

# Development of cassava chip processing in Ghana

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# Abstract

Dried cassava chips (kokonte) are traditionally processed in Ghana. The piece sizes are large and they typically take a long time to dry ( $> 2$  weeks) and product quality is low. NRI and MoFA have been collaborating to investigate improved chip production at the farm level for human consumption and for use in animal feed to replace maize.

This paper summarises a series of related studies that have been undertaken to understand and develop a system for the production of high quality chips for identified markets. These studies have investigated: the markets for the cassava chips, consumer perceptions, improvements to the chipper to increase ergonomic performance, on-farm participative trials of a chip production system, availability of credit, suitability of use of the product in layer, broiler and pig diets, consumer sensory evaluation and trader panel assessments for the human food market. The results of these studies are briefly outlined as is the importance of considering the whole of product production and marketing system.

# Background

Needs assessment studies in 1994 identified need of farmers to diversity markets for produce.

Collaborative follow-up studies have investigated:

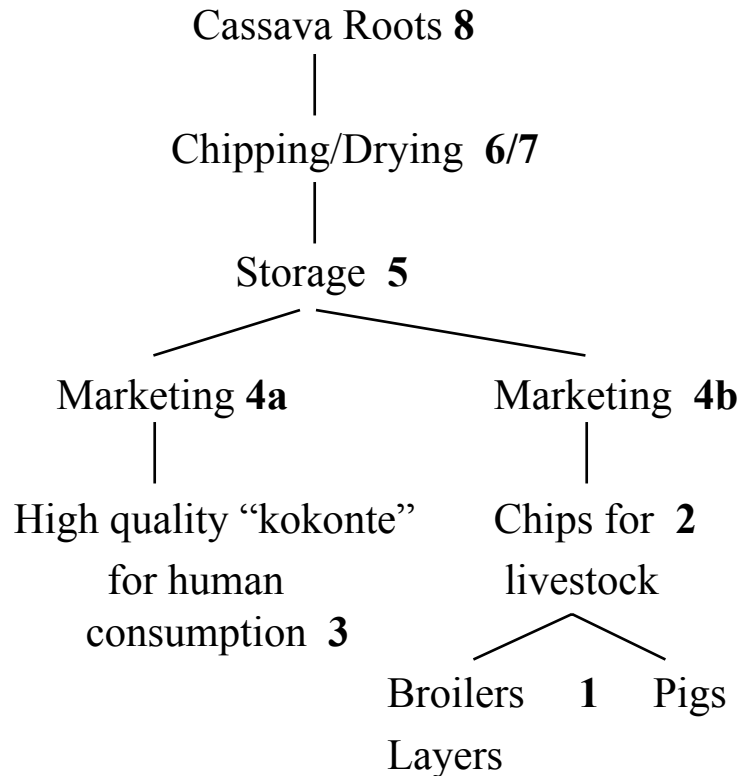
- Production of improved dried chips for human consumption from peeled roots as an alternative to traditional kokonte
- Production of chips for the partial replacement of maize in livestock (broiler, layer and pig) rations.

# Approach

A market-based approach was used to investigate the potential of cassava farmers to access new markets. Starting from the potential markets a numbers of studies have been undertaken to assess and develop these new market opportunities. These are detailed below.

These studies were based around the mini-chipper - a machine developed by the International Institute of Tropical Agriculture, Nigeria. It produces thin “mini-chips” that look like spaghetti.

# Elements of the system

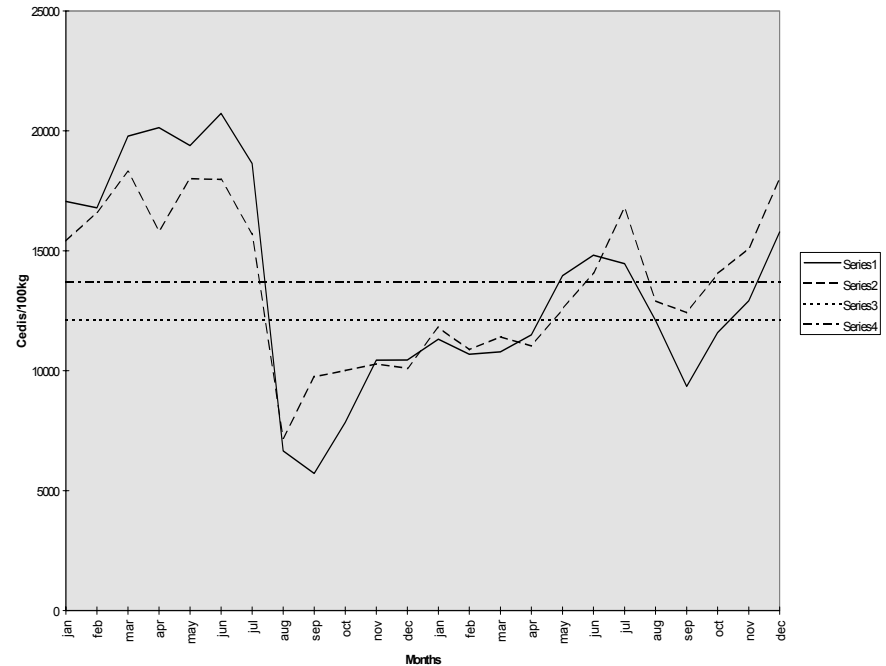


Elements of system investigated:

