Mirt Promotion Billboard, Assela Town

Typical Logs of Hard Wood in Mekelle

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FINAL REPORT

Impact Assessment of Mirt Improved Biomass Injera Stoves Commercialization In Tigray, Amhara and Oromiya National Regional States

Submitted to:

The MoARD/GTZ SUN Energy Programme

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Table of Contents

ACRONYMS

ALRI	Acute Lower Respiratory Infections
BLT	Branches, leaves and twigs
CBOS	Community Based Organizations
CCT	Controlled Cooking Test
CEINFMP	Cooking Efficiency Improvement and New Fuels Marketing Project
DALY	Disability-Adjusted Life Year
COPD	Chronic Obstructive Pulmonary Disease
DAs	Development Agents
DFID	Department for International Development
DGIS	Dutch International Development Cooperation
EEA	Ethiopian Energy Authority
EREDPC	Ethiopian Rural Energy Development and Promotion Center
ETB	Ethiopian Birr
GoE	Government of Ethiopia
GTZ	German Technical Cooperation
HHE	Household Energy
IAP	Indoor Air Pollution
KPT	Kitchen Performance Test
MDGs	Millennium Development Goals
MFIs	Micro Finance Institutions
MME	Ministry of Mines and Energy
MoA	Ministry of Agriculture
MoARD	Ministry of Agriculture and Rural Development
NGOs	Non-Governmental Organizations
ODA	Overseas Development Agency
PNR	Protection of Natural Resources
SF	Shell Foundation
SNNP	Southern Nations Nationalities and Peoples
SUN	Sustainable Utilization of Natural Resources

EXECUTIVE SUMMARY

GTZ, under the auspices of the Ministry of Agriculture, has started the Household Energy/ Protection of Natural Resource (HHE/PNR) Project in 1998. The Project adopted a commercial approach for wide scale dissemination of 'Mirt' stove, an improved biomass Injera baking stove, in four regions in Ethiopia including Amhara, Oromia, Southern Nations, Nationalities and Peoples (SNNP) and Tigray Regional states. The Project continued until now under three consecutive phases with finances obtained from various sources.

Various Phases of the Project

The first phase of the Project, Household Energy and Protection of Natural Resources (HHE/PNR), was fully financed by GTZ anticipating that wide scale dissemination of the stove would bring a positive impact towards the environment through efficient utilization of the natural resources. Implementation of this project was started in 1998 and continued until 2003. During this period had covered several Woredas in Amhara, Oromia and SNNP Regional states. Activities of the project were held back in Tigray region until the security situation created by the Ethio-Eritrean border conflict was improved. The second phase of the project was financially supported by the Shell Foundation and implemented between February 2004 andJune 2006. Of the multifaceted benefits of Mirt stove, reduction of indoor-air-pollution (IAP) was the aspect that captured the attention of the Shell Foundation. During this phase, only Tigray Region was covered, perhaps to compensate for the time lost during the border conflict with Eritrea. The third phase of the project was started in February 2006. This phase of the project is being financed by Directorate General for International Development (DGIS) of The Ministry of Foreign Affairs of the Netherlands. The intention of DGIS is to assist the efforts towards the achievement of the Millennium Development Goals (MDGs) through supporting initiatives with proven potential to reduce poverty through improving access to modern energy.

The project therefore, has several anticipated outputs which have been designed to bring various beneficial socioeconomic and environmental impacts. Thus, this study was initiated to assess the impacts of the project - sustainable livelihood impacts on stove producers and users, assess effectiveness of various promotional and marketing tools adopted by the project.

Although the third phase of the project is still underway, it is believed that the project has been operating for a time long enough to bring about

anticipated outcomes and hence warrant this impact assessment study. Conducting the impact assessment before the completion of the project will have an additional advantage in that findings of the study could be used to tune project activities in a more optimal and sustainable manner.

Methodology

The study methodology was designed in such a way that both primary and secondary sources of data were used to assess the project impacts. Results Chain method was used to carefully identify the anticipated impacts of the project – tracing towards the project's impacts going through the project cycle including project inputs, activities, outputs and indicators to direct and indirect impacts. Quantitative methods with sample surveys were applied to assess the impacts on consumers and producers. Stakeholders assessment and detailed case studies on selected producers were conducted as part of the qualitative assessment for in-depth study and understanding of impacts on producers and stakeholders. The quantitative and qualitative assessments were conducted in three towns and surrounding rural households in each region (Amhara, Oromia and Tigray). A total number of 613 household consumers and 34 stove producers were covered in all three regions. Rural consumers account 12% of the total consumers surveyed.

Project Outputs

The project to-date trained 370 Mirt stove producers in 230 town in four regions including Amhara, Oromia, SNNP, and Tigray. So far, a total number of 170,000 Mirt stoves are sold. This has been supported by intensive awareness raising, sensitization and market promotion campaigns. Institutional strengthening and capacity building to some partner organization were activities that have been held in parallel by the Project.

Of the total number of households surveyed, on average 63% of them were using Openfire stove before they were using Mirt stove. Surveyed households that used to use Openfire stove were higher in Amhara and Oromia Regions with 89% and 96% respectively; while in Tigray it was only 2.5% as most of the households, 86% were using the traditional enclosed stove.

About 5% of the households surveyed are not currently using their Mirt stove for various reasons such as "broken stove", "prefer electric Mitad", "change of residence". Nearly 90% of the households that reported that they have given up their Mirt stoves are in Tigray region.

Impacts of Mirt on Consumers

Fuel saving and Income

Mirt stove on fuel saving has been perceived and appreciated by 85% of consumers as one of the most important characteristics of the stove. Well over 80% of the consumers who responded positively to the fuel saving characteristic of Mirt, estimated that a fuel saving of over 50% is achieved. It is also important to note that significant number of households in Tigray region have faced difficulties in adopting Mirt. Field observations indicated that this problem is mainly due to the door size of Mirt which is not suited to the type of firewood typical to that region.

The implication of reduction in fuelwood 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 fuelwood and hence the price variation. For the poorer bottom of households whose monthly income is less than ETB 500, the savings are about 10% of their monthly income.

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.

Financial savings of Mirt is greater on commercial consumers who use Mirt for baking injera for sales as they more frequently use the stove. On average the saving for commercial consumers is about ETB 60 per month.

Fuel saving and time

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. 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. Maximum time saving is reported in Tigray while the minimum is in Amhara region.

The time saved from collection of firewood due to Mirt has been used to meet domestic chores, entertainment (coffee time with neighbors and friends), look after kids and businesses.

Health and other related impacts

Another important benefit of Mirt appreciated by consumers is the health and other related benefits such as reduced drudgery, cleaner cooking space and cleaner Injera. Most appreciated health related benefits reported by consumers is protection from smoke and heat, followed by improved eye health and redued risk of fire hazards.

Impacts of Mirt on Producers

In the three regions namely Amhara, Oromia and Tigray, the project set up and supported the establishment a total of 339 Mirt stove production entepreneurs. Of the this total number of project-supported producers 36% are women. A total number of 126,377 Mirt stoves were recorded to have been sold in all the three regions. Sales records indicate that 22%, 48%, 30% were sold in Amhara, Oromia and Tigray Regions respectively.

Mirt stove business is characterized by producers who are mainly informal with small scale production which is largely operated by family labour. It has been a little over 10 year since Mirt business was started as a commercial operation and yet only very few producers have formally registered and evolved into large scale production of the stove. Mirt business for some producers is the only source of livelihood while it serves only as a supplementary source of income for others.. The benefits of Mirt business and its impact on producers are directly related to the producers' degree of dedication to the business and volume of sales achieved by each producer.

The analysis of the study on 34 producers (10% of total number of producers) indicated that 65% of them were unemployed before they joined Mirt business. Ninety percent of producers interviewed reported that their income has improved significantly after they joined the Mirt business. Furthermore, analysis stove sales records indicated that 3% of the producers are earning incomes as high as over ETB 16,000 per annum, while another 8% of them are earn incomes ranging between ETB 8,000 and ETB 16,000. The majority, 60% of producers, were earning income of less than ETB 2,000 per annum.

Technical and business skills acquired by producers because of their involvement in the business has been highly valued and appreciated by almost all producers as a key beneficial impact. Various technical and business management skill provided by the project and experiences gained as a result of running Mirt business have indeed developed their entrepreneur skills.

Housing conditions for 38% of producers have improved. The majority of them have purchased or built new houses, while the rest have managed

to rent better houses with incomes obtained from Mirt business. Mirt business has also impacted producers livelihood positively in a number of ways.

Ownership of assets (35%), food intake (80%), able to support extended families (68%), afford medical expenses (over 30%), improved ability to pay school fees (76%), improved credit worthiness (62%).

Cost-effective of Promotion Tools

Out of the total cumulative sales of Mirt stove since the start of the project, 53% of the sales has taken place in 2005 and 2006. This was the Shell Foundation phase of the project where intensive promotion compaigns were conducted and a great number of producers were trained in Tigray. The remarkable boost in stove sales in Tigray during those years is attributable to the coupon-based subsidy system. The sudden drop of sales figure in the subsequent years following the escalation in raw material price and later the temporary discontinuation of the coupon system indicates that the coupon-based subsidy has not actually helped the real market to grow and expand in a self-sustaining manner. Despite similar trends in the price of raw materials, Mirt business in Amhara and Oromia regions was doing well without any form of subsidy. The project has learned lessons from Tigray that consumers' subsidy distorts the real market prices. Similar subsidy was initiated in late 2007 in Amhara and Oromia. In order to mitigate the adverse impacts of consumer subsidy on actual market prices, consumers in these two regions were being told that the subsidy will be there only for a short period of time. However, the study Team strongly believes that subsidizing consumer prices does more harm than good to the Mirt market, and hence, it should be terminated as quickly as possible. Resources should rather be shifted to consolidation of achievements in adopting commercial strategy. These may include various technical business management support and vigorous market promotion adopting selected cost-effective promotion tools and methods.

Selection of the type of promotion tools can be seen from two perspectives – wider geographic coverage for awareness creation and effectiveness in influencing customers to make purchase decisions. On top of these, their appropriateness for urban and rural consumers should also be carefully seen.

For urban areas TV ads, radio commercials, posters and billboards have high geographic coverage and are very important promotion tools to create awareness. In terms of influencing purchase decision TV ads (specially animated Mirt) is very effective in urban areas. Radio

commercials are effective tools to create awareness in rural areas as most rural dwellers do own radios. Since they are only audio, the effectiveness in terms of influencing customers to make purchase decision is rather low. Posters come to the second place in reaching wider rural population as they can be easily distributed to more rural public centers. Public cooking demonstrations even though their coverage is highly limited and localized are very effective in convincing customers to make purchase decisions. The analysis of the survey indicates that 85% of customers who have watched cooking demos were actually influenced by them to make their decisions for the purchasing of their stove.

Institutional Issues

The roles and responsibilities of partner government institutions is believed to be clarified after the completion of the Business Process Re-engineering that is currently under way in government institutions at Federal and Regional levels. The SUN Energy Project should be more transparent and involve partners more actively particularly in planning and budgeting aspects of the project. Additional capacity building initiatives should be carried out to strengthen the staff of partner organizations at Woreda level.

1. INTRODUCTION

1.1 The Ethiopian Household Energy Landscape

Household energy is one of the most important issues in the energy sector in particular and the Ethiopian economy in general. The household energy sub sector is not only the major consumer of energy (89%), but also household energy demand for cooking is met almost entirely by traditional or biomass fuels (99%) such as wood, branches/leaves/twigs (blt), charcoal, agricultural residues and animal waste. Biomass fuels also contribute an overwhelming share of 96% to the national energy balance. Surprisingly, despite their indispensable role in providing badly needed energy for the growing economy at present, the share of modern energy (electricity and petroleum) is mere 4% of final energy consumption.

Besides, the household energy sub sector is characterized by, among others, extremely wasteful utilization of energy from biomass. The three stone fire with its very low thermal efficiency of only about 10% is ubiquitous, and is used for cooking regularly in almost all rural and many urban households. Even more disappointing is the fact that biomass fuels are not only in short supply, but they are also being supplied from unsustainable natural resource base, exacerbating a vicious cycle of the nexus between poverty and environmental degradation. With increasing scarcity of supplies of biomass fuels, access to energy for cooking has become increasingly difficult for household consumers. According to several studies made in the sector in the past, while urban households were spending significant amounts of their meager financial resources on biomass energy supplies, their rural counterparts were spending several hours each day on collecting firewood.

Ethiopia's current population is estimated at about 80 million and it is growing at about 3% per annum. Studies conducted to estimate woody biomass resources at national level indicated that with demand for firewood already exceeding the sustainable supply levels by several folds, such an unabated population growth can only worsen the already disturbed ecosystems poor natural resource base of the nation in the future. It was on the bases of these alarming facts that the Ethiopian household energy sector started to receive some attention from the government with support from various donors.

1.2 Background: The Genesis and Overview of the Project

Mirt improved biomass Injera stove was first developed by the then Ethiopian Energy Authority (EAA), now Ethiopian Rural Energy Development and Promotion Center (EREDPC), of the Ministry of Mines and Energy (MME) in the first half of the 1990s. The actual designing and testing of Mirt was completed under a World Bank funded Cooking Efficiency Improvement and New Fuels Marketing Project (CEINFMP).

With the termination of the World Bank financial support to the project in March of 1995, Mirt was very close to a "pre-mature" death. The project was salvaged in April of same year, thanks to financial support from the British ODA, now Department for International Development (DFID). During the two years of DFID's financial support, Mirt project accomplished several important tasks including identifying alternative raw materials for stove production, optimizing the stove to accommodate different fuels, producer training and market promotion in a dozen of major urban centers, establishing small revolving fund credit system for producers, and testing and refining the overall commercialization strategies. Stoves sales monitoring records of the DFID-supported phase of the project indicate that, by the end of the project in March 1997, over 15,000 Mirt stoves (nearly 70% in Addis Ababa) were sold completely on non-subsidized commercial basis. By the end of the project (March 1997), there were over 110 trained stove producers and installers and over 30 stove production units set up and running in 16 towns in the four targeted Regions of the country.

Threat to continued survival of Mirt stove project loomed around once again when the DFID supported phase terminated in March 1997; and the government of Ethiopia (GoE) showed neither commitment nor interest in supporting this important project. Although the basic framework and strategy for commercialization of Mirt was tested and put in place, the project lacked the necessary infrastructure that could serve as a springboard to jump-start the commercial process. Thus, despite its enormous potential for commercial success primarily due to its appeal to consumers, chances of self-sustained production and marketing of Mirt were rather gloomy during the second half of the 1997. It was under such circumstances that another project champion emerged and offered to support the project to the fullest extent possible. This time, it was the German Agency for Technical Co-operation (GTZ) that showed interest to support the continuation and scaling up of the project to a number of Regional towns.

Under the auspices of the Ministry of Agriculture (MoA), the Project Household Energy /Protection of Natural Resources (HHE/PNR) started

supporting the processes of commercial dissemination of Mirt stoves in 1998. Ever since then, the project has been, and still is, operating for nine consecutive years, but under different project titles for different phases financed by different donors.

The geographic focus of the first phase of the project, HHE/PNR, were Amhara, Oromia, Tigray and Southern Nations Nationalities and Peoples' (SNNP) National Regional states. This phase of Mirt commercialization project ran for about five years between 1998 and 2003. During this phase, operations of the project in Tigray National Regional state were discontinued shortly after commencement due to security concerns caused by the Ethio-Eritrean border conflict at the time.

The second phase that ran between February 2004 and June 2006 was implemented exclusively in Tigray, perhaps to compensate for time and effort wasted during the Ethio-Eritrean border conflict. Funding for this phase was obtained from the Shell Foundation (SF). While the technology and its strategy of commercialization remained the same, thematic focus of the SF supported phase of Mirt project has been shifted and more emphasis was given to smoke reduction and in-door air pollution (IAP) improving aspects of Mirt stoves project. Thus, the SF-supported phase of the project was focused on the promotion and scaling up of Mirt stove, as a household cooking device with proven potential for reducing IAP during cooking, in Tigray Region.

The third phase of the project, known as GTZ-SUN Energy, commenced in February 2006 and is underway currently. GTZ-SUN Energy is a component of the GTZ Sustainable Utilization of Natural Resources for Improved Food Security Program. It is jointly implemented by the German Agency for Technical Co-operation (GTZ) and Ministry of Agriculture and Rural Development (MoRD) at the federal level. The Bureaus of Agriculture and Rural Development of Amhara, Oromiya and Tigray Regions in general and the Regional Energy Agencies in particular, are the major implementation partners at the regional level.

GTZ-SUN Energy is co-financed by the "Energizing Development" initiative of the Directorate General for International Cooperation (DGIS) of the Ministry of Foreign Affairs of the Netherlands. The overall goal of the DGIS support is to contribute toward the achievement of the Millennium Development Goals (MDGs) through supporting initiatives with proven potential to reduce poverty through improving access to modern energy. Thus, the DGIS supported phase of Mirt stoves project, is aimed at scaling up operations in the two regions to promote the stove and accelerate its market up-take through supporting the establishment of nationwide networks of stove producers and adopting different promotional and marketing tools.

Over the past eight years, the GTZ supported Mirt fuel saving biomass injera stove project has accomplished several activities in regions it has been actively working with on the promotion commercial dissemination of the stoves. First and for most, the project has provided technical and basic business skills training to stove producers and supported and set up over 370 Mirt stove production units in over 230 towns in the four Regions. Secondly, the project has conducted numerous and massive awareness raising, sensitization and market promotion campaigns. Third, the project has also contributed significantly to institutional strengthening and capacity building of some partner organizations at various administrative levels. Fourth, while maintaining its commercial approach to the marketing of the stoves, the project has provided subsidies through issuing coupons to accelerate the market penetration of Mirt stoves. The coupon based subsidy initiative was completed in Tigray in June 2007 and it has just commenced in Amhara and Oromia National Regional states. As a direct output of all of these promotional activities, the SUN Energy project has caused sales of over 126,377 Mirt stoves through commercial channels until end of August 2007. From the outset, the project has adopted a commercial approach to stove dissemination and it has maintained that commercial focus to this date.

1.3 Objectives of the Study

Mirt improved biomass Injera stove commercialization efforts are now almost a decade old and much has been accomplished during that period of time. Efforts so far were focused almost exclusively on commercialization and scaling up the intervention through expanded producers training and extensive awareness raising and marketing campaigns and promotion of the stoves.

Despite all these achievements, however, a proper impact assessment study that helps to look back into the past, self-examine ruthlessly, address short-comings of existing strategies, and draw lessons for the future, was lacking. Therefore, the primary objective of this study is to assess various impacts of Mirt improved stoves commercialization project on various groups and project partners and draw important lessons that could be used to adjust existing strategies and approaches as well as guide similar efforts elsewhere in the future.

The specific objectives of the study are:

- Assess the sustainable livelihood impacts of the project on Mirt stove producers and their families;

- Assess the quantitative and qualitative impacts of Mirt improved biomass Injera stoves on consumers;

- Assess the effectiveness of various marketing and promotion tools adopted by the project in creating awareness, consumer demand and accelerating stoves sales in the SUN Energy intervention Regions.

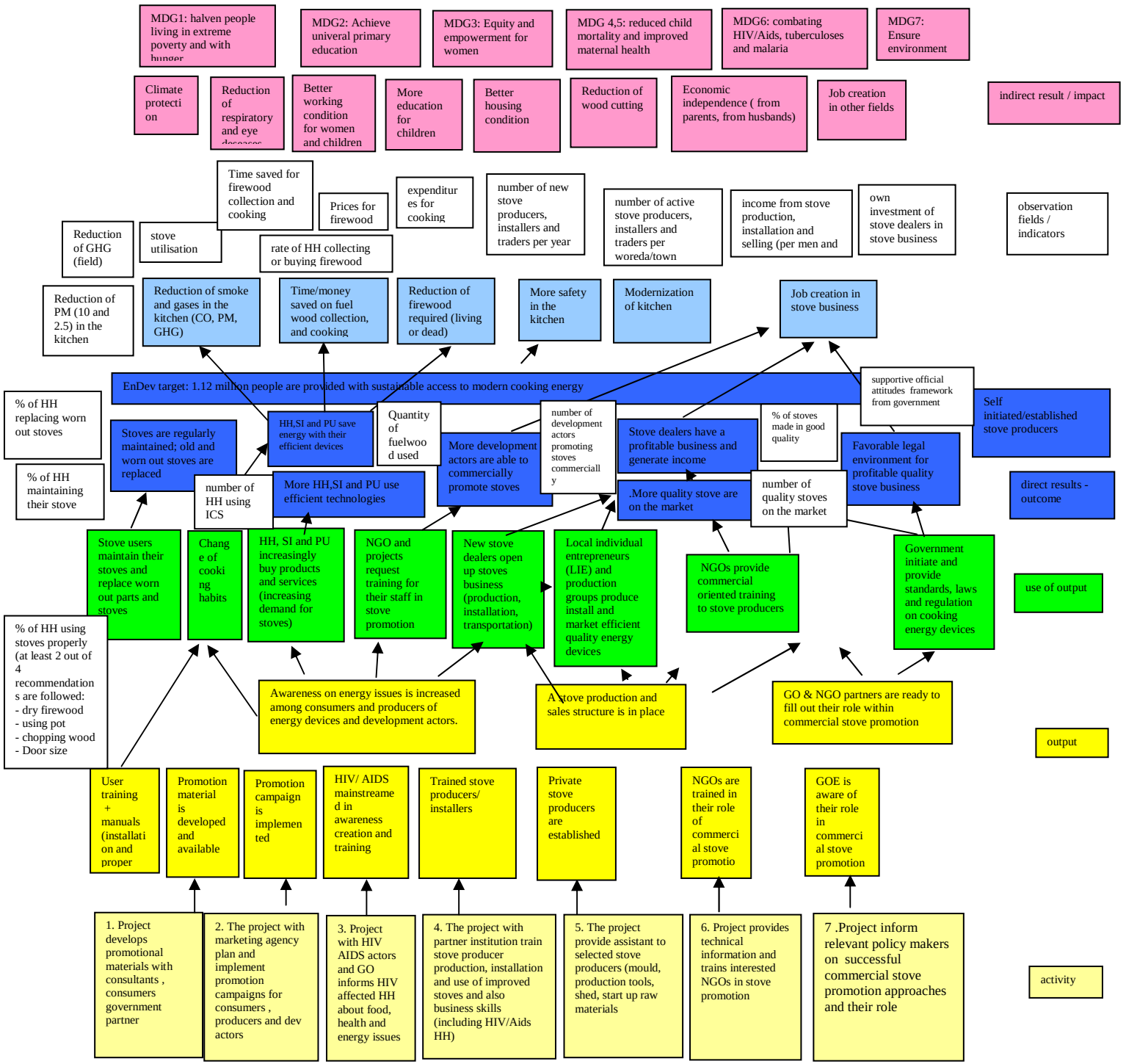
- Assess impacts of the project on various partner organizations at different administrative levels and key stakeholders that have actively participated in the on Mirt promotion; and,

- Based on the findings of the assessment, draw up important conclusions and recommendations that are useful for refining commercialization strategies and marketing and promotion tools currently in use; and lessons for similar initiatives elsewhere in the future.

1.4 The Study Methodology

Various methods of data and information collection were adopted in for this assessment. Results chain which depicts the Project goal towards the anticipated Project impacts was used to develop the tools that were used to assess the direct and indirect impacts of the Project. Both primary and secondary sources of data were used to assess the impacts. Brief description of data collection methods employed for the assessment is presented below.

Fig. 1.1: Results Chain - Ethiopia



1.4.1 Literature Reviews

There existed considerable amount of useful information from literature on household energy in Ethiopia in general and in the three regions covered by this study in particular. Major secondary sources of information including the SUN Energy Project's own electronic databases, various household energy baselines surveys, general household energy needs assessment survey reports, and statistical reports were extensively consulted and used in this study.

1.4.2 Quantitative Sample Surveys

1.4.2.1 Household Consumers Sample Surveys

From the outset, it was decided that in order to achieve maximum variability three towns from each one of the three Regions were included in the study. Selection of the towns in each region was based on certain key criteria including number of stoves sold (high, medium, low), age of project activities (old, medium, new), geographic and agro-ecological distribution within the regions, size of towns (Regional or Zonal capitals), and towns with reasonable amount of Mirt stove sales in rural areas.

Based on stoves sales records kept by producers in their respective locations, survey households were identified and selected using stratified random sampling technique. Key criteria used for stratification were settlement (urban, rural) and geographic distribution of income (wealthier neighborhoods, poorer neighborhoods). The original plan was to interview a minimum of 50 households in nine[1] towns in the three Regions. Thanks to the full-hearted support by Mirt stove producers and relentless effort by local recruited and trained supervisors and enumerators, the number interviews actual made exceeded the plan by 36% and 613 interviews were completed in all the three Regions. Details of the numbers of households interviewed in each Region are summarized in Table 1 below.

[1] Since Goba and Robe towns are close to each other, and more importantly, the study Team had to do producers surveys in both towns, it was decided to conduct household consumer surveys in both towns. In effect, in addition to contributing to increased household consumers' sample size from the initially planned 450 to 613, the number of towns covered in this study also grew from nine to ten.

Table 1: Distribution of Households Surveyed in each Region and Woreda/Town

Woreda/Town	Region			Total	Percent
	Amhara	Oromia	Tigray		
Adigrat			61	61	10%
Alamata			71	71	12%
Ambo		64		64	10%
Asella		53		53	9%
Bahirdar	61			62	10%
Debre Birhan	62			62	10%
Debre Markos	51			51	8%
Goba		52		52	8%
Mekelle			72	72	12%
Robe		66		66	11%
Total	174	235	204	613	100%
Percent	28%	38%	33%	100%	

During the field work, conscious efforts were made to reach out and include as many rural consumers as possible. Out of a total of 613 household consumer interviews conducted, 12% were rural households. While the numbers of rural household interviews completed were significant in Oromia (43 households) and Tigray (28 households), the numbers were very low in Amhara (5 households only). This was mainly due to physical inaccessibility of some of the rural areas where Mirt stoves were sold and negligence on the part of stove producers to keep details of rural sales properly. Usually, rural sales is initiated and takes place indirectly through Development Agents (DAs) and Home Economics experts of the Offices of Agriculture and Rural Development (OARD) at Woreda level.

