

Mozambique: Promoting Orange-fleshed Sweet Potatoes¹

Background

Vitamin A is one of the critical micronutrients needed by all human beings. Vitamin A deficiency limits the ability of the body to defend itself against disease in about 40 percent of children under five years of age in the developing world. Consumption of this essential nutrient is extremely low in many parts of sub-Saharan Africa. In Mozambique, vitamin A deficiency affects more than 70 percent of children under five years of age. This is being tackled in many different ways.

What is innovative? This project sought to develop a strategy that would sustainably increase young child intake of vitamin A and energy, and potentially other nutrients as well. OFSP was not seen as a “magic bullet” but as a nutrient-rich resource that poor households can easily exploit. OFSP provided an entry point for change agents to empower mothers to change how they feed their young children and prepare food for the family as a whole.

Most strategies focus on young children, because achieving adequate vitamin A status has been shown to reduce child mortality. The three most common methods are administering vitamin A capsules every 6 months (supplementation), adding vitamin A to another food such as sugar (fortification), and increasing the consumption of vitamin A-rich foods (food-based approaches). Poor people in rural areas often have limited access to health services and limited amounts of money to spend on food.

Easy to produce, vitamin A rich foods could therefore have an important role in improving human health in such settings. In the past 15

years, the potential of “biofortified” staple crops – varieties bred for increased vitamin or mineral content – has been increasingly recognised. Orange-fleshed sweet potato (OFSP) is particularly promising because its levels of provitamin A carotenoids are high and can easily be absorbed by the body. Sweet potato is considered an excellent food security crop in sub-Saharan Africa because it often survives when other crops (for example, maize) fail. It is also less labour intensive than most other staple crops, is produced using vines instead of seeds, and can be planted over a broad range of time without considerable yield loss. But most varieties in Africa are whitefleshed, lacking in beta-carotene, the precursor of vitamin A.

The introduction of OFSP is simplified as knowledge of sweet potato production already exists. The interest in OFSP in Mozambique came about due to local demand for drought-tolerant crops to address the serious food insecurity problem. In addition, the Ministry of Health considered that it would be better to address the underlying cause of inadequate food intake (both in terms of quality and quantity), rather than contemplate distributing capsules every 6 months for the indefinite future.

Project Objectives and Description

In late 2002, the Towards Sustainable Nutrition Improvement Project was launched to explore whether an integrated agriculture-nutrition project could result in improved vitamin A intake among children under five years of age living in drought-prone areas of Zambézia province, Mozambique. The area is characterized by high levels of young child malnutrition, a monotonous diet with cassava as the primary staple, and a very poor resource base. The two and a half year action research project was a joint effort of research institutions (Michigan State University, the National Institute of Agronomic Research of Mozambique, the Southern African Root Crops Research Network) and development agents (the Ministry of Health, World Vision, Helen Keller International).

There were three parts to the approach:

1) **Introduction of a new source of vitamin A and energy.** Farmers received planting material of high-yielding OFSP varieties and were directly involved in their evaluation. Improved agronomic and storage techniques were

¹ This Innovative Activity Profile was largely drawn from Low et al. (2007a); Low et al. (2007b); Low et al. (2007c); and personal communication with the project team. This was reviewed by Ira Matuschke, Catherine Ragasa (Consultants); Regina Laub (FAO), and Maria Hartl (IFAD),

promoted to maximise the availability of OFSP in the diet throughout the year.

2) ***Demand creation and empowerment through knowledge.*** At the village level, principal child caregivers participated in interactive group learning sessions, which encouraged and enabled them to improve infant and young child feeding practices, hygiene practices, and to diversify the household diet. Radio and community theatre were used to build awareness among the broader community to create demand for the new OFSP cultivars and products made with OFSP, and to create demand for other vitamin A-rich foods. Raised awareness also promoted a supportive environment to speed up changes in practices within the household.

3) ***Market development for OFSP roots and processed products.*** This component linked farmers to traders and informed consumers about where they can purchase OFSP. Farmers knowing to whom or where they can sell their crop are more likely to expand area under production. Thus, generated demand combined with market development stimulated production, enhanced producer income and spread the health benefits of OFSP to a wider population, all of which would contribute to farmers' willingness to retain OFSP and expand production. Earned cash could be spent on foods to improve diet quality or increase use of health services. Demand for OFSP was expected to grow if profitable processed products using OFSP as a major ingredient were developed.

