

Opportunities for Utilization of Roots, Tubers and Banana (RTB) byproducts and waste

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A concept developed by RTB Cluster 4.1 –
Demand-led Approaches to Drive Post-Harvest
Innovations and Nutritious RTB Products

Background



Utilization of Roots, Tubers and Bananas (RTB), in fresh market and in processing chains, generates significant amounts of byproducts and waste including:

- Sweetpotato peels and vines**
- Banana peels and peduncle**
- Cassava peels; liquid and solid wastes from cassava processing**



Background



- Potato peels, effluent from potato processing
- Local pollutions (smells, visual pollution, pests, etc)
- Global pollutions such as emissions of methane, a greenhouse gas 25 times more potent than CO₂, in the case of anaerobic fermentation.

Main types of wastes and byproducts from RTB crops

Byproducts	Quantities	Potential solutions
Banana peels and peduncle	25%-30% of volume of bunch	Animal feed (fresh, pellets, silage), human food, bio-mulching film, ethanol production
Yam peels	10% of the root	Human food, animal feed, mushroom production
Cassava peels	25-30% of the root	Mushroom production, biogas, animal feeds; fermentation enhancers, medium for yeast growth and propagation
Potato peels	5%	Animal feed; fermentation enhancers, medium for yeast growth and propagation

Main types of wastes and byproducts from RTB crops



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Byproducts	Quantities	Potential solutions
SP peels, vines and non-marketable roots	5% harvested roots, 4% at market level, 35% vines	Animal feeds (fresh or silage)
Effluent from cassava, potato and yams processing	Cassava (10-50%) Potato (10-30%) Yam (10%)	Biogas
Cassava bagasse	25-35% initial weight of food processed	Animal feed, biogas; glucose; extraction of antioxidants; starch-cellulose binders or glue

Why waste/byproducts management?



- Demand for innovations in better management of byproducts and waste is driven mainly by:
 - Opportunity to increase profitability of post-harvest processing of RTB crops, and
 - Necessity to comply with increasingly stringent environmental regulations.

Why waste/byproducts management?

Economic factors:

- Necessary to reduce RTB waste and utilize RTB byproducts
- Reducing the environmental footprint of RTB processing is increasingly becoming an integral element of corporate social responsibility programs and private sustainability standards.
- Need to extract more value and revenues from a given quantity of raw materials and reduce costs of waste management at enterprise level.
- Near zero waste economy
- Employment for the women and youth

Why waste/byproducts management?



Regulatory and policy factors:

- Compliance with country-level environmental and natural resource policies, waste management policies.
- For East African countries, there is a current ban on plastic bags. RTB waste can be critical in addressing packaging gaps by providing fibre/residual starch to produce various bio based packaging material.
- Comply with regulations: City ordinances e.g. Lagos, Kampala City Council, Lima etc.
- Policy priority placed on reducing carbon footprint, increasing youth employment, expanding agri-industry, etc.

Knowledge gaps and Research questions

Knowledge gaps	Research questions
Entry points for RTB byproducts and waste into feed for animal systems	<ol style="list-style-type: none">1. What is best feed formulation of RTB byproducts for different classes of animals?2. What is the cost-benefit ratio of using RTB crop peels as feed for different animals and the production of mushrooms, biogel fuel, biogas and silage
Business and employment opportunities differentiated by gender and age	<ol style="list-style-type: none">1. What is the potential for business development and employment generation from RTB byproducts and waste with emphasis on women and the youth?2. What are viable business models and entry points in value chains of RTB byproducts and waste-based products?3. What are the economic, social and gender specific factors that may accelerate or hinder inclusive growth of these value chains?
Options for cost efficient collection and bulking of RTB byproducts and wastes	<ol style="list-style-type: none">1. What technologies and management options are available for collection and bulking of RTB byproducts?2. How can these insights best be integrated into (public and private) investment planning for collection and processing centers?

Recent initiatives on management of wastes



- Sweetpotato silage work under RTB Endure in Uganda, SASHA 1 work in Kenya, silage work in Vietnam by CIAT and CIP. In Uganda, some entrepreneurs are already making and selling SP silage as pig feed.
- Work by EU-GRATITUDE project on using cassava and yam peels for mushroom cultivation by Federal Institute of Industrial Research, Oshodi (FIIRO).
- Work on conversion of cassava peels to animal feeds by IITA and ILRI. The technology is already commercialized by NIJI LUCAS group in collaboration with Feed the Future Project, IITA and ILRI.
- Biogas and biogel work by the Biomass Web project in Nigeria, led by FIIRO.

Example: Commercial sweetpotato silage production by Bavubuka Tweekembe group- Uganda



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- Supported under RTB Endure: sub project on a sweetpotato silage by CIP

