Socio-Economic Benefits and Challenges of Energy Efficient Cook Stoves Utilization for Women and Children in Yaya Gulele District, North Western Ethiopia

MSW Dissertation Research Project Report

(MSWP-001)

Prepared By:

Sanka Sepe Shaita

Enrolment No: ID1051155

Indra Gandhi National Open University

School of Social Work

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Project Supervisor

Sebsib Belay (Mr.)

Indra Gandhi National Open University

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DECLARATION

I hereby declare that the Dissertation entitled "**The Socio-economic Benefits and Challenges of EECSU for Women and Children"** submitted by me for the partial fulfillment of the M.A in Social works Indira Ghandi National Open University (IGNOU) is my own original work and has not been submitted earlier to IGNOU or to any other institution for the fulfillment of the requirement for any course of study. I also declare that no chapter of this manuscript in whole or in part is lifted and incorporated in this report from any earlier work done by me or others.

Addis Ababa , Ethiopia Signature: _____

April 2014 Enrolment No. 1051155

Name: Sanka Sepe Shaita

Addis Ababa Ethiopia

Certificate

This is to certify that **Mr. Sanka Sepe Shaita** Student of MSW from Indira Gandhi National Open University, New Delhi was working under my supervision and guidance for his project work for the course MSW-001. His project work entitled "**The Socio-economic Benefits and Challenges of EECSU for Women and Children"** which he is submitting, in his genuine and original work.

Signed:_____ Date: _____

Sebsib Belay (Mr)

(Advisor)

Name and Signature of internal examiners

Name Signature

1. _____ _____
2. _____ _____

Name and Signature of external examiners

Name Signature

1. _____ _____
2. _____ _____

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List of Acronyms and Abbreviations

CRGE	Climate Resilient Green Economy
DARDO	District Agriculture and Rural Developing Office
DCPO	District Cooperative Promotion Office
DFID	Department for International Development
Dung/cow Dung	A cake of sheet made of cow faces and use as fuel when dried.
DWCO	District Women and Children Office
DWMEO	District Water ,Mineral and Energy Office
EECS	Energy Efficient Cook Stoves
EECSU	Energy Efficient Cook Stoves Utilization
FGD	Focus Group Discussion
GO	Government Organization
GDP	Growth Domestic Product
GTP	Growth and Transformation Plan
HIV/AIDS	Human Immune Deficiency Virus/Acquired Immune Deficiency Viruses
IAP	Indoor Air Pollution
ICS	Improve Cook Stoves
IEA	International Energy Agency
IGNOU	Indira Gondi National Open University
Injera.	Spongy unleavened sourdough bread used as plate and utensil. It's smooth on its underside and bubbly-looking on top
Kebele	Lower level government administrative unit containing Got (villages) in it.
KGs	Kilo Grams

Mesob	Ethiopian Traditional Dish with its own cover used to keep Injera for a period of time.
Mirt	A name of EECS which means Nice or Good.
Mitad	It's traditionally made on a large round hotplate-type devise called a *mitad* (in Amharic), *mogogo* (in Tigrinya), or *eelee* in Afaan Oromo.
MSW	Masters of Social Work
MSWP	Masters of Social Work Project
MT	Metric Tone
NGO	None Government Organization
No	Number
Sefed	Flat material made of an artisan which is used to take out Injera safely from Mitad.
SPSS	Statistical Packages for Social Science
SWC	Soil and Water Conservation
Tikikil	A name of EECS which means Right or Perfect.
UNDP	United Nation Development Program
WE	Women Empowerment
WHO	World Health Organization
Woreada	Equivalent to District Higher level government administrative containing many Kebeles unit in it.
WOT	A spicy dish made with *berbere(hot spice)*.
WVE	World Vision Ethiopia
WVEKPT	World Vision Ethiopia Kitchen Performance Test
WVEYDADP	World Vision Ethiopia Yaya Gulele Area Development Program

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ABSTRACT

In Ethiopia the major fuel sources are fire wood, cow dung, crop residues and some leaves twigs and branches which are also common in North Shoa zone, Yaya Gulele District. For the surprise the fuel wood collection, preparation as well as cooking is the major roles and responsibilities of women and children in the district. Using fuel wood and cow dung have toxic emissions (CO2 and CH4) and coupled with low efficient (5-10%) traditional three stone stoves and very narrow and confined kitchen has been affecting the lives of thousands of the community more specifically women and children in the district. In attempt to reduce the reliance of households in fuel wood so that to improve their health and economic status of the participant households, World Vision Ethiopia Introduced a project called Energy Efficient Cook Stove (EECS) (improved cook stoves) just commencing 2010 by pilot phase. Though, these stoves have multifaceted benefits the utilization and adaptation by the beneficiaries found low. Hence, the purpose of the research is to assess the socioeconomic benefits and challenges of EECSU for women and children and hence to produce important recommendation for improvements. The specific objectives are to assess the socio -economic benefits having from utilization of EECSU, to identify the socio economic challenges facing while EECSU and the strength and weakness of the project. The study conducted using both qualitative and quantitative methods using descriptive design. In the district about 1600 EECS distributed for more than 800 Households from which both probability and non-probability sampling methods were used to select the samples. The non-probability sampling used to select Kebeles already using the EECS and then proportionate stratified sampling used to select 75 households based on the number of the beneficiaries (universe) in the selected Kebeles. Both qualitative and quantitative data were collected from the sampled households using structure and semi structured questions. While the qualitative data mainly were generated from focus group discussions, field observations using structured interview schedule and documentary analysis. Before conducting the actual data collection the structured interview schedule was pre-tested, revised and then administered in the study area. Descriptive statistics such as mean, and frequencies were used to summarize the quantitative data using computer(SPSS) where us qualitative data's from FGD and filed observations are collected, sorted, rearranged grouped and incorporated to support the primary data. The study result showed that EECSU have increased access for capacity building through trainings (52% Health, 41% Agriculture and 39 % on climate and SWC), fuel wood reduction (28 %) perceived smoke reduction ((65.3%), utilization saved time for childcare and livelihood, reduction of hazards compared to traditional stove (example 24.4 % burning of body) reduction in work load pressure, and improvements in safety and protection for women and children. Despite the benefits there were challenges related to EECU that hindering the benefits for women and children ranging from community to stockholders level. The fuel wood types (56 %,46 % and 17 % for cow dung, fuel wood and others such as crop residue ,lives and twigs) and fuel wood collection and responsibilities(48%,38.5 % and 13.5 % for women , children and men respectively), lack f appropriate utilization of EECS, low monitoring and evaluation. The project has strengths like focusing on global concern (addressing the impact of climate change), focuses on women and children and opens opportunity for women empowerment and child wellbeing through community organization and improving saving culture. EECSU have various benefits for women and children that are limited in number as well as concepts but the benefits should go beyond the current thought as well as the practice. Hence, it is recommended that all the partners (the women, the NGOs, and GOs) should work in collaboration to boost the benefit from EECS utilization in holistic manner including their social, economical, psychological,

moral and other issues in terms of women empowerment and child -well being issues. The challenges of the households for not adopting and utilization of the stoves are related to awareness, access for fuel wood, inappropriate design of stoves for traditional meal preparation and lack of commitment and integration among stakeholders for implementation and monitoring of the project. Hence, it is recommended to prepare mass awareness and educations on benefits of EECS benefits, developing individual and communal nurseries for increasing access to fuel wood, promote men to engage in household chores and develop workshops that will boost the stakeholders to work together particularly in the project monitoring and supervision. Besides, many of the literatures and the current study focusing on the socioeconomic benefits of the EECS and related matters. Therefore, it is essential to conduct research specifically on the contribution of EECS for Women Empowerment and Child Well Being because these two groups are suffering most in the world in chores related to fuel wood collection, preparation and food preparation.

Chapter I

Introduction

1.1 Background of the Study

In the World more than three billion people depend on solid fuels, including biomass (i.e. wood, dung and agricultural residues) and coal, to meet their most basic energy needs: cooking, boiling water and heating. While considering energy access situation in developing countries, reported that 600 million of these people live in sub-Saharan Africa where access to modern fuels is as low as 17% and 69% of the population rely on wood as their primary cooking fuel. (WHO, 2009; UNDP, 2009).

Ethiopia is the third largest user in the world of traditional fuels for household energy use, with 96% of the population dependent on traditional biomass (e.g., fuel wood and dung) to meet their energy needs; this is in comparison to 90% for Sub-Saharan Africa and approximately 60% for the African continent. (Jargstorf, 2004; Dawit, 2012).

Given Ethiopia's position as the third largest user in the world of traditional fuel, combined with the habit of burning fuel wood in the traditional three stone fire, whose efficiency is just 5 to 10%, compared to 70 to 80% for an electric stove and 25 to 50% of improved cook stoves like Tikikil, Stove Tec and Mirt Injera stoves has been put significant benefit for the community. (Jargstorf, 2004; WHO 2006; Feldmann and Brinkmann, 2007; GTZ, 2008)

The major task of acquiring sufficient energy in Ethiopia to meet a family's basic needs of food and shelter is delegated to the women, both young and old, of the household, with women's work, more so than men's, depending on access to energy and biomass. Yet, acquisition and use

is more difficult due to greater reliance of traditional fuels. The more time spent on collection and preparation, the less time spent pursuing more productive activities, such as education; this is unfortunate in a country where, in 2003, only 41.5% of the adult population was literate and only 57.4% of the youth population was literate (UNDP, 2005)

With heavy workloads and low-income livelihoods, women also cannot manage without their children and particularly their daughters. The inefficient burning of solid fuels on an open fire or traditional stove indoors creates a dangerous cocktail of hundreds of pollutants, primarily carbon monoxide and small particles and nitrogen oxides, benzene, butadiene, formaldehyde, poly aromatic hydrocarbon and many other health-damaging chemicals.(WHO, 2006)

The utilization of these traditional biomass fuel coupled with very low efficient traditional cook stoves has been affecting the lives of the community particularly women and children. Indoor air pollution results in 1.6 million deaths worldwide each year, 24% of which occur in Africa and half of worldwide child deaths. The primary cause of this indoor air pollution is household fuel use particularly from traditional fuels burned in highly inefficient stoves of which Ethiopians likely figure prominently in this count. (Jargstorf, 2004; WHO 2006; WHO, 2010).

To reduce the aforementioned challenges associated with traditional stoves utilization and Indoor air pollution various technological innovations (Improved cook stoves, solar technologies, expansion of electricity) are going well throughout the world including Ethiopia.

Particularly, the production ,distribution and utilization of improved cook stoves has been recording significant contribution for reduction of indoor air pollution ,reduction in fuel wood

utilization, time to collect wood , indoor smoke, improve social interaction, environmental sanitation, personal hygiene, job creation, business development, and the likes.(DFID,2000).

