

## Participatory On-farm Evaluation and Demonstration of Groundnut Varieties in Abaya Woreda of Borana Zone

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### Abstract

*The research activity was carried out with the objective of evaluating and identifying adaptable and improved groundnut varieties and to familiarize farmers with groundnut production techniques. It was executed at Abaya woreda of Borana Zone for two years (2012/13-2014/15). A multidisciplinary team composed of breeder, pathologist, agronomist and agricultural extensionist was closely working both with the farmers and woreda agricultural experts and DAs. Regular visits, trainings and field days were conducted to provide for interaction among researchers, extension workers and farmers. The variety selection process was carried out from different dimensions including utilization, marketing and field performance. In general, color, size, market demand were identified as important farmer criteria. The other important criteria were related to field performance of the variety that includes: yield and tolerance to disease and insect pest followed by maturity period. Using these criteria the farmers identified varieties that suit their respective location. Accordingly, Abaya farmers showed special interest to Tole-1, Fayo and NC4x. The most interesting part of the finding was that most of the varieties preferred from utilization and marketing angle were also found superior in their field performance. Side by side, with the aim of strengthening local availability of seeds of preferred varieties, farmer based seed production was launched and the seed produced thereby was distributed both in cash and kind from farmers to farmers. Moreover, by way of revolving seed it was attempted to redistribute the seed to other non participant farmers in the area. In so doing both awareness and access to the technology was improved.*

**Key Words:** Participatory on-farm evaluation, demonstration, groundnut, Tole-1, Fayo and NC4x

## Introduction

Ground nuts are grown as oil crops and grain legume crops. It is a major cash crop and widely grown in all in all tropical and subtropical region of the world for direct use as food, oil and high protein meal. Ground nuts are a warm season crop and need abundant sunshine and warm climate for their normal growth. They are adaptable to a wide range of climatic conditions, that completely intolerant to frost at any growth stage and require relatively high temperature throughout it's growing seasons. Although the plant requires adequate moistures during its growing seasons followed by distinctive dry seasons during pod ripen and maturity. As fruiting and pegging periods are critical times, adequate moistures should be available at these periods. Excessive moistures and high temperatures reduce the yield (Bulcha, 1992). On the other hand ground nuts may have substantial beneficial effects relative to non legume crops on immediately subsequent non legume crops, which may ascribed to soil nitrogen difference (Ethiopian Custom Authority, 2005). Ground nuts are extremely soil exhausting when nuts and entire top growth are harvested. Where the top growth is buried in to the soil after removing the nuts, the effect on the soil is less harmful.

Many groundnut varieties were adapted by the Pastoral and Dryland Agriculture Research Center in addressing the technology gap that fills both the market and consumption demand. Nevertheless, those technologies were not sufficiently introduced to all potential production sites. Recently released groundnut varieties (Tole-1, Fayo and NC4x) were also found potential for small farmers. The varieties were good yielder (up to 38.9Qt/ha) compared to previous ones and also have short maturity cycle (146 days), they pose an opportunity for the farmers who at times hardly wait too long to feed the family, especially in Borana lowlands where moisture is a limiting factor for crop production. On the other side, most of the farming community had little chance to know and make own choice from the ranges of available groundnut varieties adapted.

Therefore, this activity was designed to evaluate and demonstrate improved groundnut varieties and seed production techniques to farmers in major groundnut growing areas of Borana Zone, particularly, in Abaya Districts.

## Methodology

### Description of the study area

Abeya (Semero) is also found in southern Ethiopian rift valley 367km away from Addis Ababa. It has an altitude of 1641 masl, annual rain fall ranging from 900mm to 1400mm and temperature 16-28<sup>0</sup>C. It is characterized by black paddy clay soil.

### **Site and farmers' selection**

The activity was carried out in Abaya District of Borana Zone purposively selected based on potential in groundnut production. It was implemented for two years (2012/13-2014/15): the first year focused mainly on evaluation and identification of the best varieties for the respective sites while farmer based seed multiplication of the best (preferred) varieties was done in the following year.

There were 16 participating farmers in the study based on their interest towards the technologies, willingness to manage and allocate field trial for the activity. The woreda agricultural office experts and Development Agents (DA) had also taken part in the implementation process.

Multidisciplinary team composed of an Agricultural Extensionist, crop breeder, Pathologist, Entomologist and Agronomist were in charge of this activity.

### **Research design**

Three different groundnut varieties Tole-1, Fayo and NC4x were used. The trial was carried out on selected farmers fields in such a way that three improved varieties were planted side by side on equal sized plots (10m x 10m) replicated by the number of participant farmers. The improved varieties used in each site were the ones ranked first, second and third by bio-physical researchers during the on-station adaptation trial process.

