# Forage Seed Production and Multiplication through Farmers' Research Group in Adami Tulu and Arsi-Negelle Districts

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Abstract

In Ethiopia, forage seeds are mainly supplied to farmers by government and non-government organizations (NGOs) in unsustainable manner. As an alternative option to this, the Adami Tulu agricultural research centre in collaboration with JICA undertook participatory community based forage seed production study using farmer research group approach for two years (2008 main growing season and 2009 main growing season and using irrigation) in Adami Tulu and Arsi-Negelle districts. Generally, 10-13 farmers at Arsi-Negelle and 9-14 farmers in Adami Tulu were involved in the project and the main forage species used were Lablab, Napier grass, Alfalfa, Cowpea, Cajanus and Vetch (Arsi-Negelle). It was learned that farmers are capable of producing forage seeds and sold the forage seeds at a price of 40 birr/kg (2008) and 25-40 birr/kg (2009) which contributed substantially to their income. With the money they got, some farmers bought water pumps, constructed houses, bought household equipments like radios. It is recommended that farmers better organize themselves in the form of cooperatives, have a shop in the town, reduce the prices of forge seeds for larger dissemination among the farming community, and have dual purpose in forage production (increased livestock production and seed production).

## 1. Introduction

One of the bottlenecks to increase livestock production in Ethiopia is the shortage of feed for different animal species. In order to improve the shortage of livestock feed in crop livestock production system, it is important for farmers to integrate forage production in the farming system. Establishing reliable forage production depends on the availability of reliable supplies of quality forage seeds/cuttings (Alemayehu, 1997; FRG, 2008) and locally producing forage seed ensures sustainability and it is economical. Many different organizations are requesting seeds of different forage species from Adami Tulu research centre. Nevertheless, the centre is unable to produce the seed that meets the demand for forage seeds. Even at a national scale, despite the presence of high demand, there is a critical shortage of forage seeds (MOARD, 2006; Kedir, 2008). One option could be the involvement of the community in the production of forage seeds with the support of government and non-government organizations with an ultimate goal of establishing a forage user group within the community. By linking community based seed production with a reliable market, it can be possible to sustain the production of different forage seeds. To this effect, production of forage seeds on a contractual agreement base had been tried by the fourth Livestock Development Project and was found to be successful (Alemayehu, 1997). However, it could not be sustainable in that it only provided basic seeds and technical support and then back collect seeds produced by farmers and sell to others and eventually the effort stopped when the project phased out. The principle of participatory community based forage seed production is taken from such concept in that producing forage seed at community level on farmers' participatory base (FRG, 2007) where the identification of the problem, evaluation and both linking market potential and/or local use as animal feed source.

Therefore, the objectives of this study are to assess the forage seed/cuttings production capability of farmers and develop the mechanisms of establishing community based forage seed/cuttings production

## 2. Approaches and Methodology

The approach we used in our study had three phases. The first phase which focused on assessing the demand for forage seeds had 3 sub-phases with different methodologies while the second phase which dealt with forage development strategy had two sub-phases. The last phase focused on ensuring sustainable back up forage seed supply and the methodologies for each are given below.

## 2.1. Phase 1: Assessing demand for seeds

### Consultation with senior forage agronomists and expertise

A consultation and discussion with the objectives of enriching the concept of community based seed production and the way forward was undertaken with senior forage agronomists and concerned expertise from the Ethiopian Institute of Agricultural Research (EIAR), Oromiya Agricultural Research Institute (OARI), and International Livestock Research Institute (ILRI). The outcomes of the consultation were:

- The entry point of forage production better be as soil conservation, animal feed and integrated with crop production.
- Regarding the forge seed demand, it was said that the demand and price is high whereas the supply is very low **(Table 1)**. This was mainly attributed to the coverage of the forage seed needs of the country by only International Livestock Research Institute (ILRI) where the supply is limited in quantity, timely not available and the price is high, which is unaffordable at small scale farmers.
- Regarding the strategy how to start, it was suggested to start with a few farmers on small lands with high competitive forage crops particularly with those engaged in dairy and beef production.
- The group was advised to have a collaboration work with MOA for forage seed quality seed certification. It was also indicated that as there is an emerging private investors engaging themselves in forage leaves and seed pack and export which is indicative in forage seed market availability.

