



Quality Seed Potato: Making it available to small holder farmers

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Planting quality seed material is the answer to improving productivity of potato crop in Kenya. Quality seed potato is material for planting that is free of pests and diseases, it is of good size and well sprouted to give uniform germination. One of the major challenges among the potato growing small holder farmers in Kenya is lack of adequate quality seed potato for planting. Where available, farmers are unable to access it due to transport challenges because they order in small quantities.

Community Action Research Project plus (CARP+) is project funded by Mastercard Foundation through Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) and hosted by Egerton university, Nakuru. The project started in July 2017 and will run for four years up to 2021. The project aims to enhance availability and accessibility to high quality seed potato and improve income of smallholder farmers in Nakuru County. The project is being implemented in partnership with the NPCK, BAC-TVET, ADC-Molo and NASFA.

Before the intervention

The project team conducted a baseline survey in Nakuru County in November 2017. The project targeted four potato growing sub counties in Nakuru namely Molo, Kuresoi North, Gilgil and Njoro. The purpose was to establish the status of seed potato production within the county and identify small scale seed potato producers and potential producers, especially those already in groups. As the team interacted with the farmer groups, they discovered the following:

- Many farmers grow potato for consumption and not for seed. Even though potato is a common staple food crop in Kenya, second only to maize, productivity is only 8t/ha against a potential of 20 t/ha. The low productivity is attributed to lack of quality seed potato.
- Smallholder farmers in the surveyed sub counties sourced seed potato by saving the small sized tubers which were the left over after sale and consumption. Although the formal system of seed potato started in 1958, more than 96.3 percent of seed potato used in Kenya is farmer saved seed while both clean and positively selected seed contribute 2.6 percent and certified seed contribute 1.1 percent only.

No more begging for seed potato

Wanjiku a farmer in Elburgon ward, Molo sub-county of Nakuru owns about 0.5 acres of land. The main crops she grows to sustain her family are potatoes, maize, beans and vegetables. During the planting season, Wanjiku prepared the land hoping to get quality seed from Mbaaria, a fellow farmer trained on positive selection of seed potato. However, she was often disappointed to find he did not have enough seed to sell to her.

Wanjiku belongs to the Green Vision Self-help group. It was through this group that she was introduced into the Community Action Research Project (CARP+). She was very happy to hear about this project because she would get quality seed potato to plant. Through the intervention of the project team members she was enlightened on the growing of seed potato, positive seed selection and storing of quality seeds for planting. There are several other smallholder farmers who are hoping to get enough seed potato.

- Smallholder farmers grow potato continuously in the same field leading to low yields.. Smallholder farmers rely heavily on their own saved “seeds” which they have recycled for many years. These seeds have carried over a lot of diseases and pests and their yield potential has degenerated. As a result, they get very low yields and subsequently get meagre income which cannot sustain them.
- Most of the farmers would like to grow good quality seed potato but it is not easily available and it when it is available it is very expensive. Only about 4 percent of farmers have received training on seed storage and diffused light stores nationally, while more than 60 percent do not renew their seed regularly. In addition, certified seed potato is sold at minimum 2500 KES per 50kg bag which is the minimum packaging. A farmer would require approximately 40,000 KES to acquire seed for planting one acre. This is in addition to other costs of production such as ploughing, management, chemicals and fertilizers, transportation, harvesting and storage. These production costs are way above what smallholder farmers can afford.

Most of the farmers would love to use high quality seed potato to improve their yields but it is not only expensive but difficult to access. Farmers from Nakuru County willing to pay premium for quality seed travel an average of 124 km to source for certified seed from ADC or the other few existing multipliers; spending a minimum of 5 cents per kilogram of certified seed on transport charges.

The aim of CARP+ is to enhance accessibility by building the capacity of smallholder farmers to multiply their own quality seed in farmer groups or cooperatives. They can then distribute to members and sell excess supplies to other farmers thus making extra money.