The fuel saving efficiency of EECS ranges from minimum of 25 % to a maximum of 70 %.ICS could save over 60% in fuel expenditure and (42-45%) that less time required for cooking food using ICS compared to traditional stove both in different seasons. The same study revealed a saving of 25% and 47 % over traditional stove and open fire stove respectively Compared to that for traditional stove (Dey, Ali and miller, 2012)

The implication of reduction in fuel wood consumption on financial savings, on average, is reported to be ETB 33 per household per month - the highest in Tigray and the lowest in Oromia due to availability of fuel wood and hence the price variation.(GTZ,2008). The average time saved per week for this group of consumers is 6 hours per week per household but varies greatly between 4 to 13 hours. The time saved from collection of firewood due to EECS has been used to meet domestic chores, entertainment (coffee time with neighbors and friends), look after kids and businesses. (GTZ, 2008)

Key benefits of Mirt cited by consumers included protection from heat and smoke, improved upper respiratory and pulmonary health, cleaner cooking space, reduced drudgery and risk of fire hazard and accidental burns and Other significant livelihood improvements consistently identified by household surveys, including those carried out by this project, are increased safety in terms of reduced fire risk and risk of burns from the use of improved stoves. GTZ, 2008; DFID, 2000 & Dey, Ali and miller, 2012)

ICS compared to traditional stoves performance regarding ‘time saved’ and ‘use of saved time’. ICS saved time compared to traditional stove according to over 57% respondents. The saved time could be used mainly for cleaning or sweeping rooms/surrounding (40.9%), taking care of children (21.5%) and domestic animals (14%), sewing *kantha* (13.6%), collection of fuel (8.6%), etc.(Dey, Ali and miller, 2012)

With their better combustion efficiencies, Stove Tec stoves have actually reduced the level of smoke that would have created smoke screens otherwise. In this regard, it can be argued that the new stoves do not only conserve cooking energy that is in short supply, but they also provide developmental benefits (through improved health and better time management) to their consumers. WVEKPT, 2009; DFID, 2000; Dey, Ali and Miller, 2012).

For the past three years Ethiopia implementing both the five years GTP as well as the ambitious CRGE plan for to reach the middle income economy by 2030 while keeping the emission of the CO2 as low as possible to 250 MT from its original 150 MT by 2010.It is very difficult to achieve this carbon emission reduction with the business as usual scenario like using livestock production, crop production, energy utilization in the traditional ways. To this end, the CRGE suggests four pillars particular the fourth says leap forging to energy efficient technologies like improved efficient cook stoves, wind energy and expansion of electricity in all sectors of development. (CRGE, 2010).

The majority of household energy particularly in rural areas is traditional biomass wood collection, food preparation and many other related chores in the home particularly women and children. What make the situation worse most of the rural households are living in a very confined environment with dense smoke and ashes that had been putting significant pressure

particularly on women and children. Many reports and publication suggests that a millions of deaths in the world are due to indoor air pollution of which Africa took the big share and this is true for Ethiopia in general Yaya Gulele in particular.

Therefore, adoption and utilization of improved cook stoves in Yaya Gulele should be an integral part of all development sectors of GOs and NGOs for better utilization of the stoves for women and children benefit. Therefore, detailed identification of the benefits of improved cook stoves and associated challenges will have the following significances:

- Proper identification of the benefits of improved cook stoves for women and children will be used at local level for education, mobilization, recruitment and new users so that to increase the benefit from EECSU more specifically for women and children.
- The study will clearly found the socioeconomic benefits of utilization of for Children and women. The results from it will be used for education, awareness, experience sharing for household living in the same target Kebeles and none target areas which will contribute for the new adoption and utilizations of EECS.
- In the same manner the study will identify the challenges related to EECSU to women and children. The identification of challenges will lead to development of associated strategies and hence solving the problem in the sect and future success of the EECS scaling up, utilization, and management.
- Besides, the recommendation will be drawn in major topics will be valuable tool for the project implementer as well as all stakeholders in various parts of the project district and out of project areas. Furthermore, the study will clearly pave way for further study in EECS.

In the past recent 3 years nearly 1600 improved cooks stoves has been distribute to more than 800 households in Yaya Gulele Woreda aiming to benefit the community. Based on household visit, workshop at Woreda level, despite the fact that improved cook stoves have multifaceted benefits like its adoption and utilization in Yaya Gulele district observed very low. Hence, the study aimed to assess the socioeconomic benefits of EECSU and its associated challenges for low utilization in the district so that to draw important conclusion and recommendation for future effective utilization of EECS, solving challenges and study areas.

1.2 Statement of the Problem

Firewood is the major biomass type consumed in Ethiopia. The country is the number one producer in its share to world's charcoal and woody fuel wood as compared to other African countries. Evidences indicate that 99% of households, 70% of industries and 94% of service enterprises use biomass as energy source. Trend in total biomass consumption different sectors implies that households consumed almost all biomass fuels in the last decade. Computed average share of household biomass fuel consumption out of total biomass consumption as fuel over the 11 years stood at about 99.6%. (Dawit, 2012).

In regard to stoves utilization kitchen arrangement and type have significant on women and children heath. In the case of Yaya Gulele Woreda Firewood (99%) closely followed by animal dung (97%) and Branches/Leaves/Twigs (BLT) are the most widely used traditional cooking fuels. Use of charcoal and kerosene are limited extent tough - among rural households for diversification of cooking energy sources to mitigate risks associated with scarcity of woody biomass fuel supplies. (WVE KPT, 2009)

The majority of residential units of the area consist of a single round room made of wood and mud walls and grass-covered roofs. Regardless of wealth differentials, almost all kitchens (including those of affluent households whose housing units are covered with CIS) are single round rooms with grass roofs of which only 43% of the households own separate kitchens for preparing food. Even when households have a separate kitchen, they are poorly ventilated. Most kitchens either do not have window openings at all, or when they have one, they are too tiny to provide sufficient light and circulation of clean air to the kitchen. To make matters worse, even the tiny little opening (window) remains usually closed during cooking sessions, despite thick smoke screens created by the poor combustion of cow dung during cooking. Well over half (53%) of women in the survey households cook inside the same room where they and their families lives. (WVE KPT, 2009)

Though commercialization of traditional fuels among rural household consumers is still at their early stages and can be regarded as very low, rural households have started purchasing their supplies. For example, nearly 10% of the households in the study area reported that they obtain their supplies of firewood by paying money. Given the growing scarcity of traditional fuels in the study area, this trend of commercialization biomass fuels is set to grow, and grow rapidly. (WVE KPT, 2009).Recent study by world vision Ethiopia depicted that about 43 % of the households are using fuel by purchasing from different markets. (WVE KPT, 2009)

Due to the above mentioned facts firewood is extremely scarce in Yaya Gulele. In fact, heavy reliance of households on animal dung for cooking is a strong indicator of scarcity of firewood in the area. Firewood is still important cooking fuel among the study households. Households in the study area spend 21 hours per week gathering or processing various biomass fuels for their own

domestic consumption. This means that one member of a household (women mainly) in the study area spends three hours gathering and or biomass fuels each day.

The amount of time and effort spent in collecting and or processing various biomass fuels in the study area is hugely significant in every term. Assuming an average life expectancy of 50 years for a female household member in the study area, she spends 54,750 hours, or 2,281 days of her life collecting/processing biomass fuels during her life time. This is equivalent to 12.5% of a woman's life over a life time of 50 years. Since the amount of time required collecting and transporting traditional fuels has been growing increasing, households are adopting strategies to reduce their fuel consumption include using fuels sparingly (34%), obtaining fuel supplies in large quantities (26%), freely collecting instead of purchasing (23%). (WVE KPT, 2009)

The more time spent on collection and preparation, the less time spent pursuing more productive activities, such as education; this is unfortunate in a country where, in 2003, only 41.5% of the adult population was literate and only 57.4% of the youth population was literate (UNDP, 2005).With heavy workloads and low-income livelihoods, women also cannot manage without their children, and particularly their daughters. Ethiopian women travel up to 12 kilometers from their home to gather fuels, and longer preparation and cooking times. (World Bank, 2006)

The intervention of improved cook stoves in Ethiopia is not recent phenomena, peoples particularly local artisans and producers has been trying their best in order to reduce their biomass utilization as well as burden associated with it. The modern concept started lately mainly related to climate change, the intervention, production and utilization of different improved cook stoves has been addressing the country irrespective of regions. The same is true

in Yaya Gulele Woreda recent past three years more than 1600 improved stoves distributed in thinking to reduce reliance on biomass so that to improve their health and socio-economic status.

There are number of studies in fuel efficient cook stoves throughout the country: the study specifically on benefits and challenges EECS for women and children very few throughout the country and almost negligible in Yaya Gulele district. Based on the field visit in four localities (Kebeles), the workshop conducted in Yaya Gulele Woreda among stakeholders of the project the utilization of the already distributed cook stoves is significantly low and the contribution for women empowerment and child well-being limited. What worsen the situation in Yaya Gulele the scaling up of the project and distribution of EECS to further Kebele administrative has been facing many challenges.

Except WVE KPT 2009 and WVE 2012 evaluation report there are no any studies in Yaya Gulele Woreda in line with benefits and challenges of improved cook stoves project for women and children. Particularly, there are no any studies on the challenges at various levels (individual, group, organizational, etc.) that impeding the improved cook stoves adoption and utilization in turn its contribution women empowerment and child well-being.

1.3 Research Question

In attempt to address the research objectives, the major research questions were,

- What are the socioeconomic benefits of EECS for Women and Children?
- What are the challenges associated with EECSU at various levels (individual, group, community and stakeholders) level?
- What are the major fuel wood types?

- ❖ What are the major light sources of the households?
- ❖ Who are the major responsible for fuel wood collection and preparations?
- ❖ What are the strengths of the project (EECS project)?
- ❖ What are the weaknesses of the project (EECS project)?

1.4 Research Objective(s)

1.4.1 General Objective

The General objective of the study was to asset the socio-economic Benefits of women and children getting from EECSU and those associated challenges

1.4.2 Specific Objectives:

It specifically intended;

- To assess the socio -economic benefits having from EECSU for women and children
- To identify the socio-economic challenges facing from EECSU for women and as well as children in the study area and
- To assess the strength and weakness of the EECS project

1.5 Definition of Terms and Concepts in the Study

Here most of the terms are presented and defined based on working/operational definitions in social work practice.

Biomass: is biological material derived from living, or recently living organisms. In the context of biomass for energy this is often used to mean plant based material, but biomass can equally apply to both animal and vegetable derived material. For Example includes fuel wood, crop residues, and cow dung.

Energy: this is to mean the energy we are having from burning of biomass, we use the energy manly for cocking, heating and boiling in this contexts.

Traditional/three stone stoves: these are stoves manly used in rural also as well as in urban areas using three stone which have low efficiency compared to the improved stoves. The stoves are open in all sides and exposing the family for fire risks.

Improved cook stoves/Energy Efficient Cook stoves-compared to the traditional stoves having closed nature as well as made of some more advanced technologies having efficiency better than the traditional one.

