Fuel Wood Crisis	19
3.1.3 Household Energy Need with its Efficiency	19
3.1.4 Improved Stoves and Empowerment of Women	22
3.1.5 Gender and Energy Policies	23
3.1.6 Gender Mainstreaming in Development Projects	24
2.1.7 Gender Content in Energy Project Plans.	26
3.2 Theoretical framework	27
3.2.1 Eco-feminism	28
3.2.2 Material Feminism	30
3.2.3 Contemporary Socialist Feminism	32
 CHAPTER FOUR	
 4. ANALYSIS OF FINDINGS AND DISCUSSION	
4.1 Women's Views and Concerns on GTZ-Mirt Project	35

TABLE OF CONTENTS

TITLE	PAGES
4.1.1 Profile of Quantitative Survey Respondents	35
4.1.2 Impacts and Benefits of Mirt	38
4.1.3 The Impact of Mirt Project on Women's Life	45
4.1.4 Information and Marketing Promotion on Mirt	50
4.1.5 Decision on Stove Purchase	52
4.1.6 Financial Issues	55
4.2 Gender, Energy Policy, Strategy and GTZ-Mirt Project	59
4.2.1 The GTZ-Mirt Project Profile	59
4.2.2 Fuel Wood Consumption Pattern of Bahir Dar	60
4.2.3 Role of Women and Women's Organizations in GTZ-Mirt Project	65
4.2.4 Integration of Gender Concerns in the GTZ-Mirt Project Cycle	67
CHAPTER FIVE	
5. CONCLUSION ANDRECOMMENDATIONS	
5.1 Summary	79
5.2 Conclusion	81
5.3 Recommendations	83
References	85-88

LIST OF ATTACHMENTS

Appendices	Pages
A: Sample of Survey questionnaire	89
B: In-depth Interview Guide with Mirt Users	95
C: Key-informant Interview Guide with Mirt Producers	96
D: Interview Guide for Stakeholders of the Project	97
E: Profile of in-depth Interview Participants	100
F: Profile of key-informant Interview Participants	101
G: Pictures Taken During the Study	102
H: Map of the Study Area	103

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LIST OF TABLES, GRAPHS AND PICTURES

I. List of Tables	Pages
Table 4.1. Background Characteristics of Survey Participants	37
Table 4.2. Information on How to Maintain Mirt	40
Table 4.3 Responses on Convenience and Comfort of Mirt	44
Table 4. 4. Reasons for Not Having Mirt	55
Table 4. 5. Financial Sources to Purchase Mirt	58
Table 4.6. Fuel Wood Supplement by Respondents	62
Table 4.7. Assessment of National Energy Policy and Strategies	70
Table 4.8. Assessment of Improved Stoves Technology Package	71
Table 4.9. Assessment of various GTZ-Mirt project documents	73
Table 4.10. Gender perspective of ‘Impact assessment of the GTZ-Mirt Project’	75
Table 4.11. Assessment of Different Promotional document	77
II. List of Graphs	
Graph 4. 1 Time Mirt Acquired Versus Comfort to Polish Pan	45
Graph 4.2 Sources of Information on Mirt	51
Graph 4.3. Information that Influence Respondents to buy Mirt	52
Graph 4.4 Husband’s Reaction in Buying Mirt	53
Graph 4.5 Energy Sources Used by Respondents	61
III. List of Pictures	
Picture 4.1: kitchen where three Mirt located, short chimneys taken of	40
Picture 4.2: Mirt being used in contrary to users guide	42
Picture 4.3: A Woman in Bahir Dar Baking in the Open Air	57
Picture 4.4: Women and Men Carrying Fire Wood to Bahir Dar for Sell	63

ABBREVIATIONS

1. **ARS-MEA:** Amhara Regional State Mines and Energy Agency
2. **ARSPA:** Amhara Regional States Planning Agency
3. **BOA:** Bureau of Agriculture
4. **BOH:** Bureau of Health
5. **BOWA:** Bureau of Women's Affairs
6. **BOWME:** Bureau of Water, Mines and Energy
7. **CBO:** Community Based Organization
8. **CSA:** Central Statistics Agency
9. **EAEDPC:** Ethiopian Alternative Energy Development and Promotion Center
10. **EPA:** Environmental Protection Authority
11. **ESS:** Energy Saving Stoves
12. **GDI:** Gender related Development Index
13. **GEM:** Gender Empowerment Measure
14. **GTZ:** Deutsche Gesellschaft fur Technische Zusammenarbeit
(German Agency for Technical Co-operation)
15. **GTZ-AMES-Cooking :** GTZ- Access to Modern Energy Services-cooking
16. **GTZ-ECO:** GTZ- Energy Coordination Office
17. **HDI:** Human Development Index
18. **HEPNR:** Household Energy/ Protection of Natural Resources
19. **HHE:** Household Energy
20. **MME:** Ministry of Mines and Energy of Ethiopia
21. **REST:** Relief society of Tigray
22. **SUN:** Sustainable Utilization of Natural Resources
23. **UN:** United Nation
24. **UNDP:** United Nation Development Program
25. **UNIFEM:** United Nations Development Fund for Women
26. **WAD:** Women's Affairs Department

GLOSSARY OF TERMS

Edir; is a traditional association of people in Ethiopia and its purpose is to help members when they lose a family member in organization of funeral ceremonies, providing money, labor and other necessary arrangement.

Ekobe; is a traditional association where people save money and use it in turn.

Fetenech; is an improved stove which saves about 70% of fire wood and used for pots.

Gonzie; Is an improved biomass stove which is used to bake injera. It is made of clay and can be dismantled when not used and can be used as a stove of pot, mitad and pan by changing the direction of the assembly.

Injera: a traditional bread made of Teff (Cereal) and consumed by most Ethiopians.

Kebele: the lowest administrative structure in Ethiopian.

Lakech; is an improved stove which saves about half of charcoal and used for pots.

Mirt: an improved biomass stove which is used to bake injera and believed to save about half of fuel wood consumption.

Mitad: a traditional injera baking stove made up of clay.

Slim Mirt: Improved version of mirt which is less in weight and doesn't have a shoulder that carry the mitad unlike the ordinary mirt.

Tikakinina Anestena: a micro finance enterprise at Kebele level.

Woreda: the next administrative level from Kebele and next to Zonal administration.

Wot: a traditional sauce usually eaten together with Injera by most Ethiopians.

ABSTRACT

The purpose of the research was mainly to investigate women's views, experience and problems related to Mirt stove project in Bahir Dar City. Evaluation of integration of gender aspects in the project cycle in respect to a strategy of gender mainstreaming, environmental crisis affecting women and energy policies and strategies of Ethiopia were the main focus. Quantitative and qualitative research methodologies were used and accordingly different methods of data collection such as quantitative survey, in-depth interview coupled by personal observations, case studies and document review were applied. Quantitative survey covered 256 and in depth interview 18 women where as key informant interview covered 9 individuals including men.

Findings of the research showed that GTZ supported Mirt project has contributed positively to environmental protection despite gender mainstreaming was not applied through the project cycle. However, the project's counterpart on the Government side which is Ministry of Mines and energy is implementing gender mainstreaming and has a five year strategic plan in this respect. The major house energy is biomass accounting to 89.1% of the energy sources from which fire wood accounts 82.42% and 20-50% of respondents spend their income on the fire wood causing pressure on women. Respondents accounting to 62.11% are using Mirt stove for baking *Injera* and is definitely contributing to fire wood consumption. The GTZ-Mirt project assumes 50% of fire wood will be saved compared to the conventional stove however, in real life, conditions were found to discredit the assumption.

Absence of timely updates of the technology, no consultation with users (women) and shortage of finance for women to buy the stove are among the main limiting factors. From the collective findings it is concluded that the assumed success of the Mirt project is not fully attained and should not only be measured by the number of stoves distributed and should have a regular real life test and should include gender aspects. Twin track approach strategy meaning Mirt stove dissemination should be undertaken in parallel with fuel wood supply enhancement through community forestry program to combat fuel wood deficit.

CHAPTER ONE

1. INTRODUCTION

1.1 Background

Ethiopia is located in the horn of Africa with land surface area of 1.2 million square kilometers and is the 7th largest country in Africa in size. Its resource is largely the land and much of the arable land with low access and only 15% are used so far. The country's forest coverage was 16% in 1950 and was only 3.4% in 1983 (GTZ, 2000). Renewable and natural resources that are land, water, forests and trees as well as other forms of biodiversity, which meet the basic needs for food, water, clothing and shelter, have now deteriorated to a low level productivity in most parts of the country (EPA, 1997).

Since Ethiopian economy is largely dependent on agriculture it is exposed to climate shocks and the shocks are caused by short period rain that lead to crop failure and highly associated with environmental degradation. The total population of the country is 73,918,505 in which the male population is 37,296,657 and the female population is 36, 612, 848, (CSA, 2008). The population size coupled with serious environmental degradation, the country scores low in almost all social and economic growth indicators. The economic indicator shows that the real GDP per capita of USD 130 for 2006 (Million, 2008). Ethiopia is ranking 169th in Human Development Index, 149th in GDI and 72nd in GEM out of 173 countries (UNDP, 2008).

Population is the cause of the discrepancy between population growth and available resources. Over the last few decades, the population of the country increased to the extent that the population carrying capacity of the environment decreased and to these effect climatic conditions became erratic and both manmade and natural disasters have ravaged the country. This massive environmental degradation due to natural factors, unwise use of its natural resources, unsound ecological practices and rapid population growth has adverse impacts on the overall development of the country (Teshome, 2008).

Issues attributing to population expansion in most third world countries have prevented rapid reduction in population as it is linearly connected to poverty and basic needs are under-fulfilled. The basic needs of material life include food, clothing, and shelter necessary for physical and emotional wellbeing of mankind. Although still not officially considered as basic

human need energy is essential for human well-being and needed to cook food, to boil heat and light the home (Dankilman and Davidson, 1988). In Ethiopia, only 6% of household energy comes from electricity or petroleum products otherwise almost 94% comes from biomass such as wood, crop residues and dung (GTZ, 2009). The number of Population without electricity is 60.8 millions in 2005 (UNDP, 2008).

Energy is a key factor in economic and social development of the public and private sectors. In the past the focus concerning energy policies and development was mainly in urban and industrial areas and in contrast, the needs of rural households, farmers, small business and urban poor were generally given less priority (UNDP, 2000).

Currently, there is a change in area of focus concerning energy sources and technology developments in order to address the social, environmental and economical problems. There are also new perspectives on energy policies that are giving greater attention to the social dimension including recognition of different impacts of energy issues on women and men (UNDP, 2004).

Biomass as the fuel of the poor and source of household energy in most of third world countries is highly related to environmental and women's condition. In third world countries women are largely responsible for survival tasks that are essential for daily life. They grow food crops, provide water, gather fuel and perform most of the other works that sustain the family. As daily users of the natural resources, women are often the hardest hit by environmental degradation. It has become a common fact that the ongoing natural resource degradation is desperately affecting the majority of the rural poor whose livelihood is entirely dependent on these resources. Men and women are expected to different environmental stresses in different ways (Teshome, 2008).

Women are the primary sufferers of environmental degradation and as a result walk distances to collect fuel wood and fodder. The problem becomes even worse for them because of feminization of poverty and gender division of labor that makes women's life difficult and implicates them as the cause of the problems. Third world women often have no choice but, to exploit natural resources in order to survive, even though they may have the knowledge to promote sustainability (Dankelman and Davidson, 1988).

The principal victims of environmental degradation are those most underprivileged people and majority of these are women in which their problems and the environment are very much

interrelated. Usually, both are marginalized by existing development policies and because of complex cycles of poverty, inappropriate development and environmental degradation, poor people are being forced to live in ways which induce further destruction (Davidson, 1998).

To address the complex environmental problem, Ethiopia has ratified and signed many international laws related to environmental protection. To mention some are the Cartagena Protocol on Bio-Safety 2003, the Framework Convention on Climate Change 1994, the Kyoto Protocol on Climate Change 2005 and the convention to combat desertification 1997 (UNDP, 2008). Accordingly, Energy Policy of Ethiopia was enacted in 1994 followed by 1998-2002 EC strategic plans which include some gender concerns in its program and strategy (MME, 1998).

Different programs and projects were designed and executed to implement the Ethiopian Energy Policy as well as Women's Policy of Ethiopia Which was enacted in 1993. Governmental, non-governmental and private organizations have been working to alleviate problems concerning household energy, environment and women's socio-economical problems since then. GTZ (German Technical Co-operation in Ethiopia) is one of NGOs which is undertaking different projects and approaches in cooperation with the Ministry of Mines and Energy of Ethiopia.

One of the house hold energy project is the development of alternative energy technologies such as the energy saving stoves specifically called 'Mirt' which is the focus of this research. Mirt stove is used to make '*injera*' which is the staple bread for most of Ethiopian people and as gender division of labor usually prepared by women. The project gives emphasis to protect the natural resource and biodiversity of the country through efficient use of household energy. These stoves are believed to save 50% of the energy consumption as compared to the open-three stone cooking stoves (GTZ, 2000).

These facts and figures are agreed upon different stakeholders who are working on projects related to ESS. According to GTZ, using ESS means less time spent on fuel collection and cooking, less frequency of collecting fuel wood which cause to have more free time for women for productive endeavors, more time for adult education and child care, reduced risk of assault and injury, enhanced prestige and empowerment (GTZ, 2009).

In accordance with policies and strategies drawn, major steps have been taken through different projects on the household energy crisis. The emphasis of this research was to assess

particularly the integration of science and technology with our own 'local' voices and indigenous knowledge. The integration of gender concerns in the formulation and implementation of energy programs and projects (Naomi, ND).

The main subject of the study was to identify whether household energy technology produced by the projects is usable, affordable, convenient and contextual to the person in question, mostly woman in the study area, Bahir Dar City. More specifically, to understand the meaning of our material solution measured from the perspective of the actor in question in these case women who are actors in the provision and consumption of household energy in Ethiopia.

1.2 Statement of the Problem

Limited access to modern energy technology is a problem because it has disproportionate effect on women, especially in rural areas. The differing work and social roles of men and women are culturally established and vary from place to place. In many areas women are responsible for gathering fuels and using them for cooking, heating and boiling in the process women are usually exposed to health hazards (UNDP, 2000).

There is also a growing International concerns on climate change and carbon emission that are highly associated with the current energy crisis. Depletion of traditional fuels because of land clearing, deforestation, desertification and overuse together with current climate change have affected women negatively. This has in turn deprived women from traditional benefits which used to be previously obtained under community managed resources available to all (UNDP, 2000).

A study conducted in Gambia in 1991 on 500 children who always stay with their mothers working on traditional kitchen were at risk of having acute respiratory illness six times higher than a control group, cited in (Tadelech, 2003). Smoke from poorly ventilated indoor fires that contain air pollutants like carbon monoxide, nitrogen dioxide, formaldehyde and other complex hydrocarbons accounts for close to 2 million premature deaths per year (UNDP, 2004).

Women usually bear the main burden of providing and using biomass energy sources so most of their time, energy and money will be spent for this purpose. In addition to time and physical burdens involved in gathering fuel, they also have to worry about threats of assault, harassment and violence which sometimes end up in unwanted pregnancy (Clancy, 2003).

Many income-generating activities especially those undertaken by women are usually based at the household level and are highly dependent on availability and efficient energy sources but, husbands may not be interested in buying or acquiring new and improved energy equipment and in effect the women will be lacking capital (Dankelman and Davidson, 1988).

What makes the situation worse in Ethiopia is that Biomass fuel constitutes the majority of household energy which is 94% of the total energy source of the country. Further it breaks down into 77% woody biomass, 8.7% crop residue and 7.7% dung. This being the general situation, there is considerable variation in both supply and consumption patterns (GTZ, 2009). The fact that the major proportion is supplied by traditional energy sources, have serious implications on the natural resource base. The fuel wood deficit is estimated to reach 47 million cubic meters in 2000 which is 4 times higher than the sustainable supply. The rate of depletion of the natural forests is estimated between 150,000 and 200,000 hectare per annum (GTZ, ND).

Household energy consumption pattern of Bahir Dar City, the study area shows that 89.1% use biomass fuel of which the majorities use only fire wood accounting to 82.42%. The other 3.52% of them use firewood in combination with Kerosene and Electricity while only 6.64% use electricity.

Household energy expenditure accounts as much as 35% of the overall household expenditures and this is a big burden for low income families. Actions have been taken to alleviate these interrelated problems from the Government side. Three major interventions on household energy crisis at national level are supply enhancement, inter-fuel substitution and improved stove dissemination (GTZ, 1998). In order to implement these initiatives various policies, strategies and programs have been developed and finally became practical through different projects.

Most policy makers view energy policies as gender neutral, but the fact is women and men are affected differently by energy policies wherever their work roles differ, as is the case in many developing countries. Usually, in problem identification, planners and experts are involved but the end-users including community women from all income groups are not represented. Consultation with women's groups and collection of gender-specific data are not exercised. Especially, in the process of monitoring and evaluation of energy projects the criteria selected to measure successfulness of the project did not include women's views who are the end users (UNDP, 2004).

Solving the household energy crisis together with the environmental protection in general do not reside in scientists and experts toolboxes, the tools will rather be found in the practical application and indigenous knowledge of those who are enmeshed in the world out of which the objects of knowledge were extracted and refined (Windy and Francis, 2005).

Although projects were mostly intended to benefit women, plans are rather based on assumptions instead of considering objective facts about what women needs which often proved unrealistic. Projects for provision of local energy are assumed to introduce better technology which will bring benefits to the community and particularly to women in respect to fuel wood saving, less time needed to gather fuel wood and healthier cooking condition (Skutch, 1997).

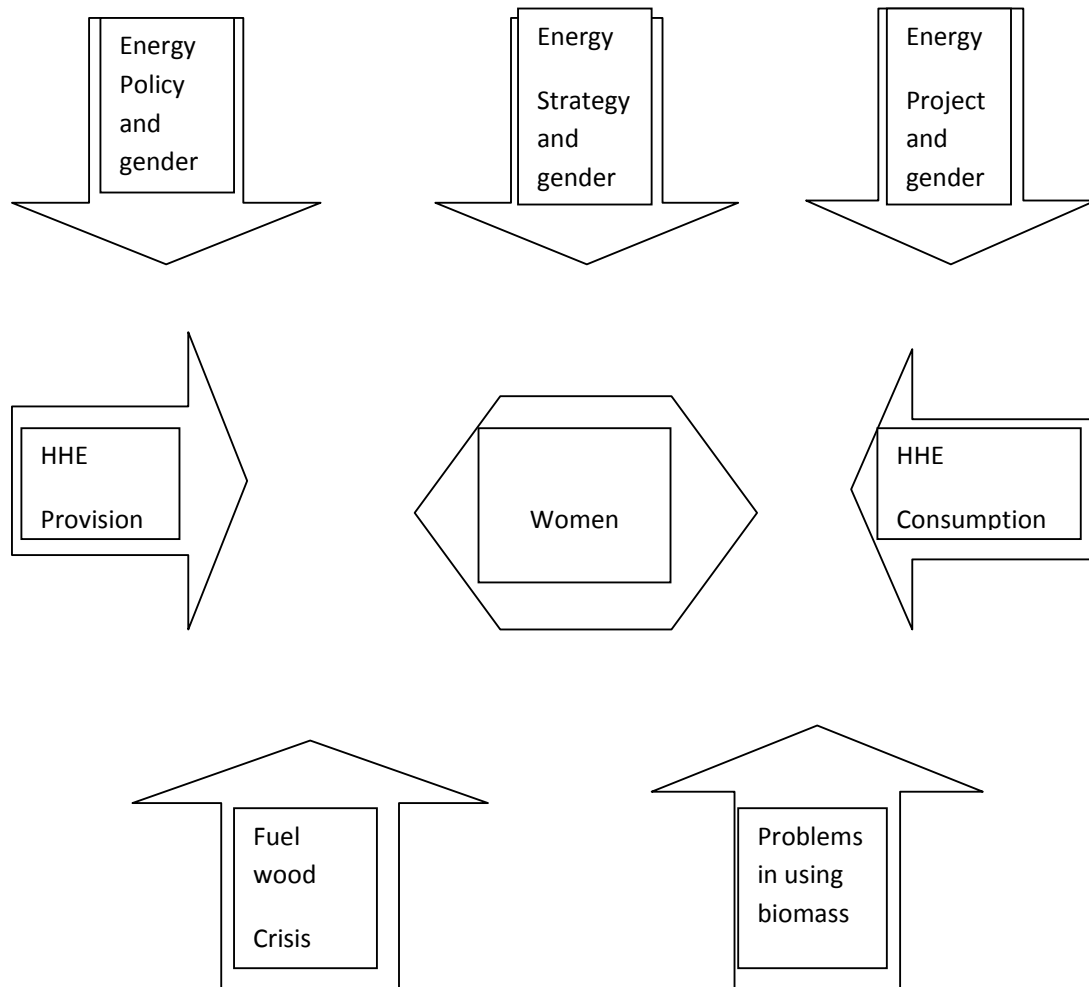
However, energy projects fail to address the intended benefit to women and thus the common problem is women strangely don't seem to be interested in this wonderful new technology. Mysteriously adoption rates are low and interest wanes rapidly and is very disappointing for the energy planners (GTZ, ND). At the end of the day, when compared to project life and financial investment, the objective of these projects are underachieved and goals are not easy to attain (Skutch, 1997).

As a result, most of the existing literature on Household energy crisis in Ethiopia seems to totally relate the problem to the impact of using biomass energy on the natural resource and biodiversity of the country (GTZ, 2000). It seems that the consequence of household energy consumption pattern is highly associated with environmental issues where it neglects and de-emphasizes the impacts on women (GTZ, 1999). The objective of intervention strategies to address this environmental issues looks devoid of gender concerns. Hence, the researcher intends to obtain vital information relating the environmental crisis with women's situation and gender division of labor. Investigating women's views towards the strategy of demand management of household energy consumption or energy efficiency through dissemination of energy saving stoves will be the primary focus of the research.

Hence, this research will give emphasis on the voice of women who have the experience on a specific energy project, its services and its products more than any donor, policy maker or project coordinator. It is the belief of the researcher that, the women who are the most important actors in the energy cycle have to say about the whole process of energy projects, its achievements and drawbacks.

1. 3 Fuel Wood Crisis, HHE Strategies and Gender Division of Labor.

