

Policy Briefing

Options for developing the Ugandan cassava value chain



Photo: Andrew Craffham



Photo: TAGRM ridging-type cassava planter working in Bulisa-Biiso, AgriTT project: www.youtube.com/watch?v=TxnB9ftBN2c

The AgriTT programme is an innovative trilateral initiative between the UK Department for International Development (DFID), the Chinese Government, the Governments of Malawi and Uganda and the Forum for Agricultural Research in Africa (FARA). The programme facilitates the sharing of successful experiences in agricultural development with developing countries to improve agricultural productivity and food security.

The AgriTT Research Challenge Fund supported two year research projects to generate new thinking and practice on technology transfer and value chain development. Each project had a Chinese, UK, and African or South-East Asian research partner.

 Agricultural Technology Transfer

Assessing the transferability of Chinese production and processing technologies

Both Chinese and Ugandan cassava systems are based on smallholder farmers, but China's systems, with more inputs and mechanisation, are significantly more productive. However, the crop is destined for different markets: in China cassava is primarily a non-food crop, used for animal feed and to produce starch and ethanol; in Uganda it is a food security crop, with some cash sales. Processing in Uganda is mainly limited to fermented sun-dried chips for making cassava flour, a popular product traded extensively both within Uganda and to neighbouring countries. In contrast, although relatively young, China's cassava industry is highly efficient. In just 25 years production has risen from 1 million tonnes per year to 10.5 million; average yields have leapt from 9 t/ha (Uganda's current level) to 27 t/ha; and starch content has increased from 14% to 25%.

The Government of Uganda aims to commercialise cassava production by establishing a strong raw material supply base, processing industries, and a well developed market for end products. This focused research project provided support to the wider AgriTT Pilot Development Project¹ on cassava value chains in Uganda, which aims to improve yields, post-harvest handling, primary processing

¹ <https://agritt.landellmillsprojects.com/uganda-pdp>

and markets. Cassava processing in China has grown rapidly, now numbering 145 large-scale factories, most of which process 250–500 tonnes per day. The main products are ethanol, native starch, modified starches, animal feed and starch-based sugars, and there is significant importation of dried cassava chips for ethanol production. In addition to starch and ethanol, cassava is a source of a wide range of sugars, sugar alcohols, organic acids and even biodegradable plastics. It is also used to produce high-quality cassava flour (HQCF), which has many applications in food industries and can also be used to prepare paperboard adhesive or as a glue extender for plywood manufacture. In Uganda, HQCF is being processed on a small scale at rural level. This is a good start, but the technology is limited and the scale of production is restricted to a few tonnes per day. Cassava processing in Uganda is mainly limited to fermented sun-dried chips for local flour markets. China's sophisticated post-harvest processing systems are generally too large-scale for adoption in Uganda considering the current state of both cassava-processing systems and identified markets. However, individual pieces of equipment may well meet specific applications.

Some technologies for on-farm mechanisation are promising – with modifications to make them effective in the Ugandan context.

The greatest benefit of mechanisation

in Uganda could come through land preparation, particularly ploughing and ridging. Ugandan soils may also benefit from additional equipment, such as a ripper for land preparation, but this is arguably an investment worth making. Other machines, for example for planting and harvesting, may need significant modification depending on what is chosen. At the processing stage, drying systems for cassava and other crops could be adapted for food-grade chips or shreds in Uganda, using modified materials (stainless steel instead of mild steel) and fuel sources (agro-waste instead of coal). While overall power consumption of this technology will determine the business case, it could prove useful for wet-season drying.

Good Agricultural Practices (GAP) for cassava should be promoted.

As a result of this project, many GAP implemented in China have

been identified for adaptation to the Ugandan context, where they have not been widely used. Chinese GAP include clean planting material (with strong government support); well tilled soils; optimal row and plant spacing and ridging; inorganic fertilisers; organic mulches; removal and destruction of diseased material; herbicide and insecticide applications (when needed); water conservation and weed control via plastic mulches; intercropping; and crop rotation strategies. For example, Ugandan farmers commonly intercrop with legumes, but as cassava takes 11–12 months to grow, they cannot rotate their crops within a single year. Chinese farmers tend to leave the crop for an additional 6 months and use the time to intercrop, thus doubling their yield without increasing fixed costs.

Part of a bigger picture

- **These results have contributed to AgriTT's ongoing Uganda Pilot Development Project on cassava value chain development.** To achieve economies of scale, considerable investment will be needed from both government and private sector entrepreneurs. In a global market some of this investment could come from outside Uganda.
- **Protocols for GAP should be developed for Uganda, demonstrated and publicised.** These could include different varieties of cassava, cultivation methods, improved fertiliser management, soil conservation and modern processing equipment. However, work on irrigation is not recommended for the Ugandan context as it is unlikely that farmers would see sufficient return on the high capital investment required.
- **Work has begun with Ugandan farmer groups and local extension services to disseminate these findings.** A demonstration system run by Chinese technical assistance in collaboration with farmer groups and extension officers, and entrepreneurs, is being used to publicise more commercial approaches for cassava production and processing of non-traditional products. Farmer groups would need to access finance in order to adopt mechanised production and processing of cassava, and some form of cost-sharing would be beneficial.
- **Ugandan growers need better access to markets and market information to support larger-scale investments.** Working out the right price indicators, and giving farmers the flexibility to respond to them, will be critical to the expansion and stability of the Ugandan cassava industry. This research has identified specific market outlets for HQCF; further work is needed to understand the business case for different processing options in rural areas, and the market opportunities for non-traditional products such as high-quality cassava chips and cassava flour. Findings from this research project will be useful in guiding decisions about purchasing processing equipment.



Each brought something different to the partnership, making the whole greater than the sum of the parts: Chinese innovation + Ugandan local knowledge/adaptation + UK research.



Partners

China

Chinese Academy of Tropical Agricultural Sciences (CATAS), Haikou City

Institute of Starch Chemical Industry (ISCI), Guangxi University

Uganda

Africa Innovations Institute (AFRII), Kampala

UK

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