

Assesment of Teff [*Eragrostis tef* (Zucc.) Trotter] Seed Production in Local Seed Business at Halaba Special Woreda and Meskan Woreda, South Ethiopia

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ABSTRACT: The Meskan and Halaba Special Woredas are among Teff producing areas of South Nations Nationalities and Peoples Regional State. Despite the fact that Woredas possess a potential for Teff production, the productivity is low due to input and quality seed related problems. Tseeday (Cr-37) and Quncho (Cr-387) are the major Teff varieties grown in Halaba Special Woreda and Meskan Woreda respectively. From the survey conducted it was observed that those farmers participating in the two cooperatives were better seed secured than non-participant ones. Participant farmers used separate plot for seed production and performed extra special activity for seed production including isolation and rouging out of off types or undesirable plants. The certification practice in the region is erratic because there are only two quality control centers in the region that they could not cover all the seed production area. All the participants have produced seed contractually in the past. In this study it was vividly observed that farmers participating in the two local seed Business cooperatives in Halaba special Woreda and Meskan Woreda had the edge towards having better performance in production of Teff.

Keywords: Contractual seed production, seed health, seed vigour

In Ethiopia, Teff (*Eragrostis tef*) is the most important crop in area coverage and number of farmers engaged in its production. In 2010/2011 meher season alone 2,761,190.05 ha of land was covered under Teff with 6,235,502 peasants [1]. Teff is an important cash crop for small holder farmers in most cereal based farming systems of Ethiopia [2].

Integrated seed sector development (ISSD) is currently being carried out to improve the access to quality seed by farmers through strengthening of informal and formal seed systems since 2009. The project is aimed to enhance pluralism by matching food and seed security to private sector development. ISSD guides specific interventions in identified seed systems. It supports local seed business targeting crops for which improved varieties are available but lack of established marketing mechanisms because these are neglected

by the larger seed companies [3]. In phase I of the programme (2009-2011), 34 farmers' groups were successfully supported in their production of quality seed of both local and improved varieties, with the focus on crops with high local seed demand [4].

In addition to supporting local seed business, ISSD strives to strengthen these regional, national and/or international companies to produce and market quality seed of improved varieties of major food and cash crops in which one of the focus crops is Teff. The local seed business activities have been conducted in many sites including Halaba special Woreda and Meskan Woreda [3].

The Meskan and Halaba Special Woredas are among Teff producing areas of SNNPRGS. Despite the fact that Woredas possess a potential for Teff

production, the productivity is still found to be at very small level due to input and quality related problems. In Halaba Special Woreda Teff had very low productivity in quintal per hectare with 10.05 and in Gurage zone where Meskan Woreda belongs with 12.40. Both are less than the national yield of 12.81 quintals per hectare [5] and potential yield of demonstration plots (15.0 to 27.0) in quintals per hectare [6].

It was reported that from the breeder seed to the certified seed there is a critical quality problem; while the government pledged heavily on seed production, seed certification is very much lagging behind in South Nations Nationalities and Peoples Regional State. The present study was undertaken to investigate the level of seed quality assurance measurements taken in LSB in the two Woredas [7].

Therefore, the objective of the current research is to assess Teff seed production in Halaba and Meskan Woreda of South Ethiopia.

MATERIALS AND METHODS

Surveys

The survey was conducted in the Teff Producing sites of the local seed business cooperatives in both Halaba and Meskan Woredas. Participant farmers were purposefully selected from farmers who are members and produce Teff and 15 of them were randomly selected. Personal observation and questionnaire were utilized as data collecting tools and sample was collected from the storage facilities of the two cooperatives as well as their source seed for laboratory test. The survey included visiting the Sothern Nations Nationalities and Peoples Regional Bureau of Agriculture, Wolkite Plant Seed Quality Control Center and Durame Plant Seed Quality Control Center for they are the responsible bodies for inspection and certification in the region.

Questionnaire was used to assess the implementation of seed quality standards in the two Woredas. In Halaba special Woreda seed samples from 15 farmers out of 121 in total who produce Teff seed and were participating in the seed producing cooperative Napi Leka Nasi and

15 farmers who were not participating but produce Teff were purposefully selected. A total of 30 farmers were interviewed and qualitative data was collected. Similarly in Meskan Woreda, samples were collected from 15 farmers, out of 98 in total who participate in Zerfeyan seed producing cooperative as well as from 15 non-participants. The data was compared to check and see the progress in perception and actual application of seed production of LSB and non participants.