Women are mostly responsible for providing and consumption of household energy in Ethiopia as gender division of labor. As a result women are most affected by fuel wood crisis and in-door air pollution during food preparation using biomass fuel. Energy Policy, strategy and projects have been developed to address these interrelated problems of environment and energy that resulted from using biomass energy in Ethiopia. It is stated in International and National legal frame works that views, knowledge, and concern of women need to be included in HHE policies and development. This research tries to look into the gender aspect of energy policies, strategies and projects in relation to gender division of labor and fuel wood crisis. Hence, the frame work shown below has been developed by the researcher in order to define the research questions and formulate objective of the study.



1.4 The Research Questions

The research questions considered are the following:

1. Are the different impacts of household energy issues on women and men taken into consideration in energy policy and strategy of Ethiopia which household energy projects have to adopt?
2. What is the influence of the project on fuel wood consumption pattern in Bahir Dar City?
3. Is gender integrated at all stages of the GTZ-supported Mirt project cycle in Bahir Dar City?
4. What are the views, problems and concerns of women related to the improved biomass Injera stove 'Mirt' in Bahir Dar City?

1.5 Objective of the Study

General Objectives

To assess the integration of gender concerns in Energy policy, Strategy and the GTZ-supported 'Mirt' dissemination project and explore the views of women on the service and product of the project in Bahir Dar City.

Specific Objectives

1. To find out how gender concerns are integrated in energy policy, strategy and programs of Ethiopia especially in the household energy sector.
2. To evaluate the planning, implementation, monitoring and evaluation of the 'Mirt' project for its gender concerns.
3. To find out how the GTZ-supported Mirt dissemination project influence the fuel wood consumption pattern in Bahir Dar City.
4. To identify views, experiences, problems and constraints of women related to 'Mirt' in Bahir Dar City.

1.6 Significance of the Study

The study can serve as background for future researchers giving them insight into the gender perspective of household energy problems and solutions. It contributes its part to the existing literature on gender aspects of household energy as it contains facts, problems and recommendations. It is also believed that this study will have its importance for policy makers and development agencies to make them better understand the issues of household energy sources and technologies from gender perspectives. Specifically, this study helps to design appropriate policies for different problems, constraints, interests and priorities of the two genders concerning household energy.

1.7 Structure of the Thesis

The thesis contains five chapters and the first chapter deals with the overall introduction of household energy crisis covering women's situation in Ethiopia, research questions and objectives. The second chapter deals with description of the study area and methodologies applied in the course of the research. The third chapter deals with literature review and theoretical framework and Chapter four with findings, analysis of the findings and discussion. Chapter five covers summary, conclusions and recommendations and sample of data collection tools are annexed.

1.8 Scope and Limitations

The scope of the research covers the investigation of integration of gender concerns in Energy policy of Ethiopia, strategy and GTZ-supported Mirt project including assessment of their inter-related issues. In addition to assessing policies, strategies and projects this research incorporates women's views on the services and products of the GTZ-Mirt project.

One of the limitations of the research was a limited research and resources available on energy and gender in which case it was not possible to associate or compare previous facts in relation to energy and gender. The second limitation of the study is inability of getting fully dependable data on monthly income and expenditure of respondents on fuel. Therefore, it was not possible to calculate the fuel expenditure per head and make comparative analysis with those who have Mirt and have not. The third limitation is that sampling of quantitative survey was dependent on the amount of the research fund and time availability rather than taking into consideration the target population in the study area.

1.9 Definition of Terms

Policy: Public policies are an essential element in modern democracies in that they provide guidance for government officials and accountability links to citizens. It could be defined as a course of action or inaction chosen by public authorities to address a given problem or interrelated set of problem. Every policy has three key elements. The first is the definition of the problem, the second is the goals that are to be achieved and the third is the instrument or means whereby the problem is to be addressed and the goals achieved (Leslie, 2005).

Gender Mainstreaming: It describes efforts to scrutinize and reinvent processes of policy formulation and implementation across all issue areas and at all levels from a gender-differentiated perspective, to address and rectify persistent and emerging disparities between men and women. Gender Mainstreaming was established as a global strategy for achieving sustainable economic development in the 1995 Beijing Platform for Action ratified by all United Nations member states. It is now incumbent upon nation-states and international organizations to carry out gender mainstreaming (True, 2003).

Project: In the broadest sense, a project is a specific, finite task to be accomplished. A project is usually a one-time activity with a well-defined set of desired end results. It can be divided into subtasks that must be accomplished in order to achieve the project goals (Jack, 1985).

Project-cycle: Like organic entities, project have life cycle. From a slow beginning they progress to a buildup of size and then peak, begin a decline and finally must be terminated. Some projects end by being phased into the normal, ongoing operations of the parent organization. The ever-present goals of meeting performance, time and cost are the major considerations throughout the project's life cycle. The cycle of a project include conception, selection, planning, implementation, evaluation and monitoring (Jack, 1985).

Improved Stoves: are those stoves that are developed through improved stoves program taking in the energy scarcity of the country in to account that comes from unsustainable usage of resources by the household sector. It saves energy and reduces the expenditure on fuel by half from that of the traditional ones. It is a tool that offers a better way of cooking for a particular area and group of people who can't afford modern stoves such as Electricity stoves (GTZ, 1999).

Biomass Energy: constitute fuel-wood, charcoal, agricultural residues and animal dung which is used for household cooking, baking and other purposes (GTZ, 2000).

Energy Saving Stove (ESS): closed biomass stove which saves the amount of fuel used by 50% (GTZ, 2000).

Household Energy: energy used to cook heat and boil at the household level (EREDPC, 2002).

Open Stove: it is a traditional stove where the fire place is not closed and 10% fuel efficient (REST, 1992).

In-door Air Pollution: The presence of one or more kinds of air contaminants in residential or work places. Pollutants like carbon monoxide, nitrogen dioxide, formaldehyde and other complex hydrocarbons. Under slow- burning conditions, fuel woods are capable of producing pollution such as benzopyren (a poisonous gas). These pollutants cause respiratory and eye disease and can bring acute bronchitis, pneumonia and death where respiratory defenses are impaired (APi, 2009).

Particulate matter: is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings and small droplets of liquids. In other words it is tiny subdivisions of solid or liquid matter suspended in a gas or liquid (APi, 2009).

CHAPTER TWO

2. THE STUDY AREA and METHODOLOGY

2.1 The Study Area: Bahir Dar City

Bahir Dar, the capital city of the Amhara Regional State (*KILIL*) is located in north western Ethiopia. Situated Southern Shore of Lake Tana located approximately 578km north-northwest of Addis Ababa. Having a latitude and longitude of 11° 36' N and 37° 23'E with an elevation of 1840 meters above sea level Bahir Dar city enjoys tropical type of climate with an average temperature of 17.5°C (ARSPA, 2008).

Administratively Bahir Dar city is considered a special zone with overall diameter of 10km radius and within 20 km radius three satellite cities are included such as Abay, Mechanti, Zege, and 5 rural *kebeles* named as Dishet, Abaraj, wereb kora, tion, zenzelema and weramit. The city is bordered by Tenta from eastern side, Sebatamit from South, Tana lake Wongta from North, and Ybab Eyesus from west. Total numbers of *kebeles* are 13 where 9 of them are *kebeles* in the city and the remaining are 4 rural *kebeles* (ARSPA, 2008).

Based on figures from Central Statistics Agency in 2005 the city has an estimated total population of 167,261 of whom 86,355 were males and 80,906 were females; in rural and urban *kebeles*. With estimated 28 kilometer square area the population density is 5,973 people per kilometer square.

The municipality of the city of Bahir Dar was established in 1933 by 'kegnazmach Tebeb' now the city is developing fast into a place considerable social , political and economic activities and becoming a top commercial center and tourist destination of Amhara National Regional states. The total number of houses in the city is assumed to be 3603 which are located in 9 *kebeles* of the city, out of which 2810 are residential 759 business houses and 34 serving as residential and business (ARSPA, 2008).

2.2 Methodology

To collect relevant data for the study, both quantitative and qualitative research methods were employed. More focus was given to qualitative data in order to be able to find information

from participants perspective particularly women who are the focus of the research. The data that was collected through quantitative methodology helped to acquire facts for generalizations.

2.2.1 Sampling

Selection of the Project: The researcher who is interested in any project related to natural resource protection has taken this research as an opportunity to look the connections women have with energy and environment. By virtue of working in the Ethiopian Geological Survey under the Ministry of Mines and Energy, the researcher had the chance to easily communicate with the GTZ-ECO office.

Selection of the Study Area; GTZ-Mirt project had four pilot areas when the project started operating in 1998. These areas were located in Guder (Ambo), Bahir Dar, Awassa and Mekelle. Bahir Dar was selected by employing convenience sampling method.

Selection of Key-Informants: Four key informants for in-depth interview were selected using purposive sampling from GTZ, Energy Coordination office in Addis Ababa and Bahir Dar branch office. One person from Alternative Energy Resources and Technologies Promotion and Dissemination Core Process under Ministry of Mines and Energy (MME) one person was selected purposively who is currently working as a government counterpart with the project. Gender Mainstreaming Process Owner from the Ministry was also selected purposively for key-informant interview. In addition, one energy officer from Bahir Dar zone Energy Office and two 'Mirt' producers in the study area were selected purposively as key informants. The total numbers of key-informants selected were nine out of which four were women. All selected individuals are believed to have responsibility and rich information about the project that can be helpful to attain the research objectives.

Selection of Quantitative Survey Participants: In the case of quantitative survey the sample frame was all households in Bahir Dar City which are located in 9 urban *Kebeles*. The target populations of the research were totally women in every randomly selected household in Bahir Dar city. Quota and random samplings were applied to select 32 women from 32 households from each *Kebeles* with a total of eight *kebeles* in Bahir Dar city. Then using purposive sampling, questionnaires were distributed to women in randomly selected households and these questionnaires were filled with the help of enumerators. The total

sample of women selected from 8 *kebeles* of the city was 256 and the remaining one *kebeles* was covered with in-depth interview.

Selection of In-depth Interview Participants: For purpose of in-depth interview and personal observation, 18 women from 18 household from one *Kebele* were picked randomly. Out of the 18 women, 12 of them have Mirt and the rest do not.

A total of 274 women from 274 households were randomly selected for quantitative survey and in-depth interview. The number of residential household in the nine urban *kebeles* of Bahir Dar city is 2810 and thus, the number of household covered for this research is 9.7%.

2.2.2 Data Collection Methods and Tools

Key- informants Interview: Data from a total of nine individuals where four of them are from the GTZ Addis Ababa office and branch office in Bahir Dar was collected using key-informant interview. Three individuals also were interviewed from the government counter-part and two *Mirt* producers in the study area. These key- informants are from Policy implementing authorities, project administrators, both in the ministry of Mines and Energy and GTZ. This method was applied to gather information on integration of gender concerns in policy, strategy and particularly in household energy projects. Information on the projects services, challenges encountered while *Mirt* production and feedback collected from *Mirt* users were gathered from two *Mirt* producers and distributors women in the study using key-informant interview. The time span for key-informant interview is between 50 minutes and one hour. In the case of interviewing the Information Communication and PR Coordinator at GTZ-ECO office the time taken was for 5 days and each time taking 40 minutes to one hour.

In-depth Interviews and Observation: The total numbers of women interviewed were 18 where 12 have *Mirt* and 6 of them don't have *Mirt*. During in-depth interview with those who have *Mirt* the condition and status of their *Mirt* were observed. The observation helps to see how the users were using *Mirt* according to users guide or not. In addition it was observed that if broken part is replaced and maintained with plastering. This method helped to gather information on views and experiences of women about the *Mirt* project services and products in the study area. Reasons, for not having *Mirt* were collected using the method. It has also helped to collect information on problems and constraints they face concerning energy saving stove particularly *Mirt* together with their suggestion for better *Mirt* adaptation. The time span of the interview was between 30 and 40 minute for every individual.

Quantitative Survey: Questionnaires were designed to collect quantitative data such as demographic data on the target population and other basic information concerning Mirt. The questionnaire was translated into Amharic language and filled with the help of enumerators by asking women who are selected purposively from randomly selected households in the study area. This method has helped to understand facts concerning the project's services and products from women in the study area. It is also aimed at collecting data on various concerns, constraints, problems and priorities of women concerning Mirt.

Document Review: both published and unpublished documents concerning GTZ-supported Mirt projects were reviewed to collect relevant data. The type of document thoroughly reviewed using gender in project cycle checklists includes project baseline survey, project profiles/review, project impact assessment, project monitoring and evaluation documents. Based on gender mainstreaming principle the documents were scrutinized whether gendered problems, concerns and priorities integrated in problem definition, objective/goal and strategies of the energy policy, strategy and GTZ-Mirt project in its project cycle. The Ethiopian Energy policy, the five year energy strategy documents of both Ministry of Mines and Energy and Amhara Regional States were reviewed from gender mainstreaming strategy point of view.

Case Studies: This method was used to study the experience and knowledge of two Mirt producers who have also been participating in key-informant interview. Using case study method it was possible to gather detailed stories of these two women Mirt producers in relation to the benefits they get from the project. Using the method an important data were also collected from one woman who bakes bread for living but couldn't afford to buy Mirt but wished to have it. The time taken for the case studies for Mirt producers was for three days and each time taking 30 to 50 minutes.

Data Collection Tools: Data collection tools used during the research are questionnaires for quantitative survey, interview guide for in-depth and key informant interviews and a Checklist for assessment of project related documents on Gender Issues.

2.2.3 Data Collection and Data Analysis Methods

Information and data were gathered by means of questionnaire, key-informant interview, in-depth interview, observation and case studies. During in-depth interview, data were collected by taking notes because most people were not pleased to be tape recorded. Photographing was

used as additional data collection tool during Observation, in-depth interview and case studies.

Data from various sources were analyzed both quantitatively and qualitatively. Descriptive statistics available in the Microsoft Excel was used to analyze the data from questionnaires. The data output from the questionnaires are presented in appropriate tables and graphs. The data from key informants and respondents in-depth interviews were categorized thematically and analyzed accordingly together with narrative analysis. All data from document review was analyzed using gender mainstreaming principles and summarized in tables. The presentation of the all the data from different resources are presented categorically by merging them together. Finally, conclusions and recommendations are drawn from the available data.

2.3 Ethical Considerations

Some of the concerns of feminist research are the position from which distinctively the question has to be asked, the political and ethical question in the research process including politics of position, interpretation and publication. This research as feminist research had tried not to misrepresent, misappropriating or distorting of the reality of the respondents in the research process in any way (Kirsch, 1999).

In the process of data collection issues of willingness, confidentiality and privacy have been taken care of. Before commencing any data collection the participant's willingness was asked and conformed for any oral interview or photographing. The consents of participants were obtained to use their names together with their stories in the document otherwise their names and profiles are presented separately. They have been assured that their responses will only be used for research purpose and the principle of the study is such that it should respect privacy of the participants. As it is ethically important to minimize the power imbalance between the researcher and the research participants, maximum care was taken to do so in the research process.

Briefing was given to the enumerators who filled in the questionnaires on the need to minimize the power imbalance, to respect the participant's privacy and willingness, confidentiality and the principle of feminist research. Accordingly, during data collection there was continues information exchange, feedback and discussion between the researcher and the enumerators on how to handle properly the data collection process.

CHAPTER THREE

3. LITERATUR REVIEW AND THEORITICAL FRAMEWORK

3.1 Literature Review

Literatures available on household energy crisis and efficiency mostly deal with issues from environment and gender perspective. The literatures can be categorized in to two broad groups those dealing with the household energy problem in relation to environment and those giving emphasis to gender when dealing with household energy. The later one is mostly considered by international organizations such as UNDP and Eco-feminists from abroad.

The literature review presented in this paper is grouped into related issues such as; environment and gender, gender roles and fuel wood crisis, the need for household energy and its efficiency, Improved stoves and its benefit to women, gender and energy policies, gender mainstreaming in development project and gender content in energy projects.

3.1.1 Environment and Gender

For women, trees and forests are multifunctional, whereas men tend to concentrate on their commercial potential for timber and other goods. Trees offer 'fuel, food and fodder'-the three F's, as women say. Deforestation, the clearing of open and closed forests, is one of the world's most pressing land use problems. Other important factors are commercial timber logging, planned migration and resettlement, land speculation, large scale construction projects and the expansion of commercial ranches. At local level, forest fires, growing demands for firewood and fodder, and grazing contribute to the loss of forest. Are women to blame? With so much pressure on the land, women have little choice but to use forests (Dankilman and Davidson, 1989).

Third world women often have no choice but to exploit natural resources in order to survive, even though they may have the knowledge to promote sustainability. Senghor and Aidoo stated that the principal victims of environmental degradation are the most underprivileged people, and the majority of these are women. Due to complex cycles of poverty, inappropriate development and environmental degradation, poor people have been forced into ways of living which induce further destruction, cited in (Dankilman and Davidson, 1998). Their

problems and those of the environment are very much interrelated where both are marginalized by existing development policies.

In Ethiopia the overall demand for fuel wood is five times the sustainable supply. According to GTZ, the total projected fuel wood deficit of the country was 58.1 million cubic meters by the year 2005 (GTZ, ND). The tragedy of this dependency on wood is that it is depleted rapidly than any fossil fuel, and that its consumers have little political power. In 1983 a study by FAO showed that more than 100 million people suffer an acute fuel wood scarcity and are consuming amounts below the minimum required for cooking and heating. The loss of forest is accelerating worldwide but the figures tell us nothing of the daily pressure which deforestation and the degradation of forests lands place on women, cited in (Dankilman and Davidson, 1998).

One can see that, due to agricultural overexploitation and industrial over expansion environmental degradation particularly deforestation result in fuel wood crisis which is household energy source of the poor. Demand for fuel wood exceeds the supply and in this regard poor women in rural areas of developing countries suffer most in terms of lost labor time, undercooked food and malnutrition of the family members due to low agricultural productivity arising from environmental degradation (Grace Sunny, 1992).

Sometimes, fuel shortages may change eating practices as the number of hot meals is reduced or foods that require longer cooking times are abandoned. It follows that fuel availability is relevant to any development project that is designed to encourage the cultivation of certain crops or affect food processing and preparation or general nutritional practices. e.g. in the upper Volta region for instance soya beans introduced as part of large –scale development project have grown well, but it is reported that the women don't accept them because they require longer cooking time than the traditionally grown cowpea (Dankilman and Davidson, 1998).

Environmental degradation and deforestation means that women have to walk further to collect firewood and this takes its toll in terms of time and energy (REST, 1992). As a result, they are forced to use dung and crop residues for fuel as alternative which is usually used as traditional fertilizers in farmlands in Ethiopia. Out of the total 3% financial losses in GDP in Ethiopia which is caused by environmental degradation, 98% is due to the use of dung and crop residues for fuel (Tessfay, 2008).

3.1.2 Gender Roles and Fuel Wood Crisis

The burden of the fuel wood crisis in most third world societies is borne by women because of their acquired responsibility to meet household energy needs largely by collecting biomass fuel and preparation of food (REST, 1992). The fuel crisis for women is only half of the story of the problems and the second half is attributed to the technology that women use for cooking.

The crises in fuel supply combined with slow improvement in readily available cooking technologies have affected women in severe ways. In using of open fire stove or traditional stoves there are high emissions from biomass fuels which are dangerous sources of in-door air pollutions (Mikell, 1997). Fuel woods are capable of producing pollution concentrations which is higher than fossil fuels under slow- burning conditions and some studies show the cook, mostly women, suffer most from smoke and pollutants than residents of the dirtiest urban environment.

According to World Health Organization, a female cook can inhale an amount of benzopyren (a poisonous gas from burning fuel) equivalent to 20 packs of cigarettes a day. In few places chronic carbon monoxide poisoning is also evident. As a result respiratory and eye disease are so abundant among third world women and children by wood and other biomass fuels. Exposure can bring acute bronchitis, pneumonia and death where respiratory defenses are impaired, cited in (Dankilman and Davidson, 1998).

Although commercialization of fuel wood means increased income for some, it also places an extra demand, on family budgets, posing special dangers for the poor. The hike in the prices of firewood has reduced women's housekeeping money and has adversely affected the quality of meals women can provide. Higher prices have also limited any small savings women could otherwise make from careful management of money received from their husbands (Mikell, 1997). Whenever there is Fuel wood crisis and lack of money to buy fuel wood women in the countryside scoured the fields for cattle droppings and stockpiled dung cakes which could be used as fertilizer in the farmland (Harrison, 1993).

3.1.3 The Need for Household Energy and its Efficiency

In order to overcome household energy problems and bring sustainable energy intervention a redefinition of household energy is needed. This definition must recognize the fact that energy is one of the most important parts of our daily life at the same time energy supply and use

affect men and women differently. Addressing household energy issues can result in opportunities for time and labor saving, income generation, health improvements, and social empowerment especially for women because of their relationship to household energy (Joy Clancy, 2003).

One avenue for bringing about sustainable society and a socially just world is through green politics which according to Carolyn Merchant we are supposed to ‘think globally and act locally’. To address social problems, there is a need to mainstream social theory, science and technology especially mainstreaming cross-sectional issues like gender and environment will be crucial if we are seeking sustainable development (Merchant, 1994).

Whenever we are talking about sustainable development it will be logical to talk about social justice. Social justice is a key factor in the transition to a sustainable world and liberation of nature and women. In turn social justice without fulfillment of human basic needs is unthinkable. As a result, societies have to be able to obtain basic needs such as food, clothing, shelter and energy and provide conditions for physical and emotional health (Merchant, 1994).

As part of redefinition of household energy, Carolyn Merchant has incorporated energy under the short list of basic needs. It illustrates the need to look behind the ‘food’, which is basic need, and recognize the importance of energy (Merchant, 1994). Aligned with the statement of Carolyn Merchant ‘energy as basic need’, Dankilman and Davidsson in their book entitled ‘Women and Environment in the Third World’ stated that, energy although still not officially considered as a basic human need such as food, clothing and shelter. It is essential for human-being and as important as to cook food, boil, and heat and light the home (Dankilman and Davidson, 1998).

It will be wise to discuss further the important point raised by Carolyn Merchant in stating energy as basic needs for two reasons. The first important reason is that the type of food people are consuming such as cereals need huge amount of energy for preparation. Typical cooking patterns in Ethiopia are associated to agro-ecological zones. In highland areas where agriculture is dominated by cereal production *Teff* (traditional bread of Ethiopia, *Injera*, made out of). *Injera* is baked on a large clay pan (*mitad*) of about 55-60 cm in diameter and requires a large size stove to accommodate the pan. *Injera* baking requires the bulk of the domestic energy demand in large parts of Ethiopia. It is reported that *injera* baking alone contributes

50% of the total primary energy consumption of the country (GTZ, 1998). We can observe that the basic food identified above requires huge amount of energy for baking before consumption which makes energy basic need.