Energy Efficiency-the amount of energy saved due to utilization of cook stoves (whether improved or traditional).Example both stoves traditional and improved are given 10 KGs of wood and to boil one litter of water. The traditional used 8 KGs of wood to boil the water while the improved 3 Ks of wood. The former used about 80% of the energy while the later takes only 30 % of the energy. There for the latter is 50 % energy efficient than the former. In other terms we remained only 2 KGs and 7 KGs after boiling a liter of water using Traditional and improved stoves respectively

Energy saving: the amount of fuel we saved due to using improved cook stove changed into kilo joule (energy unit). In the above example we can say 5 KGs fuel wood which is changed to energy saved due to utilize ton of improved cook stoves

1.6 Limitations of the study

Since the research conducted on the Kebeles already having EECS and using samples from the study population it will have the following limitations

The research sample size was 75 households which assumed to be representative. Though, the sample size is representative and adequate it may lack the full representation of the Population. The enumerator have no prior experiences of data collection except one full day training and pilot test day for research purposes and appropriates techniques in interview, data collection and maximum observation and hence lack having enough picture on the study topics. The study geographic area only covered the high land and midland Kebeles of the district due to the EECS project implementation only in these agro ecological zones. Hence, in general it was difficult to generalize the findings of the research to the whole Woreda and other places adopting EECS but the results can be useful assets for districts of the same or different agro ecological zones of the study area and other places for having clear picture on the challenges and benefits of adoption of EECS on the lives of children and women.

Besides, the result in reduction on smoke and particulate matters can't be quantified due to lack of instrument to measure them. The study only depends on field observation and respondents response comparing with the previous times.

1.7 Organization of the Thesis

The total thesis is organized in six major chapters each explain the details of the chapter. The rest of this thesis is organized in to five chapters. Chapter two clearly deals with a review of the literature that includes conceptual explanation of improved cook stoves, women empowerment and child well-being. Different empirical studies that depict the study are also revised in this chapter. In chapter three brief descriptions of the study area as well as research Design and methodology presented. The fifth chapter describes the major findings with its interpretation and the last chapter (six) presents the conclusions and recommendations of the study.

Chapter II

Review of Literature

2.1 Socioeconomic Benefits of EECS

The EECSU has various socioeconomic benefits they explained by various literatures.

Fuel saving and Economic Benefits

Based on many researches the fuel saving efficiency of EECS various from country to country, regions to regions and local to localities due to the fuel types, frequency of food preparation and the type of food in the area. The fuel saving ranges from minimum of 25 % to a maximum of 80 %.ICS could save over 60% in fuel expenditure and (42-45%) that less time required for cooking food using ICS compared to traditional stoves in different seasons. The same study revealed that a saving of 25% and 47 % over traditional stove and open fire stove respectively Compared to that for traditional stove (Dey, Ali and miller, 2012)

Due to the traditional need and high Injera backing nature of the Ethiopian people, Mirt EECS have saving 10-16% of their income and 50 % of the fuel which enabling the poor people to afford to cook their staple food and contributing to poverty. (DFID, 2000; WVE KPT; 2009 & GTZ 2008).

The implication of reduction in fuel wood consumption on financial savings, on average, is reported to be ETB 33 per household per month - the highest in Tigray and the lowest in Oromia due to availability of fuel wood and hence the price variation.(GTZ,2008). The implication of fuel savings on time and efforts households spend in collecting firewood has been reported by the consumers as one of the very important benefits of Mirt, Tikikil and other stove types in different parts of the country. Households that collect firewood instead of purchasing it

account 11% of consumers. These are primarily rural households. The average time saved per week for this group of consumers is 6 hours per week per household but varies greatly between 4 to 13 hours. The time saved from collection of firewood due to EECS has been used to meet domestic chores, entertainment (coffee time with neighbors and friends), look after kids and businesses. (GTZ, 2008).

Despite the various benefits different respondents have various perception on the benefits of the stoves.

Table 2:1 Perception in Kenya and Ethiopia on EECS

Points of perception	**Kenya**	**Ethiopia**
Increases speed of cooking	62	69
Reduces indoor air pollution and smoke	70	55
Increases safety when handling the stove	82	83
Increases convenience for cooking	77	81
Is more durable	40	66
Improves the taste of food	81	60
Is easier to clean and maintain	80	56
Has more aesthetic appeal and appearance	28	71

Source: GIZ, 2008

ICS compared to traditional stoves performance regarding 'time saved' and 'use of saved time'. ICS saved time compared to traditional stove according to over 57% respondents. The saved time could be used mainly for cleaning or sweeping rooms/surrounding (40.9%), taking care of children (21.5%) and domestic animals (14%), sewing *kantha* (13.6%), collection of fuel (8.6%), etc.(Dey, Ali and miller, 2012)]

Most Consumers reported that savings from expenditure on firewood were being used to meet a range of domestic and other expenses such as purchase of food stuff, firewood, water, telephone and electricity bills, education fees, entertainment, and social obligations, child care and managements, purchase of children clothes and foods, etc.). (GTZ, 2008; Dey, Ali and miller, 2012).

Table 1:2 Utilization of Saved time by respondents

Can save time using ICS %		Jama	Sadar	Hatia
		% Households		
Yes		68.3	45.	57.4
No		2	51.	38.3
Can't say		5	3.	4.3
N		2	23	486
Mean time saving (in minutes)		3	30.	32.1
		(±1.0	(±1	(±0.7)
Utilization of saved time				
Taking care of children		20.4	23.	21.5
Sewing katha		1	3.	13.6
Taking care of domestic animals		16.3	10.	14.0
Washing clothes/dishes		8	17.	11.8
Cleaning or sweeping		2	59.	40.9
Bathing		1	9.	4.7
Collecting fuel		13.4	0.	8.6
Teaching children		2	0.	1.4
Handicraft		0	1.	1.1
Talking over phone		0	0.	0.4
N		1	10	279
Mean time required to be used to	(days	4	4.	4.3
		(±0.3	(±0	(±0.2)

Source: Dey, Ali and miller, 2012

Health Benefits of Improved Stoves

Due to high levels indoor air pollution (IAP) that is attributed mainly inadequate ventilation and incomplete combustion of biomass fuels and their use in large quantities on energy-inefficient three stone fires prior to Mirt, many consumers highly appreciated the health benefits of their Mirt stoves. Key benefits of Mirt cited by consumers included protection from heat and

smoke, improved upper respiratory and pulmonary health, cleaner cooking space, reduced drudgery and risk of fire hazard and accidental burns and Other significant livelihood improvements consistently identified by household surveys, including those carried out by this project, are increased safety in terms of reduced fire risk and risk of burns from the use of improved stoves. (GTZ, 2008; DFID, 2000 & Dey, Ali and miller, 2012)

Table 2:2 Health Benefits of Mirt Stove

Health Benefits	Ranking			Total	Percent
	First	Second	Third		
Protection from Heat	234	104	44	382	30
Improved Eye Health	107	66	27	200	16
No Fire Hazard	30	73	88	191	15
Improved Overall Health	58	80	28	166	13
Improved Respiratory and Pulmonary Health	60	33	17	110	9
Cleaner Cooking Space	17	35	23	75	6
Cleaner Injera	4	17	16	37	3
Reduced Drudgery	8	14	13	35	3
Improved Skin Health, No Burns	5	8	3	16	1
Improved Personal Hygiene	0	2		3	0
Missing	14	21	18	53	4
Total	537	453	278	1268	100

Source: adopted as cited by WVEKPT, 2009

Emission reductions

On the hand, one of the features that was repeatedly appreciated by Stove Tec's consumers was the stove's capacity to significantly reduce quantities of smoke produced during the process of cooking, improving in- door air quality through adoption of energy-efficient stoves such as the Stove-Tec is of particular importance to communities such as Yaya Gulele where IAP, due to increased use of cow dung as a cooking fuel, is a serious health problem.

With their better combustion efficiencies, EECS have actually reduced the level of smoke that would have created smoke screens. In this regard, it can be argued that the EECS do not only conserve cooking energy that is in short supply, but they also provide developmental benefits (through improved health, economic and better time management) to their consumers. Women (and young children who stay with mothers) who spend a good part of a day preparing meals for their families over the open fire in poorly ventilated kitchens, often bear the brunt of IAP disproportionately. WVEKPT, 2009; DFID, 2000; Dey, Ali and Miller, 2012). During discussion with the people regarding ICS better answer was found in case of reduced smoke emission (86.4%), chance of food not getting burnt (70.2%), dropped soot production (89.1%), and less time required to clean kitchen (82.5%). (Dey, Ali and Miller, 2012).

Reduced Drudgery on women and Children:

In Ethiopia, like in many developing countries, cooking is an activity that falls in the domain of women's domestic chores. Besides, in rural areas where nearly one-hundred percent of traditional fuels are collected freely, collecting biomass fuels is the responsibility of women and girls.. It was also reported that the process of collecting, processing and transporting traditional fuels takes as much as 21 person-hours per week – equivalent of 3 person-hours per day - in Yaya Gulele. Thus, the amount of time spent on collecting traditional fuels is too significant to be ignored.

Improved stoves, through better heat transfer, reduce demand for cooking energy, which in turn reduces the need for and hence time spent on collecting traditional cooking fuels and speed of coking. The intervention benefits in particular, minimizing their high workloads to

collect and supply fuel wood, and their exposure to flame hazard, high smoke emission and harmful pollutants. (Dey, Ali and miller, 2012 & WVEKPT 2009)

Rural and poor in many African countries spend a significant portion of their time gathering and collecting wood fuel, crop residues and animal dung for use as cooking and space heating fuels. Firewood collection in Kenya is often the responsibility of women. In the rural areas, 90% of the population use collected firewood in comparison to only 20% in the urban areas. In Botswana, the average distance travelled to fuel wood collection points was 6 km and the time taken was about 3.3 hours. The average distance travelled to fetch firewood in Eritrea is 10 km and in most cases (80-90%) it is the responsibility of women and children. Due to expanding sugarcane areas in Uganda, there has been a decline in fuel wood collecting areas leading to longer distances travelled to access fuel wood. Because of travelling long distances to collect firewood, in rural Africa are often left with limited time for other activities resulting in low agricultural productivity and inadequate time to pursue educational opportunities (Karekezi et al, 2003)

Biomass fuel is often collected from the local environment, most often by women. This time-consuming activity diverts time from productive and family activities. During a typical week, family members spend a considerable amount of time collecting fuel, whether from common village land or farmer's fields. In India, the time spent collecting fuel is estimated at an hour per day (World Bank 2002). Biomass fuel collection often entails walking long distances carrying heavy head loads and safety hazards. Furthermore, it can lead to a gradual deterioration of the local environment and deplete biomass supplies, meaning even longer walks and greater drudgery. It is possible that time not spent on household drudgery could be used for income-producing activities.

