Brief: Creating Wealth with seed potatoes in Ethiopia
Introduction

The CFC project ‘Wealth creation through integrated development of potato production (WCPP)’ has brought a wide range of positive livelihood changes for potato farmers in the highlands of Ethiopia.

The project began in 2008 and was aimed at addressing constraints faced by potato producers in Ethiopia and improving the wealth and livelihoods of potato producers. Implementing partners CIP, EIAR and Holetta research centre undertook the project in the zones of West Shewa, South West Shew, Guragie and Tigray, with three main objectives:

- To increase the availability of high quality potato seed at affordable prices;
- To improve farmers’ knowledge of crop husbandry and access to high quality seed, leading to improved yields and increased income and food security;
- And to improve market linkages and communication between potato value chain stakeholders, leading to increased income.

The Royal Tropical Institute (KIT) in Amsterdam, was commissioned to carry out a rapid independent evaluation of the project in April 2014 to measure change and document lessons from the intervention. A mixed methods research design was implemented in three woreda (districts) – Gumer, Geta and Wonchi. This included 190 quantitative surveys, focus group discussions at four locations based on the PADev methodology, interviews with key informants, and a review of available project literature.

This briefing note highlights the major findings of the project and summarizes them in relation to the OECD DAC principles for evaluating development assistance: relevance, effectiveness, efficiency, impact and sustainability. Scores have been given by the evaluation team based on an interpretation of the findings. Overall, the project was scored very highly on relevance, effectiveness, efficiency, and impact, and moderately on sustainability, for which challenges remain.

Relevance

The project design was highly relevant to highland farmers. Improvements in the potato production system can be a pathway out of poverty in Sub Saharan Africa, including Ethiopia. It is an excellent smallholder farmer crop, suited to Ethiopia’s highlands, with a short cropping cycle, potential for large yield per hectare, and serves as both a cash and food security crop.

Land sizes are relatively small in the research areas, averaging 1.2 hectares per household and rarely over two hectares. Land availability is a major constraint for farmers wanting to improve their livelihoods. Improved potato seed production is thus an excellent choice as a high value cash crop in the highlands, for which there is considerable market demand. Before the project 65% of farmers depended on enset (false banana) as their major source of income and food security, which while being culturally and economically important, was described by farmers as a poor cash crop choice compared with potato.

The potato sub-sector in Ethiopia is relatively undeveloped and is faced with low productivity. Constraints include a shortage of good quality seed tubers, a lack of adaptable and disease resistant varieties, sub-optimal production practices, a lack of storage facilities and inefficient...
marketing systems. The project design was highly relevant for tackling these challenges in a systematic way. The project was found to be well targeted to areas where potato production was either happening already on a limited scale, or had excellent potential through good climatic conditions.

These farmers initially expressed an interest in participating in the project when it was introduced by village leaders, and were expected to contribute at least 0.25 hectares of their land to seed potato production. The relevance of the project is clearly evident from the high take-up of knowledge and skills by farmers which led to significant livelihood impacts (see below).

Finally, the business case for the project was sound, given a rapidly increasing demand from urban centres for potato, and demand from ware potato producers in the surrounding areas for improved potato seed varieties.

In short, the activities and outputs of the programme were consistent with the attainment of the project goal and objectives, which themselves were found to be relevant and valid.

Score: 5/5

Effectiveness

The project was certainly effective in achieving its core objectives. The land size farmers grew ware potatoes on increased from 0.41 hectares to 0.77 hectares from when the project began until today. Furthermore, the number of farmers growing potatoes in the areas has increased substantially from the project - only 19% of respondents grew ware potatoes before the project, whereas 96% in the sample do now. Seed potatoes are a higher value crop than ware potatoes and require specialised skills to produce. Virtually no farmers in the sample were growing specialised seed potatoes before the project, whereas now 101 farmers in the sample (53%) grow seed on a separate plot, averaging around 0.45 hectares. Other common income sources for farmers are barley, faba bean, dairy, sheep and wheat, but ware and seed potatoes have now become a more popular crop choice than all of these. Before the project only 4% of farmers cited potatoes as their biggest source of income. Now, farmers cite seed potatoes as their biggest source of income in 24% of cases, and ware potatoes in 16% of cases. Before the project, very few farmers used improved varieties of seed and had access mostly to low yielding local varieties. However, through the project farmers received Jalene or Gudene varieties and now virtually all seed and ware potato farmers grow these as their main varieties.