Five farmer groups were selected from the baseline survey namely Greenvision Selfhelp Group (Elburgon), Giteru Potato Growers (Turi), Chomoza Cooperative (Mauche), Kasambara Bidii Selfhelp Group (Gilgil) and Kiahiti B Selfhelp Group (Likia).

National Potato Council of Kenya:

To support farmer groups access markets, develop a Nakuru County potato strategy and lobby for inclusive policies in the seed potato value chain.

Agricultural Development Corporation (Molo complex):

to supply certified seeds to farmers and institutions that are involved (Baraka Agricultural College and Egerton University). The Corporation is also offering technical assistance in training and seed potato production. Students attached to the CARP+ project were offered attachment and internship opportunities at ADC Molo and NPCK.

Baraka Agricultural College:

Committed to setting aside 20 acres for seed potato project where seed bulking, demonstration plots and training are conducted. This is a good opportunity for staff and students from both BAC and EU to participate actively through experiential learning.

Nakuru Smallholder Farmers Association:

Uses its farmer’s network to help farmers access quality seed and marketing opportunities. They have so far mobilized farmers to take part in Good Agricultural Practices (GAPs) training and attend quarterly meetings and undertake various project activities. The association has provided seed multiplication fields through its members.



Inspecting the established seed potato demos at Egerton University



An established sweet potato demonstration plot at Egerton university

Intervention

Through the initiative of various partners in the project, interventions were done at three levels. Baraka Agricultural College (BAC) and Egerton University (EU) were tasked with multiplication of seed potato of different status (Breeders, prebasic, Basic, Certified 1 and 2). At Egerton University, high status seed was to be multiplied under tissue culture and rapid multiplication on aeroponics and hydroponics. The mini-tubers and lower status seed (basic and C1) from these systems would be made available to Baraka Agricultural College (BAC) and to organized farmer groups ready to invest in seed potato production for further multiplication and bulking. Smallholder farmers would then access the certified and clean material from EU, BAC and farmer groups either as members of those particular groups or as individual farmers.

The Agricultural Development Corporation together with the International Potato Centre (CIP) were to provide breeders material and germplasm for further cleaning. In addition, the two institutions would offer technical support in tissue culture, rapid multiplication and apical rooted cuttings technology.

The CARP+ was also mandated to train farmers in seed potato production and building their capacity in developing seed potato multiplication enterprises. The farmers would then produce their own seed in organized groups and make the materials available to other potato farmers in their localities and beyond.

The following interventions were carried out at Baraka, Egerton and at farmers' level;

1. Baraka Agricultural College, Molo

The project facilitated the college to establish three acres of land for seed potato. This was made possible by giving them USD 6,400 to buy basic seed and inputs needed for establishment. The money also enabled them to construct a diffuse light seed potato storage facility that can handle up to 50 tonnes of seed potato at a time. This means that they can plant up to six acres of land at any given time without storage hassles. This continues to be a big boost for students and farmers training. The college planted the first crop of seed potato in November 2017.

The startup was accelerated by ADC Molo who are partners in the project and who provided basic seed for multiplication at Baraka. In the first season, BAC planted 49.5 bags of basic seed potato (50kg) per bag. Even though there was a dry spell between December 2017 and March 2018, the production was good considering the prevailing conditions. In nutshell they managed to get 210 bags of certified seed potato (10.5 tonnes) of 50kg from the 3-acre plot. This means they got about 70 bags per acre (3.5 tonnes) of certified (C1) seed potato. This was a high yield considering the dry spell. Baraka Agricultural College and Egerton university students and staff learnt a lot through this initiative because of the practical attachment and training. During each production cycle, KEPHIS were involved in inspection of the crop and in certification of the seed potato.

