Stakeholders' Integration in Sorghum and Sesame Seed Supply System. The Case of West Gondar Zone, Amhara Region, Ethiopia

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Abstract

Sesame and Sorghum are the major crops that are widely used for consumption and marketing purposes. However, the attention given for seed production and supply is low in these crops and it does not meet the growing demands of the farmers in the west Gondar zone, even various actors and stakeholders are involved in sesame and sorghum seed production and dissemination activities. Hence, the study tried to assess stakeholders' integration in Sorghum and Sesame seed supply system and identify the challenges of the Sesame and sorghum seed supply system in the study area. The research adopts a cross-sectional survey design that combines both qualitative and quantitative research approaches. To select the study area and respondents, a multi-stage sampling technique was used. In the first stage, Metema and Quara districts were selected purposively due to their potential for sorghum and sesame production. At the second stage, two kebeles were selected from each district purposively based on their potential for Sesame and Sorghum production. At the last stage, a total of 88 sample stakeholders were selected by using a simple random sampling technique. Data analysis was carried out by using descriptive statistics like frequency, mean, and standard deviation. The survey result indicates that the integration of stakeholders in the major activities (Problem identification, planning, implementing the activities, monitoring, and evaluation of the activities and documentation of best practices) and specific activities was not satisfactory. Hence, the stakeholders should work in an integrated manner to improve the seed supply system of sesame and sorghum ultimately addresses the problem of duplication of efforts in the study area.

Keywords: Seed Production, Seed Industry, Seed Supply Chain, Sorghum, Sesame, Ethiopia.

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Introduction

Background and Justification of the Study

The seed is a key input for production of any agricultural and horticultural commodities. Increasing the quality of seeds can increase the yield potential of the crop by significant folds and thus, is one of the most economical and efficient inputs to agricultural development (FAO, 2006). Generation and transfer of improved technologies are critical prerequisites for agricultural development particularly for an agrarian-based country like Ethiopian (CSA, 2010).

In Ethiopia, different Seed systems are operating. The formal and the informal system (sometimes called local or farmers seed system). In the recent years, the idea of an intermediary seed system has appeared in the Ethiopian seed sector. The intermediary seed system combines attributes of both the formal and the informal seed systems (Hassen and Dessalegn 2011). The Ethiopian formal sector is made up of institutional operations associated with the development of improved varieties, multiplication, processing, storage and distribution to farmers. Specifically, this includes research institutions, public seed enterprises, large private corporations, and small private seed enterprises. On the other hand, in the informal sector, farmers select their crops and local landraces/varieties, produce their seeds, and/or locally exchange and purchase seeds. Although the formal seed sector started about six decades ago, it remains limited to a few major crop varieties developed by agricultural researchers. As a result, the informal sector remains the major supplier of the seed of improved and local varieties for many crops grown by small-scale farmers (ATA, 2015).

The seed demand is increasing rapidly due to growth in agricultural sector. Thus, securing the supply of quality seed is the most effective way to sustain food security in Ethiopia (Atilaw, 2010). To satisfy the seed demand, improved variety seeds are supplied particularly by public organizations: public seed enterprises, agricultural research institutes, and universities (Alemu 2011; Thijssen et al. 2008). The participation and coordinating role of public entities are quite high in Ethiopia as compared with other sub-Saharan African countries (ISSD Africa 2012). Private seed producers also supply seed to the market. Projects are designed to increase seed production and distribution by strengthening the public and private sectors and also promoting community-based seed production strategies

(Alemu 2010; ATA 2015). However, both public and private seed producers mainly concentrate on a few cereal crops, particularly hybrid maize and bread wheat. Moreover, they supply only a small portion of the total quantity of seed demanded by farmers. Studies show that only a small area of land has been covered by improved seed. According to Atilaw and Korbu (2011), between 2005/6 and 2009/10, only 3.5 percent of the land was planted with improved seed out of a total of 12 million hectares of land under major food crops. Moreover, seed suppliers concentrate only on a few crops and cannot address the diversified seed demand of the farming community(Bishaw and Louwaars, 2012). Thus, they do not satisfy the diversified seed demand of farmers.