A total of sixty farmers were interviewed, thirty from Halaba Special Woreda and thirty from Meskan Woreda, of which fifteen each were participants of the SPCs and fifteen were non-participants using a semi structured questionnaire. Halaba Special Woreda and Meskan Woreda Agricultural Office experts were also questioned. Besides, the two quality control centers in Wolkite and Durame were also induced for the inspection of seed production.

Data analysis

SPSS (Statistical Package for Social Sciences Version 15.0) was used to analyze and report the results in descriptive statistics.

RESULTS AND DISCUSION

The results from the survey is presented and discussed below.

Socioeconomic Profile of Farmers Involved in Teff Seed Production

Farmers in the two seed producing cooperatives and non-participants

In the present study seed quality standard implementation was assessed by farmers in two local seed business seed producing cooperatives namely Napi-Leka-Nasi (NLN) in Halaba Special Woreda and Zerfeyan (ZER) in Meskan Woreda and were compared with the performance of non-participating farmers. From here onwards participants refer to farmers in the two cooperatives and non participants refer to farmers who are not members of either of the two cooperatives.

The result in table 1 below reveals that from

the sample of farmers taken those having an experience less than 20 years had constituted 76.67 % (23 out of 30) of the total participant farmers; where as 50% (15 out of 30) farmers who were non-participants had less than 20 years of experience. On the other hand, farmers having an experience of more than 20 years were only 23.33% of the participants, while farmers with the same level of experience constitute 50% of non participants. This could be taken as indication that younger farmers were more adoptive to innovation. But this was found negative with the finding of Weldehawaria [8]. Age was one of the demographic characteristics that influenced the decision to adopt new technologies. The age of a farmer was often used as a measure of his experience and experienced farmers are often expected to use

Table 1. Farmers' Teff production experience and their participation in the two cooperatives

	Participation from seed producing cooperative				
	Yes			No	
	No of years	Count	Row N %	Count	Row N %
Experience of farmers	0-10	14	70	6	30
	11-20	9	50	9	50
	21-30	4	40	6	60
	31-40	2	29	5	71
	41-50	1	20	4	80
Total	30			30	

modern technologies. This might help farmers to improve their crop production and productivity [8].

Table 2. Mean data of farmers' ages and experience in Teff production in Halaba Special Woreda and Meskan Woreda, South, Ethiopia in 2011/12 crop season (n=60)

	Minimum	Maximum	Mean	SD	Over 60 years
Age of the respondent	23	71	39.03	13.46	13.33%
Experience	3	50	19.20	12.37	

SD = Standard Deviation

The mean age of the respondents was 39.03 (SD=13.46) with minimum and maximum age of 23 and 71, respectively. Those over 60 years of age were 13.33% of the sample farmers (Table 2). The mean Teff producing experience of the respondents was 19.20 years (SD=12.37) with a minimum and maximum years of 3 and 50, respectively (Table 2).

Education of farmers in the sample population

Farmers making up the 68% in the study areas either have completed elementary (35 %) or are illiterates (33.3%). The rest 32% is distributed over 8.3% who have completed junior high school and 23.3% have completed high school (Table 3). The level of human capital available in a household (usually measured as the education of the head of household or the average education of working-age adults in the household) was strongly correlated with measures such as agricultural productivity, household income and nutritional outcomes all of which ultimately did affect household welfare and economic growth at the national level [9]. Education is one of the most important indicators, which increases farmer's ability to use effectively agriculture related information, the ability to participate in agricultural

Table 3. Educational status of 60 farmers in Halaba Special Woreda and Meskan Woreda during 2012

	Woreda of respondent		
	Halaba count	Meskan count	
Education of respondent	Elementary	10	11
	Juniour high	3	2
	High school	5	9
	Iliterate	12	8

activities and the ability for effective use of technologies [10].

