



Research Article

Women's Participation in Seed Selection and Production in The Informal Seed System: The Case of Ebinat Woreda, South Gondar Zone of Amhara National Regional State

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Keywords: gender roles; gender division of labor; dual roles; food insecurity; decision making; on-farm seed

Abstract

Women constitute almost half of the world's population though they have been excluded from decision making. Studies conducted on women and seed overlooked specific gender roles and decision making of women in seed selection and production in informal seed system in food insecure areas. This study attempted to address women's participation, women's dual roles, and constraints for their fair participation. The study employed mixed research approach. It also used primary and secondary sources of data-collected through questionnaire, FGDs, interviews, direct observation and document review. Probability and non-probability sampling techniques were employed to select study participants. Finally, the data were analyzed via quantitative and qualitative methods of data analysis. The study found out that women's participation in seed selection is with low extent and limited in decision making unlike their role in providing labor. It shows that majority of women in male headed households are part of seed production processes regardless of their health problems, level of education, and burdens in the domestic tasks. The study also indicated that lack of infrastructures, cultural barriers, and inaccessibility of market are major constraints for fair participation of women in seed selection and production. The local government shall work on awareness on gender equality, provision of technologies and production inputs, and construction of roads to local markets were possible solutions forwarded to improve women's saying and burden in seed selection and production.

Introduction

Background of the Study

In poor countries, the agricultural sector is essential to growth, poverty reduction, and food security. For instance, in Sub-Saharan Africa, the agricultural sector employs 65% of the labor force and generates about 32% of GDP growth (Christian, 2008 cited in Adeniyi, 2010). On the other hand,

more than half of rural employment in Eastern Africa, where Ethiopia is located, consists of self-employed farmers many of whom are women (Adeniyi, 2010).

Recognizing the essentiality of the agriculture sector of the economy, seed sector development receives attention as seed and food security are linked together with agricultural economic development of many African countries. This is

because good quality seed is indispensable for any food production for escalating productivity and production as well as motivating local and national economic development (Kopainsky *et al.*, 2012; Candel, 2014).

Yet, nearly 80% of all seed used in East Africa is produced in the informal system. This means that informal seed supply is the main source of seed for most crops and farmers in developing countries and may continue to some times in the future (FAO, 2010 cited in Taylor, 2012). Similarly, Bottema and Santen (1995) pointed out that informal seed systems are commonly used by most small-scale poor farmers who operate in complex, risk prone and diverse environments. Likewise, the majority of Ethiopian smallholder farmers are largely dependent on this system mainly through farm-saved seed exchange (Atilaw and Korbu, 2011).

Globally, rural women are responsible for half of the world's food production (United Nations' report on Women, 2000; De Jong, 2000). They play an important role in producing the world's staple crops and providing labour for post-harvest activities (Adeniyi, 2010). Indeed, throughout rural Africa, women's labor input is estimated as three times than men. In performing such activities, in most African communities there are gender specific roles in agricultural production (Adeniyi, 2010).

Women disproportionately bear the burden of poverty in Ethiopia despite of their participation in the agricultural activities, which is mainly a result of the gender-based division of labor and lack of access and control over resources prescribed not only by tradition and culture, but also in the law as product of social norms particularly in the past. Women are responsible for all the household tasks parallel to their support in agriculture and livestock production. Nevertheless, they have little saying on decisions (United Nations Women's Watch, 2008; Marshall and Farahbakhsh, 2013).

CDC (2008) cited in Rediet (2011) noted that the Amhara Region is known in crop production. About 85% of its economically active population is engaged in such sector. Nonetheless, some parts of the region (north east) are prone to shortage of rain fall and food for many months in the year. From the total 126 *woredas*, 64 (51%) of them including Ebinat are food insecure. Ebinat *woreda* located in drought prone areas of the ANRS is characterized by erratic rainfall, land degradation, chronic food insecurity and poor production potential (SERA/DPPC project, 2000).

Statement of the Problem

Holmes and Jones (2010) pointed out that women represent almost half of the world population in numeric terms. For example, in Ethiopia, the proportion of male to female ratio is almost equal, 0.97 male/female (ECSA, 2007; Garenne, 2017). However, women have been marginalized in many

sectors especially in decision making process (Caracalla, 2009). According to Caracalla (2009), women have no sufficient place in the society and issues of marriage and divorce which always determine by their male counterpart. In most parts of the world, particularly in developing countries, women are excluded and marginalized in the major economic arena at large and have negligible voice apart from delivering their labor.

