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**Determinants of Pastoralists and Agro-Pastoralis Women Participation in
Non-farm Income Generating Activities: The Case of Degahbour District,
Jarar Zone of Somali Regional State, Ethiopia**

M.Sc. Thesis Research

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College : College of Agriculture and Environmental Sciences

School: Agricultural Economics and Agribusiness

Program: Rural Development and Agricultural Economics

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June, 2018

Haramaya University, Haramaya

HARAMAYA UNIVERSITY
POSTGRADUATE PROGRAMS DIRECTORATE

**Determinants of Pastoralists Women Participation in Non-farm Income
Generating Activities: The Case of Degahbour District, Jarer Zone of
Somali Regional State, Ethiopia**

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**In Partial fulfillment of the Requirements for the Degree of
MASTER OF SCIENCE IN AGRICULTURE
(AGRICULTURAL ECONOMICS AND RURAL DEVELOPMENT)**

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As members of the examining board of the final MSc open defense, we certify that we have read, evaluated the thesis prepared by Ahmed Ibrahim entitled: **Determinants of Pastoralists and Agro-Pastoralists Women Participation in Non-farm Income Generating Activities: The Case of Degahbour District, Jarer Zone of Somali Regional State, Ethiopia**, and recommend that it be accepted as fulfilling the thesis requirement for the degree of Master of Science in Rural Development and Agricultural Economics.

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Final approval and acceptance of the thesis is contingent upon the submission of the final copy of the thesis to the Council of Graduate Studies (CGS) through the Department Graduate Committee (DGC) of the candidate's major department.

I hereby certify that I have read and evaluated this thesis prepared under my direction and recommend that it be accepted as fulfilling the thesis requirement.

Jema Haji (PhD)		
Name of Thesis Advisor	Signature	Date

DEDICATION

*I dedicated this thesis manuscript to my late father **Ibrahim Mahik** and my mother **Kadija Abdi** for nursing me with affection and their dedicated partnership for the success of my life.*

STATEMENT OF THE AUTHOR

First, I declare that this thesis is my original work and that all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment of the requirement for an advanced M.Sc Degree in Agricultural Economics and Rural Development at Haramaya University and is deposited at the University Library to be made available to borrowers under the rules of the Library. I solemnly declare that this dissertation is not submitted to any other institutions anywhere for the award of any academic degree, diploma or certificate.

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BIOGRAPHICAL SKETCH

The author, Ahmed Ibrahim was born in Somali Regional State of Jarer zone, Degahbour district, 04 Kebele on February 12, 1987. He attended his elementary and Junior School Education in Shiek Munmin Junior Elementary School. He attended his high school education in Degahbour Secondary School. Then he joined Bahirdar University Faculty of Agriculture and Environmental Sciences in 2006 and graduated with bachelor degree in Rural Development in 2009.

After graduation, he was employed by the Somali Regional Livestock, Crop and Rural Development Bureau and served as a Pastoral Coordination expert in Jigjiga from end 2009 up to the beginning 2011. In 2011, he was employed by International Rescue Committee in Pastoral Livelihood initiative funded by USAID and worked as Economic Recovery Officer in Degahbour Woreda from June 2011 to March 2013. Then he was transferred to the Emergency Rapid Response project funded by ECHO and OFDA and served as Senior Emergency Response Officer up to now. In 2011, he joined Haramaya University Continuing Education Program (CEP) to pursue his MSc degree in Agricultural Economics and Rural Development at Jigjiga center.

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ACRONYMS AND ABBREVIATIONS

FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GO	Governmental Organization
IGA	Income Generation Activities
IRC	International Rescue Committee
LCRDB	Livestock, Crop and Rural Development Bureau
NFIGAs	Non-farm Income Generating Activities
NGO	Non-Governmental Organization
PFE	Pastoral Forum Ethiopia
REWA	Revolutionary Ethiopian Women's Association
SDPRP	Sustainable Development and Poverty Reduction Program
SWDI	Somali Women Development Initiative
UN	United Nations
WAO	Woreda Agricultural Office

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ABSTRACT

- *Non-farm activities by rural farm households in general and women in particular are gaining importance in most developing economies due to the increasing inability of the farm sector to support rural livelihoods. This study aimed at identifying the pastoralists and Agro- pastoralists' women participation in non-farm income generating activities in Degahbour district of Somali Regional State, Ethiopia. It helped in identifying factors which are essential to design policies for promoting alternative income generating strategies for women. A two-stage sampling procedures was used to select Kebeles and sample respondents. In the first stage, from 19 kebeles in the district (12pastoral and 7 Agro-Pastoralists, three kebeles, 2 pastoralists and 1 Agro-Pastoralists were selected randomly. In the second stage, 122 sample respondents were selected using random sampling based on probability proportional to size. Data were collected through a standardized, formal questionnaire from 122 randomly selected women households from the district. Descriptive statistics and Tobit model were used to analyze data. Descriptive results showed that 83 (68%) of the sample women participated in non-farm activities such as charcoal, firewood and chat sales, and petty trade while 39 (32%) were non-participants. Results of the Tobit model showed that education, experience, distance to road, distance to market, extension contact, livestock ownership, woman's own saving, participation in social activities, and household head's participation in non-farm activities were statistically significant factors in determining women's participation in Non-farm income generating activities. On the basis of the results of the study it could be recommended that government and development practitioners should give due recognition to non-farm income generating activities in rural areas by designing policies that will equip poor rural women with better skills through education, extension services, experience sharing and social participation, increased investment in infrastructure and accessibility to financial resources.*

Key words: Income, Non-farm, Pastoralists, Agro-pastoralists, Women, Tobit, Degahbour.

1. INTRODUCTION

1.1. Background of the Study

Pastoral areas cover 60% of Ethiopia and comprised 12-15% of the human population as well as very large numbers of livestock. Residents' pastoral areas have the lowest access in the country to education and human health services, and the pastoral areas have the least developed infrastructure displaying their exclusion from mainstream development. Besides, the livelihoods of the pastoral communities are severely threatened by animal disease, drought and unfavorable policy (PCIP, 2012).

With full cognizant of these realities about pastoralists, the Ethiopian Government included a chapter on pastoral development in the Sustainable Development and Poverty Reduction Program (SDPRP) paper comprising various designed interventions meant for improving the standard of living of the pastoral communities. In line with this, the government articulated in the paper about interventions that improve pastoralists' livestock production and marketing system, water and pasture development. In addition, it is planned to develop schemes towards diversifying income sources that would help strengthen a pastoralists' economic base and thereby reduce vulnerability. For this, the government considered the tendency that pastoral communities are not always on the move. Although the frequency and extent of such human development varies from region to region, there are situations when the people manage to stay in one place for several months. Hence, during seasons when family members tend to stay in one place for a considerable period of time, it is possible to create the opportunities for these people to engage in specially identified development activities and projects (SDPRP, 2012).

Further, pastoralist women bear disproportionate tasks and responsibilities compared with most pastoralist men. Men tend to migrate with most of their herds. Women are left at home with entire responsibility of managing the household, as well as children and livestock left behind, particularly young, sick or milking animals. (SDPRP, 2012).

Additionally women play an important role in animal production. Despite the pastoralist women's contribution to pastoral life, they only have limited access to and control over key productive resources. They might get negligible income from milk trading. Besides, their access to resources including livestock is mediated by men (Wallace, 2015).

Ironically, as household resources have dwindled or livestock have become more volatile, women have taken more role for bringing food and income to the home, a role which was previously reserved for men. In the old days, women hardly earned an income, the man was supposed to take care for everything. Recently, however women are more engaged in non-farm income generating activities to supplement the income from livestock rearing (Wallace, 2015).

A study by Ridgewell and Flintan (2007) shows that given the many challenges they have been facing, how increasingly pastoral women and men are diversifying their livelihoods away from a reliance on livestock towards other income generation activities that raise much needed cash and help to spread risks. Many of these challenges as to them are particular to pastoral communities who face a range of constraints to business development including poor infrastructure, communication, markets and access to resources including credit that can provide the first step towards livelihood diversification for many.

According to UN and OCHA (2007) pastoralist livelihoods are increasingly under pressure and caught in a downward spiral of resource depletion, and diminishing resilience against drought; loss of livestock and shrinking rangelands, break up of traditional governance; lack of market linkage, education, public health, veterinary services, and water both for human and for livestock and rural finance are the least developed. As a result of all such challenges Ethiopian pastoralists were mobilized to engage in diversified livelihoods. Specifically, according to Adugna (2012), the participation of pastoral women in non-farm activities have been significant in recent years.

Ethiopian women constitute a significant portion of the households' agricultural labor force. Women in rural areas produce over half of the food required by a family. Bear most responsibilities for household food security and contribute to the welfare of the household through income generating activities. In short, women shoulder the bulk of both productive and reproductive roles of rural household and obliged to work for longer hours than men. In

addition to traditional activities such as child care, cooking, fetching water, fuel wood collection, etc. they contribute more than 50% of the total labor in crop production involving in different tasks such as weeding, harvesting, food processing and other postharvest operations (FAO, 2011). Somali pastoralist women have a marginalized position in the household. The Somali communities are highly patriarchal. The women have less decision making power within the home. These women feel undervalued saying themselves as “the half of men”: if a man is killed, his family has to be compensated with 100 camels. If a woman is killed, she is compensated with only 50 camels. So we are only treated as half of men, one respondent highlighted in Devereaux (2000).

In Somali region, there is a projects those designed to improve the participation of the pastoral women including Somali Women Development Initiative, This project have tried to support pastoral women specifically. To date they have provided initial capital investments as well as assistance in livestock and livestock product marketing.

The Somali Women Development Initiative (SWDI) was reported to have had remarkable success in small-scale business development and empowering Somali women. Working in close collaboration with the regional Women’s Affairs Office, the project is said to have benefited 391 poor pastoral women directly and more than 3000 family members indirectly (Habtamu, 2006).

In total, 12 cooperatives have been established in Degahbour in collaboration with GO and NGOs and received training on entrepreneurship, marketing and business management as well as practical and logistical support such as legal licensing and the provision of land. The different cooperatives have been encouraged to work together to solve problems and undertake market assessments and to ensure product quality and supply. The small-scale business cooperatives that have been established have concentrated on different areas of trade like livestock and livestock products, petty trade, fruits and vegetables and so on. International Rescue Committee (IRC) has been supporting the capacity development of these groups and will be constantly looking to increase women’s involvement in different income generating activities. The main thrust of the capacity building was training in livestock-related issues and awareness rising on markets and other business opportunities that IRC identified as profitable for women’s groups.

This study aimed at assessing the different non-farm activities that women in the study area involved in and factors affecting women participation in NFIGAs and the income from these sources.

1.2. Statement of the Problem

Many other Sub-Saharan Africa countries, Ethiopia is characterized by a complex, diverse and risk-prone agricultural production environment (Devereux, 2001; MOFED, 2002). Natural disaster (drought) forced people into alternative livelihood such firewood, charcoal and grasses sale (Goodrich, 2001). The agricultural production has been deteriorating over time, and has forced people to look for alternative employment option other than agriculture. That means, households engage in diverse livelihood strategies away from purely crop and livestock production towards farm, non-farm and off-farm activities that are undertaken to broaden and generate additional income for survival and livelihood improvement.

In Ethiopia, policy makers give due attention to the agricultural sector. Nevertheless, there is a growing evidence that rural sector is much more than just farming (Csaki and Tuck, 2000). The role that non-farm activities play in promoting growth of the rural economy and reducing poverty is also well documented (Rosegrant and Hazell, 2000; Roslan and Siti, 2011; Brazil and Bukenya, 2012). This means that, multiple employment opportunities exist which can also be potential livelihood strategies on part of the rural people when the farm does not provide an adequate amount of income to the peasant families. For instance, according to Rijkers (2008) about 25% of the households in rural Ethiopia participate in one or more non-farm activities and on average account for approximately 38% of total household income.

In Somali region, given the effect of climate change in recent years, income from alternative sources are needed to reduce the poverty and the pressure on men for covering the expenses of the whole family. According to UNOCHA PCI (2007), pastoralist systems and related livelihoods are increasingly under pressure and caught in a downward spiral of resource depletion, poverty and diminishing resilience against drought related emergencies. Despite the economic dominance of livestock in the region, pastoral households widely practice diverse income generating activities as livelihood strategies to overcome the recent challenges and risks due to climate change (Gecho, 2016).