In case of land distribution the most frequent amount of land are 0.5 ha, 0.75 ha and 2.00 ha, each having 15% and collectively constitute 45%

Table 4. Amount of land allotted for Tef in 2012 in ha in Meskan Woreda and Halaba special Woreda (N=30)

Land in hectare	Frequency	Percent
0.50	9	15.0
0.75	9	15.0
1.00	7	11.7
1.25	8	13.3
1.50	3	5.0
1.75	6	10.0
2.00	9	15.0
2.25	4	6.7
2.50	2	3.3
3.00	3	5.0
Total	60	100.0

The largest and the smallest land allotted for Tef from both Woredas was 3 ha and 0.5 ha respectively (Table 4).

percent of land allotted by farmers interviewed and who were cultivating Tef in 2012 cropping season.

IMPLEMENTATION OF SEED QUALITY STANDARDS

Varieties grown

In Halaba Special Woreda, Nepi Leka Nasi cooperative produces the variety Tseday (Cr-37) as a result most of the farmers in the Woreda have grown this variety. While in Meskan Woreda Zerfeyan cooperative have produced Quncho (Cr-387) and consequently the farmers in the Woreda have grown the same. As shown in Table 5 below, all the famers interviewed in Halaba Special Woreda produce Cr-37 and those in Meskan

Woreda did produce Cr-387 in 2011/2012 cropping season. This was because the seed producing cooperative in Halaba distributes only Tseday (Cr-37) as it was preferred by farmers in the Woreda while the Seed producing cooperative in Meskan distributes Quncho only for it is well known by farmers in the woreda.

Seed Source

Initial seed source before 2009: This is the year that the two SPCs (Seed Producing Cooperatives) were established. Initial source of seed for the farmers in the two Woredas was 100 % from informal seed supply 61.7 % by purchasing from other farmers while the rest 38.3% had their own stock which were saved from the previous year's production (Table 6). Zewdie (2004) also indicated that the informal sector was an initial source of modern wheat varieties for 57.8% of the farmers where seed was obtained from neighbours/other farmers (35.5%), relatives (6.9%) or local trading (15.4%). It was reported that the local market and other farmers had served as the main initial source of seed for wheat in eastern Ethiopia [11]. It was also recognized that relatively most small-scale farmers

Table 5. Tef varieties grown in Halaba Special Woreda and Meskan Woreda in 2011/2012 cropping season (n=60)

Woreda	Variety	Frequency	Percent
Halaba special	Cr-37	30	50.0
Meskan	Cr-387	30	50.0
	Total	60	100.0

(79.2%) had obtained seed of new wheat varieties from other farmers compared to large-scale farmers (69.8%) in Kenya [12].

Seed source in 2012: In Halaba Special Woreda and Meskan Woreda all the farmers who participated in the two cooperatives obtained their seed from the respective cooperatives while non participating farmers got from the Woreda agriculture office. The farmers in the cooperatives collect basic seed from their respective cooperative and produce certified-1 seed and then provide their respective Woredas for distribution to non

Table 6. Source of seed for initial and 2012 cropping season of the farmers in Halaba Special Woreda and Meskan Woreda, South Ethiopia

Seed Source	Initial before 2009 (n= 60)		2012 (n=60)	
	N	%	N	%
Own stock	23	38.3	-	-
Purchase from other farmer	37	61.7	-	-
NLN coop(Halaba Special Woreda)	-	-	15	25
Zer Coop(Meskan Woreda)	-	-	15	25
Halaba Special Woreda Agriculture office	15	15	25	25
Meskan Woreda Agriculture Office			15	25
Total	60	100	60	100

NLN coop = Nepi Leka Nasi seed producing cooperative, Zer coop =Zerfeyan Seed producing cooperative

participating farmers.

Generally, farmers raised issues on availability of seed both in quantity and quality with reasonable price and at proper time through a sound price and quality assurance system. There were farmers complaining specially on the issue

of availability of Teff seed at the proper time of planting. This should be well addressed as time is a crucial factor particularly in rain fed agriculture.

Out of the sixty farmers 57 of them purchased seed from a certified source and the rest 3 purchased from local seed source. 47.37 % of the

Table 7. Farmers' perception of seed source and frequency of purchasing certified seed and local seed (n=60)

Reason for purchasing CS (n=57)	n	%	Reason for purchasing LS (n=3)	n	%
High productivity	27	47.37	High productivity	-	
Marketability	10	17.54	Marketability	-	
Eligibility	9	15.79	Eligibility	-	
Seed quality	11	19.30	Seed quality	-	
Shorter distance	-	-	Shorter distance	3	100
Total	57	100	Total	3	100
Distance travelled to buy CS(n=57)			Distance travelled to buy LS(n=3)		
1.5 to 3 km	27	47.37	0.3 km	1	33.33
4 to 6km	30	52.63	1.5 km	2	66.67
Total	57	100	Total	3	100

CS=Certified Seed LS=Local Seed

farmers who purchased from a certified source had high productivity as a reason and 19.30%, 17.54%, and 15.79% had seed quality, marketability and eligibility as a reason respectively. The distance travelled by half of the respondents (52.63%; n=30) to buy certified seed was within 4 to 6 km radius. The rest 47.37 (n=27) travelled within 1.5 to 3 km (Table 7).