1.4.2.2 Producers Sample Surveys

The SUN Energy Project maintains an extensive database on all project-supported producers. However, the existing database does not provide information more than physical addresses, commencement dates and figures on numbers of stoves produced and sold by each producer. Therefore, in order to beef-up information from the existing project database and obtain additional in-sights about sustainable livelihood impacts of Mirt businesses on producers and their families, a sample of 34 producers were interviewed in a total of 14 towns. As far as the number of producers interviewed in each Region is concerned, a total of 13, 12, and 9 producers were covered in this study in Amhara, Oromia, and Tigray Regions respectively. The Producers Sample Survey was designed primarily to overlap with Household Consumers Sample Survey towns, i.e., all producers residing in towns where Consumer Sample

Surveys were conducted were included in Producers Sample Surveys automatically. However, 15 producers residing in five other towns were covered in this survey in order to improve on the statistical significance as well as representativeness of the sample.

1.4.3 Qualitative Assessments

1.4.3.1 Producer Case Studies

As a third layer that adds to the in-depth understanding of sustainable livelihood impacts on producers that are attributable to Mirt stoves business, detailed Case Studies were conducted on selected producers. Among key criteria used for selecting producers for Case Studies are sales volumes, gender of producer, age of business, and degree of success or failure in business.

1.4.3.2 Stakeholders Assessment

Over the years, the SUN Energy Project has established a network of relationships with key partners and stakeholders all of which have both contributed to and benefited from the project. Therefore, in order to obtain their views on and experiences with the SUN Energy Project, discussions and interviews were held with key project partners and other stakeholders. These included Ministries, Bureaus and Offices of Agriculture and Rural Development, Mines and Energy at different administrative levels, Non-governmental Organizations (NGOs), UN agencies and other humanitarian and development-oriented organizations.

2. ANALYSES OF SURVEY RESULTS AND DISCUSSION OF IMPACTS ON CONSUMERS

2.1 Socio-economic Characteristics of the Survey Households

A total of 613 household consumers of Mirt stoves were interviewed in the three regions. Out of the total number of households interviewed 31% were female-headed households. Female headed households were the highest in Tigray (50%) followed by Amhara (27%) and Oromia (16%). Details of the headship patterns are summarized in Table 2.1 below.

Table 2.1: Gender of Heads of Households

Gender	Region			Total	Percent
	Amhara	Oromia	Tigray		
Female	47	38	102	187	31%
Male	127	198	101	426	69%
Grand Total	174	236	203	613	100%
% Female	27%	16%	50%	31%	

Nearly one-thirds of the heads of households were under the age of 40 years. Heads of households within the age range of 40 and 59 years constituted well over half (52%) of the total number of heads of households. More senior heads of households over the age of 60 years constituted 15% of the total (Table 2.2 below).

Table 2.2: Age Structure of the Heads of Households

Age Range	Regions			Total	Percent
	Amhara	Oromia	Tigray		
19-29	2	3	18	23	4%
30-39	32	70	70	172	28%
40-49	54	79	48	181	30%
50 -59	52	44	36	132	22%
60+	34	35	23	92	15%
Missing	0	5	8	13	2%
Total	174	236	203	613	100%

As far as the marital status of the heads of households is concerned, 73% were 'married'. Those heads of households who are 'divorced' and 'widowed' constituted 12% and 11% respectively. Only 3% of the heads of the survey households were 'singles' (Table 2.3 below).

Table 2.3: Marital Status of the Heads of Households

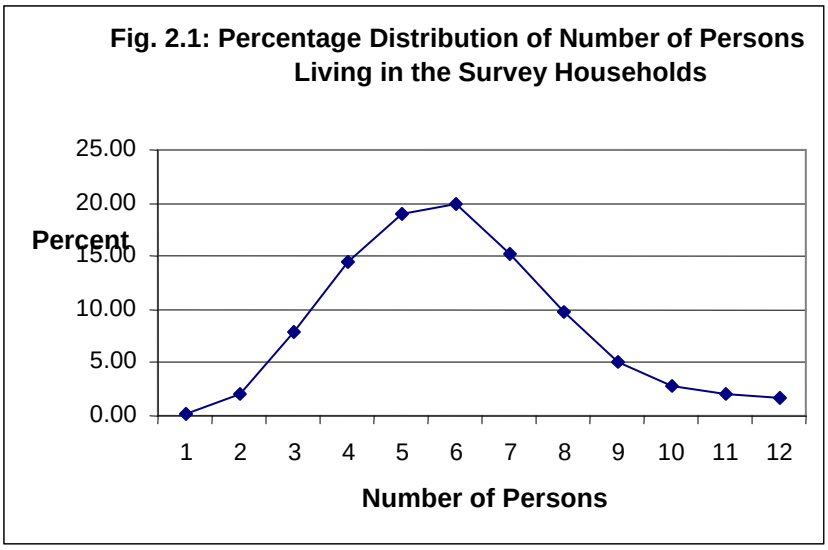
Marital Status	Region			Total	Percent
	Amhara	Oromia	Tigray		
Married	124	195	130	449	73%
Widowed	18	20	36	74	12%
Divorced	27	18	22	67	11%
Single	4	3	12	19	3%
Other	1		3	4	1%
Total	174	236	203	613	100%

Analyses of the household consumers survey results show that while 12% of the heads of households have had no formal education of any sort, 9% of the heads of households have had some form of traditional education. The remaining 79% of the heads of households have attained varying levels of educational qualifications ranging from Elementary School to a University degree and above. Details of educational qualifications of the heads of households surveyed are summarized in Table 2.4 below.

Table 2.4: Levels of Education of the Heads of the Households

Level of Education	Region			Total	Percent
	Amhara	Oromia	Tigray		
No Formal Education	16	14	41	71	12%
Traditional Education	23	17	18	58	9%
Elementary School	25	36	35	96	16%
Junior Secondary School	13	36	30	79	13%
High School	47	85	38	170	28%
Diploma	34	39	26	99	16%
First Degree and Above	15	9	15	39	6%
Missing	1	0	0	1	0%
Total	174	236	203	613	100%

With regard to number of persons living in the households, a total of 3207 persons were living permanently in the 613 households covered in the survey. This gives us an overall average of 5.22 persons per household, a figure pretty much similar with the national average of 5.1 per family. As an indication to relatively large numbers of persons living in the households, Figure 2.1 below shows a normal distribution curve with longer tail at the right hand side of it indicating slightly positively skewed distribution.



Regarding the types of occupations of the heads of households, results of the surveys showed that "civil servants" and "traders" constituted 37% and 25% of the total. While rural farming household heads constituted about 12%, pensioners were 11% of the total heads of households surveyed.

Table 2.5: Types of Occupations of the Heads of Households by Region

Employment	Regions			All	Percent
	Amhara	Oromia	Tigray		
Civil Service	57	105	63	225	36.70
Traders	61	36	58	155	25.29
Farmers	6	44	21	71	11.58
Pension	27	29	14	70	11.42
Daily Laborer	7	9	9	25	4.08
Technician	3	7	4	14	2.28
Manufacture	1	5	7	13	2.12
Unemployed	2	0	11	13	2.12
Other	10	1	12	23	3.75
Missing	0	0	4	4	0.65
Total	**174**	**236**	**203**	**613**	100.00

In spite of the fact that it has always been difficult to obtain accurate information on the amount of cash income households earn within a given period of time, attempts were made in this study to estimate incomes households earn from all possible sources. Accordingly, analyses of the results of the survey showed that households were earning cash income of an average of Etb 879 per month. Monthly

incomes were highest for Amhara region followed by Oromia (Table 2.6 below).

Table 2.6: Monthly Income of Households by Regions

Range of Income	Regions			Grand Total	Percent
	Amhara	Oromia	Tigray		
Missing	0	0	17	17	3%
Less than 150	8	16	30	54	9%
151 to 499	42	83	47	172	28%
500 to 999	51	70	48	169	28%
1000 to 1499	26	30	31	87	14%
1500 to 1999	23	18	14	55	9%
2000 to 2499	16	7	10	33	5%
2500 to 2999	5	6	5	16	3%
3000 and More	3	6	2	11	2%
Valid Observations	174	236	186	596	97%
Total	174	236	203	613	100%
Total Income by all Households	174,741	201,251	147,663	523,655	
Average Monthly Income	1,004	853	794	879	

2.2 Adoption and Utilization of Mirt Stoves

Closer examination of results of the consumer surveys revealed that before they purchased Mirt Injera stove, the majority of households (63%) were using three stone fire distantly followed by traditional enclosed stoves (32%). Only about 6% of the households surveyed were using electric Injera stove prior to Mirt. Perhaps due to sever shortages of firewood in the northern parts of the country, the majority of households using traditional enclosed biomass stoves and electric Injera stoves were in Tigray region (Table 2.7 below).

Table 2.7: Types of Stoves Used for Injera Baking Before Mirt

Types of Stoves	Region			Total	Percent
	Amhara	Oromia	Tigray		
Three Stone Fire	154	227	5	386	63%
Traditional Enclosed	13	4	175	192	31%
Electric Injera Stove	7	5	22	34	6%
Other			2	2	0%
Total	174	236	204	614	100%

Results of the surveys also indicated that while 79% of the consumers bake their Injera in a privately owned separate kitchen, responses for the remaining 21% of respondents are distributed equally between a

communal kitchen, a living room, and an open air Injera baking practices. Furthermore, in addition to using Mirt stove for baking Injera for their own domestic consumption, findings of the surveys indicated that some 11% of the households were utilizing Mirt for baking Injera for commercial sales. Obviously, when Mirt stove is used for commercial operations such as the one mentioned above, its potential for savings on firewood consumption and thus, expenditure on cooking energy, would enormous due to scale economies involved in such operations. For instance, commercial Injera bakers in Addis Ababa were observed using Mirt stoves seven days a week and for 10 to 13 hours each day. As a business operation, they bake a few hundreds of Injeras everyday on each Mirt stove making the stove pay for itself in days rather than weeks and months which is the case when the stoves are used in domestic setting.

Results of analyses of the consumer surveys also indicated that 88% of the consumers are using Mirt stoves regularly whenever they bake Injera. Only few number of households were using the stove in an "on" and "off" manner (see Table 2.8 below).

Table 2.8: Frequency of Use of Mirt Stoves

Frequency	Region			Total	Percent
	Amhara	Oromia	Tigray		
Always	165	224	152	541	88%
Mostly	1	9	10	20	3%
Rarely	7		6	13	2%
Sometimes		2	10	12	2%
Never	1	1	26	28	5%
Total	174	236	204	614	100%

On the other hand, significant number of households (about 5%) have reported that they were not using their Mirt stoves for various reasons. Among reasons cited for not using the stoves responses such as "broken stove" (40%), "prefer electric Mitad" (14%), and "change of residence" (9%), which requires a new stove or reinstallation of existing one, if at all, are significantly important. Nearly 90% of the households that reported that they have given up their Mirt stoves are located in Tigray region.

Paradoxically, Tigray is one of the regions where there is sever shortages of biomass fuels and where households have adopted innovative measures such as enclosed Injera stoves to cope with firewood scarcity. There are clear indications that some households in Tigray are reluctant to adopt Mirt primarily for two reasons. First and for most, the fuel inlet of Mirt stove is too small for the kind of dense, hard wood (and hence, very difficult to split) consumers are using in Tigray. Secondly, there are

reports that indicate that in the interest of reaching critical mass in dissemination of the stoves particularly in rural areas, Mirt stoves are being packaged with other essential services and distributed to some rural consumers in Tigray without their will or prior consent. If this really happening on the ground, and continues to happen undeterred, then the consequential damage to Mirt stoves dissemination strategy will be far-reaching.

When used for domestic Injera baking only, Mirt stoves are estimated to last at least five years. This was confirmed by the consumer survey results that showed average useful age of the stoves to be around six years in real world. With proper maintenance and management, Mirt can be expected to last even longer. According to the survey results, 7% of the consumers have replaced their stoves after an average of 5.6 years in service.

Thus, Mirt stoves were either replaced wholly (7%) or, partially (12%), or some sort of maintenance and plastering was made to them (31%) in nearly half of the survey households (Table 2.9 below). Not surprisingly, over 90% of parts of Mirt that were replaced were sections around the fuel inlet and the chimney outlet. These sections are worn out relatively quickly as the thermal shock (and mechanical stress in the case fuel inlets) is greatest on these parts.

Table 2.9: Number of Households that Have made Maintenance to or Replaced their Stoves or parts thereof

Responses	Region			All	Percent
	Amhara	Oromia	Tigray		
Plastered	56	63	69	188	31
Replaced parts	34	19	19	72	12
Replaced whole stove	21	9	13	43	7
No Maintenance or Replacements Made	63	145	102	310	51
Total (Maintenance and Replacements)	111	91	101	303	49
Grand Total	174	236	203	613	100

Consumer survey findings showed that producers installed Mirt stoves in nearly 50% of the households. Stoves were installed by consumers themselves in 42% of the households. Only less than 10% of Mirt were installed by separate installers and other people.

2.3 Consumers' Perceptions of Key Impacts of Mirt Stoves

2.3.1 Consumers' Perceptions of the Features of Mirt Stoves

Consumers' perception is the key to success of Mirt of commercialization. Mirt stoves are extremely popular with and well-adopted by consumers across all regions. Consumers purchased Mirt stoves for a variety of reasons ranging from the often-cited fuel economy and reduced smoke to health and convenience. Similarly, Fuel economy as a major reason for purchasing was ranked first by the majority of consumers in all the three regions. This was then followed by reasons such as protection from fire or heat, reduced smoke, speed in cooking and better quality Injera. It should be noted that these are the key selling points for Mirt stoves and as such they should be considered seriously in all promotion and commercialization efforts in the future. Details of consumers' perception are summarized in Table 2.10 below.

Table 2.10: Ranking of Consumers' Perceptions of Benefits of Mirt Stoves

Features of Mirt	Ranking			Total	Percent
	First	Second	Third		
Saves Fuel	454	90	27	571	33%
Protects from Fire/Heat	40	149	84	273	16%
Reduces Smoke	27	113	95	235	14%
Cooks Fast	24	91	120	235	14%
Simultaneous Use	13	55	45	113	7%
Clean	6	24	51	81	5%
Better Quality Injera	19	20	41	80	5%
Convenient	5	14	31	50	3%
Improves Health (Respiration)	8	21	18	47	3%
Robust	7	15	9	31	2%
Portable/Modern	2	1	6	9	1%
Total	605	593	527	1725	100%
% Households Interviewed	99%	97%	86%	Na	

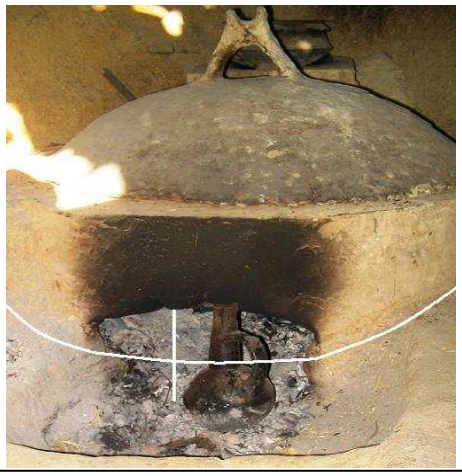
2.3.2 Consumers' Perception of Mirt Stoves on Fuel Consumption

Consumers' perception of Mirt stoves on fuel consumption was extremely positive across all regions. An overwhelming majority of 85% of the consumers have responded that Mirt stoves saved fuel in actual household use. However, it is important to note that significant number

of households in Tigray region have faced difficulties in adopting Mirt. According to field observations, the problem is the door size of Mirt which is not suited to the kind and size of firewood typical to that region. Therefore, in order to enhance the acceptance of Mirt in the region and achieve set project objectives, it is crucial to explore options for wider door sizes without compromising the thermal performance of the stove too much.

Picture 2.1: Fuelwood market in Mekele

Picture 2.2: Door size widened to fit wood size



Beyond confirming the fact that Mirt stoves save fuel in real world situation, consumers were also asked to estimate the amount of fuel that stove saved for them. It is not surprising to see that well over 80% of the consumers reported that Mirt has saved at least 50% of their fuel consumption. This Figure on savings on fuel consumption is pretty much consistent with findings of previous Kitchen Performance Tests (KPTs) and Controlled Cooking Tests (CCTs). Only about 10% of the consumers reported that their savings on fuel consumption were one-thirds or less (Table 2.11 below).

Table 2.11: Number of Households that Have Estimated Amount of Fuel Saved

Responses	Region			Total	Percent
	Amhara	**Oromia**	**Tigray**		
More than Half	56	56	65	177	29%
Half	86	152	87	325	54%
One-third	4	22	24	50	8%
One-fourth	7	1	6	14	2%
Less than One-fourth	1		2	3	0%
Saved but I Can't Tell	17	4	12	33	5%
Total	171	235	196	602	100%

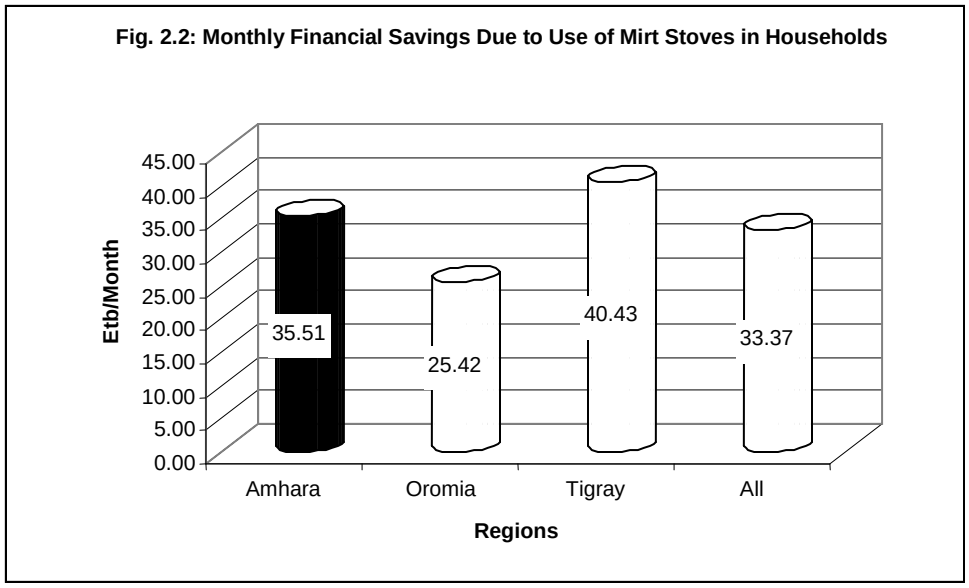
2.3.3 Financial Impacts of Mirt Stoves on Consumers

A series of laboratory and field-tests carried out on the stove in the early years of its commercialization unambiguously showed that Mirt is a highly energy-efficient cooking device with a potential of reducing fuel consumption by half in actual household cooking conditions. As far as financial impact of the stove on consumers is concerned, Mirt stoves seem to have kept that promise and have delivered significant financial savings to consumers.

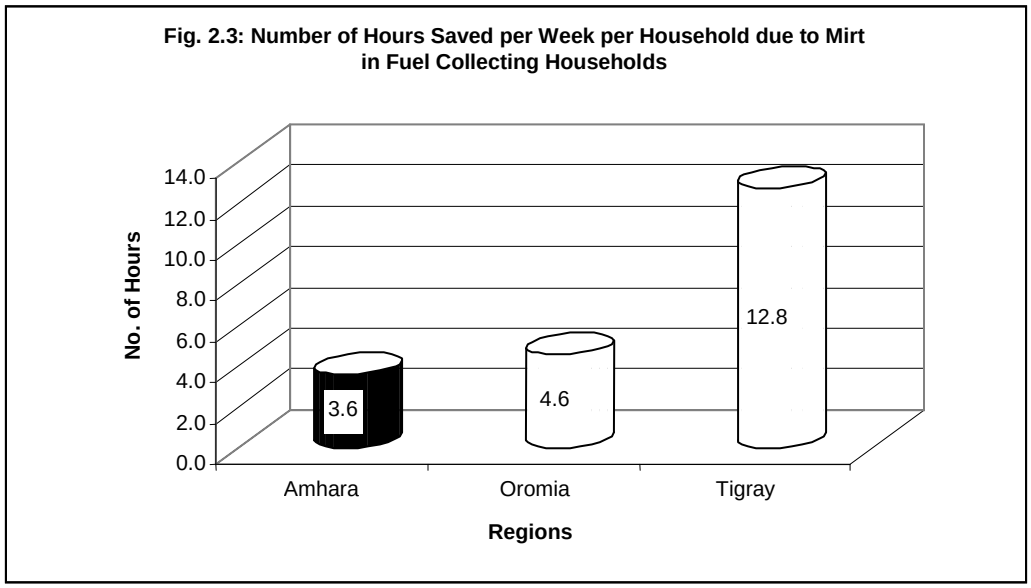
The analysis showed that 69 out of the 613 households surveyed were collecting firewood instead of purchasing it. According to responses obtained from those households that purchase fuelwood, on the average, the stove has saved Etb 33 per month per household. The financial impacts of Mirt stove varied significantly between the regions with savings in Tigray (Etb 40 per month) and Amhara (Etb 36 per month) being higher than the overall average. Financial impacts or savings of the stove were relatively lower in Oromia (Etb 25 per month) region (Fig. 2.2 below). This could be due to the fact that availability of biomass fuels is better, and hence prices lower, in many parts of Oromia relative to the two other regions. In terms of cash saved each month, the savings might not be that large. But for the poorer bottom 40% of consumers whose monthly income is less than Etb 500, the savings are in excess of 10% of their income, which makes it very significant. Besides, this is without considering the worth of other benefits such as smoke removal, health benefits, cleanliness and safety that Mirt stove offers.

Domestic consumers of the stoves have 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.

The other interesting consumer's perception of Mirt was its impact on time and effort households spend in collecting firewood. This became evident primarily from rural households as they mostly collect fuelwood than purchase it. According to this group of consumers, Mirt has helped them save an average of six hours per week per household. Number of hours saved varied widely between regions. The highest saving was in Tigray where savings of 13 hours per week per household was reported. The time savings ranged between 4 and 5 hours for Amhara and Oromia regions (Fig. 2.3 below).



Similarly, consumers who have reported to have saved time due to Mirt stoves indicated that they were using the extra time to meet domestic chores, have coffee with friends (entertainment), look after their kids and businesses.



The financial impact of Mirt is obviously greater on consumers who bake Injera for commercial sale than those who use it for domestic consumption. Commercial consumers use the stove more frequently and intensely than domestic consumers. For instance, this survey captured some 61 households who were using the stove to bake Injera for sale, apparently on a very small scale. Overall financial savings for this group of consumers was almost twice as much (Etb 59 per month). In fact,

results of the survey showed that 18% of so called commercial consumers were saving between Etb 100 and Etb 200 per month.

2.3.4 Health and Other Related Impacts of Mirt Stoves on Consumers

Another key beneficial impact of Mirt, perhaps even more important than that of financial savings, often cited by consumers was that of health and related benefits. Perhaps due to high levels indoor air pollution (IAP) that is attributable 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 (Table 2.12 below).

Table 2.12: Health and Related Other Benefits of Mirt Stoves

Health Benefits	Ranking			Total	Percent
	First	Second	Third		
Protection from Heat and Smoke	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	1	3	0%
Missing	14	21	18	53	4%
Total	537	453	278	1268	100%

2.4 Relevance of Project Impacts to the Millennium Development Goals (MDGs)

Mirt stove users have perceived the benefits of the stove in terms of fuel saving, convenience, safety and associated health impacts. Even though Mirt is not directly generating income for consumers, the tremendous fuel saving due to its high performance has significant financial implication on expenditure for fuelwood. With increased scarcity of

fuelwood, many households have been forced to reduce their expenditure for food as a copping mechanism for the increased price of fuelwood. The implication of financial saving because of using Mirt can indirectly be considered as a different source of income, which to a certain extent alleviates the poverty level. In this regard, it contributes its own share in reducing the poverty as outlined in first statement of the MDGs.

It is now widely accepted that exposure to indoor air pollution (IAP) increases the risk of acute lower respiratory infections (ALRI) in children, chronic obstructive pulmonary disease (COPD) in adults, and lung cancer[2]. There is also emerging evidence of causal links between IAP and tuberculosis (TB), perinatal mortality (stillbirths and deaths in the first week of life), low birth weight, asthma, otitis media, cancer of the upper airway and cataracts (WHO 2002). In 2000, IAP was responsible for more than 1.6 million deaths and 2.7% of the global burden of disease (Rehfuess, 2006, p 12)[3]. In most cases it is women and children who endure the most prolonged exposure times and are consequently most at risk from IAP.

Recently, the WHO assessed the burden of disease from IAP at the national level. This evaluation is based on, by country,

- the percentage of the population using biomass fuels and coal
- deaths and DALYs* for ALRI, COPD and lung cancer by age group and country,
- relative risk of ALRI, COPD and lung cancer when exposed to IAP (WHO, 2007, p 1)[4].

* DALY (Disability-Adjusted Life Year) is the measure typically used to quantify mortality and morbidity due to a given disease or risk factor. The DALY combines the years of life lost due to disability with the years of life lost due to death.

It was reported that in 2002 in Ethiopia, the total DALYs attributable to solid fuel use was 1,790,800 (WHO, 2007, p 4). It was found that, for the same year, 50,320 ALRI deaths and 6,410 COPD deaths were attributable to solid fuel use (WHO, 2007, p4). Moreover, 4.9% of the national burden of disease was due to solid fuel use (WHO, 2007, p4). The findings of WHO and data from Ministry of Health show that

[2] WHO, 2002, Addressing the links between Indoor Air Pollution, Household Energy and Human Health, Washington DC.
[3] Rehfuess, E, 2006, Fuel for Life: Household Energy and Health, Geneva, WHO.
[4] WHO.WHO, 2007, Indoor Air Pollution: National Burden of Disease Estimates

respiratory infections are the second biggest killer in Ethiopia and a major public health issue[5].

Evidence is also emerging which suggests that IAP may also increase the risk of TB and Asthma, diseases highlighted by Ministry of Health as prevalent in Ethiopia. Solid fuel smoke poses particularly serious problems for immunocompromised HIV/AIDS patients with increased susceptibility to respiratory infections (Rehfuess, 2006, p 11).