Women's low decision-making power, particularly in developing countries, is more pronounced at household level (Chirnet and Mulugeta, 2002; Kopainsky *et al.*, 2012; Marshall and Farahbakhsh, 2013). In other words, women have lower status in the society compared to that of men, which has an adverse impact on the overall health status and conditions of women in developing countries. The problems of gender inequalities discussed so far have very much prevalent in and relevant to Ethiopia which has a patriarchal society that keeps women in a subordinate position as noted by Chirnet and Mulugeta (2002).

But what the past studies failed is that they did not give due emphasis on some specific issues that need to be searched so as to know women's share in such issues. Among those issues that so far has not been assessed very well is women's voice in seed selection and their participation in the process of seed production. For instance, Dawit *et al.* (2012) noted that women in rural areas of Ethiopia at large have low participation in most decisions of seed production. But, this study overlooks to see the condition of women in food insecure areas and specific gender roles and gender division of labor in seed production and selection.

Cognizant of such fact, the researcher conducted this study which aimed at assessing the nature of women's participation in selecting seeds and their role throughout its production process in the informal seed system at local level where farmers' livelihood depends on agriculture, and production is not more than hand to mouth. In nutshell, it is important to take intervention measures and to have scientific evidence for the question to what extent women are playing roles and what tasks are belongs to women and men in the informal seed system.

Objectives of the Study

The general objective of this study was to assess women's participation in seed selection and production process in Ebinat *woreda*. The study intends to pursue the following specific objectives under this general objective:

- ❖ Examine the extent of women's participation in seed selection and production;
- ❖ Examine the degree of participation of women among themselves in selection and production of seed;
- ❖ Identify the tasks do women and men play in seed selection and production;

- ❖ Investigate the socio-cultural factors determining women's participation in seed selection and production processes.

Research Methodology and Description of the Study Area

Description of the Study Area

Location and Topography

Ebinat is located in between 11° and 12° north latitude, and 37° and 38° east longitude. It is bordered by North Gondar Zone (East Belesa *woreda*) on the north; Farta *woreda* in the south; North Wollo Administrative Zone of Bugna *woreda*, and Waghimra Zone of Dihana *woreda* on the east; Lai Gayint *woreda* in the south east; and Libo Kemkem *woreda* in the west (Ebinat *Woreda* Communication Affair, 2013).

Landscape and Agro-ecology

The *woreda* covers a total land area of 249,427.1 sq. kms of which 169,784.1 (68%) comprise cultivable land. Topographically, 45% of the *woreda* is mountainous, 35% hilly, 15% plain and 5% is valley. Its altitude ranges from 1800m-2150m above sea level. Ebinat has three agro-ecological zones with 50% *kolla*, 35% *Woyina Dega* and 15% *Dega*. Moreover, the average annual rainfall ranges from 500 mm to 1300 mm (South Gondar Administrative Zone Information and Communication Office, 2011; Agegnehu, 2015; Melkegnaw, 2015).

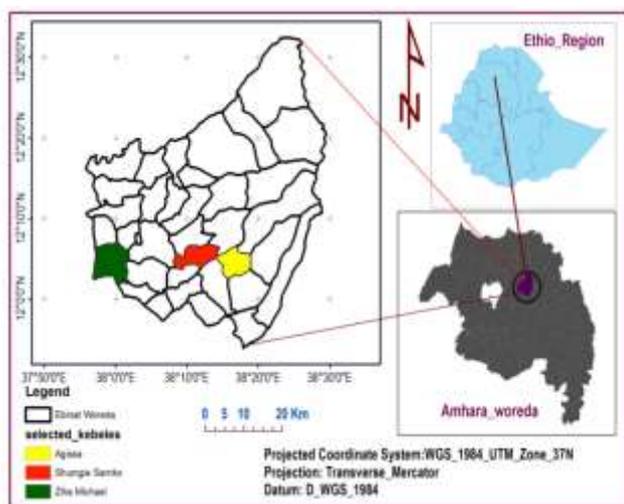


Fig. 1: Location Map of the Study Area (Ebinat *Woreda* and Selected *Kebeles*)

Research Methodology

Research Approach and Design of the Study

The study employed mixed research approach for the reason that quantitative or qualitative research method is not sufficient to address the complex social phenomena when it's treated separately. Hence, when quantitative and qualitative research methods used in combination in one

study, they complement to each other and allow for a more complete analysis of the research problem (Angell & Townsend, 2011; Creswell *et al.*, 2006).

