



# Feeds and forage interventions in the smallholder pig value chain of Uganda

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Smallholder pig producers face a number of constraints in the areas of health, feeds, breeding and marketing in developing their enterprises. The high cost and poor quality of commercial feeds, and a lack of low-cost local alternatives, prepared from amply available cheap ingredients found on farms, are probably the major constraints facing smallholder pig producers. This situation is aggravated by seasonal changes in the environment causing fluctuations in feed quantity, quality and price. Consequently, farmers engage in opportunistic and inadequate feed practices. ILRI has undertaken a number of feed-related interventions designed to alleviate some of the above constraints, including:

- Testing of diets comprising local feed resources on pig performance;
- Increase of the use of nutritious forages in the pig diets; and
- Use of supplemented sweetpotato silage.

## Testing of diets comprising local feed resources on pig performance<sup>1</sup>

### Aims

Summarize the nutritional value and seasonal availability of locally available pig feedstuffs.

- Compare the productivity of pigs fed on commercially prepared diets versus silage-based or forage-based diets.
- Develop balanced low-cost diets for local and

crossbred pigs using seasonally available local feedstuffs.

### Intervention sites

The Masaka and Mukono districts of the Central Region, Uganda

### Approach

The approach included assessing and documenting the seasonal availability, relative importance and nutritive content of local resources. Two compounded diets using common feedstuffs: forage-based and silage-based diets, and a commercial diet were tested. The local ingredients used to formulate diets based on local feed resources included: avocado fruits, banana leaves, cassava leaves, cotton seedcake meal, jack fruit, maize bran, papaya leaves, mukene (silver fish), sweetpotato vines and roots, limestone, common table salt and vitamin premix. A feeding trial involving 90 pigs was undertaken in Masaka district at Kamuzinda farm. The formulation took into account the nutrient requirements of pigs and feed costs.

### Key findings

Feeding commercial diets to newly weaned pigs, and then feeding silage- or forage-based diets to finishing pigs is the most cost-effective solution. The poor growth performance of newly-weaned pigs in this study indicates that strategies resulting in increased weaning weights, creep feeding, and the identification of nutrient dense, digestible, palatable feedstuffs and their incorporation into low-cost balanced diets suitable for newly weaned pigs are needed. The results of this study indicate forage and silage-based diets can be year-round low-cost pig-feeding strategies that improve the

1. Adopted from Carter, N. et al. 2016. *Silage- and forage-based diets compared to commercial diets in Ugandan pig growth*. Poster prepared for the 24th International Pig Veterinary Society Congress, Dublin, Ireland, 7–10 June 2016. Nairobi, Kenya: ILRI. <http://hdl.handle.net/10568/76024>

growth performance of pigs, thereby increasing pig farmer income and food security.

### Impact

Farmers in Masaka district were trained on how to formulate experimental diets using available local feed resources. Some smallholder farmers have adopted these diets and one of the farmers even planted avocado trees to increase availability of avocado fruits for pig feed.

## Increased use of nutritious forages in the pig diets

### Aims

Identify and promote nutritious forages for pig feeding that can be incorporated in the pig diets to improve their nutrition value and reduce feed costs.

### Intervention sites

The Kamuli, Masaka, Hoima and Lira districts of Uganda, in collaboration with local governments.

### Approach

Best-bet forages for feeding pigs with low fibre and high protein were selected. The varieties were also selected on the basis of seed availability and suitability to local conditions. Participant pig farmers were supplied with seed to plant forages on at least 0.125 acres of land. The planted forages are shown in Table 1 below. After establishment of the forages, a monitoring study was undertaken in November 2016 to assess the germination and growth performance of the forages. The farmers assessed pig preferences for the varieties. The farmers were also asked about the challenges they faced in planting and using these forages.