It is evident that Mirt reduces IAP level in the kitchen as it burns fuel more efficiently and uses less amount of fuel than Three-stone-stove to bake the same amount of injera. Therefore, the contribution of Mirt stove in the effort for the realization of the MDGs as outlined in statement 4,5,6 and 7 is substantial.

[5] Ministry of Health, 2006, Health and Health Related Indicators, Planning and Programming Department, Ethiopia.

3. ANALYSES SURVEY FINDINGS AND DISCUSSION OF IMPACTS ON PRODUCERS

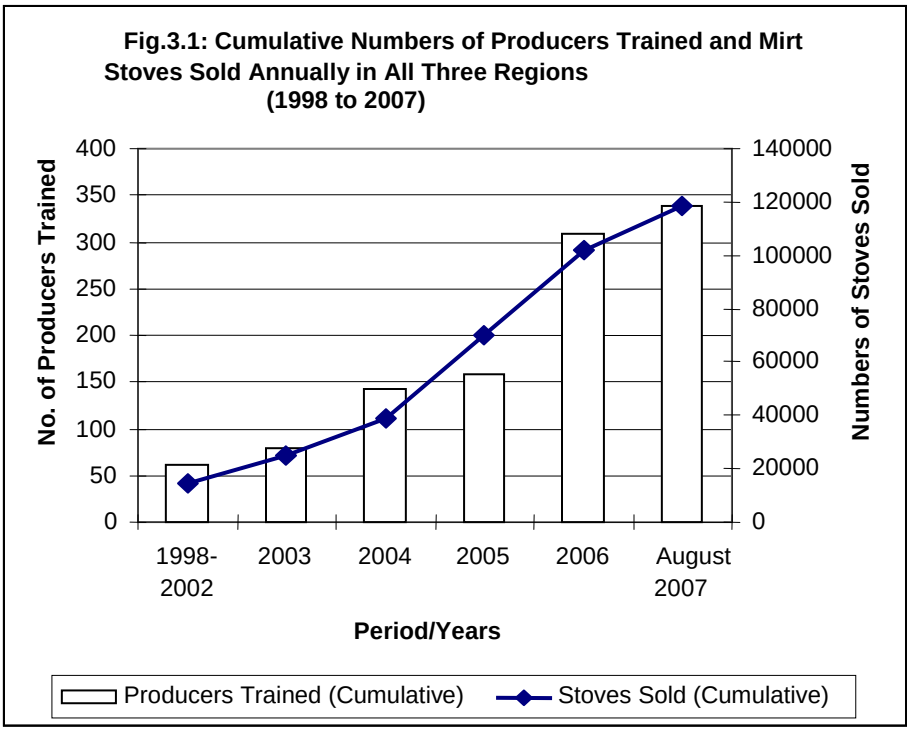
3.1 Analyses of Findings of Producers Surveys

3.1.1 Producers Universe Survey: Literature Review

According to records kept by the SUN Energy Project Head Quarters in Addis Ababa, a total of 339 producers were trained and received a package[6] of project support since the project commenced in 1998. With regard to producers' regional distribution, 50% of them are located within Oromia National regional State. The remaining 34% and 16% are located in Amhara and Tigray Regional States respectively.

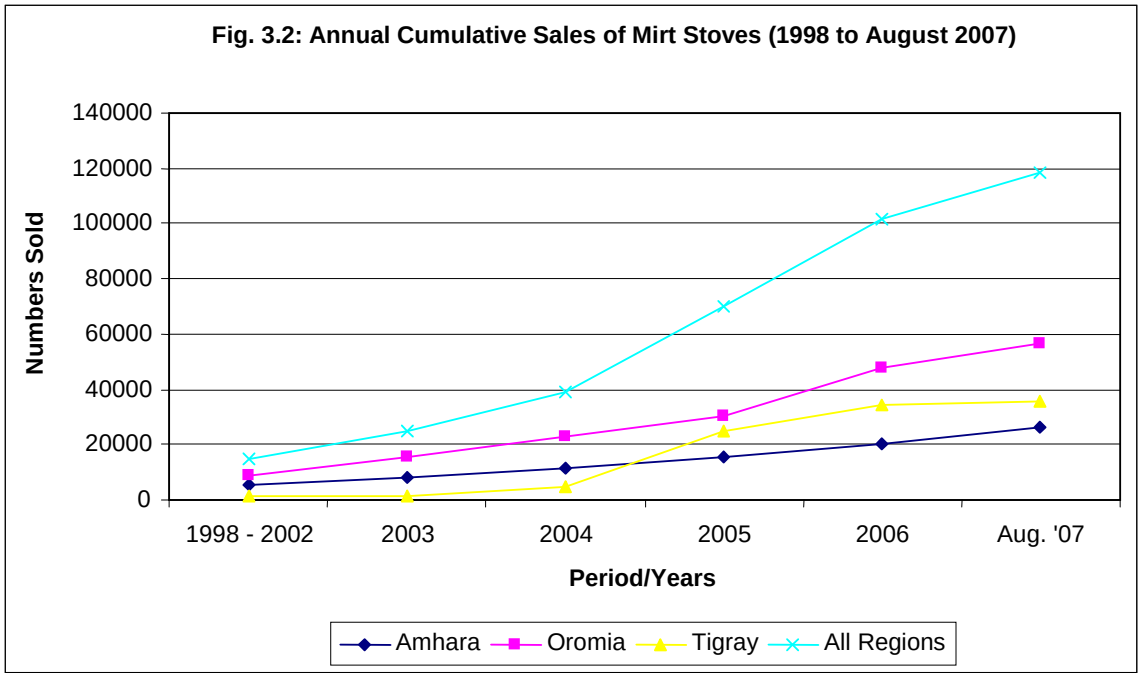
Figures on recorded sales of Mirt stoves indicated that a total of 120,000 stoves were sold through commercial channels during the past eight years ending on August 2007 (Figure 3.1 below). According to more recent sales figures (end October 2007), a total of 126,377 stoves were recorded to have been sold throughout the three Regions. These figures, of course, do not include sales in other regions including Southern Nations, Nationalities and Peoples (SNNP) national regional state where the Project was once actively supporting Mirt commercialization efforts.

[6] The package includes technical training on Mirt stove manufacturing, basic business and management skills, a 4mx6m CIS roofed shed for producing, curing and storing stoves, a stove production mold and hand tools, a truck-load of sand/scoria/pumice and 8 bags of cement as a starter, follow up and marketing and awareness raising campaigns.

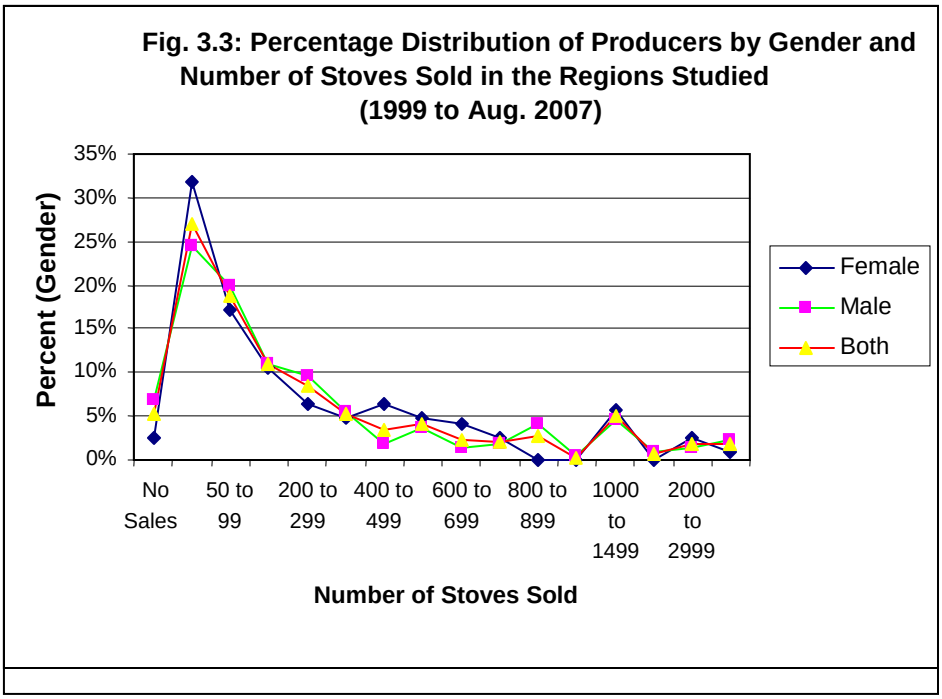


Out of the total recorded sales of Mirt stoves in all the three regions under study, Project sales records indicate that 22%, 48%, 30% were sold in Amhara, Oromia and Tigray Regions respectively.

In terms of annual distribution of sales of stoves over a quarter (26%) of total sales took place in the year 2005 and another 27% of total sales took place in 2006. This is directly related to intensity of market promotion expanded producers training conducted in those years. In other words, with financial support obtained from Shell Foundation (SF), several producers were trained and supported and market promotion and awareness raising campaigns launched in 2005 and continued throughout the year. Similarly, with DGIS financial support to scale up Mirt stoves commercialization efforts, the SUN Energy Project has embarked upon massive promotion campaign and extensive producer training activities both in Amhara and Oromia Regions since the year 2006. Figure 3.2 below shows the performance in terms of cumulative sales on an annual basis for all the Regions under this study.



Another interesting dimension of the Project is its gender aspects. First of all, 36% of the total number of producers are women. Secondly, stove sales by women producers are almost proportionate (34% of total sales) to their numbers. Third, the rate of quitting Mirt stoves business is lower (20%) among women relative to their men counterparts (25%). Figure 3.3 below shows performance, in terms of sales, of female producers relative to their male counterparts.



3.1.2 Analyses of Producers Sample Surveys: Sub Universe Surveys

3.1.2.1 Socio-economic Background of Producers

Out of the total number of 339 producers trained and supported by the SUN Energy Project in the tree Regions 34 producers were interviewed to obtain information on impacts of Mirt business in their lives and also assess the effectiveness of various promotional tools adopted by the project in raising awareness and creating effective demand.

Female producers constituted 53% of the total number interviewed. With regard to educational qualifications of the producers, about a quarter of the producers have completed up to ninth grade while the majority of 62% have completed High School level of education. The remaining 15% have had educational level above High School.

As far as marital status of the producers is concerned, while about a quarter of them are “singles”, 56% were “married”. The balance of 15% and 6% were “widowed” and “divorced” respectively.

A total of 212 family members were living as dependants in the families of 34 producers covered in this study. This translates into an overall

family size of six members per producer family. This is significantly higher than the national average family size of about five persons. In fact, average family size is highest (6.89 persons per producer family) for producers in Tigray, perhaps due to smaller sample size there.

Table 3.1: Number of dependents living with producers families

Age Range	Regions			Total	Percent
	Amhara	Oromia	Tigray		
Less than Five	9	8	7	24	11%
5 to 18	35	28	20	83	39%
19 and Above	36	34	35	105	50%
Total	80	70	62	212	100%
N	13	12	9	34	
Average Family Size	6.15	5.83	6.89	6.24	

3.1.2.2 Characterization of Mirt Businesses

According o producers sample survey results, while half of the producers interview have joined Mirt business prior to year 2005, the remaining half joined the business only in 2005 and afterwards.

The majority of Mirt stove businesses are small, informal and based on family labour. In spite of the fact that commercial production and dissemination of Mirt stoves at least is a decade old 'industry', only very few producers have evolved into large scale manufacturers of the stoves. In recent years, there are indications that some producers have secured licenses for their operations. However, the majority are still reluctant to formalize their businesses and obtain licenses for fear of visibility, which in turn could lead to, in the producers own language, "*falling prey of tax authorities*".

Table 3.2: Number of People Employed by Mirt Production Workshops

Region	Family Members			Employees			All			
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Percent
Amhara	19	20	39	12	11	23	31	31	62	40%
Oromia	15	19	34	17	2	19	32	21	53	34%
Tigray	16	14	30	10	0	10	26	14	40	26%
All	*50*	*53*	*103*	*39*	*13*	*52*	*89*	*66*	*155*	*100%*
% of Each	*49%*	*51%*	*100%*	*75%*	*25%*	*100%*	*57%*	*43%*	*100%*	*na*
% of Categories	*na*	*na*	*66%*	*na*	*na*	*34%*	*na*	*na*	*100%*	*na*
No. of Workers per Unit	*na*	*na*	*3.03*	*na*	*na*	*1.53*	*na*	*na*	*4.56*	*na*

A total of 155 persons (excluding owners) were reported to have been working on Mirt business in the 34 production units covered in this study. Out of the total workforce employed by Mirt businesses, two-thirds were family members of the owners themselves and the balance were employees. Overall, an average of 4.6 persons were working in each one of Mirt production workshops.

From gender perspective, more females were contributing labour as 'family members' (51%) as opposed to 'employees', where males' representation is disproportionately high (75%). Overall, however, representation of females in the workforce – both as family labour and formal employees – is 43% signifying the important role played by women in Mirt stoves production. It should also be noted that even if the owners of Mirt businesses are men, the actual production of the stoves is done almost always by their wives.

3.2 Discussion of Key Impacts of Mirt Businesses on Producers

The livelihood impacts of involvement in the manufacturing and marketing of Mirt improved biomass Injera stoves were studied in all three Regions. A summary of the results is presented below. More detailed account of impacts can be found in the section that presents Case Studies of producers.

3.2.1 Income, Employment and Skills

Analysis of employment and income conditions of the producers indicate that out of 34 producers interviewed 65% were unemployed before they joined Mirt business. In fact, some of them did not have any experience of employment at all. Today, however, these people are not only employed, but they have also employed others on their stove businesses. According to findings of the interviews with some producers, the employment situation of those who claim to have been employed before joining Mirt business were highly insecure and their incomes meager indicating the vulnerable positions of their livelihoods. Nearly 90% of the producers have reported that their monthly cash earnings have improved after they started Mirt stoves business. Besides, according to Case Studies conducted on selected producers, producers are earning net monthly cash income of between Etb 500 and 1500 from Mirt business.

In fact, analyses of annual sales of producers indicated that the top 3% of the producers were earning an annual income of more than Ethiopian

Birr 16,000 annually from sales of Mirt stoves. Another 8% of the producers were earning annual incomes ranging between Etb 8,000 and 16,000. On the other hand, the bottom 60%, who are the majority, were earning income of less then 2,000 annually (Table 3.3 below).

Table 3.3: Percentage Distribution of Producers by Annual Income Earned

Annual Income (ETB)	Percent of Active Producers
>=16,000	3%
8,000-15,999	8%
4,000-7999	15%
2,000-3,999	14%
1,000-1,999	19%
<1,000	41%
Total	100%

Another important area of impacts is skills. The majority of producers confirmed that they did not posses any technical or business skills prior to joining Mirt business. Thirty-three out of thirty-four producers interviewed reported that they have obtained useful skills as a result of their involvement in Mirt stoves business. Obviously, the skill transfer is the result of both tailored trainings provided by the Project as well as experience gained as a result of running Mirt stoves business.

3.2.2 Shelter and Accommodation

Box 1: "The God used Mirt to salvage my life"

"… my small grain trade business went bankrupt. I was no more able to support my family. When my previous wife realized that I was unable to put food on my families table, she left me and went-off with our three kids. My landlord chased me out of my house as I was unable to settle my rent arrears for few months. Life has turned its back onto me. I was ashamed to see my former friends. In those days I was running without food for days sometimes. I left the town and started to my new miserable life in the bush next to a river. I put up a squatter shed of about four square meters with plastic roof in the outskirts of the town and lived there for thirteen solid months. …. But now, my life has transformed completely due to Mirt business. I am a believer and I am a Protestant. I praise the God for He gave me second life, resurrection, using Mirt project as pretext. The God used Mirt to salvage my life. The first thing I did after earning some money from Mirt business was I killed a sheep and fed myself until I re-gained all the weight I lost during the previous bad times of starvation and misery. Once I fully attained my physical appearance and fitness, I bought 1,100 square meters of land and built a new house of over 60 square meters. The land and the house costed me about 24,000 Ethiopian Birr (Etb). Few years back, I purchased additional 1,600 square meters of land at a price of 12,000 Etb. I brought my kids back home and fully supported their education. Two of them have now joined universities. I am now living dignified and respected in the community. I am now not only an active member of community associations but I am also the leader. Thanks to the God, all these are due to Mirt business."

Housing conditions have improved among 38% of the producers after the business. According to those producers who have reported that their conditions of housing and accommodation have 'improved', the majority of them have built their own houses while the rest have either renovated existing ones or afforded to rent better residential units after the business. Regarding the positive changes in "food intake" and housing or "shelter" and "accommodation" conditions of producers after Mirt business, one of the more successful and happy producers described the impacts eloquently in Box 1 above.

3.2.3 Ownership of Assets: Urban Land and Cattle

Reportedly, ownership of assets including land, cattle and consumer electronics, and furniture has improved among 35% of the producers after Mirt business. While some of the producers have afforded to purchase urban land from the savings they made from their businesses, others have received land and market stalls in key market locations from local governments as incentives to encourage producers to continue their Mirt businesses in a self-sustaining manner.

3.2.4 Food Intake

One of the key aspects of impacts studied was food intake of producers and their families. According to results of the surveys, ability to meet food related expenses of their own and that of their immediate families has improved among 80% of the producers after the business. Detailed assessment of the conditions of food intake after the business indicated that improvements in food intake are achieved both in terms of quantity and quality. In addition to meeting their own basic necessities, many producers (68%) were also able to provide support to extended families. Regarding the situation of food intake before and after the stoves business among families of some producers, excerpts from one of the Case Studies is summarized in Box 2 above. Detailed account of the Case Study is presented in Annex 2.

Box 2: "my son was starving; and he was crying for food … but, my own sister refused to help me out"

"… before Mirt business my life was miserable. I remember one terrible day when my son was starving and he could not stop crying. The previous day, I bought him a colourful T-shirt and I had no money left for anything. I took him to my sisters' and asked her if she can give him a loaf of bread or lend me a couple of Birr so that I can buy some food for my starving child. My own sister refused to help me out. In stead, she told me she liked my kid's T-shirt and asked me if I am willing to sell it to her kid for two Birr. You believe it or not, I did not hesitate to give her the T-shirt in exchange for two Birr. I used the money to buy some bread to my kid. I never forget that day. …….. but, I have forgiven my sister and I am supporting herself and her children, thanks to Mirt business. Using my savings from Mirt business, I have built a kiosk for her at a cost of Etb 10,000. I am also supporting her child who is studying in a university".

3.2.5 Medical and Health Care

Results of the surveys indicated that ability to pay for medical and health care for themselves and their families has improved among three-quarters of producers after Mirt business

3.2.6 Children's School Fees and Expenses

In terms of the ability to cover for children's school fees and related expenses, producers' financial positions have improved among 76% of the producers after the business. Thanks to Mirt business, some successful producers are able to afford sending their children to the more expensive private Schools and Universities. As an instance, according to findings of Producers Case Studies, thanks to improved earnings from the business, one producer was supporting University education for two of his children, while another one has sent two of her kids to one of the most expensive and 'top' notch private school in town.

3.2.7 Access to Financial Credit

Given their extremely poor financial and business background, almost all Mirt stove producers were considered "unbankable" or "not credit-worthy" before they entered Mirt business. This has changed tremendously after the business and 62% have reported that their credit-worthiness has improved after Mirt business. Thus, the majority of the producers can now raise money from various sources if they needed it for expanding their businesses.

3.2.8 Membership and Position in Community Associations

Rate of participation of the producers in community organizations is an important indicator of the degree to which they are part of the community life. The degree of Integration into the community life in turn depends on the rate of success or failure of ones own personal and professional life. Owing to the vulnerable livelihood positions they occupied in their respective communities before Mirt business, almost all producers were outside the mainstream community life. Some were squeezed out others were unable to become members in the first place and were simple forgotten. After the business, however, membership and participation in community life has improved among more than three-quarters of the producers. According to an interview with a producer, before Mirt business "*other community members do not even consider us as humans*". After the business, however, some producers have started ascending in the ladder and have become not only active members in but also leaders of community based organizations (CBOs). Some of the most prominent beneficial impacts that Mirt businesses have had on

producers and their families are summarized in Table 3.3 and Table 3.4 below.

Table 3.3: Livelihood Impacts of Mirt Businesses on Producers by Region

Conditions	Regions			Total	Percent
	Amhara	Oromia	Tigray		
Housing	4	5	4	13	38%
Urban Land Acquisition	4	5	3	12	35%
Domestic Animals	4	4	3	11	32%
Access to Financial Credit	9	10	2	21	62%
Social Acceptance	10	11	5	26	76%
Ability to Meet Educational Expenses	8	11	7	26	76%
Ability to Meet Healthcare Expenses	9	10	6	25	74%
Ability to Support Extended Family	8	9	6	23	68%
Ability to Afford Clothing Expenses	9	10	9	28	82%
Ability to Meet Food Expenses	7	11	9	27	79%
Monthly Cash Income	10	11	9	30	88%
Business Management Skills	13	11	9	33	97%

In addition to the more obvious and quantitative aspects of impacts that Mirt businesses have had on producers lives, some qualitative and equally important social benefits were reported to have been achieved by the producers. The most prominent among these qualitative social benefits that were accrued as a result of Mirt business are improved social acceptance or position in a community, membership and participation in community organizations, membership to business networks.

Table 3.4: Ranking for Social Benefits Accrued Due to Mirt Business

Social Benefits	Ranking for Social Benefits			Total	Percent of Total
	First	Second	Third		
N	**34**	**34**	**34**	**102**	**100%**
Social acceptance/dignity	8	7	3	18	18%
Ekub (Informal Financial Association)	5	5	1	11	11%
Edir (Neighborhood Self-help Association)	9	0	1	10	10%
Increased business network	3	2	1.0	6	6%
Access to financial credit	0	3	0	3	3%
Self reliance	1	0	1	2	2%
Not applicable	8	17	27	52	51%
Total (ranked benefits)	26	17	7	50	49%
Percent (ranked benefits)	52%	34%	14%	100%	

3.3 Summary of Case Study Findings

To capture a detailed account of impacts and the dynamics that had taken place for Mirt stove producers within their respective geographic areas, extensive case studies were carried out. A minimum of three producers per region, representing a wide range of experiences and circumstances were interviewed using a very detailed check list of key livelihood and business issues. As opposed to the study Team's initial plan and anticipation, more successful producers were represented in the Case Studies. Because, those producers that are either poorly performing or have quit the business were disinterested to participate in this study. With this limitation in mind, the whole stories and experiences of over 10 Mirt stove producers were captured comprehensively and described eloquently in Annex 2 A summary of some of the most important findings of the Case Studies are presented in the following section.

3.3.1 Mirt business has transformed the life of a young woman

'MT' is only 28 but a mother four. She was born to a very poor family. Her family background explains why she was unable to attend education after Grade nine. 'MT' divorced her first husband and got remarried to another man. She has four kids from two different husbands. She had no skills other than making and selling '*Arakie'*, local liquor. Despite the hard work income from her liquor was far from adequate to support her kids. One day, she says, one of her kids cried bitterly and told her he is hungry. She had neither the money to buy food with nor has she the food to give it to her child with an empty-belly.

According to 'MT', her life has completely changed after she started the 'Mirt' stove business. Unlike before, she says she saves an average of Etb 500 per month from her Mirt business. This is her net saving after meeting all domestic as well as other expenditure. Today, her family gets quality and enough amount of food three times a day. She has renovated her old house and also built eight new rooms for renting out. She bought a hybrid cow for her mother. She bought a plot of urban land for her elder son. She has bought complete sets of household furniture. She built a shop at a cost of Etb 12,000 and made it ready for business for herself. She had another kiosk for her sister at a cost of Etb 10,000. She bought an ox for her poor uncle. She is bringing up her friend's daughter whose mother has passed away. She is supporting her sister's son who is currently studying in Mekele University. 'MT' says, after Mirt business,

no one in her family bothers about clothing. In fact, she said she has purchased jewellery (59 grams of gold, worth several thousands of Etb) for herself and her husband.

Unlike before, 'MT' has access to electricity using a private meter, telephone including mobile phone and tap water in her compound. She says, she is sending her kids to the best private school in town. She is also supporting her husband's education who is attending a distance education programme. She confidently reported that all these expenses are being met entirely from earnings from Mirt business. Currently 'MT' is a member of community based institutions; she is highly respected by the community. As such, 'MT' is invited as a guest of honour to some Zonal Council meetings.

3.3.2 The longest serving entrepreneur: Does the business really pay dividend?

'TT' was born to a poor rural family. She is single and she is in her mid 30s. She completed her High School education in 1991. As she was unable to continue her education any further, she left her home town in search of jobs. She moved to a regional capital where she was hired as a housemaid earning Etb 10 monthly. The pay was so little that she left that job and started looking for another one. As she was unable to get better job, she was hired as a casual labourer earning Etb 2.5 per day. According to her, the new job was not bad but, it is erratic and hence unreliable. She was unable to cover for her accommodation expenses and feed herself adequately. Her landlord chased her out of her one room house. 'TT' had ran out of options except looking for a person who is kind-enough to offer her free-accommodation.

'TT' remembers her life between 1991 and 1994 as a 'cruel' and 'bitter' one. But, she had hopes. One day in 1995, when she was looking for casual jobs as she does very often, 'TT' met someone who informed her that there are some people hiring daily labourers. I explained my situation to the person in charge and begged him to consider me to whatsoever position is available. He was kind enough; he put me in the list of trainees for Mirt stoves production. From that day onwards, 'TT' life started to change for the better.

Ever since 1995, 'TT's livelihood is entirely dependent on Mirt business. Disregarding the 'dips' and 'peaks' common to all businesses, she says she is earning an average monthly income of Etb 1000 from her stove business. According to her, worrying about food and clothing is a 'thing

of the past', thanks to her stove business. She has built her own new house. She owns a shop in key market location. She has electricity, running water, and telephone (land line and mobile) in her house now. She is supporting her parents and siblings. She has become an active member of community based organizations. She claims to have a savings of over Etb 20,000 in a bank deposit.

During the past few years, 'TT' has won a number of prizes as a successful female entrepreneur. Above all, as a direct result of her Mirt stoves business, she has become popular and has established strong business relationships with various individuals and organizations. She believes that it is such popularity and rising profile that helped her be recruited as a broker to an insurance company. Yes, Mirt business pays dividends for those who worked harder to stay in business. It in fact, leads to a web of business and other forms of relationships and raises profiles of successful entrepreneurs, which, in turn leads to further improvements in overall environment necessary for business operations.

