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1. INTRODUCTION

1.1 Background

M. Stenopetala is one of the most useful tropical trees. The relative ease with which it propagates through both sexual and asexual means and its low demand for soil nutrients and water after being planted makes its production and management easy. Introduction of this plant into a farm which has a biodiversity environment can be beneficial for both the owner of the farm and the surrounding eco-system (Foidl et al., 2001).

M. Stenopetala is an indispensable plant to promote at the household level because it is extremely resilient to harsh growing environments, including drought, poor soil quality and diseases. Locally called “halleko” a green, drought-resistant plant where leaves are commonly used in cooking for human consumption (Berhe et al., 2007).

The plant is a widely deciduous plant that is eaten as a vegetable in the daily diet which is distributed in the South of Ethiopia at an altitude range of about 1100-1600 meters (Mekonnen and Gessesse, 1998).

Leaves from the *M. Stenopetala* tree are a very important vegetable and more than 5 million people depend in Ethiopia, especially during dry seasons (Abuye et al., 2003). The tree is resistant to both insects and pests character and is known to be a fast growing plant where one *Moringa* tree can support a large family for many years (Abuye et al., 2003).

Currently there are thirteen known species of *moringa* trees in the family *Moringaceae*, and a study that evaluated the antioxidant effect and nutritional content of four types (*Moringaoleifera*, *Moringa peregrina*, *Moringa stenopetala* and *Moringa drouhardii*) showed that all have a high content of antioxidants (Yang et al., 2006).

Moringa stenopetala, which is most common in Ethiopia and Kenya, has the second highest content compared with the other species (Yang et al., 2006). It is stated that all four types have an enormous potential to contribute to improved diet and health, where *M. Stenopetala* is the most important economic species (Yang et al., 2006).

The tree crop of whose leave, seed, bark, pods are of economic importance could be grown as a relatively cheap, all year round, high quality food for both humans and animals. This potential of *Moringa* tree crop for sustainable agriculture has sparked interest among national and international agricultural development stakeholders. This can facilitate the introduction of the *Moringa* crop to rural areas in Africa. However, the success of the cultivation of this crop by small-scale farmers is expectedly hinged on various socio-economic factors (Fuglie, 2001).

These conditions need to be well researched, identified and documented so as to facilitate a successful adoption of the crop for cultivation by small-scale farmers. *Moringa*, because of its socio-economic and cultural importance, is raising a growing international interest among NGOs, scientists, public and private sectors (ibid).

The socio-economic value of biological diversity resides not only in the direct use that one makes of biological resources, but also in the indirect uses, such as the ecological services (e.g.: improvement of the quality of water and air, the fixing of nitrogen, the formation of soils), socio-cultural uses (e.g.: religious and cultural functions), recreational and aesthetic uses (e.g.: tourism of vision), etc. These uses end up at the level of feeding and the different sectors of activity that are interested in biological diversity (Scoones et al., 1992).

The most recent global debates about alternative development have emphasized gender. A gender approach addresses not only the different needs of women and men, but social structures related to both. According to Mikkelsen, men and women do, after all, play different roles in society (Mikkelsen, 2005:234), which needs to be considered when compiling information about post-harvest socio economic utilization of *Moringa stenopetala*. Therefore, based on the multifunction of *Moringa* plant, it's categorized under agro-forestry which help women's to full fill the food security of their families in addition to income generation.

Agroforestry was identified as a distinct discipline in agricultural science due to the benefits obtained from suitable combinations of woody perennials and annual crops combining with animal husbandry (Verheij, 2003).

It is the most self-sustaining and sound system as it involves the growing of crops either together or in rotation maintaining the ground cover permanently (Martin and Sherman,

1992). It helps in increasing the output and household earning but also intensifying the tree cover on private lands (Rahman et al., 2012).

The system's adoptability and compatibility with the cultural practices provides better welfare of the society and overall community development. Therefore, it is essential to approach agroforestry with social science knowledge with effective social or organizational technologies. Participation of women is fundamental to agricultural production and is responsible for maintaining the small stock husbandry and larger livestock. Women are also the primary users of various forest products from fuel wood collection to the knowledge about the medicinal value (Ahlawat and Hasumati, 2009).

