Rice Productivity
Efficient Gains for Increased Yield
A Case Study
About MEDA

Since 1953, MEDA has been designing and implementing market-driven economic development programs that improve the welfare of millions of people around the world. As a leader in financial services and market development, MEDA collaboratively creates business solutions to poverty by working in partnership with the poor and the institutions that serve them.

Abstract

This report is one of two evaluative case studies focused on the EDGET Project, developed towards the end of the project to assess the changes and benefits of MEDA’s rice value chain interventions to learn from and strengthen them for future interventions. This report explores rice productivity gains made by the producer for better quality, increased yield, and efficient production.

About EDGET

Ethiopians Driving Growth, Entrepreneurship and Trade (EDGET) is a five-year value chain development project funded by Global Affairs Canada (GAC). The project was designed to increase incomes for 10,000 men and women farmers and textile entrepreneurs by facilitating access to growing markets, enhancing production techniques and appropriate technologies, and improving input supplies and affordable support services, including finance.

EDGET, which means ‘growth’ in the Amharic language, has been concentrated on integrating smallholder rice farmers and small-scale artisans into higher value markets through increased market linkages and enhanced productivity. As a result of the project, Ethiopian rice and textile entrepreneurs are producing high-quality products and reaching new and growing markets to drive growth and improve livelihoods.
Introduction

Ethiopians Driving Growth, Entrepreneurship and Trade (EDGET) is a five-year value chain development project funded by Global Affairs Canada (GAC). EDGET works primarily with rice farmers and weavers, as well as other market actors, to help them increase their incomes and livelihoods by linking them together for a stronger value chain. Strong, equitable market systems, with sustainable support from private businesses and local institutions is a critical outcome of the project. A component of this system is access to technology. MEDA hopes that both producers and processors become more profitable in their production and marketing of rice with more efficient technology. This report centers on how rice farmers were able to make strides in better quality, increased yields, and more efficient production.

Over the life of the project, MEDA worked with 8,567 rice farmers in Amhara and the Southern Nations, Nationalities, and Peoples Regions (SNNPR) Regions of Ethiopia, as well as other value chain actors. MEDA facilitated a lead farmer model of extension support, marketing, as well as access to financial services for the farmers. Between five to seven member farmers would form a group, with a lead farmer directly accessing trainings lead by MEDA and partners. Training topics were diverse and ranged from agronomy practices, such as weeding and row planting, to conservation agriculture, post-harvest handling, intra-household dynamics, and technology training. Various gender strategies were used to work equitably with both women and men throughout the five years.

This report presents the successes and early wins of the EDGET project on rice production. MEDA’s value chain rice project was founded on gains in rice production cycle from pre-planting, growth, and postproduction. EDGET was also underpinned by important aspects of marketing, consolidation, quality, financial services, and demand, everything to ensure a functional, competitive, and cooperative value chain. Under discussion here is our intention to provide information that will be useful to research and practitioner communities interested in understanding how to facilitate positive changes for producers and other value chain actors through rice production gains.

MEDA worked with 8,567 rice farmers
Methodology

This case study is an investigation delving into a particular intervention or model. Increasing production for rice farmers was a key element to MEDA’s goal of increasing livelihoods and income for rice farmers. As the project comes to an end, it was necessary to document and explore the successes and challenges faced by producers in the rice value chain.

A mixed methods approach was used—both qualitative and secondary quantitative data was gathered and analyzed. A field trip to Amhara in early 2015 was conducted to meet with farmers, processors and field staff to start collecting business records used in this case study. In-depth interviews were conducted with rice farmers and field staff, and observations were made at farms. Survey, focus group discussions, and monitoring data all contributed to this report as secondary data. Additionally, MEDA collected baseline information from approximately 200 rice farmers. This baseline survey was followed up with annual surveys to compare income and marketing outcomes and progress. The sample size increased each year with the population size of clients so that a 95% confidence level could be maintained with a 5% confidence interval (367 farmers were surveyed in 2014). The baseline survey asked questions about total land devoted to cultivation of rice, the use of fertilizer, pesticides and herbicides, agronomic practices and yield.

This document looks only at productivity gains with the intention of increasing overall yield of the farmers. It does not deal with quality measurements, enhancing post-harvest value addition, or linkages to markets, or ways of increasing the selling price.