Secondly, in case of fuel wood crisis the alternative method to save fuel at individual level will be mainly by eating uncooked food or eat those requiring less energy. Saving energy with such practices have negative impact on nutrition of a family which will cause the family to have health problems such as infection and malnourishment and this eventually result in reduced agricultural productivity (Dankilman and Davidson, 1998). For these two basic reasons, the researcher of this study argues that energy is one of the basic needs of human race even if it is not stated so as food, clothing and shelter.

The problem of household energy is serious in a country like Ethiopia where about 60.8 % of the population lives without electricity and 94 % and more of the household energy source is Biomass (UNDP, 2008). Moreover, most people especially women use the three-stone fire stoves and studies have confirmed that open fire stoves (Three-stone open fire stoves) have a very low efficiency estimated at 10-15% for cooking and about 7% for baking (Rest, 1992). Thus, most of the potential energy 85-90 % is wasted. The low utilization efficiency of the open fire stoves have resulted in a relatively higher demand for biomass particularly for households that primarily or entirely rely on biomass fuel 'the fuel of the poor' constitutes only 1% of energy consumption in developed world (Michael Atchia , 1995).

One way to increase cooking efficiency is introduction of improved stoves or closed stoves which can save energy and are also environmental friendly. Under laboratory conditions, improved stoves may save up to 50% of the wood which would have been used for the same task over an open fire. Factors such as time saving, convenience, smoke reduction, house heating and food test are at least as important for users to qualify these stoves as fuel efficient. However, improved stove designs often fail to offer some of these qualities to the users. In some cold areas the heat as in the open stove is needed and the smoke is also believed to protect houses from worms and insects (REST, 1992).

Improved household energy supply can significantly contribute in reducing health problems when compared to open stoves. Further improved stoves help to save time, money and to generate income which will contribute to women's advancement (Clancy, 2003). Especially, when women are engaged in food processing, production and income generating activities a reliable, affordable and safe energy sources are needed. It is only with affordable energy that

women can generate income since they are engaged in small scale and informal sectors. They also need credit services, trainings and technical assistance to generate income using energy efficient technologies (UNDP, 2004).

3.1.4 Improved Stoves and the Empowerment of Women

Empowerment includes change and transformation from one level or stage to another. These changes can be in mind set, behavior and attitude which help to change one's situation. It is essentially a bottom-up process at individual level or up-bottom where different organization can facilitate empowerment by creating conditions which can change women's lives and their families (Emebet, 1999).

According to Jo Rowlands, empowerment must be about bringing people who are outside the decision-making process into it. This puts a strong emphasis on access to political structures and formal decision-making and, in the economic sphere, on access to markets and incomes that enables people to participate in economic decision-making. It is about individuals being able to maximize the opportunities available to them without, or despite, constraints of structure and state (Eade, 199).

Within the generative interpretation of power, empowerment also includes access to intangible decision-making process. It is concerned with the process by which people become aware of their own interests and how those relate to those of others, in order both to participate from a position of greater strength in decision-making and actually to influence such decisions.

Empowerment is also a key element in any development process as recognized by UNICEF to be used as operational tool in any development endeavor (UNDP, 2004). Different organizations be it GOs and NGOs can empower women by way of providing them credit, skill training, consciousness raising trainings and technical assistance (UNDP, 2004). Any stove program should include women from the start, as planners and designers, builders and promoters and by doing so can contribute to the empowerment of women socially and economically (Skutch, 1998).

Energy meets women's practical, productive and strategic needs. In the form of improved biomass (supply and conversion technology), improved health through better stoves and less time and effort in gathering and carrying firewood, address women's practical needs.

Improved biomass stoves can save time and minimize cost for productive activities whereby it can address women's productive needs at the same time empowering them (Clancy, 2003).

3.1.5 Gender and Energy Policies

Energy policies and projects alone will not change the role of men and women in a particular society, but they can be used as entry points for promoting greater fairness in the allocation of opportunities and resources. Given the critical role that women play as energy managers in Ethiopia recognition of greater sensitivity to gender disparities in particular concerning women could improve effectiveness of energy program. Although the application of gender sensitivity to energy policies has not thus far been a regular exercise, some efforts have been made to analyze the impacts of traditional energy usage on the situation of women. These efforts have revealed several crucial aspects of how energy can affect the lives of women both positively and negatively (UNDP 2000).

The fourth world conference on women, held in Beijing in 1995, emphasized the vital role of women in sustainable development and the need to promote greater overall development opportunities for women. With regard to energy, the Beijing Platform for Action called on Governments to support the development of equal access for women to sustainable and affordable energy technologies, including renewable energy and energy efficiency technologies, through participatory needs assessments, energy planning and policy formulation at local and national levels (UNDP, 2000).

As a result of the Beijing platform for action, The Durban Declaration, "Women in Energy Ministerial Meeting' was held in Durban South Africa from 11-12 December 2000. This declaration was made by African Ministers responsible for the development and utilization of energy, in partnership with representatives of international organizations, NGOs, and the private sector. The Conference discussed and explored possible policy, financial, and economic solutions for problems experienced by African women with regard to the energy sector (UNDP 2004).

According to UNIFEM the elements of gender-sensitive energy policies has four general aspects namely political, economic, environmental sustainability and social (UNDP, 2004). These four aspects address gender issues and especially emphasize on the need to give attention to women's empowerment and reduce inequalities between women and men by improving access to energy services.

The four general aspects of energy policy listed above need to be correlated with three issues that lie at the heart of women's energy needs; availability, affordability and safety. The multidimensional aspects of energy policy can be combined with gender issues in the form of a matrix and used in any intervention on energy conservation (UNDP, 2004: 32).

However, Energy policy of Ethiopia has overlooked the necessity to conduct studies on women's access to and energy use. In addition, the need for women to participate in the implementation and evaluation of energy projects is not mentioned (GTZ, 1999). It is also clear that, the context in which the policy was formulated was different from the present day and it was before the Beijing platform for action.

3.1.6 Gender Mainstreaming in Development Projects

As it was agreed upon during the fourth world conference in Beijing in 1995, Gender mainstreaming was adopted as a strategy to bring gender equity and equality as well as sustainable development. Gender mainstreaming is about assessing the implication for women and men of any planned action, including legislation, policy, program and project in all areas and levels. It is also understanding of gender relations and their implications for development policy and implementations (UNDP, 2000).

This developmental approach perceive gender issues in a balanced way rather than see women crushed further under the burden of their traditional work in unchanging divisions of labor. As human survival is now the world's most pressing problem, gender mainstreaming strategy help to see that women are crucial to that survival, then the empowerment of women is essential for the emergence of new, creative, and cooperative solutions (Eade,1999).

There have been considerable discussions in the development circles about the need for a 'people centered' approach to projects. The process of gender mainstreaming helps us to identify people's needs through gender analysis tools. Accordingly, any program or project must ensure full incorporation of roles, needs and participation of women and men in development processes (Eade, 1999).

Incorporating the perspectives of women provides a unique and powerful vantage point from which we examine the effects of development programs and strategies (Fenella, 1999). This point of departure is fruitful for a number of reasons: first, if development goals primarily targeted to improve the standard of living of people, reduction of poverty and create dignified

employment and ending of reduction in societal inequality, then it has to start with women who constitute the majority of the poor, underemployed and socially disadvantaged (Gita, ND).

Second, women's work is under remunerated and undervalued while objectively seen as being vital to the survival and ongoing reproduction of human beings. Therefore, it will be logical and necessary to understand and address the hidden gender power existing within relations caused by gender division of labor. In food production and processing, in responsibility for fuel, water, health care, child rearing, sanitation, and in the entire range of so-called basic needs women's labor is dominant. Hence, if we are to understand the impact of development strategies on these same needs, the viewpoint of women as the principal producers and workers is an obvious starting point (Charlton, 1984).

On the contrary most development projects Project evaluations and reviews are difficult to obtain and uneven in quality. The methodology varies considerably from study to study, and most evaluations are devoid of larger analytical frameworks especially of gender analytical tools and frameworks. Most of the time both project and higher level management are either not fully committed or insensitive to changing women's situation or unaware of important aspect of a development project strategies like gender sensitive planning and evaluation (Eade, 1999).

Additionally most projects suffer from a lack of baseline information about the socioeconomic situation of project beneficiaries, and economic requirements of the project in terms of available market. Most importantly these baseline studies do not sufficiently break down by gender and class concepts such as the household or the family and it takes the household as a point of analysis ignoring the gender power relation lying behind each household (Charlton, 1998).

Household is frequently targeted as the frontline of implementing agencies in a range of schemes that aim to increase productivity and reduce poverty. Most policy –makers are reluctant to be intervening directly in intra-household norms and relations, the private domain. Research in intra-household relations has revealed asymmetrical distribution of resources and responsibilities embedded in domestic norms (Gita, ND). A gender – aware approach to the design of anti-poverty programs and projects requires that policy makers are clear, consistent, and well informed about the relevance of gender in specific contexts to their goals, objectives and strategies (Eade, 1999).

3.1.7 Gender Content in Energy Projects

As most of development projects and programs, energy projects have often failed to achieve their objectives in the past, in part because the needs and potentials of the target groups have not been properly considered and mapped. Women were not consulted about the type of stoves and were not trained to make them or to repair them (Skutch, 1997). There is often little attention paid to women's opinions about the technology involved or their real possibilities as regard to these technologies or becoming involved in the projects from the start.

An approach where women are part of the project plan and implementation had been followed by an ILO/World Bank Stoves Feasibility Project in Ethiopia as reported by Gebresslassie, cited in (Dankilman and Davidson, 1998). It was focused on urban users in Addis Ababa and survey was made of characteristics of the households using different stoves, appliances and fuel types. Different methods of marketing and dissemination, such as the sale of stoves through women's groups, were also tested and collaborating with neighborhood women's association was found to be effective. This project showed how women, the end users, can be involved in a program from the start.

According to Skutch, it is affirmed that improved stoves have not been widely accepted. An evaluation of program in Gujarat, India, demonstrated that sponsoring agencies assess their success primarily in terms of the number of stoves which have been built. Only in few cases, had the sponsoring agency tested whether the stoves built were less smoky or more efficient in practice than traditional fire places. Further explaining the reasons, Skutch pointed out that little is known about the sustained performance of new stoves, for most surveys are carried out soon after they have been installed. Many stoves use, under field conditions, almost as much fuel as an open fire; laboratory testing alone cannot replicate the field situation (Skutch, 1985).

To assess the impact of any stove, a systematic collection of gender disaggregated data such as who does what, when and who controls the important resources, who is using these technologies and their efficiency are essential instead of depending only on laboratory testing. Monitoring and evaluation should be conducted on other socio-economic variables to be able to identify complete information on availability of the knowledge to install, use and maintain these technologies (Skutch, 1997).

On the other hand, even if energy projects are considered as ‘women’s projects’ still in the eye of the majority of women, these projects are not taken seriously. According to Skutsch, this is so perhaps women are responsible for daily small scale purchase including wood or charcoal and men for capital expenditures and purchase of large items. If the household is conceptualized as an economic unit, it would be expected that investment in an improved stove would be seen as an advantage. But if the household does not perceive itself to be an economic unit but in fact as two parts which may even be in competition with each other, it is clear that the capital for the stove will not easily be made available (Skutch, 1997).

Even if the capital for the stove can be raised at one go, there are other features the energy planners give attention to than energy efficiency. These features which are more important to the women, the cooker, are speed and ease of cooking, safety, compatibility with existing pots and pans, ability to use different types of fuels at different seasons (Dankilman and Davidson, 1989). What is important to the women? In this case the energy planners have to sit and discuss with the women about what the situation is. If the concern of the planners is that deforestation is taking place as a result of firewood extraction, but the women don’t perceive any serious problem, then it is no use building a project around the idea that women will be motivated to participate because they will save time and drudgery (Skutch, 1997).

3.2 Theoretical Framework

Feminist theory and writing provides a basis for understanding every area of our lives and proposes strategies for activism and action. The basic issue that concerns feminist theory is inequality of women and focuses in trying to explain the cause and condition of inequality while examining the structure of domination. Feminist theory tries to explain women’s situation using gender as an element of analysis. The theory is progressive, multifaceted, with cumulative history and has a history of persistent change.

Accordingly, there has been a debate on women, environment and sustainable development which has given rise to ecological feminism or Eco-feminism. The rise of ecological feminism or Eco-feminism has created a chance to give attention to poor women’s problem and women are seen by many researchers involved in the women environment and sustainable development debate as privileged environmental managers, or the source for solutions to the environmental crisis.

In this research the overall situation and condition of women as household energy providers and managers is seen from feminist theoretical perspective. Accordingly theories of Eco-feminism, contemporary socialist feminism and Material feminism are used to explain the condition and situation of women in relation to the course of intervention about fuel wood crisis.

3.2.1 Eco-feminism

In her 1962 book entitled “The silent spring”, Rachel Carson warned Americans that unless they begin to take care of their environment, all man assaults upon the environment including the contamination of air, land, Rivers, and sea with dangerous and even lethal materials will undoubtedly shatter or alter the very material upon which the shape of the future depends (Warren, 1997).

Eco-feminism is relatively a new variant of ecological ethics. In fact the term Eco-feminism first appeared in 1974, in Francoise d’Eaubonne’s book entitled “Le Feminisme ou la mort”. In this work, she expressed the view that there exists a direct link between the oppression of women and the oppression of nature. According to Eaubonne in order, to find solutions for ecological problems feminist perspective is important. In her explanation, she further elaborated the fact that the liberation of women cannot be effective without the liberation of nature from destruction. Her argument asserts that the domination of woman was the original domination in human society from which all other hierarchies of rank, class and political power followed (Warren, 1997).

The theory of Eco-feminism gives emphasis on women’s displacement from productive activities by the expansion of development. This is because development projects destroyed the natural resource base used for subsistence and survival. It destroyed women’s productivity, by removing land, water and forests from their management and control, as well as through the ecological destruction of these resources, impairing nature’s productivity and renewability. Women are the first victims of ecological destruction because of their gender roles and responsibilities (Tong, 1998).

Eco-feminists brought new ground when they began arguing that the capitalist exploitation of resources was connected to the degradation of nature and women. Especially the radical Eco-feminists affirm the women-nature connections and domination of nature and abuse of

women's bodies while socialist Eco-feminists repudiate the women –nature connection (Warren, 1997).

Ecological feminist claim that any feminism, environmentalism and environmental ethic which fail to take these connections seriously is grossly inadequate. The women–nature connection, according to Warren is very strong. Hence, any feminism has to look this connection and look the position of women in relation to nature (Warren, 1997).

In 1974 there was a movement by women called Chipko in Hindu for 'to embrace or hug' where women were against the cutting down of trees. Trees and forests are inextricably connected to rural and household economies governed by women especially in the third world countries (Braidotti, 1994). Shortage of trees is a concern for women, because women are the actors of the household economies and suppliers of food, fuel, fodder and products for home including herbal medicines from trees.

We can see that deforestation means environmental change or change in weather and the disproportionate effect on fauna and flora of a country for an environmentalist. When it comes to the women it is a question of survival in every aspect of life. First of all women are the primary sufferers of environmental degradation in a way that they have to take a walk farther for fuel wood and fodder.

Thinking of remedies for environmental degradation, one needs appropriate technology which is also an Eco-feminist issue. Usually, the household technology is need of women which new development projects have failed to adequately address. So the environment-feminist project and its success require the revaluation of women's caring labor. Whereas third world development is also a feminist project because the women's work has to do with sustainable development for those who cares for other but never being cared for them (Warren, 1997).

Agencies who seek to develop without appreciating what women tend to know about the environment will usually end up being unsuccessful. There is an epistemic biases with women knowledge example about traditional medicine it is the masculine biases in dualism favors the modern scientific, rational, global and high-tech over the traditional, small-scale and low-tech (Braidotti, 1994).

Warren provides a useful schematic for conceptualizing ecological feminism the intersecting and complementary spheres of feminism, indigenous knowledge, and appropriate science, development, and technology. These create an Eco-feminist development rationale which

takes seriously epistemic privilege, women's issues, and technologies which work in partnership with natural systems (Warren, 1997).

Science and technology are needed to solve environmental problems still Eco-feminism not only welcomes appropriate science and technology but, as an ecological feminism, requires the inclusion of appropriate insights and data of scientific ecology. However, Eco-feminism also insists that data about the historical and interconnected exploitation of nature and women and other oppressed peoples be recognized and brought to bear in solutions.

Hence, energy projects in a country like Ethiopia have to give attention to the voice of women and consider their problems in relation to energy crisis and environmental degradation. The insights of women, who are the main household energy providers and consumers, have to be an integral part of any energy project, program and strategy. The constraints, problems, and views of women have to be part of energy planning and implementation process of any energy intervention on energy crisis.

An ideology of ecological feminism is an alternative of a moral universe which is not focused on power and control or on the accumulation of material at the expense of human and environmental system. The two most important tools to create this moral universe is gender analysis and gender training that can address basic organizational and personal change which humans find it difficult to unlearn the habits of centuries. These habits are the habits of plundering environmental resources as well as exploiting the natural resources and the underprivileged and the marginalized where most of them are women (Merchant, 1994).

3.2.2 Material Feminism

Material feminism is one of the variant of feminism. The purpose of Material feminism is to bring the material, the materiality of the human body (bodies) and the natural world (nature) to the forefront of feminist theorization. This theory takes Eco-feminism one step ahead and offers comprehensive and compelling transformation of the category of nature. Material feminists don't take the nature /culture divide instead in continuity among actors between human, non-human and technological (Haraway, 1991).

The theory advocates that, human bodies within specific environmental contexts as biological as they are political, as material as they are social. The theory emphasizes the need for feminist theory to re-think, the materiality of human corporeality, pain, illness, physicality of

bodies. It shows how the personal, the political and material are braided together (Haraway, 1991).

According to Material feminists, with the advent of postmodernism and post-structuralism, many feminists have turned their attention to social constructionist models. Though the social constructionist model has allowed understanding how gender has been articulated with other volatile markings, such as class, race, and sexuality within cultural system of difference postmodern feminist theories are criticized for loss of the material. Environmental feminists have long insisted that feminism needs to take the materiality of the more-than-human world seriously (Alaimo, 2008).

According to Alaimo, the mainstream feminist theory has more often than not relegated Eco-feminism to the backwoods, fearing that any alliance between feminism and environmentalism could only be founded upon a naïve, romantic account of reality. Alaimo argues, predominantly feminist theories have persuaded a flight from nature. Clearly feminists who are also environmentalists cannot be content with theories that replicate the very nature/culture dualism that has been so injurious-not only to non-human nature but to various women (Alaimo, 2008).

Within material feminism interactionist ontology acknowledges both the agency of materiality and the porosity of entities. Separating the natural from humanly, genes from environment is impossible as a result bodies and sexes are fluid and emergent. As we are producers of environmental change we need to articulate biological and social. Since biological bodies are within the physico- chemical environment which affects us (Alaimo, 2008).

Gender division of labor gives to women the responsibility to provide and use household energy in Ethiopia where women are exposed to different physico-chemical environment than man. Due to environmental degradation, lack of modern energy sources and inaccessibility of improved energy technology women are impacted negatively from biological, economical, social and political aspects.

According to WHO report, an example a female cook can inhale an amount of benzopyren (a poisonous gas from burning fuel) equivalent to 20 packs of cigarettes a day, cited in (Dankilman and Davidson, 1998). In few places chronic carbon monoxide poisoning is also evident. Exposure can bring acute bronchitis, pneumonia and death where respiratory

defenses are impaired. This implies the negative impact of household energy crisis needs to be looked by taking the materiality of the more-than-human world seriously.

3.2.3 Contemporary Socialist Feminism

The integration of the social aspect in development agenda comes from environment crisis, the growth of poverty and gender inequality. It is also clear that it is a common interest to all humanity, surviving on increasingly scarce natural resources.

The dominant development has been critiqued, for its way of marginalizing women from the process since poor women are usually trapped in gender-division of labor. One of the proponents of Socialist feminism, Iris Young suggested that only a gender-sighted category such as 'division of labor' has the conceptual power to transform Marxist feminist theory into a socialist feminist theory. According to her, the category 'division of labor' enabled to discuss women's entire estate which is women's position in the family, the workplace, reproductive and sexual roles as well as women's productive roles (Tong, 1998).

Mostly women's work despite under remunerated and undervalued is vital to the survival and ongoing reproduction of human beings in all societies. In food production and processing, in responsibility for fuel, water, health care, child-rearing, sanitation, and the entire range of so-called basic needs, women's labor is dominant. Thus to understand the impact of development strategies on these same needs, the viewpoint of women as the principal producers and workers who are not paid for their labor is crucial (Charlton, 1984).

According to Braidotti, patriarchal culture tends to locate women's practices at the border between nature and culture. These involve caring for others like mothering, cooking, health care and certain kind of simple, traditional agricultural labor that are low paid or unpaid, such as weeding and tending to livestock (Braidotti, 1994).

When it comes to household energy supply commercial fuels can't compete with fuel wood, because it is gathered free from forests. In this case good energy solutions like energy saving stoves to real human problems and to fulfill real human needs are the victims of market economies because some elements in the equation are non-monetized. Women's labor usually not monetized, but value is attached to it thus, it is expected that for Government to step in and counter balance the negative effect of the market to protect the natural resources. It can be debated, that provision of the stove freely or by subsidy means the country is saving money, labor and natural resources. In order to do that it will be wise to consider household energy as

basic need. Women's fuel gathering time plus risk is equivalent to marketed fuel wood even ignoring the value of forest in environmental terms (Eade, 1999).

It is clear that women in Ethiopia, because of the gender-division of labor are engaged in unpaid labor of productive, reproductive and community maintenance. Women usually carry out tasks to maintain household and ensure reproduction. One of these tasks is to supply and use household energy and this has negative health and safety impacts. In addition they suffer from fuel wood crisis which result walking long distances to collect it, paying high prices and serving undercooked food.

It is important that women's work in many cases is given monetary value in NGOs which are not controlled by market forces. Policy have to balance financial sustainability versus the unvalued labor and public property protection instead of moving against financial subsidy in the energy sector and cash payment by the consumer for energy services provided. Eventually, societal and global redistribution of power, which is sought by socialist feminism, could be true (Charlton, 1984).