### **Technology evaluation and demonstration methods**

The evaluation and demonstration of the trials were implemented on farmers' fields to create awareness about the groundnut varieties. The evaluation and demonstration of the trials was followed process demonstration approach by involving FRGs, development agents and experts at different growth stage of the crop. The activity was jointly monitored by FRGs, researchers, experts and development agents.

### **Data collection**

During life span of the activity data like yield of the crop and farmers preference toward the crop were collected through supervision and organizing mini field day by researchers and DA of the respective kebeles.

### **Data analysis**

The collected data (quantitative data) were analyzed by using average and frequency distribution while qualitative data were analyzed using descriptive statistics and preference ranking.

## Results and Discussion

### Training of farmers and other stakeholders

Trainings were organized in 2013 and 2014 to orient farmers, DAs and district agricultural office experts about the technical and related matters of the trial to be executed (Table 1). Moreover, tailor made training was also organized to meet specific needs/gaps observed in the implementation/management of the activity. This includes both theoretical and practical types of training. The following table illustrates the number of farmers, DAs and experts participated on the training.

Table 1: Training of farmers and other stakeholders

Year	Participants					
	Experts (DA + SMS)			Farmers		
	Male	Female	Total	Male	Female	Total
2013	2	-	2	12	4	16
2014	1	1	2	15	3	18

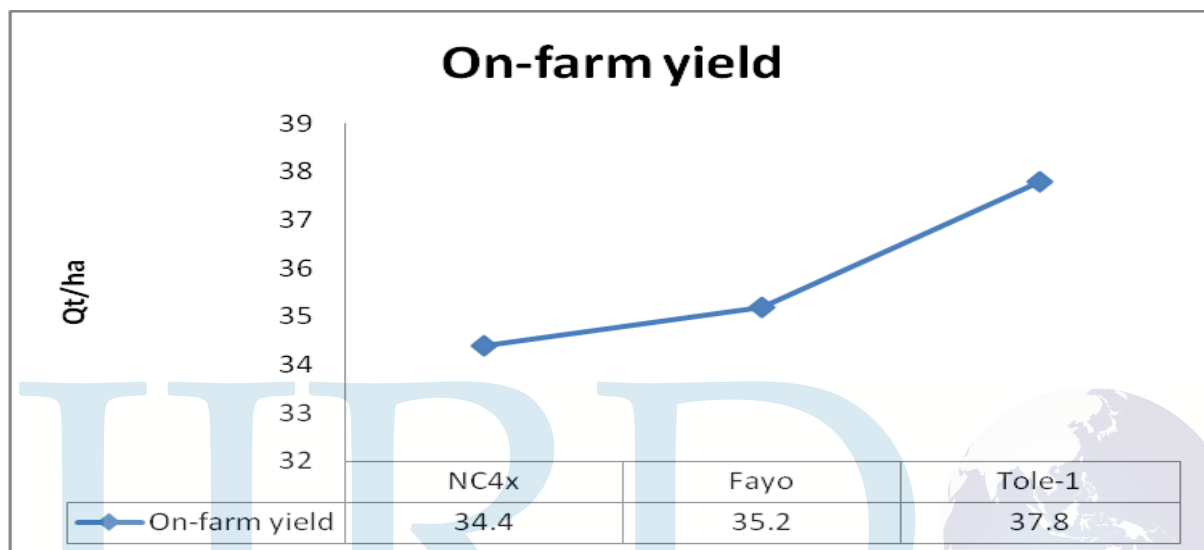
### Farmers' and other stakeholders' participation in demonstration

The participating farmers (12 male and 4 female) were in general given the role of carrying out the actual field activity on their own land as per the agreement reached at a joint planning stage. The trial farmers followed up the trial and recorded their observation on the treatments. They also took part in multiplication of best preferred varieties.

Field visits were conducted every fortnight with a team of researchers, DAs and occasionally with Woreda agricultural office experts. Woreda experts usually participated in a scheduled meetings usually conducted at planning field activity, after planting, mid season and after harvest (evaluative meeting).

## Agronomic and yield performance

The varieties ranked from first to third in respective sites (Table 1) were evaluated for their field performance. In some of the sites, the varieties selected just by using their physical (color, size), chemical (taste) and market also exhibited outstanding field performance. Below are presented the results from the field of trial sites.



**Figure 1:** Average Yield of groundnut varieties, Abaya, 2012/13 and 2013/14

In Abaya at Samaro PA the varieties tested with sixteen trial farmers as indicated earlier were Tole-1, Fayo and NC4x variety. As shown in fig 1, Tole-1 had the highest (37 Qt/ha) yield followed by Fayo (35 Qt/ha) and NC4x (34 Qt/ha).