Table 1 Forage seed request to ATARC from 2007-09 (ATARC)

| Forage type | Organization | Amount(kg) |
|---|---|---|
| Rhodes grass | Mension fur Mension | 10 |
| | ATJK MOA | 105 |
| | Akaki development coordinator | 55 |
| | Boset ARD | 30 |
| | Dire Dawa Catholic Relief | 100 |
| | Jijiga Pastoral Development | 164 |
| | Private | 2 |
| | Oromia Pastoralist Areas Development Commission | 30 |
| Lablab | Mension fur Mension | 5 |
| | ATJK MOA | 106 |
| | Mechara Research Center | >0.5 |
| | Boset ARD | 80 |
| | Debrebirhan ARC | 2 |
| | Dire Dawa Catholic Relief | 30 |
| | Jijiga pastoral development | 7200 |
| | Private | 1 |
| | Somali ARD | 150 |
| | Oromia pastoralist Area development commission | 43 |
| Cow pea | Mension for Mension | 5 |
| | Mechara Research Center | >0.5 |
| | ATJK MOA | 105 |
| | Diredewa catholic relief | 50 |
| | Private | 1 |
| | Somali ARD | 100 |
| | Gambella ARD | 1 |
| | ILRI- FAP | 100 |
| Citaria | Akaki development Coordinator | 65 |
| philaris | Akaki development coordinator | 65 |
| Stylosanthes | Mechara Research Center | >0.5 |
| vetch | Mechara Research Center | >0.5 |
| | Lome ARD | |
| | Jijiga Pastoral Development | 820 |
| | Somali ARD | 47 |

| | | |
|---|---|---|
| Desmodium | Mechara Research Center | >0.5 |
| Panicum | Boset ARD | 50 |
| Ciratro | Boset ARD | 45 |
| Cajanus cajan | Debrebirhan ARC | 2 |
| Elephant grass cuttings | Woliso Development coordinator | 15000 |
| | Mariam dairy farm | 18000 |
| | Meki catholic relief | 20000 |
| | Jijiga Pastoral Development | 76800 |
| | ATPSc | 3000 |
| Pigeon pea | Dire Dawa Catholic Relief | 25 |
| | Jijiga Pastoral Development | 820 |
| *Leucnea pallidea* | Jijiga Pastoral Development | 1025 |
| *Sesbania sesban* | Jijiga Pastoral Development | 1025 |
| All types | Debrezeit Research Center | |
| Alfalfa | Lome ARD | |

***Source :*** *Archive of Adami Tulu Research Center for the years 2007, 2008 and 2009*

### Discussion with ARD offices

A discussion was held with Arsi Negelle and Shashemene Agriculture and Rural Development (ARD) staffs as what their present forage production and development activities look like. It was found that they had forage seed multiplication program at Farmer Training Centre (FTC) sites for distributing it to farmers. In their forage production and development, the bottleneck problem is seed and budget shortage to quench the great seed demand by farmers.

The constraints indicated above with regard to forage development had an implication on the approaches to be followed to achieve what is desired. Accordingly, the study team followed an approach that in one way solves the problem of shortage of forage seed by making the farmers the actual producer of the needed forage seeds and on the other hand an approach that can contribute to increase the income of the farmers by directly selling the forage seeds and improving the productivity of his animals through better livestock feeding.

### Farmers' interest in forage seed production

In the first year, to understand and realize farmers' interest in forage production and development in particular to forage seed production, a PRA was conducted in two sites at Arsi Negelle PA called Gambiltu (rainfed) and Adami Tulu (irrigation), PAs of Abine and Bochesa. In the meeting, sixteen and nine farmers participated from Arsi Negelle and Adami Tulu districts, respectively. In Arsi Negelle, maize is the major cereal crop produced in the area followed by wheat since the rainfall pattern in the area is bimodal, the same land used for wheat production again used for vegetable production mainly potato whereas the land used for maize is only used for maize production throughout the year of production whereas maize, haricot bean, tef, barley and wheat are the common cereal crops produced in their order of importance in the Adami Tulu area during the main rainy season and vegetables like onion, pepper, and tomato using irrigation.