It should be noted that translation from English to Amharic or other regional dialects, and vice versa, may have impacted the nature and depth of questioning.
Rice Farmer Productivity: The Agronomy

Background

A relatively new crop to the country, rice was introduced to Ethiopia a few decades ago and now is considered a millennium crop, fourth in food security importance after teff, maize, and wheat. The MEDA rice team looked at various constraints in rice productivity and designed the EDGET project to address bottlenecks in the production and marketing of the crop. Throughout the agricultural season, MEDA and EDGET clients strived for agricultural efficiency—producing more rice on the same amount of land. A summary of the rice production cycle can be seen in Figure 1.

When MEDA began operations in two regions of Ethiopia, Amhara and SNNPR, the production challenges included:

1. **Inputs:** Facilitating farmer access to key inputs like quality and improved seed, fertilizer, pest management and the associated training of using such inputs.

2. **Growth and agronomic efficiency:** How could farmers be more efficient in planting, weeding, field preparation, and how MEDA and partners deliver associated training.

3. **Post production techniques:** Harvesting, threshing, drying, and other post-harvest handling, and how MEDA and partners deliver associated training.

Figure 1. Rice Production Cycle

Key Elements of Rice Production

1. **Pre-planting:** Seed variety, seed quality, fertilizer, pest management, and associated training

2. **Growth:** Land preparation, planting method, water management, and weeding

3. **Post production:** Harvesting, threshing, and associated handling. Also includes post-harvest handling to reduce loss in the harvesting, drying, storage and milling processing

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1. [http://www.slideshare.net/AFRIGARice-research-and-production-in-ethiopia](http://www.slideshare.net/AFRIGARice-research-and-production-in-ethiopia)
Rice Farmers

Farming in Ethiopia is largely a family activity where both men and women participate in many of the tasks. The average age of the male and female farmers was found to be between slightly over 40 years in Amhara, and slightly less in the SNNPR. Families (average number of children is 3-5 per family) provide much of the labour as the farms are relatively small with an average of about one hectare each. This complicates the task of calculating production costs as for most families farming is a way of life and tracking time spent on various activities is not the norm. Some activities such as weeding fall more on the women and when men are the primary respondents, this time is even less likely to be tracked or considered a cost. Similarly, as much of the land under cultivation was originally grazing land, threshing is done with oxen by the families simply as another family activity rather than a service paid for.

Most farmers diversify their income streams by planting various other crops and through owning livestock. Although few do intercropping, most farmers plant guaya, or rough pea, prior to rice harvesting. The rough pea is then cut back when the rice is harvested, allowing it to grow out more vigorously a few months later. The importance of animal grazing also has implications on the harvest and threshing activities. For example, in Amhara, farmers did not like the mechanized harvesters as they cut the rice higher above the ground, which reduces animal feed.

Results and Discussion

Yield

MEDA found large increases in yield through the EDGET project. In 2011, average yield was found to be 18.3 quintals/hectares (1.8MT/ha), and in 2014, 35.2 quintals/ha (3.5MT/ha). This increase is due in large part to the pre-planting and agronomic extension support and techniques that the project promoted. The overall percent change in productivity over the life of project was found to be 92%. More detail can be found in the below table.

Table 1

<table>
<thead>
<tr>
<th>Average Rice Yield (quintals/ha)</th>
<th>2011</th>
<th>2014</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>11.6</td>
<td>34.0</td>
<td>192%</td>
</tr>
<tr>
<td>Male</td>
<td>19.8</td>
<td>35.5</td>
<td>79%</td>
</tr>
<tr>
<td>Average</td>
<td>18.3</td>
<td>35.2</td>
<td>92%</td>
</tr>
</tbody>
</table>
Pre-Planting

Seed

In Ethiopia, most rice farmers cultivate more than one plot of land, and often will hedge their bets by planting different seed varieties on these multiple acreages. When MEDA started the project, farmers traditionally used X-Jinja, a local cultivar, and reused their own seed. In the baseline survey, MEDA found that most farmers identified the lack of availability of improved seed to be a constraint, however our early attempts at seed demand were considerably overinflated.