Women in developing countries usually have limited access to resources and opportunities and their productivity remains low relative to their potential. Due to lack of awareness in the society, women's role in the household has not been recognized. The inequality in the provision of education reflects the deep rooted tradition and values within the ideological, political, economic and socio-cultural structure of societies (Kasente, 2000; cited in Takele, 2008).

Notwithstanding the prevailing constraints faced by women in the region, there are a number of income generation opportunities for women to improve their position and livelihood of their households. For example, petty trading, daily labor, livestock marketing vendors, vegetable trading, cereal trading and chat trading are some of the off/non-farm activities which are often dominated by women, albeit not equally exploited by all women.

Many social and economic studies have shown that, the essential factors for economic resources such as landownership and inheritance, access to credit and market facilities, extension services and entrepreneurship skills are in favor of men than women (Mukangara and Koda, 2007). However there is lack of adequate information on how pastoral and agro-pastoral women in Degehabour district participate in non-farm income generating activities (IGAs) and to identify the determinants of pastoralists and agro-pastoralists women's participation in non –farm income generated in the study area. This study therefore intends to provide some information to fill the existing knowledge gap by examining the types of (IGAs) undertaken by women its operations and eventually to identify the determinants of pastoralists and agro-pastoralists women's participation in non –farm income generation activities.

A good understanding of the determinants of women participation in NFIGAs as well their income is essential for designing policies promoting many income generating activities. Women in the region are making significant contribution to household livelihoods. This however, was overlooked in development interventions. For instance, the extension system is male dominated constraining women access to the service. That is, the extension agents often target male due to cultural and religious reasons.

1.3. Objectives of the Study

The general objective of this study was to assess pastoral and agro-pastoral women's participation in non-farm income generated at Degahbour district.

The specific objectives of the study were:

- To identify the NFIGAs on which pastoral and agro-pastoral women participated at the study area.
- To identify the determinants of pastoral and agro-pastoral women's participation in non-farm income generated in the study area.

1.4. Significance of the Study

Women are more than half of the population of Somali region and also in Ethiopia. Women contribute much to the income of the households; but little is known on how and how much they contribute and factors affecting women's contribution to household income.

This study can assist socially and economically vulnerable women to benefit from the increasingly expanding economy and private sector opportunities. It will seek to improve the standard of living of women and contribute to increase women income earning from non-farm income generation activities. Addressing the constraints to implementing the national policy on women and supporting the establishment of grassroots women's organizations will build women's ability to organize themselves to effectively voice their concerns and preferences about their economic, social and civic rights.

This study identifies factors affecting pastoral women's participation in non-farm income generating activities which enable policy makers and concerned bodies to design appropriate policies and strategies which can bring improvement of livelihood of many pastoral and agro-pastoral women in particular and to the country in general. It can also serve as a reference material for further studies conducted in the area.

1.5. Scope and Limitations of the Study

This study was designed to investigate the determinants of pastoral and Agro-pastorals women's participation in non-frame generating activities in Degahbour district of Somali regional state in Ethiopia.

These are the limitations of this study:-

- ✓ Unwillingness to get interviewed - a number of respondents was unwilling to spend their time being interviewed as they were told there was no money after the interview. This problem was solved by the assistance of a village executive officer and a well-experienced extension staff to get the required information.
- ✓ Keeping records.-Data related to income earned and spent per household is a big limitation because of failure of respondents to keep records and to recall memory. The experience of the village executive officer and a well experienced extension officer was instrumental in getting the required information.
- ✓ Accessibility.-Some areas were not easily accessible due to geographical location.
- ✓ Wrong Perception: - Some respondents were not open to answering questions particularly those questions involving their welfare, for example on the income earned per week, monthly or per year. They were also hesitant of telling how much they spent on household food and the contribution of men in their activities. Others were even reluctant to say why they decided to engage in non-farm income generating activities without involving their husbands. By telling them the secrecy of the interview, I managed to interview them in the absence of anyone else.

Nonetheless, to minimize these limitations, the sample women were carefully and cautiously selected based on the proper utilization of the available secondary information and an in-depth discussion with key informants at village level.

1.6. Definition of Some Concepts (as used in this study)

- (i) **Income generating activities refers to** those activities that are characterized by the following elements
- Activities that tend to be family or household based relying primarily on family labor.
 - Activities which are not permanent and they change according to external factors such as changes within the economy, the weather and therefore the seasons, the availability of capital, labor and equipment.
 - Activities which are characterized by marginal returns which do not allow for savings and systematic expansion of business
 - The activities that may generally not be included in national statistics and other economic indices, unpaid family work particularly amongst women, girls and children
- (ii) **Non-farm income generating activities (non-farm IGAs)** - Type of activity done excluding farming activities like agriculture, gardening and livestock keeping.

1.7. Organization of the Thesis

The thesis is organized into five chapters. The first chapter provides background of the study and statement of the problem. Objectives, significance and the scope and limitations of the study are also discussed in this chapter. The second chapter deals with review of relevant literature. The third chapter deals with the research methodology. The results of both descriptive and econometric analyses are presented and discussed in chapter four. The final chapter summarizes the main findings of the study, conclusions and draws policy recommendations.

2. REVIEW OF LITERATURE

2.1. Importance of Women Non-Farm Income Generating Activities

During the 1980s and 1990s most African states (Ethiopia included) witnessed a proliferation of women's income generating projects (Meena, 2010). Women became increasingly involved in non-farm income generating activities than in agriculture perhaps due to the fact that women especially in the rural areas do not control the income gained from agricultural production, therefore this made them turn to other economic activities to enable them earn independent income in order to fulfill their obligations (Nkurlu, 2009). Similarly, real crop prices dropped compelling peasants and their dependents to diversify income sources by engaging in small ventures within the rural areas or in urban centers. (UDEC, 2002).

The growing importance of non-farm IGAs in Ethiopia is evidenced by its increasing size in the national economy (Nkurlu, 2000). Non-farm Income generating activities are important for creating employment, production of locally needed commodities, income generation, growth of farm activities and poverty alleviation (Washa, 2002). Apart from creating employment, these activities are important in their contribution to food security and raising household income through selling of products (Minde, 1988; UDEC, 2002). The income generated from these operations may be small, but it plays a significant role in buying clothing for babies and children, paying for school fees and health care (IFAD, 2006). For Example, a study conducted in Taiwan in 1995 found that, after holding per capita household income constant, women's income share has a significant and positive effect on share of staples and education and negative effects on budget shares allocated to khat and cigarettes (FAO, 2005).

2.2 Women Participation in Non-Farm Income-Generating Activities

The participation of women in non-farm IGAs differs in many ways according to their participation varies according to age, religion, ethnicity, wealth, education level, literacy marital status, social status, experience and social economic position, they differ in terms of motivation to start and develop business (UDEC, 2002). These differences according to Mutagandura (2005) are responsible for a consideration of variation in nature, scope and magnitude of women's non-farm IGAs. Non-Farm Income generating activities undertaken

by women may provide more chances for women to become visible workers, perceive and identify themselves as economic beings, become more organized, and their activities being linked to the mainstream of the national economy and receive pay directly and control their earning (UDEEC, 2011).

The participation of women in income generating activities is of vital interest to women throughout the developing world. Women participate in those activities which they feel will bring increased income, which they could use to supplement whatever is available or brought in by their spouses. In some cases, however, the women are the breadwinners of the family Wambura *et al.* (2009). Women contribute to agricultural production, especially food production, more than has been generally recognized. The reality in most SSA countries is that more than 50 percent of the active female population works in agriculture, reaching 93 percent in Burkina Faso, 87 percent in Angola, 98 percent in Burundi, 96 percent in Malawi, and 92 percent in Mali and Tanzania (FAO,2011). Women's work in the agricultural sector often remains invisible because the products of their labor are for the largest part intended for household consumption and do not reach the market economy (Ibnouf, 2009). Household variables such as decision-making patterns and cultural beliefs, norms, consumption practice and utilization of nutrients influence allocation of resources and individual food security Johnson-Welch *et al.* (2000).

While poverty affects households as a whole, gender division of labor and women's responsibilities for household welfare make women bear a disproportionate burden in alleviating poverty. For example, trade liberalization policy in Ethiopia removed price control and subsidies. This forced women to look for ways of earning incomes to meet the rising prices of food items. The policy has affected women more because they are the immediate food suppliers at the household level Makombe *et al.* (1999).

Moreover, households in which women have access to their own incomes and can exercise decision making powers, tend to have an expenditure pattern different to the one existing in male dominated households (IDRC, 2004). This is because women tend to spend a significantly higher portion of their income than men on food for the family (FAO, 2006).

Women produce and consume, manage business and households, earn income, hire labor, borrow and save and provide a range of services for business and workers. Women represent an increasing proportion of the world's informal sector labor force and their activity rates are rising. In Africa, Asia and Latin America, there is over one third of the officially enumerated workforce (IFAD, 2006). Poor and uneducated women are likely to be found in informal sector operating small eating places “mama lishe” while the richer women have more capital and hence run relatively large enterprise employing more Labor and use appropriate technology. Women contribute substantially to the family budget through non-farm IGAs, even where a woman is not completely alone, her contribution to the budget is of utmost importance to the family, more so because women spend more of the income in family welfare.

2.3 Characteristics of Women's in Non-Farm Income Generating Activities

Women usually conduct income generating activities of one kind or another; sometimes duplicate business that may lead to problem of considerable competition for market and lack of business sustainability (IFAD, 2006). Majority of these are traditional, low capital input and labor intensive while the returns accruing to them by comparison tend to be low (Women Watch, 2005). According to ILO (2000), women tend to concentrate in the least rewarding income generating activities production that usually covers a fairly narrow range of consumer goods for example garments, charcoal production, khat, petty trade, woven goods, food processing and handcrafts. Moreover, women tend to keep business close to home to minimize conflict between their many roles as wage earners, mothers and home makers. For example a cross regional studies of women in the informal sector in Zimbabwe found that about 64% of women run their business close to their home (UNICEF, 2006).

2.4. Non-Farm Income Generating Activities among Pastoralists and Agro-Pastoral in Ethiopia

Today, there are many pressures on many pastoralists and agro-pastoral to diversify their livelihoods and get involved in various income generating activities beyond a reliance on

livestock and farm as was common in the past. Drought, land loss, population pressure, conflict, land degradation and economic change resulted in the impoverishment and marginalization of pastoralists and agro-pastoralists. As a result there are generally fewer livestock per capita than before. Livelihoods are changing and many can no longer realistically hope for a pastoral future. The changes are not all imposed from the outside; nor is rapid change a new phenomenon. Hence, livestock herders of east Africa increasingly pursue non-pastoral income strategies to meet consumption needs to buttress against risky shocks caused by climatic fluctuation, animal disease, market failure and insecurity. Moreover, as the above mentioned livelihood stresses undermined pastoralists men's sole traditional roles of bringing income to the household more and more pastoralists women have started engaging in income generating activities to provide for the family- a roles which was previously kept for pastoralists men (Little, 2011).

According to Devereux (2012), income-generating activities among pastoralists and agro-pastoralists in Somali region of Ethiopia are implicitly stratified into high-status, high-return activities, which are reserved for men (these include livestock rearing and large-scale trading), and low-status, low-return activities, into which women are channeled disproportionately (e.g. petty trading, collecting fire wood). As men have access to resources including substantial amount of initial capital such as livestock, they usually participate in large return activities which are deemed as high- status activities (Rotich, 2005). Whereas, women tend to lack such resources and they mostly subsume low-return income generating activities.

Pastoralists men move with the livestock and trade livestock whereas women sale milk and milk products, firewood, medicine, handicrafts as an income generating activity. Hence, income generation opportunities practiced mostly by women are typically more closely connected to the herding activities: they encompass, for instance, wild product collection (firewood resins and gum), milk trading, petty trade or production and trade of handicrafts (Rass, 2001 in Nduma, 2003; Brockington, 2001; Smith, 1998).