Sampling Techniques for the Quantitative Component

Women who are living in the rural *kebeles*' (35 *kebeles*') of Ebinat selected purposively as women know better their situation and contribution than others. From those women, the targets of this research were those who are married (37,705). This is for the reason that looking the participation, decision making of women, and examining gender roles in seed selection and production needs the existence of male and female in a household. Three *kebeles* were selected by probability sampling-stratified random sampling-technique since the rural *kebeles* of Ebinat *woreda* are categorized in to agro- ecological zones of *Dega* (15%), *Woyina Dega* (35%), and *Kolla* (50%). From these strata, *Shumgie-sarniko*, *Ziha*, and *Agissa kebeles* were selected randomly from *Dega*, *Woyina Dega*, and *Kolla* agro-ecological zones respectively.

Sample Size and Determination

The researcher used Cochran's (1963) formula for determine the sample size based on the real context of the study. The formula is:

$$n_0 = \frac{z^2 pq}{e^2}$$

Where, n_0 = the required numbers of sample

z = the desired confidence level

e = margin of error/precision/confidence interval

p = estimated variability/proportion of the population

$q = 1 - p$

Accordingly, 95% confidence level ($z=1.96$), the maximum variability among the population (50%), and $\pm 7.5\%$ margin of error/confidence interval were used.

When we apply the formula,

$$n_0 = \frac{(1.96)^2 0.5(1-0.5)}{(0.075)^2} = \frac{3.8416 \times 0.5 \times 0.5}{0.5625} = 170$$

Consequently, the required sampled population (170) was distributed to each of the three stratum (sampled *kebeles*) proportionally. Then, 45, 59, and 66 women were selected from the stratum of *Kolla* (*Agissa*), *Woyina Dega* (*Ziha*), and *Dega* (*Shumgie-sarniko*) residents respectively. Finally, the individuals involved to fill the questionnaire also selected in random sampling method from the respective *kebeles*.

Sampling Techniques for the Qualitative Component

The participants to give the qualitative information were Agriculture experts, Food Security officials, and Women, Youth and Children Affair officials of Ebinat *woreda* as well as rural women who have lived in marriage and

relatively have experience in involving in crop production. To select the key informants, in-depth interviewees, and focus group discussants, the researcher used non-probability sampling. Accordingly, 8 key informants, 5 in-depth interviewees and 18 focus group discussants with three groups having six members were taken in line with data saturation.

Data Sources and Data Collection Techniques

The sources of data to this research were both primary and secondary sources.

Methods of Data Analysis

Both quantitative and qualitative data analysis techniques were used in this study. The data were coded, edited and entered into SPSS (Statistical Package for Social Scientists) version 20, and analyzed using descriptive and inferential statistics. On the other hand, the information that collected through KIs interviews, focus group discussions and observations were documented and analyzed textually via thematic analysis to complement the statistical results.

Results and Discussion

Demographic and Socio-Economic Characteristics of Respondents'

Regarding the age of respondents, about 42% lies in the age group of 35-44 while the age group of 55-65 accounts for

1.8%. The data revealed that the age of respondents concentrated in the middle age of the labor force. The study also indicated that about 2% of the respondents have more than 10 children while 58.8% of them have 0-4 children (Table 1).

The other characteristic of respondents was their health situation in which the majority (77.7%) responded that their health status was normal while some of them (22.3%) agreed that they have certain health problems. The characteristic that high variation is shown is their residence in which more than half (63.5%) of respondents responded as their residence is patrilocal while 13.5% of them were matrilocal residents. The result showed that in the study area a woman after marriage has little chance to live near to her family. As it can be seen in Table 1, about 37% of respondents' were illiterate while very few of them attained preparatory (0.6%) levels of education. Among the total respondents, 38.2% of were beneficiary of safety net program while the remaining 61.8% of them were not. In other words, since the program is /was designed for food insecure *woredas*, it is possible to argue that 38.2% of the respondents could be grouped to chronic food insecurity.