3.3.3 Stove business gives a bankrupt businessman a 'second chance to life'

'GW' is over 60 years old now. He was born, brought up, educated and lived all his life in the same town. He was brought up by his God-father. He used to run and look after his God-father's business. His God-father promised 'GW' that he will be treated like his own biological child and he will inherit his property accordingly. However, things did not work out well for 'GW' according to his expectations. Upon a sudden death of 'GW's God-father, legal heirs came into the picture more assertively and denied 'GW' of any rights as a heir. 'GW' gave up the litigation shortly when he realized that he was betrayed and he has no legal proof to inherit his God-father's property.

With whatever money was left in his hands, 'GW' engages himself in grain trading. He says, as competition becomes tougher profit margins declined by the day. His business went bankrupt. He could not support his family – two kids and his wife - any more. His wife left him behind and went off to her relatives with their two children. He has got nothing to eat, no extra clothes to wear. Things went from bad to worse for 'GW' when his landlord chased him out of his house. Now, 'GW' has no decent place to stay in. He was ashamed of his own circumstances. One day, 'GW' decided to go to a forest in the outskirts of the town and put up ramshackle hut from twigs with a plastic roof. He says, in those days he runs without food for days. When lucky, he finds a casual work which barely pays for his daily meal. He passed thirteen difficult months in that ramshackle shed next to a river.

'GW' says, "*… I was selected only by the grace of the God, because I do not meet any of the criteria set by the project*". He says, he is a hard worker, but hard work alone is not enough; it has to be supported by opportunities. According to him, that opportunity was the '*Mirt stoves business that gave him a second chance to life*'. As opposed to official project sales records of only three and half thousands, he believes that he has produced and sold close to seven thousand stoves ever since he joined Mirt stoves business.

From proceeds of his business, to day, 'GW' can support his family adequately. After the business, he was remarried to another woman and had two more kids. He has purchased 1100 M^2 of land and built a residential house. According to him, food is no more an issue to his family. He has purchased another plot of 1600 M^2 for agricultural development. He is supporting his two elder sons who are attending their higher level education in various Universities. He says, he has a savings deposit in a bank. As his retirement plan, 'GW' intends to use his earnings from his business to build more houses to be rented out. The full story of 'GW' is presented in Annex 2

3.4 Relevance of Project Impacts on Producers to the Millennium Development Goals (MDGs)

Mirt business has played a significant role in realizing the MDGs in producers' life. Mirt became major source of income for some of the producers and supplementary for others. In all cases, the earning from the business has helped them improve their life by enabling them to acquire better shelters and accommodation, improved food intake, afford medical and health cares, and easily send their children to school. The ability to do this means that they managed alleviate their poverty level, achieve primary education for their children, reduced child mortality and improved maternal health. These in consequence enable them combat HIV/AIDS, tuberculoses and malaria.

4. IMPACTS OF MARKET PROMOTION TOOLS ON SALES

Proper identification and implementation of commercialization tools and marketing strategies are very important parameters that bring success to wide scale dissemination of products. Type of commercialization tools and marketing strategies very much vary from one product type to another depending on the features of the products, targeted market segment and physical locations.

4.1 Setting the Context

Mirt stove is primarily designed for baking injera for households using biomass fuels. It was optimized to burn a range of biomass fuels including fuelwood, agri-residues and dung. Unlike other cook stoves (i.e. charcoal and kerosene stoves), Mirt is a high-mass stove which needs on site assembling of parts. Due to the necessary parameters incorporated in the design of Mirt such as high power output, large injera size (on average 60cm) and shielding of the fire, it became inevitable for Mirt to be a high-mass stove. Efforts have been put in the design to facilitate production and improve portability by producing Mirt in six different sections which need to be assembled on site during installation.

Despite the fact that it was those design parameters that made the Mirt stove saves fuel and protects cooks from smoke, heat and fire hazard, and hence, made it a popular products among its consumers, the same parameters contributed to its weight and the need for on-site installation (in-situ stove) rendering it difficult for Mirt to be an off-the-shelf item. These features of Mirt stove have remained major drawbacks for wide scale dissemination to this date. Furthermore, difficulty in obtaining some raw materials such as cement, among other things, has limited dissemination efforts to be confined primarily to urban peri-urban areas.

The commercialization and marketing strategies adopted for dissemination of Mirt is one of the type that takes the features of Mirt into consideration. Localized production and sales of Mirt has been proven advantageous (over other strategies such as self-made high mass stoves[7]) where trained producers base their livelihoods on production and sales of Mirt stove. Even though the market uptake for Mirt is remarkable compared to previous efforts recorded for other high mass

[7] 'Tehish' injera stove has been promoted by Agriculture Bureau, Rural Technology Promotion Center and GTZ in Tigray. Standardizing stove dimensions was the major problem which led to a drop in efficiency and difficulty in combustion.

stoves (locally and internationally), it was quite sluggish when seen in light of success stories achieved with other off-the-shelf stoves (Lakech, Kenyan Ceramic Jiko).

These being the fact, extra efforts have been required to build a sustainable market infrastructure for wide scale dissemination of Mirt stove. GTZ-SUN for the last nine years has been promoting Mirt stove and training producers in three Regions (Amahara, Oromia and Tigray) in order to make the business sustainable so that efficient utilization of fuelwood for cooking would contribute to the efforts towards a sustainable utilization of the natural resources. Promotion tools and capacity building activities have been implemented several times and at various levels. Each of these efforts has their own effectiveness in terms of raising awareness and boosting stove sales. Identification of the most cost effective promotion tool would help proper allocation of resources to on-going activities and future plans for wide scale dissemination of stoves.

4.2 Assessment of Effectiveness of Promotion Tools

Several types of promotion tools have been used to raise awareness and boost sales of Mirt stoves. Actual public cooking demonstrations have been used in Amhara and Oromia, though not regularly, since the project started in 1999. However, most of the promotion tools were used simultaneously between March 2005 and February 2006. This overlap of promotion tools makes the study of the impact of one promotion tool against another difficult. In general, sales records indicate that promotion tools in fact helped to raise demand as Mirt sales has been boosted since 2005.

The increase in sales in Oromia and to a certain extent in Amhara Regions in the absence of coupon subsidy, as opposed to the case in Tigray, is a good indicator to evaluate the effect of the coupon system in raising demand and building a sustainable market for Mirt. On the other hand, training and deployment of Mirt producers in all three Regions during this period was unprecedented even though about 25% of producers trained were not generally active either in terms of reporting sales or totally stopped the business (Table 4.1). Number of active producers was increased by about 250% and 178% in Oromia and Amhara Regions in 2005 and 2006 respectively. This has raised the number of producers in Oromia from 42 in 2004 to 146 in 2006 while in Amhara it was increased from 18 in 2004 to 64 in 2006. As this was happening within the same period that promotion tools where implemented, the increase in total sales of Mirt could not perhaps be

totally ascribed to promotion tools. See Table 4.4 below for the timing and type of promotion tools used.

Table 4.1: Total number of producers trained and producers that are still active in the business

Region	1999-2002	2003	2004	2005	2006	August 2007	Total
Total Number of Producers							**339**
Amhara	22	25	36	36	84	114	
Oromia	29	43	66	68	169	170	
Tigray	11	11	40	55	55	55	
Number of Active Producers							**250**
Amhara	22	20	18	23	64	94	
Oromia	30	34	42	43	146	126	
Tigray	11	3	21	54	44	30	
Project Phases	HHE/PNR		Shell Foundation		DGIS		

Comparison of the ratio of total number of Mirt stoves sold to number of active producers (Per Capita sales of stoves) in Amhara and Oromia Regions before and after major promotion campaigns would give a rather clearer picture as to how promotion tools relative to increased number of producers affected the demand for Mirt.

Table 4.2: Mirt stove sales per capita and annual sales figure (number)

Regions	Year									
	2003		2004		2005		2006		Aug. 2007	
	Per Capita	Annual Sales	Per Capita	Annual Sales	Per Capita	Annual Sales	Per Capita	Annual Sales	Per Capita	Annual Sales
Amhara	146	2,924	163	2,939	183	4,213	74	4,731	69	6,450
Oromia	208	7,063	175	7,343	165	7,092	121	17,594	71	8,934
Tigray	106	319	164	3,443	367	19,838	214	9,403	57	1,699
Average	181	10,307	169	13,725	260	31,143	125	31,728	68	17,083

Comparison of per capita sales in Amahra was increased by about 12% between 2004 and 2005 while in that year no newly trained producer was introduced in the market. The increased in sales can actually ascribed to the promotion compaigns implemented. The situation in Oromia was the same with regard to number of producers but sales actually did not increase in Oromia, in fact it dropped slightly that 2004.

However, in 2006 even though total annual sales is increased both in Amhara and Oromia, the per capita sales has actually decreased. The observed increased in sales is due to the great number of new producers trained and entered into Mirt business, coverage of new geographic locations, and of course the accompanied promotion campaigns. The decrease in per-capita sales tells that the total sales has not grown in

equal proportion to the increase in number of producers as the market perhaps not responded immediately to the promotions. With time the market could grow as more households become aware of Mirt and its benefits. Unfortunately, the sales figure for 2007 is not complete to make any conclusion.

In Tigray, in 2004 and 2005 the number of producers increased greatly. In 2004 sales increase is mainly due to the increased number of producers. During this year, public cooking demo was the only promotion tool implemented. The following year, in 2005, the number of producers was increased by more than double in Tigray and all sorts of promotion tools were simultaneously implemented. The per-capita sales and total sales recorded indicate how promotion tools, newly trained producers introduced in the market and coverage of new geographic locations boosted the demand and hence sales of Mirt in Tigray. Sales in Tigray was almost totally with subsidies with coupon system. In 2005 about 20,000 coupons were available, perhaps slightly over the number of stoves sold during the same year. The increase in raw material price observed in 2006 and later has badly affected sales in Tigray than any other region (i.e. Amhara or Oromia). The coupon system seems not helping the real market to develop.

In all three regions, had it not been for the coincidence of a rise in raw material prices, a greater sales figure could have been observed. In other words, sales figures could have been dropped much lower if promotion tools were not implemented. In addition to this, poor sales recoding and reporting behavior of producers is also concealing the true sales figure. Discussions with producers during the field visit reveals that most producers do not properly keep records nor report the true sales figures on purpose to evade tax, or due to negligence and lack of incentives to report. Some producers have shown a sales recoding note book which they have forgot to report and realized after prize was awarded by GTZ-SUN for producers with higher sales.

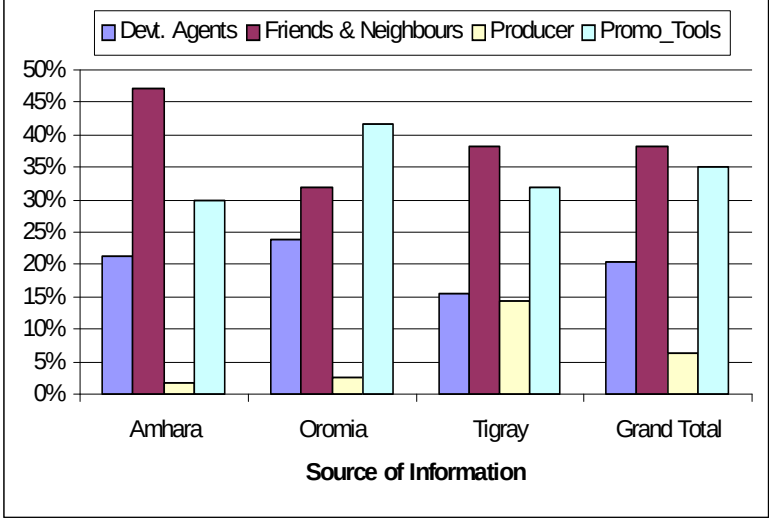
Table 4.3: Differences between reported sales and estimations of stoves producers claimed have sold

Woreda/ town	Number of stoves sold since starting business		% difference over reported
	Reported Sales	Producers estimation	
Guder	3,479	6,500	87%
Ambo	1,482	2,700	82%
Ambo	688	1,800	162%
Ambo	2,453	3,200	30%
Assela	52	650	1150%
Assela	76	3,500	4505%
Assela	61	600	884%
Robe	526	1,200	128%
Robe	248	1,200	384%
Goba	529	1,500	184%
Shashemene	713	1,000	40%
Shashemene	106	1,200	1032%
Total	10,413	25,050	141%

As the above table shows, this assessment reveals that, on average, the actual sales figure of stoves as estimated by producers can be as high as 140% of (or 2.4 times greater than) the reported figure. This may not be a representative sample to deduce a factor by which the whole national sales figures could be adjusted in order to get closer to the actual sales. Estimation of stoves sold as indicated in Table 4.3 above are obviously affected by some extreme values (i.e. estimation by the producer in Assela). Even if this producer is excluded as an outlier, the overall value for the estimated sales will still be as high as 108% - which still is outrageously high.

Promotion tools have also had spill over effects in that customers who have purchased the stove or have heard about would tell to their friends and neighbors. Word-of-mouth is a powerful tool in promoting or demoting a product even though its coverage is narrow and only local. Word-of-mouth from early adopters of Mirt is also a very important tool of promotion particularly in the early

Figure 4.1: Source of information consumers learned about Mirt first



stages of commercialization. It is an essential mechanism which influences customers to purchase the stove as it is a witness from a trusted source.

The results of the consumers survey shows that about 45% of consumers from all three Regions first learned about Mirt from friends and neighbors.

GTZ-SUN project has been implementing several types of promotion tools to raise awareness so that through wide scale dissemination of Mirt stove demand side management of the biomass resources would be partly achieved and household indoor air pollutions would also be reduced. The following table shows the type of promotion tools used by GTZ-SUN project over the years.

Table 4.4: Promotion tools used by year

Regions	Years					
	1999-'02	2003	2004	2005	2006	2007
Tigray	Actual Cooking Demos	Actual Cooking Demos (17)		• Actual Cooking Demos (40) • TV Com. (41 Ads) • Radio Ad (18) • Radio Prog (~50) • Billboard (14) • Sign board (40) • Publications (2) • Exhibition & Bazaar (3) • News Paper Ad (1) • Coupon sales (about 20,000)	• Actual Cooking Demos (40) • TV Com. (25 Ads) • Radio Ads (38) • Billboard (2) • Sign board • Publications (3) • Exhibition & Bazaar (2) • News Paper Ad (1) • Coupon sales (about 9,000)	• Exhibition & Bazaar (1) • Coupon sales
Oromia	Actual Cooking Demos (more than 100)			• TV Com. (31 Ads) • Radio Ad (34)	• TV Com. (25 Ads) • Radio Ad (36) • Publications (1) • Exhibition & Bazaar (1)	• Actual Cooking Demos (61) • Radio Ad (27) • Billboard (17) • Exhibition & Bazaar (1) • Coupon sales (about ?)

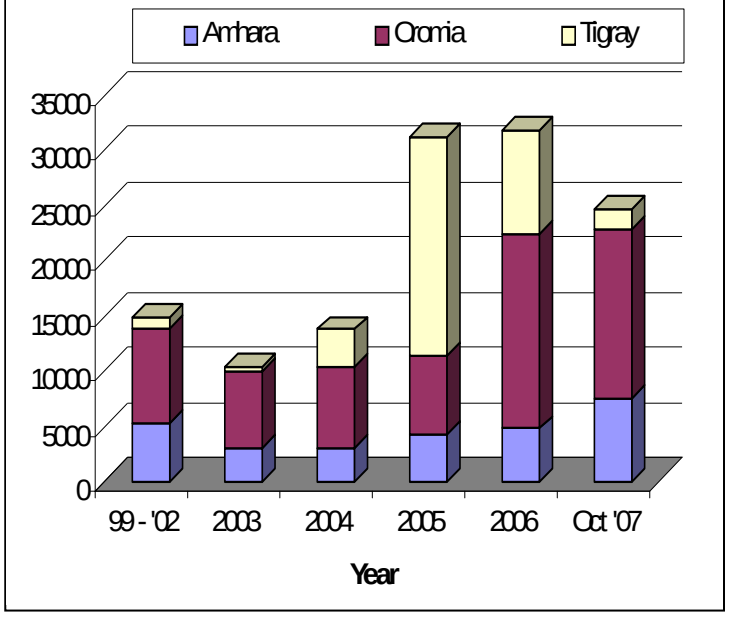
Table 4.4 (Contd…): Promotion tools used by year

Regions	Years				
	1999-'02	2003	2004	2005	2006	2007
Amhara	Actual Cooking Demos (more than50)			• TV Com. (45 Ads) • Radio Ad (35)	• TV Com. (33 Ads) • Radio Ad (35) • Publications (5) • Exhibition & Bazaar (5)	• Actual Cooking Demos (90) • Radio Ad (30) • Billboard (8) • Publications (1) • Coupon sales (about ?)
In all Regions				• Leaflet(15,000) • Posters(15,000) • T-shirt(400) • Cape(300) • Apron(100) • Match Box(1000) • Shopping bag(200) • Sticker(700) • Banner(4)	• Leaflet(25,000) • Posters(7,000) • T-shirt(200) • Cape(200) • Shopping bag(400) • Sticker(400) • Banner(6)	• Leaflet(25, 521) • Posters(4640) • T-shirt(500) • Cape(500) • Apron(150) • Match Box(3,000) • Shopping bag(50) • Banner(4)

Note: Numbers in brackets show numbers or repetition of promotion tools in a given year.

Some of the promotion tools were Region specific while others are country wide. For example, coupon sales was implemented only in Tigray in 2005 and continued until mid 2007. In Oromia and Amhara Regions it was introduced in few Woredas after November 2007. Therefore it is yet early to affect sales in these two Regions. All TV commercialization were aired through ETV which has a nation wide coverage, though some of the programs at times were conducted in specific languages.

Figure 4.2: Mirt sales by Region and year



Subsidy with coupon system seems to increase sales in Tigray as it is observed from sales records. However, even with presence of coupon system, sales in Tigray dropped by more than half in 2006 than the previous year. This was reported as mainly due to the increase in price of raw materials of Mirt. On the contrary, the price increase in raw materials did not seem to affect sales in Amhara and Oromia Regions as it did in Tigray. In fact sales has been gradual but continuously growing in Amhara since 2003 despite the continuous increase in price of raw materials. In Oromia too a similar trend has been observed but with a big boost in sales in 2006 and that rate maintained in 2007 as well. This is primarily due to increased number of producers, new area coverage and impacts of other promotion tools (not coupon).

Sales in Tigray appears to be more erratic and unnatural. The big boost in sales recorded in 2005 seems rather artificial than market driven. This has been actually confirmed on discussions with stakeholders in Agriculture Bureaus and Desks in Tigray. By including Mirt as an additional item in the package for agricultural inputs, rural households (primarily farms) were made to purchase without getting their consents. This has been reported by some farmers that they involuntarily purchased the stove. The coupon system itself dwelled longer than necessary. It was meant to be a promotion tool to trigger or jump start sales in Tigray – but remained there distorting the market. The true market based sales in Tigray is perhaps about 1200 stoves per year[8]. Such low level of market up take for Mirt in Tigray could be due to the negative impact of coupon driven sales and distorted perception of the stove price. Sales of Mirt in many places in Tigray is litrally stopped as consumers are waiting for the adjusted price of the stove (slim Mirt) and producers are not able to sell the stove at actual price. It should be noted that the acceptability of Mirt in Tigray is also low as compared to other Regions. It is observed during field visits that significant number of consumers have altered the door size so that it can accommodate the type of wood used in the Region. Furthermore, since the tradition of using enclosed stove has already been there, perhaps the merits of Mirt may not be appreciated much.

In Amhara and Oromia Regions Mirt sales is growing without a subsidy in coupon system. Other promotion tools are just doing well. Sales figures for 2007 are recorded only up to the month of October. Sales figures for 2007 has already excelled that of 2006 in Amhara Region. In Oromia, the 2007 figure will be surely higher than that of 2006 if figures for November and December were added. Sales records in Amhara and

[8] The estimation is made by extrapolating the sales reported in September and October in 2007 where coupon system has been temporarily discontinued since mid 2007.

Oromia could be taken as control variable for the effectiveness of coupon system.

The coverage of some promotional tools such as TV ads and perhaps publications including bulletins and news papers are in urban areas as their availability in rural areas is literally nil. For rural market segment, appropriate promotional tools that can reach and be appreciated by rural communities must be identified in order to be effective in raising awareness and increase demand for Mirt stove. Effectiveness of promotional tools has been assessed in both urban and rural areas where Mirt stove has been disseminated. Development agents in Oromia are very effective in creating awareness and influencing rural customers to purchase Mirt. In Goba Zuria and Sinana Woredas rural sales are almost in equal proportion to urban sales, which is clearly attributable to the efforts by development agents.

Figure 4.3: Awareness of promotion tools and their effect in influencing purchase decisions.

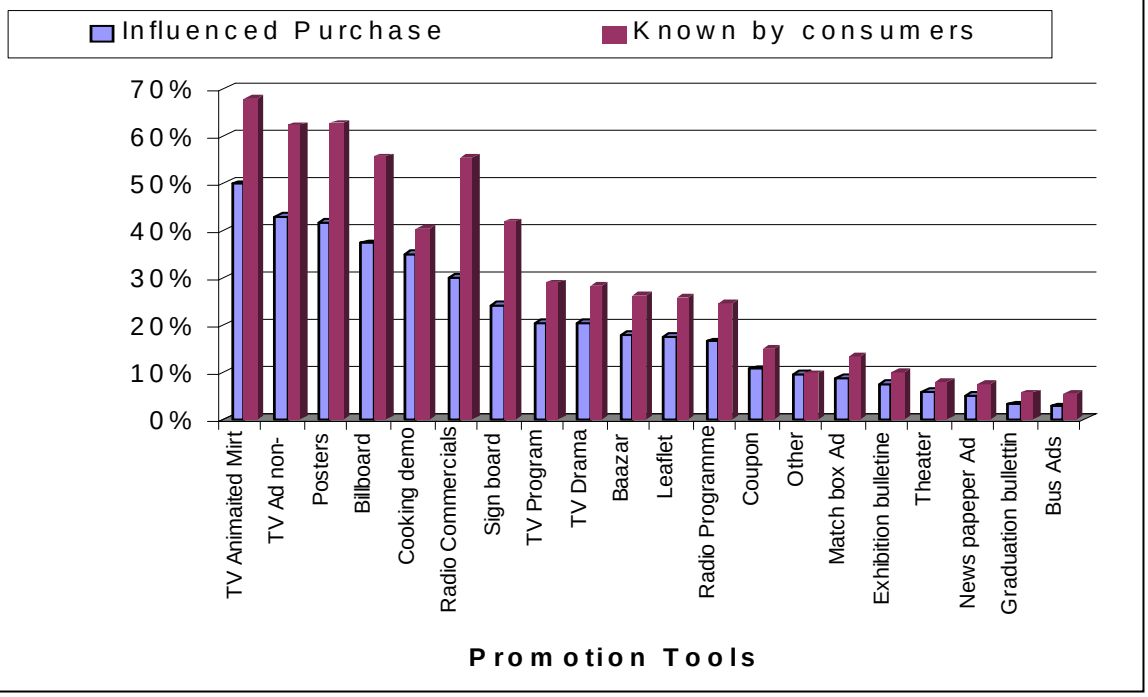


Figure 4.3 above summarizes the responses given by all urban and rural consumers whether they know or aware about certain promotion tools and as to which tool influenced their purchase decisions most. The category "Other" in Figure 4.3 above and Figure 4.4 below includes producers efforts, awareness creation by Development Agencts, and word-of-mouth from users of Mirt. The graph presents promotion tools according to their level of influence on consumers' purchase decisions in descending order from left to right. TV ads, both animated and non-animated Mirt, are the most known and most influential in terms of

persuading customers to make their purchase decisions. Posters come to the third level followed by billboards. Actual cooking demonstration comes to the fifth place even though it is not so widely know as radio commercials. It is evident that cooking demo is more influential than radio ads as visual impact is stronger than that of audio. In terms of coverage, however, radio is the most effective means as it covers both urban and rural targets. Publications are the least known and least effective means of promotion as their distribution is mainly to a different target (i.e. academia, business world).

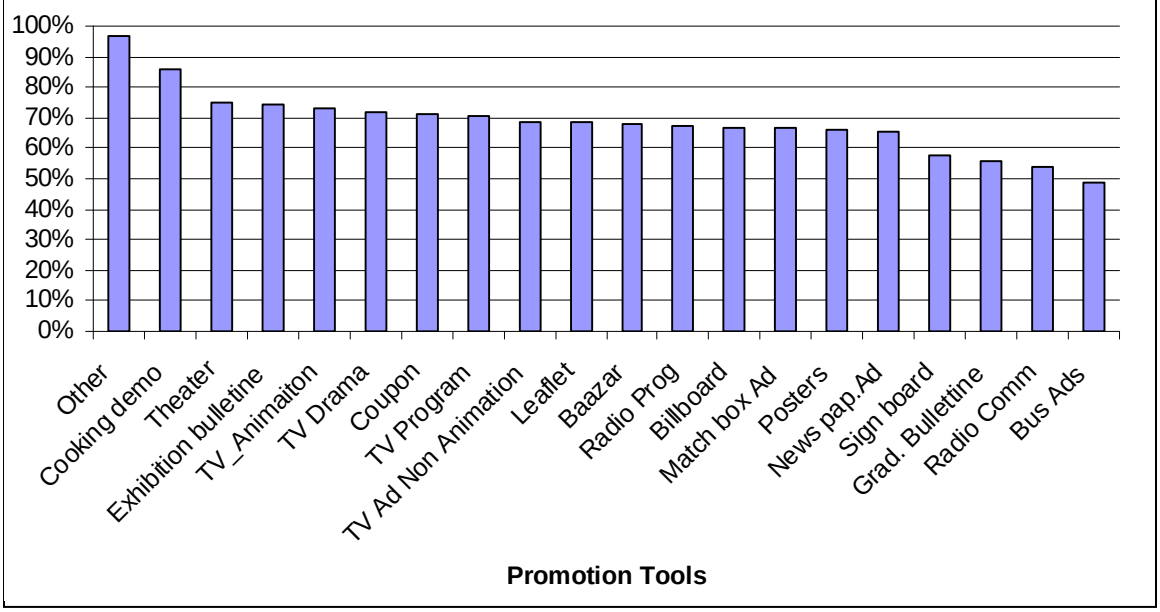
Knowledge of coupon sales is overshadowed as it has never been well known in Amhara and Oromia until the time this study has been conducted. However, considering responses from Tigray only, 43% are aware of the coupon sales while in actuality 56% of the consumers interviewed purchased the stove with the coupon system. Most stoves disseminated by development agents from Agriculture bureau buy the coupons with the money they collect from rural consumers. Some rural consumers may not know the actual price of the stove as they simply paid only the coupon price. This is an indication that some consumers are not aware of the subsidy behind the coupon.