Under her study conducted about income generation activities amongst Ethiopian pastoralists, Flintan (2007) asserts that gender division in income generation might be also explained by pastoralist's men roles. Women need to ensure that they have a certain amount of money at hand to feed the family and therefore may be happier to have a small but more

secure income. Men however may be able to take more risks and are keen to see larger returns for their input: livestock sales for example (Flintan, 2007).

Brockington (1993) in Sikana (1993) also entails as income generating activities are important source of food in pastoral communities. Where sufficient milk is not available from the herd; pastoralists sell milk to get food. For instance, as Brockington and Homewood (1999) also describe for Masai pastoralists families removed from Mkomazi protected area, “for women in these families opportunistic selling had become a daily necessity. The poorer the family, the more likely it become for food to be bought on a hand to mouth, daily bases in exchange for whatever products women could sell. Most of the women thus relied upon goods sold locally, but some travelled regularly and frequently to towns further a field in Kenya and Tanzania”.

2.4. Women Pastoralists and Agro-Pastoralists’ Participation in Non-Farm Income Generating Activities in Somali region

The gender roles among pastoralist and agro-pastoralists group vary from one culture to another, in different ethnic groups and within the society according to the age, social class and religious affiliation. As the differences in gender roles entail among different societies and places, gender roles are not always static, and change over time. Hassen (2007) in his study conducted regarding mainstreaming gender in Ethiopia pastoralist organization indicated that married pastoral women in Ethiopia and in other parts of east Africa in general are household managers, but subordinate to men who serve as the house hold head and represent the household to the outside world. Pastoral men do play strategic decision making in the livestock production, while women carry on a day to day management and retain primary responsibility for dairy related activities.

As outlined above, the increase in income generation activities to cope with the different livelihood shocks is having on impact on men and women in different ways and on their gender roles. Women’s role as co-breadwinner through income generating activities is new and challenges long held views on the ‘appropriate’ role of women. Women are increasingly moving out beyond the domain of the home, whether by choice or necessity, and trying to establish themselves as business owners. These changes have generated much debate in society particularly between elders and younger people. One elderly man in Somali region

spoke for many of his generation at a workshop when he asserted that women should maintain traditional roles and cited a Somali proverb: “Hooyadu mar waadabaakh, mar waadoobi, mar waadaabad, marnawaafuraash” (A mother’s function is to cook, launder, nurture and be a wife to her husband). This view is based in part on tradition but also the frustration that many men feel when not being able to support their families as accustom prescribes (Omar, 2010).

As study conducted by Brockington and Homewood (1999) in Mkomazi Game Reserve in northeast Tanzania shows the loss of livestock caused by drought affects women in a pastoral group and results a change in women’s livelihood in response to altered circumstances of decreases in herds due to drought. This loss of (male-owned) livestock also translates directly into loss of male power, which women can and do exploit. This is mainly because live stocks are largely owned by Men and men in pastoralists’ societies usually acquire prestige and power by accumulating large herds of animals (Rotich, 2005).

Income generation activities during times of emergency (such as drought) not only generate cash, but they can also play an important role in increasing women’s feeling of worth and self-esteem (Flintan, 1998 cited in Mohammed, 2002).

By earning an income independent of their husbands, women now make many more decisions in the households. A major change in this regard is that in the past a large sum of money was earned occasionally from the sale of an animal but now there is a small but continuous flow of money from petty trading or other business. Due to this as well as the tendency of women to spend money on necessities rather than ‘luxuries’, household security has improved in many cases. Additionally those women who have started business have gained more confidence, status and self-esteem. This new assurance was expressed by one woman in the following terms: whatever happens, women will not return to their homes even if normality returns, because we have gained economic independence. Although all of these can be seen as positive changes, business development also has a number of negative impacts on women. It also can increasing burden on women who are already overworked and under pressure. As a result they may reduce the time spent on child care and/or put their own health or security at risk in order to raise income (Sead, 2007).

In a similar vein, Robertson in his study in Kenya puts the contradictory views of the impacts of income generating activities by women. He concluded that Kenyan women may well have more independence from the men as a result of earning their own money. However, as the income gained by women from milk selling is small, that they were no better off or more food secure. They have only won the “freedom to be poor” (Robertson, 1995).

Brockington (2007) in his study about the livelihood strategies of dispossessed pastoralists near the Mkomazi Game Reserve, Tanzania explains the other negative impacts of the income gained from the income generating activities due to crisis. He asserts that women may have sold goods before eviction because they needed their own income to achieve some form of financial independence.

What the women were complaining about was the fact that the income they would have had for themselves is now required for needs once met by pastoralism. Where men are unable to provide sustenance from their herds, women’s freedom to enjoy the fruits of their sales for their own purposes is denied. On the other hand, Sead (2007), in their research in Somali pastoralist region, Ethiopia state that as women’s status as ‘household provider’ increases, men may feel that their own status is diminishing. This can cause resentment, conflict between husband and wife and perhaps rejection by the husband of any other responsibilities to contribute to the household, preferring instead to hang out on the streets or chew khat (a mild stimulant). In some instances it is noticed that men appear to be unwilling to support their wives, mothers, daughters where they need it, in providing assistance with the business and for example, labor. Attitudes have not changed enough to encourage men to help the women and rather doing so would still be seen as demeaning and highlight their failure in providing for the household. However, in other instances men appear more willing to assist their wives for example husbands help collect palm leaves for handicraft production and fuel wood for sale. Lemlem (2007) suggested that this can be partly attributed to the intervention of development organizations and their promotions of gender equity.

However, as Flintan (2007), suggested that this can be linked to the degree of poverty and commercialization: where households can be considered to be ‘very poor’ they tend to work in a reciprocal manner battling to Fulfill basic needs and ensure households survival. However once a certain level of wealth is reached and commercialization of the household

economy is of a greater degree particularly where based on the income of wife than attitudes changes to those such as resentment or complacency on the part of the husband.

2.5. Women's Access to and Control over Economic Resources

2.5.1. Women and Their Marital Status

One contributor to the twentieth century rise in married women's labor force participation was declining responsiveness to husbands' wages and other family income. Now that the rapid rise in married women's participation has slowed and even begun to reverse and asks whether married women's cross-wage elasticities have continued to fall. Using the outgoing rotation group of the monthly Current Population Survey (CPS) and estimating coefficients separately for each year from 1994 through 2006, it was found that the decline in responsiveness to husbands' wages had come to an end at least for the time being and even find evidence of rising responsiveness to husbands' wages. This increase in the cross-wage elasticity of participation occurs largely between 1997 and 2002 and is concentrated among younger women and women with children.

We also explore a number of possible explanations for this development. We conclude that declining divorce rates, rising child care costs, and the increasing prevalence of high work hours for high pay all of which were more pronounced at the high end of the income distribution along with rising income inequality may have played a role. Also possible is that some of the decline is an artifact of changes in the tax system and the way income is measured. In addition, we observe some backsliding in attitudes supportive of gender equality in the market and at home, and perhaps a change in lifecycle timing among Generation women (Ibnouf, 2009).

2.5.2. Women and Access to Education

Access to education has a major impact on rural women's potential to access productive, income-generating opportunities and more decent work, because of their increased confidence and skills to be able to negotiate for better conditions and organize with others to do so. However, FAO points to a gender bias in education for girls. While the gender differences in education are significant and widespread, a recent FAO study of 15 countries

demonstrated that male-heads of household typically complete more years of schooling than their female counterparts. Although there is evidence of bias against girls in education, tremendous gains have been made in primary school enrolment rates for girls. When girls expand their knowledge and skills, they expand their range of employment opportunities upon leaving school(Bharathamma, 2008).

Estimates indicate that an extra year of schooling increases women's wages by 10 to 20 per cent (Psacharopoulos and Patrinos, 2004, cited in World Bank, 2007). Finally, in looking to future generations and the education of rural women's children, evidence indicates that when rural women are economically empowered, their children are more likely to attend school and less likely to engage in child labor (ILO, 2009b). Increased education and training for women can also increase their opportunities for migration under skilled migration schemes (IOM, 2008).

A variety of approaches, including non-formal education, technical and vocational training, Agricultural extension services, workplace training, lifelong learning and training in new technologies, and literacy and numeracy training are needed to assist women in searching for better jobs (World Bank, 2007). This calls for policies that are broad and comprehensive in addressing education in terms of recognizing the value of formal and non-formal education in the Context of rural areas, and making education more accessible to rural women and girls as well as Men and boys. This calls for the strengthening of social protection systems that can also support Women in accessing education opportunities (through accessing funds, childcare facilities, etc.) and increased investment in rural infrastructure and human resources to provide greater access for rural women. The Beijing Platform for action stress that education is one of the most powerful and effective tool for women 'empowerment in Africa. However, limited access to quality education and training opportunities continues to hinder women's equal participation in decision making, leadership and also in positively contributing to development in their countries. It is a well-recognized and acclaimed statement that education is the most instruments for development and for mental and social emancipation (Ojo *et al.*, 2006).

The importance of the need for teaching and learning within and outside the school environment and the sudden rise in technological creativity in several developed and some under developed societies has brought distance education into limelight. These learning

trends indicate that less effort is needed to ensure access to education for all especially for girls who are socialized to be more domesticated and docile while boys are encouraged to teach (Egwuasi *et al.*, 2006). Female children, like male children need quality education; but unlike male children several challenges which include poverty, cultural and economic issues, hinder the regular participation of the girl-child in education. Hence women and girls have been discriminated against and effectively denied education which is one of the fundamental human rights and a veritable tool for development and empowerment (Okoli, 2012).

2.5.3. Women Access to Land

The Tanzania government has used several strategies to improve the economic empowerment of women. The first strategy was to make access and equitable control of means of production possible for women. The Government therefore revised the National Land Policy of 1995 and enacted the Land Law Act of 1999 as well as the Village Act of 1999. This has enabled women to own clan and family land on equal rights with men. The major constraint lies in the traditional norms and culture. It is hard to change attitudes in the society. The main thrust is to embark on gender sensitization to influence change attitude of the society (IFAD, 2009).

Access to land, workspace, and productive resources is critical to unlocking the economic potential of women. Despite positive land reforms, land tenure in Tanzania continues to discriminate against women because of traditional practices and customary laws. This is particularly the case in relation to inheritance and in circumstances of the death of, or divorce from a spouse (IFAD, 2009). Women's rights to land have traditionally been neglected, and their access to land often depends on their relationship with men (Deininger, 2009). The weakness of women's land rights results in an inability to use land as collateral to obtain access to credit.

2.5.4. Women Access to Credit

Without access to credit, rural women often lack the capacity to deal with risk and the costs associated with innovation such as establishing or growing a rural enterprise or improving their productivity (as agricultural producers). Constraints to women's access to financial

services include policy and legal barriers as well as cultural “norms” that prevent women from keeping bank accounts or entering into contracts without their husbands or another man (FAO, 2011a).

Moreover, women’s lack of ownership over assets that can be used as collateral to leverage loans also constrains them more than men. Women may be more disadvantaged than men in starting up enterprises, as they may be less able than men to afford long and expensive registration procedures either because of financial and/or time costs (United Nations, 2009) or because of illiteracy issues that constrain them in the process. Women are also constrained in transitioning to general finance. Approaches to address this problem have included group collateral through associations.

Recently, there has been growing interest in developing comprehensive “inclusive financial sectors” that include a diverse range of financial services to rural areas including agricultural and Non- agricultural finance (World Bank/FAO/IFAD, 2009). Both financial institutions and governments at national and regional levels have taken interest in increasing the access of women entrepreneurs to financial instruments, including regular banking services, debt financing and equity financing (United Nations, 2009). Through financial service access, women can become economically empowered through using credit, savings, and insurance to promote their own economic activities, as well as create and protect their assets, enter or strengthen their links to markets, and diversify their economic activities (World Bank/FAO/IFAD, 2009).

Micro finance institutions around the world have been quite creative in developing products and services that avoid barriers that have traditionally kept women from accessing formal financial services such as collateral requirements, male or salaried guarantor requirements, documentation requirements ,cultural barriers ,limited mobility and literacy. Nevertheless, in a number of countries and areas few or no institutions offer financial services under terms and conditions that are favorable to women. Together, the type of products offered their conditions of access and the distribution of an institutions portfolio among different products and services affect women’s access to financial services. Much more can be done to serve poor women in certain cultural and economic contexts (Deshpanda, 2001; USAID, 2000).