In western Ethiopia, some maize farmers travelled at least more than 10 km to obtain improved seed although there were differences among district [13]. Gamba reported that 21% of small-scale and 63% of large-scale farmers had travelled over a distance of 10 km to purchase seed [12]. Expensive seed price, lack of seed and seed quality problem were the major drawbacks that discouraged farmers to use the formal seed source. Gamba also reported that 66.7% of small-scale farmers and 68.4% of large-scale farmers did not adopt new varieties because of high seed price and seed unavailability, respectively [12].

TEFF SEED PRODUCTION

Farmers' concept on Teff seed production

There were 50% of the respondents who used separate plot for seed production. The rest 50%, i.e. all the non participants did not have separate plot for seed production (Table 8). The area of separate seed plot adopted by farmers did range from 0.25ha to 1.75 ha. The most frequent being 0.50 ha (30%; n=9) and the least frequent being jointly 1.25ha and 1.75ha constituting of 3.33% (n=1) each.

Similar to that of the separate plot scenario, 50% of the respondents i.e. 100% of the participant farmers did carry out special activity for seed production and all the non participants did not (table 9). These activities include isolation and rouging out of off types or undesirable plants. While 10% (n=3) of the farmers do extra activity in that they harvest the boarder raw for grain and the central rows for seed (Table 9). From the interview given to Halaba Special Woreda and Meskan Woreda agricultural offices experts and extension agents it was possible to understand that the experts give special training for seed producers in their respective Woredas. In addition

Napi Leka Nasi and Zerfeyan Seed Producing Cooperatives are giving to their members training on seed production that all of the participants acquired the basic principles of seed production.

Farmers who have produced seed contractually were 50% (participant farmers) of the respondents and then rest (non participating farmers) have no

Table 8. Farmers' use of separate plot for seed production

Separate plot for seed production	N	%
Yes	30	50
No	30	50
Total	60	100

Amount of plot for seed production(ha)		
0.25	6	20.00
0.50	9	30.00
0.75	8	26.67
1.00	5	16.67
1.25	1	3.33
1.75	1	3.33
Total	30	100

Table 9. Special activity done for seed production by farmers in Halaba Special Woreda and Meskan Woreda

Separate plot for seed production	N	%
Yes	30	50
No	30	50
Total	60	100

Type of activities (n=30)		
Isolation distance	30	100
Rouging out of off types	30	100
Harvesting boarder raw for grain	3	10

Contractual seed production

Table 10. Farmers' experience in contractual seed production

Contractual seed production(n=60)	N	%
Yes	30	50
No	30	50
Total	60	100
Time of contract (n=30)		
2009	15	50
2010	3	10
2011	4	13.33
2012	8	26.67
Like to have contractual production for non participating farmers		
Yes	30	100
No	-	-
Total	30	100

experience to this cause. From the participant farmers 50% of them had their contract in 2009, the rest 10%, 13.33% and 26.67% had their contract in 2010, 2011 and 2012 respectively. Moreover, the non participating farmers who did not have contractual agreement in the past had demanded for Contractual Seed Production (CSP) for the reasons of getting good quality seed, yield/income and to get on time all the recommended inputs (Table 10).

Person responsible for seed sorting were 56.67% only female farmers, 5% were all house hold members, and only 1.67% were male farmers. Time of sorting of the Teff seed were just after threshing for 75% cases and the rest 25% were just before planting (Table 11).

