

000339



VOLUME II



**P**roceedings of the Second Biennial  
Conference of Ethiopian  
Horticultural Science Society

22 - 23 January 2009  
Addis Ababa, Ethiopia

**E  
H  
S  
S**



## **Experience, Challenge, and Future Prospects in Creating Sustainable Community-Based Informal Potato Seed Scheme and Associated Technologies in Parts of Western Amhara Region**

*Tesfaye Abebe, Baye Berihanna, Yazie Chanic, Gedif Mulugeta and Alemu Werku  
Potato Breeder, Agronomist, Technical Assistant, and Horticulturists at Adet Agricultural Research Center,  
P.O. Box-08, Bahir Dar, Ethiopia*

### **ABSTRACT**

*Seed is an important medium to enhance the production and productivity of food crops such as potato. Efforts directed at improving the performance of the agricultural sector should include among others the production of improved seed and its delivery system. Nonetheless, because of the absence of an official as well as standardized informal seed multiplication and delivery system, only 0.2% of the 164,146 hectares total land under potatoes production is planted with improved potato seed. This in turn resulted in the very low average productivity (5-8 t/ha) of the crop at both National and Regional levels. To avert this scenario an informal and community-based seed multiplication and distribution scheme was launched in parts of western Amhara Region in partnership with governmental and non-governmental organizations and farmers at six districts of three zones, viz. West Gojam, Agew Awi and South Gonder. This activity was initially started with small plot size (450m<sup>2</sup>) individual collaborative farmer's land organized under Farmers-Research-Extension Group (FREG) during 2004/05. Later it was scaled up to larger plots adjoined to each other in 2005/06, 2006/07 and 2007/08 cropping seasons. As part of the activity, a comprehensive training programme was organized for all the stakeholders drawn from the selected districts. Repeated field days were made to create awareness of these technologies among the farming community and development organizations. This has served as a vehicle for linking seed producers, ware crop growers and consumers which in turn created good opportunity for the marketing of produced seed. As a result seed growers were able to sale their seed tuber at a cost ranging from 300 through 500 birr/quintal. As a result of this price seed growers were able to earn from as low as 1, 500 birr through over 176,000 Birr. They were also able to pay back loans borrowed from the Amhara Credit and Saving Institute (ACSI), buying of ox, horse and dairy cow, construction of residence house, open a bank account and buy farm inputs on cash than on credit. This had resulted in a significant impact on the living conditions of the participating farmers. Besides, the number of seed growers has increased one year after the other observing the profitability of earlier participants. Hence, this study revealed the possibility of creating sustainable seed multiplication and delivery system for the expansion of potato production in the Region. This article highlights the results of this activity in light of its success, challenges, lessons learnt and future prospects of creating sustainable system in the Region.*

## INTRODUCTION

Potato (*Solanum tuberosum* L.) is among the leading vegetable crops in Ethiopia. According to the Central Agricultural Census Commission report about 164, 146 hectare of land is covered by potato in Ethiopia during the 2001 cropping season (CACC, 2003). The total volume of potato produced during this period was more than 940,209 tons. At a national level an average of 2,310,035 households are supported by potato during the stated period. Likewise, potato is among the widely grown food as well as income generating crops in the Amhara National Regional State (ANRS). It plays an important role in addressing the seasonal food deficit normally experienced during the months of August through September because of its short crop cycle (90-120 days) relative to other food crops (Aleligne *et al.*, 1992). The ANRS with its 71,000 hectares of potato per year is the leading potato producer in the nation. The total amount of potato produced from this area was 338,781 tons, which was estimated Birr 338,781,000 at the price of 1000 Birr/ton.

Despite the enormous role of potato in the country as well as the Region, the Regional average yield of potato during 2001cropping season was lower than the national average of 4.80 t/ha. Multiple factors have contributed for the low average tuber yield per hectare. Amongst which, availability of improved seed tuber of improved varieties precedes others. Seed is an important catalyst and the foundation for increased potato production and productivity. To this effect, efforts targeted at improving the performance of the agricultural sector should include, among others, seed production and delivery system. Nonetheless, the absence of an official or informal seed multiplying and disseminating body limited the area planted with improved potato seed to only 329 hectares of the total areas under potato (CACC, 2003). Hence, almost all area

is planted with late blight susceptible, low yielding and many generations recycled poor quality seed tubers of unknown origin. This in turn, has severely restricted the adoption and diffusion of improved varieties and associated technologies. Consequently, potato growers have not benefited from the massive public investments made to develop these technologies. Nonetheless, for seed producers there is ample opportunity considering the need for good quality potato seed. In Amhara Region alone, over 140 000 tons of seed tuber is needed at least every three to four years to cover the area under potatoes cultivation.