Women group are considered to be imperative in the agroforestry system due to some reasons. They perform most of the work in the initial stages of establishment and incur diverse benefits by the low cost inputs in the system.

A woman in the family performs the influential role in absence of man which provides an opportunity to manage the system. The study of role of women in the traditional agroforestry system has become very popular as the differences are seen in the division of labor and management and acquiring various types of products.

Many had brought a successful finding on the contribution of women in the success of any system from planting to final destination for self-use or for sale (Akpabio and Ibok, 2009; Reyes-Garcia et al., 2010; Asse and Lassoie, 2011; Mendez et al., 2011; Rahman et al., 2012; Brandt et al., 2013). With 2/3rd of total Indian population in rural areas the input by women in agricultural and allied activities is a factor of vital importance (Kishtwaria et al., 2009). Gender analysis becomes particularly important in post-harvest utilization given the historical and pivotal roles played by women in agricultural activities (Meinzen-Dicket al., 2011).

This study's main focus is on a gendered analysis on post-harvest socio economic utilizations of *Moringa stenopetala*. Gender analysis can be approached differently by different people and in different situations. For the purpose of this study, gender analysis refers to post harvest socio economic utilizations, awareness and adoptions of technologies by men and women relative to each other, and the factors that determine such conditions. By comparing women and men rather

than looking at women and men as isolated groups, gender analysis illuminates key aspects of a given situation, making it easier to identify obstacles and potentially workable solutions to achieving gender equality and women's empowerment.

1.2 Statement of the Problem

Gender analysis becomes particularly important in post-harvest utilization given the historical and pivotal roles played by women in agricultural activities (Meinzen-Dicket al., 2011), and the history of failures of previous post-harvest attempts and initiatives which so far have emphasized economic and technical aspects of the post-harvest improvements with little attention paid to socio economic dimensions.

The focus on women and agroforestry is important for various reasons. Agroforestry as a farming system in which perennial trees and shrubs are deliberately grown on the same land management system as annual crops and/or livestock is a common system of production in Africa. At the center of this type of farming system are women farmers who are responsible for producing most of the labor. For example, in the smallholder dairy farms of Central Kenya, it has been reported by Maarse (1995) that women provide most of the labor (cutting grass, manure application, feeding animals, milking, fetching water and even selling milk).

Moringa stenopetala is most valuable tree among Derashe Women have been played crucial role in post-harvest than men. However this tree remained to be used for house hold consumption and no grass root level promotion is done on the innovation practices to increase the socio economic benefit of the tree.

Since recent years there is a growing national and international interest among NGOs, scientists, public and private sectors, however little have done to increase the awareness of community to benefit from this growing huge potential markets.

In relation to post harvest socio economic utilizations of *Moringa stenopetala* among the Derashe farmers, women's have a better awareness than men's in utilization of the products of this vibrant agroforestry plant into food security and income generation for their household. In addition this is a unique potential opportunity for Derashe women's to utilize *Moringa Stenopetala* tree. However, there is a research gap on post-harvest technological adoptions, lack of awareness among men's and women's in a way that every part the tree is edible. Therefore,

the focus of this study is to magnify the role of women's in the post-harvest socio economic utilizations of *Moringa stenopetala* relative to men's.

1.3 Objectives of the Study

1.3.1 General Objective of the Study

The general objective of the study is to gain deeper understanding of gender relation and roles on post-harvest management and utilization of agro-forestry with a particular reference to *Moringa stenopetala*.

1.3.2 Specific Objective of The Study

This study has the following objectives:

- To assess the role of men and women on post-harvest management of *Moringa*,
- To identify knowledge gaps in the area of gender and post-harvest management of *Moringa*,
- To investigate the technological adoptions in post-harvest management of *Moringa* product,

To assess the institutional interventions to support the farmers in utilizing *Moringa*.

1.4 Research Questions

1. What roles do men and women play in post-harvest management of *Moringa*?
2. What socio-economic constraints do women and men in different household circumstances encounter in post-harvest management?
3. What gender knowledge gaps exist in the context of study?
4. What lessons can be drawn from this study to inform the development of a gender equality strategy for the implementation of post-harvest management strategies for equitable processes and outcomes for men and women farmers?