2. Egerton University, Njoro

At Egerton University, CARP+ project focused on establishing a rapid multiplication unit for seed potato through tissue culture, aeroponics and hydroponics system. This was to create a high status seed potato that BAC and farmer groups can access for

further multiplication for certification. Egerton university also established demonstration plots at five farmer locations for the purpose of training farmers, students and staff on seed potato good agricultural practices. At Likia, Mauche, Elburgon, Turi and Kasambara, farmers offered small sections of their farm measuring about 25mx15m where demos were established. The partners involved during demos establishment were ADC Molo, MOA, NASFA and Egerton university. The CARP+ project provided inputs such as seed, fertilizers and chemicals. The farmer group in each site got about 100kg of certified seed potato (C1) which they established in a clean field (without a current history potato production). CARP+ conducted a series of trainings on these demo sites focused on land preparation, planting, fertilization, pests and disease management, dehauling and post-harvest handling.

3. Farmer group organization

Kiahiti B Self Help Group, Likia

The group was given a 50kg bag of certified seed potato (C1) which was sourced from ADC Molo through the CARP+ project. They planted the seed potato in April 2018 season. From the 50kg bag, they harvested eight bags of 50kgs. They planted the seed sized potato tuber in a quarter acre in November 2018. Despite the prevailing dry spell in the season, they were expecting about 20 bags, 50 kg of seed sized potato in March 2019. The group has sold 15 bags of 50 kg clean seed potato to farmers who knew about the project. They sold the bags for between 2000 and KES2500 and have enough quantities to plant on their farms.

Results

Since the project started in July 2017:

- Three out of the five farmer groups have successfully grown and managed to harvest quality seed potato for planting. Each of the farmer group were given two 50 kg bags of Shangi and Jelly varieties of seed potato.
- Trainings were conducted where over 140 farmers in the five farmer groups gained skills in identifying and managing pests, diseases and weeds.
- The farmers learnt to embrace the practice of Dehauling (removal of vegetative growth after flowering of potato crop) to restrict the size of tuber to seed size, and crop rotation in the production of seed potato. They were also trained on the different grade sizes of seed potato. The large sized potatoes were not to be used as seed as they take a smaller land area increasing cost of production. The tuber smaller than the size of an egg were considered as chats which are not suitable for propagation.
- Kiahiti B self-help group in Njoro got eight bags of 50kg seed potato from one bag of 50kg.
- Baraka Agricultural Colleges site has managed to bulk seed potato variety Shangi twice, with three acres of Basic seed planted in season I (Nov–Feb 2018) and later five (5) acres of Certified 1 seed in season II (June–Sept 2018). This basic seed was bought from ADC Molo. They have been certified by KEPHIS. Baraka students (150) and staff were actively involved in potato multiplication where they learnt a lot of skills. They have had two farmer field days where they have exposed up to 500 farmers. Through the project, the college established a store where they store their seed before sale.

- Egerton University planted tissue cultured apical root cuttings from Stokman Rozen. They planted 2,000 cuttings of UNICA, Sherekea and Shangii variety for multiplication, which is at pre-basic level. Egerton university organized an open day at Egerton in June 2018 where more than 300 farmers were exposed to different potato varieties and the apical rooted cuttings in the field.

Challenges

The team encountered challenges such as;

- Access to initial certified material since there was a high demand and low supply which delayed planting.
- Acquisition of certified seed was expensive and the project had to buy for the farmers the initial planting material.
- Accessibility to some of the demo sites during the rainy season.
- Procurement procedures through government institutions delayed purchase of agro inputs and in some cases, chemicals were not availed on time. Due to this, preventive measures for diseases and pests were not possible. Two farmer groups (Turi and Mauche) lost about 80 percent of the crop to late blight disease. Requirement for suppliers to deliver goods before payment was difficult as most are not willing to take the risk of having to wait so long to get paid.
- Lack of team work and participation from team members due to lack of motivation. The members were concurrently teaching and running other administrative duties.
- Coordinating farmers, partners, faculty and students was difficult due to the different schedules of each in their respective organizations.
- Certification of seed potato by KEPHIS at farmers level was complicated and was not practical. The farmers have small parcels of land below three-acres on which they have been growing uncertified potato for years. Certification of this size of farms especially with potato history is not allowed by KEPHIS.
- Lack of proper storage structures after harvesting of the seed potato. Farmers were forced to plant in the short rainy season of November 2018. Due to this, they experienced the dry spell and, like in the case of Kasambara Bidii Self Help group, lost their entire second season crop to drought.