These increases in land under ware and seed, an increase of potato farmers in the research areas, and the cultivation of improved varieties have contributed to the achievement of the objective to increase the availability of high quality potato seed at affordable prices.

Ware potato yields have significantly improved by roughly 80% in all of the research areas from an average of around 9 tonnes to 16 tonnes per hectare. Seed potato growers too report yields upwards of 16 tonnes per hectare. Many reasons were given for this significant change in yield, including the much improved use of fertilizer, new seed varieties, improved cultivation practices and improved use of fungicides and insecticides. The main reasons cited for this change was the project training, followed by the improved seed varieties supplied by the project.

Training began by Holetta taking one ‘elite’ farmer from each area and bringing them to the Holetta research centre to gain first hand insight on what clean seed is and what improved varieties constitute. Those farmers then returned to their groups and reported back, which was soon followed by Holetta researchers and staff who delivered a series of practical on site trainings. Farmers first received training on what clean seed actually is, how to plant it, how to use various inputs for productivity increases.

The penetration of training was quite high – 74% of respondents who declared that they had received training through the project. Farmers received an impressive range of trainings, the most frequently cited being fertilizer application, cultivation, land preparation, storage, harvesting, pesticide use and crop rotation, seed and seed varieties, group formation, storage and marketing. An interesting training component was that women were given training on potato recipes for local dishes, to enhance the local acceptance of potato in the area and consumption of the crop.

The quality of the training received was also perceived to have been either ‘good’ or ‘very good’ by 86% of the
respondents who received training. Farmers perceived their knowledge to have increased substantially. Around 80% of farmers rated their knowledge before the project as either ‘very poor’ or ‘poor’ whereas now 80% of farmers rated their knowledge as either ‘good’ or ‘very good’. This indicates both the very low base that these potato farmers started from, and the excellent job the project has done in building farmer capacity in a relatively short amount of time.

Most importantly, the training was perceived to have had an impact on yields - 61% of trained respondents said that the training had a ‘high impact’ on yield, while a further 35% percent described the impact as ‘moderate’. The training contributed to changes in production methods of farmers, and the project generally encouraged farmers to reinvest in their production. Large increases were found in the number of beneficiary farmers using fertilizers, insecticides and fungicides (200-300%), as well as oxen (75%).

A further component of the training was storage. Holetta trained farmers on how to construct a diffused light storage facility (DLS) by building a demonstration store in each Kabele. These improved stores help to maintain quality of seed and reduce losses from leaving potatoes in the ground or covered in the field, or stored in the house, either covered or uncovered but usually in piles. Following training and the construction of demonstration DLS by the project, 52% of respondents reported storing their seed in DLS stores. By the end of the project the model stores had been replicated 110 times by farmers using their own investments of time and materials.

However, record keeping among farmers is still very low, with only 12% saying that they keep detailed records, and 67% saying that they keep no records at all. While 45% of trained respondents said that they had received training in record keeping, it is clear that this is one training type which has not had good penetration. Work remains in this area if farmers are to plan properly and manage their farms as a business.

The project worked with and trained the heads of households, which were men in roughly 80% of cases. In general, men were said to be more involved in the heavy work of land preparation and ploughing with oxen. Women are more likely to contribute their family labour to planting and harvesting, where they collect the potatoes behind the oxen driven by men. However, the project did require that at least 20% of cooperatives members should be women and at least one woman should hold a leadership position in each of the cooperatives. This was found to have been achieved. Women involved in the cooperatives tended to be widows or unmarried, as they were the head of their respective households. The household head was then required to disseminate the training knowledge to other household labourers and hired labourers. How well this was done was not able to be determined. Women tended to own smaller plots of land for ware potatoes than men, but did have about the same amount of land under seed potatoes. One training that was specifically targeted to women was cooking. Before, women said they only knew about boiling potatoes, but have now been trained in twelve recipes. While this might seem as small detail, this was reported to be quite important to the acceptance of potato in the community. It can be hoped that this component of the project will help with sustainability because potatoes can be grown both as a cash crop and for household consumption.