Table 1: Demographic and Socio- Economic Characteristics of Respondents' (n=170)

Characteristics	Category	Frequency	Percent (%)
Age	15-24	17	10.0
	5-34	54	31.8
	35-44	71	41.8
	45-54	25	14.7
	55-64	3	1.8
Number of children	0-4	100	58.8
	5-9	67	39.4
	10-14	3	1.8
Number of children in terms of sex	More male	66	38.8
	More female	63	37.1
	equal number	41	24.1
Health status	Normal	132	77.6
	have health problems	38	22.4
Residence	Patrilocal	108	63.5
	Matri-local	23	13.5
	Neutral	39	22.9
Level of education	Illiterate	62	36.5
	Adult education	55	32.4
	Elementary	38	22.4
	high school	5	2.9
	Preparatory	1	0.6
Beneficiary of safety net	Others	9	5.3
	Yes	65	38.2
	No	105	61.8

Decision Making Power of Women in Seed Selection in the Study Area

Regarding women's involvement in seed selection, the lion share (76.5%) of respondents are participator in seed selection whereas some (23.5%) of them are not participant (Table 2). As it can be seen in Table 2, the majority (76.5%) are participator in seed selection and seems important. But, the question is to what extent they are involving and on which decision making activities they are being involved? Accordingly, as it is shown in Table 2, about 21% of women's participation in seed selection is high while 44.7% of women are low and non-participant. Though the majority of women are participant in seed selection decisions, their participation is not active and overrides by their counterparts as the result shows.

The other important thing is on which areas of seed selection decisions women are active participant and on which of them they are less participant. In this regard, the data revealed that women are relatively active participant in checking the germination potential of seeds and accounts for 27% while they have low participation in deciding the amount of seed to be planted in which they have 6.5% participation. Extent of women's participation in plowing and others are not discussed here rather summarized in Table 2.

From these, it is possible to say that women's participation in decisions regarding seed selection varies across the types of decisions where they have better saying in some areas and neglect voice on some other seed selection decisions. At the same time, one can understand the fact that women have better knowledge on the quality of seeds including

their germination potential, but women have little chance to decide what amount and type of seed to be planted.

This finding is supported Owusu-Bempah (2019), as he found out that in traditional farming systems, crop diversity provides the opportunity for farmers to keep their options open where women play a bigger role than men in many cropping systems so that they frequently control seed selection and management of crop varieties and therefore; this would imply women have more knowledge of plant diversity and have an important role in the management and conservation of plant genetic resources.

Likewise, Sikod (2007) argued that crop domestication has often depended on the observational powers of women who historically have been most associated with seed selection and noticing new varieties which spontaneously appear in the field. The same author also suggested that women 'naturally' are more interested in crop diversity than men. Inconsistence to these suggestions indicated, Nuijten (2010) pointed out that gender does not seem to be a factor for how varieties are selected. Regarding the association between women's participation in seed selection and their background characteristics, the chi-square test result showed that respondents' age, greater number of children in terms of sex, and residence are statistically significant at $p < 0.05$. In contrast, there is no significant difference between women's education and their decision making. This seems contradictory to many findings that revealed the existence of relation between education and decision making of women in different spheres. But it is unlikely to women's involvement in seed selection due to the fact that whether women are educated or not they have indigenous knowledge and expertise on seed through experience.

Table 2: Respondents' Decision-Making Power in Seed Selection

	Category	Frequency	Percent
Women's participation in seed selection	Yes	130	76.5
	No	40	23.5
Extent of women's participation in seed selection	Non	40	23.5
	Low	36	21.2
	Medium	59	34.7
	High	35	20.6
Decision maker on the amount of seed for sowing	Husband	99	58.2
	Wife	11	6.5
	Both	60	35.3
Responsible to check germination potential of seed	Husband	82	48.2
	Wife	46	27.1
	Both	42	24.7
Decision maker on re-plowing	Husband	95	55.9
	Wife	4	2.4
	Both	71	41.7

Table 3: Respondents' Participation in Seed Production across Different Activities