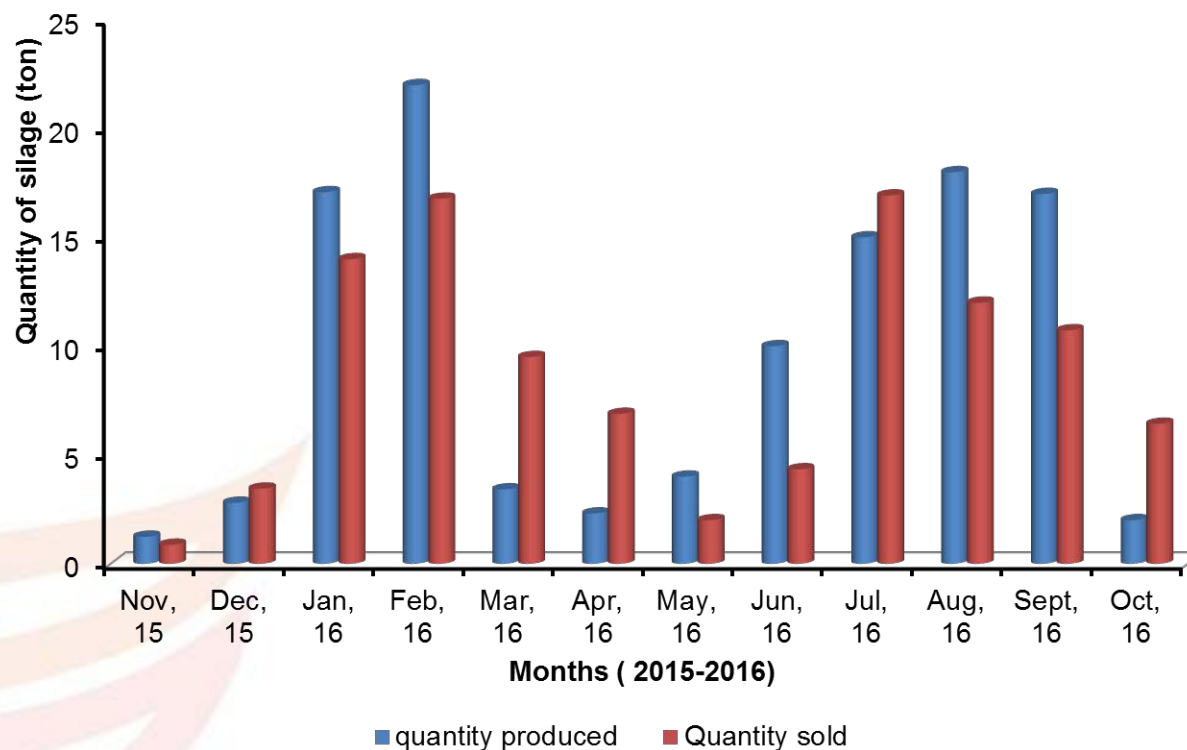


Courtesy: Bavubuka Tweekembe Group- Uganda

Sweetpotato vines silage production and sales



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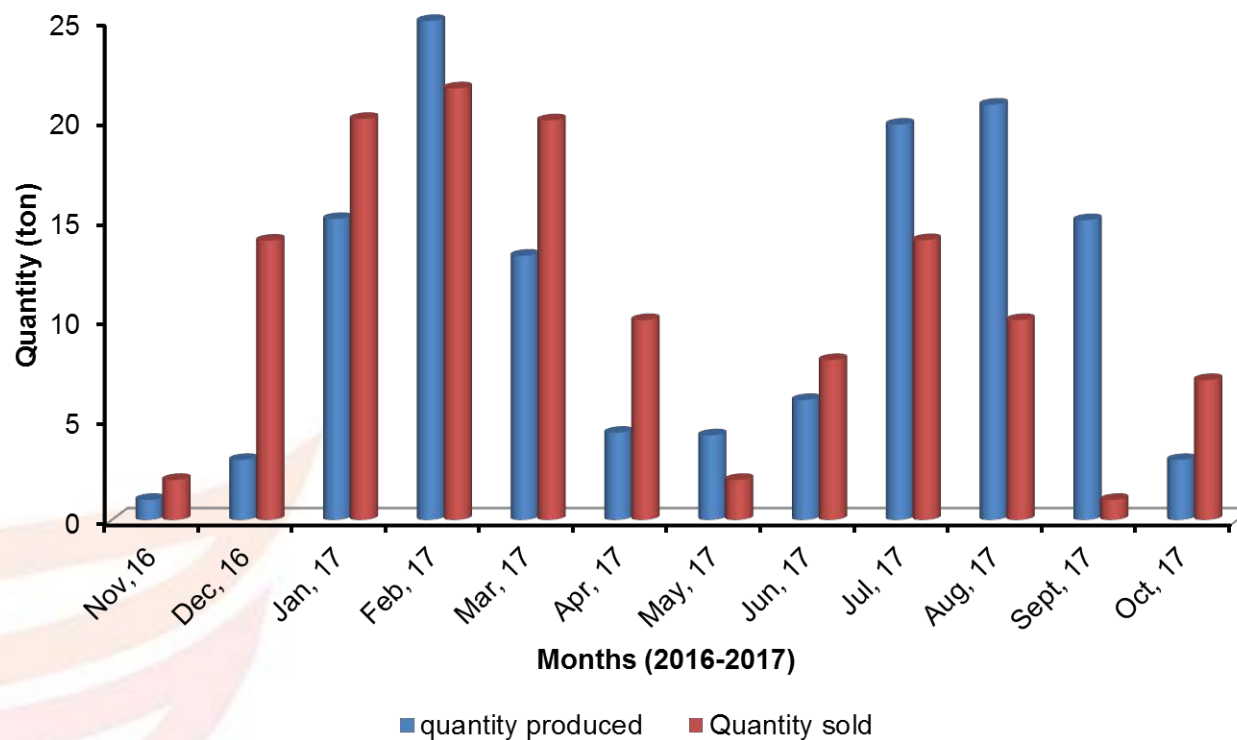


Courtesy: Bavubuka Tweekembe Group- Uganda

Sweetpotato vines silage production and sales



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Courtesy: Bavubuka Tweekembe Group- Uganda

Commercial sweetpotato vines silage production

- 242 tons produced between Nov. 20015-Oct. 2017
- 227 tons sold in the same period
- **Source of SP vines:** farmer fields and markets
- **Categories of customers:** Urban and peri-urban pig and dairy cattle farmers

Courtesy: Bavubuka Tweekembe Group- Uganda



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Thank you for listening

Asante sana!