1. Price competitiveness
2. Fitness for use - on farm participative trials
3. Consumer market/acceptability
- 4a. Marketing/trader acceptability
- 4b. Marketing for livestock
5. Storage
6. On-farm participative development of technology
7. Availability of credit
8. Sustainability of production

# 1. Price competitiveness compared with maize

- Range of mini-chip prices calculated based on costs of production and assuming same return on labour as for chips for export.
- This gave a range from 121 and 137 Cedis/Kg assuming real interest rates of 0 and 15% respectively.
- Compares with a chip for export price of 90 Cedis/Kg.
- When compared with maize price on an equivalent basis (same protein content) cassava would have been competitive for 13/24 months in 1995/96 period at 121 C/Kg.



- Chip production is seasonal and optimum drying conditions are December - April which is time when price of maize is highest

## 2. Fitness for use - on-farm trials.

- In workshop with stakeholders in livestock sector, a major issue was fitness for use of cassava.
- On-farm broiler, layer and pig trials undertaken. Promising results when comparisons made between conventional diets and ones with cassava.
- For example, pigs came to market weight (60 kg) in 7 months on the cassava based diet compared with one year (or more) on the conventional diets.
- Poultry showed no significant loss in performance with 20% cassava in diets.

## 3. Consumer market/ acceptability

- Sensory panels have shown a marked preference for the minichip by certain groups of consumers.
- Kokonte has a reputation for being a low priced, low quality staple for lower income consumer groups.
- However, a recent survey suggests that kokonte is well liked by a significant proportion of urban based, higher income consumers, who, however, do not eat because of its unhygienic method of production and food safety.
- Such consumers may pay more for a high quality product such as the minichip.

## 4. Marketing

- **Trader acceptability**
- Quality assessment by trader panels shown they recognise the superior quality of minichips in terms of colour, mould growth and insect infestation.
- The minichip is a new and unfamiliar product and traders are uncertain how to price it.
- The commercialisation of the minichip is a challenge facing the introduction of this new high quality, high value product onto the market.

### **Marketing for feed**

- PRA studies have shown that farmers will produce the chips if there is a market.
- Discussions with feedmillers and PRA studies of livestock producers have shown they will use cassava if there is a regular supply.
- The challenge is to link these two ends of the chain.

## 5. Storage of chips

- Storage trials in structures traditionally used by farmers.
- Minichips have a significantly longer storage potential than traditional kokonte.
- After three months of storage, kokonte became mouldy and infested with insects. Minichips, on the other hand, remained in good condition, white in colour and free from insect infestation after six months of storage.
- Minichips can be a valuable food security reserve for farm households during the lean season or be sold when prices are higher.

<u>Month</u>	<u>Kokonte</u>	<u>Minichip</u>
May	4.4	0.3
July	10.5	4.1
<u>Nov.</u>	<u>38.5</u>	<u>4.4</u>

Percentage weight loss in 1997 season in Brong Ahafo. Storage started in April.



## 6. On-farm development of “technology”.

- Chipping and drying system developed with Farmers Group in Brong Ahafo.
- Chipping done with IITA developed chippers with some improvements made to increase performance.
- Combination of chipper, drying on trays for 1 day and on polythene sheeting for 1 day produces high quality product.
- Microbiologically - low in coliforms; also low in ash.
- Tested with farmer groups over 2 seasons.



## 7. Availability of credit

- Examined availability of credit for agroprocessing in Brong Ahafo.
- Formal and informal sector credit exists for agroprocessing, but informal more important especially for working capital.
- Seven different lending practices identified.
- Banks decreasing lending to agricultural sector - expect increased reliance on informal sector.
- Emphasis on lending to groups - but little evidence that is always successful. Individual entrepreneurs often excluded.

## 8. Sustainability of production

- PRA study undertaken in Brong Ahafo.
- Cassava secondary crop to yam.
- Land pressure not that great - still operate shifting cultivation.
- No land tenure, hence grow crops and move on - no attention to soil fertility.
- Where farmers have become geared up for chip production for export - growing time to harvest reduced.
- Impact of new varieties?

# Conclusions

- A market based approach to research and development can work.
- It is however important to gain an understanding of the whole system
- In this project, there are three significant bottlenecks that are still being investigated:
  - linkage between producers and consumers in the case of the livestock.
  - traders in minichips need confidence in the product - it is still unfamiliar and this causes problems in pricing.
  - the scale of processing still needs to be optimised.

# Acknowledgements

This is an output from a research project funded by the United Kingdom's Department for International Development (DFID). However DFID can take no responsibility for any views expressed. The authors would like to thank the many scientists, extension workers and farmers who contributed to this work.