In the ways described above, the project clearly achieved its objective of improving farmers’ knowledge of crop and access to high quality seed, leading to improved yields and increased income and food security (see ‘Impacts’ for food security).

The significant profits made from seed potato farming was able to be reinvested in fertilizer and other inputs both for potatoes and other crops, reinforcing a positive cycle of agricultural investments and higher yields.

The project also organised beneficiary farmers into potato farmer groups, many of which became formalised into cooperatives. The cooperatives have played an important role in consolidating farmer knowledge, gained through the project trainings. The cooperative also plays a role in ensuring good practices are followed by member farmers, and perform quality control of seed potatoes stored in cooperative DLS stores. Finally, the cooperative is able to effectively market fairly large volumes of seed potatoes to formal buyers – often NGOs - on behalf of its members. In this way the project achieved the objective of improving market linkages and communication between potato value chain stakeholders.

Beneficiaries farmers attributed the above changes directly to the project. Confidence in attribution is strengthened by the fact that no other agricultural project (let alone potato project) was reported by farmers to have been undertaken in the research areas in the past 10 years or so.

Score: 5/5

Efficiency

The total cost for the project across Ethiopia, Kenya and Uganda was USD $3,857,018. Of this, USD 2,051,123 was CFC grant money, (of which USD $500,000 was from the contribution of the OPEC Fund to CFC). USD 1,805,895 was provided by country counterparts, of which USD $512,114 was provided by CIP and USD $1,293,781 by public and private sector collaborating Institutions.
This money appears to have been invested well in the project (see ‘effectiveness’ and ‘impact’). The project achieved all of its objectives, and in many cases exceeded them. For example, the project surpassed its targets in the amount of quality seed produced by the trained seed growers, the number of DLS constructed and/or modified, and the number of male and female farmers trained. In Ethiopia, a total of 139 farmer groups were established (65 in Guragie zone, 53 in West Shewa zone, 20 in Southwest Shewa zone and one in East Tigray (Atsibil) whereby 3,390 households were trained in seed potato multiplication and management (79% male, 21% female) – the initial target was 2000. In terms of the DLS stores, 6 were constructed for communal use with partial support from the project. These were enthusiastically replicated by farmer groups, with over 110 DLS stores having been completed by farmers by the end of the project. The financial investment of the program also yielded considerable income gains to the beneficiary farmers, indirect income gains to non-beneficiaries who bought improved seed from beneficiary seed growers, and wider economic multiplier effects in project communities (see ‘impact’).

The objectives were achieved within the project time frame, and the positive outcomes largely continued beyond the project (see ‘sustainability’). The programme is also believed by the evaluator to have been carried out in a most efficient way compared to alternatives. Several factors are involved, such as the fact that from 2004 to 2007 CIP together with KARI developed a methodology for training ware potato farmers on seed quality management which could be applied during the project. Also, the design of the project took a holistic approach to the ware and seed potato sub-sectors and applied a systematic, rather than fragmented, approach which meant that there was sound logic to the sequencing of project activities.

Score: 5/5

Impact

The project impacts follow on from the description of project effectiveness (above). As discussed, the project’s introduction of professionalised seed potato production has changed household income sources. Changes in farmer knowledge and skills led to improved potato farming practices which resulted in higher yields, fewer losses, higher quality seed produce and commercialisation of produce. For beneficiary farmers, this translated into substantially higher incomes from seed potatoes than they were earning before with other traditional crops such as enset, or barley, wheat, beans and peas.