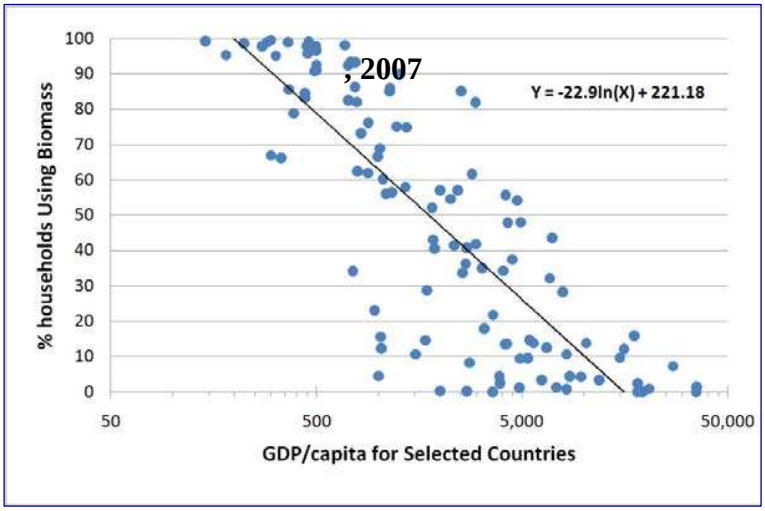
Environment and Climate Change

One of the contributions of EECS cited by many literatures is its contribution for climate change directly by reducing deforestation. The dependence on biomass in the world 2.7 billion on solid biomass as fuel source leads to unsustainable wood use and ongoing deforestation. Globally, deforestation contributes to the build-up of harmful GHG in the atmosphere which is contributing to global warming. Locally, deforestation can generate soil erosion, pollution of streams with sediments, loss of biodiversity and desertification (UNEP 2005). The wide dissemination of improved cook stoves could help to slow down deforestation and hence contributing to overall climate change significantly

Poverty and Biomass Use

According to many researches biomass use is also closely intertwined with poverty. As their incomes rise, households in developing countries generally switch to LPG fuel and various types of specialized electric cooking appliances. Thus, income growth is one obvious answer to the problems of biomass energy use in developing countries. The savings from EECS in are leading for improving their livelihood so that to up lift their financial savings (example Mirt in Ethiopia) and hence reduction in Poverty. However, a doubling of typical incomes in a country would reduce the number of people dependent on biomass energy for cooking by only 16 percent suggesting that the use of biomass fuel among developing- country households will continue for years to come (IEA 2009, GIZ, 2008).

GDP



Source: WHO and UNDP (2009).

Figure 2:1 Biomass and GDP in developing countries

2.2 Challenges of EECU for Women and Children

Satisfaction level of the users with improve cook stove (ICS)

Satisfaction levels of the respondents are one of the challenges affecting effective and efficient utilization of EECS. Fifty-four percent of the users were completely satisfied with ICS and they did not face any difficulty in, partial satisfaction among (46%) of the households was found in the study. They faced difficulties include lack of opportunity to spend time to do other familial works during cooking especially with portable ICS with grate; all kinds of biomass fuel cannot be used in ICS, and sometimes fuel not easily available. (BRAC, 2006)

In addition study by Joseph (1981), many times; the improved cook stove designs are found to be incompatible with traditional ways of cooking. For example, any change required in the posture of the cook while cooking may not be accepted. Grate in ICS is placed at the middle stage. Fuel mainly firewood is kept on the grate while about 50% of the firewood remains outside the stove.

After a few minute cooking/burning, outside portion of firewood is displaced and fall-down in absence of the cook. So, a continuous attention of the cook to firewood during cooking must be maintained. The improved cook stoves may allow use of only certain sizes and types of fuel such fuel wood in very small amount and dried wood, thus further constraining the choice of fuels (George1990 and WVEKPT, 2009). Besides, over 33% respondents reported that they cooked some of the meals using ICS while 33% used it for cooking all meals, and 24% cooked most of the meals. However, rest of the users (8.5%) did not cook with the stove**.** (Dey, Ali and miller, 2012)

Use of other stove besides improve cook stove (ICS): Types and reasons

The local rural households' settlements particularly in slums are very confined where majority of the families have no separate kitchen. Though, a household have EECS the traditional stoves are stand by while preparing meal for the household.

According to Quadir 1995 Fifty-six percent of the households used another cook stove in addition to improve cook stoves most of them (87%) used traditional clay fixed cook stove. A number of reasons behind using traditional cook stoves they mentioned which include feeling comfortable, fuel easily available, cheaper to use, meeting seasonal demands .However, and majority of them said that they were habituated and felt comfortable in using traditional cook stove in addition to ICS. Any of the new things though introduced with a view to maximizing wealth and minimizing bad impact on total system takes time to be accepted and established..

In addition Improve cook stove has some limitations. It does not permit all types of pot to be used for cooking purpose due to the large pot size in the households versus small size of EECS like Tikikil (Quadir 1995, WVEKPT, 2009)

Use of fuel: Types, methods of obtaining, and cost

One of the significant challenges to use EECS in many rural households are kinds of fuel, methods of obtaining and the associated increase cost of fuel wood following growing scarcity. For example, nearly 10% of the households in the study (Yaya Gulele Woreda) area reported that they obtain their supplies of firewood by paying money Given the growing scarcity of traditional fuels in the study area, this trend of commercialization of biomass fuels is set to grow, and grow rapidly.(WVEKPT,2009)

Majority of the households (63%) collected fuels free of cost. Some of them used fuels through both purchasing and gathering. A few of the households purchased fuels on regular basis for cooking. In the study it was found that rate of involvement of the female members in the household in obtaining fuels was higher. Wife or daughter in the household was responsible to collect fuels free of cost in most of the cases where as Husband in the family was involved in purchasing fuels in some cases. In gathering fuels concerned family members spent time more than 6 hours on average a week (BRAC, 2006)

Use of fuel: Problems and preferences

Study shows that twenty-four percent of the households faced problems related to fuels. The problems included expensive in case of purchasing firewood, not easily available for gathering free of cost, produces lot of smoke in case of watery fuel wood especially in the rainy season. Of course, majority of the households who did not face any problem related to fuels mentioned some reasons behind using the fuels. These were affordable price, availability of the fuels including free of cost, and habituated. A wide variety of fuels which are available especially in rural Bangladesh can easily be used in improve cook stove. Most of the households preferred

firewood, dry leaves, twigs, hay, straw, and rice husks as fuels. Some of the households preferred cow-dung as fuel. (BRAC, 2006)

Placement of Stoves/Kitchen spaces

In the follow-up survey it was observed that most of the stoves were placed inside the kitchen which was an enclosed compound near the main residence (63.0%). Some were in an open space nearby the main house (19.6%) or completely in the open space (15.3%), and a few (2.1%) were inside the main residence. (Dey, Ali and miller, 2012).What worsen the situation in Yaya Gulele District all the stoves are placed with other local stoves in the house with very narrow kitchen sometimes with animals, kitchen materials; other stocks all forms dense of sophocation which are too dangerous for children. For making things worse these confined kitchens have no windows or if have that may not exceeds 25cm by 30cm cm roughly which aggravating the pressure of smoke on the family mainly children and women.(WVEKPT ,2009)

Chapter III

Design of the Study and Methods

3.1 Description of the Study Area-

Yaya Gulele District is located about 115 Kilometers (Km) North-West of the capital, Addis Ababa. Administratively, Yaya Gulele is divided into 17 rural and one urban Kebele administrative. The total population of the Woreda was estimated to be about 75,000 with an average population density about 279 persons per km2.

Agro-ecological divided into “Dega” (cool to very cold climate in the highlands), “Woinedega” (moderately cool climate in the mid-lands) and Kolla (warm to hot climate in the low lands). Total area of the Woreda is estimated to be about 338 km2. Over 70% of the Woreda lies within elevations greater than 2000 masl. The Woreda livelihood depends on subsistence mixed agriculture where crop production (mainly cereals and leagues) mixed with livestock rearing (cow, sheep, goats, etc.).

According to a recent study made by WVE, with over 70% of the land area under cultivation, Yaya Gulele is one of the most intensively cultivated areas in the country. The same study indicated that about 24% of the area is grass land and vegetation with patches of bushes and woodlands.

In Yaya Gulele, natural forest has disappeared long ago giving way to intensive cultivation. Natural forests were completely cleared and land cover became denuded when people started putting more and more land under cultivation to meet basic physiological needs (food, energy

for cooking and warmth) of ever-growing population.

The major energy source for cooking, heating and lighting are fuel wood and cow dung while the later takes the big share mainly using traditional three stone stoves until recent three years of World's Vision intervention of EECS.

3.2 Study Design and Methods

Since the project intervention has took since three years ago and the women are using the EECS for the mentioned years the research design is descriptive where to see the benefits brought by the previous intervention.

Research Methods - Mostly a single method of research design may not give full picture of the research topic either due to it lacks the quantitative data or may unable to find the required information through observation and FGDs. Hence, it is used both qualitative and quantitative design to have full, accurate and enough information on the study topics.

Qualitative Design- basically the qualitative design used in individual questionnaires, FGDS, and observations. These addressing the questions like the EECSU benefits, challenges and their contribution for women and children

Quantitative Design- the quantitative design deal on a discussion with individual questionnaires with women beneficiaries in their homes in combination with observations.

3.3 Universe of the Study

The key concern of the study is to assess the potential socioeconomic benefits and Challenges of EECSU in Yaya Gulele District. In the past three years due to the intervention of WVE Yaya Gulele ADP about 1600 EECS (Both Tikikil and Mirt in pair) distributed for more than 800

Households. The distribution took different time and hence the period each women used the EECS. Therefore, the universe of the study only includes about 300 women who have been using both stoves continually.

Considering finical, time and resource constraints the study will be conducted in four Keble administrative taking them in purposive sampling and targeted households in simple random sampling.

3.4 Sampling Methods

The EECS stoves interventions are conducted in four Kebeles for the past three years out of the total of eighteen Kebeles in the Woreda. Hence, the sampling method will take the combination of non-probability and probability sampling. Purposive sampling employed to select the Kebeles; the project intervention had been going. Then proportionate stratified sampling employed to select households to be interviewed. The choice of the later sampling method was because of the different population of Universe found in each Kebele (i.e. the number of households used the stoves for three years in four targeted Kebeles differs). Accordingly, 75 households selected and interviewed.

3.5 Tools and Procedures for Data Collection

Both qualitative and quantitative data collected from primary and secondary sources. The primary data collection methods employed in the form of questionnaires, observations and focus group discussions. Likewise, secondary data from various sources particularly from the Woreda sector offices and the WVEYGADP incorporated.

3.5.1 Interview Schedule

The main data collection tools of the study were Interview Schedule and Questioners. The questionnaires were prepared in English and these then translated to “oromiffa”(local language) to make clear understanding for sampled women which created smooth and constructive environment between the interviewer and the households (the Interviewee). Before the actual commencement of the schedule one day pilot conducted aiming to modify the questionnaires as well as to add more relevant questions. The interview schedule contained both structured and semi structured questionnaires in the form of open and close ended questions.

3.5.2 Observation Schedule /Checklist

Observation, particularly participant observation conducted besides with the interview schedule. This tool was purposefully selected to have clear information such as household situation like smoke, households’ kitchen settlements, house situation and other data (qualitative) which are difficult through the interview schedule and FGDs. In nut shell the observation schedule aimed to address

- To see the kitchen situation of the HHs and the level of smokes in the kitchen
- To observe the Improved stoves utilization and related chores in the HHs
- To see how the kitchen settlements are arranges to avoided the burden on women
- To observe the fuel types, use of pattern and its challenges on
- To ask some weakness and strength of the project

3.5.3 Focus Group Discussion (FGD) Guide/schedule

The focus group discussions employed for women, men (the husbands of the women group) and staffs from stakeholders on selected topics using open ended unstructured guiding questionnaires. The main essence of conducting the FGD was to see overall picture on the

EECSU particularly to examine its benefits and challenges to women and children. Besides the FGD was the sole tool for collecting information regarding challenges of EECSU and its associated activities for women empowerment and childe wellbeing at various levels.