	Category	Frequency	Percent
Women's participation in seed production	Yes	145	85.3
	No	25	14.7
Women's participation in plowing	Low	94	55.3
	Medium	44	25.9
	High	7	4.1
	None	25	14.7
Women's participation in wedding	Low	15	8.8
	Medium	27	15.9
	High	103	60.6
	None	25	14.7
Women's participation in harvesting	Low	28	16.5
	Medium	90	52.9
	High	27	15.9
	None	25	14.7
Women's participation in threshing	Low	73	42.9
	Medium	60	35.3
	High	12	7.1
	None	25	14.7
Women's participation in exporting seeds to farm	Low	41	24.1
	Medium	61	35.9
	High	43	25.3
	None	25	14.7
	Total	170	100.0

Women's Participation in Seed Production in the Study Area

The majority (85.3%) of the respondents noted that they are participant in the process of seed production while few (14.7%) responded that they do not have any participation in the process of seed production. Since there are different activities in the process of seed production, it is advisable to see the extent of women's participation in each activity so as to see on which activities of seed production do women have high participation and on which of the activities they are less participant.

As it is shown in Table 3, the majorities (60.6%) of women have high participation in weeding; but, very few (4.1%) have high participation in plowing. The result showed that plowing is usually the work belongs to men while weeding is commonly performed by women. This leads to the fact that in rural areas where agriculture is the dominant economic activity there is an unfair division of labor based on gender in which certain works belongs to male and female thereby makes women disadvantaged.

This result is consistent with the work of Adeniyi (2010) which says rural women play an important role in producing the world's staple crops and providing labour for post-harvest in which most African communities have had gender specific roles in agricultural production. The same author further indicated that land clearing is normally assigned to men, while weeding and transporting crops from

the farm to the home or to cooperative units are normally done by women. In relation to this, Olumakaiye and Ajayi (2000) cited in Boon *et al.*, (2009) found out that African women including Ethiopian women perform about 80% of the transportation from farm to village; 90% of the work of hoeing and weeding; and 60% of the work of harvesting and marketing of farm products. With regard to the association between women's participation in seed production and their background characteristics, respondents' age and number of children have an association with women's participation in seed production at $p < 0.05$ as the chi-square result shows.

Women's Participation in Seed Storage in the Study Area

Among the total respondents, 66.5% of them agreed that they are responsible for seed storage while 15.9% responded that the responsibility of seed management is the task of their husband. On the other hand, regarding the responsibility to prepare seed store, 25.9% of them are responsible for such task while 22.4% of them responded that their husbands are responsible in preparing stores for seed (Table 4).

From the result shown in Table 4, it can be understood that women have greater responsibility in managing seed though their husband has cooperation in preparing storage material for the seed to be saved from the on-farm seed production. For the question do women face problems in relation to seed storage; more than half (61.1%) of respondents agreed that they experienced problems in relation to seed management. In relation to this, the respondents were asked to give their

opinion and indicated the problems as shortage of seed due to using the seed for household consumptions; attacked by insects and animals like rats while storage; expiration of seed due to moisture and high temperature; lack of sufficient and safe storage there by exposed to thief; and problem of seed's inability to germinate when planted because of unsafe storage. Concerning the association of facing problems in storage of seeds and the demographic and socio-economic backgrounds of women, no association is found at $p < 0.05$ in all characteristics as the chi-square statistics shows. Thus, women are facing problem in storage seed regardless of their backgrounds.

Women's Participation and Decision Making in Seed Exchange in the Study Area

Regarding to women over all participation in seed exchange, 47.1% of the respondents have medium participation and followed by high (35.9%) participation while only few (17%) of them have low participation and therefore, women in the male headed household are active participant in seed exchange and marketing (Table 5). But, the question here has to be raised is in which activities of seed exchange women have strong saying and participation. Accordingly, women's voice in deciding on the necessity of

seed exchange, and on where and from whom the seed to be exchanged is low in which decision made by women accounts 18.2% and 11.2% respectively. In contrast, regarding to under taking seed exchange, 45.3% of the respondents responded that they are responsible to make seed exchange when needed while 25% of them agreed as their husbands are responsible to do that. From this, one can understand that women's participation in seed exchange is relatively high though it is low regarding passing decision. This implies that women are responsible to give more labor to undertake seed exchange. This result confirmed with the findings made by Senait (2000) cited in Dawit *et al.* (2012), which says rural women have significant roles in most farm operations of seed management although their competence in decision making has been questioned.