Although, Sesame and Sorghum are the major crops that are widely used for consumption and marketing purposes. However, the attention given for seed production and supply is low and it does not meet the growing demands of the farmers in the west Gondar zone. This indicates that there are different factors directly or indirectly influencing the input supply system that believed to boost production and productivity of the smallholder farmers. But the reasons why the input-supplying system failed to satisfy the requirements of the farmers are not analyzed so far in the study area.

Various actors and stakeholders are involved in sesame and sorghum seed production and distribution activities. All these actors and stakeholders, in one way or the other, contribute to the production, promotion, supply, and marketing of improved sesame and sorghum seed varieties in the country as well as in the study area. These include research institutes, public and private seed companies, cooperative promotion offices, agricultural offices, seed-related projects, financial institutions and Non-governmental organizations (NGOs) (Alemu 2011; Hassena et al. 2013). These stakeholders are expected to perform different activities in an integrated manner. However, previous researches did not attempted to analyze the integration of stakeholders in the sesame and sorghum seed supply system. Hence, the study was initiated to analyze the stakeholders' integration in Sesame and Sorghum seed supply system in the study area.

Objectives of the Study

* To analyze the integration of stakeholders in Sorghum and Sesame seed supply system in the study area

* To identify the challenges of Sesame and sorghum seed supply system in the study area

Operational Definition of Terms

Seed system refers to the full set of activities and stakeholders involved in effectively developing, producing, and distributing seed to smallholder farmers.

Stakeholders refer to various groups, actors, organizations involved in Sesame and sorghum seed supply system activities

Research Methods

Description of the Study Area

West Gondar zone has four districts and three city administrations. It is located in the North-Western part of the country and far from the capital city Addis Ababa about 800km. The boundaries of the West Gondar Zone are North Gondar Zone and Tigray region to the North, Awi zone and West Gojam zone to the South, Central Gondar zone to the East and Sudan to the West. This study was conducted by taking samples from two districts from Western Gondar Zone.

Research Design

The study adopted a cross-sectional survey design which helps to collect data for more than one case at a single point in time. Both qualitative and quantitative research approaches were employed for the study. Quantitative data were obtained from household survey interviews. The qualitative data were obtained from the focus group discussion and key informant interviews.

Sampling Techniques and Procedures

A multi-stage sampling technique was applied to select sample districts, kebele, and respondents. In the first stage, Quara and Metema Districts were selected from West Gondar zone purposively, due to researchers' prior information about the Sesame and Sorghum seed supply system in the area. In the second stage, two kebeles from each district (Bambaho and Dubaba from Quara district and Shinfa and Kokit from Metema

district) were selected purposively depending on their potential to sorghum and sesame production by consulting the district's agriculture office. In the last stage, a total of 88 sample respondents were selected from the stakeholders using a simple random sampling technique in proportion to their sizes.

Stakeholders	Sample respondents		Total
	Metema district	Quora district	
Agriculture Professionals	16	10	26
Farmers	16	16	32
ATA	1		1
Researchers	2		2
Cooperative officers	6	5	11
Private input suppliers	7	2	9
ACSI officers	4	3	7

Data Sources and Methods of Data Collocation

Data Sources

The data were collected from both primary and secondary sources. Primary data were collected through stakeholders' interviews and Focus Group Discussion (FGD). Secondary data were collected from government annual reports, zonal and district agricultural office and research office annual reports, and research results undertaken in similar areas.

Methods of Data Collection

To gather the required data for this study, various data collection instruments were used. These include; interview schedule for household survey, Checklist for Focus Group Discussion (FGD) and interview guide for key informant interviews. The interview schedule consists of close-ended questions which were used as data collection instrument. This instrument was used to collect data for demographic and social variables. The interview schedule was prepared in English and translated into the local language (Amharic). Before collecting the actual data, pilot testing was conducted for correction based on the feedback

obtained from the test. The training was arranged for enumerators to familiarize themselves with the interview schedule. Through household survey, data were collected from 88 stakeholders, Focus Group Discussion (FGD) was also conducted with 12 participants to generate additional data and complement the data obtained through the household survey.