Farmers in the sampled area who replaced seeds of different Teff varieties were 51.67% in both Woredas. Most of the farmers did replace the varieties because of better seed quality and to get higher price in the market. As per farmers' reflection, a good quality of Teff seed have to meet

Table 11. Types of sorters and time of sorting, seed replacement and characteristics of quality Teff seed

Sorters of Tef seed	N	%
Female only	34	56.67
Male only	1	1.67
Both male and female	22	36.67
All hqus.e hold members	3	5
Time of sorting		
After threshing	45	75
Before planting	15	25
Replaced different Tef varieties once		
Yes	31	51.67
No	29	48.33
Characteristics of a good Tef seed		
Have both seed and food quality values	14	23.33
Marketability mainly seed color	11	18.33
High yield	5	8.33
All	30	50

18.33% said marketability or seed color, 23.33% said seed or food quality (palatability), and the rest 50% mentioned all. However, only 5% from both districts indicated that a good quality Teff seed should consist of higher production or yield (Table 11). Similarly, farmers mentioned similar characteristics of good quality seed during preference ranking of candidate varieties.

Seed storage and protection

Basic seed is the seed that has been produced directly from breeder seed or through pre-basic seed, while certified-1 seed is a seed that is produced seed from basic seed. The two seed producing cooperatives (SPC) had special packages for both basic seed and certified-1 seed. In the assessment it was observed that the two SPCs use

Table 12. Farmers Teff storage structure and protection

Storage place for seed/grain	n	%
In the house	40	66.67
In different store	20	33.33
Total	60	100
Pests in the store		
Rats	23	38.33
None	37	61.67
Total	60	100
Control measures		
Cats	12	52.17
Pesticide	7	30.43
Traps	4	17.39
Total	23	100

blue sack for basic seed and green sack for certified-1 labeled with the type of the variety the SPC produced by, date of production, and weight of the seed. From amongst the farmers interviewed, 66.67% (n=40) responded that they did store Teff seed and grain in the house and the rest 33.33% (n= 20) stored Teff in different stores.

Majority of the farmers in the two Woredas (66.67%; n=37) had not faced any pest attack in their stored Teff seed and grain. While the rest 38.33% (n=23) had rats in their store as problematic pests. From the farmers (n=23) having pest problem, 52.17% did use cats as control measure while the other 30.43% and 17.39% used pesticide and traps respectively (Table 12). Although, there were complaints about rats causing trouble; farmers responded that generally Teff has minimum storage constraints in that it is not attacked easily by weevils, like other crops. The Farmers did feel more comfortable storing Teff. Similarly, Teff can be stored for longer periods without being attacked by weevils. It was also possible to store in any local storing material. The two cooperatives i.e. Napi Leka Nasi and Zerfeyan use a common store for participating farmers.

The most frequent amount of Teff stored ranges from 14 to 33 quintals, with 22 farmers out of 60 making up 36.67% and the least being 74 to 90 quintals with only 5 farmers and 8.33% composition. While the most frequent number of quintals sold ranges from 10 to 29, constituting

Table 13. Quantity of Teff seed stored and sold after harvesting during 2011

Tef seed stored in qt	N	%
14-33	22	36.67
34-53	17	28.33
54-73	16	26.67
74-90	5	8.33
Total	60	100
Amount of Tef seed sold in qt		
10-29	24	40
30-49	15	25
50-79	18	30
80-99	3	5
Total	60	100

40%(n=24) of the respondents and the less frequent one was 80 to 99 in 2011 (Table 13).

Farmers in the Halaba Special Woreda Meskan Woreda did not either loan or give their seeds in exchange for labor and other things. All the 60

Table 14. Seed exchange among farmers

Way of exchange	N	%
Yes	-	-
No	60	100
Total	100	100
For labor and other things		
Yes	60	100
No	-	-
Total	60	100

farmers reflected that they were only selling or keeping their seed for the next cropping season (Table 14).

Considering cleaning methods 5% (n=3) of respondent farmers used hand, without any material support 56% (n=34) winnowing and sieving, 11.67% winnowing, sieving and by hand, only winnowing 26.67%. The reasons given by the respondents varied from the most frequent one

Table 15. Teff seed cleaning methods and reasons

Cleaning method	N	%
By hand	3	5
By winnowing and sieving	34	56.67
By winnowing, sieving and hand	7	11.67
By winnowing	16	26.67
Total	60	100
Reason for cleaning		
Improve quality	28	46.67
Remove weeds and other crops	13	21.67
Improve quality, remove weeds and other crops	15	25
Improve quality, remove weeds, small, broken and damaged seeds	4	6.67
Total	60	100

being to improve quality with a percentage of 46.67(n=28) and least frequent pling 6.67% to improve quality, remove weeds, small, broken damaged seeds (Table 15).