The effectiveness of promotion tools can rather be measured more precisely, irrespective of their geographic coverage, by asking consumers who know the promotion tools and how much they were influenced by them to make their purchase decisions. Even though consumers' decision to purchase the stove is the influence of multiple promotional tools, some tools are still more influential than others.

Figure 4.4 below is deduced from responses of consumers regarding the effectiveness of promotion tools on their purchase decisions.

It is basically the ratio of "Influenced Purchase" to "Known by Consumers" in Figure 4.3 above. This ratio depicts how effective a certain promotion tool is in terms of convincing consumers. The word "convincing" in the previous statement presupposes the 'knowledge' of the promotion tool by consumers. Figure 4.3 above is talking about the general case for urban and rural including those who have heard about (or know) the promotion tools and those who have not. Figure 4.4 is rather focused on consumers telling only about promotions tools they know. In other words, Figure 4.4 below is the outcome of the analysis for consumers responses as to which promotion tools they know influenced their purchase decisions most. This is not a measure of geographic coverage but effectiveness in terms of influence on consumers.

Figure 4.4: Effectiveness of promotion tools regardless of their geographic coverage

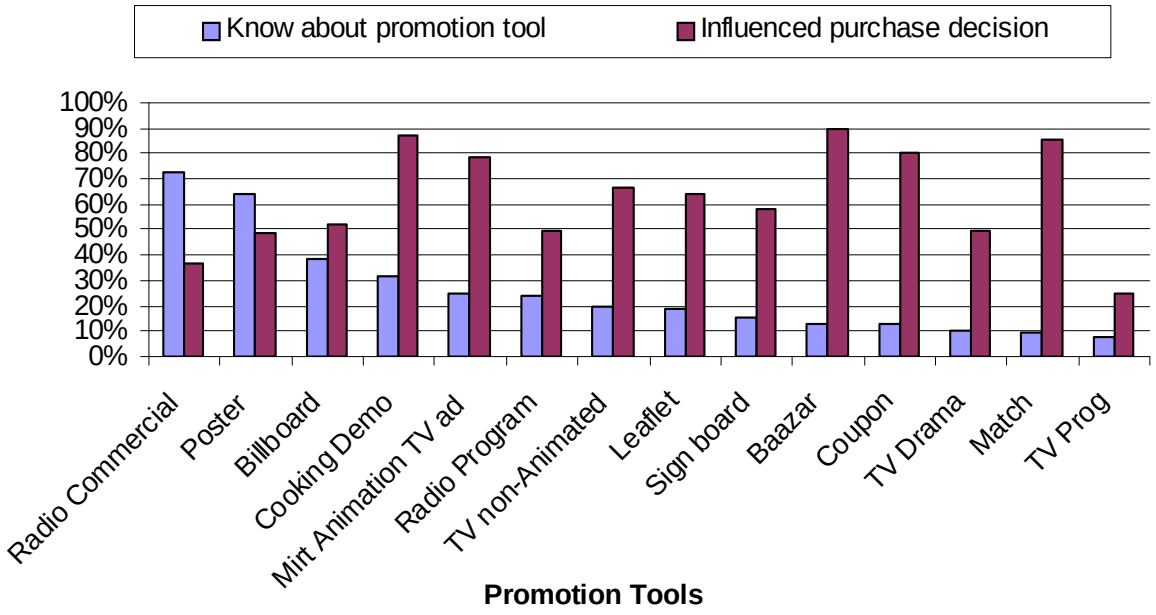


'Other' means of promotion, apart from those directly implemented by the project, includes producers own efforts, awareness creation by development agents and most of all recommendations about the stove by relatives, neighbors and friends who are using it. Stoves recommendation by other users is the most effective promotion tool. Of the total number of consumers who heard about the stove from 'Other' sources, 97% purchased the stove. Cooking demonstration is the second most effective tool. Out of those consumers who got the chance to see the cooking demo, over 85% were influenced by it and purchased the stove.

Some promotion tools such as cooking demos, theater and publications had limited coverage but were influential on those who got the chance to watch them.

When it comes to reaching the rural population, promotion tools such as TV ads are not applicable in most cases since TV set and the electricity which powers them are not available. Tools that are most effective in reaching the rural population are summarized and presented in the figure below.

Figure 4.5: Promotion tools known by rural consumers and their influence on purchase decision.



Radio ad is the most known promotion tool by rural consumers in that over 70% of them have heard it. In terms of influence however, only 30% of those who heard the ad were influenced by it to make purchase decisions. Following radio ads, posters and billboards come consecutively. Posters were distributed among rural population and local government administration offices. Billboards are permanently standing at main gates of towns where rural people see them when they come to towns on market days or for some other reasons. All cooking demos were conducted in towns where there were social gatherings like market places and church areas. Only 30% of rural consumers have seen cooking demos but a great majority of those who have seen the demos (85%) were influenced by it.

Some promotion tools have wider coverage but are less influential while the converse is true for others. The ultimate choice of cost effective promotional tools should take the target market into consideration. To optimize a certain tool for both urban and rural coverage as well as effectiveness in influencing purchase decisions may not be straightforward. Use of multiple promotion tools therefore seems inevitable to reach different market segments.

Table 4.5: Promotion Tools Evaluation Matrix

Promotion Tools	Reaching Target Market		Influencing Purchase Decisions		Cost	Remark	Yes/ No
	Urban	Rural	Urban	Rural			
TV ad – Animated Mirt	High	Low	High	High	High	Very high effect in urban centers	Yes
TV ad – non-anim. Mirt	High	Low	Medium	Medium	High	Very high effect in urban centers	Yes
Poster	High	High	Medium	V. Low	Low	At present distribution is low in rural areas	Yes
Billboard	High	Medium	Medium	Low	Low	Permanent	Yes
Cooking demo	Medium	Medium	High	High	Low	Should be conducted by local producers- not by Project staff	Yes
Radio Commercial	High	High	Low	V. Low	Medium	Very high urban and rural coverage	Yes
TV Program	Low	V. Low	High	V. Low	High	The effect compared to the cost is very low	No
Sign board	Medium	V. Low	Low	Low	Low	Redundant – rather put billboards on each city/town gates.	No
TV drama	Low	V. Low	High	Low	High	Too expensive but less effective	No
Radio Program	Low	Low	Medium	Low	High		No
Bazaar	Low	V. Low	Medium	High	Low	Basically is cooking demo	Yes
Leaflet	Low	V. Low	Medium	Medium	Low	It is primarily a How to Use Guide; Producers train customers; Cheaper material can be used.	No

Table 4.5 (Contd…): Promotion Tools Evaluation Matrix

Promotion Tools	Reaching Target Market		Influencing Purchase Decisions		Cost	Remark	Yes/ No
	Urban	Rural	Urban	Rural			
Coupon	V. Low	V. Low	High	High	High	High in coverage & High in influence in Tigray – but involuntary; Distorts the market	No
Publications	V. Low	V. Low	Low	V. Low	Low	Not very appropriate for the target group	No
Match box	V. Low	V. Low	Medium	High	Low	Over all effect is low,	No
Recommendation by other users, Development agents, Producers themselves.	Low	Low	High	High	No cost	Current penetration rate of stove is low; It happens by itself	Yes
Note: Ranking based on consumers responses: Reaching Target market: High > 50%, Medium 30%-50%, Low 20%-30% , Very Low < 20% Influencing Purchase decisions: High >70%, Medium 60%-70%, Low 50%-60%, Very Low <50%							

The table above summarizes the outcome of this assessment regarding cost effectiveness of promotion tools either in creating awareness at a larger scale (in terms of area coverage) or in influencing the purchase decisions of customers. Hence, TV ads, Radio commercials, Posters, Billboards and Cooking Demonstrations are the most cost effective promotion tools.

4.3 Individual Differences: Dedication and Commitment

Individual differences also matter in achieving higher sales or becoming a successful business person. Given equal opportunities some producers became very successful in Mirt business while others could not be. Comparisons made among producers with all other things being equal prove individual differences. The following table shows producers from same town with same business starting date but very big difference in their average annual sales.

Table 4.6: Comparison of individual differences in performance among producers

Woreda	Producers	No. of stoves sold per year
Oromia, Ambo	Producer A	54
	Producer B	435
Amhara, Bahidar	Producer A	72
	Producer B	475
Tigray, Adwa	Producer A	54
	Producer B	255

The impacts of Mirt business on the livelihoods of producers are also related to the individuals' level of dedication and commitment to the business. Some producers transformed their life dramatically, while for others it is just a supplementary income. The successes and life transforming impacts of Mirt business in some of the producers is discussed in the section for case studies.

4.4 Some Issues on Sustainability and Replicability of Mirt Commercialization

Developing a sustainable commercial market for Mirt stove depends on how well potential risks are identified and mitigated, and the supply chain is developed. An assessment of potential risks and possible mitigation options are discussed in Table 4.7 below.

Table 4.7: Potential Risks and Mitigation Options

Risk	Description	Relative Rating	Opportunities/ Risk mitigation
Technology risk	Risk of performance of technology	Low to Moderate	• Performance of stove proven in lab and in actual cooking tests, • Stove has been commercialized for at least a decade – performance is witnessed by users (fuel saving, IAP reduction, protection from burns, convenience), • Type of fuelwood (size and type) mostly used in recent intervention areas (in Tigray) seems not to fit well in the stove, • Modify the stove with minimum R&D effort to increase applicability while maintaining performance efficiency – work closely with relevant organizations (Government, NGO, Private).
	Risk of acceptability of technology	Low to Moderate	• Fuel saving, IAP reduction, protection from burns and convenience are some of the features of Mirt appreciated most by customers, • Some resistance in Tigray regarding suitability of the stove for the type of fuelwood they are using,

Table 4.7 (Contd…): Potential Risks and Mitigation Options

Risk	Description	Relative Rating	Opportunities/ Risk mitigation
Policy Related risk	Risk of insufficient government policy	Low	• Household energy is one of the main government agendas from ensuring supply of cooking fuel to sustainable utilization of natural resources points of view. • Regional governments are also promoting Mirt stove
	Risk of insufficient program support/ GTZ	Low	• Efficient utilizations of fuel wood by urban and rural consumers will reduce demand and hence supply which ultimately reduce the burden on the natural resources base – primary objective of GTZ watershed management. • Reduction of IAP (with Shell Foundation) a new interest for GTZ • Access to modern energy resources/ technologies (with DGIS) a new interest for GTZ
Financing risk	Risk that producers lack adequate financing	Low	• Start up capital is low • Already hundreds of producers trained, equipped and deployed.
	Risk that consumers will lack adequate financing to purchase the stove	Low to Moderate	• Despite a continuous increase in price of raw materials sales in Amhara and Oromia is increasing.,
Implementation risk	Risk that supply chain of the stove may not develop evenly	Low to Moderate	• Raw materials may not be readily available in rural areas in particular, • Fluctuating and high price of raw materials may affect the business, • In the absence of financial support/ subsidy sales in Amhara and Oromia Regions is continuously growing, • As a high mass stove rate of market up take could be low, • Assess for alternative raw material and conduct R&D – work closely with relevant organizations.

Table 4.7 (Contd…): Potential Risks and Mitigation Options

Risk	Description	Relative Rating	Opportunities/ Risk mitigation
Market Risk	Risk that there will not be sufficient market for the stove	Low to Moderate	• Over 90% of population bake/cook with biomass fuels, • Fuelwood is becoming very scarce as it is reflected in the continues increase in price or increased distance travel for collection, • Mostly, market target in rural areas collect fuel rather than purchase – but time saved from collection can be used for other productive use or household chores.

It should be noted time and again that market up take for high-mass stoves is very slow. This has been seen from local and other countries experiences. Once a sustainable commercialization of such stoves is reached, wide scale dissemination can be supported with market based strategies that will not disrupt the already developed market.

A sustainable commercialization can be said reached if a product is acceptable by consumers, earning from the business becomes a means of livelihoods for suppliers/ producers and most importantly if the business/the market develops resilience so that it recovers from shocks. Seeing in light of these parameters, despite slow but steady sales growth the market for Mirt in Oromia and Amhara Regions seems to be very close to reach a sustainable commercialization stage. Producers assessment shows that active producers based and improved their livelihoods in Mirt business, sales records prove a continuous but slow growth of sales, even in times of difficulty due to rise of raw materials prices. In fact, more than ever it is during this period that high sales figures are reported in Amhara and Oromia Regions.

4.5 Future Promotional Strategy

Lessons learnt from this assessment are helpful in the choice and implementation of promotion tools and identification of appropriate strategy for wide scale dissemination of Mirt stove in urban and rural market targets.

Promotion tools

Based on the cost-effectiveness assessment, the following promotion tools are recommended for future use.

- TV Ads (Animated and non-animated Mirt)
  - TV ads are very effective in urban areas for awareness creation as well as influencing purchase decisions
  - Costly but nation wide coverage

- Radio ads for rural and urban population
  - primary means of creating awareness in rural areas,
  - not very costly but medium influence

- Cooking demonstration :
  - very effective in influencing purchase decisions both in urban and rural areas,
  - can be cost effective if conducted by local producers with support provided by the Project,
  - it can be carried out cost-effectively not only in major towns but also in several rural villages,
  - can be conducted quite frequently at various locations in the same towns, villages or rural settlements if carried out by producers themselves,
  - location and timing is very important (in market places in market days, special religious occasion near and around churches, major social events and gatherings),
  - special occasions can be organized for rural dwellers by development agents so that cooking demo can be carried in rural areas.

- Posters
  - Poster is semi-permanent and can be distributed to wider areas. At present, distribution of posters to the rural population is moderate to high.
  - Has high impact in creating awareness though not very effective in directly influence purchase decisions,
  - Wide distribution of posters can be achieved at a relatively low cost but creates awareness among larger market targets,

- Billboards
  - Are permanent and low cost
  - Reaches both urban and rural
  - Could reach more rural population if put in major rural villages where main rural travels happen,

- Coupon system

  Employing coupon system in Amhara and Oromia Regions would do more harm than good. It was discussed in the above sections that commercialization in these two Regions is already going well without any subsidy or coupon system. Coupon system may be useful in areas where Mirt is recently introduced to initiate sales and make the stove known. Then the stove will sell itself if it gets acceptance by the local consumers. The influence of word-of-mouth from early adopters is highly critical in promoting or demoting the stove or any other commodity at the early stage of commercialization. Use of coupons should therefore be used to only encourage first few buyers.

  - Coupon system should be used only as a promotional strategy - not a marketing strategy,
  - Only few hundreds of coupons should be distributed as promotional strategy to jump start sales by encouraging new adopters to purchase the stove in new intervention areas,
  - Ensure that customers know the purpose of the coupon system and that it is only temporary,
  - Ensure that customers do not consider the coupon price is the actual price of the stove.

Project Supports

Project support should focus on creating market using appropriate promotion tools, training of more producers in new areas and building their capacities technically and financially, and work closely with partner organizations in developing strategies so that the market by itself responds and recovers from shocks. It may include:

- Investing more on producers by training and equipping them. It should include training and capacity building to more metal workers to become suppliers of production molds,
- Create demand for the stove through market based means – promotion,
- Lobbying with and raise awareness of Regional and Woreda level government officials in order to create a conducive environment for the market to develop. This may include tax holidays/ exemption, acquiring of production plots, etc.
- In areas where the stove has limitation in meeting customers requirement, adapt the stove so as to meet the requirement while maintaining an acceptable level of performance. Such kind of supports can be coordinated with relevant government

organization such as Ministry of Mines and Energy and Regional energy bureaus.

Sales Recording

As discussed in the above sections the current sales recording mechanism of the project is not very efficient as it under estimates total sales by a significant percentage due to poor recording discipline of producers. Efforts have been made by the project by providing trainings on small business managements and various types of sales and raw material purchase recording methods.

To improve sales recording mechanisms the project should perhaps put the following additional efforts:

- Keep on recording sales figures as it has always been done,
- Once in a year collect sample sales figures with close discussion with representative sample producers from all three regions to get a correction factor to adjust the total sales,
- Conduct a quick random sample survey to estimate the penetration rate of Mirt stove,
- Gauge spill over effects of efforts made in project areas to other area – Southern Nations Nationalities and Peoples Region (previous GTZ-HEPNR project area) and other areas outside the three project regions.

5. ASSESSMENT OF PROJECT IMPACTS ON PARTNERS AND OTHER STAKEHOLDERS

The GTZ household energy project was primarily designed to supplement the efforts towards protection and sustainable utilization of the natural resources by introducing demand side management measures in the household sector whereby biomass cooking fuel would be used efficiently. For successful implementation of the project, GTZ had to identify and work with relevant partner organizations and stakeholders at federal, regional and Woreda levels.

Energy is a cross-cutting issue in that it directly or indirectly involves a number of organizations. When it comes to household energy, organizations whose major area of intervention is related to heath, gender, child-care, environment (conservation of natural resources, emission reduction), or improving households' access to energy are all stakeholders. They are potential resources that can be used to further the realization of the project objectives. On the other hand, these same stakeholders can become obstacles and stumbling blocks for implementation of project activities if they are not properly engaged in and aware about the project activities and adopted methodologies.

5.1 Project Implementation Partners

Since the GTZ household energy project was conceived under the natural resource protection program that GTZ had been implementing with the Ministry of Agriculture and Rural Development (MoARD), it was obvious for MoARD to continue being their primary partner under this project too. Household energy is the issue that the project is mainly dealing with, though focusing more on the dissemination of appropriate technologies for the household sector. Apparently, Ministry of Mines and Energy (MME) is the mandated government organization that deals with energy issues – in particular the Ethiopian Rural Energy and Promotion Center (EREDPC) for non-conventional energy issues including household energy.

Table 5.1. Project partners at various levels of government structure:

Governance Level	Amhara	Oromia	Tigray
Federal Level	MoARD and MME		
Regional Level	• Agriculture Bureau, • Mines & Energy Resources Development Agency	• Agriculture Bureau • Mines & Energy Resources Development Agency	• Agriculture Bureau • Water, Mines and Energy Development Bureau
Zone Level	• Agriculture Office	• Agriculture Office, • Mines and Energy Development Office,	• Water Resources, Mines and energy Development Office,
Woreda Level	• Agriculture Office	• Agriculture Office • Energy Desk (accountable to Woreda Council)	• Agriculture Office • Water Resources, Mines and Energy Development Office

The structure of the partner organizations is not uniform in all Regions. In Amhara Region, Energy structure is only at Regional level. It is the Agriculture Offices that are mandated to carry out household energy related activities at Woreda level and further down. In the other Regions, the energy structure continuous all the way to Woreda level. Therefore, defining mandates, roles and responsibilities at Federal and Regional level is critically important not only in saving duplication of efforts but also in avoiding potential problems that may arise due to conflicting interests, and mixing up of mandates in terms of taking authority, accountability and credits. Apparently, such confusions of mandates and roles have already caused lose of desirable synergy starting from federal level government organizations down to Woreda levels.

5.2 Major Stakeholders

During the course of implementing project activities, the Project has identified a number of stakeholders interested in incorporating the project idea in their activities.

Table 5. 2. Major Categories of Stakeholders

No.	Name of Organization	Relevant activity	Capacity Building efforts by the Project	Target Groups
1.	NGOs, Civil societies,	Advocacy	Awareness creation	Government, rural communities, Refugees,
2.	NGOs, World Food Program , Austrian Development Corporation		Producers Training and stove promotion	Outside GTZ-SUN project areas,
3.	NGOs	• Health, environment, gender,	• Stove dissemination	Outside GTZ-SUN project areas
4.	Private sector, NGOs	• Creating employment opportunities ,	Technical support (Mould production, raw material supply)	Stove producers
5.	Regional/ Woreda level – Trade and Industry Offices, local government administration units,	• Facilitate trade and business opportunities • Tax revenue collection	Awareness creation – environmental benefits and employment opportunities	Mirt stove producers,
6.	Micro Finance Institutions	• Loan financing consumers	Administer the subsidy system	Consumers,

The project has organized and conducted several capacity building activities in terms of awareness creation and technical training in anticipation of engaging interested stakeholders in the stove dissemination business. Technical stove production training has given to over 300 experts from stakeholder organizations and also conducted two workshops for awareness creation where over 160 representatives from 130 organizations participated.

Table 5. 3. Workshops held and Mirt stove production trainings provided to stakeholders

Awareness creation and Capacity Building Activities	Oromia	Amahara
Workshops conducted (in 2003)		
No. of Workshops	2	2
No. of participants	84	77
No. of organizations represented	72	58
Stove production Training to experts from stakeholder organizations (in 2006/07)		
Experts trained	184	161

5.3 Impacts

- Some NGOs and government organization started to disseminate Mirt stoves either as a free hand-out, or introducing a technique where producers themselves produce their own stoves – dedication indicates that they are well aware of the benefit of stoves but their method of dissemination may not result in sustainable commercialization of the stoves,

- Trade and Industry Bureaus in Amhara Region cooperated in finding strategies that Mirt stove producers may not be discouraged by taxes at the infant stage of their businesses,

- Regional government become more aware of the fact that fuelwood is scares and dissemination of improved stoves such as Mirt is mandatory –
    - Mirt becomes one of the items in the agriculture package for rural families,
    - In Tigray, the Regional government set aside a special budge to be used for promotion and wide scale dissemination of Mirt,

5.4 Issues and Implications for Future Commercialization Efforts

The impacts of the Project activities to engage stakeholders in the dissemination of Mirt have become partly successful. However, the methodologies adopted by some of these stakeholders can hamper efforts towards building a sustainable commercialization network for wide scale

dissemination of the stove. In addition to this, the mixing up of mandates by partner organizations will also be a potential problem in future activities of the project. Some of these issues are highlighted below:

- Regional government in Tigray committed over 3 million Birr to subsidize all Mirt sales by 50%. This shows the level of commitment by the Regional governments but the consequence of which is a total damage to the commercial sustainability of the stove. This is perhaps the consequence of the bad lesson learned from the coupon system the project introduced in Tigray. Now, it requires a great deal of effort to roll-back the damage. Precaution must be taken in other Regions where coupon system is just introduced.

- The coupon system in Amhara and Oromo regions is not being properly managed by the implementing institutions. In some towns Micro Finance Institutions (MFIs) try to limit distribution only to their existing customers only while the some Agriculture Office experts wrongly advise MFIs to set aside higher proportion of coupons for rural sales only without the knowledge of the Project personnel. This not only mismanagement but also opens door for favoritism and nepotism to benefit certain producers.

- Adapting a promotion strategy that deviates or not acceptable by government policy is a potential risk that could possibly bring a total failure in the effort for wide scale dissemination of Mirt stove. Subsidy is against the Regional government's policy at least in Amhara Region. Project partners in Amhara Region commented that the subsidy approach is not in line with the Regional government's policy.

- Some government partners commented that the execution of project activities is not well coordinated. Activities and schedules were supposed to be planned together or in consultation with local partners. Now, the relationship is reported by some partners as loose and, project plans and budget are hidden. Some Regional level partners also strongly commented that there is no transparency from GTZ side in terms of procedure, working program and the budget allocated for the region. For them activities by GTZ seems spontaneous.

- Agriculture offices suggested that full participation of Energy Offices is crucially important. Coordination is highly needed. Energy offices do have budgets for stove dissemination but in some regions the energy structure is newly formed and personnel are novice for implementation of such activities. They need special capacity building and operation manual on how to effectively disseminate stoves.

- In some Woredas Energy Offices are planning to incorporate Mirt in the health package while Agriculture Offices are already doing it with the Agriculture package. This means a single rural household could purchase two Mirt stoves – one in each package.

5.5 Supply Enhancement Intervention

Supply enhancement is a complementary strategy that the project recently adopted as a twin track strategy to tackle the burden on the natural resource base due to biomass fuel demand. Plantations of fast growing energy trees in private homestead farming are the methodology adopted. Activities have already started in Oromia Region in Sinana Woreda in Bale Zone where over 20,000 seedlings of eucalyptus globules were distributed. In addition to this, an agreement was made between GTZ SUN-E and Organisation of Rehabilitation and Development in Amhara (ORDA), a local NGO, to address supplies enhancement component of the project through nursery establishment and plantation activity in Zege peninsula. Zege peninsula is one of the major fuel wood supply source to Bahir Dar.

It is yet too early to comment on the strategy used for promoting supply enhancement activities. However, it is important that the project should learn from experiences of other organization. The Ethiopian Rural Energy Development and Promotion Center, which has implemented several projects in various regions as part of the World Bank financed Energy Access Project.

6. SUMMARY DISCUSSION OF IMPLICATIONS OF FINDINGS TO EXPANDED COMMERCIALIZATION OF MIRT STOVES

As an energy-efficient domestic cooking device, Mirt biomass Injera stove has enormous potential for conserving natural resources while at the same time saving on cooking energy expenditure, improving in-door air quality and reducing drudgery on women who are often responsible for collecting firewood and preparing meals. It was such appeal and potential of Mirt that attracted donors to support its large scale dissemination back in late 1990s. A brief discussion of performance and adoption of the Mirt stoves among consumers, key issues pertaining to the stoves commercialization strategies and prospects and perceived challenges for continued commercialization of the stoves are presented in the proceeding section.

6.1 Adoption and Performance of the Stoves

Consumer perception is the key to the successful adoption and commercialization of any technology. Likewise, consumer perception of Mirt stoves is extremely positive. Consumers liked and purchased their stoves for a variety of reasons including fuel economy, improved health due to reduced smoke, heat and risk of burns, speed of cooking and cleaner cooking environment and personal hygiene. In terms of fuel economy, for instance, overwhelming majority of consumers did not only perceive fuel savings in actual use of their stoves, but the majority of them were also able to estimate how much fuel, and hence money or time, they have saved due to their new stoves.

