

Upscaling the orange-fleshed sweetpotato in East and Central Africa

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Abstract

The Orange-Fleshed Sweetpotato (OFSP) is a wonder crop – 125 g supply the recommended daily vitamin A for a child below five years of age. This would combat vitamin A deficiency, estimated in 27 million children in East and Central Africa. However, OFSP has not readily been available among resource-poor farmers. The Dissemination of New Agricultural Technologies in Africa (DONATA) project aimed at popularising OFSP uptake and utilisation in Ethiopia, Kenya, Rwanda, Tanzania and Uganda.

The project employed a multistakeholder approach to promote proven OFSP technologies. Twenty Innovation Platforms for Technology Adoption (IPTAs) comprising national agricultural research institutions, non-governmental organisations, farmer organisations, the private sector and extension agents availed vines, roots and processed products along the production-consumption continuum.

The project addressed availability of quality seed through a three-tier seed system. Twelve varieties were disseminated to 100,000 farmers. About 26,000 farmers and 1040 trainers of trainers were trained in agronomy, processing and marketing technologies. This led to increased production and marketing of OFSP products, envisaged by fulfilment of ten contracts. Over 500,000 people were sensitised through the media, schools, hospitals, field days and exhibitions.

The initial narrow focus of the IPTAs was a challenge addressed through value-chain development. Other challenges included: institutional rules of leading organisations, which curtailed the IPTA process; loss of key members on platforms and limited activity monitoring. Lessons learnt include harmonising and leveling IPTA member expectations, and the importance of the media and traders on the platform. Future applications would benefit from adopting gender-transformative approaches within IPTAs and value chains.

Keywords: *innovation platforms, sweetpotato, value chains*

Introduction

The pro-vitamin A rich Orange-Fleshed SweetPotato (OFSP) is a wonder crop – only 125 g is needed to supply the daily recommended intake of vitamin A for a child below five years and non-lactating women (HarvestPlus 2010). Even at low yield levels (e.g. 5 tons/ha), a family of five can obtain their annual supply of vitamin A from a 500m² (0.05 ha) plot (HarvestPlus 2010). In addition, vine tops have excellent micronutrient content and adequate protein for use as feed or food. Also, sweetpotato produces more food per unit area per unit time than other major staples, tolerates occasional dry spells and yields even on less fertile soils (Woolfe 1992). OFSP is hence an important source in combating vitamin A deficiency, estimated in 27 million children in Eastern and Central Africa (ECA) in 2007, with a prevalence of around 40% (UNSCN 2010). Levels of vitamin A deficiency are highest in drier areas, where the diversity of micronutrient-rich foods is lowest. However, OFSP has not readily been available among resource-poor farmers where it is needed most. The Dissemination of New Agricultural Technologies in Africa (DONATA) project hence aimed at popularising OFSP uptake and utilisation in Ethiopia, Kenya, Rwanda, Tanzania and

Uganda. The 5-year project (2008–13) used a multistakeholder approach to transfer and promote proven technologies for production, processing, storage and marketing of OFSP. Twenty Innovation Platforms for Technology Adoption (IPTAs) comprising national agricultural research institutions (NARIs), non-governmental organisations, farmer organisations, the private sector and extension agents were formed and worked to increase availability of vines, roots and processed products along the production-to-consumption continuum. The specific objectives of the project included:

- Enhanced uptake of OFSP technologies and innovations in Ethiopia, Kenya, Rwanda, Tanzania and Uganda
- Strengthened capacities for disseminating and scaling up OFSP innovations in the production-to-consumption continuum in ECA
- Enhanced availability of information on OFSP innovations and uptake approaches to stakeholders in ECA.

The IPTA approach enabled achievement of the objectives through transfer and promotion of proven, available and emerging technologies for production, storage and processing of OFSP into higher-value products, development of agro-enterprises and linking farmers to markets.

Materials and methods

The NARIs spearheaded the formation of IPTAs in all countries, except in Gulu, Uganda where the university oversaw the process. The International Potato Center (CIP) provided technical backstopping. The NARIs identified potential research and development actors and invited them to join the IPTA. The IPTAs developed vision and mission statements that guided their work, and convened regularly to plan and review activities and strategies to promote OFSP. This was further augmented by delegation and harmonisation of roles, responsibilities and expectations. The IPTAs also sought expert support (where absent) in developing seed systems, production plans, value addition and marketing strategies. While there were differences in mandate and scope among the IPTAs, most of them focused on the entire value chain. By the close of project, 20 IPTAs were functional: two in Ethiopia, three in Kenya, four in Rwanda, nine in Tanzania and two in Uganda.

Main results

One of the greatest achievements was addressing the availability of quality seed at planting time. IPTAs supported establishment of 240 ha of multiplication sites. This was done using a three-tier system: i) Primary Multiplication Sites, which were established at NARIs and provided clean starter seed to the next levels; ii) Secondary Multiplication Sites, which were managed by farmer groups or entrepreneurs; and iii) Tertiary Multiplication Sites (TMSs) at individual farmer level. The hypothesis was that availability of planting material of adequate quality at the onset of rains would lead to early planting and increase the volume of fresh roots as well as providing raw material for processed products to satisfy market demand (Ndolo *et al* 2012). Seed was not only of high quality due to close supervision from research and the IPTA members, but was usually readily accessible in farming communities where the TMSs were based. In Kenya, for example, this enabled farmers to produce roots twice a year, whereas previously the first season was normally used to multiply vines for the second season. However, loss of seed was experienced due to drought, as was the case in Tanzania and Ethiopia. In Ethiopia, private seed multipliers greatly augmented disaster and relief management efforts after prolonged drought, through timely provision of seed to farmers, especially in incidences where TMSs had been wiped out.

