PROCESSING TECHNOLOGY COMPONENT 4A OF THE CATISA PROJECT BASELINE STUDY FIELD TOOLS

1.0 Background to Start-up Baseline Study

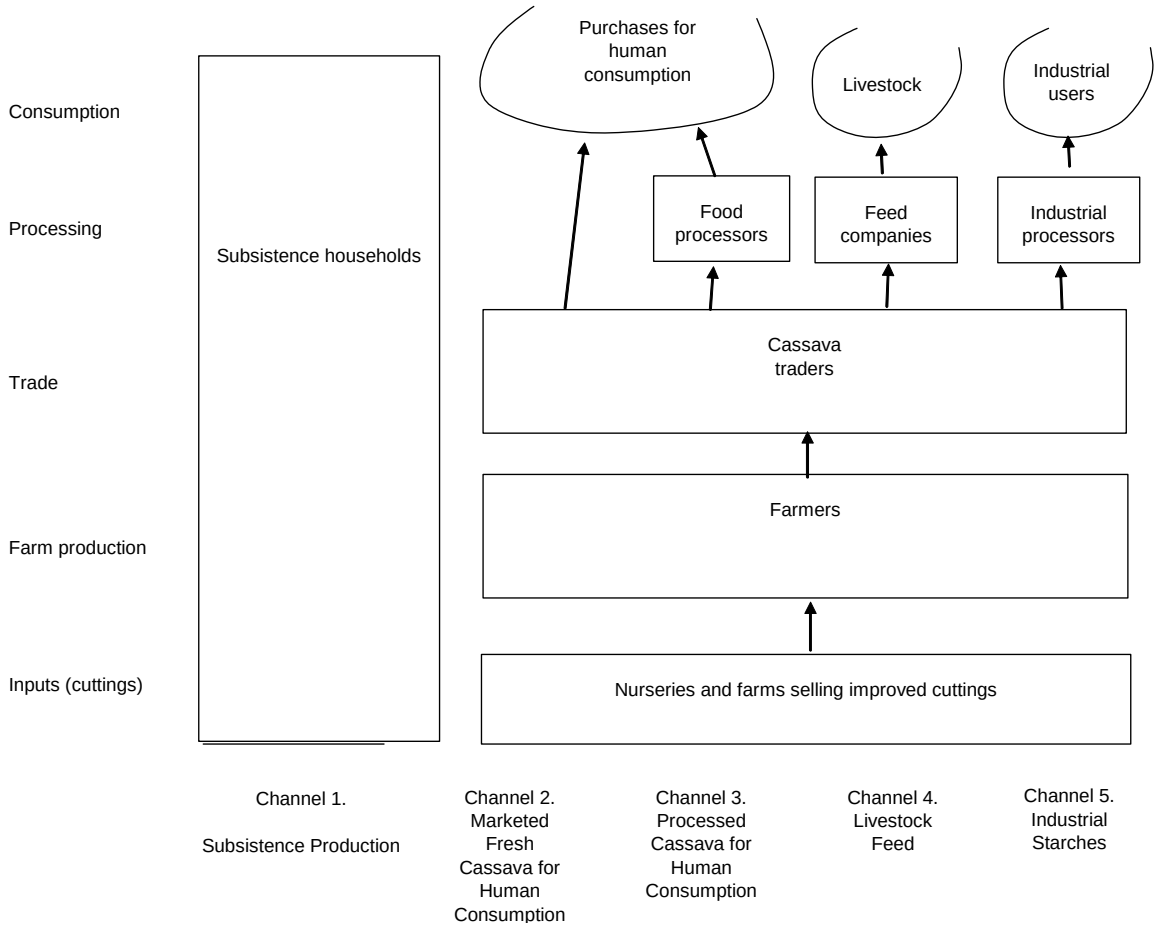
1.1 Cassava as Food Security Buffer

Cassava's potential importance in enhancing regional food security goes far beyond its prospects for generating income in cassava farming, trade and processing and for moderating consumer prices for this basic staple (Dixon et al 2003). The cassava belt in these four countries are what Haggblade (2006) refers to as "flexible surplus production zones" or "food security-enhancing hot spots" (FSEHS). These are regions where substitution possibilities among multiple food staples permit highly flexible supply responses. Regional examples include northern Mozambique (cassava, maize and Irish potato), southern Tanzania (cassava, maize and rice), northern Zambia (cassava and maize) and northern Malawi (cassava, maize and bananas). While the neighbouring maize-producing regions face regular drought and persistent demands for food aid, these cassava zones rarely launch food aid appeals. Because cassava can be harvested over a 2-3 year period, because these zones are highly productive maize producers, and because local consumers prefer cassava, these multi-staple FSEHS can adjust cassava production very rapidly (upwards or downwards), moderate internal maize consumption, and release large quantities of both maize and cassava to other regions. Thus, they serve as built-in food security shock absorbers for the region.