Farmers received free OFSP vines via farmers' groups, and were introduced to improved agronomic practices. These included appropriate size and number of vines to plant and their spacing (farmers planted using their methods next to a test method of planting). The life cycle of the sweet potato weevil and how to control it –hilling up soil and using clean planting material– was also studied, as were proper harvesting techniques to improve root quality and storability, vine conservation techniques, and improved local drying techniques to ensure adequate beta-carotene retention. Village-based extension personnel from World Vision Mozambique supported production, storage, processing, commercialisation, and demand creation activities. World Vision had worked in project areas before, which facilitated implementation. These communities receive little government service support beyond

emergency food distributions when there is a disaster, so were enthusiastic about the project.

Gender Approach

Approximately 1000 farmers, belonging to 53 farmers groups, participated in the project, 70 percent of whom were women. Both men and women were encouraged to participate in nutrition extension activities, which covered a range of topics including breastfeeding, hygiene, signs and consequences of malnutrition, and what foods, when, and how to feed infants and young children.

The project's "gender perspective" was incorporated in its initial design. The work grew out of previous experience the project team leader had working with women farmers in western Kenya. In the project area in central Mozambique, sweet potato had traditionally been a "women's crop" - a resource that women had some control over and a resource where they might keep some control (unlike in other agricultural technology interventions, where resources have shifted from women to men as value increased).²

Women's multiple roles as producers, including their role as the "gatekeepers" of family nutrition, were considered in the design. At the same time, project planners knew that it is not a good idea to target all information strategies to women and mothers -- other influential people, including their husbands, and older women were also reached, particularly through the community theater and radio spots. The objective was to create an environment where women were given information and skills to improve children's diets, but also where changes in relevant behaviors (e.g. feeding practices) could happen because other influential individuals were also informed and could support.

In designing the key nutrition extension activities, the "trials of improved practices (TIPS)" approach was used. The TIPS approach aims to identify constraints to adopting new behaviors, related to women's work, time use and roles. The method actively involves women in identifying practices that they are able to adopt. This is another aspect where one can say gender is considered. Many past projects have

² Personal communication with Mary Arimond (IFPRI)

had disappointing results if women's time and workload are not considered and, for example, labor-intensive food processing is part of the recommendations.

Agriculture extension personnel were all male; and nutrition extension personnel were female. So that women would “respect” the advice from the nutrition extensionist, the project sought extensionists who were themselves mothers. Over time, the number of men participating in nutrition sessions declined (except for cooking demonstrations), and the number of women participating in agriculture sessions declined. Many participants explained that one household representative at each was enough due to other time demands. In response, the project periodically arranged to send the nutrition extensionist to agriculture sessions and the agriculture extensionist to nutrition sessions. Monthly joint meetings between management and all extension personnel complemented senior management field supervisory visits enabling the team to detect emerging problems and make appropriate adjustments in a timely fashion.

Out of 9-12 available group nutrition sessions, female caregivers attended an average of 7.8 sessions (range 0-12; 82 percent attended 6 or more sessions). When asked for the two main reasons for missing sessions, most women (87 percent) reported this was due to their own illness and/or the need to care for another ill person. Only 15 percent of men reported attending nutrition sessions frequently; and 38 percent never attended.

Benefits and Impacts

Around 70 percent of farmers were producing white-fleshed sweet potato, and so were familiar with sweet potato production. By the end of project, 90 percent of participating households produced OFSP and a third of them sold OFSP. Most farmers did not drop the white-fleshed varieties, but added OFSP to their system. The average sweet potato plot size increased more than 10 times. Agronomic performance of OFSP was similar to white-fleshed local varieties, and young children in particular loved the taste of the new varieties. Most important, vitamin A intakes among young children in participating households were 8 times higher than in non-participating households. Intakes of energy and several other nutrients were also slightly higher. The frequency of OFSP consumption among children was similar to the

pattern found for adults: 2-3 times per week when in season; an average of 314 g eaten on days consumed. Controlling for infection, the prevalence of low serum retinol concentrations (a proxy for vitamin A status) remained the same in control areas and dropped from 60 percent to 38 percent in intervention areas. There were no significant differences among boys and girls in the consumption or serum retinol findings. In addition to OFSP, families also increased their consumption of papaya and dark green leaves – two other easy-to-grow sources of vitamin A. The timely availability of vines at planting time and the conservation of vines for the next season emerged as key factors driving the amount of OFSP produced in areas which have a risk of drought. The two most common methods of vine retention by farmers during dry season are planting in valley bottoms using their residual moisture to sustain the vines, and leaving some roots in the ground to re-sprout when the next rains come.