- What is perception about the stove project in general and what is going on in the community?
- Would you explain the socio-economic benefits of EECS utilization for?
- Would you explain the challenges of EECSU for at various levels (at Community, Group and Stakeholders level)
- What are the weakness and strength of the project

3.5.4 Documentary Analysis Template/matrix

One of the tools for data collection in the study was secondary data review. To this end secondary data's collected from all stakeholders particularly World vision Ethiopia, Woreda Water, Mines and Energy office, offices. The major concern of the secondary data was to see different reports, minutes, which showing the benefits of fuel efficient Cook stoves utilization for women and children. Besides, other related documents related to women cooperatives status, EECS distribution related issues, trainings reviewed to have full picture on the study topic**.** The major concern of the document review were,

How much EECS users in the area?

What are different reports in relation to EECS?

What are previous intervention and its benefits for targets in the study areas?

What are the contributions of women in the cooperatives in the groups?

How the women are managing the Book keeping and other cooperatives issues?

How you are working as stakeholders for the project success?

What are the project monitoring and evaluation reports?

What Women monthly contribution and financial status of the cooperatives?

What are the contribution of the women cooperatives and status of bookkeeping's?

3.6 Data Processing and Analysis

Both qualitative and quantitative data processing were conducted. The responses collected from the women households scrutinized, verified, edited and arranged according to the topics of the objectives to facilitate the analysis and interpretation. A master code sheet prepared for all respondents for the collected data. Then, all the quantitative data were processed on computer using SPSS. The qualitative data particularly related to challenges of EECSU for WE and CW collected from interviews, FGDs, observations were identified based on topics, sorted and grouped. Then it is incorporated to supplement the quantitative data processed in the computer.

Chapter VI

Analysis and Interpretation of Data

This chapter mainly traces the data analysis and its interpretation of the survey result. The chapters crosses the socio-economic profiles, the major benefits from EECSU and their associated challenges of the respondents with the study findings which are divided into various sub sections. Each section contains the analyzed data, the interpretation of each section findings and the conclusion. The results in each section clearly depicts the output of the result from the computer in terms of percentages, frequencies which shortly narrated are supported by observation and FGDs.

4.1 Socioeconomic Status of the Households

From total 75 surveyed households about 60(80 %) married, 4(5.3%) unmarried 3(4%) divorced, and the rust 10.7 are separated and widowed respectively. Results of the survey revealed that a total of 404 persons were living in the 75 households surveyed. Thus, average family size for survey households is 5.39 persons per household. From total population of 404 living in the survey households, children under the age of 15 years constituted 35.5 % while males and females aged 15 years and above respectively constituted 31% and 28.5. If we consider the age of the women respondents only 5(6.7%) are below 25 years of age and 5(6.7) % of the respondents are above an age 55.The majority of the respondents are aged between 25 and 45 which is about 73.3.Results of the surveyed household showed that none of the respondent has higher level of education even completion of secondary school. Significantly, about 81 % of the respondents are illiterate who are unable to read and write.16% only completed grade 1-4

surprisingly that are unable to read and write. The survey results should that the majority households livelihood depends on agriculture followed by minor no faming activities such as petty trade(market stall, grain, food stuffs, local liquors) and casual labor. Absolutely, 100 % of the household's livelihood primarily depends on farming and only 13(14%) and 5(5.4 %) petty trade and casual working wherever available.

4.2 Socio-economic Benefits of EECSU

4.2.1 Capacity Building Training for Women

The survey result showed that most of the households took one or more trainings to improve their awareness from GOs, NGOs and other stakeholders either formally by collecting in one center or at filled level. The major capacity building trainings mainly include; health, environment and agriculture related.

Table 4:1 Trainings Received by Respondents

Capacity building Trainings received by Respondents				
		Responses		Percent of Cases (%)
		N		
$Trainings by respondent	Health Training (Family Planning, Personal Hygiene, Maternal Health, HIV/AIDS, etc.)	38	16.9	52.1
	Environmental (SWC, Climate changes, Benefits of stoves, etc.)	27	12.0	37.0
	Education (child education, women education, etc.)	30	13.3	41.1
	Agricultural related(crop/livestock production, organic farming,)	30	13.3	41.1
	Income generating and business development	29	12.9	39.7
	Improved technologies (agricultural, environmental, etc.)	35	15.6	47.9
	I haven't took any trainings	36	16.0	49.3
Total		225	100.0	308.2
a. Dichotomy group tabulated at value 1.				

Based on the above table 4: 1 the survey result showed that 39 (52%) the surveyed householders believed that effective utilization of EECS have created opportunity to take trainings and the remaining 36(48%) of the householders responded either undecided or disagree. Out of the total 75 respondents about 35(47.9%) of the households took one or more trainings About 38 (16.9%) of the households took health training formally or informal this include personal hygiene and environmental sanitation, public health, child health, family planning and other health related trainings. The survey showed that about 27(12%) of the households took training environment and climate change more importantly topics such soil and water conservation and their measures. About 30(13.3 %) of the respondents took educational related trainings such as the importance of child education, women education and sponsorship in the context of the WVE and government organizations in relation to EECS. Significant number of the households 30(13.3%) have took trainings on agriculture and food security addressing topics like crop production and management, livestock production and management, compost preparation and utilization of improved technologies like planting in rows ,using BBM and some pre and post-harvest managements. From the above interpretation the EECSU has opened opportunity for women to improve their capacity through various trainings

Attitude of respondents on climate change and EECS impact on climate change

Most of the surveyed households have a good understanding on the climate change through time, its effect on women and children and the contribution of EECSU for the mitigation of the impacts climate change. See table 4:2 below

Table 4:2 Attitude of respondents' climate Change through time

		Fre	Percent	Valid	Cumulative
	Strongly agree	19	25.3	25.3	25.3
	Agree	41	54.7	54.7	80.0
	Disagree	10	13.3	13.3	93.3
	Strongly Disagree	5	6.7	6.7	100.0
	Total	75	100.0	100.0	

Table 4:3 Effect of Climate on women and children

	Frequ	Percent	Valid	Cumulative
Strongly agree	22	29.3	29.3	29.3
Agree	31	41.3	41.3	70.7
Disagree	17	22.7	22.7	93.3
Strongly Disagree	5	6.7	6.7	100.0
Total	75	100.0	100.0	

Table 4:4 Contributions of EECS for climate change

		Frequ	Percen	Valid	Cumulative
	Strongly agree	18	24.0	24.0	24.0
	Agree	35	46.7	46.7	70.7
	Disagree	18	24.0	24.0	94.7
	Strongly	4	5.3	5.3	100.0
	Total	75	100.0	100.0	

As we can see in table (4:1, 4:2 and 4:3) about 80 % of the respondents agreed that climate of their surrounding is changing from time to time and only 20% disagree for the change occurring through time. Almost nearly 71 % of the respondents agreed that climate change highly affecting women and children in various aspects and EECSU playing significant role for the mitigation of the impacts. Most of the FGD participants described that climate is changing through time and its indicators include rising in temperatures, erratic rainfalls, and disappearances of the forests. Besides, they examined that the EECSU have multifaceted benefit to mitigate the effects climate

by reducing fuel wood utilization which in turn deforestation, reduction in cow dung utilization (reduce emission of Methane) and reduced deforestation (carbon dioxide sequestration).

4.2.2 Perceived Reduction in Fuel, Time and Expenses and other benefits

Due to the introduction of EECS the household energy consumption tilting to more utilization of fuel wood than cow dung due to the nature of EECS only allowed to use fuel wood as criteria. This contributed for increasing utilization fuel wood on one hand on the other reduction of fuel wood utilization, time for preparation and collection and reduction in smoke in the homes and expenses of the households.

Table 4:5 Perceived Reductions in Fuel, Time and Expenses and other benefits

EECSU Benefits for Women and Children				
		Responses		Percent of
		N	Percent	
Benefits[a]	Reduced Smoke	49	11.2	65.3
	Saved Fuel Utilization	57	13.0	76.0
	Reduced Expenses	49	11.2	65.3
	Saved time	52	11.8	69.3
	Improved Safety and protection	48	10.9	64.0
	Improved personal Hygiene	47	10.7	62.7
	increased social interaction	41	9.3	54.7
	Improved leadership	37	8.4	49.3
	Access to new technologies	19	4.3	25.3
	Improved knowledge/capacity	40	9.1	53.3
Total		439	100.0	585.3
a. Dichotomy group tabulated at value 1.				

According to table 4:5 from the total respondents 57(76%) and 65.3%) of the respondents replied that EECSU have reduced fuel wood utilization and its associated expenses. The research result showed that in average a household uses 12.3 KGs of Fuel wood per day per household before

the introduction of improved stoves and about 8.80 KGs of fuel wood after introduction of the EECS. This shows about 28% 0f fuel wood reduction.

The FGD, especially women group explained that we were suffering from large volume of wood utilization before the introduction of EECS , now thanks to Mirt and Tikikil stoves a hand of wood is enough even to bake Injera for the families. During file observation a women said that "in local terms I was using at list three donkey of wood for the family per week. Now, thank for I am using 1-1.5 donkey of wood per week". In simple calculation terms it is a saving of an average 33-50 % percent of fuel wood and associated expenses.

Out of the total 75 respondents 49(65.3%) of the respondents replied that EECSU reduced in smoke in their kitchen. FGD at all levels supporting this data by explain it in terms of reduction in fuel wood utilization due to improved cook stoves. The filed observation in the kitchen of the surveyed households revealed to important feature of the reduction in smoke. First, most of women were keeping the particularly Tikikil in their main house (salon) due to low smoke emission. The second observation was many women cooking in the kitchen wearing clean clothes where sometimes their children and husband around joining the chore

The survey showed most of the respondents replied that effective utilization of has contributed on health improvements. The major health improvement recorded due to the reduction in smoke (49, 65. 3 %) from three stone traditional stoves which have large emission of carbon dioxide even using the dried fuel wood as well as reduction of the methane emission from cow dung due to the utilization of which requires dried and thinly chopped wood. The reduction in fuel wood as well as cow dung utilization results in reduction of emission of smoke to the kitchen as well as the bodies of women which results an improvement on personal hygiene and environmental sanitations.

From total of 75 respondents 48(10.9 %) and 47 (10.7%) of the respondents replied EECSU enhanced personal hygiene and environmental sanitation and improved protection from hazards. Besides, the FGD with women leaders and filed observation showed that the introductions of have contributed in improving the health of women through using the saved time from U for time for health related issues. The filed observation sowed that most of the women are working kitchen activities even by wearing clean and neat closes. From the above interpretation it is clearly showed that EECSU have benefits such as reduction in fuel wood utilization and improvement in personal hygiene.

Utilization of Saved time by respondents

Majority of respondents using the saved time for different activities in the home and outside home.

Table 4:6 Utilization of saved time by respondents

Utilization of saved time by respondents				
		Responses		Percent of Cases (%)
		N	Percent	
	Saved time for Agricultural Activities	45	15.2	60.0
	Saved time for Marketing and	44	14.8	58.7
	Saved time for Child care and	45	15.2	60.0
	Saved time for Working other	44	14.8	58.7
	Saved time for Social Interaction	42	14.1	56.0
	Saved time for Good rest in Home	42	14.1	56.0
	Saved time for Others	35	11.8	46.7
Total		29	100.0	396.0
a. Dichotomy group tabulated at value 1.				