According to Table 6, unlike to problems in seed storage, concerning the participation of women in seed exchange, *kebele* of respondents has an association with women's participation in seed exchange at $p < 0.05$. This would imply that the participation of women varies across *kebeles* and thereby agro-ecological zones which have different features in terms of topography and land escape.

Table 4: Respondents' Participation in Seed Storage

	Category	Frequency	Percent
Responsible to seed storage/management	Husband	27	15.9
	Wife	113	66.5
	Both	30	17.6
Responsible to prepare seed store	Husband	38	22.4
	Wife	44	25.9
	Both	88	51.8
Problems in relation to seed storage	Yes	69	61.1
	No	44	39.9

Table 5: Women's Participation in Seed Exchange

	Category	Frequency	Percent
Decision maker on the necessity of seed exchange	Husband	58	34.1
	Wife	31	18.2
	Both	81	47.6
Decision maker on where and from whom the seed to be exchanged	Husband	32	18.8
	Wife	19	11.2
	Both	119	70.0
Responsible to make seed exchange	Husband	44	25.9
	Wife	77	45.3
	Both	49	28.8
	Total	170	100.0
Overall condition of women's participation in seed exchange	Low	29	17.1
	Medium	80	47.1
	High	61	35.9

Table 6: Respondents' Problems in Relation to Seed Storage and Participation in Seed Exchange by their Demographic and Socio-Economic Backgrounds

Characteristics	Problems in relation to seed storage		Women's participation in seed exchange	
	χ^2	p	χ^2	p
Respondents' Age	9.563	0.297	5.788	.671
Respondent's number of children	4.883	0.299	5.217	0.266
Beneficiary of safety net programme	5.247.	0.073	1.384	0.501
Greater number of children in terms of sex	2.431	0.657	3.364	0.499
Respondent's Kebele	3.419	0.490	13.817	0.008*
Respondent's level of education	17.216	0.070	4.526	0.921
Respondent's Health status	3.255	0.196	2.597	0.273
Respondent's residence	1.270	0.867	6.549	0.162

Households' Experience in Seed Shortage and Women's Contribution to Fill Seed Gaps in the Study Area

From the total respondents, the majority (68.2%) of them have faced seed shortage. From the result, it can be said that many households in the study area are subject to seed shortage, and they unable to save sufficient seed from their on-farm production. In this regard, head of Ebinat *Woreda* Food Security Office stated that there is frequent shortage of seeds in the *woreda* particularly for seed varieties that resist diseases and drought. This finding is consistent with the study conducted by DPPC/SERA project (2000), which revealed that,

"Food shortage is the major challenging problems causing misery among the population of Ebinat woreda. The comparison of total crop production and annual food need of the households clearly shows the severity of food deficits. Production per capita is very low compared to the recent DPPC standard of 180 kg per person per year. According to DPPC's study in 2000, more than half of the households (61.2%) considered their stock as insufficient for the remaining period of the year, while 33.4 percent were out of reserve."

In relation to this, a question was posed in such a way that who is responsible in finding solutions for seed shortages? About 72% of the respondents indicated that both wife and husband are responsible for finding solutions for seed shortage where as 12% of them agreed that their husband is responsible for such task (Table 7). The other issue raised was the coping mechanisms taken when households faced seed shortage. As it is shown in Table 7, about 38% of the respondents used borrowing seed which is mainly accessed from local merchants, neighbors, relatives, friends, families, churches, and local governments' agricultural inputs office borrowings. Whereas, very few (12.9%) of them used other options including *dubie* from local traders, buying seed from grain market, leaving certain plot of land without

covering of crops, selling live stocks (oxen, goats, sheep), seed exchange, and using the land jointly.

From the results indicated, it can be said that women have nearly equal participation in finding coping mechanisms for seed shortage. However, in return borrowings, women have less participation especially in re-turn money related borrowings. That is why from the total respondents the majority (47.5%) of them responded that their husband is responsible to return borrowed money while only 5% of them agreed that wives are responsible to such tasks (Table 7). Here, the important thing that observed from these results is that women have less access and control on money related issues and mostly engaged on activities that need more labor in terms of energy and time.