At the inception of the project, seed was identified as a major constraint in optimizing yield. There is a higher yield potential for improved rice varieties such as Nerica-4, Gummra, and EDGET, and for this reason the project promoted use of improved seed. Survey results indicate that most farmers have been introduced to these varieties, however, the traditional varieties continue to be heavily relied on by our clients. In 2011, baseline data shows that most farmers planted the local variety meanwhile in 2014, we found that 72% of farmers planted the traditional cultivar of X-Jinja, 26% planted Nerica-4, 6% Superica, 5% Gummra, and 5% EDGET improved seed.

This slow uptake of improved seed was a challenge. The Fogera National Rice Research and Training Center, the partner MEDA worked with to develop improved varieties, committed to developing 10, but only 2 were shared with farmers during the life of project. Further, farmers had trouble accessing EDGET and Nerica-4 improved seed. Because farmers only need to buy clean seed every 3–4 years, the profitability of seed multiplication is still being explored. MEDA attempted to find a marketable model for this, but this still needs development.

Although many farmers said that they experienced shortages of clean, improved seed, many still appear unwilling or unable to purchase seed if they perceive that their existing varieties produce relatively well. MEDA recommended to change seed every three years but given the conditions in Ethiopia it can be used for five, provided seed is cleaned and sorted. Nonetheless, the 2014 survey also showed an increased number of farmers who plant multiple varieties, indicating potential willingness to experiment with some of the new seed. Additional development for a profitable seed multiplication system is recommended.

Some farmers and cooperative groups have begun producing seed, however government mandated policy restricts selling of seed for more than 15% higher than the commodity price. In most seed systems, this difference is not sufficient to meet the requirements of registering as a seed company and producing within a regulated system. A future project may want to consider coordinating policy discussions in collaboration with Japan International Cooperation Agency (JICA) to address this.

Farmer Focus: Fanta Zeleke

As is the case with many farmers in the area, Fanta’s land is split into three sections of 0.25 ha each. Over time, the productivity of the land has been deteriorating. Even the famous productive local rice, called X-Jinja, could never yield her more than three quintals per 0.25 ha.

While the local rice variety is very productive in the area, it was not very productive on her plot of land, due mainly to a lack of moisture. She could never harvest more than three quintals—not enough for her family. Through EDGET, Fanta received training from the project and improved upland rice variety, called Nerica-4. Fanta was also supported by the extension staff.

Finally, for the first time, Fanta was able to harvest more than 7.5 quintals of Nerica-4 rice from only 0.25 ha. She brought the seed to the Private Seed Enterprise and earned over Ethiopian Birr (ETB) 3,000. This was the first experience in her life to bring such a surplus to the market. With the money she earned, she bought a bull, realizing a lifelong dream.
Transplanting

Rice can be either direct seeded, as practiced by many EDGET clients, or transplanted. MEDA found that only 6.3% of female farmers and 2.3% of male farmers practiced transplanting.

Widely practiced in Asia, transplanting requires less seed and gives more yield. This practice means planting in irrigated beds and then transplanting into the field when the rice is approximately 25 days into germination and 15-20 cm tall. Although it can increase production, it also requires irrigation (water pumps to flood the nursery) and extra labour to transplant to the field. It is doubtful that this would be a wise intervention in the near future when so many other easier gains to achieve productivity are yet to be fully exploited. However, it is a practice that could be demonstrated with champion farmers with access to labour and resources.

Irrigation

In much of the Amhara Region, farmers can irrigate by channeling surface water from local water sources. In other regions, the water table is too low, so hand digging of wells is relatively simple and hand operate pumps are practical. Yet, the soil conditions in many of these areas is unstable and wells need to be relocated and refitted each year. MEDA has not supported irrigation during the current project, although there are numerous other NGOs and other governmental programs addressing irrigation in the Amhara region. This practice does ensure higher yields and thus might be explored for future projects.

Fertilizer

The Ethiopian government cooperative system is the primary source of fertilizer; farmers often complain of the quality and availability. Currently, most fertilizer is imported by the government, but plans are underway for local production which should increase supply.

In the baseline survey, slightly over 50% of farmers reported using commercial fertilizers. In the 2014 survey, this number has increased to approximately 90% (F 88.9%; M 92.8%). Discussions with the staff reinforced the need for soil testing so that fertilizer recommendations can be specific to the soil conditions.