2.5.5. Women Access to Extension Services

With globalization and the ever increasing reach of information and communication technologies, rural women and men, with the right policies and institutional frameworks in place, can access information through a number of different means including traditional extension services as well as through M- and E- technologies. Yet, rural women still face gendered disparities in access extension services as well as ICTs. Constraints to women's access (both to extension and ICTs) include general misperceptions that women do not farm and that extension advice will "trickle down" to others in the household (although anecdotally this has been found to be disproven). Because women also have less access to education overall, this may also limit their participation, particularly in activities using a language or written materials that women cannot use. Time and labor constraints (due to other responsibilities) also hinder women as do mobility or restrictions (e.g. with male extension workers) due to so-called "cultural reservations" (Meinzen-Dick *et al.*, 2010).

Women whose ability to travel to distant markets is restricted may benefit from access to modern ICTs including radio, mobile phone, computers, and internet service. Information and communication technologies (including E- and M-commerce, E- and M-finance and marketing) can reach and benefit rural women. A recent study from India shows that rural women's information needs vary widely and that ICT strategies need to consider each specific context. The study found that while ICTs have improved rural women's access to new information, many rural women do not have the required human networks and financial support to access "complementary sets of knowledge and services to make use of the information they find" (Sulaiman *et al.*, 2011).

Women access to technological such as improved seeds, fertilizer and pesticides is limited. In addition, women are not frequently reached by extension services and are rarely members of cooperatives, which often distribute government subsidized inputs to small farmers. According to Blackden *et al.* (2003) targeting women for extension services resulted in higher yields. The weak technology diffusion and innovation in both Tanzania and Kenya was confirmed by the UNDP technology achievement where they were both listed as marginalized (UNDP, 2011).

2.5.6. Women Access to Information and Market

Many rural women and men around the world are involved in the production of produce and value-added goods traded in local and export markets either as farmers, wage workers or as processors or vendors along different value chains. On the whole, small-holder farmers and small entrepreneurs – in particular rural women – have difficulties accessing wider export markets and competing in domestic markets with often cheaper imported foods grown elsewhere (Fontana and Paciello, 2010). Women increasingly supply national and international markets with traditional and high-value produce, but compared to men, women farmers and entrepreneurs face a number of disadvantages, including lower mobility, less access to training, less access to market information, and less access to productive resources. Evidence suggests that women tend to lose income and control over agricultural produce or products when these are marketed (Gurung, 2006 in World Bank/IFAD/FAO, 2009).

They are also impacted by globally integrated markets which provide for free entry of agricultural products into domestic markets that can impact smallholder women and men farmers. For example 50,000 potato farmers, mostly women, in the Philippines were negatively impacted when pre-cut, ready to cook fries entered the country's market (World Bank/FAO/IFAD, 2009).

To ensure women's improved access to, and benefit from both local and export markets, financial services that target women must be linked to a wider policy framework that ensures access to rural women's financial services and contributes to the development and expansion of markets and value chains. The privatization of rural services has often impacted rural women negatively. For example, when Zambia abolished its marketing boards and privatized extension services and rural credit under structural adjustment, women farmers, more than men, were affected as it was women who tended to access credit and extension services at local market cooperatives (Evers and Walters, 2000 cited in UN, 2009). Local markets often are more accessible to rural women as they are less likely to have the time, permission, or transport to travel beyond their own villages to (often more lucrative) peri-urban and urban markets; they may also be forced to sell their crops to intermediary traders who often pay lower prices or trade in-kind (Whitehead, 2009 in UN, 2009).

A woman operating business that denies them access to markets as well as critical services, such as finance and training and confines them to a vicious cycle of low productivity, low income and low access to resources. The limited access to market is the other main issue when comparing women to men, lack of education and training superimposed on deep-rooted traditions and institutions arrangements help to create discriminating barriers for women to accessibility of markets. Women's ability to penetrate markets outside their local area is affected not only by physical mobility issues, but also by the type of business women engage in (UDEEC, 2002). In Tanzania while male entrepreneurs can travel long distance to do business, most women are inhibited by traditional roles, domestic responsibilities and cultural values. Women limited networks and information reinforces women isolation as entrepreneurs and reduces their scope opportunities for building market and business know-how and accessing other physical and financial assets. Women also face disadvantage in increasing information, social networks and other resources they need to succeed in business and in life. Women entrepreneurs operating informally that denies them access to markets as well as critical services, such as finance and training and confines to a vicious cycle of low productivity, low income, low access to resources (Olomi, 2001).

2.5.7. Women and Access to Transport

Transport is a key element for rural women's economic empowerment and for sustainable development in general. Not only is it closely related to the issue of women's collection of water and fuel wood, but also, it is important for enabling women's greater participation in institutions as well as mobility to access input and output markets, health services, and formal and informal education opportunities. Women often face great constraints in accessing goods and services and moving their own produce and products to market and they face higher prices for consumer goods because of the distance and fuel costs involved in transporting goods to rural areas and low selling prices for their produce for the same reason. All of these factors combine to hamper rural women's establishment and growth of on and off-farm enterprises and productivity (FAO/IFAD/ILO, 2010).

Rural women's access to transport is constrained, in part, because of the absence of fair and equal decision-making dynamics in households and communities. For example, in Tamil Nadu, India women were trained to ride bicycles as part of a literacy campaign and although they learned to ride, they could only access their husband's bicycle when their husbands felt

it was convenient. Moreover, husbands also expected women to increase their workload and take on extra tasks such as marketing and taking children to school (Rao, 2002 cited in Carr and Hartl, 2010). Transport costs are often out of women's reach also. Moreover, women often lack the means to communicate their transport needs to those controlling the transport (e.g. lack of access to a phone). Policies that promote affordable, appropriate and reliable transport can improve rural women's livelihood strategies and strengthen their exchange of information, build their social awareness and promote women's social inclusiveness (Omar, 2001). Through increased mobility and improved linkages between rural and urban centers, women are also able to leverage urban income sources – through employment in informal (street vending, casual employment, etc.) and formal employment in public infrastructure services, factories, and restaurants and shops to name a few.

2.5.8. Women IGAs and Record Keeping

Record keeping is a key practice used by successful entrepreneur. Accurate written IGAs records are helpful (Mohammed *et al.*, 2004). Record keeping warrants a situation where policy formulation, planning IGAs programs, monitoring and evaluation becomes difficult because data collection from IGAs is practically impossible. It is imperative for policy makers to convey information to producers by demonstration projects, technical assistance and education programs (Han-Hong –yun and Zhao, 2009). Farmers are likely not to keep farm records. However, it will be easier for experienced farmers to keep records of their farm activities (Adekoya, 2005).

Some business owners do not keep records because they perceive business to be too small to be managed with the help of records. That is to say, small business owners who do not keep records feel that they are capable of correctly computing revenue and expenditure by recalling from memory. However strong ones memory may be one cannot hope to remember all the details regarding all these transaction. Level of education, nature of the business ownership, training and size of the business are the main factors influencing accounting record keeping. Despite this importance of accounting records, most small enterprises do not maintain proper records the influence of records on business performance has not been well documented (Mairura, 2009).

2.6. The Effects of Women's Participation in NFIGAs on Household Welfare

Women IGAs in rural areas accounted for 40 percent, on average of total in Africa countries. A similar trend was also observed in sub-Saharan countries, where non-farm income contributed from 30 to 42 percent of total household's income. In Asian countries however, the shares were lower but still significant around 20 to 32 percent (Reardon and Winters, 2002). In Ethiopia, the rate of women non-farm labor participation is high and out of total non-farm employment 48.8% were pursued by women (Holger, 2009). Although women entrepreneurs often run enterprises that exhibit low productivity, they provide important supplements to household income. More than 39% of those women who are employed in IGAs as the main activity report that they do this in order to generate additional income to their household.

2.7. Review of Empirical Studies

The approach applied focuses on the access to the different types of assets which is conditioned by external factors, like institutions and infrastructure. In this section, we review the empirical evidence on determinants influencing activity choice and activity income. Why do women diversify their activities and increase for example their income from activities outside agriculture?

They change because returns to their assets endowed in agricultural production decrease in relation to the returns from using them in activities outside agriculture. This implies that the choice of activities highly depends on access to the different types of assets (Winters *et al.*, 2002; Barrett *et al.*, 2001) and also explains why not all women have the same opportunities to participate in non-agricultural activities. Poorer women tend to have less access to non-farm activities than women that are better off. These other physical assets are mainly unrelated to agricultural production. The area of land and the livestock units owned are also included as explanatory variables in the regression models to account for the influence of physical capital related to agriculture on activity choice. In the activity choice and income models we distinguish the possession of rain fed and irrigated land to investigate the influence of paddy rice production on the production of perennial crops.

Barrett (2001) found a strong positive relation between education and non-farm incomes in almost all of the papers reviewed. Nevertheless, when also considering the agricultural sector then the results are mixed. Joliffe (1998), reports for Ghana that schooling has a negative influence on income from agricultural self-employment, whereas it has a positive impact on total and off-farm income. In Mexico, Taylor and Naude (2000) find high returns from schooling in wage labour, whereas the returns in the production of staples are low and not significant. These results reveal the importance of activity differentiation. Moreover, they show the need for a clear definition of the income activities to make the results more easily comparable. In this study we include the years in school of the head of the household as a proxy for education. Besides education, we also control for the influence of ethnicity on activity choice and income.

Other than human capital, access to social capital can also play an important role. Narayan and Pritchett (1997) demonstrate with an econometric model for Tanzania, that social capital has a higher influence on household income than human or physical capital. Grotaert (1999) highlights the important influence of social capital on welfare and poverty in Indonesia.

In terms of activity choice social capital can foster the ability to participate in many different income activities. To test whether the density of a social network has any influence on activity choice and incomes we include a social capital index, measuring the access and the influence of household members in formal institutions. Moreover, we also include a variable measuring the ethnicity of the head of the household since this can influence the access to informal social networks.

Less-poor households do not only own more productive assets, but also have better access to markets, especially to financial markets. Limited access to credit can either “push” poor households into wage labour activities to earn cash (Reardon *et al.*, 1998) or it further restricts their ability to invest in non-agricultural activities. Poor households are not able to adjust their capital stock to the different needs in activities outside agriculture. Households which have access to credit are able to participate in credit markets, but they may choose not to do so or may borrow less than they could (Diagne, 1999). Due to difficulties in measuring access to credit, we measured the participation in formal credit markets by using a dummy variable which is “one” when the household received a formal credit in the last five years and “zero” otherwise. Studies by Canagarajah *et al.* (2001) in Tanzania and Smith

(2001) in Uganda show that better physical access to markets increase non-farm earnings. Thus, we include the distance from the homestead to the next tarmac road in our econometric models. Nevertheless, it is difficult to distinguish the effect of the distance to roads from other spatially fixed effects.

2.7. Conceptual Framework of the Study

In this study, non-farm income generating activities (NFIGAs) refers to employment outside of the agricultural sector. Participating in agricultural and non-agricultural products trade, firewood and charcoal sales are considered as non-farm activities.

We present the choice of NFIGAs in the framework of decision of women's maximization of household income involving allocation of one's labor and capital resources into alternative activities. Such a decision involves a constrained optimization with a set of incentives that determine the return from the respective activities and a set of constraints that define the capacity of women to undertake the activities. This choice of diversification into non-farm income generating activities can be decomposed into two interdependent and simultaneous choices: (1) The decision as to whether or not to participate in non-farm activities and (2) The decision on the type of non-farm activity.

The set of incentive variables relevant in these choices can be grouped into two: push and pull variables. One set of push variables represent factors related to the poor performance of the agricultural sector as a sufficient and reliable source of income. Such factors include interseasonal and other transitory drops in farm income, chronic food insufficiency and fluctuations in farm income (Reardon *et al.*, 2007). Another source of push variables are incomplete markets for factors, including but not limited to missing credit and insurance markets. In the absence of financial markets, individuals and households diversify to self-insure themselves and provide working capital (Barrett *et al.*, 2001). The pull variables emerge from comparing earnings in non-farm employment with earnings in farm employment. The most important pull variables are the returns to factors supplied in the non-farm sector-wage or salary in nonfarm wage employment and profits in self-employment. The higher the returns to labor and capital in non-farm employment, the most attractive non-farm employment will be compared to farming.