Similarly, other health and related benefits of Mirt stoves were greatly appreciated by their consumers. Due to scale economies involved in commercial Injera baking, Mirt is by far more appealing to and appreciated by those consumers who used the stove to bake Injera for sale. In addition to consumers own perceptions, a clear indication of the rate of adoption of Mirt is the fact that those consumers who used their stoves used them regularly, i.e., almost every time they baked Injera. Such positive perceptions about the qualities of Mirt do not only signify the levels of consumer satisfaction and acceptance the stove is enjoying currently, but they are also extremely important for its image and prospects in the future.

On the other hand, however, the popular acceptance of the stove among the majority of its consumers should not mislead one into complacence.

As we shall see in the next section, significant numbers of consumers have found it difficult to adopt the stoves particularly due to its 'small' door size to fit in the type of firewood they are using.

6.2 Key Issues

It has been over a decade since Mirt stoves were tested in the laboratory and optimized for various fuels and suitability of alternative raw materials tested and approved for the stoves' production. So many things have changed since then. But, very little, if any, has been done in terms of adaptive research in the field of product development and improvement. True, the SUN Energy project under its Shell Foundation supported phase has recommended some modifications aimed at primarily reducing the weight of the stove, which was later implemented during the DGIS phase of the project. As a starter, efforts that went into the design modification and production of the '*Slim'* Mirt are appreciated. It was a commendable job. But, too little too late; unless one argues that 'better late than never'.

The point is, there are several issues related to design modification and raw materials that, if properly addresses, could have contributed significantly to improve further the image, acceptance and marketability of Mirt stoves. For instance, the rate of adoption of Mirt is lower in Tigray region, where it was expected to be he highest. Because, firstly, consumers in Tigray are used to shielding their fires traditionally, and secondly, biomass fuels are relatively more scarce and hence more expensive in Tigray than other parts of the country. Therefore, it was a bit paradoxical to see that significant numbers of consumers were reluctant, at best, to adopt Mirt stove. This was neither the stove's fault nor is it that of the consumers. In the absence of a 'perfect' market where market forces play the role of a 'watch dog' and send signals to players to respond to consumer demands, it is the project sponsors and promoters to act as a substitute, bridge the gap created by market failures, and address consumer needs and preferences in a prompt manner.

Therefore, hand in hand with aggressive market promotion on the 'Slim' Mirt, limited but basic research and development work should be conducted to address issues if wider consumer acceptance and marketability of the stoves. Areas of for this research should include the effect of wider door size on stove's thermal performance, assessing options for optimizing the stove for consumer preferences without heavily compromising heavily on fuel efficiency, assessing options for optimal or even minimal use of cement as a binder, and last but not least, identification and testing of cheaper raw materials that are also easily

available in most parts of the country. As part of a product development and improvement process, the research should also look into the needs and preferences of commercial and institutional Injera bakers and explore options to integrate a chimney to the stove.

The second important issue that the Team observed during the fieldwork was that Mirt stoves were being sold as a package to rural consumers without their will and consent. Understandably, this was being done in order to reach out the unserved but more difficult rural market. However, this is likely to have some unintended consequences in terms of image and popular acceptance of the stoves. Moreover, it was also learnt during the fieldwork that some donors and development agencies were distributing stoves to rural consumers free of charge. In the shorter term, this will have beneficial impacts in terms of stimulating the market, raising awareness and above all providing a leverage, a springboard to producers to jump-start their businesses. It is important for the SUN Energy project to persuade and convince such donors and stakeholders to observe the rules of the game, i.e., commercial strategy, in their support to improved stoves dissemination initiatives in the future.

Thirdly, another important issue that needs some attention is the Project's stoves production and sales monitoring system. The SUN Energy Project maintains a well established sales monitoring database that is updateable at any one point in time. Mirt stoves production and sales data is collected regularly through telephone calls to all 340 producers in the three regions. Then, the data are recoded and the database updated every month. This database, as an internal monitoring tool, is intended to provide data and information useful for internal reality-check and informed decision making by Project Management.

The Project Team is working hard to maintain the database and the overall monitoring system accurate and up-to-date. The current monitoring system however, cannot actually perform more accurately in capturing of production and sales figures from producers than it is doing now. This is mainly because many producers are reluctant either to keep records of their activities, or to report them to the Project Office in Addis, or both. In effect, stove sales figures are inevitably underestimated. In some cases, the underestimation is over 100%. Therefore, the Project should look into ways and means of improving the efficiency of its sales monitoring system. Judiciously planned and executed random check on producers could give information on order of magnitude, which can then be used to adjust the figures accordingly. If the SUN Energy Project needs to establish Mirt stoves' penetration rates in all its focal regions, however, a better alternative is to conduct quick quantitative sample surveys using simple random sampling technique.

Fourth, in response to a slow down (actual or perceived) in demand, the Project, based on its previous experiences in Tigray region, has introduced a system of subsidy that is based a pre-paid coupon. The Project's intention in subsidizing stove prices is to stimulate demand that has become 'sluggish' ever since the price of cement sky-rocketed and reached a record-high three or even four fold. According to the Team's observation, two points are crucial at this juncture. Firstly, the administration of coupon-based subsidy sales was not functioning as properly as it was intended to. Unlike the normal commercial sales, administration of the coupon-based subsidy involves players other than the usual producers and consumers. Staff of Agricultural and Rural Development Offices, Rural Energy Development Offices and Micro Finance Institutions (MFIs) are all involved with the administration of the subsidy process. Leaving the issue of confusion on their respective roles and responsibilities aside, the sheer numbers of players involved in the processes of the subsidy made its administration difficult, extremely bureaucratic, and hence, inefficient. Secondly, and more importantly, the subsidization of prices was applied down stream, i.e., consumer price subsidy. This is not judicious.

All forms of subsidy are bad for business. But, some forms of subsidy are more damaging to businesses than others. According to some Regional Government officials, such a subsidy is not in line with the Federal government's economic policy. Thus, the study Team is of the opinion that subsidizing consumer prices does more harm to the infant Mirt industry than good in terms of sustainability. That is why, consumer price subsidy was avoided and it was applied only up stream, i.e., on producers in the form of training and technical assistance. During the fieldwork, some producers have already expressed their concern about the future of their market distorted by the coupon-based consumer price subsidy. It is true that raw material prices have gone out of the roof recently. It is also true that it is all prices of all 'basket of goods' that went up outrageously during the past few years. Besides, as it is over two years since the price shocks, which means many producers have coped with the new realities already, the timing when the subsidy was initiated does not seem to be right either. Therefore, it is high time for the project to discontinue the administration of consumer subsidy. Instead, the focus should be on intensifying efforts to control the damage already done by subsidization of consumer prices. The adverse impacts of consumer subsidy can easily be seen from extremely sluggish sales in Tigray right after the subsidy has been suspended since June 2000. The SUN Energy Project has actually learned lessons from the experience in Tigray and made it clear in Amhara and Oromia regions that the subsidy is only temporary. The Project should also act accordingly towards the termination of the coupons system.

Fifth, from the out set, the SUN Energy Project has been, and still working, with key project implementation partners at Federal as well as Regional levels. The official attitude toward Mirt stoves commercialization efforts of the Project can be termed as generally very good. However, some partners, while appreciating its achievements and commercial focus, have expressed their discontent with the way the Project is being implemented in their respective regions. The major point that was raised as key issue among the partners was the lack of transparency particularly on Project financial budgets. Besides, there seems to be lack of clarity on the mandates of the different partner government organizations. This seems to have led to unnecessary frictions between the institutions, which is detrimental to the ownership and sustainability of the whole project. Finally, it was also observed during the fieldwork that there was a huge demand for additional capacity building initiatives at the lowest level, i.e., Woreda DAs, Home Economics and Extension Agents, who are the prime movers of Mirt in rural areas.

It should also be noted that high staff turnover in partner organizations and structural adjustments in government organizations have affected project activities. Understandings and agreements made between the Project and partner organization may not be properly transferred to the new office and persons in charge. Similarly, when trained staff from partner organizations leave and new ones come, the project has to put additional capacity building efforts. It is however, up to the project to keep up with the pace of change. Ethiopian Rural Energy Development and Promotion Center believes that the Business Process Re-engineering (BPR) that is currently under way, will clarify the mandates of the different partner government organizations.

6.3 Prospects and Challenges Ahead

It has been repeatedly argued that Mirt has enormous potential for achieving global environmental as well as development objectives at macro (national) and micro (household) levels. However, 'potential' is something, but translating that 'potential' into practical benefits is completely another thing. Therefore, some of the key questions that need to be answered are: *'how much of that potential has been realized to date? Is there a room for further market expansion to maximize the benefits? Has there been any dynamic created as a result of previous initiatives? If any dynamic, then can this be built upon and capitalized? What could or should be done to maximize the rate and accelerate the pace at which the 'potentials' are realized?*

According to some simple calculations, a single household using a Mirt stove for Injera baking saves nearly 500 kilograms (kg) of woody biomass annually relative to three stone fire. The savings on woody biomass consumption are equivalent to four trees during the life of the stove, which is usually estimated at five years. In terms of financial savings to the households, every single Mirt stove used in domestic setting saves up to Etb 233 per household per year (Table 6.1 below). Obviously, the savings are several fold for commercial Injera bakers. Assuming a stove price of Etb 60, and the stoves are used for domestic Injera baking only, the savings also mean that Mirt pays back for itself in about 3 months.

Table 6.1: Implications of Potentials: Macro and Micro (Household) Benefits of Mirt Stoves

Stove Type	Annual Biomass Consumption (Tons)[9]	Annual Forest Land Equivalent (Ha)[10]	Annual Expenditure on Biomass for Injera Baking (Etb)[11]
Three Stone Fire	1.47	0.24	735.54
Mirt (Energy-efficient Biomass Injera Stove)	1.00	0.16	502.32
Savings Per Household (Based on Actual Lab Test Results)	0.47	0.07	233.22
Savings Per 150000 Households (Actual Recorded Sales)	*69,966.00*	*11,248.55*	*34,983,000.00*
Savings Per 200000 Households (Adjusted)	*93,288.00*	*14,998.07*	*46,644,000.00*
Savings Per 300000 Households (Projected)	*139,932.00*	*22,497.11*	*69,966,000.00*

On a national level, according to the SUN Energy Project Mirt sales records, a total of over 11,200 hectares (ha) of land with woody biomass cover is being protected from anthropogenic disturbances annually due to the 150,000 Mirt stoves that are currently in use in the households. The impacts on natural resources protection could be even greater if one considers the number of stoves that were sold but not captured by the Project's sales monitoring system.

On the market potential, Ethiopia has an estimated population of 80 million, which translates into 16 million households. Out of this, urban

[9] An average household bakes Injera 2.3 times a week and 30 Injeras in each baking session

[10] Assumptions: One hectare = 10 M^3 sustainable offset from a poorly managed resource base. 1M^3 = 622 Kilograms.

[11] Firewood price = 0.5 Etb per Kilogram.

households constitute nearly 2.5 million. Therefore, according to the number of stoves reported to have been sold, only about 8% of the urban population has had a Mirt stove currently. This is something, but, very little, compared to the bulk of majority (over 90%) of the urban population. If the project intensifies its promotion and manages to double its sales, say 300,000 consumers are reached in its remaining life time, it might have served only about 15% of the urban market. Even if the project aims to reach just a quarter of the urban market over the next few years, the potential market size would be over 600,000 households.

The market that is waiting to be served is simply enormous. It should be noted that this is without considering the rural market which could be estimated at several millions of consumers. As the project expands its frontiers to cover more geographic areas, its resources will be stretched to the limit. Besides, as the levels of commercialization of biomass fuels is still very low in many of the smaller urban centers and almost non-existent in rural areas, initially market uptake of Mirt can only be expected to be very slow in those areas. Among others, these are the two most important challenges that the project will have to face in its expanded commercialization of Mirt in the future. When the project reaches a level where the urban demand is served satisfactorily, then the same urban markets can be used as a launching pad for efforts to serve the more difficult and dispersed rural markets.

Finally, it is important to look back in Project's history and see if there is any dynamic that was created by as a result of its previous and on-going efforts. The SUN Energy Project has been working with several NGOs and government organizations over the last several years. The Project has provided training, capacity building, promotion and awareness raising and technical assistance to partners and stakeholders, In effect, some kind of dynamic seems to have been created. Because, there are improved stoves initiatives among a number of governmental organizations and NGOs outside the SUN Energy Project. For instance, Energy Offices of Regional Governments, were able to design improved stoves projects and obtained access to a World Bank funding through a project Energy Access. Similarly, NGOs such as Menchen fur Menschen and World Vision Ethiopia have incorporated Mirt as part of their integrated area development plan. Therefore, the momentum that was created as a result of the SUN Energy Project needs to be maintained and the dynamic protected and nurtured further in order to ensure wider dissemination of the stoves in a self-sustaining manner.

7. RECOMMENDATIONS

In the previous section, summary and discussion of key findings and their implications to wider commercialization of Mirt was presented. Based on those findings and their implications, some recommendations are forwarded in the following section.

7.1 Product Testing and Improvement

In order to improve the popular acceptance of the stoves further, consumer needs and preferences need to be addressed adequately and swiftly. There are regions and places where stove adoption rates are relatively low. This was primarily due to small door size of the stove which does not accommodate the type of wood being used by some consumers. Therefore, it is recommended that product testing and design modification, if necessary, should be conducted in order to address preferences of consumers as appropriate.

Secondly, it is recommended that the Project should seriously consider the need for continuous product improvement through basic adaptive research that would enable it respond to the changing market conditions, consumer preferences, and above all, improve the affordability and marketability of the products. Therefore, building on the gains from and experiences from the 'Slim' Mirt, basic R&D should be conducted to identify and test alternative raw materials that are both cheaper and more easily available. In this regard, the Gonzie Injera stove, which is a variant of Mirt and produced by EREDPC in recent years, could provide the bases for steps in the right direction.

7.2 Promotion and Marketing Strategy

The SUN Energy Project should continue adopting TV and Radio commercials, actual cooking demonstrations, posters and billboards as its promotional tools. With the exception of TV commercials, these same promotion methods are also recommended for rural areas. Given the effectiveness of actual cooking demonstrations in creating demand among those who attended or heard about it, the Project should strongly consider ways of reducing its costs so that more potential consumers can be reached. One way to reduce costs of demos is providing support to and bringing partners and producers on board to organize them themselves. Continued use of leaflets is also recommended on the grounds that they are less expensive and provide useful information to consumers on the correct installation and use of their stoves.

It is recommended that the coupon-based consumer price subsidy should be terminated immediately. In stead, the SUN Energy Project should divert resources meant for subsidizing consumer prices and launch damage-control efforts in order to mitigate the ill-effects the subsidy had already caused to the markets.

7.3 Market Expansion

In order to achieve critical mass and maximize benefits, the SUN Energy Project should expand the frontiers of Mirt stove market and embrace commercial Injera bakers and institutions that prepare food for large numbers of people. The stoves market should also be expanded to carefully selected new areas through further decentralization of production centers in an optimal manner.

Increasingly growing rural sales of Mirt in Bale Zone, Oromia state, provide a solid basis for designing strategies of commercialization to reach the rural market. Therefore, the Project should carefully study the key success factors in Bale and replicate them in elsewhere as necessary.

7.4 Institutional Issues

In the interest of the Project as well as its partner government institutions, it is highly recommended that roles and responsibilities of partners at Federal as well as Regional levels should be clearly defined perhaps at the most senior government level. To avoid any future confusion and misunderstandings between partners, mandates between research and development on the one hand, and promotion and dissemination on the other, should be clearly stated.

Secondly, in order to galvanize its existing good relationships with partners at different levels, the Project should be more transparent and involve partners more actively particularly in planning and budgeting aspects of the project. Besides, additional capacity building initiatives should be carried out to strengthen the staff of partner organizations at Woreda level.

7.5 Sales Monitoring System

It is recommended that the Project should improve the efficiency of its existing sales monitoring system in capturing useful sales data and information. One way of addressing this problem is to reduce the number and complexity of forms and information sheets required to be filled in by producers. But, the categories of rural and urban sales should be maintained. Another way to improve on the situation is to conduct a random check by senior project staff so that adjustments can be made to

sales figures accordingly. Finally, if stove sales should be estimated with much more accuracy, then a sample survey using simple or stratified random sampling techniques should be adopted for the future.

7.6 Supply Enhancement

Supply enhancement as a strategy to complement to demand-management, was initiated only recently. Therefore, it is recommended that the Project should draw on lessons and experiences from partners and stakeholders such as EREDPC who might have accumulated a wealth of knowledge, experiences and information in the area.

ANNEXES

Annex 1: List Persons and Organizations Contacted

No.	Name	Title	Organization	Region	Town	Telephone
1	AZ	Representative and Former Energy Expert	North Shewa Zone Agrculture and Rural Development Office	Amhara	Debre Birhan	NA
2	GM	Head	East Gojam Zone Agriculture and Rural Development Office	Amhara	Debre Markos	NA
3	Ato Wondwossen Mengiste	General Manager	Rural Energy Development and Promotion Agency	Amhara	Bahir Dar	NA
4	Ato Desalegn		Rural Energy Development and Promotion Agency	Amhara	Bahir Dar	NA
5	Ato Endalew Merzo	Representative	Mines Control and Follow Up Department	Oromia	Ambo	011 - 2364290
6	W/o Genet G/Michael	Energy Expert	West Shoa Agriculture and Rural Develoment Department	Oromia	Ambo	0911 - 398536
7	Ato Mechalu	Head	Tiyo Woreda Agriculture and Rural Development Office	Oromia	Asella	NA
8	W/o Etagegn Sharew	Energy Expert	Tiyo Woreda Agriculture and Rural Development Office	Oromia	Asella	022 - 3314827
9	W/o Beyenech Mengesha	Home Economics Expert	Tiyo Woreda Agriculture and Rural Development Office	Oromia	Asella	NA
10	Ato Nebi Morka	Head	Arsi Zone Agriculture and Rural Development Department	Oromia	Asella	0911 - 638239
11	W/o Bekelech Tolla	Mirt Stove Producer	Private	Oromia	Asella	0911 - 840985
12	W/o Aberash Bekele	Representative	Bale Zone Mines and Energy Department	Oromia	Robe	022 - 6652430
13	W/o Ejigayehu	Energy Expert	Goba Woreda Agriculture and Rural Development Office	Oromia	Goba	0911 - 774084
14	W/o Tirfinesh	Extension Programme Team Leader	Tigray Agriculture and Rural Development Bureau	Tigray	Mekelle	NA

No.	Name	Title	Organization	Region	Town	Telephone
15	W/o Aheza Woldu	Rural Women's Development Expert	Eastern Tigray Zone, Agrculture and Rural Development Office	Tigray	Adigrat	NA
16	Ato Gebrehiwot Gebre Egiabiher	Head	Eastern Tigray Zone, Water Resources, Mines and Energy Office	Tigray	Adigrat	NA
17	Ato Sa'are Tajebe	Head	Catholic Church Relief Services	Tigray	Adigrat	NA
18	W/o Bire Waye	Home Economics Expert	Alamata Woreda Agriculture and Rural Development Office	Tigray	Alamata	NA
19	Ato Solomon Hadish	Head	Alamata Woreda, Water Resources, mines and Energy Development Office	Tigray	Alamata	NA
20	Ato Feseha	Department Head	Tigray Water Resources, Mines and Energy Development Bureau	Tigray	Mekelle	NA
21	Ato Asres W.Giorgis	Director	Ethiopian Rural Energy Development and Promotion Center	14	Addis Ababa	0115 150465
22	Ato Tesfaye Alemayehu	Team Leader	Ethiopian Rural Energy Development and Promotion Center	14	Addis Ababa	

Annex 2: Presentation of Producers' Case Studies

Case Study 1: The Case of 'GW'
Mirte Business Gives a Bankrupt Businessman a Second Chance to Life

'GW' is over 60 years old now. He was born, brought up, educated and lived all his life in the same town. He was brought up by his God-father. He used to run and look after his God-father's business who then was an old man in his 70s. His God-father promised 'GW' that he will be treated like his own child and he will inherit his property accordingly.

" *…one day he old man, says 'GW', told me that he is too old to run his grain milling business and asked me to quit my education (at that point, I was promoted to Grade 10) and run the business. The old man also promised to give me one of the grain mills in return to my services. When all these was discussed and agreed between us there were neither witnesses nor a written agreement. It was all done informally, which paid for dearly later".*

Despite all these promises, things did not work out well for 'GW' according to his expectations. Upon a sudden death of 'GW's God-father, legal heirs came into the picture more assertively and denied 'GW' of any rights as a heir. *"… they asked me if I have any evidence, written ot otherwise, regarding his claim on the property of their deceased father. At this point, I knew I have lost the case and decided to give it all up".*

With whatever money was left in his hands, 'GW' engages himself in grain trading. He says, as competition becomes tougher profit margins declined by the day. His business went bankrupt. He could not support his family any more. *"… I was really disturbed by events all of which happened to be working against me. I was frustrated, became mentally unstable and fallen ill for sometime. …. I changed my religion from Coptic Christianity to Protestant. This helped me to recover from my illness and gave some of for the future. But, the act disappointed my ex-wife. One day, she said: "you know, I love you so much. But I can not continue as your wife when you have changed your religion". …. My life was shattered once again when my ex-wife left me behind went off with our four children. At this point, I had no job, had nothing to eat".*

Things went from bad to worse for 'GW' when his landlord chased him out of his house for he was unable to meet his monthly rent expenses. Now, 'GW' has no decent place to stay in. He was ashamed of his own circumstances. One day, 'GW' decided to go to a forest in the outskirts of the town and put up ramshackle hut from twigs with a plastic roof. He says, in those days he runs without food for days. When lucky, he finds a casual work which barely pays for his daily meal. *"… after several months of going without a job, I was hired as a guard to an organization in the outskirts of the town. My monthly was Etb 80. As my salary was too little to support myself, I used to carry an empty lunch-box to*

workplace where I pretended in front of people as if I was eating my lunch. 'GW' says, he had spent thirteen difficult months in that ramshackle shed next to a river.

'GW' says, "*… I was selected only by the grace of the God, because I do not meet any of the criteria set by the project*". He says, he is a hard worker, but hard work alone is not enough; it has to be supported by opportunities. According to him, that opportunity was the '*Mirte stoves business that gave him a second chance to life*'.

As opposed to official project sales records of only three and half thousands, he believes that he has produced and sold over six thousand stoves ever since he joined the Mirte stoves business. He says, nearly half of the sales goes unrecorded. According to him, this is because, producers pay more attention to production and business aspects rather than keeping records. *"though I promise to record every sales I made, I have rarely succeeded in recording all my sales. This is mainly because, either myself or someone in sales outlets forget to record sales as it happens or keep it in a sheet of paper but forget to transfer it to the main archives"*.

As part of his own promotional campaign, 'GW' claims to have installed over 80 Mirte stoves to consumers in selected locations free of charge. In addition to conducting his own cooking demonstrations, he also promotes his stoves travelling deep in to rural areas carrying support letters and promotional materials such as posters and flyers.

From proceeds of his business, to day, 'GW' can support his family adequately. After the business, he was remarried to another woman and had two more kids. He has purchased 1100 M^2 of land and built a residential house. According to him, food is no more an issue to his family after the business. He has purchased another plot of 1700 M^2 for agricultural development. He is supporting his three elder childre who are currently attending their higher level education in various Universities. 'GW' describes the positive impacts of the Mirte business as follows:

"… my small grain trade business went bankrupt. I was no more able to support my family. When my previous wife realized that I was unable to put food on my families table, she left me and went-off with our three kids. My landlord chased me out of my house as I was unable to settle my rent arrears for few months. Life has turned its back onto me. I was ashamed to see my former friends. I went into hiding. In those days I was running without food for days sometimes. I left the town and started to my new miserable life in the bush next to a river. I put up a squatter shed of about four square meters with plastic roof in the outskirts of the town and lived there for thirteen solid months. …. But now, my life has transformed completely due to the Mirte business. I am a believer and I am a Protestant. I praise the God for He gave me second life, resurrection, using the Mirte project as pretext. The God used the Mirte to salvage my life. The first thing I did after earning some money from the Mirte business was I brought my kids back to my place and sent them all back to school, I rejoined my neighborhood self-help associations; and I killed a sheep and fed myself until I re-gained all the

weight I lost during the previous bad times of starvation and misery. Once I fully attained my physical appearance and fitness, I went back to my old friends, offered them lunch and I introduced myself as if we do not know one another before. Shortly after I started Mirte business, I had quite some money deposited as a saving in a bank. ….. I met my second wife, Asamenech, (pointing to her). *… When I realized that she was a divorcee, I asked her to marry me, which she agreed to. We got married one early September 1999 day. I left my squatters in the forest and moved to a single-room house with my new wife. The monthly rent was Etb 35. Exactly one year later, I bought 1,100 square meters of land at Etb 8,000. One year later, we built our new house of over 60 square meters at a cost of over 16,000 Birr. The land and the house were purchased or built at a cost of about 24,000 Ethiopian Birr. … Few years back, I purchased additional 1,700 square meters of land at a price of 12,500 Etb. Besides, I bought four cows at different times at a cost of over Etb 6000. Three of them have now joined various Universities in Addis, Bahirdar and Nekempte. I am now living dignified and respected in the community. I am now not only an active member of community associations but I am also the leader. Thanks to the God, all these are due to nothing else but the Mirte business."*

He says, he has a savings deposit in a bank. As his retirement plan, 'GW' intends to use his savings and future earnings from his stove business to build more houses to be rented out.

Case Study 2: The Case of 'MT'
Stove Business Extricates 'MT' from Grinding Poverty

'MT', now 28, was born to poor family. Like other poor girls in the town, for lack of support, she was unable to continue her education beyond Grade nine. In effect, she got married – a marriage that did not work very well. After she gave birth of two sons, she divorced her husband and joined her parents. As her parents were too old and too poor to support her and her kids she started to make and sell local liquor, locally known as *Arekie* for subsistence. *Arakie* business was the sole source of her livelihood from which she supported her two kids and old parents. At certain point, 'MT' found life to become even tougher than before, she decided to marry someone who can share both her happiness as well as sorrow in life. She found her soul mate. But, his earning was not great enough to support the whole family. She realized that she has to do something to support their family earnings. But, what alternatives does she have other than her *Arakie* business? Average monthly income of Etb 200 from her Arakie business was just hand-to-mouth. MT remembers a very bad day life as follows:

"… before Mirte business my life was miserable. I remember one terrible day when my son was starving and he could not stop crying. The previous day, I bought him a colourful T-shirt and I had no money left for food or anything. I took him to my sister's and asked her if she can give him a loaf of bread or lend me a couple of Birr so that I can buy some food for my starving child. My own sister refused to help me out. In stead, she told me she liked my kid's T-shirt and asked me if I am willing to sell it to her kid for two Birr. You believe it or not, I did not hesitate to give her the T-shirt in exchange for two Birr. I used the money to buy some bread to my kid. I never forget that day. …….. but, I have forgiven my sister and I am supporting herself and her children, thanks to the Mirte business. Using my savings from the Mirte business, I have built a kiosk for her at a cost of Etb 10,000. I am also supporting her child who is studying in a university".