Table 1: Varieties of forages given to farmers established in different districts of Uganda

District	Sub-counties	No. of farmers	Varieties established
Masaka	Kabonera, kyanamukaka	36	<i>Morus alba</i> , <i>Lablab purpureus</i> , <i>Brachiaria</i> cv. Mulato, <i>Clitoria ternatea</i> , <i>Canavalia cathartica</i>
Kamuli	Bugulumbya, Butansi, Namwendwa	36	<i>Morus alba</i> , <i>Lablab purpureus</i> , <i>Brachiaria</i> cv. Mulato, <i>Clitoria ternatea</i> , <i>Canavalia cathartica</i> , <i>Brachiaria</i> hybrid cvs.: Cayman, Cobra and Mulato II
Lira	Ojwina Division, Adyel Division, Adekokwok and Barr sub county.	12	<i>Trifolium decorum</i> , <i>Lablab purpureus</i> , <i>Desmodium uncinatum</i> , <i>Lupinus angustifolius</i> , <i>Desmanthus virgatus</i> , <i>Trifolium tembense</i> , <i>Desmodium intortum</i> , <i>Vicia villosa</i> and <i>Stylosanthes hamata</i>
Hoima	Busiisi, Kitoba and Kiziranfumbi	14	<i>Trifolium decorum</i> , <i>Lablab purpureus</i> , <i>Desmodium uncinatum</i> , <i>Lupinus angustifolius</i> , <i>Desmanthus virgatus</i> , <i>Trifolium tembense</i> , <i>Desmodium intortum</i> , <i>Vicia villosa</i> and <i>Stylosanthes hamata</i>

### Key findings

In general, the establishment of the forages was affected by the long dry spell. The preliminary findings indicated that amongst these forages, *Brachiaria* species established well in all the districts. Farmers reported that the pigs loved the *Brachiaria* species. However, some species like the *Morus* mulberry did not establish well with the dry season. There is a need to evaluate further the use of *Brachiaria* species as pig feed.

### Impact

The impact was not assessed since most of the farmers had just established the forages, and for some of forage species, the biomass yields were poor due to the long dry spells.

## Use of supplemented sweetpotato silage

Uganda is the highest producer of sweetpotatoes in Africa (about 2.2 million tonnes/annum). An estimated five tonnes of vines can be harvested in a hectare. It is well documented that sweetpotato vines are the most common forage fed to pigs by smallholder farmers in Uganda. Most farmers feed sweetpotato vines in a fresh form because this feed resource is available immediately after harvest. They feed vines without any form of supplementation. Sweetpotato vines have a very short storage life.

### Aims

- Increase the shelf life of the vines through silage making to even out the seasonal feed scarcity.
- Determine the performance of growing pigs fed on a supplemented sweetpotato silage-based diet.
- Develop innovative business models to promote and commercialize sweetpotato silage.

This intervention is expected to transform the production and utilization of sweetpotato vines and non-commercial roots to attenuate the constraints of livestock feed shortages. Sweetpotato silage provides an opportunity to reduce waste in urban markets and at household level it can open up business opportunities for young people and women.

### Intervention sites

The Masaka and Kamuli districts of Uganda.

### Approach

The experiments were carried out in Makerere University to determine the best sweetpotato silage combination using different fermenters (maize bran and cassava flour). Then on-station feeding trials were carried out on 48 pigs fed on three 'best bet' silage-based diets and one commercial diet. The best performing diet of supplemented silage at 40% with the commercial feeding ingredients was validated with farmers in Kamuli and Masaka districts. To increase the awareness of the technology, district extension staff of Kamuli and Masaka were trained in silage making so that they would act as trainers in their respective areas. Smallholder farmers (280 young people, 1458 females and 402 males) were trained for over two years in silage production. Two silage business centres were launched in Masaka and Kamuli districts. Partner organizations attended several agricultural shows around the country exhibiting

the sweetpotato silage technology. Two open days were organized in Kamuli and Masaka districts and the public were invited to witness demonstrations on silage making.

### Key findings

- The use of sweetpotato vine silage can even out the supply of feed on smallholder pig farms.
- The feeding of Sweetpotato silage that constitutes 60% of the daily ration of pigs combined with 40% provided by the supplement improves the growth performance of the animals.

### Impact

Sweetpotato silage has reduced feeding costs by 40% and increased sweetpotato vines and roots shelf-life by four months. Sweetpotato silage technology is providing employment to different groups of people, including: young people (Twekembe youth group) making silage for sale;

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sweetpotato farmers selling vines for silage; and non-governmental organizations are offering training on silage making and supplementation. This intervention has enabled farmers feeding pigs on sweetpotato silage to increase the sizes of their pigs and their incomes.

### Conclusions

- Sweetpotato silage can alleviate dry-season feed shortages and offers potential for business opportunities, especially to young people.
- More work is needed, especially in the testing the performance of sweetpotato-based diets on pigs.

Ben Lukuyu, Peter Lule, Brian Kawuma and Emily Ouma work for the International Livestock Research Institute.

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