By modelling the data, it was found that costs of production for one hectare of seed potatoes was approximately 44000 Birr and that revenues from sales amounted to approximately 104000 Birr. This leaves farmers with a very good profit of 60205 Birr per hectare (US$ 3204, EUR 2416). Seed potato farmers had an average of 0.45 hectares under potato seed last season, meaning that an ‘average’ farmer
made 27092 Birr from seed potatoes per 0.45 hectares last season (USD$1380, EUR1016). Furthermore, roughly half of the respondents were growing potatoes two seasons per year (long ‘Meher’ rains and shorter ‘Belg’ rains), meaning that their annualised income from seed potatoes could be up to double this figure if the short rainy season was good and there was some supplementary irrigation.

The crops that seed potatoes typically replaced were enset, barley, wheat and faba bean which were described by farmers as being far less profitable than seed potatoes. Working with the assumption that profits from other agricultural produce are less than half that of seed potatoes, it can be reasonably argued that the project contributed upwards of 13500 Birr in additional income last season alone (US$687, EUR504).

For ware potato growers, yield has improved 7 tonnes per hectare as a result of the project. This amounts to an additional 12600 Birr per hectare for potato growers than before the project. Those growing potatoes had on average 0.77 hectares, meaning a typical ware beneficiary farmer is now generating 9702 Birr more per season. After accounting for extra input costs such as additional labour, fertilizers and fungicides, this would amount to roughly an additional 6000 Birr more per season (US$305, EUR224).

Farmers used this income in various ways, such as purchasing corrugated iron sheets for their houses, buying mobile phones, radio, and TVs or connecting to the electricity grid. Farmers spoke of being now able to afford school fees, whereas before this was a serious struggle for most households. Income from potatoes enabled farmers to invest in oxen, dairy cattle, horses, sheep, and other small livestock. It is clear farmers are now seriously investing their production through purchases of fertilizer, seed and other inputs – although not yet new clean seed. Beneficiary farmers also reported improvements in yields of other crops because they now applied better practices to their other crops too, such as fertilizer use, and crop rotation.

Of course, farmers who were non-beneficiaries also stood to benefit from the project, as the beneficiary farmers have produced improved seed which non-beneficiaries can buy and use on their potato farms. It is difficult to estimate how much this improved seed alone can add to yields, however one potato expert estimated this at 25% for the first year the seed is bought and a further 17% when it is recycled by the ware grower the second season. Taking the baseline yield figure of 8.8 tonnes per hectare, this means an approximate improvement of 2.2 tonnes per hectare in the first year for non-beneficiary farmers using improved seed produced by beneficiary farmers. This translates to an additional 3960 Birr more per hectare per season for non-beneficiaries (US$202, EUR 148).

Major changes in food security can be attributed to the project. Potato helps households to bridge the hungry season from August to October when existing grain stocks may be low and grain crops are not yet ready for harvest. This is because potato has a relatively short growing cycle of around 3-4 months. Before the project, households endured on average 1.5 months of the year with only one meal a day. Since the project this hungry season has been all but eliminated, with virtually all households having at least 2 meals a day all year round. Furthermore, before the project households reported having 3 meals a day for only 3.9 months of the year on average. Now, households are having 3 meals a day for an average of 7.6 months of the year. This change was stressed as important by farmers, which they directly attributed to the project, due to potato being a short season crop that can be harvested before the grain crop is ready, even for those producing on small plots of land.

In focus group discussions, groups frequently recalled how before the project there were few employment opportunities in the area, that local economies were seriously depressed economically, and that it was very common for households to send one or more members to work seasonally in the nearest towns to earn money through petty trading or services. This had negative impacts, such as on household cohesion, hardships and risk of violence in the towns, and risks of exploitation and ‘diseases’. However, project beneficiaries strongly believe that the project has revitalised local economies and stopped, or even reversed, outward migration. This is because local people now believe that now there are better prospects in the area because households now have significantly more money due to potatoes. While this is very difficult to verify, this change was mentioned unprompted by all focus groups in the research areas.

Rating 5/5

Sustainability

The author is able to comment on sustainability issues with some confidence, as the evaluation was timed 1.5 years after the project was completed. As discussed earlier, beneficiary farmers were organised into a potato farmer group or cooperative by the project implementers. All of the visited cooperatives were observed to be still functioning, and some had appeared to have strengthened, such as by improving their offices or building new stores. Record keeping at the cooperative level was observed to be generally good. Farmers too showed in focus groups that they have retained a good knowledge of potato production related issues, as disseminated during project trainings, and reported that ‘good practices’ were now widely adopted in these potato farming communities. Unfortunately the
degree to which 'good practices' are actually applied was not able to be widely observed due to the rapid nature of the evaluation, which also occurred outside of the season.