Socialist feminists are also interested in undermining the power-over system of capitalist patriarchy through empowerment. They believe that, this can be accomplished best by a societal and global redistribution of power, as opposed to placing their hopes in the empowering capacity of feminine traits. As a result, socialist feminists are most active in socialist revolutions and women's economic movements, organized around such issues as women on welfare, women in development, and effects of economic globalization on women (Tong, 1998).

Jo Rowlands further explains, feminist interpretation of power lead to a still broader understanding of empowerment, since they go beyond formal and institutional definitions of power and incorporate the idea of the personal as political, cited in (Eade, 1999). Since these affect the ability of less powerful groups to participate in formal and informal decision-making, and to exert influence, they also affect the way that individuals or groups perceive themselves and their ability to act and influence the world around them.

Empowerment is thus more than simply opening up access to decision-making, it must also include the process that lead people affected come to see themselves as having the capacity and the right to act and have influence (Eade, 1999). In-addition existing gender division of labor and resources the interests of poor men and women are not same. Empowered women

start to exercise greater bargaining power within the household and active participation in community life (Eade, 1999).

Moreover, the objectives of developmental initiatives and agencies are advancement and empowerment of women then according to socialist feminists they have to open chances for women in decision making process. It must also include the process that lead affected people come to see themselves as having the capacity and the right to act and have influence. Women who are the main actors in the household energy provision and consumption must have the right to positively influence the overall energy project cycle so that their voices become an integral part of the solution to household energy crisis in Ethiopia.

CHAPTER FOUR

4. ANALYSIS OF FINDINGS and DISCUSSION

4.1 Women's Views and Concerns on GTZ-Mirt Project

4.1.1 Profile of Quantitative Survey Respondents

The number of questionnaires completed with the help of enumerators amounts 256 and was directed to women purposively selected in every household picked with quota and random sampling in Bahir Dar City. The target group includes women who do and do not possess Mirt since the type of questions asked to a woman who uses Mirt differs from that of a woman who does not have Mirt. All the variables in the questionnaire are not addressed equally with the entire respondents. Therefore, the percentages of responses are calculated out of 256 for questions applicable for the two groups, out of 159 for questions raised on Mirt and out of 97 for questions raised on not having Mirt. The data collected focuses on technicalities of Mirt in the cases of 159 women and on financial and other related issues in the case of 97 women. The profiles of respondents shown in (Table 4.1) who have participated in the quantitative survey are summarized as follows.

Out of the total 256 respondents, the majority which is about 60% of them are between the age of 21 and 40. Respondents within the age range of 41 to 61 constitute about 25% of the respondent while those who are younger than 21 years of age and those who are older than 61 years of age take a share of 5% each. Details of respondent's age are presented in ranges in (Table 4.1).

Regarding marital status of the respondent's the result of the survey showed that majority of them as married which amount 64.45%, and those living single are 13.67%. The divorced, widowed and those living separate places constitute 10.15%, 9.37%, and 2.34% respectively. In relation to this, the family composition is dominantly of male headed which is 61.32% as it is indicated in (Table 4.1).

As far as the educational status of respondents is concerned, the majority are found to be between grades one to twelve constituting almost half. About 30.46% of them don't have

education at all while 16.40 of them have basic education and can read and write. Only 3.51% of them have attended higher education as indicated in (Table 4.1).

Concerning the occupational status of the respondents, the result of the survey showed that the majority of the respondents are housewife constituting 50.00%. Those who have paid occupation are around 42% and these women are either civil servants or engaged in small private business. Detailed occupational statuses of the respondents are summarized under (Table 4.1).

Monthly income of family of these respondents largely belongs to the low income group which is less than 500 birr per month. Analysis of the results of the survey showed that the average income of the households is 2550 Birr per month and it ranges from 100 Birr to 5000 Birr. As it is indicated in the second chapter of this study the respondents were not comfortable telling the family income to the enumerators so this data is believed to show at least the pattern of family income in the sampled households.

Regarding the number of person living in each household the study showed that it ranges from single to 14. The majority of the respondents have an average family size between 2 to 5 which amount 64%. The average family size of this study almost matches the national average family size which is around 4 people per family. In relation to this the family premise ownership showed that about 37.11% own a house while the remaining of the respondent rent a house from *Kebele*, private tenant as indicated in (Table 4.1).

Finally, the analysis of the study shows that out of 256 respondents 62.11% are using Mirt for *Injera* baking in the study area. Only 5.47% of the respondents uses electric stove for *Injera* baking while about 28% are using open fire stove. About 3.51% are using traditional enclosed stove by building the stove from local raw material themselves.

Table 4. 1. Background of Survey Participants

Items	Category	Frequency	Percentage
Age	< 21	14	5.47
	21-30	95	37.11
	31-40	67	26.17
	41-50	37	14.45
	51-60	26	10.16
	61 and above	17	6.64
Total		256	100
Religion	Orthodox	218	85.16
	Muslim	27	10.55
	Protestant	11	4.30
Total		256	100
Marital status	Married	165	64.45
	single	35	13.67
	Divorced	26	10.15
	separated	6	2.34
	Widowed	24	9.37
Total		256	100
Household Composition	Male headed	157	61.32
	Female headed	97	37.89
	No response	2	0.78
Total		256	100
Educational status	Illiterate	78	30.46
	Read and write	42	16.40
	Grade 1-6	48	18.75
	Grade 7-12	78	30.46
	Above Grade 12	9	3.51
	No response	1	0.39
Total		256	100
Occupation	Housewife	128	50.00
	private business	76	29.68
	civil servant	31	12.10
	students and retired	20	7.81
	No response	1	0.39
Total		256	100
Income	<500	110	42.97
	501-1000	82	32.03
	1001-1500	19	7.42
	1501-2000	11	4.30
	2001-2500	2	0.78
	>2501	5	1.95
	No response	27	10.55
Total		256	100
Premises Ownership	Kebele rent	89	34.77
	own house	95	37.11
	rent from private	72	28.13
Total		256	100
Family Size	only one	12	4.69
	2-5	163	63.67
	6-10	77	30.08
	11-14	2	0.78
	No responses	2	0.78
Total		256	100
Stoves Used	Electric stove	14	5.47
	Traditional enclosed stove	9	3.51
	Open fire stove	74	28.90
	Mirt Stove	159	62.11
Total		256	100

4.1.2 Impacts and Benefits of Mirt

Mirt *Injera* Stove is an improved stove in its energy efficiency. Mirt stove as any other improved stoves is developed through improved stoves program taking in the energy scarcity of the country in to account that comes from unsustainable usage of resources by the household sector (GTZ, 1999). According to the designers of the stove it is a tool that offers a better way of cooking and which use no more fuel than the traditional stoves or open fires. It encloses the fire and the smoke is removed through a short chimney at the back.

It is recorded by MME that fuel saving in family ranges 33-57% by using Mirt (MME, 2008). According to GTZ, Mirt reduces fuel consumption by about 50% as compared to traditional methods. Moreover, the GTZ stove test result indicates carbon monoxide (CO) in parts per million is 69, 02 PPM for open stove while with Mirt stove it is 7.37 PPM. Particulate matter (mg/cubic meter) for open stove is 0.68mg/cubic meter and 0.51mg/cubic meter in Mirt that is 30% over the open fire (GTZ, 2010).

Mirt has six parts after production then assembled and fixed as a complete set in a leveled position. Four parts out of six make the circle where the pan or *Mitad* is rested on. These four parts additionally makes the wood inlet and the smoke outlet of the stove. The two remaining part one on top of the other make the short chimney and pot rest. All together six parts of the stove weighs 69.8 Kg in the case of ordinary Mirt and 38.18 Kg for Slim Mirt. Slim Mirt is a type of Mirt which is designed taking into consideration the high price of cement. The weight of the Slim Mirt is 38.18kg while the ordinary Mirt weighs 69.8kg which means fewer raw materials is used without compromising the efficiency.

There are few basic guides to be followed for best result of Mirt and make it efficient and these are the following: Do not put too much fuel wood at the in-let of the stove; lit the fire around the inlet; circulate the fire around and put a pot or pan to boil or cook at the smoke escape and use hardboard to blow the fire whenever it is out (GTZ, ND).

The impacts and benefits of Mirt as stated by GTZ, is that for 150,000 Mirt stoves, fuel wood saving amount to 56,250 tons per year, household expenditure savings amount to 31.5 million Birr per year, annual fuel wood savings are equivalent to 11,250-15,000 ha of forest plantations (eucalyptus) and avoids re-forestation costs estimated at 71.2 million birr per year. Improved stoves contribute to reduce net carbon emission and improve quality of life by providing convenience and comfort. It also improve kitchen environment (GTZ, ND).

As collected from respondents, the benefits are multidimensional and these include fuel, money, and time saving. In addition smoke reduction, protection from fire hazard, convenience and comfort are additional qualities mentioned by the respondents. Answering on who is benefiting the most by using Mirt among wives, children and husbands majority (99.37%) agreed women benefit the most followed by children and then husband. Only one respondent believes that the beneficiaries are in the order of husband, wife and children.

Fuel and Money saving: According to respondents, the amount of fuel and money saved expressed in percent are equal. Fuel and money savings stated by respondents range from 20% to 50% as compared to traditional stoves and some of them believe that the saving is insignificant. Out of 159 respondents who possess Mirt about 61.62% of them believe that the saving amounts to 50%. Those who assume the saving to be 40-45% amounts to 8.9 % and 30%-20% savings constitute 12.5% of the respondents and 16.98% did not respond.

The findings from the in-depth interview with Mirt users doesn't go along with the finding from the quantitative survey instead most of them believe that the saving is very minimal (not more than 25%) when compared to open stoves. One woman from in-depth interview participant explained that the only reason she is using Mirt is for her protection from fire hazard, otherwise she did not observe any fuel or money saving by using the stove.

She further stated the following: *“I really don't know the secret how people save half of their fuel wood and money but as for me it doesn't make any difference”*. Later it was observed that the respondent's Mirt is in bad shape and looks like almost the traditional stove. The short chimney is totally removed and the inlet part is broken. The reason why she removed the short chimney she said that *‘The chimney is totally useless and what it does is blocking the air and putting off the fire’*.

Mirt of the above respondent was located in a common kitchen with other two Mirts and was possible to look the physical status of the stoves. Same as the first woman, the other two women have also removed the short chimney which makes a total of three chimneys-less stoves in one common kitchen (See Picture 4.1).

On the contrary, report on stove testing and advertizing promotions made by GTZ states that the specific fuel consumption compared to open fire stove is about 50.7%. However, these tests were conducted under laboratory conditions where all factors were under control (GTZ,

2010).The indicated fuel saving was attained in a controlled kitchen test, thus the efficiency of these stoves can't be expected to be same in real life situation.



Picture 4. 1: A common kitchen where three Mirt located and short chimneys taken off

In- efficient use of the stove is further evidenced by lack of information as shown in (Table 4.2). Out of the total respondents 22.64% of them do not know even how to plaster their stove when it is cracked. The crakes when left without plastering mean negative influence on the efficiency of the stove. Above all, 66.66% of the women who are using Mirt don't know that they could buy parts of the stove if their Mirt is broken partly. Unless the broken part of the stove prohibits them from using it they will continue using it according to some of the in-depth interview participants. Using the stove while it is broken consequently has a negative influence on the efficiency or fuel saving capacity.

Table 4.2. Information on How to Maintain Mirt

Information on;	Yes	Percentage %	No	Percentage %	No Response	Percentage %	Total
How to plaster	109	68.55	36	22.64	14	8.80	159
possibility of purchasing parts	52	32.7	106	66.66	1	0.06	159

Reduction of In-door Air Pollution: stating the reasons why respondents bought the stove 96.13% of them responded for its ability to save firewood and its property of being smokeless. The remaining 1.94 % bought only for it being smokeless and equally the rest 1.94% bought it only for saving firewood.

During in-depth interview with women, the performance of Mirt in real life situation was observed while women were baking *Injera*. Additionally, the overall situation of performance was observed during interview of those cases where Mirt was not seen operational. As a result it was learnt that most of them have removed the smoke escape or pot rest to reduce the congestion of the smoke and believe that it is useless.

None of respondents use the side pot for cooking for many reasons. According to them, cooking while baking *injera* will be inconvenient because the smoke instead of going up return by the pot to the main part of the stove. One of the in-depth interview participants and who owns a small restaurant explained;

“If we cook food on the stove while baking, it will test smoky and our customers will complain about it. Even the pot we use happens to be metallic pot then it will be blackened. The only thing we can use the smoke escape is to heat water with a small kettle, which can only be used to wash dishes.”

According to energy advisor of GTZ, the principle behind Mirt in air pollution reduction is based on a proper and total combustion of the biomass. The report on stove testing also shows that emission reduction of Mirt over the open fire stove is 92.28% on the average (GTZ, 2010). It is clear that emission reduction by using Mirt is only possible with the proper use of the inlet and outlet of the stove as stated in the user’s guide. Responding on users comment, on the smoke escape as useless, one key informant stated the following:

“They are considering the smoke escape as a drawback because they are not aware about the use of the inlet and outlet of the stove. Moreover, if cooking on pot rest of Mirt is considered to make the food smoky what about when cooking with open stove which is smoky than this one. Generally, it is more of attitudinal and awareness problem from the users side that they mention so many Mirt related problems”.



Picture 4. 2: Mirt being used in contrary to user's guide

In most cases the pot rest is not being used while baking for the reason that they can't cook *wot* while baking (See Picture 4.2). According to the in-depth interview participants, it is impossible to stir since it is at the rear end of the stove. They further commented, why designers of Mirt don't think of a thin and light smoke escape which goes out of the house instead of making a chimney which is short at same time heavy and thick.

In line with this finding Celcelski, stated that improved stoves have many different shapes and sizes and are frequently made from locally available material. Moreover, chimneys made of sheet-metal are critical to improved stove performances, cited in (Dankilman and Davidson, 1989). Hence, as the women suggested for improved stoves to have best performances chimneys which is made of sheet-metal that can go beyond the roof is the best options. According to these women, the smoke could be removed totally from the cooking space with long chimney but with the short chimney smoke reduction of Mirt is difficult to notice.

Almost all the findings on benefits of Mirt especially in respect to in-door air pollution reduction, fuel wood and money saving are not as intended by the designers of Mirt or stated in the stove testing report. As it has been evidenced from the observation and in-depth interview, most of the users are using it not more than the traditional enclosed Mitad. In a condition where the smoke escape is taken off, broken part not replaced or not plastered immediately, the impacts and benefits claimed by the project can't be attained. From the GTZ-Mirt project part and other stakeholders, the impact is calculated from the number of

Mirt disseminated and theoretical assumption which gives us to save 50% fuel. These benefits and impacts can be attained if and only if users are using Mirt properly according to the user's guide prepared by the project which is not addressed to most users.

The above findings are in agreement with Skutch's argument, that sponsoring agencies assess their success primarily in terms of the number of stoves built and distributed. Only in few cases, had the sponsoring agency tested whether the stoves built were less smoky or more efficient *in practice* than traditional fire places (Skutch, 1985). Little is known about the sustained performance of new stoves, for most surveys are carried out soon after they have been installed.

In most of the households where in-depth interviews were conducted and from observations made the stoves are not being used efficiently for reasons such as: removal of the smoke escape and broken parts not replaced. This happens mainly because users are not aware of the importance of the parts. They don't have the information that they can buy parts of the stoves if partly broken and don't know how to plaster it. Generally information on how to install, repair and use Mirt is lacking.

This finding is in line with Skutsch argument, why some energy programs under achieves theirs goals because of lack of analyzing the impact on both men and women. Where women were not consulted about the type of stoves and were not trained to make them or to repair them (Skutsch, 1999).

Time saving: all respondents agree that using Mirt for baking makes the process faster. In their responses they were not able to decide how much faster their cooking is in using Mirt.

Comfort and Convenience: improving quality of life by providing convenience and comfort in the kitchen is one of the benefits mentioned by the project. Agreeably, women have positive remark in this respect and these remarks are: its protection from burning hazard, comfortable, compatible with pan and pots, easy to control fire and easy to use different types of fuels. For most of the questions listed in the table concerning features of Mirt, women who used Mirt have responded positively. The positive response on these qualities ranges from least 85.53% to 98.74% as it is indicated in detail in (Table 4.3).

The most important quality appreciated by most of respondents is Mirt's durability. The life span of Mirt ranges from 1 to 12 years. About 13.84 % of those who have Mirt have used them from 5-12 years and the remaining groups have used Mirt between 1 to 5 years.

Table 4.3 Responses on Convenience and Comfort of Mirt

	Feature of Mirt	Yes.	Y.%	No	N.%	Mo.	Mo.%	Total
1	Mirt taking space	10	6.28	145	91.19	4	2.52	159
3	Protect from burning hazard	149	93.71	4	2.52	6	3.77	159
4	Mirt comfortable to cook	152	95.60	5	3.14	2	1.26	159
5	Comfortable to polish (<i>Massess</i>)	30	18.87	127	79.87	2	1.26	159
6	Mirt compatible with pan	136	85.53	4	2.52	19	11.95	159
7	Stove compatible with pots	145	91.19	8	5.03	6	3.77	159
8	Control heat easily	157	98.74	0	0	2	1.26	159
9	Easy to use different types of fuels	148	93.08	5	3.14	6	3.77	159

Note: Mo. stands for moderate and *massess* in Amharic is to polish the clay pan or *Mitad* after each and every baking with oily seed to get best result.

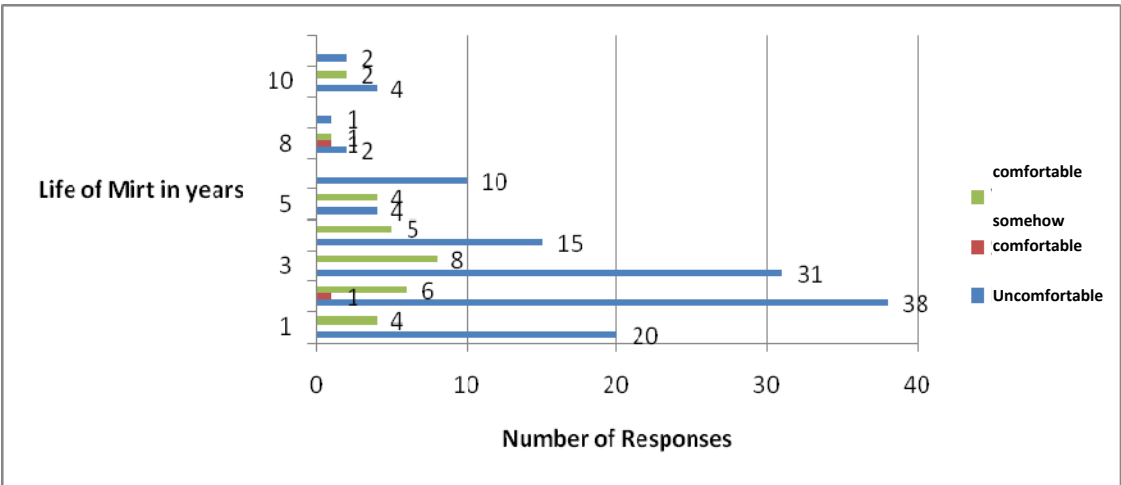
About 78.87% of them don't feel comfortable to polish the *mitad* while baking *Injera*. It is recognized that the group of women who have responded that their Mirt is not comfortable while polishing most of them are who acquired Mirt 4 years and less as shown in graph 4.6. The timing of the discomfort coincides with the introduction of Slim Mirt, kind of Mirt which is less in weight and without edge or shoulder to carry the *mitad*.

Slim Mirt needs frequent maintenance on its part where the *Mitad* lies because it doesn't have the shoulder part unlike the ordinary or old Mirt. The mud that is used to plaster easily dried and crumble out due to exposure of the fire (GTZ, 2010). So if the need for frequent plastering was communicated to users would have done it and the problem of discomfort could have been solved.

The in-depth interview with Mirt producers also revealed that they get frequent feedback from users about (slim Mirt) not being comfortable while pan polishing. The producers agree that this is happening because 'Slim Mirt' doesn't have an edge or shoulder which can carry the *Mitad*. In that case while polishing the *Mitad* there is a risk of the *Mitad* to go down and needs frequent plastering.

When slim Mirt, the improved stove was on market many women have complained about the quality that so thin and easily brake according to the producers. On the contrary the producers believe that Slim was a product of technological improvement pushed by high price of cement.

Graph 4. 1. Time Mirt Acquired Versus Comfort to Polish Pan



By considering the price of cement and its impact on the price of Mirt the previous 6cm thickness of Mirt is reduced to 4 cm. As a result one quintal of cement which is used to produce 5 pieces of Mirt rose to produce 8 Mirt. Hence it was not possible to create shoulder for Slim Mirt out of 4 cm thickness according to one key informant from GTZ.

4.1.3 The Impact of Mirt Project on Women’s Life

The impact of Mirt-project in women’s life is seen from two aspects. First the impact of Mirt-project was assessed on the life of women who are producing and marketing which was collected from two producers in Bahir Dar. Second it was gathered during in-depth interview how Mirt impacts women’s life when they are using it.

Mirt Producers: Two producers of Mirt in Bahir Dar city were interviewed by the name of Tigist and Genet to see how the project assisted these producers, what experience they have, what challenges they face and what their relations are with Mirt users. Accordingly, the cases of these two women are presented below to show how life changing and beneficial the project was to them just from their stories.

Case 1: Tigist Tefera, Mirt producer in Bahir Dar

Tigist was trained in the production of Mirt in 1988 where 16 people trained out of which 13 are women. During this time she had completed grade 12 and was working as daily laborer. After completion of her training she was given 2 quintals of cement, ten quintals of sand and mold for Mirt to start with.

She and others were working inside Mines and Energy compound then later she managed to rent a working place. In the beginning, she had to promote Mirt by moving door to door until concerned bodies started promoting. With the help of these marketing promotions it was possible to sale large amount of Mirt. Starting from 1992, GTZ was operating the commercial dissemination of Mirt and things changed positively especially in the area of marketing promotion.

Starting with 150 birr capital, Tigist now has 600,000 Birr in cash and in fixed asset from production and sales of Mirt. In 1994 she hired one person who could help her in Mirt production and marketing but now she managed to hire 7-10 people per day. In order to promote and market Mirt she participates actively in different exhibitions, demonstrate Mirt during *kebele* meeting and participate in bidding rounds.

