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RTB-ENDURE: Expanding Utilization through Research

Expanding utilization of roots, tubers and bananas and reducing their postharvest losses

Sweetpotato silage: a nutritious and affordable feed solution for small-scale pig farmers

Small-scale pig farmers in Uganda face challenges in accessing feeds for their livestock. This project aims to counter this problem by investigating options for sweetpotato silage making and supplementation as well as developing business models to produce, conserve and commercialize sweetpotato-based feed.

What is the problem?

In Uganda, quality commercial pig feeds are expensive, while other locally available feeds are seasonal in nature and often of poor quality. Feed accounts for about 62% of the total production costs in pig farming and the problem is further compounded by farmers' limited knowledge of supplementation strategies. To mitigate feeding costs, farmers often resort to using locally available feed resources, e.g., crop residues, plant leaves (*Ficus natalensis*), swill and kitchen leftovers to feed their animals. Sweetpotato accounts for about 20% of total crop residues provided by roots and tuber crops and sweetpotato vines are the most common fodder for pigs. Unfortunately sweetpotato vines are seasonal and highly perishable. This results in an excess of vines at harvesting times that are largely wasted while, during the dry season, farmers are forced to sell off some of their animals at give-away prices in a bid to maintain a herd size which they can afford to feed. While pig rearing is a lucrative business, many farmers fail to expand due to limited access to all-year-round feed source. This impacts negatively on small-scale farmers,

especially women, who are responsible for feed management. Silage (fermented, high moisture stored fodder) is a relatively easy and affordable technology that farmers can use to conserve roots and vines for feeding pigs in times of scarcity and has the potential to help cope with seasonal feed prices fluctuations that many smallholder pig producers experience.

What do we want to achieve?

Silage provides an opportunity to reduce postharvest losses by utilizing sweetpotato vines and non-commercial roots that otherwise will be largely wasted. Furthermore, it can contribute to decrease feeding costs while opening up business opportunities for youth and women. Cost-effective sweetpotato silage recipes were developed and tested in Kenya during the Sweetpotato Action for Security and Health (SASHA) Phase 1 project. However, the technology is not known amongst smallholder producers and has not been validated under Ugandan conditions.



Some participants to the farmers' training on silage making in Masaka (credit H. Sempagala)

How are we going to make it happen?

We will (i) investigate options for silage making and supplementation; (ii) identify gender responsive models for organizing value chain actors to produce, conserve and market sweetpotato-based feeds; (iii) strengthen existing linkages between pig farmers and sweetpotato traders; and (iv) build business capacity for profitable silage making and pig production. We are validating sweetpotato-based silage using various combinations of sweetpotato roots, cassava flour and legumes (*Gliciridia* and *lablab*) at Makerere University. These results will form the basis of on-station feeding trials to evaluate optimal supplementation strategies using sweetpotato silage as a basal diet. This will then pave way for on-farm trials with selected farmers in Kamuli and Masaka districts. Research is also being conducted to determine the best dual purpose sweetpotato varieties and harvesting regimes that will ensure optimal balance between roots and vines production. Promotion and commercialization of silage will be guided by business models that focus on innovative silage production and marketing. In order to understand the economic viability and social acceptability of silage, studies will be conducted to assess farmers' willingness-to-pay for silage as well as the profitability of the silage enterprise.

Where are we working and who are we working with?

We are working in Kamuli and Masaka districts in Uganda. The project is led by the International Potato Center (CIP) and implemented in collaboration with International Livestock Research Institute (ILRI), the National Agricultural Research Organization (NARO), Makerere University, Uganda Martyrs University, Volunteer Efforts for Development Concerns (VEDCO), Coalition for Health, Agriculture and Income Networks (CHAIN)-Uganda, Pig Production and Marketing Ltd (PPM) and farmer organizations.

What have we achieved so far?

We have adapted and developed protocols to guide silage making and pig feed supplementation. Ten treatments have been tested on sweetpotato silage and supplementation regimes and organoleptic results have been generated. Proximate analysis



Practical session on silage making at the TOT course (credit M. Mbabazi)

is being carried out on the samples to assess the nutritive value of each treatment. Trials on dual purpose varieties that would best fit within farming systems in Kamuli and Masaka are also underway, while 16 pilot farmers (50% female) who will host the on-farm feeding trials have been profiled and have already established sweetpotato gardens. A protocol to assess existing feeding practices has been finalized and data collection has started. Silage making manuals in English and a local language have also been developed as well as various communication material. Thirty extension staff and model farmers have already been trained as trainers in silage making and pilot farmers in Masaka have been trained. Selected project partners have already joined existing local and national pig multi-stakeholder platforms where they are kept abreast of pertinent issues in the sector. Three Master's students have been enrolled and are conducting research to complement the project outputs.

What's next?

We are embarking on strengthen the capacities of pilot farmers in Kamuli as well as youth in silage making and feeding. On-station feeding trials are about to commence which will quickly be followed by on-farm trials and economic studies to assess the potential for commercializing silage. Farmer demonstration centers will soon be established and equipped. A gender baseline survey is being planned and the findings will be used to strengthen the gender strategy.



Participants to the TOT course on silage making (credit M. Mbabazi)



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The CGIAR Research Program on Roots, Tubers and Bananas (RTB) is a broad alliance led by the International Potato Center (CIP) jointly with Bioversity International, the International Center for Tropical Agriculture (CIAT), the International Institute for Tropical Agriculture (IITA), and CIRAD in collaboration with research and development partners. Our shared purpose is to tap the underutilized potential of root, tuber and banana crops for improving nutrition and food security, increasing incomes and fostering greater gender equity, especially among the world's poorest and most vulnerable populations.

Contacts

Gerald Kyalo (CIP)
gerald.kyalo@cgiar.org
Ben Lukuyu (ILRI)
b.lukuyu@cgiar.org