It was observed from the PRA that the number one problem in livestock raising was feed shortage and almost all of the respondents replied as forage seed supply is a serious problem not to go for forage production and development as a strategy of feed problem alleviation. From the discussion held, it was realized that farmers were obtaining forage seed from ARD and they were not advised or trained how to produce forage seed for use in the subsequent growing farming seasons or for marketing purpose. The ARD cannot supply forage seed regularly due to budget shortage, seed unavailability both in quantity and timely. Because of the serious feed shortage, the farmers responded as they can allocate land ranging from 0.125-0.25 ha for forage both for seed and animal feed.

## 2.2. Phase II Forage development strategy

### Looking for forage seed buyers

In an attempt made to look for potential seed buyers, one private investor interested in buying forage seed in the country was found and a discussion was held and the interest on the type of forge seed that farmers can produce was identified in the mean time. But, when the forage seeds were produced, the farmers obtained a better price for the seed produced and the seeds were sold to government and non-government organizations in both years.

Workshop and training supplied

A workshop and training was organized in the first year at the beginning of the study and the objectives were to technically equip the farmers how they can produce forage seeds primarily to use for themselves in subsequent growing season, for their animal feed and sell the rest as other cereal crops to generate additional income and to bring the buyers and producer at front. In the year 2008, ten farmers from Arsi Negelle (rain-fed) and twelve framers from Adami Tulu (from Edeokontola, Abine and Bochesa using irrigation that are dairy beneficiary of SEDA) willing, dairy cattle keepers were purposely selected, private seed buyer, NGO (SEDA), development agents, senior forage agronomists from previous staff of ILRI (Ato Abate Tedla) as guest and trainer and Adami Tulu researchers as trainers (economics, extensionist and forage agronomists) participated in the workshop and training. The training was provided on most promising productive species and to the interest of the buyer, a group discussion was held and each stakeholder shared their responsibilities. At the end of the discussion, two committees from farmer side representing the two sites were formed who would deal and fix the seed price that would be produced and to make a negotiation at the end with the forage seed buyer. As indicated above, because of the better price the farmers obtained during the first year, the idea of linking the community with the private investor was left out.

The various plantation strategies and improved forage species were raised and discussed with the farmers as source of animal feed and for the purpose soil fertility improvement. The strategy used was in soil erosion protection, soil fertility improvement, and integration with the main crop. In the Arsi Negelle, Napier was planted around water harvest pond to protect soil erosion, intercropping of lablab with maize, cowpea with sorghum and vetch with maize/sole crop whereas in Adami Tulu (using irrigation) Napier along the ridge of canal/intercropped with alfalfa, alfalfa sole cropping, lablab with maize/sole cropping.

At the end of the workshop, each stakeholder shared responsibilities in that the farmers will provide land, make the necessary land preparation and management and plantation and research center,

technically support the farmers , distribute basic forage seed and undertake monitoring, the DAs follow up the actual plantation and regular monitoring, NGO and ARD buy forage seed to support farmers initiation.

### 2.3. Phase III: Ensuring sustainable back up seed supply

To ensure sustainable forage seed supply for the community based forage seed production trial and for practically training of farmers at Adami Tulu Agricultural Research, the centre established those forage crops that are pertinent for the intended community.

## 3. Results and Discussions

### Promote Group Action and FRG

In order to improve the linkage among research, extension and farmers, and thereby help them function synergistically with an aim to bring significant change/transformation in the lives and livelihoods of resource poor farmers, there is a need to promote group action and formation of FRG. Accordingly, in the first year, two FRGs were formed containing ten farmers from Arsi Negelle (rain-fed) and twelve framers from Adami Tulu districts (Edeokontola, Abine and Bochesa PAs using irrigation and dairy beneficiary of SEDA) that were willing and dairy cattle keepers were purposely selected. In the second year, ten farmers from Arsi-Negelle and eight farmers from Adami Tulu participated in forage seed production

### Seed production and marketing

Lablab yield more seeds in Adami Tulu area than in Arsi Negelle. This is because of enough light or temperature for flower to set seed whereas in Arsi Negelle there was a continuous high rainfall that enabled the plant to have a more herbage yield (dry matter per ha). The establishment of Alfalfa was possible in both districts during the rainy season, however, failed to collect seed in the first year as it inherently needs deprivation of water after the onset of flower.