Her customers are usually women and some organizations like Injera baking association namely ‘Lemlem Injera bakers association’ which supply *injera* to Bahirdar University. She stated that:

“Generally the business of Mirt production is good because it contributes to the protection of natural resources. However there are challenges such as shortage of mold, red-ash, cement and lack of store where I can buy cement and store. On top of this the major challenge is lack of permanent working space.”

In the future she is planning to work in agricultural related business while producing Mirt. She believed that staying in Mirt business for long time and going through many challenges helped her to develop confidence. She further elaborated how the business shaped her to be active participant in social and economical forms as follows:

“I was founder and chairperson of Bahir Dar women’s Entrepreneur’s association. This had helped me to get different skill training on Entrepreneurship, to know different laws, strategies and regulation on Trade and business. Many women come and consult me on business management and I am happy to share my experience how they can be successful in their business and encourage them. I was able to help women who are very poor and helpless by providing Mirt for free so that they can bake injera and sale.”

Nowadays, Tigist is producing energy saving pot stove which is adapted from Keneya that works with wood called ‘*Fetenech*’. Since a new improved Injera stove called ‘*Gonzie*’ is in

the market now and is being promoted many people are asking Tigist why she is not producing or selling this stove. *Gonzie* is made up of clay, same material as the *Mitad* and cheap. *Gonzie* now is so popular because it only costs 30 birr around Bahir Dar and can be dismantled and be used for pots and pans. It can also be stored if not used means no need to fix it in one place. Tigist is now planning to sell *Gonzie* by establishing a connection with producers who lives 90 km away from Bahir Dar in Hawi zone. Tigist also suggested that introducing *Gonzie* into the market is a good alternative and timely.

Case 2: Genete Tadesse, Mirt Producer in Bahir Dar

Genet is married and has a family size of 10. Until 2005 she was housewife with no means of income. She was recruited in 2006 by the *Kebele* Women's Association and trained by GTZ on Mirt production and Marketing. She was given theoretical and practical training for five days and she was able to get working place from *Kebele*.

To start Mirt business GTZ has supplied her with mold, 2 quintals cement and ten quintals of red ash. After her first round production she was faced with lack of market and she explained her challenges as follows:

“In the beginning I was faced with lack of market and the products were stored with 200 Mirt in number. As a solution I started to promote the product in kebele meetings as well as women's traditional association like Edir and Ekob. I displayed it during Kebele meetings by baking Injera. As a result even some men came and asked me to install the Mirt in their home.”

She sells Mirt for long term payments for those who can't afford to buy at once. In collaboration with the women's association in the *kebele* she started to sell in 3 payments. Additionally, coupon system was introduced by the regional government and people were encouraged to buy Mirt because in this case they were expected to pay only 44 birr only.

Nowadays, Tigist has additional rooms for rent in her compound built from profit of Mirt business. She is getting money which is more than enough to support family by renting these rooms. She said that her husband on top of his job is now supporting her projects. She is getting respect from friends, neighbors and women in the area.

As indicated above, we saw that to what extent the life of Tigist and Genet is changed, being involved in the production and dissemination of Mirt. This shows how energy projects could be used to empower women and enhance advancement of women. The cases of Tigist and Genet indicate the contribution of the GTZ supported Mirt dissemination project in the empowerment of women. This is evident from the capital they possess now and their increased participation in the community.

These women while being involved both in production and distribution of these stoves passed through many challenges in which they have learned a lot. Their disappointments in the lack of market have made them devise other alternative strategy to sell these stoves. As a result they were able to promote the stoves through women's affairs office, *kebele* as well as traditional women's groups such as *Edir* and *Ekobe*. They have made women buy these stoves by organizing *Ekobe* and credit system through community organization. Sometimes they have to donate these stoves to poor women so that these women can use the stove and improve their living.

These women participate in different social and economical forums and having economical power causes their acceptance in the society to be very high. As a result one of the producers has become founder and chairperson of Bahir Dar women Entrepreneur association and in the process was able to know and gather important regulations and procedures in business and trade.

The process of empowerment as Jo Rowlands argued has a different meaning for feminists than the formal definition of it. It affects the ability of less powerful groups to participate in formal and informal decision-makings, and to exert influence. It also affects the way that individuals or groups perceive themselves and their ability to act and influence the world around them. In relation to this one can clearly see that women who got the chance to engage in Mirt production were empowered economically through the project's intervention. Further one of the producers has been the founder and chairperson of Bahir Dar Women Entrepreneur Association. This tells us how women when empowered economically will have the ability to influence the world around them as Jo Rowlands stated (Eade, 1999).

Empowerment is thus more than simply opening up access to decision-making. It must also include the process that lead people affected to come to see them as having the capacity and the right to act and have influence. As it is indicated in the cases of these women, having a chance to get training, financial support and other support have helped them to produce Mirt

and raise money which has changed their lives. This phenomenon indicates how energy projects could be used to empower women and be used for the advancement of women. To strengthen the position of women in society generally energy projects can offer some support in this process of empowerment strengthening women in their ability to organize , express their views, and tackle forces that have opposed them (Skutsch,1999). Accordingly the GTZ supported Mirt dissemination project has contributed to empowerment of women tremendously like Tigist and Genet.

Socialist feminists are also interested in undermining the power-over system of capitalist patriarchy through empowerment. Socialist feminists believe, this can be accomplished best by a societal and global redistribution of power, as opposed to placing their hopes in the empowering capacity of feminine traits. As a result, socialist feminists are most active in socialist revolutions and women's economic movements, organized around such issues as women on welfare, women in development, and effects of economic globalization on women (Tong, 1998).

Mirt Users: data from the survey and in-depth interview show that women have recognized the use of Mirt as multidimensional such as fuel wood and money saving, reduction of in-door air pollution, comfort and convenience. It was also clear from the study that the benefit these women get depend on the efficient use of the stoves. However, these benefits have impact on women's life even if the degree varies.

For most women, who are in small scale business and other business at institutional level benefit most from the saving they get because of using Mirt. The impact of using these technologies has enabled women to save both money and time as it is stated in section 4.4. These women with improved cooking stoves were able to work faster and have a better health condition. Additionally, many women were able to use these stoves and create small scale business of baking *injera* and bread for a living. Associations like ' Lemlem injera baking Association' largely uses these stoves and empowered economically while protecting natural resources according to one of the Mirt producers.

As one of the in-depth interview participants stated, the saving even if it is minimal it is important for the woman in the house who has to manage the household expenditure. She further says:

These stoves on top of saving some amount of money protect us from burning hazards. I don't have to worry about my little baby while baking. It is not as dangerous as the open fire stove where the flame goes around the mitad. It is also relatively clean since it is enclosed and create cleaner kitchen environment if we use it properly.

4.1.4 Information and Marketing Promotion on Mirt

One of the interventions made by the government and other non-governmental agencies to address the household energy crisis is dissemination of Mirt stove. Accordingly, information on Mirt and its benefits were made available so that people could adopt the improved stove and protect the environment. Based on the findings of this study, respondents irrespective of possessing the stove had information on Mirt since 12 years at maximum and one year at minimum whether the respondents have Mirt or not. It also indicated that the number of people who were informed about Mirt during the last two years and the first 6 years is minimal amounting 18.75%.

The Sources of information about Mirt include both formal and informal. The informal sources are friends, relatives and neighbors. Formal sources are marketing tools used by the project and other stakeholders includes TV, Radio, Public demonstrations, Billboard, flyers and publications as indicated in (Graph 4.2).

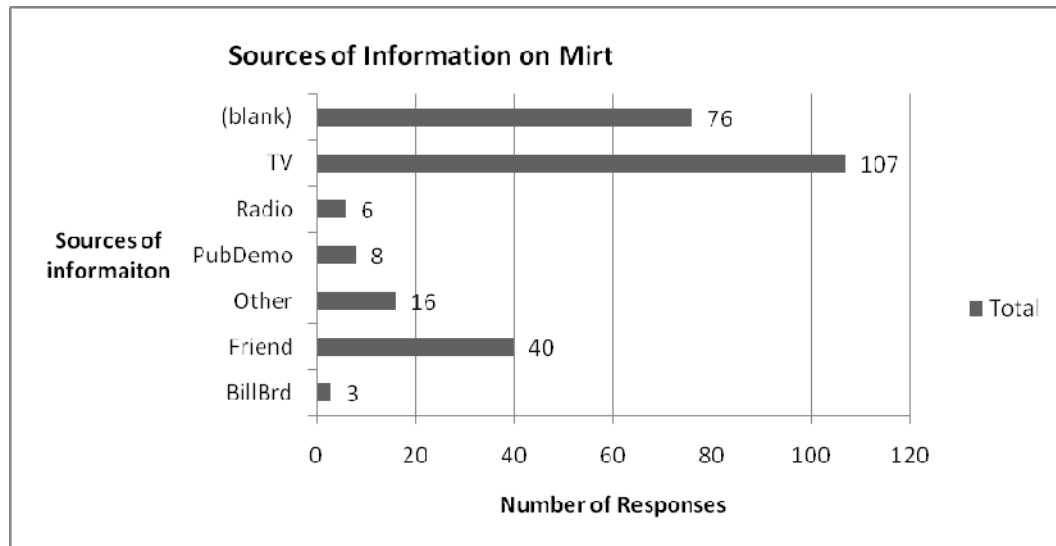
Out of the total 256 respondents 41.80% of them have learnt about Mirt through TV and 15.62% were informed by a friend. The promotional advertisement through Radio, public demonstration and billboard takes a share of 2.34%, 3.13% and 1.18% respectively. The remaining 35.93% don't have specific media they remember through which they learnt well about Mirt. This finding shows that most of respondents have learnt about Mirt from TV and friend.

From the total 159 respondents who possess Mirt responding to which of the information or marketing advertisement they were influenced to buy the stove, 58.3% of them, majority were influenced by a neighbor, a friend and a relative. The other 22.43% have decided to buy Mirt by being influenced by promotional demonstration and the rest 19.23% were influenced by *Kebele* or women's affairs office as indicated in (Graph 4.3).

The above finding shows that even if most respondents learn about Mirt from TV, no one was influenced by it to buy the stove. On the other hand most of the women who bought Mirt were influenced by the word of mouth of their neighbors, relatives and friends or influenced by

public demonstrations. So one can conclude that in order women to buy Mirt either they have to see the stove functioning physically or need someone who they trust to assure them that the stove is good.

Graph 4.2. Sources of Information on Mirt



According to Dankilman and Davidson, (1989), several factors have influenced the spread of most efficient stoves: their design and development, their cost, the need for infrastructural change (including extension services and credit facilities) and the attitudes and status of women. In relation to this one can see that the kind of information that has power to influence women in the study area comes not from modern marketing tools. Instead the information that influences them comes from someone who is close and trustful which is indicative of the attitudes and status of women.

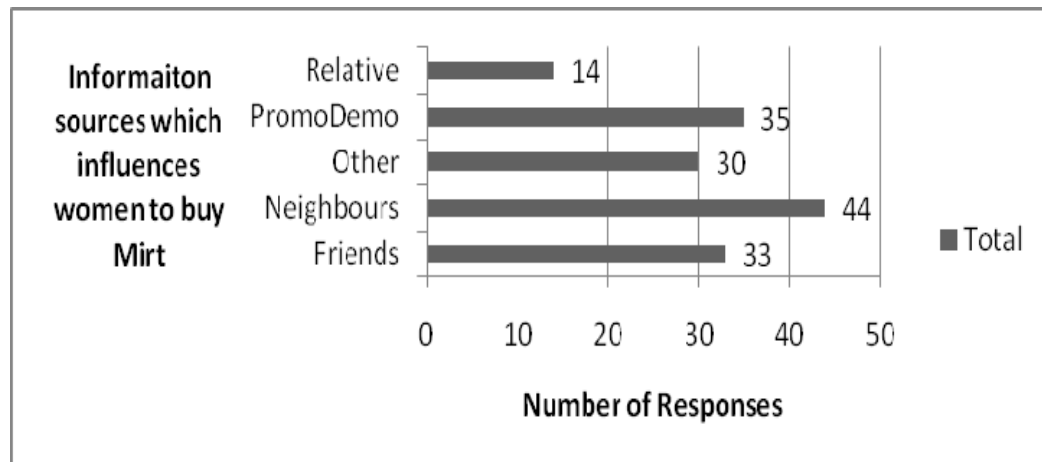
One of Mirt producers named Ms. Tigist stated that, one of the problems in the area of Mirt dissemination is the promotional strategies used. Even if most of the information sources on Mirt are informative not influential. Further, she shares her experience on alternative marketing strategies as follows:

Even if there are promotions of Mirt on TV, Radio and Billboard etc. still these promotional strategies don't have the power to influence people. The most effective promotion so far is the demonstration. It is far better to demonstrate in market places by baking Injera in which case even men who came to the market place were influenced and interested to buy it.

According to Mirt producers Genet and Tigist, working together with community associations like *Edir* and *Ekob* is more effective in disseminating Mirt where people can have access to raise money without difficulty. The findings obtained from one of the producers are in line with the finding from the quantitative survey that shows even if TV is most informative it is not the most influential tool.

Therefore, we can observe that in any energy or other developmental projects it is important to give sound attention to gender through consultation (participatory planning), with women's groups. According to Eade, it helps the planners to understand cultural norms and work with women. While collecting baseline data understanding of socio-cultural phenomena at village level and project site is very important (Eade, 1999).

Graph 4. 3. Information that Influence Respondents to buy Mirt



Sustaining the above argument, out of the entire respondents amounting 60.15% of them had told to their friends and relatives about the benefit of Mirt. Out of which 88.96% of them were able to influence those people to buy the stove. This finding together with the fact stated above where women were influenced by friends it is obvious in this case that word of mouth is influential source of information to disseminate the stoves.

4.1.5 Decision on Stove Purchase

As an objective reality in the Ethiopian context, women and girls in the household have the responsibility to cook food. Finding from this study showed that, among the people who cook food, women account to 76.34%. Young girls and house maids account to 23.27% and only one person was found to be a man. In the case of making decision to purchase the stove it was

the wife who decided the most and this accounted to 49%. About 45% of them decided together with their husbands, 2.65 % by husband and 3.3% by other family members respectively.

As shown in (Graph 4.4), the reactions of husbands in buying Mirt were various where most encourages and some even bought the stove themselves. About 65.40% of the women obtained encouragement from their husbands out of the 159 respondents. Only few (1.25%) of husbands discouraged the wives when they buy the stoves. On the other hand 6.91% of husbands bought the stoves while 20.75% have shown no involvement in the process of acquisition while the remaining 5.66% did not responded to the question.

Graph 4. 4 Husband's Reaction in Buying Mirt



It is unquestionable that since women are responsible for food preparation in every household any problem related to household energy sources affects them most. Despite the problem attributed to fuel wood and its inconveniences is associated to women the decisions of buying Mirt include men as we have seen from the data above in which 45% of the time the decision was made both by men and women. Above all 65.40% of respondents at least had to get encouragement from husbands to buy the stove. Therefore as stated by Eade, energy data and projects must have data further from household and look into the gender power relation and its impact on the adaptation of these technologies (Eade, 1999).

Sustaining the statement of Eade, it is also argued by Skutsch most of the time women are responsible for daily small scale purchase including wood or charcoal and men for capital expenditures and large items. If the household is conceptualized as an economic unit, it would

be expected that investment in an improved stove would be seen as an advantage. But if the household does not perceive itself to be an economic unit but in fact as two parts which may even be in competition with each other, it is clear that the capital for the stove will not easily be made available (Skutsch, 1999).

One respondent from in-depth interview stated that she doesn't have Mirt unlike most of her neighbors. She wanted to buy the stove but couldn't since she doesn't have any income. When she was asked how she couldn't afford Mirt while having a TV in her house. She had to respond the following:

My husband doesn't want to miss news and sporting events so he had to buy the TV. Maybe I was not able to convince him about the benefit of the stove so that he allocates money to buy Mirt. From what I observed if men are the one responsible for baking Injera and tolerate the flame of the open fire stove Mirt would have been a priority than TV.

In light of the argument by Skutsch stated above, out of 97 women who don't have Mirt, 18 of them or 19% of them said that if they had the power to decide on the purchase, they would have bought the stove. So this shows the gap between the need of these women and the ability to decide on financial matters at home.

Out of 159 women who possess Mirt the level of education between grade 6 and 12 is about 33.33%. Those who are illiterate are also the next majority of those who possess Mirt. In this finding, Mirt possession is not associated with educational status as it is learned from the descriptive statistics. This to some extent shows that, the educational background of the women is not positively associated with their ability to decide on stove purchase. Instead most of the women who possess Mirt are married which constitute 55.35 % irrespective of their educational status. One reason for high number of married women in possessing Mirt comes from the high number of married women in the sampled households.

These finding ,where most of the women who possess Mirt being housewife and married make us see beyond basic needs regarding an entry-point of any development interventions. According to Eade, this need is basic and stemming from gender- specific constraints and gender division of labor where men and women terms of responsibility and roles are different (Eade, 1999).

Majority of women who don't have Mirt are housewives and those who have private business. These women had the information about Mirt and might have liked to have it but they lack the capital or no support from husbands.

4.1.6 Financial Issues

The price for Mirt varies from time to time and producer to producer and at the time of the study the price of Mirt stove was 84 birr in the study area. For Mirt with metal claddings and long metallic chimney costs about 500 birr. Even though the price of Mirt seems relatively small, majority of women who do not have Mirt expressed that lack of money is main reason for not purchasing the stove.

Out of 97 women who don't have Mirt, considerable amount of them accounting to 31.95% don't have money to buy the stove as indicated in (Table 4.4). On the other hand, 16.49% of them don't have space since Mirt should be fixed and is not mobile. The remaining 51.56% have combinations of the above reasons including not having trust in the use of Mirt. As few in-depth interview participants stated instead of spending money for it is possible to make an enclosed stove from local material for free. Further about 78% of the respondents stated that their neighbors are not using Mirt due to lack of money.

Table 4. 4. Reasons for Not Having Mirt

Reasons	Frequency	Percentage
Lack of Money	31	31.95
Lack of Space	16	16.49
Lack of Information	7	7.21
Not Believed in the use	7	7.21
Lack of Money and Space	6	6.18
Other Reasons	30	30.92
Total	97	100.00

Finding from a case study of a woman in Bahir Dar city is presented below. The woman who is not using Mirt but wishes to have one and her evidence for the lack of finance to acquire these stoves can be shared by most women.

Case 3; A woman in Bahir Dar

She was baking in the open air using an open fire stove. The wind was blowing and putting off the fire repeatedly. She was putting fire wood which is mostly dry leaves

into the fire as (see picture 4.3). She was asked why she does not use kitchen and her reply reads as follows:

“I rented one room from my tenant with no kitchen. In the rainy season I have to cook inside the house but in dry season I cook outside because I can’t bake bread everyday and live in the same house. For a living I have to sell home- made bread, as I am cooking right now with tea mostly to students in the area.”

She was married to an ex-soldier and now divorced and has one 5 years old girl. For the moment she doesn’t have much choice since she has lost her land when she moved out of rural area. She thinks that her husband divorced her because she is poor and don’t own land. She used to work as a maid in Addis Ababa but now having a child she can’t do that anymore. She had tried to sell Tella (local beer) like many other women in the area but because of strong competition she stopped the business.

Now her source of income is only from baking bread, making tea and selling it to students who pass by her house. She makes tea by putting the tea pot near to the open fire while baking. When she was asked whether she knows availability of Mirt which can make her life easier she responded the following:

“I know and have used it when I was working in Addis Ababa but now I don’t even consider buying it for two reasons. The first reason is I can’t afford buying it as I don’t earn any extra income and what I am getting is just for survival .The second reason is that I can always collect twigs, dry leaves and fire wood from the nearby forest for free thus saving firewood is not my priority.”

However, even if she has the option to collect firewood for free she wishes to buy Mirt if she can afford it because of its qualities being smokeless and safety from fire hazard. She said that it would have been good to have it since she has a serious eye problem. In addition animals like goats from the neighborhood come closer to the fire while she is baking and this makes her uncomfortable. According to her if she can afford Mirt she will fix it in her one -room house and will be protected from smoke and fire hazard and stop worrying about rain.

As shown in (Table 4.5), out of 156 women who possess Mirt 40.25% of them had to use their savings to buy the stoves. Those who bought the stove from wages amount 38.99% and those who bought with *Ekob* are 8.81%. Only 4.40% of them get the Mirt with donation and

5.66% get credit to buy it. On the other hand out of 256 of the respondents 96.37% believed to organize a credit to buy these stoves as necessary.

Types of financial resources illustrates that the capital to buy the stove is not readily available and not affordable to most of the respondent's income level. Majority of them have to use their savings to buy the stove and can't allocate it easily from their monthly income. Usually, savings are meant to be for emergency like medical and other family problems. In this case these women have to decide with their husbands to use this saving which is meant to be for emergencies for stove purchase. In this case, one can see that using saving needs decision and negotiations at household level. The process of deciding on saving makes it difficult for the women to acquire the stove which can make their life easier.



Picture 4.3: A Woman in Bahir Dar Baking in the Open Air

On the other hand, about 8.81% of the respondents have to collect *Ekob*. Collecting *Ekob* means they can't pay from monthly expenditure as the cost of Mirt is 84 birr currently. Instead, women had to organize themselves into small *Ekob* groups where the number of women ranges five to ten. Then women contributing 10 birr each month and one woman get the chance to buy the stove. Hence for most of the respondents the cost of the stove is not within their monthly expenditure. As a result 96.37% of them wishes if there are credit services in terms of long payment and cash credit for the purchase. They believe this credit can be organized through small scale business offices (*Tikankina Aneshtena*) or women's affairs office and associations.

Mrs. Genet, one of the Mirt producers, has also indicated though many women have the awareness and the readiness to use Mirt still can't afford it. Hence, it is Genet's belief that to organize credit service and organize strategies to disseminate Mirt for the very poor in order to protect the environment. Speaking on slow adaptation and dissemination of Mirt Genet states that:

The problem of slow adaptation is related to the price and affordability. This is because most people can't pay this amount of money at once above all women don't have the resource to pay like 84 birr. As solution some women organize Ekob just for Mirt and then every member will collect the Mirt when their turn comes.

According to Skutsch, some of the reasons why improved stove programs are not successful are, the women's inability to raise the money in one go or the capital cost of these stoves. Thus the majority of respondents who possess Mirt have allocated budget from saving. This indicates that purchase of these stoves is not within the limit of monthly income of most families. On the other hand three out of four respondents believe that facilitating credit is important (Skutsch, 1999).