Methods of Data Analysis

The collected data were analyzed with the support of SPSS software version 20 software. Descriptive statistics like frequency, mean, and standard deviation were used to analyze the demographic and social characteristics of the respondents. To measure the perception of different stakeholders, Likert scale statements were used and analyzed using frequency and percentages. On the other hand, the qualitative data were analyzed through narrations and descriptions.

Limitation of the Data Analysis

The study employed simple descriptive statistics to analyze the data due to the nature of stud. As a result, the advanced quantitative data analysis models were not executed. Performance of the stakeholders integration were also not examined by the appropriate data analysis methods.

Results and Discussion

Demographic and Social Characteristics of Respondents

The educational level of the respondents indicated in Table 1. Among the total respondents, 29.3% of them fall under can read and write whereas 2.3% under cannot read and write category. Respondents in the first, second and third cycle (high school) make up about 11.4 per cent and 4.5per cent of the total respondents. On the other hand, 20.5% and 31.8%fall under diploma and first-degree category respectively. The educational level distribution of the respondents followed the pattern where the majority of the respondents fall in diploma and the first-degree category. This is due to the data collected from different stakeholders in the study area.

The sex distribution of the respondents in Table 1 shows that about 87.5 per cent of the respondents were male while the remaining (12.5%) were female. It was observed that the majority of the respondents were male while small proportions of them are female respondents. About the age distribution of the respondents, it was observed that the maximum age was reported 58 years and the min was 23 years with 35.03years average age.

Table1: Education Level, Sex and Age of Respondents

Variables	Category	Frequency	Percentage
the education level of respondents	Cannot read and write	2	2.3
	Can read and write	26	29.5
	Grade 1-8	10	11.4
	grade 9-12	4	4.5
	Diploma	18	20.5
	First Degree and above	28	31.8
	Total	88	100.0
sex of respondent	Female	11	12.5
	Male	77	87.5
	Total	88	100.0

Variable	N	Minimum	Maximum	Mean	Std. Deviation
age of respondent	88	23.00	58.00	35.0341	8.27467

Source: Survey Data 2017/18

Stakeholders' Participation in Major Activities

Key stakeholders that were categorized into the seed supply system of Sesame and Sorghum in the study area includes Gondar Research Center, Office of Agriculture, Cooperative Unions, Cooperative promotion Office, Amhara Saving and Credit Institute, Amhara Seed Enterprise, Farmers Seed Multiplication Cooperatives, Sesame Business

Network (SBN), Agricultural Growth Program (AGP), Agricultural Transformation Agency (ATA), Farmers, and private input suppliers. Thus, a total of 12 stakeholders were identified who have been involved in Sesame and Sorghum seed supply in the study area. It was expected that these stakeholders have to perform different activities in an integrated manner. In this regard, stakeholders' participation in the major activities of Sesame and Sorghum seed supply, were assessed using five statement items. They were asked to rate the level of integration concerning problem identification, participation in planning, implementation, monitoring, evaluation, and documentation of best practices. The results of the survey in Table2 indicate that 37.5 per cent, 37.5per cent, 40.1per cent, 44.3per cent, 33per cent of the sample respondents expressed their integration in planning, implementation, monitoring, evaluation activities was poor. On the other hand, 44.3per cent, 39.8per cent, 30.7per cent, 36.4per cent, 40.9per cent of the sample respondents expressed their integration in planning, implementation, monitoring, and evaluation activities were good. Besides this, 26.1per cent and 44.3per cent of the respondents expressed their integration in documentation of best practices was very poor and poor respectively. The overall average result of the different statements in relation to stakeholders integrations revealed that the integration was poor.

Table 2: Stakeholders' Participation in Major Activities of Sesame and Sorghum Seed Production and Supply.