4.2.3 Safety and Protection

Based on the respondents the utilization of three stone fire exposed them different fire hazards on family assets and family members**.** Households exercising the hazards like burring of materials

and burning of bodies particularly women and children because of their primary responsibility for food and related chores. After introduction of EECS households exercised low number of different hazards on their assets and bodies. See the tables 4:6 and 4:7 for comparison.

Table 4:7 Hazards faced by Respondents BI of EECS

Hazards faced By Respondents BI of EECS				
		Responses		Percent of Cases
		N	Percent	
	Burning of the materials(like Mesobe ,	58	34.3	77.3
	Burning of Clothes and assets (Dresses,	48	28.4	64.0
	Burning of body (like hands ,foots ,faces,	41	24.3	54.7
	Burning of assets (like animals, houses	13	7.7	17.3
	no any hazards	9	5.3	12.0
Total		169	100.0	225.3
a. Dichotomy group tabulated at value 1.				

Table 4:8 Hazards faced by Respondents BI of EECS

Hazards faced By Respondents AI of EECS				
		Responses		Percent of Cases
		N	Perce	
	AIS Burning of the materials(like	26	25.2	39.4
	AIS Burning of Clothes and assets	28	27.2	42.4
	AIS Burning of body (like hands	31	30.1	47.0
	AIS Burning of assets (like animals,	8	7.8	12.1
	AIS No any hazards	10	9.7	15.2
Total		103	100.0	156.1
a. Dichotomy group tabulated at value 1.				

Re: from the above two tables we can see the percentage reduction in hazards. For example the burning of body reduced from 41 to 31 which means 24.4 % reduction.

The result showed that households also suffering the burning of various assets and materials after the introduction of EECS but the percentages difference from the previous. Based on the same respondents About 58(77.3.%),and 26(39.4%) of the households exercised the hazards like burring of materials such as Mesobe , Sefed , buckets, and other materials before and after

introduction of EECS respectively. The filed observations in selected women houses shows that the closed nature of the EECS have potential to prevent from burring which opens opportunity to enjoy the kitchen with children and their husbands. From the above table we can conclude that the introduction of EECS has reduced hazards in the respondents' house.

4.2.4 Food Security, Agriculture and other Income Related Issue:

Unquestionably women are one of the members of the household suffering from the shortage of the food whenever yields are reduced in one or other cases. If we consider the majority of agricultural works in rural areas are the primary responsibilities lies on women besides their care for children, animals and other household assets.

Table 4:9 Management of Excess manure in the respondent's house

Manure managements		Responses		Percent of Cases
		N	Percen	
	Preparation and	36	19.0	48.6
	Storing in the field	52	27.5	70.3
	Compost for Organic	53	28.0	71.6
	Removing as a waste	48	25.4	64.9
Total		189	100.0	255.4
a. Dichotomy group tabulated at value 1.				

Based on the above table 4:8 out of the total 75 respondents about 36(19. %) of the respondents are using the extra manure due the introduction of for preparation compost (organic fertilizer) for their farms which logically reduce the expenses related to fertilizer purchase.. The filed observation showed that most of the respondents of the survey have compost field in their farm lands for managing the extra manure which in turn reduced their dependence on the introduction of in organic fertilizer. The FGD with women group, the government staffs clearly explained that the culture of women using organic fertilizer has been increasing since the introduction of EECS.

4.2.5 Education and Schooling and reduction workloads

The survey results showed that the primary fuel collectors in the area. This collection of wood from different distances has significant impact on the children either in the form of absenteeism, late coming and some cases dropping of students. The introduction of has reduced the frequency of fuel wood collection and hence children have time for education and schooling. The FGD particularly women explained that our children were suffering from the collection of fuel wood from far distances, as well as predation of it which have great impact on their education attainment, performance and other related topics. The introductions of EECS have reduced the pressure on children and hence have valuable impact on their schooling. All the FGD the respondents' agreed that children are the next top responsible takers of fuel wood and related chores mainly fuel wood collection and preparation. The introduction of the reduced the pressure on children particularly related to fuel wood collection and preparation

4.3 Challenges Related Of EECU for Women and Children

The challenges of EECSU for women and Children are managed by Individual survey questions which then supported by FGDs and observation, documentary analysis from various sources. The major challenges include awareness off the community, the beneficiaries, low commitment of the stakeholders as well as the new nature of the project.

4.3.1 Challenges at Community Level Related to EECSU

Knowledge and awareness of the community: From total respondents of 25(33.3%) agreed that awareness is the major challenge to bring changes in women and children. Both the field observation and FGD at all levels revealed that most of the households don't know the effect of the emissions as well as the benefits of EECSU.

Experience of the community on access and utilization of EECS: majority of respondents 20(26.6%) have stoves are traditional three stone which the community using them for many years. The experience of the community on access and utilization on EECS is very limited

The attitude of the community towards NGO projects: 35(46.67) replied that accustomed to supports include agricultural inputs, Educational materials, clothes and other health and school gifts. This free hand gifts has created a sort of dependency in the community particularly in the families of the registered children (RCs). This scenario has limited most of the community to join the project because one of the major requirements to be beneficiary is engaging in the group and saving monthly payments for their cooperatives.

4.3.2 Challenges at Beneficiary Level (EECS users)

The challenges posed by the community mentioned above are similar for users' level. Since they are using the EECS and participating in the project they have been facing challenges different from non-users.

Low adoption and utilization: most of the respondents have been using the EECS for more than three years since 2010. Both the field observation and FGDs at all levels particular with WVE and Government staffs the users showed that they are not using frequently or appropriately. Due to some challenges in the design and its feasibility for local works and celebrations. They also expiated that the stoves skirts are too small to accommodate stoves mainly large pots which are important during holidays, celebrations and Faith asked activities and festive.

Fuel wood type and collection responsibilities: thirteen percent of the respondents explained that fuel type and responsibilities for managing are the primary challenges. From a total

respondents about 56(81.2%) of the householders using cow dung for fuel followed by 46(66.7%) wood and 17(24.6 %) of crop residues, lives and twigs for as food preparation, lighting and heat. The fuel wood collection and preparation is the primary responsibility of the 48 %, 38.5 % and 13.5 % for women, children and men respectively.

Low support from stakeholders (Including husbands): majority 35 (46.6%) of the respondents said we have low support from all stakeholders including their families particularly husbands. The survey result should that most of the husbands have no knowledge and awareness about stove use and benefit for their families. According to survey 44(58 %) respondents their husband never helped them in any of fuel wood collection, preparation and cooking activities. Only, 31(42%) of the respondents replied their husbands have knowledge and awareness on benefits and uses for the family particularly of which on 29(38%) are helping women in various forms such as wood collection and preparation, support monthly payments, and the likes. FGDs both the women and husband strengthened the result.

4.3.3 Challenges at Women Cooperative Leaders Level

As a user and a member of the community points mentioned at above two levels are applicable here too. But, as leaders of the cooperative there are different constraints limiting WE and CW

Education level and Cooperative management: the management of the cooperatives requires education in monthly payments collection, bookkeeping, financial management, leadership skills as well as engaging in different communication with government and WVE staffs. The data from WVE,DWCO and DCPO showed that out 52 leaders in four sampled Kebele cooperative leaders ,30(57.6%) are illiterate they can only speak the local language Oromiffa.Only,12(23.07%) of the respondents completed primary education(grade 1-4) these only can speak also the local

language. The rest 10(19.23 %) can speak, and write the local language. None of the cooperative leaders well able to speak write and reads the Amharic and English languages

The commitment of the cooperative leaders: Despite many trainings such bookkeeping, financial management, community mobilization most of the cooperative leader's commitment is very low to bring the women to some higher level. The FGD with women group and the government staffs showed that the women leaders are missing the monthly meeting, collection of the monthly payments, mobilization of the members and education from time to time. Bedsides, in some significant meetings they are one front leaders to coordinate and organize by coming in time but they are one of the members to arrive late in most of the meeting, workshops and different project activities.

Capacity and experience of the women Leader managing a group: Just below half (48 %) of the respondents replied that this topic highly affects well-being and empowerment**.** The data from CPO revealed that there are a minimum of 214 and a maximum of 360 members in each group of the women. Managing this group requires skills in bookkeeping, leadership, financial management, and intensive communication, verifying the distributed stoves, coordination, monitoring as well as reporting of the success or failures and other good practices to the members as well as other stakeholders. But, as mentioned above most of the women leaders' educational status as well as skill in managing such large group is observed very low.

4.3.4 Challenges at Group /Cooperative Level

Instability of the cooperatives monthly contribution/cancellation of the members: the field observation of the cooperatives bookkeeping, discussion with government staffs and cooperative leaders showed that most of the members are not contributing the monthly contribution continually every month. See table 4:10 below

Table 4:10 Members attending and contribution as of September 2013

Name of cooperatives	Total members	Members attended on monthly contribution for sampled KAs ,2013							
		June		July		August		September	
		#	% total	#	%	#	%	#	%
Derara Gudina	275	115	41.8	90	32.7	65	23.6	112	40.7
Biftu Lemi	272	120	44.1	115	42.3	95	34.9	90	33.1
Abdi Waka	160	75	46.9	65	40.6	80	50.0	88	55.0
Bekelch Beri	360	225	62.5	240	66.7	175	48.6	190	52.8
Total	1067	535	50.1	510	47.8	415	38.9	480	45.0

Source: DWCO and DCPO (2013)

4.3.5 Challenges at Stakeholders' Level

Most of the challenges at community, users' and cooperatives leaders' level are observed also on the stakeholders. The following are highlighted FGDs and workshop reports.

Commitment on project implementation: Regarding the commitment of the staffs only 11(14.65) of respondents replied they are committed to the project. There are more than 12 government line offices this project requiring working together in all the project process. The minute in the agency (WVE) dated on January 11, 2013 showed that about 10 offices signed memorandum of understanding to effective implementation of the project but only three in line with it based on current information.

Monitoring and Evaluation of the Projects: Both survey in the households and the FGDs showed that there is low monitoring and evaluation of the project activities from government

stockholders. Accordingly only 6(8 %) of the respondents visited by them the responsible partners. FGD with government staff and the NGO showed that from a total minimum ten stakeholders of the project expected to work on the project only three are attending well.

4.4 Major Strength and Weakness of the Project

4.4.1 Major Strength of the Project

Global and National Concern: The FGD particularly with Government staff and WVEYGADP staffs described its strength with global Climate change and its effects. Its effect has been touching the doors of all countries irrespective of developed, enveloping countries. Climate change has been recording its maximum damages through the world most importantly on the lives of the human being mainly women and children in form of deforestation, flooding and high temperature. Besides, Ethiopia launched the CRGE and 5 years GTP both focusing on the reduction of toxic gases emission while the latter planned to distribute 9 million stoves in the 5 years.

Women and Child focuses: the project by its nature targets specifically women at rural areas. The individual questionnaire, the FGD at all levels surprisingly explained that the project major strength is its focus on women particularly these under lower income level. The data from DWCWO, DWMEO, and WVEYGADP explained that one of the major project criteria to join the project is the women should be economically low class/the poorest of poor. Since the rural children are mainly passing their time for the long period of time the fuel saving, time, reduction in smoke and other social benefits address children.