The profits from these activities are themselves dependent on the demand for goods and services produced by the non-farm sector. Anderson and Leiserson (1980) identified three sources of demand for rural non-farm activities: (a) non-food goods and services for the rural population, which rise with rural income levels; (b) inputs and services to agriculture which rise with agricultural development; and (c) manufactured and handicraft goods, stemming from external markets in other regions or abroad. An increase in demand from any of these sources directly increases the market and possibly the profit for self employment activities. It also increases the derived demand, and possibly the income, for labor in those sectors, although the labor demand response of enterprises may also be itself affected by owners' capacity (Randrianarisoa *et al.*, 2009).

The main capacity variables that affect non-farm participation are the human, physical and financial capital. Women differ in their capacity regardless of the market structure, as we see for example in the difference between educated and uneducated women or between women who have some startup capital for business and those who do not. The physical and financial constraints are less of a problem in a well functioning market as one can finance a business by borrowing. However, where markets are not functioning, one's human, physical and financial capitals are not easy to augment and become binding constraints. This leads to different outcomes by different women facing the same incentives. This capacity limitation restricts resource-poor women and households to a few low paying activities, as is observed in many African countries (Reardon, 1997). What is more, according to Barrett *et al.* (2005), in rural Africa heterogeneity is not limited to the constraints. There are also differences in the incentives that women and households face. Such differences may result from the observable 'spatial variation in transaction costs and gross market prices' and from less observable differences in the shadow prices of factors and goods across individuals. The implication of the heterogeneous incentives and capacities is that different individuals and households face different feasible sets of activities from which they can choose (Barrett *et al.*, 2005). Hence, while those who have more options because of their capacity can choose the activity that maximizes their return and sets them on accumulation path, others who have limited choice in the non-farm sector but need to complement the insufficient farm income may be relegated to residual activities with very low return and negligible prospects for longer-term accumulation.

Even though disaggregating the factors influencing women's non-farm participation decision into incentive and capacity variables is very useful, we have to keep in mind that the distinction between the two is not always clear cut. Some variables such as livestock can be considered both an incentive variable, indicating farm potential, and a capacity variable indicating wealth. This study examined how the different forces influence women's participation and earning from non-farm activities.

3. RESEARCH METHODOLOGY

This chapter presents how the research have been conducted including the description of the study area, selection of the study site, sampling technique, data collection procedures and methods of data analysis.

3.1. Description of the Study Area

This study was conducted in the pastoral households in Degahbour of Somali Regional State of Ethiopia. The Somali region is located in eastern part of Ethiopia, neighbors the Federal Republic of Somalia in East, the Djibouti Republic in Northern east, the Kenya Republic in Southeast, Afar region in the northwest and Oromia region in the west and southwest. The Somali Regional State has nine zones. Being one of the 11 districts of the Jarer zone, Degahbour is bordered on the southeast by the Gunagado and Korahe Zone, on the southwest by the Fiq Zone, on the west by Degehamedo, on the north by the Jijiga Zone, and on the east by Aware; it is frequently considered part of the Haud. The administrative center of this Woreda is Degahbour(FEDB, 2011)

The two perennial rivers in Degahbour are the Fafen and the Jerer. As of 2008, Degahbour has 68 kilometers of asphalt, 62 of all-weather gravel road, and 387 of community roads; about 24.4% of the total population has access to drinking water. This Woreda was reported in October 1974 to have been the area worst hit by the Hararghe famine (FEDB,2011)

Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this Woreda has a total population of 115,555, of whom 65,081 are men and 50,474 women. While 30,027 or 25.99% are urban inhabitants, a further 45,818 or 39.65% are pastoralists. The majority (98.6%) of the population are Muslim. This Woreda is primarily inhabited by the Darod and Isaq clans of the Somali people (FEDB,2011)

The major livelihood of the communities in the Woreda is agro-pastoralism. That is they depend on livestock-shoats, camel and cattle and rain-fed and flood irrigated crop production

(sorghum). The main sources of water are deep and shallow, hand dug wells in the Jerer valley. Sorghum is the predominant crop in the areas. In the dry seasons crop residue is used as fodder for livestock. The majority of the households in the district do not move far from their home areas/grazing (FEDB, 2012).

The main food source is procuring food from the surrounding districts going long distances through selling their livestock or livestock products. The main income sources are the sale of livestock and livestock products. Livestock sales are more important for poor households. Poor households spend proportionately more on food (SC, 2010).

Degahabur is the most important market for livestock, livestock products and cereals. Agricultural labor opportunities do not exist; the only labor opportunities are livestock herding and own farm labor. High dependency on animal rearing and small-scale rain-fed farming means on relying seasonal rains that are frequently insufficient (SC, 2010).

Key risks therefore include recurrent drought, water shortages, livestock export restrictions and market failure, and poor social services. Middle and better-off households have some income flexibility, but not enough to help in a crisis beyond the short term, all in all, health, education, water provision and road infrastructure are improving now (IRC, 2011).

3.2. Data Types, Sources and Methods of Data Collection

Both primary and secondary data were gathered and used for this study. Primary data were collected from the sampled respondents on different issues such as household characteristics and all other variables hypothesized to influence participation and level of participation of women in non-farm income generating activities using structured interview schedule which is pre-tested before the formal survey begins. Training on methods of data collection and the contents of the questionnaire were given to the selected enumerators. The survey was administered under the continuous supervision of the researcher. Secondary data were collected from different stakeholders particularly from the LCRDB and WAO offices of the district, NGOs and others who are supposed to have relevant information for this particular study.

3.3. Sample Size and Method of Sampling

A two-stage sampling procedures have been followed to select Kebeles and sample respondents. In the first stage, from 19 kebeles in the district (12 pastoral and 7 Agro-Pastoralists), three kebeles, 2 pastoralists and 1 Agro-Pastoralists were selected randomly. In the second stage, 122 sample women were randomly selected based on probability proportion. In order to determine the sample size, there are several formulas developed. But the simplified formula to calculate the sample size was provided by Yamane (1967) which is given by:

$$n = \frac{N}{1 + N(e)^2} \quad (1)$$

Where

n is the sample size

N is the number of households

e is the level of precision.

According to CSA (2008), the average family sizes for rural and urban areas are 7.2 and 6.1 persons respectively. Using the ninety percent confidence level and the degree of precision $e = 0.01$, equation (1) gives us:

$$n = \frac{14,850}{1 + 14,850(0.09)^2} = 122$$

Hence, using Yamane (1967) formula, a sample of 122 of Pastoral and agro-pastoral women were selected randomly from the three selected kebeles for an interview.

Table 1: Kebeles, Population and Sample size

Name of the kebele	Population		Sample	
	Participant	Non-Part	Participant	Non-Part
Obele(Past)	526	250	28	13
Higloley(Past)	421	201	22	11
Hodale(Agro-Past)	632	291	33	15
Total	1,579	742	83	39

3.4. Methods of Data Analysis

To address the objectives of the study, quantitative data were analyzed using both descriptive statistics and econometric model.

3.4.1. Descriptive Statistics

Descriptive statistics is important to have clear picture of the characteristics of sample units. By applying descriptive statistics one can compare and contrast different categories of sample units (women) with respect to the desired characteristics. In this study, descriptive statistics such as mean, standard deviation, percentages and frequency of occurrence were used. The statistical significance of the variables was tested for both dummy and continuous variables using chi-square (χ^2) and t-tests, respectively.

3.4.2. Econometric Model Specification

Tobit model was used to analyze the factors that affect the participation of a woman in non-farm economic activity. The model is appropriate, in this study since the dependent variable is the level of participation in a variety of non-farm income generating activities. Thus the dependent variable is between 0 limit and continuous level of participation above the limit. According to Eboh (2009), Tobit model is useful in situations where the dependent variable has the property of jumping discretely to zero or any other threshold.

A particular form of non-farm income generating activity is engaged in when the utility from engaging in it exceeds that of non-participation in non-farm income generating activity. Though it is not observed directly, the utility (U_{ij}) for a particular woman (i) to participate in a non-farm income generating activity (j) can be defined as a function (H_i) of some vectors of entrepreneurial associated characteristics (X_i), plus an error term with zero mean and constant variance (e_{ij}).

Thus

$$U_{ij} = e_j F_i(H_i, X_i) e_{ij}, \quad j = 1, 2, 3, 4, 5 \quad i = 1, 2, \dots, 126 \quad (1)$$

Where 1 represents participation in a non-farm income generating activity and 0 otherwise. The i^{th} woman adopts non-farm activity $j = 1$ if $U_i^1 > U_i^0$.

Pastoralists and Agro-Pastoralist woman-specific characteristics include such variables as age, level of education, household size, dependency ratio, farm size, farm income, remittance to household and distance to the nearest market. The utility of participation in a non-farm income generating activity U_{ij} can be inferred from woman's continuous choice over a predefined interval (intensity of participation). This justifies the use of Tobit model, as has been applied in previous studies of agricultural adoption studies (Norris and Batie, 1987; Lynne *et al.*, 1998; Adesina and Zinnah, 1993). This model enables one to estimate the likelihood of participation in a non-farm income generating activity and the extent (i.e, intensity) of participation.

The lower-limit Tobit model following from the work of Fernandez-Cornejo and McBrid (2002) can be expressed as:

$$y_i^* = x_i \beta + \varepsilon \quad (2)$$

Where y_i^* is a latent variable (unobserved for values smaller than 0) representing participation in non-farm income activity, x is a vector of independent variables, which includes the factors affecting participation in non-farm income generating activities, β is a vector of unknown parameters and ε is a stochastic error term assumed to be independently and normally distributed with zero mean and constant variance and $i = 1, 2, \dots, n$ is the number of observations. As applied by Oladele (2005), denoting y_i (the level of participation in non-farm income generating activities as the observed dependent (censored) variable, it will fall into the range:

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases} \quad (3)$$

Unlike traditional coefficients, the Tobit coefficients cannot be interpreted directly as estimates of the magnitude of the marginal effects of changes in the explanatory variables on the expected value of the dependent variable. Each marginal effect in a Tobit equation includes both the influence of the explanatory variable on the probability of participation as well as intensity of participation. As Adesina and Baidu-Forson (1995), and Chukwuji and Ogisi (2006) indicated, the total (marginal) effect accounts for the simultaneous effects of the number of participants and the extent of participation by both current and new participants. To decompose the relevant effects of changes in explanatory variables on the dependent variable,

the McDonald and Moffit decomposition method as applied by McFadden (1984) and adopted by Chukwuji and Ogisi (2006) is employed as follows:

$$E(y) = F(z)E(y^*) = X\beta F(z) + \sigma f(z) \quad (4)$$

Where:

$E(y)$ indexes are the expected value of the level of participation in non-farm income generating activities. It indicates the level of participation to be made by new participants;

$E(y^*)$ gives the expected value of participation by those who are already involved in non-farm income generating activities;

z , given as $\frac{\alpha + \sum_{i=1}^n x_i \beta_i}{\sigma}$ is the z -score for an area under the normal curve, evaluated at the mean values of x_i ;

α is the constant term in Tobit estimate;

β_i are the coefficients of the independent variables;

$f(z)$ is the standard normal density distribution function;

$F(z)$ is the cumulative standard normal distribution function. It predicts the probability of participation in non-farm income generating activity, given the mean value of the explanatory variables. That is the percentage chance of participation by new participants in non-farm income activities.