The most efficient use of fertilizer is to drop when planting. When seed is sewn by broadcasting, the fertilizer is done in the same way. Currently the blanket recommendation is application of urea and diammonium phosphate (commonly known as DAP), totalling 130 kilograms (kg) per ha/year, in three applications a) at planting, b) when rice is knee high, and c) when close to flowering stage.

Although our data does not compare farmers who use fertilizer to those who do not, our staff agronomist reports local belief that appropriate fertilizer use can increase productivity up to 20%. Based on the uptake of fertilizer use by farmers, this increase easily justifies the purchase price of the fertilizer. Any follow-on programming would benefit from collaboration with JICA and the research institutes to conduct controlled trials to provide better evidence to support the fertilizer recommendations.
Growth

Planting

Row planting was a major agronomy practice promoted by the EDGET project. Traditionally, seed is sewn by broadcasting. In regional test sites and in an internal survey, row planting showed some productivity gains, although the results were mixed. Tests conducted by extension agents indicate production increases of up to 25%, however productivity is only one of the benefits. When planting is done in carefully spaced rows, less seed is needed, and the weeding and harvesting requires less labour. Discussions with our agronomist indicate that row planting was perhaps the most significant intervention introduced during the project and will continue to be important.

While broadcasting is easier, row planting is worthwhile in the long run. There are additional labour costs to row plant, as seen in Table 2, however, that cost is more than offset by the savings in weeding (see next section).

Table 2. Rice planting method costs

<table>
<thead>
<tr>
<th>Planting Method</th>
<th># of people</th>
<th># of days</th>
<th>Labour daily rate (ETB)</th>
<th>Total planting cost (ETB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcast planting</td>
<td>2</td>
<td>4</td>
<td>60</td>
<td>480</td>
</tr>
<tr>
<td>Row planting</td>
<td>5</td>
<td>4</td>
<td>60</td>
<td>1,200</td>
</tr>
</tbody>
</table>

One note from the most recent survey is that many farmers indicate that they use both row planting and broadcast seeding methods. Further discussions revealed that when planting season comes, most farmers start row planting, however some tire of it or simply run out of time with the rains coming and resort to broadcasting. The EDGET team observed that farmers were also more likely to broadcast their older variety of seed simply out of habit.

MEDA recommends that future programming continue and strengthen the focus on row planting, especially when coordinated with use of other manual technology such as row makers and rotary weoders.

Row Maker Technology: MEDA prototyped and helped Farmer Field Schools to test row makers within the EDGET project. In Libo Woreda, the Technical and Vocational Education College is working on a row maker design that will be oxen driven. Row makers have the potential to accelerate the take-up of rotary weeding tools as those work optimally when the rows are of consistent width. The current design will require three people to operate with one person plowing, one dropping the seed, and another adding fertilizer. Use of row makers is still problematic on many plots of land because of lack of leveling and smoothing of the land. Leveling of the land can ease both planting and irrigation challenges.

MEDA recommends further refinements of the technology to ensure farmer uptake and efficient production. Specific attention should be paid to technology around land preparations, such as leveling, row makers, and rotary weoders.

Farmer Focus: Arekea Abtwe

After joining EDGET in 2013, Arekea participated in agronomy and rice food receipt trainings facilitated by different actors. He then allocated half a hectare to rice, using the new technique he learned, row planting, as well as applying fertilizer. As a result, Arekea was able yield 30 quintals (3,000 kg) of rice.

The next year, he planted 1 hectare of land of rice, and he yielded 67 quintals (6,700 kg). Arekea’s cultivation of rice on his farm progresses from year to year because the value and the knowledge of rice increases within the community, in addition the market price of rice also increases from time to time.

3 Although this is untested, staff believe that a one hectare plot could be planted in one day with oxen and row-maker, reducing the planting cost, and allowing for lower weeding costs.
Weed Management

Weeding is a critical component to rice production. In Ethiopia, most rice production involved weeds removed and collected by hand—a very labour intensive process (as opposed to chemical control). The collected weeds are piled on bunds or can be used to feed animals. Manual weeding is a part of an integrated weed management that involves the integrated use of cultural, manual, mechanical and/or chemical control methods. Loss of yield to weeds is the worst during up to 30 days after sowing or transplanting, and again after 40 days, according to the International Rice Research Institute.