1.5 Significance of the Study

This study will assess the possible importance gender analysis on post-harvest management of *Moringa stenopetala* among the farmers community of Derashe. This will help to impart adequate information about the comparative role of men and women on awareness, technological adoption, income generation activities and food consumptions of *Moringa* product. It also bestows to close the gender gap and empower women's on the post-harvest management the plant. It can also give prompts for other scholars to conduct further research on the area.

1.6 Outline of the Thesis

The study has organized into five chapters. Chapter one presented the introduction of the study, Chapter two gives a literature review explains the gender in agro forestry with its conceptual definitions and framework. Chapter three provides the methodology used, as well as experiences during the data gathered in field survey. Chapter four focuses on the result and discussion in relation to the objectives revealed. Finally, Chapter five will provide a conclusion of the study with specific recommendations.

2. RESEARCH METHODOLOGY

2.1 Description of the Study Area

Derashe is chosen as a study area for two main reasons. The first reason is that high *Moringa* trees are found to be growing in the locality. Secondly there is study gap on the area on the role of **women on post-harvest management of *M.stenopetala***.

2.1.1 Location

The area is located at the southern part of the country within GPS coordinate location of 5°-6° N and 37°- 37° 30'E. The area endowed with 47% plain lowlands, 43% hilly and 10% of mountainous highland topography and the altitude ranged 1140-2614. The study which will be conducted in SNNPR.

Derashe is bordered on the south by Konso special woreda, on the west by the Weito River which separates it from the Debub Omo Zone, on the north by the Gamo Gofa Zone, on the northeast by Lake Chamo, and on the east by Amaro special woreda. The administrative center of Derashe is Gidole CSA (2004). Derashe has 57 kilometers of all-weather roads and 44 kilometers of dry-weather roads, for an average road density of 66 kilometers per 1000 square kilometers. High points in Derashe include Mount Gardolla 2545 meters CSA (2004).

2.1.2 Climate

The mean annual rainfall in the area is ranged from 600-1600 mm and according to traditional agro climatic condition the study area is categorized as Dega (cold), Woyina-dega (moderate) and Kola (warm) with 17.24%, 34.17 % & 48.61percent respectively. The area has bimodal climate, the major rainy season is the belg season from March to May, and the minor, meher season is from September to November both in the lowland and highland areas and *Hagaya*' is called minor rainy season from August to October (Derashe woreda administration, 2013).

2.1.3 Soil

Soil in the study area are majorly characterized by 48% clay, 30% red and 22% black soil with water holding capacity, it cracks during dry season of the year and hence it is vertisol in its origin. In the rugged mid-highland areas of Derashe remnants of volcanic ashes predominantly

exist indicating the surrounding soil to be cambisol in its origin (Derashe woreda administration, 2013).

2.1.4 Economic Activities

The economy of Derashe woreda is predominantly agriculture and mixed agriculture. Farmers produce both crops and livestock as it is in elsewhere in Segen zone. Crops such as teff, maize and Sorghum are dominant among in almost all kebeles, wheat and barley are dominant in few kebeles and “Chat” dominates the stimulant crops in the woreda (Derashe woreda administration, 2013).

The major financial institutes in Derashe woreda are Omo Microfinance Institution (OMFI) and the Ethiopian Commercial Bank. CBE is located in the woreda center and its service confined to the woreda capital Gidole. However, it is OMFI that serves in not only the woreda center but also it has a door to door service through kebele saving and credit agents by expanding its outreach in all 18 kebeles of the woreda (OMFI strategic plan, 2014).

