



## Graduation with Resilience to Achieve Sustainable Development

*GRAD is a five-year USAID-funded project designed to help the Government of Ethiopia find sustainable solutions to chronic food insecurity. The project supports households currently enrolled in the government's Productive Safety Net Program (PSNP) so that they may access microfinance, improve on and off-farm productivity, and improve links to markets. In addition, GRAD improves household and community resilience by: increasing women's empowerment; improving nutritional practices; and introducing local climate change adaptation mechanisms. CARE Ethiopia leads a consortium that includes REST, ORDA, CRS, Agri Service Ethiopia, and SNV. The project works in 16 districts in Amhara, Tigray, Oromia and SNNPR.*

### **Innovation Brief # 1**

### **Diffused Light Storage for Potato Seed**

#### **Background**

Potato is an excellent small-holder crop for the Ethiopian highlands, with a short cropping cycle, potential for high yields, and value both as a cash crop and as part of a nutritious household diet. It is an increasingly important crop in the Ethiopian farming system, with national production having increased about 225% in the 20 years between 1993 and 2013<sup>1</sup>. In spite of this, the sub-sector in Ethiopia remains relatively undeveloped and is characterized by low productivity due to the shortage of good quality seed tubers, a lack of adaptable and disease resistant varieties, a lack of storage facilities, and inefficient marketing systems. As most households in the area are chronically food insecure, any appreciable increase in productivity of the potato sector would have a much welcome impact on nutrition and family well-being.

More than 4,000 GRAD households were engaged in the potato value chain. GRAD is seeking to help them overcome a number of major constraints in the sector, including access to quality seed. In Ethiopia, seed potato is produced by a very few research facilities and is typically distributed through farmers' cooperatives. Supply falls far short of demand and distribution networks do not reach poor households such as those supported by GRAD. To counter this, the project has taken a fairly well known technology – Diffused Light Storage (DLS) – and introduced it in project communities in an innovative and highly successful way.

#### **What is a DLS?**

DLS is a low-cost technology used to extend storage life of seed potato and ensure a quality seed supply for the subsequent production season. A DLS is a structure that uses natural indirect light to reduce storage loss. The basic characteristics of a DLS structure are: water-proof roof, translucent walls, and adequate ventilation. DLS can be made from eucalyptus poles with shelves made of thin eucalyptus strips/sticks. Corrugated iron sheets are the only significant cost. Farmers are capable of building a DLS with tools at hand.

#### **The process**

As a first step, GRAD helped the Guna Seed Multiplication and Marketing Cooperative obtain 90 quintals of basic seed for multiplication by member farmers. However, the resulting increased production of seed potato created another problem - a shortage of storage capacity. GRAD, in collaboration with the International Potato Center in Ethiopia (CIP), helped Guna construct a large DLS. However, more storage capacity at the cooperative had minimal effect on seed supply for poor households as Guna still sold much of its stock to commercial interests or humanitarian projects. GRAD needed to adapt the DLS technology for use at the micro level so that GRAD families would finally get access to quality seed potato. GRAD's successful system links basic seed producers through cooperatives (in this case, Guna) to model farmers multiplying seed potato and storing it at home in mini-DLS's. In the subsequent season, the model farmers use some of the seed themselves, sell some to their neighbors, and share some back to the cooperative. The household-level DLS's are built by the farmers themselves using materials available locally. GRAD invested about 1,620 birr (or about 80 USD) per model farmer to buy corrugated iron sheets

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<sup>1</sup> FAO stat

and nails. The farmers supplied local materials and constructed the structures per project guidance. In one district alone, GRAD supported 100 households to build their own DLS structures. Another 211 households constructed their own DLS systems without project support after witnessing the success of early adopters of the technology. Many of these DLS owners/managers are women.

### Key outcomes

The availability of a DLS in a community eases the problem of potato seed storage and helped solve the problem of access to improved seed by small farmers. The promotion of DLS and improved seed potato by the project has given them access to healthy and of recent generation potato seed at the right time, place and at a reasonable price. This in turn has increased potato production and, therefore, household income. Model Farmers who have a DLS and produce seed potato gain an annual average income of 42,000 birr (2,100 USD).

The system has also helped the Guna Cooperative to grow, improve its capacity and profitability, and expand services into poorer communities. For instance, the cooperative's sales of 2,018 quintals of seed potato in 2014-15 more than tripled to 6,313 quintals by the next year. The working capital of the cooperative has grown from about 87,500 birr (4,375 USD) to nearly 1.4 million birr (70,000 USD).

## Household Impact

My name is Alemush Fiseha. I live with my husband and children in Lay Gayint Woreda, Amhara. My family participates in the potato value chain with the support of GRAD. The project gave us training, helped us obtain improved seed potato on loan, and covered some of the costs of



constructing our own DLS, which was a new idea for us. We had been storing seed in traditional way like keeping the seed on the floor or leaving the seed inside the soil for a long time. As a result, a lot of seed was wasted and our income remained low.

Following the construction of the DLS, we are able to store the seed with minimal loss. Two of my neighbors also constructed a DLS after they saw our success.

The new income has been very good. In 2013, we only harvested 23 quintals of potato and earned 13,000 birr (650 USD). In the next two years, we earned more than 109,000 birr (5,454 USD) birr from the business, and expect to secure over 100,000 birr (5,000 USD) gross income this year. This income helps us to send our children to school, buy assets like livestock, and have enough food for the family. I'm very confident that my family will not go back to food insecurity.

## GRAD Learning

Based on the practical experiences outlined above, GRAD strongly believes that a seed storage system based on mini-DLS's at the community level can play a vital role in making the potato sector more productive. Use of the technology has the following benefits:

- **Appropriateness** – The introduction of DLS at a household level has boosted a high potential crop and made a significant contribution to food security among the project participants as well as non-GRAD households. Both the technology and the improved seed are well received by project communities.
- **Return on Investment** – The total cost of constructing a DLS is not high, about 2,600 birr (120 USD), and eucalyptus poles are readily available in most areas. This investment can be recovered in one season from the sale of improved seed. Ultimately, the returns far exceed the investment costs.
- **Sustainability** – The profitability of the Guna Cooperative and the Model Farmers using mini-DLS structures reassures us that the system promoted by GRAD will be sustained into the future. All structural repairs to DLS structures are within the financial means and technical capacity of the farmers.
- **Scalability** – As noted above, once experiences are observed in the community the technology can be replicated by other households or could be promoted by the cooperative or extension services.