Weeding is the stage in the production cycle when row planting pays off—labour costs studied by MEDA were found to be five times cheaper with rice planted in rows compared to broadcast planting. This is why MEDA achieved so much success in convincing farmers to plant in rows. It would cost ETB 1,800 (CAD for 30 days of weeding rice in rows compared to 152 days of weeding rice seeded via broadcasting, assuming three weeding passes were made, as recommended. Table 3 below gives more detail.

Table 3. Weeding labour costs, broadcasting vs row planting

<table>
<thead>
<tr>
<th>Weeding labour required if Broadcast Planted</th>
<th>Person Days</th>
<th>ETB Rate Per day</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st weeding</td>
<td>80</td>
<td>60</td>
<td>4,800</td>
</tr>
<tr>
<td>2nd weeding</td>
<td>40</td>
<td>60</td>
<td>2,400</td>
</tr>
<tr>
<td>3rd weeding</td>
<td>32</td>
<td>60</td>
<td>1,920</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>9,120</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weeding labour required if Row Planted</th>
<th>Person Days</th>
<th>ETB Rate Per day</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st weeding</td>
<td>15</td>
<td>60</td>
<td>900</td>
</tr>
<tr>
<td>2nd weeding</td>
<td>10</td>
<td>60</td>
<td>600</td>
</tr>
<tr>
<td>3rd weeding</td>
<td>5</td>
<td>60</td>
<td>300</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>1,800</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Type of weeding method matters too. MEDA found that in 2014, still most farmers were weeding by hand, with 95% of both men and women reporting that they engaged in this practice. The traditional weeding tool, with 69.3% of women and 60.9% of men, was next in popular usage, and finally MEDA found that around 10%, or 12.7% of women and 8.6% of men had access to a rotary weeder.

**Rotary Weeder Technology:** MEDA worked with private tool maker, Mulat Manufacturing in Bahir Dar, to produce several rotary weeder. A total of 198 were sold through a subsidized voucher scheme: MEDA paid approximately 70% of the purchase cost as an incentive to get farmers to try the weeders. Take-up was mixed and the usefulness depended on several variables:
• Soil moisture and preparation. Generally, if the fields were plowed multiple times prior to planting, weeding is easier whether done by hand, using traditional hand tool, or the rotary weeder. When soil is very hard or uneven, it is difficult for the rotary weeder to work.

• Consistency of row width and straightness of the rows. Weeder work best when the rows are straight with sufficient room to go down the middle. This removes the center weeds and reduces the hand labor to the areas in between.

Staff estimate that when rows are properly spaced and straight, the use of the rotary weeder can reduce labor time of weeding by 50%. There should be future efforts to expand access and improve this technology to improve the efficiency of rice production. Continued development and promotion of rotary weeding tools should be a priority, especially if combined with row planters. Mulat has indicated that if the designs are more widely accepted and demand increases, they would ramp up production and establish a dealership in Woleta and other locations as necessary. However, further refinements should be explored.

Pests & Diseases

Herbicide and pesticide use was not a major factor in EDGET rice production, though it was found to be more common in SNNPR than in Amhara. Pesticides are more commonly used by farmers for rough pea relay cropped with rice, so they are sometimes applied just prior to or soon after harvesting the rice. As a productivity intervention, the use of both should be considered when needed, however are not generally thought to be major sources of gains or losses to the crops.

Post-Production

Harvesting

Harvesting activities include reaping, stacking, handling, threshing, cleaning, and hauling. These can be done individually or a combine harvester can be used to perform the operations simultaneously. Most EDGET clients harvested their rice by hand.

MEDA demonstrated harvesting equipment with a powered combined harvester. The initial demonstration was in field, however farmers complained immediately because it was cutting the crop at 15 cm from ground. They are sensitive to height for the animals, so they wanted to cut higher off of the ground to allow for more residue for the animal feed. There were also power problems that are being addressed by the dealer. Any equipment promoted in the future should be more suited to the local rice and conditions; this might be an efficient way for larger farms and groups to reduce harvesting time.