Lessons

- Workable procurement regulations for inputs for research projects of this nature are necessary for government/academic institutions.
- It is important to know the whole list of materials to be supplied by the contractors. They should always be clearly listed in the quotations before signing the contract.
- Coordination of staff, students and farmers: it's impossible for one person to coordinate all activities and team members should take active roles in managing farmer groups in their specialties.
- The TVET partner (BAC) was able to run its activities more efficiently due to few procedures in the decision-making process and a more practical approach they took to involve their own students in the management of the farm activities.

- Farmer group needs assessment should be done to inform what the needs of the groups are so as to focus future trainings on only identified areas.
- Farmer groups where members made their contribution in terms of investing in the enterprise performed better than those who were provided with agro inputs. There is a sense of ownership and motivation observed where farmers invested in their own resources in the project.

Recommendations

- Farmer groups should organize to book seed potato well in advance from seed companies due to shortage. This can also help them transport the seed in bulk together and reduce the cost of transportation.
- Funding from County government should be available to improve infrastructure such as roads to access the farms.
- Flexibility in procurement procedures for projects dealing with field crops/fresh produce to allow timely interventions.
- There should be motivation and allowance in the schedule of university calendar where the researcher is allowed time to undertake research and outreach activities away from classwork and administrative duties.
- The certification for seed potato by KEPHIS should be tailor-made to suit the smallholder farmer group organizations.
- Farmer groups should be supported to establish cost effective structures so they can store their produce for better handling and marketing.



Planting of demonstration sites with farmers of Likia group

The Story of Joseph Kinyanjui

Joseph Kinyanjui is a potato farmer from Likia in Mau-Narok. He has depended on potato farming as source of food and income since 1995. He is a father of eight children. He was experiencing losses in potato production because he was depending on traditional farming methods without considering spacing, use of clean seed, right amount and type of fertilizers. He was using farmer saved seeds which were of poor quality. He did not have knowledge on good farming practices and record keeping. His production level was 40 bags per acre and he was earning a gross income of KES 59,500 per acre. However, he is not quite sure of the figure due to lack of proper record keeping.

He is the chairperson of Kahiatu B Self Help Group. He has undergone several trainings on potato production. He produces and sells seed potato, though he does not have access to high value certified seeds material for multiplication. He recycles seed potato on the same piece of land due to lack of adequate land. Despite the poor returns, he continued to produce for subsistence. Often, Kinyanjui would apply less or no fertilizer and chemicals to control pest and diseases hoping to earn more money. All these did not bear fruits for him as the soil fertility level declined with each planting.

He looked for someone to provide solutions to his problems. Kinyanjui joined the CARP+ project through the County government of Nakuru in September 2017. He did not hesitate to take up the idea of the Egerton-based project because he trusted the County government staff. He offered a demonstration plot to

CARP+ Project. Kinyanjui received training on good agricultural practices to produce seed potatoes from the demonstration site. Seed potato CARP+ project trained farmers in Kinyanjui's home in Likia location Mau-Narok Ward. This training was conducted cording along different potato growth stages. The crop took three and a half months to mature.

"I was happy when Egerton University seed potato CARP+ project approached me in 2017, to provide a 25mx15m demonstration plot for teaching me and other farmers in my village how to produce clean seed potato", says Kinyanjui. A group of 15 farmers were trained for a period of three and a half months.

"After the trainings, I implemented what I had learnt. This has increased my income, and I am able to meet the needs of my family. I can also buy farm inputs for my potatoes without depending on the government subsidized fertilizer, which delays most farmers", says Kinyanjui.

He went ahead and planted his own seed potatoes in one-acre land with a total cost of production of KES 114,300. Egerton University provided 80% of the cost of production to him. He earned a gross income of KES 196,000 per acre which was 71% increase from his earlier earnings. In addition, the farmer is adopting new farming techniques. He is planting potatoes using quality seed and good agricultural practices.

More information

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More information

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