## Enhancing Access to Seeds of Farmer Preferred Varieties

Following the selection of varieties by the trial farmers, an arrangement was made to produce the seed on farmers' field thereby improve access to the technology by the surrounding farmers. In addition, events, such as field days were organized to create awareness and interest in surrounding non trial farmers.

All the varieties were multiplied by the trial farmers in respective sites. The amount of seed produced is indicated in Table 2. However, it should be noted that the figure indicated on the quantity of seed produced refers to what the research team had followed up, otherwise, the farmers had produced more from the seeds they harvested in the previous year.

The seed provided for each farmer was collected and revolved to the non trial farmers in respective sites. The information on the quantity of seed produced was also shared to the respective district agricultural offices to facilitate the dissemination of the technology from farmers to farmers. It was reported from farmers (Abaya) that there was a temptation on their side to sell the seed as a grain to traders due to problems associated to storage pest. The situation was communicated with respective district agricultural office to consider arrangements (to facilitate) whereby the seeds can be passed to surrounding farmers on cash, credit or any other possible means.

**Table 2:** Quantity of seed produced by farmers

Location	Variety	Quantity produced(Kg)	Number of farmers involved	Remark
Abaya	Tole-1	98	3	There was unaccounted seed of Tole-1 produced by the farmers using last year's harvest
	Fayo	87	2	
	NC4x	85	2	

### Farmers' opinion/perception

Based on discussion with the trial farmers the following selection criteria were identified. These include physical characteristics (size/shape); chemical characteristics (taste); field (agronomic) traits, yield, maturity period, tolerance/resistance to disease and insect pests, germination, growth habit (vigor) and demand in the local market which is basically a reflection of the combination of preferences for certain physical and chemical characteristics.

Based on color, size, taste and marketability as the first selection criteria the farmers in the trial sites ranked the groundnut varieties as indicated in Table 3. During the selection process, it was recognized that size/shape, taste as well as yield were the most important criteria of the farmers. Market value was also another important criterion, however, it is basically, a reflection of the preferences of the above criteria.

**Table 3:** Rank of different groundnut varieties as evaluated by farmers at the trial sites

Varieties	Bule Hora farmers (N-16)					Rank
	Grain size	Disease resistant	Market preference	Sweetness	Yield	
	No.	No.	No.	No.	No.	
Tole-1	7	7	6	8	8	1
Fayo	5	6	8	6	5	2
NC4x	4	3	2	2	3	3

## Conclusion and Recommendation

### Conclusion

The major variety selection criteria of farmers in the trial sites were almost similar except in very few cases where they vary in level of emphasis to a particular criterion. In general, color, size, taste, market demand were identified as important farmer criteria. The other important criteria were related to field performance of the variety that includes: yield and tolerance to disease and pest followed by maturity period. The farmers have identified, using the above criteria, the varieties that suits their respective location. Accordingly, the farmers showed special interest to Tole-1, Fayo and NC4x.

### Recommendation

Based on the preference showed by the farmers and field performance of the varieties Tole-1, Fayo and NC4x are the first three recommended Ground nut varieties for mid altitudes and moisture sufficient areas of Borana lowlands.

Ensuring active involvement of the respective woreda agricultural offices is critical in sustaining the activity. Accordingly, they should take active part from planning through evaluation of demonstration activities. This can fill up the gap that may possibly arise due to change of DAs or any extension staff from operation site and also due to capacity limitation from the side of research institutes.

It is essential to ensure, from the beginning, clear understanding of extension approach to actors (farmers, extension workers, researchers and others) involved. This is believed to have a strategic implication for sustainability of the intervention. The idea of cost sharing and capacity development should have a clear and strong footing early in the beginning to facilitate psychological preparation against the notion of free gift and dependency.

Designing a mechanism whereby the extension workers' contribution in the demonstration activity would be recognized is also central to motivate the extension staffs involvement. In this line, creating a sense of competition between DAs, Experts, trial farmers (among and within groups) and open recognition via reward to outstanding groups/individuals can be one of the potential means.

In order to ensure and sustain availability of seeds of the preferred varieties through farmer based seed production, there should be a viable storage technology/facility.

Despite the high yield potential of preferred varieties in respective woredas, absence of enough market information system leaves no option for incentive to continue production. Thus there need to be a mechanism put in place to provide market information for the farmers.

The farmers have now developed a better capacity in identifying best varieties and management practices of groundnut, thus they should be given the opportunity to share their experience to other farmers thereby strengthen farmer to farmer extension.

As the preference of the farmers in the trial sites have already been identified, it will be productive if the extension service consider farmers' preferences in varietal promotion activity.

### References

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