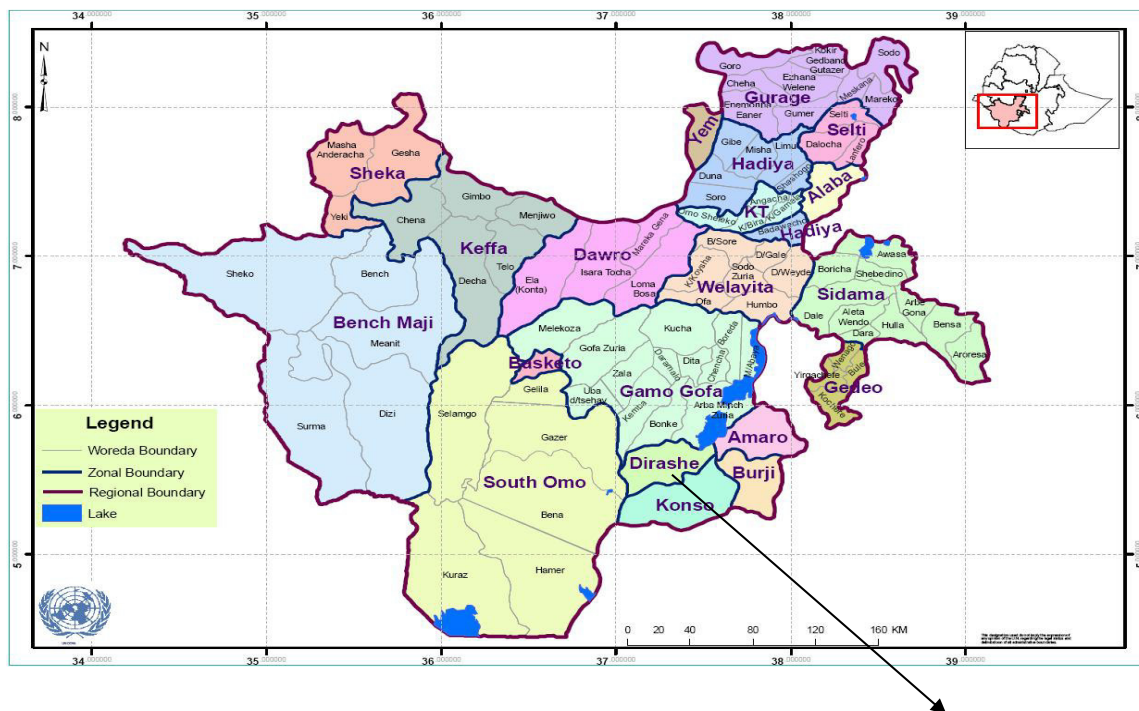


Figure 2.1 Regional map of the study area

2.2 Research Methods

The research will apply mixed approach which includes both qualitative and quantitative data. It uses cross sectional survey. In cross sectional survey, information's on all variables will be collected at specific point in time. Therefore, the research uses concurrent triangulation design which is familiar to mixed method approach.

The "triangulation" method is a mixed method design proposed to be used for the study as it increases the validity of evaluation and research findings (Mathison, 1998). It helps to overcome intrinsic biases (measurement bias, sampling bias and procedural bias) and other problems associated with a single research method (Yeasmin and Rahman, 2012). Data relevant to meet the objectives of the research will be collected from the research site (Derashe woreda, SNNPR of Ethiopia).

The quantitative aspect of the data will mainly focus on description of key demographic profiles, measurement of selected socioeconomic variables and analysis of relationship among the dependent and independent variables. Simple random and proportionate stratified sampling techniques will be used for the selection of kebeles and sample sizes respectively.

The qualitative data will consider the agricultural office expert, *moringa* processor and distributor agents, well known elders who have detail knowledge, narration of the contexts and further examinations of attitudinal and perceptual issues of the respondent on the topic of the study. Purposive sampling will be used in selection of participants.

2.3 Sources of Data

Data will be collected from both primary and secondary sources. Primary data will be through household survey, FGD, KII and observation. Whereas secondary sources will be taken from **different published and unpublished reading materials, reference books.**

2.4 Data Collection

Data gathering will be done through structured interview questioners and semi structured questioners. In collection of relevant data for the study the target groups will be interviewed and

the questionnaires will be distributed. The type of questionnaires will be used in some closed and open ended questionnaire.

1.5 Universe of the Study

The study will conduct in Derashe Woreda, which is found in Segen zone, SNNPR, of Ethiopia. It focuses specifically on the potential *Moringa* growing kebeles of Derashe woreda. The study concentrated on the gender analysis on post-harvest management of *Moringa stenopetala*.