Nevertheless, in the second year, one farmer at Adami Tulu was able to produce two kg of Alfalfa. Similarly, a higher herbage yield was recorded in Arsi Negelle district because of the high rainfall. Concerning the growth of elephant grass the growth was noticed to be slow in Arsi Negelle. In all of the species selected and established in both districts, a lower seed yield and herbage was recorded as compared to the findings in literatures (Alemayehu, 1997).This could be due to absence of fertilizer application before the establishment to support its emergency and its subsequent growth.

Table 2. Seed production and marketing at Adami Tulu

| Parameters | 2008 (Rain-fed) | | 2009 (Irrigation) | | 2009 (Rain-fed) | | | |
|---|---|---|---|---|---|---|---|---|
| | Lablab | Alfalfa | Lablab | Cowpea | Lablab | Cowpea | Alfalfa | Cajanus |
| Seed Produced (kg) | 230 | No | 100 | 392 | 411 | 324 | 2 | 16 |
| Amount of seed sold (kg) | 230 | - | 100 | 392 | 358 | 324 | 2 | 16 |
| Unit price (Birr) /kg | 40 | - | 40 | 40 | 25-40 | 25-40 | 40 | 30-40 |
| Total price (Birr) | 9200 | - | 4000 | 15680 | 13820 | 9720 | 80 | 480 |
| Average land allocated (ha) | 0.22 | 0.02 | | | | | | |

Table 3. Seed production and marketing at Adami Tulu

| Parameters | 2008 rain season | 2009 rain season | | |
|---|---|---|---|---|
| | Vetch | Lablab | Cowpea | Vetch |
| Seed yield(kg/ha) | 160 | 120 | 20 | 25 |
| Amount of seed sold | 160 | - | 20 | 25 |
| Unit price | 40 | - | 25-40 | 40 |
| Total price | 6400 | - | 500 | 1000 |
| Average land allocated (ha) | 0.1 | 0.25 | 0.04 | |

All the forage seeds produced in the first year using rain-fed and irrigation were sold at 40 Birr/kg but in the second year the price

varied between 25 and 40 Birr with more of the produce sold at a price of 40 Birr (Tables 2 and 3).

Feeding improvement and economic impact implication

The land allocation for the aforementioned forage species ranges from 0.125 to 0.75 of a hectare where 75 % of the FRG farmers allocated on average 0.25 ha. This indicated that for the annual species (lablab & vetch), it was possible to obtain lablab residue of 3722.5 kg for farmers in Adami Tulu and 760 kg in Arsi Negelle, respectively. This can support 745 TLU (Tropical livestock unit) for a farmer in Adami Tulu and 152 TLU in Arsi Negelle district. Whereas for Alfalfa it can support 4512 TLU and 3648 TLU in Adami Tulu and Arsi Negelle districts, respectively (where the cutting frequencies were two times in a month and once in a month for Adami Tulu and Arsi Negelle districts, respectively). The FRG farmers engaged in the community based forage seed production by feeding their cows with green feed (alfalfa) and the residue the milk yield of their cows increased by 1- 2 liters /head.

## 4. Lessons Learnt

- Additional efforts are required to organize farmers in one form as the sale of forage seed does not have a regular market place as food crops
- For a proper sale of forage seed the establishment of market places in the town is important
- The start of forage production should have different utilities not only seed production for sale. But, increased quantity and quality of livestock feed need emphasis particularly for those who have crossbred dairy cows.
- Doing research with participation of farmers at all stages, different stakeholders, policy makers, etc are key indicators for successfulness and sustainability of certain technology.
- Farmers who have been trained for other activity, observed the ATARC forage demonstration site and impressed much and repeatedly asked to do as the centre does and they were

unfortunately selected as one of the farmer forage seed producers and are eventually found performing better.

- Choice of forage species that have high demand in the market must be made (For instance Cowpea is more preferred in the market than Lablab)

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