The derivatives of $E(y)$ with respect to X_i yields:

$$\frac{\partial E(y)}{\partial x_i} = F(z) \frac{\partial E(y^*)}{\partial x_i} + E(y^*) \frac{\partial F(z)}{\partial x_i} \quad (5)$$

Multiplying both sides of equation (6) by y/x and following the LeClere (1994) method will result in the estimation of elasticity of expected participation intensity and the elasticity of participation probability as:

$$\frac{\partial E(y)}{\partial x_i} \frac{x}{y} = F(z) \frac{\partial E(y^*)}{\partial x_i} \frac{x}{y} + E(y^*) \frac{\partial F(z)}{\partial x_i} \frac{x}{y} \quad (6)$$

When transformed algebraically, the following expressions result:

$$\frac{\partial E(y^*)}{\partial x_i} = \beta \left[\left(1 - z \frac{f(z)}{F(z)} - \frac{f(z)^2}{F(z)^2} \right) + z \frac{f(z)}{F(z)} - \frac{f(z)^2}{F(z)^2} \right] F(z) \frac{\partial E(y^*)}{\partial x_i} + E(y^*) \frac{\partial F(z)}{\partial x_i} \quad (8)$$

where;

$\beta \left[z \frac{f(z)}{F(z)} - \frac{f(z)^2}{F(z)^2} \right]$, is the elasticity of expected participation intensity and

$\beta \left[z \frac{f(z)^2}{F(z)^2} \right]$ is the elasticity of probability of participation. The summation of the elasticity of expected participation intensity and that of the probability of participation gives the total elasticity.

3.5. Definition of Variables and Hypothesis

3.5.1. The Dependent Variable of the Model

Women's participation and level of participation in NFIGAs is the dependent variable of the Tobit model. It assumes a value of zero for non-participant woman and a continuous value which is the annual income in Birr earned by women participating in NFIGAs.

3.4.2. The Independent Variables of the Model

Women's participation in NFIGAs and the intensity of participation in a given period of time is hypothesized to be influenced by a combined effect of various farm and household characteristics. Brief explanation of the explanatory variables hypothesized to have influence on participation and level of participation in NFIGAs is presented below:

Age of the woman: Age was assumed to be related with socio-cultural roles in the study area besides its relation with experience of women participation in Non-farm income generating. Age in a traditional society is an important indicator of one's position in his/her society. Younger women are deeply accustomed with the traditional ways of participation in household works than older women. Mulugeta (1994) and Degnet (1999) found that increased age has a negative impact on the women participation in non-farm income generating. In this study, age was measured in number of years and hence is a continuous variable. Age in this study was hypothesized to be negatively related with women's participation in non-farm income generating activities.

Marital status: Marital status in this study is a dummy representing respondents' women marital status. It takes the value of 1 if married and 0 otherwise. Unmarried women are more likely to be motivated to participate in NFIGAs and level of participation, since they are relatively free from different burden related to family. In this study, unmarried women were expected to have high level of participation in NFIGAs than married women.

Education of the woman: Education is often highly prized by pastoral women, partly because they see it as a means of escaping from a harsh and marginalized life for their children. Level of education of the women was assumed to increase the ability to obtain, process, and use information relevant to the participation in NFIGAs and it is a continuous variable. Hence education of woman was assumed to have direct and positive influence on participation in NFIGAs and level of participation. However, women frequently have less access to education than men because the investment is not considered worthwhile, or because of economic and cultural reasons. Empirical studies have demonstrated that literacy is the important factor influencing the level of participation of household in income generating and the results shows that women who are educated are expected to have more participation than others, Education was measured in terms of grade completed. The result of similar studies conducted by Mulugeta (1994) and Nkonya *et al.* (1997) showed that education level of women positively influence the women participation in non- farm income generating

Family size: Family size is a very important factor that determines women's decision to participate in NFIGAs. Family size is a continuous variable measured in number of members in the household. The more family members in the household, the more income are needed to feed the family. Thus, it was hypothesized to have positive influence on participation in NFIGAs. The previous works of Haji (2003) and Teklewold (2006) confirm that family size positively level of women positively influence the women participation in non- farm income generating.

Contact with DA: This refers to frequency of contact between the extension agents and woman during the survey year. The more frequent the contact between extension agents and women, the more the agro-pastoralist women are exposed to information on income generating activities and the more likely they are influenced to participate in NFIGAs. Frequency of

contact with extension agent was hypothesized to be positively related to participation and level of participation in NFIGAs.

Number of livestock owned: This variable was defined in terms of Tropical Livestock Unit (TLU). It may serve as a proxy for the capacity to have an access to loan using his livestock as an asset. Tropical livestock unit (TLU) takes a continuous value and was calculated as prescribed by Strock (1991). The number and kind of livestock species of the household is a proxy indicator for their wealth status, and livestock ownership is an important decision factor for the women's participation in NFIGAs. Thus, it was expected that the higher the livestock the household owns, the more women can participate in NFIGAs, since it can serve as collateral for credit access and therefore it positively related to women's participation in NFIGAs.

Access to credit: Access to credit will increase agro-pastoralist women's capacity to buy inputs and risk taking decisions. Women's access to credit was hypothesized to influence positively the level of women's participation in NFIGAs (Belay, 2012). It is a dummy variable having a value of one if women have access to credit, and zero otherwise.

Road Distance: This is the distance of the woman's residence from the market in kilometers. Women who are closer to road have more information about the benefits of participation in NFIGAs compared to distant women. Previous result reported by Kidane (2008) has revealed that road distance negatively the women participation in non-farm income generating; therefore it is hypothesized that distance to the road decreases their participation in NFIGAs.

Experience: It is a continuous variable that measures the numbers of years since that woman has the experience of participation in non-farm income generating activities. Those have the experience of participation in non-farm income generating activities better than those who have no experience on participation in non-farm income generating activities. It is therefore, hypothesized that those with more years of experience in participation in NFIGAs are more likely to increase their participation in non-farm income generating activities.

Participation of Social Activities: It is a dummy variable that takes a value of 1 if the woman participate in social activities and 0 otherwise. Women who are involved in social activities will have better opportunity to participate in non-farm income generation activities to generate income,

and hence might have better financial capacity. Karki *et al.*, (2012) identified participation in social activities among the major factor that determines women participation in non-farm income generating. Therefore, it is hypothesized that this variable affects the participation of women in NFIGAs positively.

Household Saving: Household saving is a continuous variable measured in terms of birr, the more money household saves, the more women participate in NFIGAs, and hence they are capable financially to begin non-farm income generation activities. Some researchers has reported that household saving positively determine the women participation in non-farm income generating; therefore it is hypothesized that household saving increases their participation in NFIGAs.

Distance from the market: This is the distance of the woman's residence from the market in kilometers. Women who are closer to markets have more information about the benefits of participation in NFIGAs compared to distant women. Previous result reported by Kidane (2008) has revealed that market distance negatively the women participation in non-farm income generating; therefore it is hypothesized that distance to the market decreases their participation in NFIGAs.

Own Saving: own saving is a continuous variable measured in terms of birr, the more money woman saves, the more she would participate in NFIGAs, and hence she has capital and asset to begin non-farm income generation activities. Some researchers has reported that own saving has positively influence the women participation in non-farm income generating; therefore it is hypothesized that own saving increases their participation in NFIGAs.

Land Size: this is the size of the land belongings to women participating in non-farm income generating activities, this would measured in terms of hectare. Those have more land size would participate in non-farm income generating activities better than those who have less land size on participation in non-farm income generating activities It is therefore, hypothesized that those with more land size in participation in NFIGAs are more likely to increase their participation in non-farm income generating activities.

Occupation: It is a dummy variable that takes a value of 1 if the woman has occupation and 0 otherwise. Women who have occupation will have less time to participate in non-farm income

generation activities to generate income, since they have another source of income. Karki *et al.*, (2004) identified having occupation among the major factor that defines women participation in non-farm income generating. Therefore, it is hypothesized that this variable affects the participation of women in NFIGAs negatively.

Annual Household Income: Annual household income is a continuous variable measured in terms of birr, the more income household generate annually, the more women would participate in NFIGAs, and hence she has capital and asset to begin non-farm income generation activities. Some researchers has reported that annual household income has positively influence the women participation in non-farm income generating; therefore it is hypothesized that annual household income increases their participation in NFIGAs.

4. RESULTS AND DISCUSSION

In this chapter, descriptive statistics and econometric model results are presented and discussed in comparison with the results of other similar studies.

4.1. Types and Annual Income from Non-Farm Income Generating Activities

The types of NFIGAs that women in the study area participated in include chat trade, charcoal and firewood sales, and petty trade. Among those engaged in NFIGAs, 85.54% participated in only one type of NFIGA and 14.46% participated in two types of NFIGAs. The types of NFIGAs identified among the women participating in NFIGAs and their distributions are presented in Table 2. Results show that charcoal sales and petty trade are the major NFIGAs that women in the study area participated in though participations in other NFIGAs such as firewood sales and a combination of charcoal and firewood sales are also considerable. However, firewood and charcoal sales followed by chat trade are the NFIGAs which fetch better income for these women. Oneway Anova result shows that there is a significant income differences between the different types of NFIGAs at 1% probability level.

Table 1: Types of NFIGAs that women in the study area participated in and income

Type of IGA	Frequency (%)	Annual women income		F-test
		Mean	Std	
Chat trade	6 (7.23)	9000	2449.49	4.92***
Charcoal sale	25 (30.12)	8852	3928.22	
Petty trade	25 (30.12)	10748	3403.81	
Firewood sale	15 (18.07)	6260	2290.29	
Charcoal and firewood sale	12 (14.46)	9916.67	1781.64	

4.2. Descriptive Statistics Results

In this section, descriptive and inferential statistics of continuous and categorical variables were presented and discussed.

4.2.1. Descriptive and inferential statistics of continuous variables

Descriptive and inferential statistics of continuous variables hypothesized to affect women's participation and level of participation in NFIGAs are presented in Table 3.

Table 2: Descriptive and inferential statistics of continuous variables

Variable	Sample households		t-value	Total sample
	Participants(83)	Nonparticipants(39)		
Age	34.10(0.77)	37.08(2.02)	1.68*	35.05(0.84)
Family size	4.76(0.22)	4.95(0.32)	0.48	4.82(0.18)
Extension	2.76(0.20)	1.67(0.29)	-3.05***	2.41(0.17)
Livestock	16.88(1.40)	19.15(2.13)	0.91	17.61(1.17)
Road distance	2.02(0.11)	3.23(0.23)	5.51***	2.41(0.11)
Market distance	35.10(1.09)	32.51(1.60)	-1.33	34.27(0.91)
Land size	5.18(0.42)	5.87(0.66)	0.91	5.40(0.35)
Experience	2.46(0.13)	0 (0)	-12.00***	1.6(0.13)
Annualhhincome	20674.7(2977.14)	17076.92(3296.91)	-0.73	19524.59(2280.5)

Note: Figures presented are mean (Stderr)

Source: Survey results

The average age of the whole sample respondents is 35.05 years. The average age of sample participant household heads is 34.10 years while that of non-participant household heads is 37.08 years with a significant mean difference between the two groups at 10% probability level. The average family size for both participants and non-participants are nearly five persons per household which is nearly the same as

the national average of 4.6 persons per household (EDHS, 2012). Moreover, there is no significant mean difference in terms of family size between participants and non-participants.

As to livestock ownership, participants on average own 16.88 TLU while non-participants on average own 19.15 TLU with no significant mean difference between the two groups. Participants are located near the main road with a significant mean difference at 1% probability level compared to non-participants. However, they are located farther from market compared to non-participants though the difference is not statistically significant. Participants also have more contact with extension contact compared to non-participants with a significant mean difference at 1% significance level showing the importance of contact with extension agents on diversifying income sources. Moreover, there is no significant mean difference in terms of land size owned and annual household income between the two groups with participant households having relatively higher annual household income but lower farm size compared to non-participant households.

4.2.2. Descriptive statistics of categorical variables

Descriptive and inferential statistics of categorical variables hypothesized to affect women's participation and level of participation in NFIGAs are presented in Table 4.

Participant women involve in different social activities than non-participants though the difference is not statistically significant. Participant women are also the ones with better household saving but are those with lower own saving with no significant difference in terms of these variables. The majority of the participant women are the ones whose household head are mainly involved in non-farm activities followed by crop and mixed farming and government employee. Results presented in Table 3 also show that there is significant difference between participants and non-participants in terms of occupation of the household head.