S.No	Major activities	Very Poor	Poor	Good	Very Good	Excellent
		%	%	%	%	%
1	Problem identification	9.1	37.5	44.3	8	1.1
2	participated in the planning phase	4.5	37.5	39.8	17	1.1
3	Participated in implementing the activities	12.5	40.1	30.7	12.5	3.4
4	Participated in monitoring of the activities	11.4	44.3	36.4	3.4	4.5
5	Participated in evaluation of the activities	10.2	33	40.9	11.4	4.5
6	documentation of best practices	26.1	44.3	20.5	8	1.1
7	Average	12.3	39.45	35.4	10.05	2.6

Source: Survey Data 2017/18

The focus group discussion result held with stakeholders also indicates that stakeholders have been participating in a variety of trial, seed multiplication, demonstration, seed supply, providing skill gap trainings, provision of loan and financial support services. In this regard, Gondar Research center has been working a variety trial and demonstrate the result in the farmer's plot. A similar study conducted by Alemu 2011; Hassen et al. 2013 shows that research institutes work for variety development, adaptation, multiplication, and pre-extension demonstration. Variety adaptation and demonstration are practical means of improving the crop variety portfolios of SPCs (Thijssen et al. 2013). However, the FGD participants confirmed that variety trial activities were not carried out by conducting need assessment. Because of this, the variety trial does not incorporate the variety and seed demands of farmers in the study area. It was indicated that the variety of trial activities carried out in the farmers' plot lacks basic record keeping and feedback mechanisms. The FGD participant from the research center confirmed that they did not know whether the farmers are using the result or seed or food. On the other hand, the research center has distributed the Basic seed for Amhara Seed Enterprise, Cooperative Unions, Farmers and (SBN) which is obtained from the variety trial. The research center has arranged different pieces of training for staff members of the Metema district Cooperative Union, Metema district agriculture office, Metema district Cooperative promotion office, and farmers. They also arranged Field day to scale-out best practices with seed supply in the study area. The research center has been currently working with the district agriculture office in the following specific activities: the selection of kebeles, farmers, farmers plot, demonstrating best practices, and in arranging field days.

On the other hand, Cooperative Unions, Cooperative promotion Offices and Amhara Saving and credit institutions have been providing saving and credit services which directly supporting the existing seed supply system in the study areas.

Apart from this, ATA, AGP, SBN, ISSD are governmental and non- governmental organizations working in the study area to improve the productivity of sesame and sorghum by providing financial support for purchasing sesame and sorghum improved seeds and enhance the technical capacity of different stakeholders by arranging trainings and demonstration sessions. For example, SBN is providing improved seed of sesame to the farmers in the study area. It also provides credit for selected multipurpose cooperatives in which farmers can get credit through their cooperatives.

In the Metema district, ISSD has been supporting Work Amba Farmers seed multiplication cooperative which is found in Kokit Kebele of Metema district by constructing warehouse and furnishing their office, providing basic seed and financial support. This seed multiplication cooperative is the only seed multiplication cooperative responsible for seed multiplication in the district. However, the FGD participants told us it is not well organized due to the lack of appropriate farmland established on a cluster bases. Hence, the members need clustered land for seed multiplication. However, the district Environmental protection office, land administration office, and cooperative promotion did not secure clustered land for the members. The study result indicates that the seed supply system requires the commitment of stakeholders. Despite the increased demand, the seed sector supplies a limited quantity of Sesame and Sorghum seed to the farmers. A study conducted by ISSD, 2016 indicates that seed producer cooperatives play a key role in the Ethiopian seed sector. For example, in 2014 alone, more than 23 different crops and 131 varieties were produced by SPCs. In the study area, Melkam (Sorghum variety) and Aba Sena, Gondar 1 (Sesame varieties) are largely available. The problem may be due to poor integration of stakeholders that can be revealed from the survey and FGD result.