Respondents' level of education, residence and health status have significant association with their experience in seed shortage at $p < 0.05$. This implies that women's experience in facing problem of seed shortage varies depending on their level of education, health status and residence. Regarding the coping mechanisms households could take, only respondents' residence has significant association at $p < 0.05$ as the chi-square result indicated. This would suggest that the solutions households apply in case seed shortage occurs vary depending on households' residence; otherwise, no association between other women's socio-economic characteristics and the coping mechanisms the household would take.

On the other hand, regarding the responsibility of finding solutions for seed shortages in households, the chi-square result revealed that there is significant difference among women based on their health status and residence at $p < 0.05$ whereas there is no significant difference among respondents because of other demographic and socio-economic backgrounds such as age, number of children, beneficiary of safety net programme, greater number of children in terms of sex, *kebele*, and level of education at $p < 0.05$. The descriptive finding earlier showed that the greater percentage of households are in a position to find

solutions jointly-husband and wife-in case seed shortage happened; yet here, one can understand the fact that this condition depends on women’s actual health status and residence; and therefore, varies across women in line with such variables.

Women’s Participation in Seed Production and its Relation to Domestic Tasks in Male Headed Households in the Study Area

As stated earlier more than 85% of the respondents were participants in seed production. Surprisingly, about 72% of women are responsible to domestic tasks while they participate in seed production. However, about 1% of the respondents stated that their husbands are responsible to domestic tasks whilst women participate in seed production (Table 8). The remaining 13.7% of the respondents use other options (housemaids and children). This result supports the study conducted by Senait (2000) cited in Dawit *et al.* (2012) which revealed that women in Ethiopia play multiple and overlapping roles, which in turn put

pressure on their health, food security, productivity and potential contribution to improved human welfare and economic development. Another writer Tsegaye (1997) as cited in Boon *et al.* (2009) also stated that the productive and reproductive roles of females in society, termed as “double-day” roles, results in a heavier workload for females than males.

This shows that women are bearing both the burden of domestic tasks and production of seeds which exposes them for different problems. For instance, of the total respondents, who were responsible to domestic tasks and production, more than half (55.2%) have faced problems due to triple roles. Among the problems mentioned by them over exploitation of labor, losing due attention for children’s caring, feel unhealthy and unhappy, lack of leisure, over load of tasks, stress, low life expectancy, male’s attitude for domestic tasks being low, and difficult to accomplish the domestic tasks timely were notable ones cited by the majority of the respondents.

Table 7: Respondents’ Experience in Seed Shortage and their Contribution to Fill Seed Gaps

	Category	Frequency	Percent
Women’s experience in seed shortage	Yes	116	68.2
	No	54	31.8
	Total	170	100.0
Responsible in finding solutions for seed shortage	Husband	14	12.1
	Wife	18	15.5
	Both	84	72.4
	Total	116	100
Coping mechanisms for seed shortage	borrowing money	40	34.5
	borrowing seed	44	37.9
	gift from relatives	17	14.7
	other options	15	12.9
	Total	116	100
Responsible in return when borrowed money	Husband	19	47.5
	Wife	2	5.0
	Both	19	47.5
	Total	40	100.0

Table 8: Respondents’ Participation in Seed Production and its Relation to Domestic Tasks

	Category	Frequency	Percent
Responsible to domestic tasks while women participate in seed production	Husband	1	0.7
	Wife	105	71.9
	Both	20	13.7
	Other options	20	13.7
	Total	146	100.0
Facing problems due to dual works	Yes	58	55.2
	No	47	44.8
	Total	105	100.0

Table 9: Working domestic tasks while women participate in seed production by respondents' demographic and socio-economic backgrounds

Characteristics	Responsible in Finding Solutions for Seed Shortage		Responsible in Working Domestic Tasks While Women Participate in Seed Production		Facing problems due to dual works	
	χ^2	Sig(p)	χ^2	Sig (p)	χ^2	p
Respondent's Age	11.235	0.509	21.371	0.165	13.861	0.085
Respondent's number of children	10.165	0.118	15.466	0.051	6.768	0.149
Beneficiary of safety net programme	2.113	0.549	3.385	0.496	4.095	0.129
Greater number of children in terms of sex	5.146	0.525	7.147	521	3.329	0.504
Respondent's Kebele	7.926	0.244	4.358	0.823	4.625	0.328
Respondent's level of education	24.602	0.056	37.404	0.010*	32.951	0.000*
Respondent's Health status	10.505	0.015*	20.419	0.000*	54.691	0.000*
Respondent's residence	18.600	0.005*	17.550	0.025*	14.784	0.005*