Another option that the team looked into were lower tech grass cutters that operate similar to brush or weed cutters. These are hand-held, small gasoline-powered rotary blade cutters with shields that direct the rice to fall in a manner that it can be easily gathered up. Similar tools used for brush cutting in the US sell in the range of $100-$300 USD. Further research is required, but this may provide a lower cost option to full harvesters and allow the farmers to easily cut to the desired height for animal grazing.
**Threshing**

An important part of harvesting is threshing—separating the grain from the rest of the rice plant. The majority of the threshing is still done by oxen in the open field. MEDA demonstrated portable threshing machines in both regions. Farmers in the SNNPR were more receptive to mechanized threshers than those in Amhara. Staff believe this is simply a cultural tradition due to the importance of oxen in the farming operations. Most farmers own the oxen, so need little other than their families to provide the additional labour to thresh. Other farmers objected to the amount of additional chaff and rice blown around by the threshers, however this is likely in cases of settings that could be managed with adjustments to the exiting chute.

Benefits of mechanical threshers include higher quality, cleaner rice, and increased productivity as less grain is lost on the ground. Yet, as most of the EDGET farmers cultivate around one hectare, efficiencies of scale would only accrue to groups of farmers, cooperatives, or persons providing threshing as a service.

**Storage**

MEDA introduced 100 kg airtight storage bags as an alternative to traditional fabric bags. These airtight bags offer protection from insects, other contaminants, and maintain moisture content. MEDA found that most farmers used them—71.4% of females and 73.7% of males.

The current bags are marketed by Hi Tech in Addis Ababa. Perception by farmers has been generally positive although some have noted that since these still need to be outer lined with fabric for strength, that it would be better to produce the two walled bag as one unit. While MEDA does not have data to support higher rice value, farmers have been impressed with the ability to store rice for longer periods of time without the worry of infestation. This potentially offers farmers more flexibility in saving rice longer to speculate on prices.

The current cost of the bags are ETB 38. MEDA subsidized 50% of the initial purchase. Hi Tech now has a dealer in Bahir Dar and Woreta, and also sells some through processors.

The airtight bags, or others further refined, will become the norm and increase the quality of rice and reduce the amount lost to pests and contaminants. This is a technology that has huge potential to increase clean storage and marketing of rice and should be further explored.
Recommendations

Seed Policy

Future access for farmers to improved seed is unclear, as there are discouraging price caps on the sale of seed. A prospective project may want to consider coordinating policy discussions in collaboration with Japan International Cooperation Agency (JICA) to address this.

Agronomy Extension

EDGET has achieved success in promoting rice agronomy practices for higher yields, especially in row planting, for example. This work has been reinforced within existing government structures to ensure sustainability. Any follow-on programming would further benefit from collaboration with JICA and Amhara research institutes to conduct controlled trials to provide better evidence to support the fertilizer recommendations.

Technology

Technology, such as row planters, weeders, harvesters, and threshers have the potential to cut costs and time for rice farmers, as long as the technology is appropriate for conditions and accessible to farmers. The EDGET project has made early strides in development of such technology, but further research and development is needed to ensure farmers find the technology appropriate to their conditions, efficient, and profitable. A future project should devote attention to technology refinement, and consider a commercial model to promote technology for both male and female farmers.

Aggregating for Services

Relatedly, aggregating product for better services will aid in efficient rice production. This applies to technology access, as well as value-addition such as parboiling, threshing, storage, and even marketing, something not within the scope of this case study. It might be beneficial to pilot a commercial model with roving service agents selling threshing or harvesting services to farmers, for example.
Client Story: 
A Learning Rice Farmer

Berhanu Aklilu

Date: January 28, 2015

Berhanu Aklilu is one of the successful farmers in Bura Kebele in the Amhara region. Berhanu has two children. What he earned from his 0.25 ha of cultivated land was not enough to feed his family or to cover their yearly expenses. Therefore, he chose to rent out his land for ETB 500 a year and worked as a daily labourer.

Since becoming an EDGET client in 2013, all that has changed—he has been able to return to farming. That year, he rented 0.5 ha of farm land from one of the local schools in addition to his 0.25 ha of cultivated land. He produced 42 quintals (4,200 kg) of rice.