Challenges concerning Seed Supply System in the Study Area

The respondents' perception of the challenges for integration of stakeholders in Sesame or sorghum seed supply system was measured in five statement items and the result indicated in Table 3. Respondents were asked to express their level of agreement whether Lack of interest, lack of awareness about seed supply, Lack of Trusted seed sources, Lack of credit access and Poor communication among stakeholders were challenges to seed supply of Sesame and Sorghum. Accordingly, 28.4per cent, 33 per cent, 34.1per cent, 27per cent, 34.1 per cent of the respondents disagree with the stated statements. On the other hand, 37.5%,30.7%, 43.2per cent, 30.7per cent, 22.7per cent of the respondents partially agree with the stated statements. Unlikely, 30.7per cent and 37.5per cent of the respondents partially agree and agree with Poor selection, distribution, storage mechanism was a challenge in the seed supply system in the study area.

Table 3: Level of Agreement of Respondents about the Challenges of Seed Supply System in the Study Area

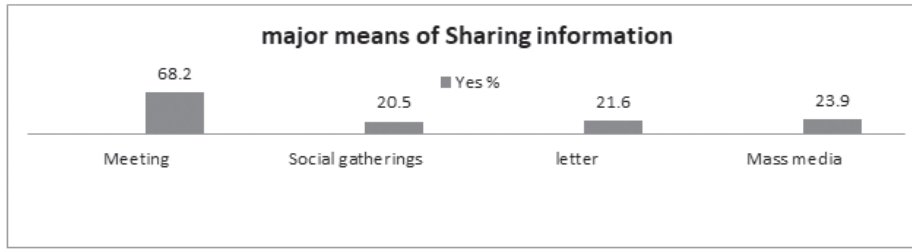
No.	challenges of stakeholders in Sesame and sorghum seed supply system	Strongly disagrees %	Disagree %	Partially agree %	Agree %	Strongly agree %
1	Lack of interest to exchange information	15.9	28.4	37.5	12.5	5.7
2	Lack of awareness about seed supply	14.8	33	30.7	13.6	8
3	Lack of Trusted seed sources	12.5	34.1	43.2	5.7	4.5
4	Lack of credit access	10.2	12.5	27.3	19.3	30.7
5	Poor communication among stakeholders	5.7	20.5	34.1	22.7	17
6	Poor selection, distribution, storage mechanism	5.7	12.5	30.7	37.5	13.6

Source: Survey Data 2017/18

Means of Sharing Information by the stakeholders

Communication enables Stakeholders to transfer, share, and use information that available when it is required. Stakeholders in the study area have been using different ways of knowledge and information sharing techniques. According to the survey results, 68.2 per cent of the respondents confirmed that they have been using the meeting to share information, 23.9 per cent mass media, 21.6per cent letters and 20.5per cent social gatherings based on the frequency of contact and sources of information. Information can be also disseminated and shared through the delivery of various sources such as training, field days, demonstrations, experience sharing, market.

Figure 1: Means of Sharing Information



Source: Survey Data 2017/18

Conclusion and Recommendations

Conclusion

The study was designed to analyze the integration of stakeholders in the Sorghum and Sesame seed supply system and identify the challenges of the Sesame and sorghum seed supply system in the study area. To achieve these objectives, a household survey from 88 sample respondents, 12 focus group discussion participants to collect data from Metema and Quara districts. The data were analyzed and discussed using appropriate statistical techniques (descriptive statistics). Based on the survey result, it can be concluded that stakeholders' integration in major activities (Problem identification, planning, implementing the activities, monitoring, and evaluation of the activities and documentation of best practices) were found to be poor. The survey result also indicates that lack of interest to exchange information, lack of credit access, poor communication among stakeholders, lack of trusted seed sources, poor selection, distribution, storage mechanism are hindering the integration of stakeholders in the study area. Since, smallholder farmers are the ultimate users of sesame and sorghum seed, and therefore a participatory approach is critical in all stages and sectors of the seed system.

Recommendations

* The results of the study indicate that stakeholders' integration in Problem identification, planning, implementing the activities, monitoring, evaluation of the activities and documentation of best practices is not *satisfactory. Hence,* the stakeholders should

work in an integrated manner to improve the seed supply system of sesame and sorghum ultimately address the problem of duplication of efforts in the study area.