'MT' had applied at a local Micro Finance Institute (MFI) for a loan. The MFI approved the loan and lent her Etb 500. The MFI was very happy with her performance, particularly in her adherence to meeting loan repayment schedules. She says, my good relationship and trustworthiness with the MFI paved the way for a 'ground-breaking' new business opportunity, the Mirte stove business. MT says:

"… My friend and I were proposed by the MFI to participate in Mirte stoves producers technical training. ….. the next day, somebody from the visiting GTZ HEPNR project told me that I am chosen for the training and he congratulated me. I thanked God and took part in the training".

With the start-up package of project support, 'MT' produced a number of stoves. But, she was not able to sell them. When she realized that consumers awareness about her products was so low, she devised her own marketing strategy. She says, she started installing stoves for commercial Injera bakers and some curious households on a condition that they give the stoves a try and

they pay her only if they liked their stoves. According to her, her strategy worked very well. This group of consumers did not only see the benefits of the stoves and pay her soon, but they convinced their relatives and friends to purchase and use one. Shortly afterwards, she says she started receiving dozens of orders from consumers. Besides, during those initial days of her business, 'MT' says that she has also used credit sales, instalments and promotional sales as her marketing strategies.

According to 'MT', her life has completely changed after she started the 'Mirte' stove business. Unlike before, she says she saves an average of Etb 500 per month from her Mirte business. This is her net saving after meeting all domestic as well as other expenditure. Today, her family gets quality and enough amount of food three times a day. She has renovated her old house and also built eight new rooms for renting out. She bought a hybrid cow for her mother. She bought a plot of urban land for her elder son. She has bought complete sets of household furniture. She built a shop at a cost of Etb 12,000 and made it ready for business for herself. She had another kiosk for her sister at a cost of Etb 10,000. She bought an ox for her poor uncle. She is bringing up her friend's daughter whose mother has passed away. She is supporting her sister's son who is currently studying in Mekele University. 'MT' says, after the Mirte business, no one in her family bothers about clothing. In fact, she said she has purchased jewellery (59 grams of gold, worth several thousands of Etb) for herself and her husband.

Unlike before, 'MT' has access to electricity using a private meter, telephone including mobile phone and tap water in her compound. She says, she is sending her kids to the best private school in town. She is also supporting her husband's education who is attending a distance education programme. She confidently reported that all these expenses are being met entirely from earnings from the Mirte business. Currently 'MT' is a member of community based institutions; she is highly respected by the community. As such, 'MT' is invited as a guest of honour to some Zonal Council meetings.

In summary, 'MT's life has shown drastic improvements after the 'Mirte' business. She was selected as an exemplary hard working women of the Region and has won award, which was handed over to her by the state Minster of Mines and Energy on March 8 2005.

'MT' does not remember how many stoves she has been selling every year since she began the business in 2002. But, she estimated her total sales to be well over 2500 stoves

Case Study 3: The Case of 'TT':
From a Housemaid to an Award Winning Stove Entrepreneur

'TT' is now 31 and single. She was born in a small rural town. She has completed her High School education in 1991. Despite her aspirations to farther her education, she was unable to qualify for University level education. Her parents were too poor to support her in any way. At this point, 'TT' decided to migrate to a regional capital in search of livelihood opportunities. As she was unable to find a better job, she was hired as a housemaid earning Etb 10 per month. The working conditions and the salary was so poor that 'TT' decided to quit and look for other alternatives. She was employed as a daily labourer at a rate of Etb 2.50 per day. She says, the rate was not bad compared to what she used to earn as a housemaid. But, the problem is, availability of such jobs is erratic and hence unreliable. She had rented a small room where she stays. However, with her new job becoming increasingly unreliable, she was unable to cover for her accommodation expenses and feed herself adequately. At this point, she says, her landlord chased her out of her one room house and confiscated her tiny bed as a compensation for her rent arrears. 'TT' had ran out of options except looking for a person who is kind-enough to offer her a free-accommodation. She found a compassionate woman who offered her to share her single-room residence free of charges.

As a casual 'labourer, TT' started working even harder to secure her daily meal. 'TT' remembers her life between 1991 and 1994 as a 'cruel' and 'bitter' one. But, she had hopes.

One day in 1995[12], when she was looking for casual jobs as she does very often, 'TT' met someone who told her about some people who were looking for people interested in temporary jobs as enumerators and daily labourers with them. She says, *"… by the time I arrived, 'Enumerators' positions were all filled up. …. I explained my situation to the person in charge and begged him to consider me to whatsoever position is available. He was kind enough; he put me in the list of trainees for Mirte stoves production"*. 'TT' says, she performed very well in the technical training, chosen as key potential producer and was given an order to produce several dozens of Mirte stoves needed by the project for field-testing. According to her own perceptions and testimony, from that day onwards, 'TT's life started to change for the better.

'TT' remembers the day she joined the stove business as follows: *"… the first day I worked with the project staff as a daily labourer, they paid me 15.00 Eth. Birr, it was nightmare for me and I went back to the person who paid me and said, please check your money, you paid me a lot and more than I deserve. The person said 'I am right, the money is all yours'. After I assured that it is my money I had thanked God and went home. While I am going home I said God has heard my prayers, my dream is becoming true. The next time one of the project*

[12] 'TT' was trained and supported as a stove producer by another project and had established Mirte business before the current SUN Energy Project. She was incorporated in to the current Project in 1998.

staff who was the leader of my group has paid me 70.00 birr and told me to produce 40 stoves within 15 days and went back to Addis Ababa. But I have produced the whole 40 stoves within 5 days and reported same to him through telephone. He found it very difficult to believe. He was checking on me by asking other people by phone. When he came back and saw for himself that I had actually produced all the stoves, he gave me an additional order of 70 stoves that were needed for further assessment study. Out of those seventy stoves, forty stoves were sold immediately in the market during a cooking demonstration conducted by the project". From that day onward, 'TT's sustainable livelihood became Mirte stoves business.

Before her stove business, 'TT' says she cannot afford a proper meal in days. She used to live on a loaf of bread only once a day. 'TT' went on to say, *"… as I told you earlier on, before my stoves business, nobody in the community wants to talk to me. I was nobody. I had no property of my own like a house, land, bed, cookery, furniture, or whatsoever. I was living in an inconceivable misery, a life hard to imagine. I had only one cloth. I was frustrated. There was in fact a time when I hated my self and decided to commit suicide. But God saved me and transformed my life and made me tell others what mighty God has done to me"*

According to 'TT', the three most important challenges that the majority of new entrants to the Mirte market would face during business start-up are lack of working capital, working space and low market demand. She has the following to say on how she overcame thos challenges:

"… after completing stove production training successfully, I was offered production equipment, hand tools and raw materials as a start-up capital. But, I had no space to put up a production shed. I asked my landlord to do me a favour; and he did allow me put up a small shed in his compound.… My second problem was very low market demand after the project support was pulled out. Consumer awareness was very low in those early days of business start-up. As my own market promotion strategy, I had installed one stove for a famous lady in town and showed her how to use it. After few days, she came to me and told me she liked her new stove. She, in fact, placed an order for ten stoves to be installed at her relatives and friends as a present. Following this, awareness about and market demand for the stoves started to grow.… I was running my business extremely successfully. Later on, however, a group of girls who were also trained as Mirte stove entrepreneurs, envied me, developed hostile attitudes and ganged-up to let my business down. When they failed to compete with me, they reduced price of the stove from Etb 40 to Etb 25 only. The idea was to squeeze me out of the market. I expanded my market frontiers to other towns and continued my business successfully. When they realized that my business was still running successfully when theirs went bankrupt, they took the matter personally and started intimidating me. Although the situation seemed to have subsided for a while after a local Police intervention, I found it unsafe to continue business as usual. In spite of the fact that I had no other alternative livelihood source, I was forced to quit my stoves business for some time. … I ventured on some other risky business and lost the whole of Etb 20,000, which I saved from my stove business. I rejoined the Mirte business when the the GTZ SUN Energy Project

came to our town in 2001. Ever since, Mirte business is the sole source of livelihood to me and my family".

To day, TT's livelihood is nothing but "Mirte" stove business. From this business she earns a monthly average saving of Etb 1000. She is supporting her siblings and parents. Quality and quantity of food intake has improved remarkably. She has built her own house from where she also runs her stove business. She has electricity in her private house, potable water and a telephone line. She has a mobile phone. She is an active member of community based institutions like Idir and others. If she needs it, she can get loans from any financial institutions, formal or otherwise.

Generally "Mirte" stove business transformed her life more than she expects. Currently she has her own house with complete furniture. She owns a shop in a key market location where she sells stove. She started saving money and currently she has over Etb 20,000.00 deposited in a Bank. Besides production and selling of the stove she has got the skill of creating and managing her business. She says, she has acquired skills particularly in market promotion, customer handling and relations and business management. As far as marketing and promotion tools adopted by the Project are concerned, she believes actual cooking demos, TV ads and bazaar as most effective tools in convincing consumers and creating demand for stoves.

In recent years, 'TT', as the most successful female entrepreneur, has won a number of prizes. Above all, as a direct result of her Mirte stoves business, she has become popular in the whole town and has established strong business relationships with various individuals and organizations. She believes that it is such popularity and rising profile that helped her be recruited as a broker to an insurance company. Yes, the Mirte business pays dividends for those who worked harder to stay in business. It, in fact, leads to a web of business and other forms of relationships and raises profiles of successful entrepreneurs, which, in turn leads to further improvements in overall environment necessary for business operations.

'TT's evaluation of current market conditions and the coupon-based consumer subsidy was as follows: *"… the rising raw material prices have had an adverse impact on demand for Mirte stoves. In effect, I was forced to adopt credit sales based on three instalments. The coupon system that is underway currently seems to have contributed significantly to stimulate market demand. But, my fear is: what ill happen to demand when such subsidy is over? Would we be able to maintain the momentum? How are we going to adjust the distorted market prices of stoves? I believe, the Project should support us in addressing this issue through focused consumer education and awareness raising"*

Finally, 'TT' claims to have produced and sold over 4300 Mirte stoves under the SUN Energy Project alone over the past eight years. In monetary terms, this is equivalent to about ETB 200,000.

Case Study 4: The Case of 'ER'

ER started Mirt business in 2005 after taking the training provided by GTZ – at that time she was 26 years old. Life was not so smooth for ER. She was brought up by her parents and attended school up to 8th grade in Mekele. Her up bringing was like an ordinary kid going to school everyday anticipating that she will pursue her education so that one day she will be employed as a professional. This was just her plan for her life. Her life was not her decision. Her parents had another plan for her and that was unrolled in 1992 when they decided her marriage to a fighter who just returned from the wilderness victoriously defeating previous government's army. Even though they are living in a city, ER parents were so traditional that her marriage to such a noble hero was a great honor and measure of success to them. At the age of 14 in 1992 ER was forced to make a swift shift from her plan on her life and got married. She moved with her husband to Addis Ababa and used to live together in a military camp. A year later she gave birth to a daughter. Her daughter is now 14 years old living with her in her mother's house together with her older sister and two younger brothers.

She lived in Addis for six years and decided to quit her marriage mainly because of distrusting her husband about which she doesn't want to talk much as it brings bad memories back again. Her life in Addis was not very pleasing to her as her husband was not with her most of the time due to the nature of his work. In 1998 she decided to leave Addis and returned to Mekele with her daughter to her parents' house. This was the year that her father died. He was the bread winner for the family doing carpentry work. The family literally had no income and nothing to depend on. This was the most difficult time for ER. Sooner her older sister started making local brew and baking injera for sell. Staying in her parents' house she continued her education up to 10th grade. She couldn't be very successful in her education as she also had other feelings that occupied her mind – all the feelings of failed marriage and being additional burden to her parents again.

Few years later, her older sister got a cleaning job in the municipality; one of her brothers was employed in the telecommunication in cabling works, and the other one became a musician in the military police orchestra band. The total family income together with that obtained from house rental was about Birr 1000 a month. This was about enough for the family. It was only ER who didn't have any contribution to the family. Besides, educational expenses for her daughter were additional expense for the family.

In 2005 the local government officials (at Kebele level) were inviting and recruiting the unemployed young people to take Mirt stove producers training to be conducted by GTZ. Almost all of them refused to participate as they thought that it is an inferior job. A couple of guys from Kebele came to ER and asked her if she could be willing to take a training but didn't tell her the type of training as they were afraid that she too would refuse. They tried to persuade

her not to consider the job as for the lower class people. Finally she agreed to participate in the training. From Mekele, she was the only one who took the training during this time but there were others from the surrounding Woredas.

As she started the business, GTZ covered all establishment costs. The first few months were not easy for ER. Managing the business was one thing and physical work was another and in both she never had any experience before. As time goes by she developed the skills needed, improved her relationship with product suppliers and her customers. She also became more interested in the work as her income increased day by day. She is more diligent in her work that she works the whole day and continues late at nights until she finishes the plan for the day. When the business was at its peak, her income excelled the sum of all incomes obtained by other members of the family by several folds. She always smiles when she tells this to other people – she says that Mirt business made her to be somebody. It made her realize the potential in her.

Her life was transformed. With the income obtained from Mirt business she renovated their old house and furnished it with items that a decent house should have. The furniture, TV sets, music players and sound systems in their house are few to mention. She has also build a new room with cement blocks for rent and, a modern toilet and a bath room at a cost of Birr 25,000. She earns enough to cover food, health, educational and other necessary expenses from Mirt business.

Since last year the business becomes very slow. Prices of raw materials increased and selling stoves with the set price has not become profitable. She stocked 84 Mirt stoves in her workshop but could not sell them out.

Case Study 5: The Case of 'YW'

YW is the oldest child in the family. She is thirty years old now. Her father was a petty trader with earnings hardly enough to support the family. She has a sister and a brother. In 1994, when she was a sixteen years old teenager, with an arranged marriage she was made to marry a person who was as old as her father. In the same year she moved to Addis Ababa with her husband. She was very much afraid of her husband that she had never seen him directly to his eyes. They used to live in a rented house in Addis sharing the same compound with others. Her neighbors used to sympathize for her because of the age difference between herself and her husband. She was not happy in her marriage as it was not her choice in the first place. And so much was happening too soon – she got married and left for a place she did not know before. Sooner, her husband became sick and died in 1996. At that time her daughter was just five months old. The money they saved was spent for her husband medication. She was not employed and had no income to lead a life in Addis. After two years in 1998, she decided to return to Adigrat to her parents but this time with a child.

After she returned from Addis with the little money she had left with, she opened a shop for food items and household consumable goods. The business was not working well as there were many other shops in her vicinity which provide similar services. She spent all her savings in the shop and it turned out to be a loss rather. It was while she was in such confusion that she happened to take Mirt stove producers training provided by GTZ. She thought that this business was the only chance that she had and promised to herself that she would do anything she could to make it a success.

Everybody in the house participates in Mirt business, from production to marketing and installation of stoves. Her mother, though is an old lady does marketing and installation works. Her father assists her in the production of stoves. Now, it has been seven years since she started Mirt business. She benefited a lot from the business. Her life is changed now. She has more than enough to spend for the household, educational or health related expenses for herself and for any member of the family. From the savings, she built a house outside the town which now is worth more than Birr 50,000. She is also planning to build another one in Adigarat town on a land that belongs to her father. She has already made some construction material ready for the building.

Case Study 6: The Case of 'MY'

MY has lived in different places in Ethiopia moving around with his father who was a road construction worker in Ethiopian Road Authority. The rest of the family was based in Alamata with their mother. After his father died, MY continued changing living places and works. He has never settled in one job more than a year. In 1993, he moved to Saudi Arabia to work as a laborer in a construction site. He stayed there for about two years. During these two years he changed so many jobs. He worked in a metal workshop then as a waiter in a tea shop. Finally, he was herding goats before he returned to Ethiopia in 1995. In the same year he got employment in the local Agriculture Office seedling production section. After working for a year he left the job and moved to Eritria for road construction works in a Korean construction company. He used to work six days a week with payment of Birr 20 per day. Few months later he quit the job and returned to Alamata. As he came to Alamata he got a training opportunity which was organized and conducted by Tigraian Development Association. He was trained for a year in carpentry and masonry works. The following year, in 1998, he joined the army.

In 1999 when the war with Eritrea fully developed he left the army and moved to the southern part of Ethiopia and got employed in one of the tea plantations. The following year, in 2000, he came back to Alamata and employed in a Chinese road construction company when building the road from Alamata to Woldia. In 2002, he didn't have anything to do as the construction work was completed. In 2004 in June, GTZ was organizing Mirt Producers Training in Tigray. Through the local government administration he was nominated to take the training. In September the same year, he got a job as a guard in the then Rural Road Works Office in Alamata, now Water, Mines and Energy Desk. Since then he has been producing Mirt and also working in the same place as a guard. MY always says "Mirt business is my life". It is because of the Mrit business that he is enjoying a settled life now with his family.

He is married and has two children. The older child is ten years old and the younger one is four. His wife assists him in the business. It improved the communication and helped himself and his wife build good relationship. His two brothers also work in the business. It created employment opportunity for them too.

MY is very happy with Mirt business. He always loves to talk about it. It totally transformed his life. With the small portion of income from Mirt stove sells they cover all their expenses such food items, educational and health expenses. The remaining is their saving. A year and a half ago the local Town Development administration provided him with 300 square meter of land in the center of the town for free as a reward to his effort and contribution towards combating environmental degradation. He built a three room house with cement blocks on the land.

Annex 3: Tables from the Analyses of the Surveys

Numbers of Producers by Gender and Number of Mirte Stoves Sold Annually

Female Producers								
Years	Number Trained	Cumulative Trained	Active	Percent Active	Annual Sales	Sales Per Capita (Active)	Sales as a % of Each	Sales as a % of All
1999 - 2002	29	29	30	103%	6710	224	17%	6%
2003	6	35	26	74%	3831	147	10%	3%
2004	18	53	33	62%	5055	153	13%	4%
2005	4	57	40	70%	9582	240	24%	8%
2006	57	114	93	82%	9316	100	23%	8%
2007 (Aug.)	9	123	102	83%	5789	57	14%	5%
Total	**123**	**na**	**102**	**79%**	**40283**	**395**	**100%**	**34%**
Male Producers								
Years	Number Trained	Cumulative Trained	Active	Percent Active	Annual Sales	Sales Per Capita (Active)	Sales as a % of Each	Sales as a % of All
1999 - 2002	33	33	33	100%	8088	245	10%	7%
2003	11	44	31	70%	6476	209	8%	5%
2004	46	90	48	53%	8669	181	11%	7%
2005	13	103	80	78%	21562	270	27%	18%
2006	92	195	161	83%	22413	139	29%	19%
2007 (Aug.)	22	217	148	68%	11295	76	14%	10%
Total	**217**	**na**	**148**	**75%**	**78503**	**530**	**100%**	**66%**
Both Sexes								
Years	Number Trained	Cumulative Trained	Active	Percent Active	Annual Sales	Sales Per Capita (Active)	Sales as a % of Each	Sales as a % of All
1999 - 2002	62	62	63	102%	14798	235	12%	12%
2003	17	79	57	72%	10307	181	9%	9%
2004	64	143	81	57%	13724	169	12%	12%
2005	17	160	120	75%	31144	260	26%	26%
2006	149	309	254	82%	31729	125	27%	27%
2007 (Aug.)	31	340	250	74%	17084	68	14%	14%
Total	**340**	**na**	**250**	**77%**	**118786**	**475**	**100%**	**100%**

Ranked Top Five for Creating Awareness

No.	Promotion Tools/Methods	Rank						Not in Top Five	Total
		Never Seen Or Heard	1	2	3	4	5		
1	Posters	-	3	8	7	7	5	4	34
2	Leaflets/flyers	1	3	2	5	7	2	14	34
3	Animated Mirte TV Ads	3	16	3	3	2	1	6	34
4	Non-animated Mirte TV Ads	3	5	4	3	2	4	13	34
5	TV Drama	9	3	3	1	1	2	15	34
6	TV Programmes	18	2	1	2	-	-	11	34
7	Radio Ads	5	4	8	4	2	2	9	34
8	Radio Programmes	16	2	3	1	-	1	11	34
9	Billboard	8	3	1	7	3	1	11	34
10	Sign board	6	3	2	4	1	-	18	34
11	Actual cooking demos	4	22	5	2	-	-	1	34
12	Bazaar	11	7	4	1	1	1	9	34
13	Exhibition bulletin	25	-	-	-	-	2	7	34
14	Graduation bulletin	31	-	-	-	-	-	3	34
15	News Paper	17	-	-	1	1	1	14	34
16	Bus Ad	33	-	-	-	-	-	1	34
17	Match Box	8	-	2	2	3	4	15	34
18	Stage Drama	23	-	-	-	-	2	9	11
19	Coupon	1	5	-	2	-	4	22	34
20	Other	18	2	3	3	4	2	2	34

Ranked Top Five for Creating Demand

No.	Promotion Tools/Methods	Rank						Not in Top Five	Total
		Never Seen or Heard	1	2	3	4	5		
1	Posters	-	2	3	7	10	6	6	34
2	Leaflets	1	2	1	7	5	4	14	34
3	Animated Mirte TV Ads	3	11	4	4	3	1	8	34
4	Non-animated Mirte TV Ads	3	3	6	1	3	5	13	34
5	TV Drama	9	2	3	2	1	2	15	34
6	TV Programmes	18	-	2	1	1	-	12	34
7	Radio Ad	5	3	5	7	6	-	8	34
8	Radio Programmes	16	-	3	1	2	-	12	34
9	Billboard	8	1	2	3	5	5	10	34
10	Sign board	6	-	3	1	3	4	17	34
11	Actual cooking demos	4	19	6	2	1	1	1	34
12	Bazaar	11	8	4	1	-	1	9	34
13	Exhibition bulletin	25	-	-	-	-	2	7	34
14	Graduation bulletin	31	-	-	-	-	-	3	34
15	News Paper	17	-	-	-	-	3	14	34
16	Bus Ad	33	-	-	-	-	-	1	34
17	Match box	8	-	1	2	2	5	16	34
18	Stage Drama	23	-	-	1	-	1	9	34
19	Coupon	1	10	1	-	-	-	22	34
20	other	18	5	5	4	-	1	1	34

Factors that convinced consumers to purchase Mirte (Rank)

Key Factors	Rank			Missing	Total
	1	2	3		
Fuel saving	29	3	2	0	34
Promotional tools	20	13	1	0	34
Subsidy	21	6	1	6	34
Word of Mouth	25	8	1	0	34
Producers Own Effort	26	7	1	0	34

Factors that convinced consumers: Ranked First by Region

Region	Fuel Saving	Promotional tools	Subsidy	Word of Mouth	Producers Own Effort	Aesthetics
Amhara	13	6	4	8	8	4
Oromia	11	8	8	9	11	3
Tigray	5	6	9	8	7	3
Grand Total	29	20	21	25	26	10

Educational Levels of Producers

Region	Level of Education				All	Percent
	Grade 1 to 6	Grade 7 to 8	Grade 9 to 12	Above 12		
Amhara	-	3	8	2	13	38
Oromia	-	3	8	1	12	35
Tigray	1	1	5	2	9	27
All	1	7	21	5	34	100

Table xx:Distribution of Age in Business for Producers Interviewed

Regions	Period			Total
	Before 2001	2001 to 2004	2005 Onwards	
Amhara	1	2	10	13
Oromia	6	2	4	12
Tigray	0	6	3	9
All	*7*	*10*	*17*	*34*
Percent	*21%*	*29%*	*50%*	*100%*

Responses of Producers on their Conditions After Mirte Business

Conditions	Better	Same	Worse	Missing	All
Housing	13	21	0	0	34
Urban Land Acquisition	12	22	0	0	34
Domestic Animals	11	23	0	0	34
Access to Financial Credit	21	13	0	0	34
Social Acceptance	26	8	0	0	34
Ability to Meet Educational Expenses	26	8	0	0	34
Ability to Meet Healthcare Expenses	25	9	0	0	34
Ability to Support Extended Family	23	11	0	0	34
Ability to Afford Clothing Expenses	28	5	0	1	34
Ability to Meet Food Expenses	27	7	0	0	34
Monthly Cash Income	30	4	0	0	34
Business Management Skills	33	1	0	0	34

Ranking for economic benefits due to Mirte business

Economic Impacts	Impacts appreciated Most				
	First	Second	Third	Total	Percent
N	34	34	34	102	100%
Purchase of household furniture	3	5	6	14	14%
Household expenses	5	3	3.0	11	11%
Purchase of house	8	2	0	10	10%
Purchase of urban land	8	0	0	8	8%
Purchase of domestic animals	0	4	2	6	6%
Educational expenses	2	3	1	6	6%
Open shop new shop	1	3	0	4	4%
Clothing expenses	2	1	1	4	4%
Opening a saving account	1	1	0	2	2%
House renovation	1	0	0	1	1%
Health expenses	0	0	1	1	1%
Not Applicable	3	12	20	35	34%
Total (Ranked Impacts)	31	22	14	67	66%
Percent (Ranked Impacts)	46%	33%	21%	100%	

Problems reported by producers by Regions

Problems	Regions			All Regions	Percent
	Amhara	Oromia	Tigray		
Increasingly growing raw material prices	11	5	4	20	20%
Distance of production site from market	5	3	0	8	8%
Incorrect uses of Mirte stoves	6	1	0	7	7%
Convincing customers about Mirte door size	1	0	4	5	5%
Transporting stoves longer distance	0	1	3	4	4%
Difficulty in getting coupons	0	1	1	2	2%
Lack of cooperation from energy offices	0	2	0	2	2%
Inadequate working capital	0	0	1	1	1%
Favoritism by Development Agents	0	0	1	1	1%
Lower in aesthetics that shown in TV	0	0	1	1	1%
Problem with mold (during demolding)	0	1	0	1	1%
Image of Mirte business as a low class	1	0	0	1	1%
Mirte production physically challenging	0	1	0	1	1%
Not Stated	15	21	12	48	47%
Total	39	36	27	102	100%
Percent	38%	35%	26%	100%	

Problem Types	Major Problems Encountered			Total	Percent
	First	Second	Third		
N	**34**	**34**	**34**	**102**	**100%**
Increasingly growing raw material prices	16	5	0	21	21%
Distance of production site from market	3	2	3	8	8%
Incorrect uses of Mirte stoves	4	3	0	7	7%
Convincing customers about Mirt door size	3	0	2	5	5%
Transporting stoves longer distance	2	0	1	3	3%
Difficulty in getting coupons	0	2	0	2	2%
Lack of cooperation from energy offices	0	2	0	2	2%
Inadequate working capital	1	0	0	1	1%
Favoritism by Development Agents	1	0	0	1	1%
Lower in aesthetics that shown in TV	0	1	0	1	1%
Problem with mold (during demolding)	1	0	0	1	1%
Image of Mirte business as a low class	0	1	0	1	1%
Mirte production physically challenging	0	0	1	1	1%
Not Stated	3	18	27	48	47%
Total (Stated Problem)	31	16	7	54	53%
Percent (Stated Problem)	91%	47%	21%	159%	

Number persons residing permanently in the survey households

No. of Persons	Regions			All	Percent
	Amhara	Oromia	Tigray		
N	**174**	**236**	**204**	**614**	**100**
1	0	2	3	5	0.16
2	16	20	28	64	2.00
3	90	96	66	252	7.86
4	96	204	164	464	14.47
5	210	235	165	610	19.02
6	180	222	234	636	19.83
7	147	182	161	490	15.28
8	56	168	88	312	9.73
9	18	54	90	162	5.05
10	40	20	30	90	2.81
11	22	22	22	66	2.06
12 and More	56	0	0	56	1.75
Total	931	1225	1051	3207	100.00
Average	5.35	5.19	5.15	5.22	

Places where Injera is usually baked

Cooking Places	Region			Total	Percent
	Amhara	Oromia	Tigray		
Separate Kitchen	158	213	116	487	79%
Shared Kitchen	10	20	14	44	7%
Living Room	2	2	37	41	7%
Open air	4	1	35	40	7%
Other			1	1	0%
Total	174	236	203	613	100%

Bake Injera for sale?