The next year, Berhanu used 2.5 ha of land for rice and was able to gain 110 quintals (110,000 kg) of rice. This year, the yield was not as good compared to last year. Berhanu mentioned, “In the beginning of planting season the weather was very suitable for the crop and we were very excited. But a few days later when the crop started to give grain, the weather became cloudy and damp, which terminated the grain from multiplying.” He remembers that last year he was able to gain 15 quintal of rice per 0.25 ha; however, this year he was able to gain 13 quintal (13,000 kg) of rice per 0.25 ha.

Berhanu owns 0.75 ha of rice cultivated land and he rents the remaining 1.75 ha. His total cost is ETB 7,000, as 0.25 ha costs ETB 1,000. Berhanu also bought a eucalyptus tree that was worth ETB 9,000 for his new home construction.

After rice was harvested from the field, Guaya is planted. Berhanu predicts that from the 2.5 ha he used for rice, he estimates he will gain 30 quintal of Guaya and earn approximately ETB 21,000. In addition, Berhanu’s wife would like to buy a parboiling machine so she can parboil the rice and sell it in the market.

In addition to harvesting rice, Berhanu learned a good lesson from his last year experience, where he bought an ox for ETB 1,400. He then sold it for ETB 6,000 three months later, for a profit of ETB 4,600. Currently, he has three oxen that he bought for fattening.

Berhanu has benefited from the project in many ways. Berhanu is currently buying different material for his new home. His home will be different from the rest of the farmers in the area. He started to build his home with stone and thinks that everyone will be surprised once it is completed. Now, Berhanu can send his eldest child who is in grade six to school and can fulfill all his school needs.

Update: July 2015

Berhanu continues to prosper in rice production. This past year he sold 74 quintals (7,400 kilograms) of rice to the rice agriculture research institute for seed purpose because his harvest was clean and good quality. The research institute offered him a good price compared to the prevailing market price. Normal rice is for sold for ETB 700 per quintal (100 kg) at the market, meanwhile Berhanu sold his for ETB 1,200 per quintal (100 kg), almost twice the price, to the agriculture research institute. He made ETB 88,800 on his rice harvest this year. As a result, he has expanded his farm and is building a new house.

Berhanu bought an ox in June for ETB 6,000 and he has a plan to sell it after two month for ETB 10,000. Berhanu has also started a poultry business and bought 10 hens last month.

Berhanu built a big house compared to his neighbours. With his increased earnings, Berhanu bought 80 iron sheets, each costing ETB 130. He said to build his new house it cost him around ETB 60,000 including different expenses like wood, labour and other materials.
Conclusion

The EDGET project has achieved noticeable changes in the agronomic practices of MEDA's rice clients. Yet, quantifying and correlating the specific productivity gains of each individual intervention is difficult due to the number of factors in play. Weather, especially rainfall, varies significantly from year to year, as well as from one region to another making it more difficult to gather strong statistical data on the specific outcomes of each variable such as might be achieved in randomized field trials where all but one variable are normalized. Further, many of the interventions tested during this project have taken significant time to develop and perfect the technology. Getting this right makes it additionally difficult to quantify benefits in the short time since they were introduced. Nonetheless, most of the interventions tested appeared to be useful even if not all might be expanded in future programming.

Interventions that appear to provide the highest rate of return to the farmer are those that require little other than minor equipment, better agronomic training and adoption. These include improved seed and row planting. For post-harvest loss, the airtight storage bags became popular relatively late in the project, yet appear to offer a very low-cost solution to on-farm storage keeping rice clean and protected from insect infestation and outside moisture.

Technology for efficient rice production still needs refinement. Row planting has many benefits including reducing tedious labour. If the row maker technology can be improved and become widely accepted, it would allow for more widespread use of the rotary weeder, lowering costs, and reducing the level of manual labour typically relegated to women.

Power harvesters are out of reach for individual farmers, but may be an option for groups or collectives, or for entrepreneurial individuals who want to provide harvesting for service. While harvesting is still reasonable to do by hand for the typical one acre plots, labour is often difficult to find during the seasons when many farmers are harvesting at once. Although not tried during this project, it would be worth pursuing small gasoline powered rice cutters if a further project is undertaken.
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