A number of technologies were disseminated and adopted. These included agronomic practices for seed and root production, e.g. rapid multiplication techniques, vine conservation, disease identification and management, as well as value-addition technologies such as OFSP flour, snack foods, baked products and juices in addition to boiled and fried

fresh roots. Processing units were established in Kenya, Tanzania, Rwanda and Uganda, while small-scale sweetpotato processing equipment for promotion and demonstration including peelers, chippers and slicers were piloted and adopted in all countries. Marketing technologies promoted included establishment of sales points, bulking centres and commercial villages, among others. While the bulking points still need consolidation, these technologies led to increased production and productivity as well as quality of the various OFSP products including vines, roots and processed snacks.

The IPTAs built capacity of its members and actors in the value chain through a multipronged capacity-building strategy: 1040 trainers of trainers were trained in a broad range of themes including seed production and management, agronomy, postharvest handling and processing, entrepreneurship, collective action and marketing, among others. In turn, the trainers trained farmers and other stakeholders and this cascaded down to 26,000 farmers and 74 agroprocessors and 95 extension personnel. Sixty-four IPTA members were also given formal training in agricultural innovations systems and value-chain development in a bid to improve marketing facilitation skills. Five MSc students were sponsored and their theses focused on improving OFSP production and value addition. The improved capacity was manifested in the IPTAs being able to address challenges impeding visibility of OFSP. Following the training in AIS, the IPTA members in Rwanda decided to redesign the existing IPTAs to take on a geographical focus, hence increasing the number from two to four, which increased uptake of OFSP technologies. IPTAs in Kenya and Tanzania were able to scan the environment for marketing opportunities and devise strategies to address them. Generally, the quality of OFSP processed products improved as gauged from the improved consumer acceptability from the taste-tests performed in Rwanda and the increased demand. The IPTAs were able to successfully negotiate and conclude over ten contracts for vines, roots and processed products worth over USD 200,000. Vines that hitherto were given or exchanged freely have now gained commercial value and are sought for in the region.

There was increased awareness of OFSP in the five countries, resulting from a concerted effort of the IPTAs to develop and disseminate knowledge products through innovative pathways. The information, education and communication materials included training manuals, recipe books, leaflets and brochure, calendars, radio/TV scripts, websites and knowledge portals. These were disseminated during exhibitions, field days, agricultural shows, drama shows, radio/TV shows, farmer meetings and also at schools, health centres and barazas, among others. Promotional materials including umbrellas, aprons and bags were also distributed. As a result, over 500,000 stakeholders including actors in the value chain, chain supporters and policymakers were reached. Wide awareness creation enabled advocacy for support from policymakers to further the OFSP agenda. In Rwanda, for example, OFSP vine multiplication was allowed in wetlands previously gazetted for “priority” crops.

Key challenges

Initially, several IPTAs focused on just one segment of the OFSP chain, with an aim of specialisation. They later realised the need to broaden their outlook owing to the need to address the challenges in production, processing and marketing. This also meant that the IPTAs had to source for expert capacity to address the upper stream of the chain, which was done through engaging consultants or technical experts from CIP. In some countries, the IPTA process did not take off immediately on account of institutional rules that barred NARIs from transferring funds to other stakeholders for activity implementation. Loss of key members on the platform was another challenge, especially as a result of transfer, study leave or departure of the member from the partner institution. The IPTAs struggled to address this through scouting for replacements, but in any case this was not very easy. Harmonising roles and expectations of IPTA members was another challenge, which was addressed through sensitisation and support from institutional development experts. Other challenges were

related to weather, e.g. drought as experienced in Ethiopia and Tanzania, and limited monitoring of project activities because of funding constraints (CIP 2008–13).

Key lessons and recommendations for research, policy and practice

The key lessons learnt include:

- *Dynamism through the value chain:* The early years of the project were driven by the need to ensure availability and access to sufficient quantities of planting material. As increased availability of planting material translated into increased root production, concerns about market linkages preoccupied the IPTAs. This resulted in different types of actors becoming involved in the IPTAs (processors, traders, business development services and consumer protection bodies). Many of the IPTAs were able to encourage and embrace these new members.
- *Positive role of media:* The media played a great role in sensitising farmers and the general public on the importance of OFSP. In Uganda, Mega FM played an exceptional role in linking buyers of roots and vines to sellers.
- *Seed business models:* While farmers are now buying seed, seed business models that are likely to succeed will either be mixed livelihood or social enterprise models. Such entrepreneurs will be driven not only by profit but also by the desire to do good for others and could, for example, provide starter seed to new farmers or link other seed growers to markets at no extra cost (McEwan 2013).
- *Need for better food hygiene:* OFSP processed products and snacks will still require additional support to improve food hygiene to be eligible for quality certification.
- *Benefits for vulnerable groups:* OFSP has significantly contributed to improved health of vulnerable groups, e.g. children and people living with HIV/AIDS.
- *Need for attention to gender issues:* Future applications of this approach would benefit from gender transformative approaches within the IPTA and the value chain in context.

Conclusions

Innovations platforms can enhance uptake and dissemination of technologies because these platforms involve multilevel, multistakeholder interactions that facilitate identification, understanding and addressing of complex challenges. Their performance greatly depends on their institutional setup, which determines their ability to respond to changes (e.g. in demand and supply) within the environment, which would dictate their ability to remain relevant in the long haul.

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