It was reported that about 52% and 17% of the farmers did clean their seed by hand-winnowing or hand-sieving, respectively, at planting time using hand-made tools to increase purity, reduce weed contamination or even remove insect damaged grains [14]. It was reported that about 47.4% farmers in the intermediate zone and 48.9% in the highland zone did clean their seeds to remove weeds [15].

Seed diversity, management and varietal selection criteria

The number of Teff varieties currently grown by the respondent farmers is Cr-37 (Tseday) and Cr-387 (Quncho) in Halaba Special Woreda and Meskan Woreda respectively. In Halaba from a total 30 famers, 29 of them responded that they did grow only the variety Cr-37 and one farmer was growing both Cr-37 and Cr-387. While in Meskan all the famers grew Cr-387.

Farmers reflected that they prefer to grow the varieties that are better adapted to the local environment and have market demand. 45% of farmers of the surveyed area reported change in the performance of the local cultivars and the rest 55% did not. As to the number of varieties grown, farmers rated 34% high, 31% medium and 11.67% low in the two Woredas (Table 16). In general, farmers in the sampled area were knowledgeable, skilled and confident on Teff genetic resources management activities thereby favoring the

Table 16. Teff varieties usually grown

Varieties	N	%
Cr-37	29	48.3
Cr-37 and Cr-387	1	1.7
Cr-387	30	50.0
Total	60	100.0

conservation and improvement of these materials on-farm. From the discussion, farmers pointed out that, there is no change in number and type of varieties grown.

The number of varieties grown by the fanners was rated from low, medium to high. In contrary, the loss of some traditional cultivars from the farming system was mainly attributed to the inability of old traditional cultivars to perform well under the changing environment [16].

Farmers did practice varietal or seed selection criteria such as lodging resistance (18.33%), seed color or marketability (35.00%), food quality high water-to-flour ratio (18.33%), high straw yield

Table 17. Change in performance of the local varieties, status of on-farm Teff genetic resource and varietal/seed selection criteria

Change in performance	N	%
Yes	27	45
No	33	55
Total	60	100
On farm genetic diversity		
High	34	56.67
Medium	19	31.67
Low	7	11.67
Total	60	100
Varietal/seed selection criteria		
Non-lodging	11	18.33
Seed color/marketability	21	35.00
Food quality or water-to-flour ratio	11	18.33
Straw yield or quality	10	16.67
Seed yield	7	11.67
Total	60	100

(16.67) % and quality (11.67%) in both Woreds (Table 17). As reported by the key informant, Teff seed selection was not based on individual plant observation. Similarly, farmers did select cultivars on the basis of criteria that will go well beyond the yield potential envisioned in conventional plant breeding schemes [17]. Lodging was the number one cause of yield loss in Teff [18].

Seed security

From the survey conducted it was observed that those farmers participating in the two cooperatives were better seed secured than the non-participant ones. From the 34 seed secured farmers only 4 of them are non-participants while 30 of them are participants (100%). All 26 of seed insecured farmers were non-participants. It might be taken

Table 18. Seed security and reason for seed insecurity

Seed secured	N	%
Yes	34	56.67
No	26	43.33
Total	60	100
Reason for seed insecurity		
Shortage of seed supply	8	30.77
Selling all out	7	26.92
Post harvest problem	11	42.31
Total	26	100

as an indication of the cooperatives performing well towards better access of seed to the farmers (Table 18).

From the 26 farmers, 30.77% of the respondents faced seed insecurity, 30.77% due to shortage of seed supply, 26.92% due to selling out all seed while 42.31% were due to post harvest problem (Table 18).

Seed certification

The minimum seed certification standard is already set by Ethiopian Standard Agency. Regional Bureau of Agriculture have the mandate to give license to seed growers, processing plants and seed fields in its region [19].