Contribution for women Empowerment and Child well being

Education and Training: the secondary date from WVEYGADP showed that for the past three years about 300 women have got training on EECS importance and utilization, Bookkeeping and financial management, enterprise development and business making and managing group for various purposes.

Decision making, Participation and Exercising Leadership: The survey result showed that 47(62.7%) and 8(10.7 %) of the respondents agreed that EECU enhanced access for decision making and participation and exercising leadership respectively in different forms.

Social Networking and Interaction: around half of the respondents 46(61.3%) of the respond repents clearly replied that the introduction and utilization of contributed for increasing the social networking of the women within their villages and out of their villages. These interactions include continuous monthly meetings, discussion of the cooperative cases, working in group such as their offices, distribution of stoves, collection of monthly payments, managing of other cases as well issues related to their group.

Access to improved technologies and resources: more than 17(22%) of the respondents replied that the EECSU has contributed for access for improved technologies particularly different types of stoves for women, availability of separate offices and materials in the Kebele for the women. Based on the data from the WVE about four kinds of stoves distribute which are traditionally believed the wealth and ownership of the women.

Organization, Capital formation and asset creation: The survey showed significant number of respondents 55(73.3%)) and 43(57.3%) respond that EECSU contribute for organization and strengthening of women and capital formation respectively. One of the important criteria to be

the user EECS is to be organized into cooperative (saving and credit) in the case of Yaya Gulele District. Based on the data from WDCPO 8 organized groups of women have about 15,000 USD (which is equivalent to 300,000 Ethiopian Birr)

Education Improvement in children from a total of 75 respondents 43(67.2%) replied EECSU have contribute for child well-being in terms of Educational improvements. The FGD at all level revealed that the primary responsible for fuel wood collection and preparation next two women are children. The EECSU reduced the amount of fuel wood utilization and hence frequency of fuel wood collection and preparation and hence allowed children to spend their time in school and studies. Besides, the saved time and money due to the EECSU used by the parents to care for children related to education and purchase of educational materials and supports.

Access to needs and Services: children require high access to various basic and psychological needs directly from their families. The result showed that 44(68.8%) of the respondents replied that EECS utilization enhanced access to basic needs and services for children. The FGD at all levels revealed that these needs include child care and management from their parents, nutritional need, health need and psychological needs. The families are using the saved time and money for childes care and management, health support and follow-up to improve their psychology.

4.4.2 Major Weakness of the project

It was so difficult to assess the weakness of the propjet from the FGD and the Householder questionnaires. Here few are explained mainly from the FGDs particularly Government and WVEYGADP staffs

Project collaboration with other projects: The project needs to be implemented by collaboration of all stakeholders' practically government line offices. But, the collaboration among staffs no offices is very low

Integration with other projects: the issue of the environment calls all sector offices to integrate their activities for example the health part with health office activities, the fuel part with energy offices and the likes but it lacks complete integration with other projects.

Integration with WVE projects: WVEYGADP has five other project name education, health, and food security, HIV/AIDs, sponsorship and construction projects. The integration on of this EECSP with all the mentioned projects is observed very low.

Low monitoring and evaluation: The EECU should be monitored and evaluated periodically to see whether the women are using the stoves periodically or not because this will affect the future carbon credit. Though this is the very critical activity but the implementation observed very low,

Chapter V

Findings of the Study and Discussions

5.1 Major Socio-economic Benefits of EECS for Women and Children

ICS have fuel saving ranges over 50 % and 60% in fuel expenditure and (42-45%) that less time required for cooking food using ICS compared to tradition on the specific location(Dey, Ali and miller,GIZ,2007,GIZ,2008).According to the research a saving of 28 % % for EEECS (Injera and Tikikil) recorded by the respondent. The law saving from both studies is due to low adoption of the respondents, late introduction of Mirt stoves to the target areas and high cow dung and unsuitable kind of stove uses.

For domestic cooking only, the 10-16% saving of their income and 50 % of the fuel saving have is highly significant in alleviating poverty and enabling poor people to afford to cook their staple food. (DFID,2000;WVEKPT,2009 GIZ,2008).The research result showed that saving of about 12 % of their income and 28 % of fuel wood both are lower than the previous researches due to nature fuel, fuel type utilization and access , frequency of cooking and their adoption level.

The current research and the previous literature the health findings are almost similar. Most benefits of health includes reduction in smoke, reduction in IAP, improves safety and protection (both children and Mothers). The major benefits these perceived by respondents fits with the previous researches are reduction in smoke, emission reduction, safety in terms of reduction in accidental burns/risk of burns, reduced smoke in the kitchen, reduction in particulate matter due

to closed nature of stoves particularly Mirt).The survey showed most of the respondents replied that effective utilization of has contributed on health improvements. From total of 75 respondents 48(10.9 %) and 47 (10.7%) of the respondents believes EECSU enhanced personal hygiene and environmental sanitation and improved protection from hazards.

5.2 Major Challenges of EECSU for women and children

According to Sakar, Akter and Rahman, 2006, Fifty-four percent of the users were completely satisfied with ICS and they did not face any difficulty in using ICS. A partial satisfaction among the remaining (46%) of the households was found in the study. They faced a little bit difficulty in using ICS such as lack of opportunity to spend time to do other familial works during cooking especially with portable ICS with grate; all kinds of biomass fuel cannot be used in ICS, and sometimes fuel not easily available. According to this study the same result expressed. From a total respondents about 56(81.2%) of the householders using cow dung for fuel followed by 46(66.7%) wood and 17(24.6 %) of crop residues, lives and twigs for as food preparation, lighting and heat. The fuel wood collection and preparation is the primary responsibility of the 48 %, 38.5 % and 13.5 % for women, children and men respectively. The filed observation in some of the respondents showed that most of the households have many hips of cow dung in their kitchen for the stock for fuel wood. In some households the cow dung are forming many hips long belts that showing the dominance of cow dung in the project area. According to Joseph (1981), many times, the improved cook stove designs are found to be incompatible with traditional ways of cooking. For example, any change required in the posture of the cook while cooking may not be accepted. The current study research in the same manner also explained that the stoves are reducing fuel, time for collection and safety but some of the respondents were not use the stoves frequently due to three reasons. The first that choice fuel wood only for ICS, the

low awareness and satisfaction level and the third is that the gate for wood are very small comparatively which put some extra pressure on children and women for preparation of fuels such as preparation large wood into small pieces to make good for stoves.

5.3 Women Empowerment and Child wellbeing

In fact there are number of EECSU benefits for women empowerment and child wellbeing including health, economic, reduction in labor, improved personal hygiene and environmental health safety and protection all contributing to women empowerment.

According to Dey, Ali and miller 2012, Ten percent of the women were the members of women's cooperative societies and most of them (84.5%) attended meetings organized by any organization. Nearly half of the women attended one to two meetings, around one-fifth three meetings, and above one-fourth more than five meetings in a month, the respondents reported a number of reasons for changing old stove. Some of these were difficulty in maintenance and more time required for cooking. Besides, difficulty of using in rainy season, higher soot production and broken of old stove were some other reasons for using ICS. In view of decision for buying ICS, women were found to be the main decision-makers (74%). Besides, women and their husbands jointly took decision to buy ICS in 13.1% cases. However, regarding perception on ICS about two-third of the husbands opined that the stove would mainly reduce fuel cost. Nearly half of the female respondents reported that they discussed with their husbands for formulating any decision for the family. However, about 88% of the female respondents reported that they had to ask their husbands before buying any tinting. According to this study from a total of 75 respondents 52 replied agreed or strongly agree where us the remaining discarded and undecided. Out of total respondents 55(73.3%), 52(69.3%), 47(14.1%) and 46(13.8%) respond

that EECS utilization contributed for Organization and strengthening (working in groups, social interaction, etc.), health improvements, decision making and participation, social networking and interaction. Besides, the intervention has contributed for child well being directly and indirectly. Directly it has been improving access to education, reduction in workloads (fuel wood collection and preparation) and schooling, safety and protection. Indirectly by saving time, reduction family expenses so that parents taking care for children.

Chapter VI

Conclusion and Recommendations

6.1 Conclusion

- EECSU have socio-economic benefits for women and children that ranges from fuel wood expenses reduction to women organization and capacity bulling. The benefits includes Fuel saving, time saving, fuel wood collection, reduction in smoke, reduction in work load pressure, and improvements in safety and protection.
- Despite the benefits for women and children there challenges related to EECU that hindering the benefits for women and children ranging from community stockholders level. The major one are community awareness on the benefits of EECS, lack of appropriate utilization of EECS, Fuel wood type and mode of collection and acquisition, low monitoring and evaluation.
- The EECS utilization has contributing for women empowerment and Child wellbeing in terms of health improvement, safety and protection, reduction in smoke, reduced air pollution, personal hygiene and environmental sanitation, reduction in IAP),group formation and organization, decision making , social interaction and capacity buildings.
- The project has major strengths like focusing on global concern (addressing the impact of climate change), focuses in women and children and opens opportunity for women empowerment and child wellbeing through community organization and improving saving culture.

- ❖ The major weakness of the project includes lack of collaboration, working with integrations of other project within GO and implementing NGO and low monitoring and evaluation of the project by the stakeholders to maximize the benefits for women and children.

6.2 Recommendation

- ❖ EECSU have various benefits for women and children that are limited in number as well as concepts but the benefits should go beyond the current thought as well as the practice. Hence, it is recommended that all the partners (the women, the NGOs, and GOs) should work in collaboration to boost the benefit from EECS utilization in holistic manner including their social, economical, psychological, moral and other issues in terms of women empowerment and child -well being issues.
- ❖ Despite a number of socio-economic benefits of EECSU have various challenges. The major challenges of the households for not adopting and utilization of the stoves are related to awareness, access for fuel wood, inappropriate design of stoves for traditional meal preparation and lack of commitment and integration among stakeholders for implementation of the project. Hence, it is recommended to prepare mass awareness and educations on benefits of EECS benefits, developing individual and communal nurseries for increasing access to fuel wood, promote men to engage in household chores and develop workshops that will boost the stakeholders to work together particularly in the project monitoring and supervision.
- ❖ Many of the literatures and the current study focusing on the socioeconomic benefits of the EECS and related matters. Therefore, it is essential to conduct research specifically on the contribution of EECS for Women Empowerment and Child Well Being because

these two groups are suffering most in the world in chores related to fuel wood collection and food preparation.

- Most of the project activities particularly community awareness creation, community organization are requires details of social work practices. Hence, it is mandatory to enhance the knowledge of staffs (GOs and the NGO) on case work, group work, community organization mobilization and associated skills to conduct the project activities in professional manner so that bring the desired benefits from the project for women and children in particular the whole community in general.

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Appendices

Appendix: A

Objective of the survey

The basic objective of the survey is to collect information from the community on the benefits, challenges of EECSU for community particularly.

Dear Respondent:

This questionnaire has a research purpose. The outcome of this research will help to promote efficient ways of implementing EECS project for further benefiting the community particularly . Therefore, I kindly request your cooperation by responding your usual genuine information for my questionnaire. I confirm you that all data will be treated confidentially and only aggregate and average information will be published for research and other purposes.