However, there are several sustainability issues that require attention, and likely require a follow-up project, or further investment to maintain the impressive gains that the project has made thus far (see recommendations for follow-up).

To maintain the quality of their seed stock, farmers must flush out older generations of seed after about three seasons and replace this with new first generation (basic) seed produced by the Holetta research centre or some private companies. Many farmers and cooperatives are now overdue to refresh their seed stock, and it was found that virtually no farmers had purchased new basic seed from Holetta research centre or another company since the project began. Farmers demonstrated perfect understanding that they must refresh their seed soon, as the issue has been affecting their yields for several seasons already.

Farmers say that they are willing to buy new basic seed for 600 Birr or so, however seed from the research centres are believed to be 2 or 3 times this. Cooperatives appear to be not organized sufficiently or have a strategy in place to approach research centres or private companies and buy new seed and begin multiplying basic seed within their membership. It is also a serious challenge for individual farmers to transport bulky potato seed they may purchase, as each hectare requires around 2 tonnes of tubers. Cooperatives are probably best placed to be making bulk purchases of new seed, rather than individuals.

Farmers clearly understand that not refreshing their seed is lowering their yields season on season – they have seen the results themselves. What they seem less aware of is that there is also a reputational issue at stake. The project areas have developed a reputation with certain institutional buyers such as NGOs who are buying improved seed from project beneficiary farmers. However, if individual farmers and cooperatives fail to refresh their seed very soon, they could suffer reputational damage that would lose them their hard-to-find formal buyers, who would likely look elsewhere.

Another serious issue is crop rotation, which is important for soil quality and reducing a build-up of diseases and pests such as bacterial wilt and nematodes. Potatoes should not be grown on the same land 2 seasons in a row and should not return to the same plots for at least 3 more cycles. While focus group discussions demonstrated a farmer understanding of this, survey data shows that only 51% of respondents rotate after a single season. It is somewhat concerning that just over 20% of farmers continue growing potatoes on the same plot for 3 or more seasons. So while their appears to be farmer awareness of the importance of rotation, the small land sizes typical of the project areas make crop rotation a particular challenge.

Rating 3/5

Conclusion and recommendations

The CFC project ‘Wealth creation through integrated development of potato production’ has clearly brought a wide range of positive livelihood changes for potato farmers in the highlands of Ethiopia. It has brought new potato
related knowledge and technologies, helped to organise farmers, and has significantly improved food security and household incomes. The project was well targeted and well implemented and applied a strategy which, rather than focussing on one or two production issues, took a systematic approach to transforming the seed and ware potato value chains. Overall, the project can certainly be regarded as a success story.

Nevertheless, there are of course aspects which the project funders, implementers and other actors should be aware of to ensure the sustainability of these gains. While the project has now wound up, there is a good opportunity for CFC or another partner to invest in a phase 2, to build on the gains made and take the sector to the next level. The following are recommendations are offered:

Project trainings have successfully built farmer capacity and professionalized seed production. It is recommended for this to be built on in other areas, as there remains a big demand for improved seed throughout Ethiopia. Furthermore, it would be wise to continue supporting project beneficiary farmer groups with, say, annual training follow-ups to ensure best practices become normalized by all farmers.

The capacity of farmer cooperatives has been built to a good level in a short time – some better than others. However, it should be kept in mind that these cooperatives are still relatively nascent and can be expected to require a degree of ongoing support to carry out business operations and support their farmers. Up until recently they have enjoyed the support of the project, and the energy of new farmers coming into the potato sub-sector for the first time. However, it is in the next phase of a cooperative’s development that governance challenges can arise due to changing expectations of members, changes in leadership, changes in market conditions, or poor environmental conditions.