Table 3: Descriptive and inferential statistics of categorical variables

Variable	Sample households		χ^2 -value	Total Sample
	Participants	Non-participants		
Education			27.48***	
Illiterate	28(33.73)	33(84.62)		61(50)
Literate	55(66.27)	6(15.38)		61(50)
Marital status			0.02	
Married	29(34.94)	14(35.90)		43(35.25)
Single	11(13.25)	5(12.82)		16(13.11)
Divorced	34(40.96)	16(41.03)		50(40.98)
Widowed	9(10.84)	4(10.26)		13(10.66)
Access to credit			0.18	
Yes	46(55.42)	20(51.28)		66(54.10)
No	37(44.58)	19(48.72)		56(45.90)
Hhsaving			0.06	
Yes	71(85.54)	34(87.18)		105(86.07)
No	12(14.46)	5(12.82)		17(13.93)
Own saving			0.01	
Yes	8(9.64)	4(10.26)		12(9.84)
No	75(90.36)	35(89.74)		110(90.16)
Partic. in social activities			1.87	
Yes	72(86.75)	30(76.92)		102(83.61)
No	11(13.25)	9(23.08)		20(16.39)
Main occupation			15.23***	
Crop production	24(28.92)	4(10.26)		28(22.95)

Crop and livestock	24(28.92)	4(10.26)	28(22.95)
Govt employee	10(12.05)	7(17.95)	17(13.93)
Non-farm activities	25(30.12)	24(61.54)	49(40.16)

Source: Survey results

***, **, * represent significance at 1%, 5% and 10% probability levels respectively.

Results presented on Table 3 show that of the total sample women half are illiterate (50%) with a significant difference between participants and non-participants in terms of their educational status. Results show that participating women are more educated compared to non-participants showing the importance of education in diversifying livelihood sources and income. The majority of the sampled women are divorced (41%) followed by married (35%), single (13%) and widowed (11%). There is no significant difference between participants and non-participants in terms of their marital status. Among those that are engaged in NFIGAs, 11(13.25%) were single, 29(34.94%) were married, 34(40.96%) were divorced and 9 (10.84%) were widowed. Among the 39 non-participants in NFIGAs, 5 (12.82%) were single, 14 (35.90%) were married, 16 (41.03%) were divorced and 4 (10.26%) were widowed. This result suggests that participation in NFIGAs is widespread among women of different marital statuses in the study area. Especially, divorced women are far more engaged in NFIGAs in the study area compared to others.

4.3. Econometric Results

4.3.1. Multicollinearity test

In this study, Tobit model was used to identify factors affecting women's participation in and income derived from NFIGAs in the study area. Before running the censored regression model, the existence of multicollinearity was tested. A Variance Inflation Factor (VIF) is used to check if there is a severe multicollinearity problem among the explanatory variables. When the value of VIF_i exceeds 10 then this is an indication of severe multicollinearity among the variables. The VIF values for the explanatory variables included in the model were found to be much less than

10, indicating the absence of multicollinearity problems among the explanatory variables.

Table 4: Multicollinearity test

Variable	VIF
Age	1.24
Marital status	
Single	1.51
Divorced	1.49
Widowed	1.51
Education	1.58
Family size	1.16
Experience	1.58
Distroad	1.28
Distmark	1.37
Extension	1.31
Credit	1.21
Livestock	1.11
Land size	1.25
HHsaving	1.33
Own saving	1.26
Annual hh income	1.18
Social activities	1.21
Occupation	
Crop and livestock	1.87
Government employee	1.77
Non-farm activities	2.07

4.3.2. Determinants of Women's Participation in Income Generating Activities

Tobit model results on the determinants of level of participation in non-farm income generating activities of women in the study area are presented in Table 6.

Table 5: Tobit model results

Variable	Coef.	Std. Err.	t	P>t
Age	-75.99	167.987	-0.45	0.65
Marital status				
Single	717.47	4361.66	0.16	0.87
Divorced	-1873.26	3078.82	-0.61	0.54
Widowed	-6663.97	4833.07	-1.38	0.17
Education	5298.03*	3071.27	1.73	0.09
Family size	-302.64	674.34	-0.45	0.66
Experience	6042.29***	1044.18	5.79	0.00
Distroad	-5572.90***	1359.25	-4.10	0.00
Distmark	-260.22*	152.44	-1.71	0.09
Extension	1577.77**	729.58	2.16	0.03
Credit	2828.82	2793.57	1.01	0.31
Livestock	-264.17**	100.07	-2.64	0.01
Land size	496.44	368.08	1.35	0.18
HHsaving	-2796.22	3961.56	-0.71	0.48
Own saving	-10963.28**	4716.95	-2.32	0.02
Annual hh income	0.90***	0.05	17.70	0.00
Social activities	8982.26**	4223.50	2.13	0.04
Occupation				
Crop and livestock	-1922.55	3812.32	-0.50	0.62
Government employee	-4265.99	4835.51	-0.88	0.38
Non-farm activities	-9463.18***	3560.41	-2.66	0.009
Constant	-14794.92	10143.79	-1.46	0.15
Sigma	11809.92	922.29		

Tobit regression Number of obs = 122

 LR chi2(20) = 202.75

Prob> chi2 = 0.000

Log likelihood = -907.370 Pseudo R² = 0.100

Obs. summary: 39 left-censored observations at income ≤ 0

83 uncensored observations

0 right-censored observations

The likelihood ratio chi-square of 202.75 (df=15) with a p-value of 0.00 tells us that our model as a whole fits significantly better than an empty model (i.e., a model with no predictors). In the table we see the coefficients, their standard errors, the t-statistic and the associated p-values. The coefficients for education, experience, distance to road, distance to market, extension contact, livestock ownership, woman's own saving, annual household income, participation in social activities, and household head's participation in non-farm activities are statistically significant in determining women's participation in NFIGAs.

All the coefficients had the hypothesized signs. Out of the 16 variables included in the Tobit model, ten of them are statistically significant at less than 10% probability levels. These are education, experience, distance to road, distance to market, extension contact, livestock ownership, woman's own saving, annual household income, participation in social activities, and household head's participation in non-farm activities. The coefficients of education, experience, extension contact, annual household income and participation in social activities affects participation in NIGAs positively while distance to road, livestock ownership, household head's participation in non-farm activities as well as own saving are all negative. These imply that a unit decrease in these variables would bring about increased level of participation of women in non-farm income generating activities in the study area.

The coefficient for main occupation of the household head (non-farm activities) is negative and significant at the 1% probability level. This implies that the more the household head participate in non-farm activities, the less the probability for his wife to participate and generate income from non-farm activities compared to others. This is so because woman whose household head's main occupation is non-farm activities are less she interested to participate in the same activity that her husband participates in. The marginal effect of -0.27 for this variable shows that compared to crop production, participation of the household head in non-farm activities decrease the probability of women's participation in NFIGAs by 27% keeping all other factors constant..

On the other hand, the coefficient of education is positive and significant at the 10% level of significance. This implies that educated women participate and generate income from NFIGAs more than non-educated ones. Education enables women to have access to new information and idea as well as an improved knowledge and skill to use resources in more efficient ways. World Bank (1998) showed that education is crucial as it provides skills and abilities which allow households to secure productive and well-paying jobs. This result is also consistent with the results obtained by Seebens (2009) and Adewunmi *et al.* (2013). The marginal effect of 0.14 for this variable shows that being educated women increases the probability of participation in NFIGAs by 14% keeping all other factors constant.

Experience in non-farm income generating activities have a significant positive impact on the income generated from these activities as expected. The result is in line with the result obtained by Adewunmi *et al.* (2013). The marginal effect of 0.17 for this variable shows that an increase in women's experience in NFIGAs by one year increases the probability of participation in NFIGAs by 17% keeping all other factors constant.

The coefficient of distance to main road is negative and statistically significant at 1% probability level. This is in line with a *priori* expectation. Long distance to main road means that women have high transportation and transaction costs and are less likely to participate in IGAs and derive better income from it. The marginal effect of -0.15 for this variable shows that an increase in distance to the main road by one km decreases the probability of participation in NFIGAs by 15% keeping all other factors constant.

The result of the model also reveals that contact with extension agents has a positive coefficient and is statistically significant at the 0.05 level. This implies that the more a woman receives advice from extension agents, the higher the probability of seeking employment in the non-farm sector. This is in line with the findings of Roslan and Siti (2011) in Malaysia. The marginal effect of 0.04 for this variable shows that an increase in extension contact by one increases the probability of participation in NFIGAs by 4% keeping all other factors constant.

Households' annual income positively and significantly influences women's participation and income derived from NFIGAs. This might be related to the fact that participation in some NFIGAs such as petty and chat trade requires some initial capitals which is not the case if the household has less income. The marginal effect of 0.28 for this variable shows that an increase in annual income of the household by one thousand Birr increases the probability of participation in NFIGAs by 28% keeping all other factors constant.

The size of livestock owned by the household in TLU negatively and significantly affects the probability of the woman engaging in nonfarm income generating activity. The coefficient of livestock size is negative and statistically significant at the 0.05 level, indicating that the more livestock the household owns, the less the chance of the woman engaging in nonfarm income generating activity. This is in line with a *priori* expectation as a woman with household having large livestock herds will have little or no time to engage in non-farm income generating activities. The marginal effect of -0.01 for this variable shows that an increase in livestock by one TLU decreases the probability of participation in NFIGAs by 1% keeping all other factors constant. This result is consistent with the results obtained by Seebens (2009) and Adewunmi *et al.* (2013).

The results of the analysis also show that the coefficient of woman's own saving is negatively signed and statistically significant at 5% probability level. This is in line with a *priori* expectation that the probability to participate in non-farm income generating activities will be low if she has her own saving in the Bank or at home for personal use or emergency. The marginal effect of -0.07 for this variable shows that women's own saving decreases the probability of participation in NFIGAs by 7% keeping all other factors constant.

This study also discovers that women's participations in social activities (such as iddir, iqub, etc) have a positive effect on women's decision to participate in non-farm employment and is statistically significant at 0.05 probability level. This is in line with a *priori* expectations since participation in such activities will ease information access and sharing of experiences thereby increases participation in NFIGAs. The marginal effect of 0.002 for this variable shows that women's

participation in social activities increases the probability of participation in NFIGAs by 0.2% keeping all other factors constant.

The variable of distance to nearest market is also negatively related to woman's decision to participate in a non-farm income generating activity. The coefficient of the variable is also statistically significant at less than 10% probability level. This is as expected as the nearer (i.e. the less the distance) a woman is located to a market, the less costs and the more the opportunities of engaging in higher remunerating non-farm employment. Hence, the probability of taking up a non-farm employment is higher for a woman when she is very close to a market and get better income. The marginal effect of -0.01 for this variable shows that an increase in the distance of the market from home by one kilometer decreases the probability of participation of women in NFIGAs by 1% keeping all other factors constant.

4.3.3. Marginal Effects of the Tobit Model

The Tobit coefficients do not directly give the marginal effects of the associated independent variables on the dependent variable. But their signs show the direction of change in probability of being participant in NFIGAs and marginal intensity of participation as the respective explanatory variable change (Amemiya, 1984; Goodwin, 1992; Maddala, 1985).

There are three types of marginal effects that may be of interest in Tobit model (Cong, 2000). These are:

1. The marginal effects $\Pr(a < Y_i^* < b)$ measures the effect of change in independent variables on probability of being participant in NFIGAs.
2. The mean of the marginal effects of explanatory variables on expected value $E(Y_i^*)$ describe how the observed variable Y_i^* changes with respect to the total participation rate.
3. The mean of the marginal effects of the truncated values $E(Y_i^* / a < Y_i^* < b)$ measures the changes in Y_i with respect to changes in the regressors among the participants.