No	Questionnaires
I	**Personal Background**
1	Name of the respondents : _____
2	Sex:_____
3	Age: _____
4	Sex
4.1	Male
4.2	Female
5	Marital status
5.1	Married
5.2	Un married
5.3	Divorced
5.4	Separated(other of divorce)
6	Please , indicate number of households living in the house hold _____(Total number)
6.1	Children 0 -14 year's _____ (Write number)
6.2	Males 15+ year's _____ (Write number)
6.3	Females 15+ years _____ (Write number)
7	Educational level
7.1	Illiterate
7.2	Primary 1-4
7.3	Secondary 5-8
7.4	Secondary 9-10
7.5	Tertiary 11-12
7.6	Certificate

7.7 Diploma
7.8 Degree
8 Occupation
8.1 Farmer (Smallholder), Indicate size of landholding (ha)
8.2 Salary/Wage Employment (Civil Service, NGO, …etc)
8.3 Self-employed (Merchant, Mason, Carpenter, … etc)
8.4 Petty Trade (Market stall, grain, food stuff, local liquor)
8.5 Casual Labor
8.6 Unemployed /_____/
8.7 Other (specify) _____
9 Household income per month in birr:_____

II Benefits of EECSU for women and Children

10 Have you taken trainings related to EECSP project in the past three years?
10.1 Yes
10.2 No
11 Your answer for question 10 is 'yes' Which of the following trainings/topics you attended so far?
11.1 Health (family planning ,personal hygiene, maternal health, HIV/AIDS, etc
11.2 Environmental (SWC, Climate changes, Benefits of stoves)
11.3 Education (child education, women education,
11.4 Agricultural related(crop/livestock production, organic farming,)
11.5 Income generating and business development
11.6 Improved technologies (agricultural, environmental, etc)
11.7 Other(specify):_____
12 Do you believe that Climate change affects the lives of community mainly children and women?
12.1 Strongly agree
12.2 Agree
12.3 Disagree
12.4 Strongly disagree
13 Do you believe that EECS have contribution for reduction of climate change effects?
13.1 Strongly agree
13.2 Agree
13.3 Disagree
13.4 Strongly disagree
14 If your answer for question 13 strongly agree or agree what are the contribution?
14.1 Reduced deforestation
14.2 Reduces Cow dung utilization(Methane Emissions)
14.3 Reduction in Fuel wood utilization(carbon dioxide emission reduced)
14.4 Other(specify):_____
15 Do you believe that EECSU have Socio-economic benefits for women and children?
15.1 Strongly agree
15.2 Agree
15.3 Disagree
15.4 Strongly disagree

16 If your answer for question for 15 strongly agree or agree what are these benefits?

16.1 Reduced smoke

16.2 Reduced fuel utilization

16.3 Reduced Household expenses

16.4 Time saving

16.5 Safety and protection

16.6 Personal hygiene and Environmental sanitation

16.7 Improved in social interaction

16.8 Improved leadership

16.9 EECS access to new technologies

16.10 EECS enhanced Knowledge/capacity of women(Enviroment,climate change,EECS,etc)

16.11 Other(specify):_____

17 How much fuel you were using before the introduction of EECS for your house hold consumption in birr /month?_____

18 How much fuel you are using after the introduction EECS for your house hold consumption in birr/month?_____

_____

19 For what purpose you are using the money saved due to EECSU?

19.1 Family food purchase

19.2 Family /Child medication

19.3 Child education

19.4 Family Clothes

19.5 Family asset Purchases(Livestocks,etc)

19.6 CBOs contribution(Idir, Eqauib, SHG, etc)

19.7 Other (specify):_____

20 How much time you were using for all fuel related collection and preparation per week before the introduction of EECS?

_____

21 How much time you were using for all fuel related collection and preparation per week after the introduction EECS?

_____

22 For what purposes do you use the saved time due EECSU?

22.1 Child care and rearing

22.2 Good rust in home

22.3 Working other businesses

22.4 Marketing and purchasing

22.5 Agricultural activities

22.6 Social interaction and meetings

22.7 Other(specify):_____

23 What are the likely damages/hazards you were exercising before the introduction of EECS?

23.1 Burning of the materials(like Mesobe , Sefed , plastic materials ,etc)

23.2 Burning of Clothes and assests (Dresses, jackets, Trouser; crops,etc)

23.3 Burning of body(like hands ,foots ,faces, etc) children and adults

23.4 Burning of assets (Animals,house,etc)) adults

23.5 Other specify:_____

23.6 No hazards

24 What are the likely damages/hazards you were exercising after the introduction of EECS?

24.1 Burning of the materials(like Mesobe , Sefed , plastic materials ,etc)

24.2 Burning of Clothes and assests (Dresses, jackets, Trouser; crops,etc)

24.3 Burning of body(like hands ,foots ,faces, etc) children and adults

24.4 Burning of assets (Animals,house,etc)) adults

24.5 Other specify:_____

24.6 No hazards

III Challenges Related to EECSU for Women and Children

25 What are the challenges of associated with EECS for Women and Children at various level?

25.1 Knowledge and awareness of the community

25.2 Experience of the community on access and utilization of EECS:

25.3 The attitude of the community towards NGO projects

25.4 Low adoption and utilization

25.5 Fuel wood type and collection responsibilities

25.6 Additional technologies like solar and electricity for Children

25.7 Low support from stakeholders

25.8 Education level Cooperative management leaders

25.9 The commitment of the cooperative leaders:

26.10 Capacity and experience of the women Leader managing a group

26.11 monthly contribution/cancellation

26.12 Creation of job opportunity and income for the members

26.13 Commitment on project implementation

26.14 sustaibale plan and vision

26.15 Providing intensives and appropriate trainings for women

26.16 Monitoring and evaluation of the projects

26.17 other(specify):_____

27 What are the major types of fuels do you use s for cooking food?

27.1 Fuel wood

27.2 Cow dung

27.3 Crop residue

27.4 Kerosene

27.5 Others(specify):_____

28 Who is taking the responsibility of the fuel wood collection and preparation in ranks?

28.1 Women

28.2 Men

28.3 Children

28.4 Other(specify)_____

29 What are the light sources for your families (children to read at night, to play and enjoy in the night)

29.1 wood,cowdung,.crop residue.

29.2 Kerosine,etc

29.3 solar technologies)

29.4 Electricity

30 Which of the following fields do you have in your home/ garden?
30.1 Compost
30.2 Biogas filed
30.3 Nursery site
30.4 Irrigation filed
30.5 Dairy Farm
30.6 Solar technologies
30.7 I have no any of the above
31 If you don't have compost/biogas filed how you manage your extra manure?
31.1 Preparation and Selling of the dung cakes
31.2 Storing in the filed for Rainy season
31.3 Compost for Organic Fertilization
31.4 Removing as a waste
31.6 Other(specify):_____
32 Do you believe that Your husband knows well about stove benefit for the family?
32.1 Strongly agree
32.2 Agree
32.3 Disagree
32.4 Strongly disagree
33 If you answer in number '32' is stongle agree or agree in what activities he is helping you?
33.1 Wood Collection and preparation
33.2 Stoves monthly payments
33.3 Stove carrying and Installation
33.4 Directly in cooking
33.5 Other (specify):_____
34 Which of the nurseries sources you have access for seedling and plantation
34.1 Individual managed by the HH
34.2 Communal (Manage by the community)
34.3 Communal (Managed by Government)
34.4 No nurseries
35 Does the government staffs (health extensions, development agents, etc) are visiting and teaching you about the project benefits and awareness in line with their normal works in the Kebele.
35.1 Always
35.2 Some times
35.3 Never
36 Who are visiting, following, and monitoring your EECSU progress?
36.1 Cooperative leaders alone
36.2 Government staffs alone
36.3 NGO staffs alone
36.4 Cooperative leaders with GO and NGO staffs
36.5 GO and NGO staffs
36.6 I had ever visited

IV Women Empowerment and Improvement in Child well being

37 Do you believe that the introduction of stove utilization contributed to women empowerment?

37.1 Strongly Agree
37.2 Agree
37.3 Disagree
37.4 Strongly Disagree
38 If your answer for question '37' strongly agree or agree for which of the following it contributing?
38.1 Education and Training (Enhanced Knowledge and capacity)
38.2 Health improvements
38.3 Decision making and participation
38.4 Social networking and Interaction
38.5 Access and control over resources
38.6 Access and control over resources
38.7 Exercising leadership
38.8 Enterprise development and market creation
38.9 Other(specify):_____
39 Do you believe that the introduction of improves stoves contribute to improvement in child well-being.
39.1 Strongly Agree
39.2 Agree
39.3 Disagree
39.4 Strongly Disagree
40 If your answer for question '39' strongly agree or agree explain how it contributed for improvement in terms of the following components.\
40.1 Contribution for Education and Schooling
40.2 Health improvements
40.3 Access to basic needs and services
40.4 Improvement in treatment and care
40.5 Safety and protection including reduction in labor exploitation
40.6 Psychological satisfaction
40.7 Other(specify)

Appendix: B Interview Guide Protocol

What are your fuel sources for EECS?(cow dung, fuel wood, others)

How do you obtain fuel wood from your area?(Collection freely, purchasing, etc)

Who is collecting and preparing fuel wood?

What are the benefits your family having from EECSU?

Would you explain the benefits of EECSU particularly for you and your children?

Would you tell the challenges you/your children are exercising while using EECS? Safety, fuel wood availability, etc

Have you exercising burning of body or other hazards using EECS?

What are the benefits your are getting from engaging in EECS? Other than health and economic benefits

Does your husband helping you in fuel wood collection and preparation?

Who were monitoring your stove utilization? GOs, NGOs, cooperative leaders, etc

Appendix: C FGD Schedules

Do you know what climate change is?

Would you please explain the climate changes through time in your area?

What are the impacts of climate change on women and children?

What are your the EECCS project contribution for climate change

Would you explain the socio-economic benefits of EECS utilization for women?

Would you explain the socio-economic benefits of EECS utilization for Children?

Would you explain the socio-economic benefits of EECS utilization for community?

Would you explain the challenges of EECSU for at community level?

Would you explain the challenges of EECSU for Beneficiary level?

What are the strengths of the EECS project in terms of addressing women and Children benefits?

What are the weaknesses of EECS the project in terms of addressing women children benefit?

Would you explain the major strength of the project?

Would you explain the major weakness of the project?

Appendix: D Observation Schedule

What are the fuel types, mode of acquisition and utilization mechanisms?

What are the households' kitchen situations look like and kitchen arrangements?

What hat are the fuels types the households utilizing (amount and types)?

How kitchen situation of the households and the level of smokes in the kitchen?

What are the good features of EECS during utilization?

What are the features of EECS challenging women and children during utilization?

how the kitchen settlements are arranges to avoided the burden on women and children

How much the levels smoke in the kitchen and its effect on women and children?

How the households managing the manure in the field?

Appendix: E Documentary Analysis Template

How much EECS users in the area?

What are different reports in relation to EECS?

What are previous intervention and its benefits for targets in the study areas?

What are the contributions of women in the cooperatives in the groups?

How the women are managing the Book keeping and other cooperatives issues?

How you are working as stakeholders for the project success?

What are the project monitoring and evaluation reports?

What Women monthly contribution and financial status of the cooperatives?

What are the contribution of the women cooperatives and status of bookkeeping's?