Response	Region			Total	Percent
	Amhara	Oromia	Tigray		
No	148	218	180	546	89%
Yes	26	18	24	68	11%
Total	174	236	204	614	100%

Reasons cited for not using stoves

Reason	Region			Total	Percent
	Amhara	Oromia	Tigray		
Stove broken	3		11	14	40%
Have electric Mitad			5	5	14%
Changed my residence			3	3	9%
Plate too large for commercial Injera			2	2	6%
Door too small to fit un-split wood			2	2	6%
Firewood too expensive			2	2	6%
It smokes too much			2	2	6%
Waiting for another housemaid			1	1	3%
Inconvenient			1	1	3%
Have traditional enclosed stove			1	1	3%
Does not heat up quick enough			1	1	3%
Missing		1		1	3%
Total	3	1	31	35	100%
Percent	9%	3%	89%	100%	

Year Mirt stove was bought

Reason	Year Mirte stove was bought							Total
	1993	1994	1995	1996	1997	1998	1999	
Stove broken		2	1	6	2	2	1	14
Have electric Mitad		1		2		1	1	5
Changed my residence					1	1	1	3
Mitad too large for commercial Injera					1	1		2
Door too small to fit unsplit wood				2				2
Firewood too expensive					2			2
It smokes too much					2			2
Waiting for another housemaid					1			1
Inconvinient						1		1
Have traditional enclosed stove						1		1
Does not heat up quick enough							1	1
Missing	1							1
Total	1	3	1	10	9	7	4	35
Percent	3%	9%	3%	29%	26%	20%	11%	100%

Number of years stoves were in use

Years	Regions			All	Percent
	Amhara	Oromia	Tigray		
Less than One	21	12	9	42	7%
1.0 to 1.99	45	73	41	159	26%
2.0 to 2.99	22	59	41	122	20%
3.0 to 3.99	21	23	58	102	17%
4.0 to 4.99	19	11	24	54	9%
5.0 to 5.9	15	19	7	41	7%
6.0 to 6.9	17	16	13	46	8%
7.0 to 7.9	2	13	1	16	3%
Eight and More	12	9	2	23	4%
Missing	0	1	7	8	1%
Total	174	236	203	613	100%

Year Mirt was replaced

Year Mirte was first purchased	Year Mirte was replaced				Missing	Total	Percent	Age of Mirte when replaced
	2004	2005	2006	2007				
1995	1			0	0	1	3%	12
1997				1	0	1	3%	10
1998				2	0	2	5%	9
1999		1		1	1	3	8%	8
2000				0	1	1	3%	7
2001	1			1	0	2	5%	6
2002		1	1	6	1	9	24%	5
2003	1			3	1	5	13%	4
2004			1	4	1	6	16%	3
2005		1	1	3	1	6	16%	2
2006				0	1	1	3%	1
2007				1	0	1	3%	0
Total	3	3	3	22	7	38	100%	67
Percent	8%	8%	8%	58%	18%	100%		
Average age of Mirte								5.58

The part of Mirt stove replaced

Parts of Mirte replaced	Region			Total	Percent
	Amhara	Oromia	Tigray		
Door (Fuel Inlet)	15	10	5	30	41%
Chimney Exit	15	6	9	30	41%
Chimney (Circle Part)	4	3	1	8	11%
Missing			6	6	8%
Total	34	19	21	74	100%
Percent	46%	26%	28%	100%	

Year Mirt stove was purchased

Year Mirte was purchased	Region			Total	Percent
	Amhara	Oromia	Tigray		
Before 1997		2		2	0%
1997	4	4	1	9	1%
1998	2	1		3	0%
1999	4	2	1	7	1%
2000	2	13	2	17	3%
2001	18	16	12	46	8%
2002	15	20	3	38	6%
2003	18	12	34	64	10%
2004	21	21	55	97	16%
2005	22	64	45	131	21%
2006	64	77	44	185	30%
2007	4	4	5	13	2%
Total	174	236	202	612	100%

Who installed the Mirte

Responses	Region			All	Percent
	Amhara	Oromia	Tigray		
Producer	117	111	73	301	49%
Myself	43	102	115	260	42%
Installer	10	21	9	40	7%
Other	4	2	5	11	2%
Total	174	236	202	612	100%

Type of stove owned by consumers before Mirt

Former Stoves	Region	N umber	% of Each	% of All
	Amhara	6	19%	
	Oromia	5	16%	
Electric Mitad	Tigray	20	65%	
Electric Mitad Total		31	100%	5%
	Amhara	153	40%	
	Oromia	227	59%	
Openfire	Tigray	5	1%	
Openfire Total		385	100%	64%
Other	Tigray	2	100%	
Other Total		2	100%	0%
	Amhara	12	7%	
	Oromia	3	2%	
Trad.Enclosed	Tigray	169	92%	
Trad.Enclosed Total		184	100%	31%
Grand Total		602		100%

Consumers response towards features of Mirt stove

Regions	Responses	Features of the Stove									Total	Percent of:	
		Fuel Consumption	Smoke Removal	Cooks' & Childrens' Health	Safety/ Fire Hazard	Speed of Cooking	Convenience	Cleanliness	Injera Quality	Aesthetics		Each Region %	All Regions (%)
Amhara	Better	171	165	161	167	166	163	163	159	165	1480	95	
	Same	2	6	9	6	5	6	6	14	4	58	4	
	Worse	1	3	4	1	3	5	5	1	5	28	2	
	Total	174	174	174	174	174	174	174	174	174	1566	100	28
Oromia	Better	235	233	233	234	231	235	234	235	235	2105	99	
	Same	1	3	3	2	5		1	1		16	1	
	Worse						1	1		1	3	0	
	Total	236	236	236	236	236	236	236	236	236	2124	100	39
Tigray	Better	191	183	175	174	191	169	189	166	195	1633	90	
	Same	8	15	25	25	7	16	9	35	4	144	8	
	Worse	3	4	2	3	4	15	4	1	1	37	2	
	Total	202	202	202	202	202	200	202	202	200	1814	100	33
All Regions	*Better*	*597*	*581*	*569*	*575*	*588*	*567*	*586*	*560*	*595*	*5218*	*95*	
	Same	*11*	*24*	*37*	*33*	*17*	*22*	*16*	*50*	*8*	*218*	*4*	
	Worse	*4*	*7*	*6*	*4*	*7*	*21*	*10*	*2*	*7*	*68*	*1*	
	Total	*612*	*612*	*612*	*612*	*612*	*610*	*612*	*612*	*610*	*5504*	*100*	*100*

Number of Households that Reported that Mirte Has Saved Fuel

Responses	Regions			Total	Percent
	Amhara	Oromia	Tigray		
Saved Fuel	163	189	166	518	85%
I Collect Fuel Freely	10	44	23	77	13%
I Don't Use Mirte	0	0	13	13	2%
It Saved, But I Don't Know How Much	1	3	1	5	1%
Total	174	236	203	613	100%

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Total	174	236	203	613	100%

Monthly Savings (Etb) Due to Mirte Stoves Estimated by Consumers

Savings	Regions				
	Amhara	Oromia	Tigray	All	Percent
Less than 10	6	2	2	10	2%
10 to 29	69	122	53	244	47%
30 to 49	47	54	59	160	31%
50 to 69	28	8	37	73	14%
70 to 89	3	1	8	12	2%
90 to 109	6	0	2	8	2%
110 and More	4	2	5	11	2%
Total HHs	163	189	166	518	100%
Total Monthly Savings	5823	4880	6751	17454	
Average Monthly Savings per HH	36	26	41	34	

Monthly Financial Savings of Mirte stoves for Commercial Injera Bakers

Monthly Savings (Etb)	Amhara	Oromia	Tigray	Grand Total
10	0	10	10	20
15	0	15	15	30
20	20	60	20	100
25	50	75	75	200
30	120	90	60	270
35	35	0	35	70
40	120	0	0	120
45	0	45	135	180
50	250	50	0	300
60	120	60	60	240
70	0	70	70	140
100	400	0	0	400
120	0	0	120	120
125	125	0	0	125
130	130	0	0	130
150	300	150	300	750
200	0	200	200	400
Total	**1670**	**825**	**1100**	**3595**
No. of Obs	**26**	**17**	**18**	**61**
Avg. Monthly Savings (Etb)	**64.23**	**48.53**	**61.11**	**58.93**

Purposes to which money saved due to Mirt was Used

Purposes Savings were used	Region			Total	Percent
	Amhara	Oromia	Tigray		
Domestic Expenses	96	101	123	320	52%
Electrcity/Water Bills	22	31	7	60	10%
Purchase Firewood	17	10	12	39	6%
Educational Expenses	15	13	4	32	5%
Meet Social Obligations (Iddir/Ekub)	3	25		28	5%
Pe-paid Mobile Phone Card	2	2	2	6	1%
Transport Expenses	2		4	6	1%
Savings Account	2	3		5	1%
Childrens' Clothes		2	3	5	1%
Labour for Injera Baking	3			3	0%
House Rent	1	1		2	0%
Additional Working Capital for Business		1	1	2	0%
Not Applicable	10	45	26	81	13%
I Don't Use Mirte	0	0	14	14	2%
Missing	1	2	7	10	2%
Total	174	236	203	613	100%

Number of Hours Saved per Week

Hours	Regions			All	Percent
	Amhara	Oromia	Tigray		
Less than 2 Hours	0	0	2	2	3%
2 to 4	4	37	6	47	68%
5 to 9	1	4	3	8	12%
10 to 14	0	4	1	5	7%
15 to 19	0	1	2	3	4%
20 to 24	0	0	2	2	3%
25 and More	0	0	2	2	3%
Total	5	46	18	69	100%

Purposes to which Time Saved due to Mirt was Used

Purpose Time was Used	Region			Total	Percent
	Amhara	Oromia	Tigray		
Domestic Chores	5	23	10	38	55%
Look after Horticulture		11	1	12	17%
Coffee Entertainment with Neighbours		3	4	7	10%
Look after Cows		6		6	9%
Retail Business		1	1	2	3%
Look after Kids		2		2	3%
Study			1	1	1%
Missing	0	0	1	1	1%
Total	5	46	18	69	100%

Number of producers by range of number of stoves sold per year (All Regions)					
All three Regions	Year Business Started				
Sales range (No. of stoves)	2003	2004	2005	2006	Aug. 2007
>1000	1	2	5	4	1
800-999	1	1	1	0	0
600-799	2	2	9	4	1
400-599	3	5	10	5	2
200-399	9	11	30	32	17
100-199	9	12	21	34	27
50-99	16	16	17	43	45
20-49	11	19	14	60	75
<20	5	13	13	72	82
Total active producers (No.)	57	81	120	254	250
Total sales (number)	10307	13725	31143	31728	17083
*Per capita per year (No.)	181	169	260	125	68
Sales/month (No.)	15	14	22	10	6
Annual capital of industry (ETB)	**515,330**	**686,230**	**1,868,604**	**2,220,974**	**1,366,672**
Stove selling price (ETB/stv)	50	50	60	70	80
* refers to the ratio of total number of stoves sold to total number of active producers.					

Percentage of producers by range of number of stoves sold per year (All Regions)						
All Three Regions	Year Business Started					Average 2003 to 2007
Sales range (No. of stoves)	2003	2004	2005	2006	Aug. 2007	
>1000	2%	2%	4%	2%	0.4%	2%
800-999	2%	1%	1%	0%	0.0%	1%
600-799	4%	2%	8%	2%	0.4%	3%
400-599	5%	6%	8%	2%	1%	5%
200-399	16%	14%	25%	13%	7%	15%
100-199	16%	15%	18%	13%	11%	14%
50-99	28%	20%	14%	17%	18%	19%
20-49	19%	23%	12%	24%	30%	22%
<20	9%	16%	11%	28%	33%	19%
Total	100%	100%	100%	100%	100%	100%

Number of producers within a range of number of stoves sold per year						
Amhara Region	Year Business Started					
Sales range (No. of stvs)	99 - '02	03	04	05	06	Aug. '07
>1000	1	0	0	1	0	0
800-999	0	0	0	0	0	0
600-799	0	0	1	0	1	1
400-599	2	2	1	0	0	0
200-399	5	3	3	3	6	7
100-199	8	3	3	7	8	9
50-99	6	5	4	5	9	19
20-49	0	5	6	6	16	39
<20	0	2	0	1	24	19
Total active producers (No.)	22	20	18	23	64	94
Total sales (number)	5245	2924	2939	4213	4731	6450
Per capita per year (No.)	238	146	163	183	74	69
Sales/month (No.)	20	12	14	15	6	6

Number of producers within a range of number of stoves sold per year						
Oromia Region	Year Business Started					
Sales range (No. of stvs)	99 to '02	03	04	05	06	Aug. '07
>1000	0	1	2	1	4	1
800-999	1	1	0	1	0	0
600-799	2	2	1	2	0	0
400-599	4	1	2	0	2	2
200-399	8	5	4	9	14	9
100-199	8	6	7	6	17	12
50-99	6	10	8	7	23	23
20-49	1	5	12	6	39	28
<20	0	3	6	11	47	51
Total active producers (No.)	30	34	42	43	146	126
Total sales (number)	8542	7063	7343	7092	17594	8934
Per capita per year (No.)	285	208	175	165	121	71
Sales/month (No.)	24	17	15	14	10	6

Number of producers within a range of number of stoves sold per year						
Tigray Region	Year Business Started					
Sales range (No. of stvs)	99 - '02	03	04	05	06	Jun. '07
>1000	0	0	0	3	0	0
800-999	0	0	1	0	0	0
600-799	0	0	0	7	3	0
400-599	0	0	2	10	3	0
200-399	2	1	4	18	12	1
100-199	1	0	2	8	9	6
50-99	2	1	4	5	11	3
20-49	5	1	1	2	5	8
<20	1	0	7	1	1	12
Total active producers (No.)	11	3	21	54	44	30
Total sales (number)	1012	319	3443	19838	9403	1699
Per capita per year (No.)	92	106	164	367	214	57
Sales/month (No.)	8	9	14	31	18	5

Effectiveness of promotion tools – All Regions		
Both Urban and Rural		
Promo_Tools	Influenced Purchase decisions	Known by consumers
TV Animaited Mirt	50%	68%
TV Ad non-animation	43%	62%
Posters	42%	63%
Billboard	37%	56%
Cooking demo	35%	41%
Radio Commercials	30%	55%
Sign board	24%	42%
TV Program	21%	29%
TV Drama	20%	28%
Baazar	18%	26%
Leaflet	18%	26%
Radio Programme	16%	24%
Coupon	11%	15%
Other	9%	10%
Match box Ad	9%	13%
Exhibition bulletine	7%	10%
Theater	6%	8%
News papeper Ad	5%	7%
Graduation bullettin	3%	6%
Bus Ads	3%	5%
Total	100%	100%

Promotional tools that influenced purchase decisions (both Urban and Rural) – All Regions		
Promo_Tools	% of total consumers	% out of consumers that are aware of promo tools
Other	9%	97%
Cooking demo	35%	86%
Theater	6%	75%
Exhibition bulletine	7%	74%
TV_Animaiton	50%	73%
TV Drama	20%	72%
Coupon	11%	71%
TV Program	21%	71%
TV Ad Non Animation	43%	69%
Leaflet	18%	68%
Baazar	18%	68%
Radio Prog	16%	67%
Billboard	37%	67%
Match box Ad	9%	67%
Posters	42%	66%
News pap.Ad	5%	65%
Sign board	24%	58%
Grad. Bullettine	3%	56%
Radio Comm	30%	54%
Bus Ads	3%	48%
Total	100%	100%

Promotion Tools known to consumers - Number and percentage of consumers - Amhara		
Promo_Tools	Amhara	% of Amhara
TV_Animaiton	113	65%
TV Ad Non Animation	112	64%
Baazar	96	55%
Posters	84	48%
Radio Comm	84	48%
Cooking demo	77	44%
TV Drama	76	43%
Sign board	75	43%
Billboard	70	40%
TV Program	54	31%
Radio Prog	53	30%
Leaflet	42	24%
Other	34	19%
Match box Ad	33	19%
Exhibition bulletine	26	15%
News pap.Ad	22	13%
Theater	21	12%
Grad. Bullettine	21	12%
Bus Ads	8	5%
Coupon	2	1%
Total	175	100%

Promotion Tools known to consumers - Number and percentage of consumers - Oromia		
Promo_Tools	Oromia	% of Oromia
Radio Comm	173	74%
TV_Animaiton	168	71%
Posters	164	70%
TV Ad Non Animation	145	62%
Billboard	101	43%
Sign board	79	34%
Cooking demo	71	30%
Leaflet	66	28%
TV Program	58	25%
Radio Prog	54	23%
TV Drama	40	17%
Match box Ad	36	15%
Baazar	21	9%
Other	16	7%
News pap.Ad	10	4%
Theater	7	3%
Bus Ads	7	3%
Exhibition bulletine	4	2%
Grad. Bullettine	3	1%
Coupon	2	1%
Total	235	100%

Promotion Tools known to consumers - Number and percentage of consumers - Tigray		
Promo_Tools	Tigray	% of All Tigray
Billboard	171	84%
TV_Animaiton	137	67%
Posters	137	67%
TV Ad Non Animation	126	62%
Sign board	103	50%
Cooking demo	101	50%
Coupon	87	43%
Radio Comm	83	41%
TV Program	66	32%
TV Drama	58	28%
Leaflet	50	25%
Baazar	44	22%
Radio Prog	43	21%
Exhibition bulletine	32	16%
Theater	20	10%
Bus Ads	18	9%
News pap.Ad	14	7%
Match box Ad	12	6%
Other	10	5%
Grad. Bullettine	10	5%
Total	204	100%

Promotion Tools known to consumers - Number and percentage of consumers – All Regions	
Promo_Tools	% of All
TV_Animaiton	68%
Posters	63%
TV Ad Non Animation	62%
Billboard	56%
Radio Comm	55%
Sign board	42%
Cooking demo	41%
TV Program	29%
TV Drama	28%
Baazar	26%
Leaflet	26%
Radio Prog	24%
Coupon	15%
Match box Ad	13%
Exhibition bulletine	10%
Other	10%
Theater	8%
News pap.Ad	7%
Grad. Bullettine	6%
Bus Ads	5%
Total	100%

Influence of promotional tools on Purchase decisions - Amhara		
Promo_Tools	Amhara	% of Amhara
TV_Animaiton	85	49%
TV Ad Non Animation	74	42%
Baazar	71	41%
Cooking demo	65	37%
Posters	63	36%
Radio Comm	59	34%
Billboard	55	31%
TV Drama	55	31%
Sign board	49	28%
TV Program	40	23%
Radio Prog	39	22%
Other	34	19%
Leaflet	33	19%
Match box Ad	31	18%
Exhibition bulletine	22	13%
Theater	19	11%
News pap.Ad	19	11%
Grad. Bullettine	14	8%
Bus Ads	6	3%
Coupon	3	2%
Total	175	100%

Influence of promotional tools on Purchase decisions - Oromia		
Promo_Tools	Oromia	% Oromia
TV_Animaiton	119	51%
TV Ad Non Animation	98	42%
Posters	96	41%
Cooking demo	67	29%
Radio Comm	64	27%
Billboard	51	22%
TV Program	38	16%
Leaflet	37	16%
Sign board	28	12%
TV Drama	27	11%
Radio Prog	24	10%
Match box Ad	18	8%
Other	15	6%
Baazar	8	3%
News pap.Ad	3	1%
Bus Ads	3	1%
Coupon	2	1%
Exhibition bulletine	2	1%
Theater	2	1%
Grad. Bullettine	2	1%
Total	235	100%

Influence of promotional tools on Purchase decisions - Tigray		
Promo_Tools	Tigray	% Tigray
Billboard	123	60%
TV_Animaiton	102	50%
Posters	96	47%
TV Ad Non Animation	91	45%
Cooking demo	82	40%
Sign board	71	35%
Radio Comm	61	30%
Coupon	60	29%
TV Program	48	24%
TV Drama	43	21%
Leaflet	38	19%
Radio Prog	38	19%
Baazar	30	15%
Exhibition bulletine	22	11%
Theater	15	7%
Other	9	4%
News pap.Ad	8	4%
Bus Ads	7	3%
Match box Ad	5	2%
Grad. Bullettine	3	1%
Total	204	100%

Influence of promotional tools on Purchase decisions – All Regions	
Promo_Tools	% of All
TV_Animaiton	50%
TV Ad Non Animation	43%
Posters	42%
Billboard	37%
Cooking demo	35%
Radio Comm	30%
Sign board	24%
TV Program	21%
TV Drama	20%
Baazar	18%
Leaflet	18%
Radio Prog	16%
Coupon	11%
Other	9%
Match box Ad	9%
Exhibition bulletine	7%
Theater	6%
News pap.Ad	5%
Grad. Bullettine	3%
Bus Ads	3%
Total	100%

Number of rural consumers who are awareness of promotion tools				
Promotion Tool	Amhara	Oromia	Tigray	Total
N (Sample Size)	**5**	**43**	**28**	**76**
Radio Commercialization	3	37	15	55
Poster	0	30	19	49
Billboard	3	9	17	29
Cooking Demo	5	7	12	24
Mirt Animation TV ad	0	8	11	19
Radio Program	4	9	5	18
TV non-Animated	0	6	9	15
Leaflet	1	8	5	14
Sign board	0	1	11	12
Baazar	5	0	5	10
Coupon	0	0	10	10
TV Prog	0	3	5	8
Match	4	2	1	7
TV Drama	0	1	5	6

Percentage of rural consumers who are awareness of promotion tools				
Promotion Tools	**Amhara**	**Oromia**	**Tigray**	**Total**
N	**5**	**43**	**28**	**76**
Radio Commercialization	60%	86%	54%	72%
Poster	0%	70%	68%	64%
Billboard	60%	21%	61%	38%
Cooking Demo	100%	16%	43%	32%
Mirt Animation TV ad	0%	19%	39%	25%
Radio Program	80%	21%	18%	24%
TV non-Animated	0%	14%	32%	20%
Leaflet	20%	19%	18%	18%
Sign board	0%	2%	39%	16%
Baazar	100%	0%	18%	13%
Coupon	0%	0%	36%	13%
TV Prog	0%	7%	18%	11%
Match	80%	5%	4%	9%
TV Drama	0%	2%	18%	8%

Number of consumers whose purchase decision is influenced by promotion tools				
Promotion tools	Amhara	Oromia	Tigray	All Rural
Baazar	5	0	4	9
Cooking Demo	5	6	10	21
Match	4	2	0	6
Coupon	0	0	8	8
Mirt Animation TV ad	0	5	10	15
TV non-Animated	0	4	6	10
Leaflet	1	4	4	9
Sign board	0	0	7	7
Billboard	3	2	10	15
Radio Program	4	3	2	9
TV Drama	0	1	2	3
Poster	0	12	12	24
Radio Commercialization	3	8	9	20
TV Prog	0	1	1	2

Percentage of rural consumers whose purchase decision is influenced by promotion tools					
Promotion tools	**Amhara**	**Oromia**	**Tigray**	***of aware Rural**	**Of total Rural**
Baazar	100%	0%	80%	90%	12%
Cooking Demo	100%	86%	83%	88%	28%
Match	100%	100%	0%	86%	8%
Coupon	0%	0%	80%	80%	11%
Mirt Animation TV ad	0%	63%	91%	79%	20%
TV non-Animated	0%	67%	67%	67%	13%
Leaflet	100%	50%	80%	64%	12%
Sign board	0%	0%	64%	58%	9%
Billboard	100%	22%	59%	52%	20%
Radio Program	100%	33%	40%	50%	12%
TV Drama	0%	100%	40%	50%	4%
Poster	0%	40%	63%	49%	32%
Radio Commercialization	100%	22%	60%	36%	26%
TV Prog	0%	33%	20%	25%	3%
* Of those who are aware of the promotion tool					