Table 4.5. Financial Sources to Purchase Mirt

Financial Sources	frequency	Percentage (%)
Saving	64	40.25
Ekob (Traditional fund raising)	14	8.81
Wages	62	38.99
Donation	7	4.40
Credit	9	5.66
No responses	3	1.88
Total	159	100

Both from the quantitative survey and in-depth interview as well as the case studies, it is revealed that women have their own experiences, knowledge and problems concerning Mirt. It will also be natural to see how these gendered concerns, needs and priorities are treated in the overall project cycle. In order to assess the integration of gender concerns both key-informant interview and documents review were conducted and presented in the next chapter.

4.2 Integration of Gender Concerns in Energy Policy, Strategy and GTZ-Mirt Project

4.2.1 The GTZ-Mirt Project Profile

In the past ten years, GTZ was working with the Ethiopian Government and other partners to introduce energy-saving methods and products to the local market while strengthening the country's ability to provide sustainable energy services. The office is still supporting sustainable energy services in Ethiopia through; rural electrification, advising the Government on improved energy service delivery structures and promoting energy-saving stoves. AMES-Cooking under GTZ-ECO is currently working on promoting energy saving stoves which reduce firewood consumption which is the focus of this research.

Specifically the Mirt project started in 1998 after the signing of a bilateral agreement between the Federal Democratic Republic of Ethiopia and the Federal Republic of Germany. Until recently it was implemented by the Ministry of Agriculture (MOA) and GTZ, GmbH commissioned by the German Federal Ministry of Economic cooperation and Development. The project was operating under different titles for different phases and being financed by different donors (GTZ, ND). For the purpose of this research the project is referred as GTZ-Supported Mirt Project.

Energy Efficiency is one of the initiatives of ECO and AMES-Cooking was introduced and promoting the Mirt *injera* baking stove in Ethiopia. The Mirt stove was designed by the Ethiopian Alternative Energy Development and Promotion Center (EADPC) of the Ministry of Mines and Energy. It is assumed to reduce fuel consumption for baking the Ethiopia's national dish, namely *Injera*, by about 50% in comparison to traditional methods. It is also believed to save 33 ETB Birr per month and the benefit is more for commercial consumers. For rural households the time saved is assumed to accounts for 6 hours per week on average but varies from household to households (GTZ, ND).

To date 455 small-scale producers were established in 225 districts and in five regions of the country. The commercial approach adopted by AMES-C with a decentralized production process and involvement of the private sector to sell the stoves resulted in the sale of over 325,750 Mirt stoves by the end of 2009 and in Amhara Regional State number of Mirt stove sold were 78,174. Most of the stove producers are not VAT registered as their business are running under small scale.

Currently ECO is working together with the Ministry of Mines and Energy, partner of the project, to implement effective strategy for improved energy supplies. Operational plans are currently being developed within the Ministry as well as Ministry's implementation offices, such as the Ethiopian Alternative Energy Development and Promotion center (EAEDPC).

4.2.2 Fuel Wood Consumption Pattern of Bahir Dar

The kind of household energy sources used by respondents are various and some use combinations. Accordingly 89.1% use biomass fuel of which the majorities use only fire wood accounting to 82.42%. The other 3.52% of the respondents use firewood in combination with Kerosene and Electricity while only 6.64% use electricity as shown in (Graph 4.5). These findings match with the fact that in Ethiopia, only 6% of household energy comes from electricity or petroleum products and almost 94% comes from biomass such as wood, crop residues and dung (GTZ, 2009).

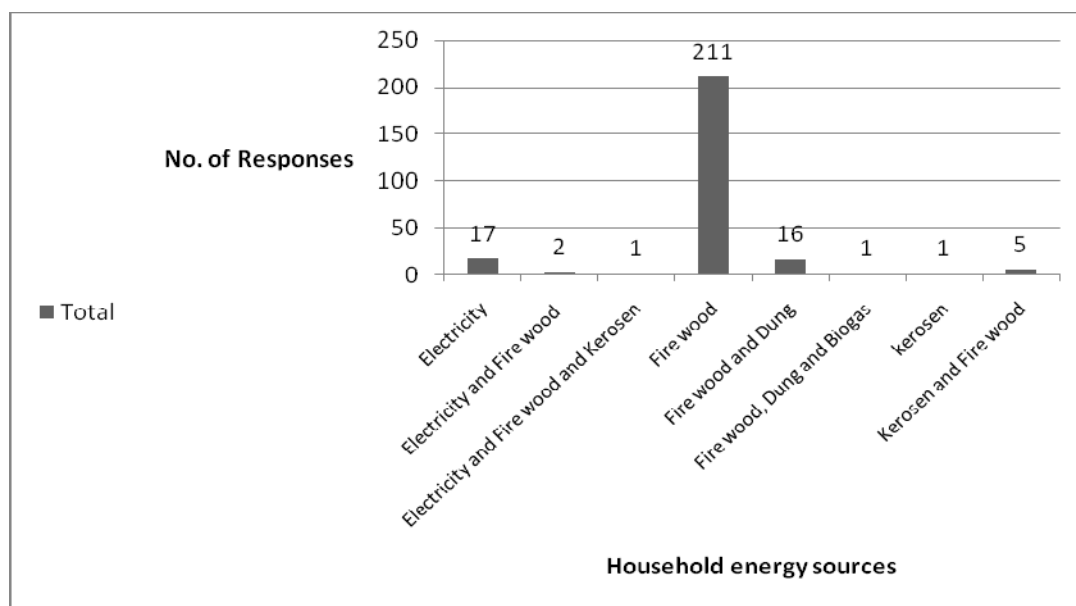
Biomass fuel further breaks down into 77% woody biomass, 8.7% crop residue and 7.7% dung (GTZ, 2009). The general situation of household energy in Ethiopia where the dominant household energy supply is biomass, the pattern of consumption and its implication on the depletion of the natural forest is huge and this in turn causes subsequent negative effect like soil erosion, deterioration of watersheds, decreasing soil productivity. The principal victims of environmental degradation are the most underprivileged people, and the majority of these are women (Dankilman and Davidson, 1989).

Out of the 256 respondents, those who get biomass fuel by buying are 89.1%, those who collect are 2.34% and those who buy and collect are 1.17%. The finding of the survey showed that women in the study area are spending 20% to 30% of their income to buy the fuel wood per person. This shows that fuel wood consumption and its related expenditure put forth its pressure on women. This finding is in line to Mikelle's arguments which indicates the hike in the prices of firewood reduced women's housekeeping money and has adversely affected the quality of meals women can provide. Higher prices have also limited any small savings women could otherwise make from careful management of money received from their husbands (Mikell, 1997).

The main food types consumed in the study area are *Injera* and *wot* and amounts 99.20% of the total responses. The amount of energy needed to bake *Injera* constitutes 50% of the total household energy consumption in Ethiopia (GTZ, 2000). Hence, the kind of food consumed

in the study area implies the need for huge amount of energy and special type of stove which accommodate the *Injera* pan '*mitad*'. Majority of the respondents, amounting 62.11% are using Mirt, the improved stove to bake *Injera* and 5.47% use Electric *Injera* stove whereas 32.42% use traditional stoves.

Graph 4.5 Energy Sources Used by Respondents



Moreover, out of 83 women who use traditional stove to bake *Injera* 89.16% of them use open fire stove and 10.84% use traditional enclosed stoves. The enclosed stoves are made by the women from local material such as stone and mud. The enclosed stove equally protects them from fire hazard and is better in fuel wood consumption than the open fire stove and it costs them nothing. For wot (traditional sauce) cooking 11.33% of the respondents use improved stove such as '*Fetenech*' and '*Lakech*' while the remaining 88.67% use open traditional pot stoves.

This finding illustrates, using Mirt stove is a familiar experience in the study area where more than half of the respondents are using the technology. Under laboratory condition, this stove can save about half of fuel wood which in turn is assumed to impact fuel wood consumption positively and contribute to forest protection. Clancy elaborates, in this line that improved household energy supply can significantly contribute in reducing health problems when compared to open stoves. Further, improved stoves help to save time, money and to generate income which will contribute to women's advancement (Clancy, 2003).

On the other hand, only few women are supplementing their fuel wood by planting trees in their compounds as shown in (Table 4.6). Accordingly, a total of 11 women (4.29%) where 4 women (1.56%) who live in *Kebele* house, 6 women (2.34%) who own house and one woman living in house rented from other people plant trees. This finding showed that even if people own the *Kebele* or their own houses do not plant trees and do not supplement their consumption. Accordingly, the finding from in-depth interview also showed that none of the participants plant tree for fuel wood supplement. The kinds of plant they have in their compound are either ornamental or herbs used as traditional medicine. Hence, they have to buy the firewood which mostly comes from the surrounding rural *Kebeles*.

Table 4.6. Fuel Wood Supplement by Respondents

Premise Ownership	Responses on planting trees to supplement fire wood consumption					
	yes	Yes (%)	No	No (%)	No Responses	% for No Responses
Rent from Kebele	4	1.56	83	32.42		
Own a house	6	2.34	70	27.34		
Rent from people	1	0.39	63	24.61		
Total	11	4.29	216	84.36	30	11.72

Sharing her experience, one of the in-depth interviewee has explained that fuel wood was not at all a problem in her earlier days of marriage. She used to bring fuel wood from relatives who reside in rural areas for free. Nowadays, no one in the rural area is willing to give it for free as a result she has to buy fuel wood from the local market. She further says;

“The good thing in Bahir Dar is that fuel wood is always available in the local and open markets in every village. On the contrary the price is sky rocketing from time to time. Just within two years the rise in price for fire wood is more than double. Whatever the price of the fuel wood is, you can’t avoid it other than using it economically.”

This is witnessed by, the researcher of this study; by being in the market day of the study area physically that many people from all age groups and both sexes carry wood to the city to sell (See Picture 4.4). According to Mainborg, on global scale it is the urban rather than the rural who are responsible for high consumption of wood that resulted in depleting rural wood

supplies, cited in (Dankilman and Davidson, 1998). As it is noted from the findings, people in the city of Bahir Dar are consuming firewood while only few people are planting and supplementing their consumption which clearly put much pressure on the forests of the surrounding rural *Kebeles*. As the firewood becomes source of money in the rural areas and with the depletion of fuel wood supplies, poor people are forced to switch to other cheap biomass substitute such as straw, crop residues, and animal dung (Tessfay, 2008).

One can clearly see the consequences of pattern of biomass consumption for a woman. As wood supplies become scarce in the city and hiking price of firewood will be a problem of the woman who is responsible for household energy provider and user. Equally, the depletion of firewood in the rural areas made worse by wood trafficking to cities means rural women will walk substantially longer distances and spend more time and energy in fetching firewood.



Picture 4.4: Women and Men Carrying Fire Wood to Bahir Dar for Sell

To tackle this complicated household energy crisis at national level there have been interventions namely supply enhancement, inter-fuel substitution and improved stove dissemination. These strategies suggest implementation of sound forestry management policy to enhance the supply of fuel wood and taking measures to increase the end-use energy efficiency (GTZ, 1998).

The major strategy followed by GTZ-Mirt dissemination Project is natural resource protection through introduction of energy saving technologies. Even if the project is focusing on

development, production and promotion of energy saving stoves it is also involved in natural protection through supply enhancement. As part of GTZ-SUN program (Sustainable Utilization of Natural Resources for Improved Food Security) it also gives attention to forestry and water shade development. As Part of this effort, supply enhancement or fuel wood plantation numbers of seedlings are planted. Through *Woreda* Ardo and model farmers, individual basis, in Oromia 101,368 Eucalyptus seedlings are distributed to 49 model farmers. In Amhara Region through ORDA local NGO 357,202 seedlings have been planted by farmers, government institution and CBOs (GTZ, ND).

However, Bahir Dar city being one of the pilot areas of the project majority of respondent is neither aware of the need for fuel wood supplement nor ready to plant trees even if they own a compound. Even those who plant trees to supplement their needs are doing it from their personal initiatives rather than the project's effort.

According to Muzira, there were similar efforts made in Uganda where dissemination of stoves integrated with promotion of community forestry. In Uganda, since 1983 the National Joint Energy and Environment Project (JEEP) were engaged in educational work to promote public awareness of the energy crisis. It broadcasts a short message daily on radio and television, promotes agro forestry at the village level and improves stoves in urban areas, cited in (Dankilman and Davidson, 1998).

According to Cecelski, integrated forestry is the best method for local community development or social forestry but local residents have to be informed and participated. Integrated projects which attain several objectives are valuable and women taking leading attempts could be exemplary to reverse the destruction by planting trees, cited in (Dankilman and Davidson, 1998). As stated in the project objectives energy sector is linked to environmental conditions and the situation of women when wood is the predominant cooking fuel.

In line with this, Eco-feminists suggest that Science and technology are needed to solve environmental problems and welcomes not only appropriate science and technology. Rather Ecological feminism requires the inclusion of appropriate insights and data of scientific ecology and insists that data on historical and interconnected exploitation of nature and women and other oppressed people should be recognized and brought to bear in solutions (warren, 1997).

4.2.3 Role of Women and Women's Organizations in GTZ-Mirt Project

As explained by one key informant from GTZ there are few criteria applied by GTZ – Mirt project to select Mirt producers so that the production and marketing process would be efficient. Most importantly to have a working space for Mirt production is one of the important criteria that have to be fulfilled by the producer. In addition the selected producer is expected to have physical fitness to carry out the production process. Either the producer must have family members who could take care of the production which demands physical fitness. Further the capacity to learn technical skill is needed since stove production needs to work with molds and other materials. It is also preferable if these people have communication ability for marketing and promotion.

Stakeholders included in Mirt producer's selection are small scale business administration in a *Woreda (Tikakinina Anestena)*, *Kebele* administration, energy as well as agricultural offices. Women's Affairs Offices are not usually involved in the process of Mirt producer selection. At the stage of promotion, it is common to work with women's affairs offices and use their forum to promote the stove. The Women's affairs offices work with the project people since these offices work on health packages together with Health Offices in *Woreda*. One of the health packages is indoor air pollution reduction and these offices use Mirt to meet this purpose.

According to the informant from the project, generally women's organizations attend promotional and Technical workshop. Otherwise these groups are not communicated directly for producer selection. The projects neither give any special attention to recruit women trainees nor give any affirmative action to include more women in the training. Out of the total Mirt producers women constitutes 35% and in Amhara Regional State women producers are 51.03% out of 145 producers.

Most women believe that it is appropriate to consult women before large dissemination of any stove designed and this response amounts to 97.99% out of the total respondents. According to Skutsch, improved stove programs are unsuccessful mainly because, the stoves are designed by male engineers who mostly have no experience of cooking. Often, the primary concern of engineers is energy efficiency in order to save fuel. Most of the time these properties are much less important to women, the cook of the household, than other aspects such as speed and ease of cooking, safety, position, compatibility with existing pots and pans, ability to regulate heat and other related issues (Skutsch, 1997).

Out of the total respondents most of them have discussed strategies how to acquire the stove in community associations where 92.8% of them answered that they have discussed it in their *Ekob* and *Edir*. On the other hand 82.26% of the respondent believed that women's affairs office could contribute in the dissemination of these stoves.

Mirt producers have reported that women have financial problems to buy Mirt that need to be addressed for better dissemination. As indicated by the women in the case study, even if women's attitude and the need for Mirt are positive they lack the capital to buy the stove. Hence working together with formal and informal women's groups is important according to the producers. Groups like *Edir*, *Ekob* and women's affairs offices are best venue to market stoves.

Eade argued that, working together with women's organization for an energy project is best strategy in improving the projects efficiency. Women don't benefit from energy project because don't have resources (Eade, 1999). According to Charlton, to fix credit program for women or using revolving fund both from government or nongovernmental sides is inevitable. Further Charlton debated that, provision of the stove freely or by subsidy means the country is saving money, labor and natural resources (Charlton, 1989).

Further women who were in-depth interview participants suggested the project should address women's issues recognizing what had been done so far by the project in general as good. One of the in-depth interview participants suggested:

The energy advisors must think of a thin smoke escape which goes out of the house instead of making a smoke escape which is short but same time heavy. In my opinion these stoves have been there forever without any improvements. I think to make the stove more efficient the designers have to find a better raw material that can use only much less fuel wood.

Most of the respondents also had same idea and suggested building long smoke outlet for Mirt that reach the roof top or that can vent out through the wall of the kitchen to the outside. The rest of the in-depth interview also suggested that demonstration and promotion must be carried out even to the rural areas. Additionally, information through producers must reach how to install, maintain and use Mirt effectively. One respondent from in-depth interview suggested:

The project people must supervise the producers properly for the quality of the stove they are producing. I am emphasizing on this because recently the stoves break easily. I suspect that because the price for cement is high the amount used by the producers might not be as required. Sometimes it is good that the government people listen to our side of the story.

4.2.4 Integration of Gender Concerns in the GTZ-Mirt Project Cycle

Assessment was carried out on the practice of the project which is written and unwritten from gender perspective through key-informant interview and document review. Examination of organizational rule from gender perspective according to Bridget Walker is an important area of feminist enquiry into women's subordination. For organizations with a mandate to promote equitable human development, this kind of enquiry is an essential and important task (Fenella, 1999). The finding from the interview of the Project revealed, how and to what extent gender concerns are integrated in the project cycle.

Gender mainstreaming starts by recognizing that gender differences which shape policy and development process and outcomes. It has traveled from the realm of feminist theory to local and global policy application. It implies, to re-invent the process of design, implementation and evaluation by taking into account the gender specific and often diverse interests and values of differently situated women and men (True, 2003). Hence, the findings on gender mainstreaming of the project is generalized into five groups such as policy, planning and implementation, monitoring and evaluation, organizational culture and technical capacity.

Policy: from the interview it was made clear that there is no gender policy or action plan that is applied in the course of the project. On top of that most of the key-informants are not aware of the Ethiopian women's policy. Both the interview and the document review have showed that, even if the project is working closely with women's groups these groups are not stated as stakeholders.

It was found out that, most of the documents related to the GTZ- Mirt project, as shown in (Table 4.9), while mentioning other relevant policies in the development initiative doesn't mention any policy in relation to women. As it is clearly stated, in the Ethiopian constitution of Article 35 number 6, women have the right to be part of any developmental activities and project in the country in principle.

Responding on the fact that women's policy of Ethiopia is not mentioned as relevant policy in relation to the project one key- informant commented that;

“It is true that Women's Policy of Ethiopia is not considered and included in the project as one of the development policy objective as Environmental and Natural Resource Protection Policies. However the rest of the staff and I believe that our organization and the project value and see the program as beneficial to women's life.”

In contrast data collected during key-informant interview in the government counterpart of the project, Ministry of Mines and Energy, reveals that gender mainstreaming strategy is adapted to some extent. Both key-informants from the government Energy offices are aware of the Ethiopian women's policy and practiced the gender mainstreaming strategy.

It was collected during document review of related document that the Ethiopian Energy policy has given less attention to the position of women in the problem, strategy and goal of the policy statements. However, the Ethiopian energy policy was formulated before the Beijing platform for action and it explains why it is not formulated with the principle of gender mainstreaming. Otherwise both strategic plan of MME and the ARSMEPA are informed with gender concerns and have mainstreamed gender in their goals, objectives and as well as strategies as indicated in (Table 4.7). Even if the Five Years Energy Strategic Plan of MME had integrated gender concerns in its goals and objectives some of the activities and strategies mentioned in the document did not consistently address gender issues.

Planning and Implementation: though the energy policy gives less priority to gender issues, the 5 years Strategic Plan of MME has made gender issues as one of institutional priorities as indicated in (Table 4.7). The gender mainstreaming office of the Ministry has contributed its part for gender concerns to be part of the strategic plan. In line with these any annual plan, program and project executed under the Alternative Energy Sources and Technology Core Process is screened for its gender concerns according to the process owner and Gender Mainstreaming Process. According to Gender Mainstreaming Process Owner, learning from the previous policy weaknesses and with the principle of gender mainstreaming strategy the gender mainstreaming process of the Ministry is ready to mainstream gender in the coming Energy policy.

Hence, gender concerns are included at all stages of planning, implementation, and monitoring and evaluation process and activities of the AESTCP. All the planning papers are

checked against a checklist to screen gender concerns by their respective planning departments and from Gender Mainstreaming Process. According to the Owner of Gender Mainstreaming Process there is also evaluation from gender aspect of any planned action and accountability for not integrating gender. This fact is further evidenced from document review of documents from gender perspective as indicated in (Table 4.8).

According to informants in GTZ-ECO, the project proposal process include criterion which concerns gender. It is also the belief of the project staff that the project services and products benefit women above all even if these things are not recorded and gender concerns are not included systematically in the project cycle. On the other hand, the organization doesn't use full participatory methods to incorporate views and preferences of both male and female staff members in project design.

Table 4. 7. Assessment of National Policy and Strategies from Gender Perspective

Document reviewed/ Topics covered	Content	Gender Perspective
National Policy on Energy	Problem, solution and strategy on energy	States only women are victims of collection and use of biomass fuel.
MME Strategy (2005-2010)		
Problem statement	Biomass use	Women and girls being victim in the process of fuel wood collection
Capacity building	Training and education of energy planners and advisors to give efficient services	GM in all capacity building programs
Energy technology development	Biomass energy is given due attention and its problem associated with deforestation	Incorporating gender issues in Energy technology is not explicitly mentioned
Socio-economic study of energy resources and potentials	Study why energy technology adaptations are low	The relevance of gender analysis in the socio-economic study of energy resources is not stated
Amhara Regional State, EMRDPA (2005-2010) Strategy		
Problem statement	Dependency on biomass energy and its consequences	women's drudgery mention as a problem
Sex –disaggregated data	Available	Not consistent but shows 54% of trainee on Mirt production are women
Planning		Planned to make sure 30% at least are participated in every activity

Source: MME, (1998). *Ministry of Mines and Energy /1998-2002G.C./ strategic plan*: Addis Ababa Ethiopia: Ministry of Mines and Energy

Table 4.8. Assessment of Improved Stoves Technology Package from Gender Perspective: Mirt and Gonzie Packages

Item	Content	Gender Perspective
Problem Statement	The impact of using biomass fuels and traditional open fire stoves	States women and children as primary sufferers of biomass fuel collection and use
General Objective of the package	Environmental protection and improve women's condition	Improve women's situation stated as general objective
Specific Objective of the package	Reduce women's drudgery and improve negative health impact of traditional open fire stoves	To Improve women's health condition and reduce workload stated as specific objective
Benefits of Mirt and Gonzie	Protect from fire hazard, fuel saving and helps women and children from spending so much time on fuel wood collection	Recognized, that the potential of Gonzie production to create job opportunity to women who are potters
Strategies	Working together with farmers associations	working together with women's associations in organizing women for Gonzie production
Promotion	Through extension workers, Elders, Influential people , market place posters and flyers	Through women's associations and women's organizations are recognized as stakeholders
Places of Implementation	By focusing in deserted areas	Where there is Women's Associations

Sources: MME, (2008). *Mirt Package; Improved and Fuel Saving Stoves*: Addis Ababa, Ethiopia: Ministry of Mines and Energy

MME, (2008). *Gonzie Package; Improved and Fuel Saving Stoves*: Addis Ababa, Ethiopia: Ministry of Mines and Energy

According to Eade, donors from the western liberal democracies take a very strong line on the empowerment of women at least in their policy statements as a result project proposal process of GTZ-Mirt project including criterion on gender. However, in the project goals and objectives gender concerns are being diminished in the process. Responding why gender concerns are not included in the project cycle one of the key-informants stated;

“The major objective of the project is protection of natural resources through improved energy technologies as it is signed with the government of Ethiopia and Germany. In addition the projects output directly and indirectly benefit women especially those who are engaged in stove production. We are also careful of agenda-hijacking since there are many organizations working on gender issues.”