Marketing was highlighted by farmers themselves as their biggest challenge now. Prices have begun to fall as supply increases, and farmers have expressed a concern about how they can best access new markets. At the moment, some feel dependent on the brokering role that the woreda MoA plays to bring NGOs and other formal buyers to them. This assistance from the MoA is certainly appreciated, however cooperatives and individual farmers feel they need to reach new markets – either more ware farmers in the area or linking with buyers further away. With the new road highway networks observed being built in the vicinity of the research areas, this would seem to be a real opportunity.

The DLS storage for seed is perceived to have been a big success. However, now seed and ware growers are interested in locally appropriate technologies for ware storage too (i.e. not electricity dependent). This is an issue for enabling ware farmers to prolong the period in which they can store and market ware potatoes, outside of the glut that occurs around harvest time. This is relevant to seed potato growers too, because they often also grow ware. Furthermore, seed producers believe that if ware potato growing is more profitable then more farmers will grow ware, resulting in higher demand for their seed.

Financial literacy is an issue for farmers – very few are keeping records, despite them reporting that they have had training. This makes it difficult for them to judge the levels of investment that they should make on inputs, and what the return on investment would likely be from yield gains. In focus group discussions no farmer actually knew their costs or how much they were profiting, although it was widely believed that they were profiting a lot.

The need for investment in clean basic seed (generation 1) is probably the biggest and most urgent challenge to the sustainability of seed potato production by beneficiary farmers. Virtually no farmers have flushed out and refreshed their seed stocks since the project began. So while seed production and storage practices are good, the inevitable degeneration of the improved seed varieties is catching up with farmers. Yields are decreasing, resulting in reduced profits. Furthermore, there is a reputational issue at stake – project beneficiary farmers and their cooperatives are currently perceived by formal buyers such as NGOs as having desirably high quality seed. Unless farmers buy new basic seed to improve the quality of their harvested seed, they can expect to lose these hard to find formal buyers. The issue here is two-fold:

First, farmers said that new basic seed from Holetta (either ‘Gudene’, ‘Jalene’ or the favoured ‘Belette’) costs roughly 3-4 times what they currently sell their own multiplied seed for. Farmers have expressed that they would happily pay around 600 birr per quintal, but the reality of market prices for basic seed are putting off farmers. Nevertheless, while this is expensive for farmers, the participatory budgeting exercises done during this evaluation show that even if farmers buy new seed at these prices, they will still comfortably return a profit that same season, with costs offset by the higher yields of new seed. Furthermore, farmers will of course benefit through higher yields in the following 3 seasons of multiplication. Assuming a cost of 1200-1500 birr per quintal (100kg) for new basic seed, and that farmers use 20 quintal per hectare (2 tonnes), this amounts to 24000-30000 birr in increased costs per hectare when renewing their stocks.

Second, access is an issue. Farmers and their cooperatives feel far away from Holetta and seed companies, both geographically and relationship wise. Potato seed is bulky and therefore difficult and expensive to transport. A seed
distribution marketing arrangement between Holetta and potato seed cooperatives would be interesting to look into. Farmers also feel that they do not know who to approach to access new clean basic seed, and how to negotiate such a deal. Therefore, it would be wise to strengthen the linkages between farmer cooperatives and Holetta and/or companies to improve access to basic seed. For example, farmers expressed interest in a revolving seed fund. After all, beneficiary farmers are now playing an important role in the chain, multiplying improved seed in numbers, on a scale that Holetta and companies cannot do on their own.

Finally, there would appear to be an emerging opportunity for investment in a medium-large potato processor in the sector, as there is in Kenya. The demand already exists and is currently met through imports. Consumption of potato chips (French fries) in East Africa is rapidly increasing due to urbanisation, the proliferation of fast-food restaurants, growing tourism, and a significant change in eating habits among both high- and low-income groups in urban areas. It is understood that there is no such company operating in Ethiopia at present. Such an enterprise has been calculated as being profitable in other research. It would also help to absorb increases in ware potato supply to the market, as more farmers look to grow potatoes and realise higher yields from the use of improved seed and better ware production practices. Beneficiary farmers would be excellent candidates to supply such an enterprise through an outgrower arrangement.

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