To ease this problem, an informal seed multiplication and dissemination is being used in many countries. This system is proved to meet over 90% of smallholder farmer's seed demand in Southern African countries (Monyo *et al.*, 2004). Such a decentralized seed production system is very effective for crops like potato that has high seeding rates and transport cost of moving seed over long distances and remote areas. Impressive success story is also registered by Agricultural Research Centers (ARC) within the country. Notable of these include the Holetta ARC efforts in central Showa on Potato, Melkasa ARC on Onion and Debre Zeit ARC on Lentil. Scaling-up of such experiences is crucial to meaningfully address the problems of seeds of improved varieties in the country. In doing so, efforts of all stakeholders involved in technology generation and dissemination need to be coordinated in an interdisciplinary and inter-institutional manner to effectively utilize the scarce resource and guarantee sustainability of the scheme. Consequently, this project was initiated:

- (1) To enhance the diffusion and adoption rate of improved potato varieties and their associated technologies and

- (2) To create access of improved potato varieties seeds that have table and processing quality for potato growers.

## Methodology

The process followed two levels of interventions; pilot level informal seed multiplication and then scaling up of it. As a result the following steps were included:

- Initially, a pilot level of informal seed multiplication activity was carried out at relatively small plot in three districts of organized Farmer-Research-Extension Group (FREG) farm land. At this level discussion was made on the plan with the FREG members, then training were given to all and finally progressive host farmers were selected by members to start the pilot scheme.
- Then, suitable varieties developed for different purposes, normal and processing types, viz, Gera and Jaleme for normal and Zengena, Guassa and Wochecha for processing purposes were selected;
- Then, clean initial/starter seed tubers were provided to organized farmers: private farmers or innovative professionals or investors on a repayment loan basis at least to return it in kind so as to guarantee the 2<sup>nd</sup> phase redistribution of tubers to another participating groups. Here, due attention and follow up was made to guarantee the production and circulation of healthy seed stock among the participants;
- This initial seed tuber passed at least 2-3 cycles of multiplication before it was used for ware crop production. This will help increase the amount of seed tubers to be distributed to small-scale farmers for further seed or consumer potato production;
- Finally, following the consecutive field days made at the different growth stages of the crop specifically at harvesting, the demand for the new varieties increased then the pilot level experience was scaled up to wider domain area and districts.
- A Regional workshop at the presence of all stakeholders was carried out to share

experiences of other Centers, build consensus on the plan and share responsibilities. Similarly, *Woreda* level workshop was carried for the same purposes in the presence of administrators and then two committees (Steering and Technical) were formed for the follow up activities.

- Both technical and practical training sessions of seed production techniques, disease identification and management options and post-harvest handling were carried to improve the knowledge and skill of participants on quality seed production and its management;
- Then, diffused light stores (DLS) were constructed by cooperatives and private seed multipliers for appropriate management of multiplied seed until the next cycle of production;
- Finally, to guarantee the sustainability of the system and create market for the produce, field days were arranged at the presence of pertinent stakeholders, Zone and *Woreda* administrators and office heads, Bureau of Agriculture & Rural Development, Seed Enterprise, Cooperative Promotion Agency, Investment Promotion Agency, NGO and farmers.

Inherent in this activity was the engagement of multipliers in quality potato seed tuber multiplication, handling, marketing and distribution structure. To this effect, best practice in potato seed tuber multiplication and management was followed as the guiding principles to the scaling-up of technology multiplication and dissemination.

## RESULTS

Following this scheme very promising results that proved the validity of such community-based system was observed. Among which the following are worthy of mention:

1) Before the implementation of this project seed growers of the improved potato varieties were non-existent in this sub Region. However, currently both individual and grouped farmers

as well as professional seed growers have increased in subsequent years.(Figures 1 and 2).