2.5 Sample Size

The population of the study will comprise from 3 potential *Moringa* growing kebeles of Derashe woreda. Among ten kebeles Holte, Ateya and Wolyte will be selected by simple random sampling techniques through lottery method. The estimated population of households for each kebele is 2,070, 1,365 and 1,719 respectively. The total population of these three kebele is 5,154 households. The following formula is selected for sample size determination. The sample size is determined by Yamane’s sampling formula.

$$N = \frac{N}{1 + N(e)^2} \qquad n = \frac{5154}{1 + 5154(0.1)^2} \qquad n = \frac{5154}{52.54}$$

n= 98

The level of confidence is 90% with the precision or standard error of 0.1 percent.

Table 2.1 Sample size proportion of the target groups

Kebeles	N(Population) By house hold	P(Proportion)	% (Percentages)	P*n
Holte	2,070	0.3979	39.79	39
Ateya	1,365	0.2654	26.54	26
Wolyte	1,719	0.3367	33.67	33
Total	5154	1.00	100	98

Where: N= Population, n- sample size, P-proportion,

2.6 Tools of Data Collection

Instruments for data collection will be; key informant interview, focus group discussion, household survey and observation each of the instruments described as follow.

2.6.1 Key Informant Interview (KII)

Key informant interviews will be conducted with five selected individuals who have long experiences on topic of the study such as *moringa* processor and distributor agents, woreda agricultural office experts and environmental protection office experts.

2.6.2 Focus Group Discussion (FGD)

FGD will be conducted with sample farmers from three kebeles. In the focus group discussion the target groups will purposively selected from elders who have details knowledge and from active market participants of *moringa* market. The discussion will be conducted in accordance with the established standard way of organizing FGD.

2.6.3 House Hold Survey

To generate information at household level, cross sectional survey will be undertaken using structured questionnaires. Eight enumerators will be recruited based on their proficiency in communicating using Derashe language, educational background, and prior exposure to similar work. Training will be given to enumerators on the content of the questionnaire, schedule and procedures to be followed in the process of collecting the requested data.

2.6.4 Observation

Another data collection instruments will be employed for data collection is observation. The researcher will collect data from direct observation from the area; checklist will be prepared and Photo graphs will be taken by using digital camera.

2.7 Validity and reliability of instruments

The test item in the instrument was validated through a cross-examination by peer review in relation to the research questions raised for the study. This was to ensure that the instrument was able to measure the variables expected in the study in terms of face, content, predictive, construct, and concurrent validities as expected. Thereafter, the reliability of the instrument was done in order to establish its consistency and adaptable to any given similar situation when applied.

2.8 Data Processing and Analysis

The sources of the data will be quantitative and qualitative in nature. Therefore, data that will be collected from the questionnaires will be analyzed by descriptive statistics. Based on farmers' survey data, frequency, percentage, and tables, charts, which are suitable to analyze socio-economic data, to ease the computation SPSS version 20 (Statistical Package for Social Sciences) programs will use to process and analyze the collected data.

2.9 Ethical consideration

The study is going to be carried out based on formal procedures. As the first step a letter of request to research was submitted to the Derashe agricultural office. At this time, the researcher planned to collect data by orienting and giving training to the enumerators in accordance with cultural, norms and traditional aspects of the study area. Secondly the researcher make observation so, the responsibility of the researcher is facilitate, manage and control the activities of the enumerators beside this the researcher is responsible to tolerate, show empathy, patience and sense of humor to the participant in order achieve the desired outcome.

2.10 Budget breakdown

Activities	Amount	Unit cost/ ETB	Total cost/ETB
Selecting the Study Sites	1 days * 3 people	100ETB x*1*3	300.00
Enumerators Training			
Data collection Training	1days*8 enumerator	100 /Trainee	800.00
Pilot testing & collection			
Enumerators	3days*7 enumerators	100/Enumerator	2100.00
Supervisors	3days*1 supervisors	150/Supervisor	450.00
Major Data collection			
Data coding & entry	400 Questionnaires	20/ questionnaire	5,000.00
Data Cleaning			
Data analysis			
Total		Unit cost/ETB	8650
Contingency (15%)			1350
Grand Total			10,000

2.11 Time schedule

Activities	Months in which activities carried out						
	April	May	June	Jul.	Aug.	Sept.	Oct.
Literature review							
Preparation of proposal							
Pilot Tryout							
Major Study							
Data compilation & Analysis							
Report writing							
Submission of Draft Thesis							
Final Draft							

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