As Bridget Walker put it, gender must not be seen as an issue to be addressed in isolation from other issues but as a defining perspective on development. There are no issues or development initiative which is gender neutral as feminists argue instead to achieve change and bring about equity and equality the process designed from the start of any program or project to be participatory. To consult women and to consider women's organization as important stakeholders is important. According to Bridget Walker, the introduction of planning and evaluation procedures which develop analysis requiring the participation of all stakeholders has the potential to transform organizational understandings and actions on gender and development. Commitment from staff with authority is needed to take this forward (Fenella, 1999).

According to the informants of GTZ-Mirt Project, there are no checklists or manuals which are used to mainstream gender in the planning process of the project. As indicated in (Table 4.9), GTZ- Mirt project documents show that problem statements usually mention that with the use of biomass energy women are vulnerable and victim of fuel wood crisis. Apart from the problem statements and women stove producers with their success stories it is indicated in the document that gender concerns are not part of project goals, objectives, strategies and activities.

Table 4.9. Assessment of GTZ-Mirt Project Brief and Review from Gender Perspective

Item	Content	Gender Perspective
Purpose of the project	Promoting the dissemination of improved stoves by focusing on the demand side of management intervention	Gender neutral
problem statement	Pattern of biomass consumption in Ethiopia and its subsequent negative effect on Natural resources	Stated how traditional fuel wood consumption and supply affect women and children during collection and consumption.
Development policy objective	Based on policy objectives of the Federal Democratic Republic of Ethiopia as outlined in The conservation strategy of Ethiopia (CSE) and The Environmental Policy of Ethiopia (EPE).	The document doesn't mention any policy or action plan in relation to women
Project planning	Stakholders included in the planning are MOA,MOH,BOA,BOWME	MOWA or BOWA at regional level are not mentioned as stakeholders
Project objective	'The efficient use of biomass resources has been improved by integrating household energy measures into national development programs'	The project objective is totally devoid of gender concerns.
Project goal	Protection, and sustainable utilization of biomass resources are improved	No goals stated in relation to women's advancement or empowerment.
Capacity building	Developing human resources including individual private sector entrepreneurs. Topics covered are environmental, economic, and social and health impacts of biomass energy consumption.	No topics of gender and household energy in the stakeholders and in the topics covered.

source: GTZ/ MOA, (2000): *Project Brief, First phase (January1998-December 2000)*:Addis Ababa, Ethiopia:GTZ.

Monitoring and Evaluation

Even if it is not consistent most of the time sex-disaggregated data are collected with emphasis on women and men who produce Mirt. The documents of the GTZ-Mirt project which were reviewed for the purpose of this study presents participants of workshop, trainings and seminars attended by, stove producers and experts are not consistent in having sex disaggregated data.

Some documents as indicated in (Table 4.10) state users of 'Mirt' as consumers in general and don't identify them as women and men. A document while stating 85% of customers who watched cooking demonstrations were influenced with the promotion and made their purchase decision it doesn't mention who these customers are whether they are women or men (GTZ, ND). According to all of the key- informants from the project, the process of monitoring and evaluation as well as impact assessment gender related criteria are not included. Most of the time these evaluations take the household as a target of the project instead of looking into the gender power relations in the household. Additionally, there is no accountability system or mechanism that can make a staff member for not to collecting these data or integrate gender in the whole process.

During impact assessment and baseline survey as indicated in (Table 4.10), closer attention to gender concerns was not given and the difference between men and women in viewing energy problems was not assessed. All the documents take the household as a target of the project and most of the data on benefit Mirts in terms of time and money are presented at a household level. So it states the respondents as users and assessing the impact of the stoves indicates only the number of the stoves in the households.

This finding is in line with the idea that most projects suffer from lack of baseline information about the socioeconomic situation of project beneficiaries and economic requirements of the project in terms of available market. According to Charlton, baseline studies do not sufficiently break down by gender and class concepts instead such as the household, or the family (Charlton, 1984). Sustaining the idea of Charlton, Bridget suggests that women may use different indicators to assess the success of a project from those of the NGO engaged in the project and the outcome may be different and unexpected even if the project is beneficial to the target group.

Table 4.10. Gender perspective of ‘Impact assessment of the GTZ-Mirt Project’

Item	Content	Gender Perspective
Project output	Number of producers at work and number of Mirt disseminated	Some data not disaggregated by sex
Impact of Mirt on consumers	Benefit in terms of fuel, money and time saving	The consumers are not defined as men or women as their gender division of labor
Impact of promotional strategy	Identification of promotional strategy which are most influential In cases of rural / urban	The promotional strategy appropriateness and the power to influence is not shown by gender
Language used		More general and gender neutral
Different impacts and benefits	The contribution of Mirt to realize the MDGs	Only health aspect of women mentioned but not empowerment of women
Sustainability	Issues to be looked at for better Mirt commercialization, like technology, policy, finance and market	Gender and Gender issues in relation to Mirt dissemination not mentioned or studied
Impact on stakeholders	Any organizations working on health , gender ,child care and environment or improving household access to energy are stakeholders	An organization working on gender stated as a stakeholder
Actions recommended	Conduct market survey, supplement Mirt promotion, identify additional market outlet,	Not recommended to look at the gender aspect of these activities

Source: GTZSUN Energy/ MORAD, (ND). *Impact Assessment; GTZ-SUN Energy Approach on Commercialization of Mirt Biomass Injera Stove* : Megen power Ltd.

Organizational Culture: all informants agree that the organizational culture is gender friendly. Women staff members are encouraged and sponsored by the organization to attend higher education. Currently, in Addis Ababa GTZ, AMES-cooking branch women have taken top position at decision making levels. According to Skutsch, bringing more women to energy sector will help to give attention to grassroots women's energy needs and problems. On the other hand Skutsch forwarded, a strong argument saying if awareness, skill and knowledge on gender is lacking the role of professional women in changing the goals of planning is debatable (Skutsch, 1999).

According to one of key-informant, maximum care is taken in the process of releasing any promotional documents such as flyers, billboard, drama and other forms of advertisement through different media. Consultation of expert on the area to screen these documents from gender perspectives is a routine procedure before any publication is released to the community at large. Encouragingly, as shown in (Table 4.11), all promotional document flyers, drama and other documents are free from gender blind approaches or languages as collected during document review. In promoting Mirt both drama and flyers create awareness on gender equality and HIV.

Technical Skill: though two most important strategies employed to enhance development with women are gender mainstreaming and gender training. Except the Executive Project Manager at Addis Ababa AMES-Cooking all the key-informants don't have the training and skill to understand neither gender issues nor no one assigned to coordinate the effort of gender mainstreaming. Since most of the staff didn't get any training on gender the skill to mainstream gender or incorporate gender concern is lacking.

Additionally, while assessing different documents related to the project it is revealed that in the process of training and workshops gender training is not included in the package. Topics covered in these capacity building activities included environmental, economic, and social and health impacts of biomass energy consumption. Training on gender in the course of these training did not take place.

Table 4.11. Assessment of Promotional Flyers and Brochures of the GTZ-Mirt Project from Gender Perspectives

Title of the Publication	Objective	Gender Perspective
The Drama 'Tikikil'	Create awareness on ESS and HiV	It conveys the message on gender power relation, violence and HIV.
Household energy, the environment and the households. Energy a key to development , flyer	It explains the natural resources situation, impact and benefits of Mirt stove. Improved stoves and the MD GS.	Concerning gender equity it states how it reduce workload of women for fuel wood collection, more time for other activities and improve status of women
Sustainable Utilization of Natural Resources for Improved Food Security Program, flyer	GTZ-SUN; Energy intervention, its objectives and strategies, implementation and potential benefits of Mirt stove	States women and children are most affected by the diminishing access to and traditional open fire use of biomass energy. Gender equity not mentioned in objective, in potential benefits.
Improved Mirt Biomass Saving Injera Stove, flyer	Manual on installation, how to use, and other basic information on Mirt maintenance	
Energizing Development	Access to Modern Energy Services-Ethiopia	Gender neutral

sources: GTZ-SUN energy, (2005). 'Tikikil' TV Drama and 'Yebanchayehy Mugit': Addis Ababa: GTZ-SUN.

GTZ-ECO, (ND). *Household energy, the environment and the households; The Ethiopian Context*:GTZ.

GTZ, (2009). *Sustainable utilization of Natural Resources for improved food security program*: Report, Addis Ababa, Ethiopia: GTZ

Again as evidenced in the above section, there is fundamental difference in having gender analysis and mainstreaming skill among Government counterpart and the project itself. Those who are working as government counterpart have got necessary training and got the skill to conduct integrating gender in their planned action and implementation. They work closely with women's affairs offices and collect sex-disaggregated data.

According to Eade, gender training is powerful tool to change and influence an organizational strategy to be gender sensitive which in other will increase project efficiency. It is a way of sensitizing so the personal become the political. Since every society has gender concerns , an organization to be efficient and achieve its intended goals has to incorporate these concerns and gender training helps to gain the skill needed not only awareness raising (Eade, 1999).

As long as government counterpart in MME and the GTZ-supported Mirt dissemination project have one and the same goal that is the protection of natural resources by demand management of household energy sources the strategy they have to follow also must be compatible. It is obvious that to bring sustainable development of the country the Ethiopian government is exercising the gender mainstreaming strategy in all areas and at all levels of developmental endeavors.

It is clear to recognize the contribution Mirt dissemination project has made to the empowerment and advancement of women is paramount. On the contrary the project is not taking the gender mainstreaming strategy as one of its strategies and tools to achieve its goals. Not taking gender integration approach into the project planning and implementation as evidenced in this research had an impact on the efficiency of the project.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The Objective of this research is three fold. The first is to find vital information related to environmental crisis, women's situation and gender division of labor in relation to Energy policy and Strategies of the country. The Second is to investigate women's views, experience and problems related to energy saving stoves the case of GTZ-Mirt dissemination project. The third is to evaluate integration of gender concerns in the project cycle based on gender mainstreaming strategy.

In order to attain these objectives, quantitative and qualitative research methodologies were used. Different methods of data collection such as quantitative survey, in-depth interview together with observation, case study and document interview were applied. Accordingly, the findings collected were analyzed and presented categorically. The findings are:

Mirt Injera stove commercialization efforts are more than a decade old and the amount of Mirt sold so far is two million. The amount Mirt sold through GTZ is 325,624 until the end of December 2009 and the number of Mirt produced is 379,001 (GTZ, 2009). Considering the size of population 73,918,505 where proportion for energy sources in Ethiopia in which 6% of the household energy comes from electricity or petroleum products and almost 94% comes from biomass such as wood, crop residues and dung (GTZ, 2009) the amount of Mirt sold so far can be considered as insignificant.

Looking the amount of effort the project is putting on to advertize and disseminate Mirt, the project life versus the amount of Mirt sold so far it is concluded that the coverage of the stove is very little. The dissemination of improved stoves is frequently very slow despite the fact that the payback period in terms of fuel saved is quiet short (GTZ, ND). At this point, it will be natural to explore the impact of the project in terms of the stove dissemination by assessing it from gender perspective.

- The Findings of the research showed that the GTZ-ECO has contributed its part to environmental protection through dissemination of Mirt stove. In the Process the

project has contributed in capacity building and strengthening of institutions and individuals in the areas of household energy technology development, production and promotion. Out of the total Mirt producers trained and assisted by the Project to produce and distribute Mirt about 35% are women at national level and 51% in Amhara Regional States are women. Hence, the project by providing technical and economical assistance to these women has helped them to be empowered economically and socially as it is indicated in this study.

- When the practices of the project are examined from gender perspective it was made clear that gender mainstreaming strategy is not applied in the course of the project cycle. The skill development and training on gender analysis and mainstreaming are absent. Consequently, monitoring and evaluation as well as impact assessment takes the households as target of the project instead of breaking it further down. Hence, gendered needs, problems and constraints are not considered in the process.
- The government counterpart, MME and ARSMEA, of the project is implementing the strategy of gender mainstreaming. All key-informants from these government offices are aware of the Ethiopian Women's Policy and have the necessary training and skill to integrate gender in their planning and implementation. Since the counterpart of the project has been assigned only in 2010, it will be early to judge why it doesn't copy this strategy to the project.
- The five years strategic plans of MME and ARSMEA have incorporated gender issues in their plans. The other packages and activities as illustrated in the document review show that gender is systematically integrated. According to 'The Gender Mainstreaming Process Owner' gender concerns are screened by checklist of any planned action of the Alternative Energy Sources and Technologies Core Process.
- It was found out that the major household energy source in the study area is biomass fuel where it constitutes 89.1% of which fire wood accounts for 82.42%. According to respondents spend 20-50% of their household income for firewood and this is in turn causing pressure on women who are managers of family expenditure. The Kind of major food types consumed in the study area is *Injera* and *wot* and account to 99.20%

of the total respondents. Respondents accounting to 62.11% are using Mirt improved stove for *Injera* baking and this has a positive contribution to the fuel wood consumption pattern of the study area.

- The project benefits claimed by the GTZ-Mirt project include in-door air pollution reduction, saving of fuel and money and convenience and comfort. In addition 50% fuel saving over the traditional open fire stove which the impact of 150,000 Mirt stoves the fuel wood saving will amount to 56,250 tons per year. However, in real situation it has been found that saving of fuel wood and money stated by the women ranges from 20-50% and sometimes insignificant and in-door air pollution reduction is not that much appreciated while protection from fire hazard is most important.
- It is also indicated that although there are user's guide to be followed by users for best result the information on how to use and maintain the stove is not communicated to users. Conformably, the findings of this research showed that the intended benefit of Mirt can fall under question due to improper use of the stove. The main reasons for the misuse of the stoves are lack of information and this is manifested by removal of Mirt's chimney, un-replaced broken part and lack of knowledge on the possibility of purchasing part of the stove.
- Women who do not purchase the stove have stated that financial problem is their major problem for not purchasing it. Even those who acquire the stove have to use financial resources such as saving and *Ekobe*. To this effect, many suggested to have credit service to be organized and working closely with women's organization for better possession of Mirt.

5.2 Conclusions

- The main objective of the GTZ-Mirt project is to protect natural resources through the use of Mirt. The success of the project was intended to be measured in terms of number of stoves distributed in the society. The measure of impact estimated by GTZ was based on the assumption that the stove saves half the money and firewood over the traditional stove. However, for technological, applicability to the real situation of

the society and Gender aspect considerations, Mirt stove is not fully benefiting the society as intended by the designers of the stove. As a result the benefits and impact of the stove evaluated from the users side, largely the women in this context is not in line with the objective given by Ministry of Mines and Energy and GTZ.

- Improvement of the technology of the stove did not involve women who are mainly users. As a result there are features of the stove which are not convenient and comfortable from the user's side. The technology as illustrated from consumer needs a long chimney like feature going beyond the roof or wall of a house is essential to be developed.
- The project in its overall cycle is not considering Gender issues or not applying Gender mainstreaming strategy. The subject of Gender division of labor and gender relations which affect the selection of marketing tools, financial issues and obtaining of information on how to use the stoves are not part of the project's planning and implementation activities.
- There is no compatibility in the type of strategies used by the Government counterpart and the GTZ in implementing the project objectives. The strategy, alternative energy packages, programs and activities in the Ministry of Mines and Energy are at least checked against a checklist for their inclusion of Gender concerns while in Mirt Stove Project the skill and personnel for Gender mainstreaming is lacking.
- From the collective results obtained in this study it is concluded that the objective of using Mirt Stove can only be attained if and if only Gender aspects are fully considered and implemented.
- Mirt stove objective shall only be attained by employing twin track approach strategy which means stove disseminations to be undertaken in parallel with fuel wood supply enhancement through community forestry programs. Dissemination of Mirt Stove by itself cannot solve the problem of deforestation and fuel wood deficit as demand is five times than the supply.

5.3 Recommendations

It has to be acknowledged that the project has contributed in empowerment of the poor in which the majorities are women. It had a tremendous contribution in improving the condition of women individually and collectively. Women who are using Mirt at individual level have saved time and fuel wood, time and protected from in-door pollution whatever the extent and efficiency is. Above all the life of women Mirt producers have changed and these women have been empowered socially and economically. However the achievement of the project could have been far better than if gender has been mainstreamed and the views, concerns, knowledge and problems of both women and men included systematically in the project cycle. Hence, the following recommendations are forwarded:

1. Conduct further research on the situation of household energy in Ethiopia in relation to gender, environment and energy before formulation of policy, strategy or project.
2. Whenever the Ethiopian Energy Policy has a chance to be revised it will be appropriate to include gender concerns in its problem statements, goals and strategy. This will help projects to equally consider gender concerns in the projects cycle while implementing the Energy policy.
3. Put accountability mechanism in place in the MME's Government counterpart of the project for a better implementation of Women's Policy of Ethiopia and women's constitutional rights.
4. The project should open a gender office or at least have a gender focal person both in the main ECO, Bahir Dar GTZ and other branch offices. The person in charge can co-ordinate and facilitates the effort of gender mainstreaming in the project.
5. Provide gender training to all staff members of the project will be important. This will help project managers, coordinators, advisors and experts to mainstream gender at all levels and areas of the project activities.
6. Give gender awareness training to producers so that they can understand gender issues and convey important messages and information by understanding the needs and priorities of women and men. This will help producers to devise a compatible Mirt dissemination strategy by understanding gendered concerns and problems.
7. Put in place a system for gender mainstreaming once staff members acquire the necessary knowledge and skill in gender analysis and mainstreaming through sector specific gender training. This will have paramount importance for staff members to

mainstream gender from starting from proposal writing to monitoring and evaluation stages of the project cycle.

8. Learn from Ministry of Mines and Energy (The counter part to GTZ Project) how to deal with the subject of gender mainstreaming and work together for better success.
9. Work closely with women, women's group and women's organization on the aspect of improvement and dissemination of these technologies. Networking with women's organization and feminist advocates who can also help the project to get assistance on gender training and gender work.
10. Collect sex and gender disaggregated data during monitoring and evaluation as well as impact assessment instead of considering the household as target of the project. This will enable the project to get information and identify gap which has negative impact on the project efficiency.
11. Since women are the main household cook it will be logical for the project to give attention in the provision of important information on how to use and maintain the stoves to women. In doing so the project has to take into consideration the educational and other important personal limitations.
12. The project should facilitate credit or other financial arrangements in collaboration with women's formal and traditional organization.
13. The project together with the producers should exploit different traditional and formal associations and organizations to demonstrate and promote Mirt stove.
14. Create awareness and encourage users and women in general to supplement their fuel wood by planting trees within their compound.

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Annex A: Questionnaire for Quantitative Survey

Ababa University

Faculty of Development Studies

Institute of Gender Studies

Addis Ababa

Questionnaire on ‘Assessment of household energy projects from Gender perspectives’: The case of GTZ-supported Mirt commercial dissemination project in Bahir Dar city, Ethiopia.

Addressed to female respondents

Name of enumerator_____ Study area_____

Date of Interview _____

Sample No._____ Code No._____

Introduction: This questionnaire is designed to collect data and relevant information on views, concerns and opinion of women on household energy products in this case ‘Mirt’ injera baking stove. You are kindly requested to give accurate and necessary information as much as possible, Thank you.

Part 1: Personal data of respondents or Demographic data

1. Marital Status
A. married B. Single C. Divorced D. Widowed E. Separated
2. Religion
A. Orthodox B. Muslim C. Protestant D. Catholic E. Others
3. Type of household composition
A. Female headed B. Male headed
4. Total number of family members_____
5. Educational Status
A. Illiterate B. Read and write C. Grade 1-6 D. Grade 6-12 E. Other (Specify)
6. Settlement A. satellite city B. city
7. Ownership status of the premise
A. own house B. rented from kebele C. rented from owner D. other; specify
8. Total family size_____
9. What is the amount of your household income_____
10. What is your major source of income _____
11. Age _____

Part 2: General Information about household Energy consumption

- 2.1 How many years did you live in this area _____ -
- 2.2 Do you cook in your house? A. yes B. no
- 2.3 Who did the household cooking mostly A. myself B. husband C. children D. waged cooker

- 2.4 What kind of kitchen do you have A. in same room with other section B. separate
- 2.5 What kind of household energy source did you use?
- A. Electricity B. Kerosene C. Firewood E. dung and agricultural residues
- 2.6 What are the major food types do you consume?
- A. Injera and Wot B. Others (Specify)_____
- 2.7 If you are using firewood and other biomass how do you get it?
- A. collecting B. Buying C. Buying and occasionally collecting
- 2.8 If you are buying how much money do you spend monthly_____ -
- 2.9 If you are collecting how much time do you spend weekly_____
- 2.10 If you are collecting is there shortage of fuel wood in the area_____
- 2.11 Who is collecting the firewood
- A. Husband B. wife C. Son D. Daughters E. Others_____
- 2.12 Have your family members encountered any problem while collecting firewood
- A. Yes B. No
- 2.13 If yes what kind of problem; Specify_____
- 2.14 Do you supplement your firewood supply by planting trees in your compound or Surrounding? A. Yes B. No
- 2.15 If yes who come up with the idea of planting the trees
- A. husband B. wife C. children D. others, Specify_____
- 2.16 Are there any other method you use to save fire wood other than planting tree and using energy saving stoves? _____
- 2.17 What kind of stoves do you use in your house?
- A. Electric B. Kerosen stove C. Energy Saving stoves E. Traditional open fire stove

Part 3: Information on Mirt , Promotion and communication questions

- 3.1 When do you learn about Mirt _____years/months?
- 3.2 Do you have Mirt Stove in your house? A. yes B. No
- 3.3 How did you learn about Mirt ?
- A. from a friend B. TV C. Radio D. Billboard E. public demonstration of Mirt
- F. Others (Specify) _____
- 3.4 From where do you purchase the improved stove?
- A. from shops B. from producers C. from local markets
- 3.5 Who did the installation of Mirt for you?