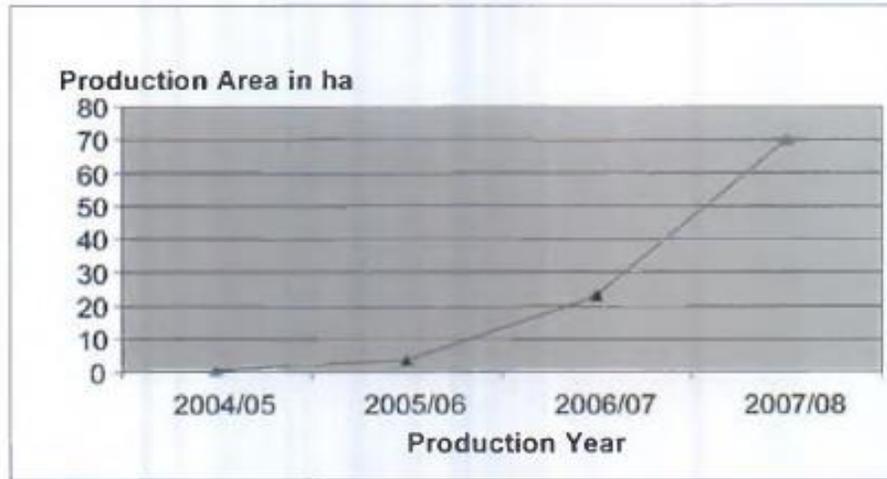


Figure 1. Trends in the production of improved potato varieties over 2004/05-2007/08 production seasons.

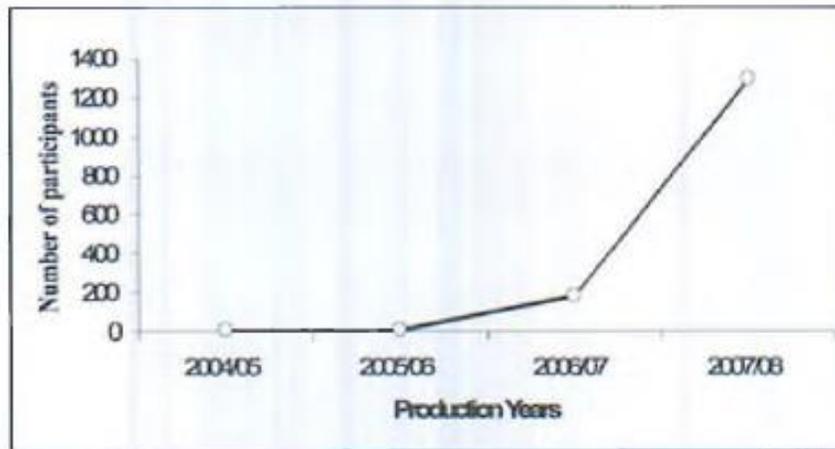


Figure 2. Trends in the number of collaborative farmers producing improved potato varieties over 2004/05-2007/08 production period.

2) Some of the collaborative growers are scaling up their activities one year after the other, while others are emerging following the over-

all success. This is an important success story of the project in which the possibility of becoming potential seed multiplier and

suppliers to requests coming from several corners. Hence, in a region where very small amount of seed is multiplied by research centers and other groups, now it has become a reality to produce improved seeds of different varieties that is close to 9,000 quintals. This is shown in Figure 3, which indicates the trend of the amount of seed tubers produced.

- 3) Potato seed growers that got linked with buyers were able to earn from 1 500 to more than 176, 000 Birr per season. As a result, some of the farmers already have cleared their loan taken from Amhara Credit and Saving Institute, while others bought oxen and horses and still others constructed better residence house and their future seed storage stores.

- 4) On average 160-360 daily laborer job opportunity is also created on monthly basis by the professional seed grower groups, which multiply potato seed on an area of close to seven hectare of land. This is a job during both the rainy season as well as off-season for production under irrigated system. Hence, significant numbers of unemployed forces are put under production.
- 5) The possibility of producing 25-30 tons/ha of potato under on-farm condition is practically demonstrated and farmers' confidence on research technologies is raised to the level that they now directly come to the center in search of other technologies.