Table 6: The three marginal effects after Tobit

Variable	Effect of change in a regressor on probability of participation	Change among participants $\frac{dE(Y_i Y_i^* > 0)}{dX_i}$	Total change $\frac{dE(Y_i)}{dX_i}$
Age	-0.002	-40.20	-56.50
Marital status			
Single	0.02	384.10	538.59
Divorced	-0.05	-983.48	-1383.79
Widowed	-0.20	-3127.37	-4432.81
Education	0.14	2805.52	3930.07
Family size	-0.01	-160.09	-225.03
Experience	0.17	3196.23	4492.77
Distroad	-0.15	-2947.93	-4143.75
Distmark	-0.01	-137.65	-193.49
Extension	0.04	834.60	1173.16
Credit	0.08	1488.99	2093.00
Livestock	-0.01	-139.74	-196.42
Land size	0.01	262.61	369.13
HHsaving	-0.07	-1547.73	-2152.38
Own saving	-0.35	-4746.83	-6655.57
Annual hh income	0.28	4145.56	5851.84
Socialactivities	0.002	0.48	0.67
Occupationofhhh			
Crop and livestock	-0.05	-993.31	-1401.44
Government employee	-0.13	-2103.92	-2981.49
Non-farm activities	-0.27	-4816.22	-6741.92

(*) dy/dx is for discrete change of dummy variable from 0 to 1

5. SUMMARY, CONCLUSION AND RECCOMENDATIONS

5.1. Summary and Conclusion

The Ethiopian economy is dominated by income obtained from the agriculture sector. Smallholder farmers are the dominant actors of the sector. As their agriculture is mostly subsistence they frequently face food shortage and fall into poverty. of finance to purchase productive agricultural inputs. Women are good partners of the socioeconomic development of the country in general and the family in particular. They can contribute significantly to the livelihood improvement of the family if proper environment with facilities can be guaranteed. In recent years, government and development practitioners are trying their level best to support rural women's participation in non-farm income generating activities. However, various household socio-economic, institutional and human capital factors affect participation and level of participation of rural women in NFIGAs which remains a challenge for policy makers.

This study had looked at the involvement of women farm households in nonfarm income generating activities and their determinants in Degahbour district of Somali Regional State, Ethiopia. Descriptive statistics and Tobit model were used to analyze cross sectional data collected from 122 women farm households selected by means of systematic random sampling technique. Tobit model was used to analyze rural women's participation in non-farm activities and their level of participation. Tobit model results show that education, experience, extension contact, annual household income and participation in social activities affects woman participation in NIGAs positively while distance to road, distance to market, livestock ownership, household head's participation in non-farm activities as well as own saving are all negative. These imply that a unit increase in education, experience and extension contact, and woman's participation in social activities would bring about increased participation of women in non-farm income generating activities. However, a unit increase in distance to road, distance to market and livestock ownership, and household head's participation in non-farm activities and woman's own saving decrease participation of women in non-farm income generating activities.

Based on the results of the study it can be concluded that due to participation in various NFIGAs rural women in Degahbour are earning some cash and contributing to some extent in

their household's income. Thus, it is of utmost important to formulate an appropriate strategy for increasing their participation and level of participation in NFIGAs by focusing on the above mentioned factors.

5.2. Recommendations

Based on the results of the study the following recommendations are made:

1. Education is one of the significant explanatory variable that positively affected participation and level of participation of women in non-farm income generating activities in the study area. This means, education should be intensified to permit rural women to participate in more lucrative non-farm jobs. Since formal education are limited in rural areas, training women on issues related to NFIGAs might be essential.
2. Participation in social activities significantly and positively affected participation and level of participation of rural women in non-farm income generating activities in the study area. This enables women to gain experience and skills from others which will improve their participation and income gained from non-farm activities compared to others. So, policy makers and development practitioners should encourage rural women to participate in different social activities.
3. Distances from the main road and market are the significant explanatory variables that negatively affected the participation of women in nonfarm income generating activities. This result showed that as the distances from the main road and market increase women's participation in non-farm income generating activities decreases. Therefore, the already initiated Universal Rural Road Access Program (URRAP) by the government has to be strengthened and reach the remaining remote areas of the district.
4. Results also show the significant negative effects of own saving, livestock ownership household head's participation in non-farm activities on participation in NFIGAs and income derived from it. These indicate the need to target poor women and those whose household heads do not participate in NFIGAs to bring about the desired livelihood improvement of the rural community.

5. This study has also revealed that increase in extension contact increases women's participation and income generated from NFIGAs. Hence, the government has to continue the already initiated assignment of Agricultural Development Agents trained in diversified fields of endeavor that give due attention to rural women's involvement in NFIGAs than can empower them and increase household's income.

In general this study recommends that local government and NGOs working in the study area should pursue rural development through provision of education, extension, finance and infrastructures so as women would diversify households' income beyond only agriculture.

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**SCHOOL OF GRADUATE STUDIES
HARAMAYA UNIVERSITY**

**Determinants of Women Participation in Household Income Generating Activities:
The Case of Degahbour Distrit, Somali Regional State, Ethiopia**

Interview schedule for M.SC Thesis

Faculty: College of Agriculture and Environmental Sciences

Department: Rural Development

General Information for Interviewer

1. Please make a brief introduction to each respondent before starting any question.
2. Please make sure creating the necessary climate of friend ship and trust and ask his /her convenient time and place to get reliable information.
3. Please ask each question clearly and patiently until the respondent understand the question.
4. Please fill up the questionnaires according to the respondents replay and don't make any promise of help.

Put √ mark for all closed questions and write the respondent's answer on the space provided and try to use local units and expression while interviewing the farmers.

1. General Information

- 1.1. Household ID _____
- 1.2. Name of the interviewee _____
- 1.3. Date of interview _____
- 1.4. Name of (Kebele) _____

2. Household Information

- 2.1. Name of the woman _____
- 2.2. Age of the woman _____
- 2.3. Marital status of woman: 1) Married 2) Single 3) Divorced 4) Widowed
- 2.5. Educational status of woman:
- 1) Illiterate=0 2) Read and write =1 3) Grades completed _____
- 2.6. Main occupation of household:
- 1) Crop production 2) Crop production and animal rearing 3) Government job
- 4) Off/Non-farm activities 5) others, specify _____
- 2.10. Educational status of family members (number of family members):
- Illiterate _____ High school: _____
 - Primary school: _____ Tertiary education: _____
 - Junior school: _____
- 2.11. Family size in number:
- Total family size: _____ Male: _____ Female: _____
- 2.12. Age structure of household:

Age class	Male	Female	Total
Less than 5 years			
5 to 14 years			
15 to 64 years			
Above 64 years			
Total			

- 2.13. Family members' involvement in income generating activities

Age class	Number of males		Number of females	
	Full time	Part-time	Full time	Part-time
Less than 5 years				
5 to 14 years				
15 to 64 years				
Above 64 years				
Total				

3. Participation of Women on Income Generating Activities (IGAs)

3.1. Do you involve in income generating activities (IGA) for the household? 1. Yes 0. No

3.2. If yes, on which IGA you are involved in? 1. Milk sale 2. Chat trade 3. Petty trade 4. Charcoa-sale 5. Firewood sale 6. Others (Specify)

3.3. Income generation experience of woman _____ years

3.4. Why do you participate in income generating activities?

1. To improve household income 2. To improve my economic power in the household 3. Income from farm activities was no able to support our livelihood 4. For education and health expenditure 5. Others (Specify)_____

3.5. What are the major constraints for the pastoralist women to participate in IGAs? 1. Cultural barriers 2. Less IGA opportunities 3. Financial problems 4. Others(Specify)_____

3.6. What are the major opportunities for the pastoralist women to participate in IGAs? 1. Government's policy and support 2. NGOs support 3. Community awareness 4. Improved access to financial services 5. Improved awareness of women, 6. Others (Specify)

3.7. What are the major changes in household livelihood after you participated in IGAs?

3.8. Do your household have saving? 1. Yes 0. No

3.9. Do you have your own saving? 1. Yes 0. No

3.10. If yes, how much is your saving in Birr?_____

3.11. Do you participate in social activities? 1. Yes 0. No

3.12. If yes, what are the social activities you participate in?

1. Women's association 2. Attending social gatherings: (weddings, cultural, invitation) 3. Informal social gatherings: gossiping 4. Visiting neighbors and friends 5. Religious activities

6. Others (Specify)_____

3.13. If you participate in women's association did you assume a leadership position? 1. Yes 0. No

3.14. Do you help your husband in agriculture? 1. Yes 0. No

3.15. If yes, what are the activities you participate in? 1. Preparing soil, planting seedlings, weeding, etc. 2. Harvesting 3. Livestock herding 4. Others (specify)_____

3.16. What household activities do you perform?

1. Cooking food 2. Cleaning home and yard 3. Washing utensils 4. Washing clothes 5. Collecting firewood or other materials for fuel, making fuel from cow dung 6. Collecting water 7. Childcare 8. Serving meals 9. Caring for the sick 10. Caring for husband 11. Entertaining guests 12. Making beds, hanging and taking down mosquito nets 13. Managing the household (organizing activities and expenses) 14. Others (specify) _____

3.17. Do you have association with a non-government organization (NGOs)? 1. Yes 0. No

3.18. If yes, why did you associate yourself with the NGOs? 1. Receive credit 2. Obtain facilities 3. Influence by others 4. Others (Specify)_____

3.19. Do you have personal income apart from household income? 1. Yes 0. No

3.20. If Yes, what is your annual personal income in Birr?_____

4. Land Holding

4.1. Do your household own land? 1. Yes 0. No

4.2. If yes, how much land do you own? _____ (hectares)

4.3. Land use type:

Privately owned land use		Area in hectares
1	Agricultural land	
2	Grazing land	
3	Woodlot(forest land)	
4	Homestead area (residential area)	
5	Other land, specify_____	

Total	
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4.4. What kind of land does your household utilize? 1. Fertile land 0. Infertile land

4.5. DO you use irrigation? 1. Yes 0.No

4.6. If your field is irrigated, what is the source of water? 1. River 2. Lake 3. Pound 4. Harvested water 5. Other(Specify)_____

4.7. Is you field prevented from erosion? 1. Yes 0. No

4.8. If yes, common way of prevention:

1. Terracing 2. Water catchments 3. A forestation 4. Plough along the cont. 5. Other ____

4.9. How many quintals did you produce (temporal crop) in the last 12 months? (For each crop)_____

4.10. How many quintals did you sell in the last 12 months?_____

4.11. What is your income from crop sale in Birr in the last 12 months?_____

5. Livestock Ownership

5.1. Did you own livestock within the last 12 months? 1. Yes 0. No

5.2. If yes, would you tell us the total livestock's and its current market value?

Livestock own	Unit	Total livestock holding	Current market value	Remarks
Oxen				
Cows				
Heifers				
Calves				
Sheep's				
Goats				
Camel				
Bees				
Poultry				
Donkeys				

5.3. What are the main feed sources in your area? 1. Grazing 2. Hay 3. Crop straw 4. Other

5.4. Quantities of feed consumed within the last 12 months in local units: _____

5.5. Price/market value of the feed_____

6. Infrastructure/Access to Road

- 6.1. Distance from the main road (in km) _____
- 6.2. Distance from the nearest town (in Km) _____
- 6.3. Distance from the market place (in km) _____
- 6.4. How do you transport agricultural produce to the market place?
1. On back 3. Horse cart
2. Vehicle 4. Other, specify _____
- 6.5. Distance from the nearest school (in Km) _____
- 6.6. Distance from the nearest health post (in Km) _____
- 6.7. Distance from the nearest water storage or Birka (in Km) _____

7. Extension Services

- 7.1. Do you receive support from DAs? 1. Yes 0. No
- 7.2. If yes, what are the supports given?
1. Other income generating activities 4. Conflict resolution
2. Business management training 5. Connecting with other traders
3. Demonstration 6. Other specify _____
- 7.3. How many times did you contact DAs last year? _____

8. Access to Credit

- 8.1. Do you have access to credit for your income generation activities? 1. Yes 0. No
- 8.2. If yes what are the sources?
1. Cooperatives 4. Neighbors and relatives
2. Local lenders 5. Micro finance institutes
- 8.3. Amount of credit received last year (in Birr): _____

9. Access to Off/Non-farm Activities

- 9.1. Are you engaged in off/non-agricultural activities? 1. Yes 0. No
- 9.2. If yes, what are the off/non-farm activities you are engaged in?

1. Daily laborer 2. Selling firewood 3. Selling charcoal 4. Petty trade 5. Hand crafts 6.

Others, specify_____

9.3. What is your annual income from off/non-farm activities in Birr?_____

Thank you so much!!