From the interview of the SNNPRS Bureau of Agriculture it was indicated that seed certification is done by the quality control centers in the region. There are two centers responsible namely, Wolkite Plant Seed Quality Control Center and Durame Plant Seed Quality Control Center which conduct field inspection and assess conformity of seed quality standards. From the interview with the respective officers of the two centers, it was possible to understand that during field inspection of Teff seed production fields, the inspectors evaluate the fields for previous crops, off types, an isolation distance of 10 meters, cultivar purity, other crop plants, objectionable weeds and freedom from

certain designated diseases. The isolation distance of Teff is only 10 meters because Teff is self pollinated crop. The stages of field inspection are pre-flowering, flowering, post flowering, at maturity and at harvest. There is also storage inspection for left over seed, pests, proper packaging and arrangement of seed lots in the store. Moreover, the assessment for conformity of the seed from representative samples is carried out in the laboratories of the two centers. Seed quality procedures follow the ISTA rules which are adopted by Ethiopian Standard Agency.

CONCLUSION

This study was conducted to assess implementation of Teff seed production Status in Halaba Special Woreda and Meskan Woreda during 2011/2012 cropping season.

The weredas are among the major Teff producing areas of SNNPRG. Despite their potential for Teff production, the productivity is still found to be very low due to input and quality related problems.

All the initial source of seed for the two Woredas was from informal seed supply, 61.7 % being from purchasing from other farmers while the rest 38.3% had their own stocks which were saved from the previous year's production. In 2012 cropping season in Halaba Special Woreda and Meskan Woreda all the farmers who participated in the two cooperatives found their seed from the respective cooperatives while non participating farmers got from the their Woreda agriculture office

Among the surveyed farmers, 50% of the respondents used separate plot for seed production. The rest 50%, i.e. all the non participants did not have separate plot for seed production. Similar to that of the separate plot scenario, 50% of the respondents i.e. 100% of the participant farmers did carry out special activity for seed production and all the non participants did not. These activities included isolation and rouging out of off types or undesirable plants. While 10% (n=3) of the farmers did extra activity in that they harvested the border row for grain and the central rows for seed. This shows that there is an awareness created by Local Seed Business cooperatives towards

following proper seed production procedures.

Farmers who produced seed contractually were 50% (participant farmers) of the respondents. From the participant farmers 50% of them had their contract in 2009, the rest 10%, 13.33% and 26.67% had their contract in 2010, 2011, and 2012 respectively. Moreover, the non participating farmers who did not have contractual agreement in the past had demanded for Contractual Seed Production (CSP) for the reasons of getting good quality seed, yield/income and to get on time all the recommended inputs.

Considering seed storage, 66.67% (n=40) of the interviewed farmers stored Teff seed and grain in the house and the rest 33.33% (n=20) stored Teff in different stores. Majority of the farmers in the two Woredas (66.67%; n=37) had not faced any pest attack for their stored Teff seed and grain, while the rest 33.33% (n=23) had rats in their store as a problematic pest. From the farmers (n=23) having pest problem, 52.17% used cats as control measure while the other 30.43% and 17.39% used pesticides and traps respectively.

For seed cleaning, 5% (n=3) of farmers did by hand, 56% (n=34) did winnowing and sieving, 11.67% winnowing, sieving and also by hand, while only winnowing was done by 26.67%. The most frequent reason (46.67% (n=28)) was to improve quality, remove weeds, and small broken/damaged seeds.

Farmers reflected the need for variety selection that fit better to the local environment and have market demand. Accordingly, 45% of farmers of the surveyed area noted change in the performance of the local cultivars and the rest 55% did not. In general, farmers on the sampled area were knowledgeable, skilled and were confident in knowledge on Teff varieties thereby favoring the conservation and improvement of these materials on-farm. There is no change in number and type of varieties grown.

From the survey conducted, it was observed that those farmers participating in the two cooperatives were better seed secured than non-participant ones. From the 34 seed secured farmers only 4 of them were non-participants while 30 of them were participants (100%). All 26 of seed

insecured farmers were non-participants. This might be taken as an indication of the cooperatives performing well towards better access of seed by the farmers.

In SNNPRG there are two centers namely, Wolkite Plant Seed Quality Control Center and Durame Plant Seed Quality Control Center which conduct field inspection and assess conformity of seed quality standards. In the region, these two are the only seed quality control centers and they face a problem of insufficient number of personnel, lack resources, have limited infrastructure and has an issue of authority and autonomy to address the issue of quality assurance in the region.

In this study it was vividly observed that farmers participating in the two local seed Business cooperatives in Halaba special Woreda and Meskan Woreda had the edge towards having better performance in production of Teff. Therefore it is very essential to consider sharing the experience of the participant farmers in the two Woredas to that of the non participant ones.