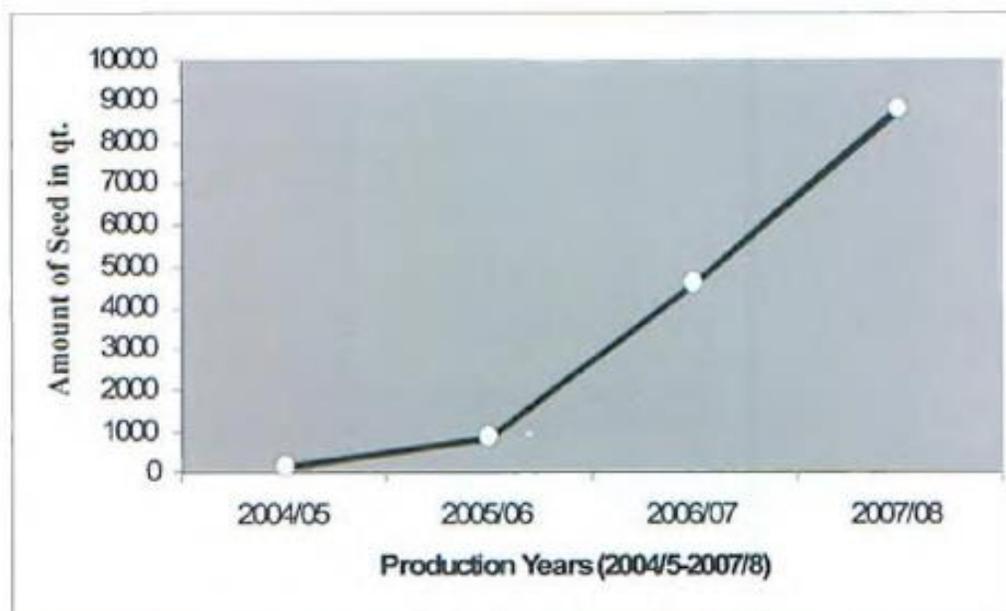


Figure 3. Amount of improved seed tubers produced over 2004/05-2007/08 production period

### Challenges Faced in the Process

Absence of strong coordination among the partners involved in the system as stipulated in the role and responsibility of each member:

- The failure of farmers to abide by the agreement signed by the two parties such as timely undertaking of recommended cultural practices as advised, construct diffused light

store, avail the necessary input such as chemicals and fertilizers.

- Absence of reliable and assured marketing opportunity at the right time forced seed producers to keep the seed tuber until planting time and resulted in the utilization of some of the improved seed for either household consumption or ware market sale.
- Lack of consistent follow up and supervision of seed grower farmers plot to monitor the

health of the seed they are producing which will help decide the fate of produced seed tuber.

### Lessons Learnt

- Working with other partners (government organizations and NGOs) was seen to hasten diffusion of technologies
- The possibility of strengthening informal seed system provide better quality seed tubers if partners commit themselves fully in the activity
- The need to create strong linkage mechanism for growers with research center in order to regularly refresh the original seed tubers.

### CONCLUSION AND RECOMMENDATION

In order to sustain the observed result all stakeholders involved in the agricultural development sector should work in a strong collaborative manner to overcome the drawbacks of uncoordinated efforts that normally result in fragmentation of the scarce resources. Besides, the propagation of vegetatively propagated crops unlike that of grain crops demands a careful approach beginning with site selection, identification of disease free seed multiplication area and season, follow up and frequent monitoring of seed farms to minimize the parallel multiplication and dissemination of seed borne diseases. Failure to do so will result in the infection of disease free areas with devastating diseases such as bacterial wilt through dissemination of diseased seed tubers. Hence, a strong back-up support of the system from the research center is recommended to replenish with quality seed stock, training of growers and monitoring of the field to sustain the system of good quality seed.

### ACKNOWLEDGEMENTS

We do acknowledge the initial support received from the earlier Ethiopian Science and Technology Agency and now Ministry. We also extend our thanks to Holetta Research Center for the initial clean seed and sharing their experiences, Adet Research Center for additional financial and logistic supports and the Amhara Regional Agricultural Research Institute (ARARI) for raising sufficient fund from the Amhara Food Security Office for the scaling up process. Deep appreciation is given to Food for the Hungry Ethiopia and the Amhara Region Bureau of Agriculture and Rural Development for financing the workshop as well as publication of a proceeding. The offices of *Wereda* Agriculture and Rural Development and administrators of the six districts and development agents, participant farmers and professionals and all the staff of Horticultural Crops Research Department of Adet Research Center are also acknowledged for their commitments.

### REFERENCES

- Aleligne Kefyalew, Tilahun Geleto and Regassa Ensermu.1992. Initial results of an informal survey of the Debre Tabor mixed farming zone. Working paper No. 12. Institute of Agricultural Research, Addis Abeba.
- Central Agricultural Census Commission. 2003. Ethiopian Agricultural Sample Enumeration 2001/2002. Statistical Report on Farm Management Practices. Livestock and Farm Implements. Part II. pp. 63-153. Addis Abeba, Ethiopia.
- ,2003b. Ethiopian Agricultural Sample Enumeration 2001/2002. Results for Amhara Region. Statistical Report on Farm Management Practices. Part III A. pp. 20-30. Addis Abeba, Ethiopia.

FAO.2004. Production Year Book. FAO, Rome, Italy.

Monyo, E.S., M.A. Mgonja, and D.D. Rohrbach. 2004. An analysis of seed systems development, with special reference to

smallholder farmers in Southern Africa: Issues and Challenges. In: Setimela, P.S., E. Monyo, and M. Bonziger (ed.). Successful Community-Based Seed Production Strategies. Mexico, D.F: CIMMYT. pp. 3-9.