* Lack of interest to exchange information, lack of credit access, poor communication among stakeholders, lack of trusted seed sources, poor selection, distribution, storage mechanism were identified as the major challenges hindering the integration of stakeholders in the study area. Hence, the stakeholders need to work hard to address the existing challenges to improve the seed supply of Sesame and Sorghum.

* The FGD result confirmed that a variety trial activities were not carried out based on the needs of rural farming community. Hence, to consider the needs of farmers, the Gondar Research center should conduct a variety need assessment in the study area.

* The existing Seed multiplication cooperatives should be strengthened and additional Seed multiplication cooperatives should be organized for addressing the seed supply shortage in the study area. Hence, the district Environmental protection office, land administration office, and cooperative promotion office should work together to strengthen Work Amba Seed multiplication cooperative.

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References

Alemu, D. (2010). Seed system potential in Ethiopia: Constraints and opportunities for enhancing the seed sector. International Food Policy Research Institute.

Alemu, D. (2011). Farmer-based seed multiplication in the Ethiopian system: Approaches, priorities, and performance. Future Agricultures Working Paper 036.

Agricultural Transformation Agency (ATA). (2015). Seed system development strategy: Vision, systemic challenges, and prioritized interventions. Ethiopian Agricultural Transformation Agency (ATA). Working strategy document, Addis Ababa, Ethiopia.

Atilaw, A., and L. Korbu. (2011). The recent development in seed systems of Ethiopia. In Improving farmers' access to seed empowering farmers' innovation. Series No. 1, edited by D. Alemu, S. Kiyoshi, and A. Kirub, 13-30. Addis Ababa, Ethiopia: JICA.

Bishaw, Z., Y. Sahlu, & B. Simane. (2008). The status of the Ethiopian seed industry and the role of the Ethiopian Seed Enterprise. In: Farmers' seeds and varieties: supporting informal seed supply in Ethiopia. 23-33. Wageningen: Wageningen International.

Bishaw, Z., and N. Louwaars. (2012). Evolution of seed policy and strategies and implications for Ethiopian seed systems development. In Defining moments of the Ethiopian seed sector, edited by A. T. Wold, A. Fikre, D. Alemu, L. Desalegn, and A. Kirub, 31-60. Addis Ababa, Ethiopia: Ethiopian Institute of Agricultural Research.

Central Statistical Authority of Ethiopia (CSA). (2005-2010). Annual Agricultural Sample Survey Report. Addis Ababa, Ethiopia.

Food and Agricultural Organization (FAO).(2006). Crop and Food supply assessment mission to Ethiopia

Hassen, M., and L. Dessalegn. (2011). Assessment of the Ethiopian seed sector. Paper presented at the African seed and biotechnology program: Integrated Seed Sector Development in Africa workshop, Kampala, Uganda.

Hassen, M., T. Dessalegn, F. Abay, and M. H. Thijssen. (2013). Participatory varietal selection for enhancing farmers' access to quality seed in Ethiopia. In Community Biodiversity Management-promoting resilience and the conservation of plant genetic resources, edited by W. S. De Boef, A. Subedi, N. Peroni, M. T. Thijssen, and E. O'Keeffe, 279-84. New York, USA: Earthscan, Routledge.

Integrated Seed Sector Development (ISSD). (2012). ISSD Africa-Ethiopian seed systems assessment. ISSD Briefing Note-ISSD Assessment Ethiopia, Wageningen UR, Wageningen, The Netherlands.

Integrated Seed Sector Development (ISSD). (2016). Program on integrated seed sector development in Ethiopia. 2015 annual report. Wageningen: Centre for Development Innovation, Wageningen UR, Wageningen, The Netherlands.

Thijssen, M., Z. Bishaw, A. Beshir, and W. S. De Boef. (2008). Farmers, seeds and varieties: Supporting informal seed supply in Ethiopia. Wageningen, The Netherlands: Wageningen International