The certification practice in the region is erratic because there are only two quality control centers in the region and they could not cover all the seed production areas.

REFERENCES

1. CSA (2011). Agricultural Sample Survey 2010/2011. Volume I. Report on area and production of crops: Private peasant holdings, *Meher* season. Statistical Bulletin. Addis Ababa.
2. SETOTAW FEREDÉ (2011). Technological Change & Economic Viability in Teff Production, Proceedings of the Second International Workshop, November 7-9, 2011, Debre Zeit Ethiopia.
3. WALTER DE BOEF AND MARJA THIJSSSEN (2010). The principles autonomy and entrepreneurship guide the strengthening of LSB development in Ethiopia, Local Seed business newsletter.
4. MARJA THIJSSSEN AND GARETH BORMAN (2012). Integrated Seed Sector Development in Ethiopia: Phase II, Local Seed Business Newsletter.
5. CSA (2012). Agricultural Sample Survey 2011/2012. Volume I. Report on area and production of crops: Private peasant holdings, *Meher* season. Statistical Bulletin. Addis Ababa.
6. DAWIT ALEMU, S RASHID AND R TRIPP (2010). Seed system potential in Ethiopia: Constraints and opportunities for enhancing the seed sector. International Food Policy Research Institute. Washington DC. 62pp.
7. HAILE DOLANGO AND MOHAMMED HASSENA (2010). Partnership Building for Local Seed Business Development in SNNPR. Local Seed Business Newsletter.
8. WELDEHAWARIAT ASSEFA (2011). Seed System and Quality of Bread Wheat (*Triticum aestivum* L.) in Deguatemben and Ofla Weredas of Tigray, Ethiopia. An M.Sc. Thesis Presented to the School of Graduate Studies of Haramaya University, Ethiopia.
9. WORLD BANK (2007). *World Development Report 2008. Agriculture for development*. Washington, DC.
10. BRIKTI FEREDÉ (2011). Seed system and quality analysis of groundnut (*Arachis hypogaea* L.), in Babile Woreda, Eastern Ethiopia. An M.Sc. Thesis Presented to the School of Graduate Studies of Haramaya University, Ethiopia.
11. ENSERMU R, W MWANGI, H VERKUIJL, M HASSENA AND Z ALEMAYEHU (1998). Farmers' wheat seed sources and seed management in Chilalo *awraja*, Ethiopia. CIMMYT, Mexico and IAR, Ethiopia, 36 pp.
12. GAMBA P., C NGUGI, H VERKUIJL, W MWANGI AND F KIRISWA (1999). Wheat farmers' seed management and varietal adoption in Kenya, 53-62. In: Tenth regional wheat workshop for Eastern, Central and Southern Africa, 14-18 Sep 1998, University of Stellenbosch, South Africa. CIMMYT, Addis Ababa, Ethiopia.
13. GEMEDA A, G ABOMA, H VERKUIJL AND W MWANGI (2001). Farmers' maize seed systems in Western Oromia, Ethiopia. CIMMYT, Mexico and IAR, Ethiopia. 22 pp.
14. ZEWDIE B (2004). Wheat and barley seed system in Ethiopia and Syria. PhD Thesis, Wagenigen University, Netherlands.
15. HAILYE A, H VERKUIJL, W MWANGI AND A YALEW (1998). Farmers' wheat seed sources and seed management in the Enebsie area, Ethiopia. CIMMYT, Mexico and EARO, Ethiopia. 32 pp.
16. KIROS M, N GEBEREMICHAEL, B TESFAY AND M KEBEDE (2009). Seed System Impact and crop biodiversity in the dry lands of Southern Tigray, Tigray Agricultural Research Institute (TARI), Ethiopia.

17. HAUGERUD A AND M COLLINSON (1990). Plants, genes and people: improving the relevance of plant breeding in Africa. *Experimental Agriculture* **26**: 34 1-362.
18. ASSEFA K., J K YU, M ZEID, G BELAY, H TEFERA AND M E SORRELLS (2011). Breeding Teff [*Eragrostis tef* (Zucc.) Trotter]: conventional and molecular approaches. *Plant Breeding*, **130**: 1-9.
19. MINISTRY OF AGRICULTURE (2013). Ethiopian Seed Proclamation. No 787/2013.