Regarding taking the responsibility for domestic tasks when women participate in seed production, the chi-square result indicated that there is significant difference among respondents depending on their health status, education and residence at $p < 0.05$ (Table 9). Thus, it is possible to argue that though the lion share of domestic tasks always belongs to women, it differs depending on women's real context like education, health, and residence. The other most important thing observed from the chi-square test is women's problem due to dual works (domestic tasks+ participation in seed production) which has significant difference at $p < 0.05$ in light of respondents' education, health status and residence. Regarding this, Sikod (2007) revealed that education is increasingly becoming a major factor enabling women to break down barriers to some socialization factors giving rise to the division of household labor. Accordingly, the same author concludes that the more educated a woman is, the more likely that she would going to venture into spheres traditionally considered as male areas.

Conclusion

The study revealed that the majority of women in male headed households in the study area are participant regarding seed selection. Nevertheless, their extent of participation is at low level in seed selection tasks and decisions, and strong on activities that require investing of labor where as their voice in decision making is nearly silent. The study also found out that the lion shares of women have participation in the process of seed production. Yet, women devote differently their labor for different parts of seed production in which they intensively invest their labor on weeding and followed by exporting of seeds. In

participating in seed production, no significance variation among women's health, education, wealth, and number of children in terms of sex was found at $p < 0.05$.

Via this study, it is proved that, in most cases, women are responsible in seed store and management in which they mainly cannot be escaped problems of seed shortage and seed expiration. More than half (68.2%) of women are in households, which have/had faced seed shortages though the situation varies depending on women's residence, education, and health. In response to this, women have almost equal participation with their husbands in finding coping mechanisms. But, women's participation is bold in borrowing and return of commodity (seed) related options while they do have low participation in borrowing and return money. According to the study, the majority (71.9%) of respondents are participating in seed production without sharing the domestic tasks to their husbands or other options though situations vary depending on women's level of education, health status, and residence at $p < 0.05$. Consequently, more than half (55.2%) of them exposed to health-related problems.

The study explored that there are gender roles and division of labor in seed selection and production in the study area. Accordingly, roles of women in seed selection include tasks for the process of ensuring the seed quality and managing the selected seed till it planted while men expected to play roles of determining the types, varieties and the amount of seed needed for planting. Regarding seed production, in most cases, women perform weeding and harvesting whereas men expected to perform tiling and threshing tasks.

Not only this, there are specific gender division of tasks in plowing, weeding, harvesting, and threshing of seeds.

Last, not least, though majority of women are participant in seed selection and production, their participation is not without constraints and challenges. Constraints in seed selection were backward technologies in the process of working on seed quality and storage, and lack of market access in nearby whilst constraints for women's participation in seed production were early marriage, gender roles and division of labor, and health problems which in most cases emanated from overload of tasks or triple roles of women.

Recommendations

- Women's participation in seed selection is with low extent and limited saying in decision making while they intensively provide their labor in production activities of seed like weeding. Thus, so as to increase women's saying apart from their labor delivery, and to reduce unfair gendered division of tasks in production, the local government shall work on awareness creation about the importance of involving women in prominent decisions of seed selection and production and avoiding dysfunctional demarcation of roles. Women are being part of seed production processes regardless of their health problems and level of education. At the same time, they are performing the domestic tasks despite of their participation in production. Thus, women with health problems and caring many children shall get leisure and the domestic tasks should be shared by someone else. For that matter, the local government shall give trainings to men in male headed households either to share the domestic tasks or find other solutions.
- Women are the direct bearer of problems in seed store and shortage which largely resulted from inaccessibility of technologies and production inputs. Therefore, the concerned body shall facilitate the provision of technologies that could overcome such problems thereby reduces the burdens of women. In relation to this, organizations working on the integration of the formal and informal seed sectors like ISSD Ethiopia shall establish local seed business cooperatives that can fill seed shortages in the *woreda*. In addition, the local government shall construct roads in local markets thereby it could be easier for women to participate actively in seed exchange, seed sale and other marketing activities in the local markets.

Conflict of Interest

Author declares no conflict of interest with the present study.

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