The project examined gender-specific participation of the principal caregivers in OFSP cultivation, changes in nutritional knowledge, and consumer preferences. Among intervention households, both men (82 percent) and women (91 percent) participated in OFSP cultivation, but 72 percent reported that women had principal responsibility for cultivating sweetpotato. Among households selling sweetpotato in year 2 (38 percent), responsibility for selling was divided more evenly between men (43 percent) and women (42 percent) with 14 percent reporting joint responsibility. Over $\frac{3}{4}$ of women felt that cultivating OFSP required no more labor than cultivating local sweetpotato; however 25 percent felt it was more labor intensive because of the improved agronomic practices (for example, planting in lines) being promoted concurrently with OFSP introduction. Men's opinions were similar.

There was little difference among men and women as to their traditional sources of advice concerning dietary practices and health. For dietary practices, one's own mother was the most important; followed by one's mother-in-law. For advice on health problems, one's spouse, one's mother, and health facilities were the top three. At baseline, nutritional knowledge scores on the 12-point scale were very similar (mean scores 3.3-3.4) across all groups (men and women in intervention and control areas). At the end of the study intervention women scored significantly higher than at baseline (8.1) and

significantly higher than control women (4.3). Intervention men also improved their scores (6.3) and scored higher than control men (4.7) ($P = 0.00$ for all comparisons). Control men and women also improved their scores significantly over baseline scores, but these 1.0-1.4 point increases were much smaller than those in intervention areas, where scores increased 4.8 points for women and 2.9 points for men. Improved knowledge scores in control areas may reflect exposure to the radio communication campaign and to market promotion stalls in the provincial capital; differences in the magnitude of the improvement between intervention and control areas could reflect participation in extension groups.

Lessons Learned and Issues for Wider Applicability

The principal use of OFSP was for home consumption. OFSP commercialisation significantly increased where access to markets was greater. The ability to produce a surplus which can be commercialised is difficult in drought-prone environments. Areas with high agro-ecological potential and/or areas within 10 kms of a major road are more likely to produce OFSP for sale. Children's intake of vitamin A increased with increased commercialisation of OFSP. Extension agents also reported that farmers were willing to invest more labour in improved practices as they knew that they could get a good price for the product. **Explicitly targeting women at the very early stage of the project design proved to be critical in the success and continued progress of the project.** However, principally targeting women and children for nutrition intervention may have unintentionally caused many men to think of nutrition as just a woman's concern. **Future initiatives should seek to address men's nutritional needs**, especially in settings such as Mozambique, where men often purchase foods and often are key decisionmakers in how much of each crop is planted. Better stimulation of their interest may result in significant spill over benefits for women and young child nutrition. The project did not see the expected increase in purchase of vitamin A rich foods, as households felt they could grow some of these foods and needed their cash for sugar, salt, oil, and other basic items. It could also reflect in part men being more responsible for purchasing decisions than women. **The specific benefits of animal-source vitamin A rich foods should be**

emphasized more in future initiatives to encourage their purchase.

Due to major differences in educational levels (60 percent of women had never received formal schooling compared to 25 percent of men), more repetitions and simpler explanations were needed with women than with men to get concepts across. Women preferred and probably gained more from cooking demonstrations, growth monitoring and community theatre activities than from lecture-style lessons. Men had greater access to radio than women did, and reported it as a more frequent source of information transfer than women did. Participation of men in the project was greater when marketing opportunities emerged. **All projects need gender-specific monitoring tools to help maintain the balance between desiring high buy-in from men and assuring sufficient access of women to the educational, nutritional and income benefits from participation.**

References

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