A. professional B. self-made C. others; specify

3.6 How were you influenced to buy Mirt stove?

A. Promotional demonstrations B. Friend C. Relatives D. Neighbors

D. Others, Specify _____

3.7 have you ever told to your friend or relatives about Mirt and its benefits?

A. Yes B. No

3.8 Did you influence them to buy the stove? A. yes B. No

Part 4: Purchasing and ownership of the stove

4.1. Why do you decide to buy the stove?

A. Because it saves firewood B. Because it is smokeless C. Both E. others _____

4.2 Who makes decisions on expenditure in the house most of the time

A. Husband B. wife C. together D. others

4.3 How do you allocate money to buy the stove?

A. from monthly Salary B. from saving C. Ekobe D. others _____

4.4 Who decided to buy the stove in the family?

A. Husband B. Wife C. together D. others _____

4.5 If you do not have the Mirt what are the reasons

A. you are not convinced with its benefits B. you don't have the information C. you don't have money D. you don't have the space E. you are using other stoves

4.6 If you don't have the money to buy the stove does it have something to do with decision making and money allocation in the household? A. yes B. No

4.7 If yes, do you think if you were to decide on spending you will have the stove?

A. yes B. No

4.8 Do you think Mirt is affordable with your income level?

A. yes it is affordable B. It is expensive C. It is moderately expensive

4.9 Have you purchased Mirt with credit money? A. yes B. No

4.10 If yes, which credit organization? _____

Part 5: Benefits of the stove

5.1 What do you benefit from the stove in terms of the list below and which comes first and second ?

In Saving; firewood (Qantify) _____

Money _____
Time _____
Health related benefits _____

5.2 Who do you think benefit most from the stove in terms of the above mentioned indicators Put it in the order of beneficiary of Mirt at household level.

A. Husband _____ B. Wife _____ C. Children _____ E. All _____

5.3 Do you think Mirt is beneficial to protect the environment? A. Yes B. No C. I don't know

5.4 Do you use other energy saving stove other than Mirt? A. yes B. No

5.5 If yes, which type of stove?

A. Gonzie B. lakech C. Fetenech D. Others _____

5.6. If you have one of them what are the reasons to have these stoves? A. Because they are cheap B. Because they don't take space

C. because of their additional feature, specify _____

5.7 For what purpose do you use Mirt?

A. Injera baking only B. Injera and bread C. Injera and wot together D. Others;
Specify _____

5.8 What is the frequency of using Mirt

A. Once a week B. twice a week C. daily D. Others;
Specify _____

Part 6: Convenience and Comfort of Mirt

6.1 Do you have a problem of space at home because of having Mirt which is fixed in one place A. Yes B. No C. Moderately

6.2 Do you like the quality of Mirt of being smokeless? A. Yes B. No

6.3 If no, what are the reasons? _____

6.4 Does cooking with Mirt safe from burning hazard A. Yes B. No C. Moderately

6.5 Is the position of Mirt comfortable for you while cooking? A. Yes B. No C. Moderately

6.6 Is it comfortable to polish the pan while cooking? A. Yes B. No C. Moderately

6.7 Is Mirt always compatible with the pan you buy and? A. Yes B. No

C. Moderately

6.8 Is the side stove of Mirt always compatible with the pots you use?

A. Yes B. No C. Moderately

6.9 can you easily control the heat while using Mirt? A. Yes B. Moderately C. No

6.10 can you use different types of fuels in different seasons and situations? A. Yes B. Moderately C. No

6.11 can the height of the stove allow you to sit while cooking? A. Yes B. Moderately C. No

6.12 Is it comfortable to stir the adjacent cooking pot while baking injera? A. Yes B. No
C. Moderately

Part 7: Durability of Mirt and other Constraints

7.1 If you have Mirt for how long did you use it _____

7.2 If you had changed the Mirt what was the reason_____

A. accidentally broken B. due to its life span C. because of its poor quality
D. Other; Specify_____

7.3 After your first or broken Mirt have you decided not to replace it? A. yes B. No

7.4 If the answer is yes what was the reason? _____

7.5 If your Mirt is disconnected do you know how to repair it? A. Yes B. No

7.6 If you know who told you or showed you? _____

7.7 If you have changed your Stove do you notice any difference between the old and the new ? _____

7.8 If your Mirt is broken A. do you change it partly B. Do you change the whole part?

7.9 Do you know that you can buy Mirt partly to replace only the broken part? A. yes B. No

7.10When you are not baking injera what do you use for small pots?

A. The pot stove adjacent to Mirt B. Other stoves

7.11 If you are using the slim Mirt, the new model, do you have any problem in?

A. stability of your mitad B. plastering frequently C. both D. none

7.12Have you try to use homemade closed stove which is similar to Mirt? _____

7.13 If yes who constructed it? A. you B. Friend C. Professional

Part 8: Adaptation of the technology and resistance to change

8.1 Do you think most people in your neighborhood acquired Mirt? A. yes B. No

8.2 If not why do you think is the main reason_____

8.3 To whom do you think creating awareness about acquiring the stove will be good among

A. women B. men C. both

8.4 Have you ever discouraged people from buying Mirt? A. yes B. No

8.5 If the answer is yes what was the reason? _____

A. Because it can be done at home B. it is expensive C. there is a cheaper and better injera stove

8.6 What was your husband's reaction when you buy Mirt A. he is the one who bought it B. he encouraged you C. no comment at all D. discouraged you

Part 9: Suggestions and opinions on Mirt's project and last practice

9.1 Has anyone ever asked your opinion about Mirt? A. yes B. No

9.2 Do you think it is appropriate to consult women before producing any model of energy saving stoves ? A. yes B. No

9.3 Do you think there could be a cheaper and local way of producing 'mitad' which is equivalent to Mirt? A. yes B. No

9.4 Have you ever complained about Mirt to the producers or disseminators? What kind of response did you get? _____

9.5 Which way of promotional strategy is appropriate to you?

A. Radio B. Tv C. demonstration D. others; Specify

9.6 Do you think Edir and Ekob can be used to promote and disseminate Mirt ? A. yes B. No

9.7 Do you think credit system should be organized to for those who can't afforded to buy Mirt with a single payment? A. yes B. No

9.8 Have you ever heard any suggestion in your Ekobe or edir to buy Mirt in turn for its members? A. yes B. No

9.10 Do you think women's affairs office can help in acquiring the Mirt? A. Yes B. No

9.11 Do you think long term payment system is important to acquire the stove if so through whom this service should be organized? A. husband B. wife C. for both

9.12 General comment, suggestion and opinion on Mirt in its production and dissemination

General Comment of the Enumerator

----- Thank you for your cooperation.

Annex B: In-depth Interview Guide with Mirt Users

Is there any fuel wood scarcity in the area?

Do you plant trees to supplement?

How much do you spend on fuel wood purchase out of the total family income?

How do you learn about Mirt?

What makes you decide to buy it?

How do you raise the money and what was your husband's contribution?

Who installed it for you?

Did you get information how to maintain and use the stove from the distributors?

Do you know how to maintain your stove?

Have you purchased part of the stove in-case it broken partly?

What do you benefit from Mirt and who benefit the most?

Do you use Mirt for Injera and Wot same time?

What are the problems you faced in using Mirt if there are any?

What do you think the contribution of women and women's groups in Mirt Dissemination?

What is overall suggestion and comment concerning this stove?

Thank you for your cooperation

Annex C: In-depth Interview Guide with Mirt Producers

What was your educational and occupational status before you start Mirt Production?

How do you get recruited to be trained of Mirt Production?

How do you start the production?

What kind of assistance do you get from Governmental and Non-Governmental Organizations?

How do you see your life before and after Mirt Business?

What challenges do you faced?

How do you overcame these challenges?

Can you describe what you gained economically and socially from the business?

Do you think Mirt's coverage is satisfactory?

What kinds of feedbacks do you get from your customers?

What are the major problems of your customers?

What suggestions do you have in Mirt project and other household energy technologies?

Thank you for your cooperation

Annex D: Interview Guide for Key-informants /Stakeholders of the Project

Name of key informant: _____ Status : _____

Responsibility: _____

Gender Policy or Gender Equality Action plan

- Are You aware of the Ethiopian Women's policy ?
- Does the organization have a gender policy or action plan ? If yes
- Are there any goals imposed by donors concerning empowerment of women ?
- Do you think management takes responsibility for the development and implementation, monitoring and evaluation of the gender action plan or the women's policy?

1. Programme Planning and Design

- Are gender equity goals and objectives included in program/project design and needs assessment?
- Are gender questions or criterion included in your program/project proposal approval process?
- Does your organization use participatory methods to incorporate the views and preferences of both male and female staff members in project design?

2. Programme Implementation

- Do your project implementation strategies and plans take into account existing gender roles and interests of both male and female participants?
- Do you think female beneficiaries of your organization's programs/projects value and see the programs/projects as beneficial to their lives?

3. Technical Expertise

- Is there a person or division responsible for gender in your organization and do you exactly know it?
- Is there assigned staff responsibility for gender integration in your department?
- Do you think staffs in your department have the necessary knowledge, skills and attitudes to carry out their work with gender awareness including training in gender planning and analysis?

4. Monitoring and Evaluation

- Is gender disaggregated data collected for projects and programs?
- Is the gender impact of projects and programs monitored and evaluated?
- Is there any accountability mechanism concerning gender mainstreaming?

5. Organizational Culture

- Have you witnessed any discrimination based on sex, nationality, language, disability or sexuality? If so what measures were taken?
- Does the organization comply with gender sensitive behaviors, for example in terms of language used, jokes and comments made?

6. Human Resources

- Are there flexible work arrangements in your organization?
- Do you think maternity and paternity leave policy equally being implemented?
- Is gender awareness including in job performance criteria, staff evaluation?
- Is there training of staff in gender awareness and sensitization?
- Is good performance in the field of gender is rewarded in your organization?

7. Advocacy and communication

- Are advocacy campaign and initiatives planned and informed by a gender perspective?
- Are your advocacy policies and plan influenced and advised by women's organizations, networks and gender experts?
- Is gender incorporated in your organization's communications, fund-raising and media strategies?
- Is a gender perspective reflected in your publications, for example, books, brochures, and newsletters?

8. Additional questions : from document review

- Is the project the only one in Ethiopia addressing and promoting household energy efficiency and improved stove dissemination in Ethiopia?
- The developmental objective of the project mentions the conservation strategy and the Environmental policy of Ethiopia as a background why not the Ethiopian women's policy or package?
- As stakeholders, Ministry of Health and Agriculture and Bureau of agriculture and other stakeholders are mentioned why not Ministry or Bureau for women's affairs? How are the needs and interests of women represented in the project?
- Regional stakeholders which are mentioned in the document are BOA and BOWME not BOWA while women are main actors in acquiring and using the stoves, how are these two points looked at in the project management?
- In the process of capacity building at any level, does training on gender and related issues considered?
- In Workshops and seminars organized through the projects are topics of gender and household energy part of it?

- Are the training courses developed by the project informed by gender aspects and concerns?
- Does the engineers who adopt the energy saving stoves do some research in the kitchen before improving any stove?
- Do they understand the real design requirement, eg. Slim not having the fitting place for the mitad?
- Do they consider ease of cooking, position and compatibility of cooking pans and pots?
- Do you think women can rise in one go the money to buy the Mirt?
- Does the project have any alternative means of dissemination of Mirt using other financial alternatives?
- Does the energy consultant and engineers do field tests of improved stoves other than laboratory test about the overall compatibility of the stove with the cook, the women?
- Do energy planners sit and discuss with women about what the problem and the solution is?

Annex E: Profile of In-depth Interview Participants

Name	Educational status	Employment	Having Mirt or Not	Age
Anchinesh Belay	Read and Write	House wife	No	35
Shewaye Hayle	Grade 12	civil servant	No	28
Beletu Mulu	Grade 7	House wife	Own Mirt	25
Werknesh Ayele	Grade 12	House wife	Own Mirt	28
Haimanot Kebede	Read and Write	House wife	No	43
Bayush Belachew	Illiterate	House wife	Own Mirt	40
Demoze Anteneh	Read and Write	House wife	Own Mirt	50
Messeret Getachew	Read and Write	House wife	Own Mirt	34
Mena Kebede	Technical diploma	civil servant	Own Mirt	27
Sofia Ahameed	Grade 12	restaurant owner	Own Mirt	34
Amarech Yeraga	Illiterate	small business	No	29
Betelhem Aragaw	Diploma	civil servant	Own Mirt	23
Wagaye Belete	Read and write	small business	Own Mirt	33
Tigist Abebe	Grade 10	restaurant owner	Own Mirt	36
Mulunesh Yebeltal	Grade 8	house wife	No	52
Asayech Daganchew	Read and write	civil servant	No	28
Nigist Worku	Read and write	House wife	Own Mirt	44
Felekech Ayele	Illiterate	house wife	Own Mirt	47

Annex F: Profile of Key-informant Interview Participants

Name and Status of Key Informants	Sex
1. Mr. Samson Atsbha, Executive program officer with responsibility of Monitoring and organizing progress reporting and communicating with donors, GTZ-ECO	Male
2. Mr. Alemayehu Zeleke , Energy and Technical advisor for all stoves, GTZ-ECO	Male
3. Ms. Konjit Negussu, Information communication and PR coordinator , responsible for promotion and marketing, GTZ-ECO	Female
4. Mr. Tewodros Berihun, Project Manager, responsible for managing project execution, GTZ-ECO, Bahir Dar branch	Male
5. Mr. Abebe Ayehu, Energy sources development expert in Bahirdar Zone	Male
6. Mr. Alemayhu Tesfaye; Alternative Energy resources and Technology Development and promotion Core process, Training officer, MME	Male
7. Mrs. Sofia Mohamed, Gender Mainstreaming Management Process Owner, MME	Female
8. Ms. Tigist Tefera, Mirt producer, Bahir Dar	Female
9. Mrs. Genete Tadesse, Mirt producer, Bahir Dar	Female

Annex G: Pictures Taken During the Study



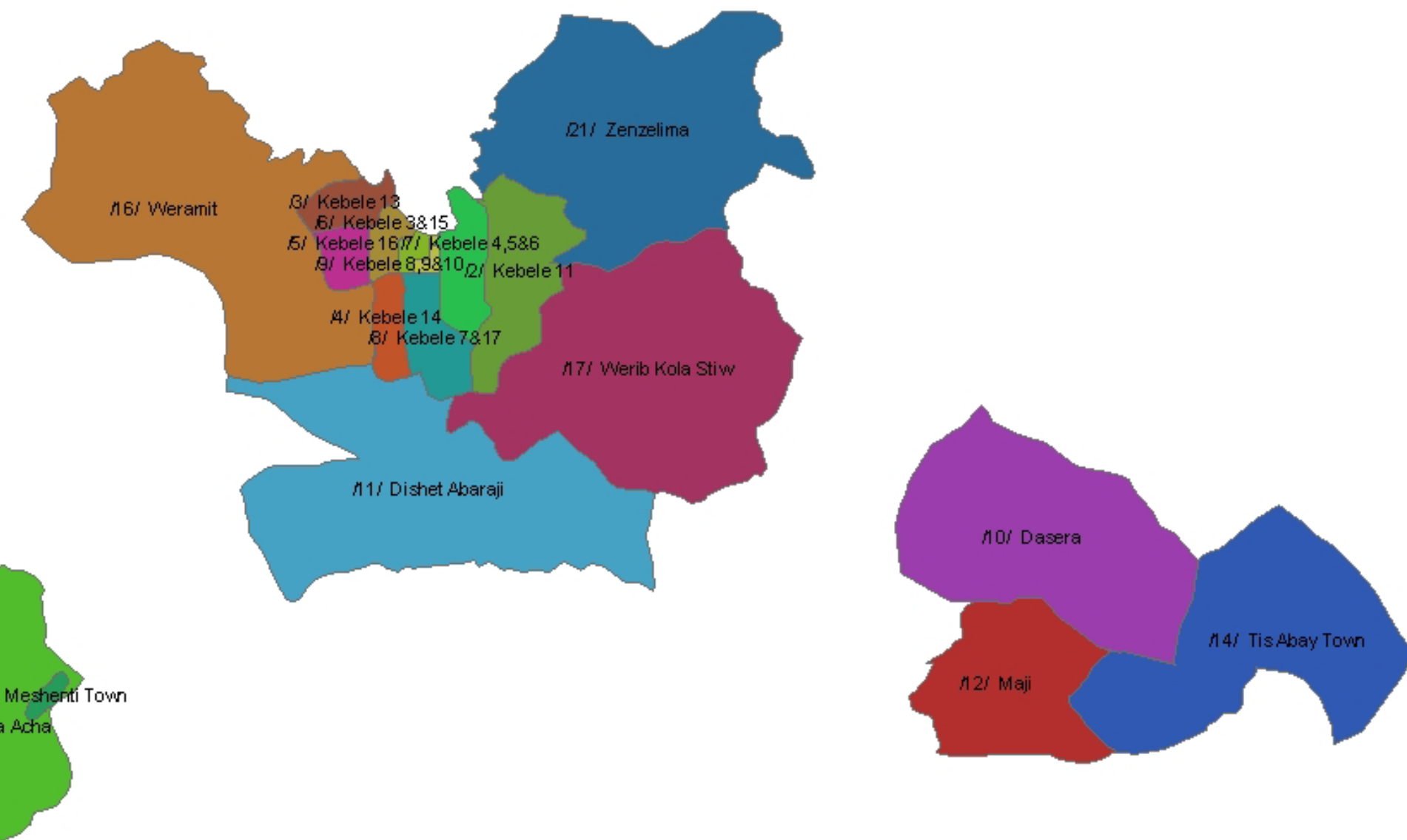
Ms. Tigist in her house built from
Mirt Profit



Mirt produced by Ms. Tigist



Mrs. Genet with her Mirt production



DECLARATION

I, declare that this thesis is my original work and has not been presented for a degree in any University and all the sources of material used for the thesis are duly acknowledged.

Name: MESSERET LEGESSE BURUSSA

Signature: _____

Date: _____

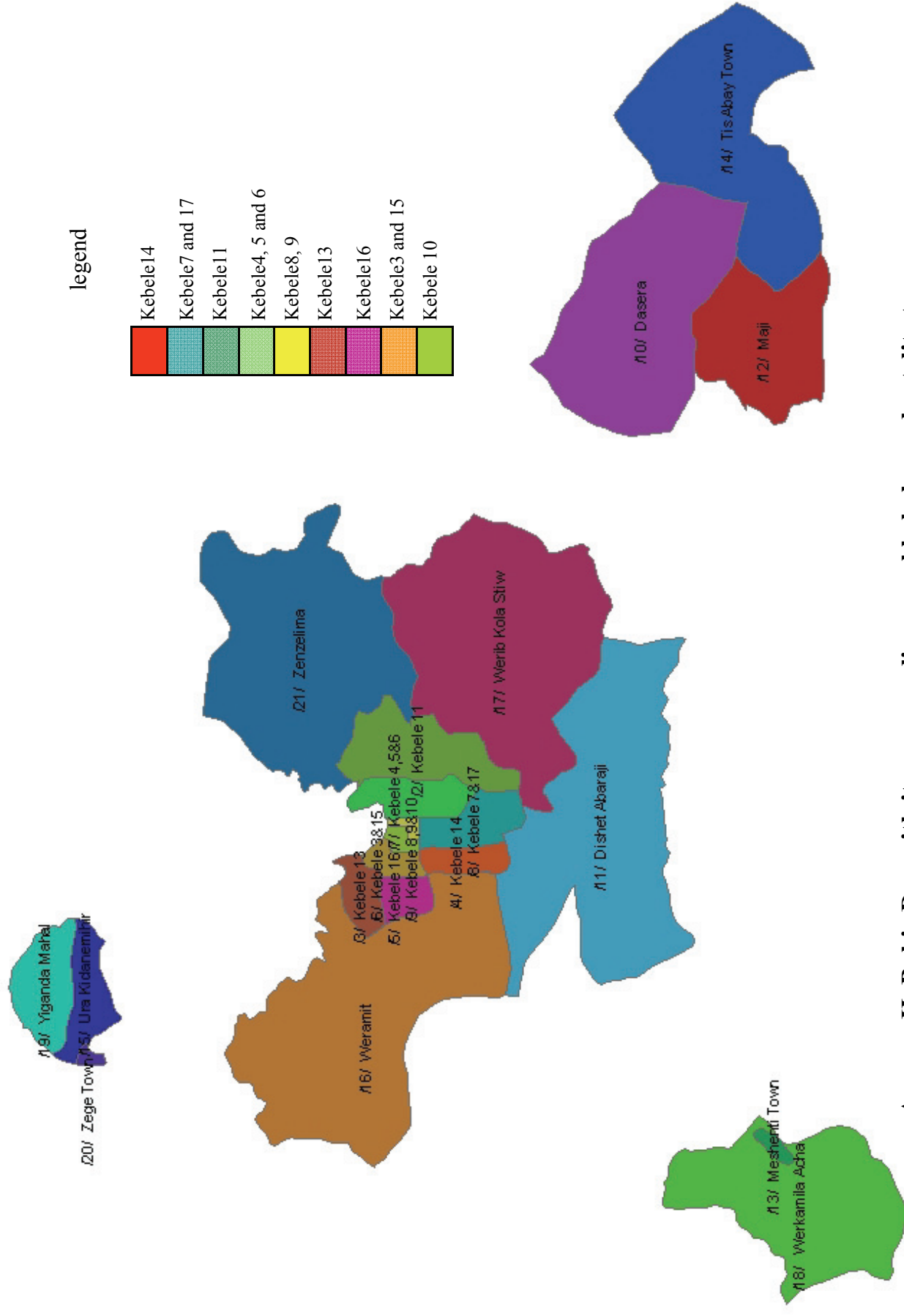
Place: Addis Ababa

This has been submitted for examination with my approval as a University advisor

Advisor's Name: Dr. MULUMBET ZENEBE

Signature: _____

Date: _____



Annex –H. Bahir Dar with its surrounding rural kebeles and satellite towns