However, for cassava to be released effectively and to gain popularity into the region to mitigate as a food security alternative, it must have well developed food processing technology systems that will assure high quality food commodity products that are ready to consume and safe for the populations consuming them.

1.2 Cassava as Industrial Input

For the cassava production to grow sustainably there must be consistent demand for the cassava and a vibrant market for its trade and processing into products which consumers will demand as shown in the Cassava value chain and supply channels concept modelled by the research.
Figure 1: Cassava Value Chain and Supply Channels



In order for this supply chain to be realised there will be need to develop through research fail-sale processing technologies both at small-scale and large scale that produce quality products be it for human consumption, animal feed and industrial starch production.

The development of such technologies will depend on the needs and perceptions of the consumers, the traders and the industries in the targeted countries.

2.0 Processing Technology Research Thrusts

Thus, the initial start-up field research thrusts by the Task 4 Team will carry out *Focussed group discussions (FGD), Key Informant Interviews* and use other Participatory Rapid Rural Appraisal (PRRA) methods to investigate at household, community, trader and industrial in order:

1. To identify the full array of cassava-based products
2. To identify the technologies used to process them
3. To assess the perceptions on adequacy of existing processing methods
4. To identify the perceived and actual needs to boost cassava processing and the
5. Team will conduct an initial inventory of cassava processed products currently sold commercially in the four study countries.
6. The team will then identify the range of existing processing technologies used to process them.

7. The CATISA team will evaluate and compare the processing technologies across countries

In the second phase of the research project the Team will focus on the following and any other areas that may be identified through the start-up research results:

1. To develop and facilitate the transfer of promising commercial technologies and marketing systems across countries,
2. Commission experimental efforts to fill identified gaps
3. Conduct study tours and practical work exchanges to facilitate commercial cross-fertilization across countries.
4. The team will also establish methods for setting acceptable consumer standards of cassava products and safety levels measured as hydrogen cyanogens equivalents for food and feed products. This is critical for quality control and labelling of final food and non-food products.

2.2 Consequences of improved Processing Technology Commercialisation

Cassava processing technology and commercialization may potentially influence: food security, at the regional, national and household level; gender and social structure; welfare and opportunities available to HIV/AIDS affected households.

The Processing Technology will contribute directly to understanding the food security impacts of growing cassava products availability as well as changes in relative prices of competing food staples and industrial products such as livestock feeds and processing material for wood, pharmaceuticals and textiles to name a few. Employment and income impact of growing cassava processing and value addition and commercialization can be assessed using production, consumption trends, combined with the value added products and employment intensities calculated as part of the value chain analysis of the various alternate supply channels.

In order to establish the impact, it is important that the baseline information is collected at the outset against which changes due to the transformation will be measured. Thus, the Team will need:

1. To explore gender roles in cassava processing and marketing, the team will conduct observations using qualitative, quantitative and structured interview techniques. Special emphasis will be given to understanding the changes that are occurring using the life grid interview method which records major events in order to understand existing patterns of behaviour as well as changes.

2. To explore the potential impact on processing technology change on household labor demand and deployment, and the dynamics that are occurring in HIV/AIDS stricken households, the team will conduct regional key informant and focus group interviews with affected households and support agencies to assess labor use and food consumption changes in response to HIV/AIDS. Where possible, the team will supplement these with quantitative analysis of household-level data. These issues will be explored with a view to formulating policy relevant actions.

3.0 FOOD SAFETY CONSEQUENCES OF THE CASSAVA TRANSFORMATION WITH RESPECT TO FOOD SAFETY FOR CATISA STUDIES:

3.1 Background

There is an over-riding general concern that cassava is a crop not safe for consumption and therefore, a risky undertaking for donors and policy-makers alike. Precisely because of these fears they are hesitant to support this crop and its development. The common concern is related to the risks or the perception of risk with regards to the natural toxin that is contained within the edible tuberous roots as well as the much prized leaves. Partly this problem is perpetuated by ignorance, partly by the lack of relevant information that presents the pros and cons of the crop and the risks attributed to promoting or consuming this as human food or feed. Notwithstanding, the main problem is compounded by the inability of scientists to convey their knowledge and the experience and knowledge that scientists, farmers and consumers collectively possess with respect to:

1) risk perception in human societies
2) general knowledge about cassava as a plant
3) the role of cassava in the farming and food systems
4) the chemical composition of the cassava plant and the role of cassava's chemical composition in human society
5) the general use and consumption patterns of cassava within a specific locality and context
6) the role of agricultural science in understanding the production and importance or perceived lack of importance of cassava in human societies
7) the role of social sciences and natural sciences in elucidating and formulating policy relevant research to be utilised by other scientists, development organisations, policy makers and most importantly, society
8) and social marketing of cassava incorporating all of the above components

Thus one of the aims of the CATISA project is to contribute to the overall understanding of cassava as a plant and food crop and the inter-connectedness of the perceived risk by those who least understand the role of cassava food security and food safety, specifically in the Southern African farming and Food Systems.

3.2 Implementing food security & food safety in CATISA – start up

Based on the tasks stipulated in project document Table we suggest below how some key questions could be incorporated in the separate parts so as to provide an initial understanding of the situation in the respective countries. There are three specific areas in the start-up vis:

A. Primary cassava processing
B. Value chain analysis
C. Technical Assessment

4.0 BASELINE FIELD STUDY TOOLS

Participatory Rapid Rural Appraisal (PRRA) methods will be used to investigate at household, community, key informant, trader and industrial level. The tools will include holding *Focussed group discussions (FGD)* with combinations of *ranking* priorities (preference, importance, availability), *mapping* of areas of high processing activities and producing *processing calendars and causal diagrams* with selected communities; *Key Informant Interviews* with leaders, and knowledgeable individuals in processing and *available secondary data collection* in high, medium and low cassava producing areas of the participating.

4.1 Administering Focussed Group Discussions Questions

In order to have good interaction between the interviewee and interviwer the group should not be less than 7 persons and not more than 14. It is best to interview women separately from men to avoid shy and over dominance of sexes. It is also, important to allow all present to participate, otherwise a few views may dominate, not that they know but just talk too loudly, fast or intimidate others.

The interviewer must choose the interview language that the majority of the people understand and use interpreters who are fluent with both the English and the Local language.

The FGD questions are asked in open ended format and in a manner that opens up a discussion, the team needs to agree on who will ask which questions and allow that person adequate time to explore all possible follow up questions to the original issue. Once the questions are exhausted, the questioner should be able to ask other team members to ask any relevant questions or clarifications from the group of interviewees before moving to the next question that explores different aspects of the study.

Quantitative information should also be explored through use of comparatives such as; if you had 10 pebbles how many would the group allocate to the response.

In order to have a good flow of information, it is important for the team to agree who will ask which questions and who will take notes for each session. The note taker should be able to stop the questioner and the responder for clarification points only and not to change direction of thought.

Once the interviews are completed the note taker should quickly transcribe the information into a detailed report and the interviewer should read and add their contribution while response memory is still fresh.

5.0 SUGGESTED INTERVIEW QUESTIONS

5.1 PART I: Farmers and Community Processors

5.1.1 Primary Cassava Assessment

a. Farmer to indicate number and origin of cassava varieties grown in the area (immediate – e.g. from neighbour, and further back if known e.g. locally bred, improved cultivars)

b. How do you define or describe the available varieties in the area?

c. Is it customary for you to taste the root tip or other part to evaluate cassava quality?

d. If yes, how do cassava roots normally taste– please describe?

e. Which described quality do you evaluate?

f. Does that quality tell you something about the cassava root?

g. How do you classify cassava based on taste? (more than just OK/not OK, good or not good?)

h. Do specific cassava varieties always taste nearly the same (fall into the same class) no matter where grown/growth period/time of year?

i. If yes/no – why do you have these differences?

j. What role do women and children play in evaluating cassava quality?

k. Do women have their own systems of evaluation?

5.1.2 The General Knowledge on Processing

a. How is cassava consumed in this area? Other areas?
b. Is cassava processing a problem and why?
c. Who does the processing? Why? Where? When?
d. Is gender an issue on who does the processing?

The specific relevant knowledge on processing methods

e. What are the cassava processing methods in this area? other areas?
f. What potential processing technologies do you know about? 0r heard of?
g. What are the differences in these methods? (significance of differences)
h. Does gender influence the processing methods? If yes, how and why?

Awareness of hazards for using improper processing

i. What happens if cassava is not properly processed?
j. Is it possible with current methods to have unsafe products? Why?
k. Who is best suited to assess whether a product is improperly processed or not? (men or women or special people in the community)?

5.1.3 Mapping processing technology areas

a. Can you draw a map of the areas where these processing technology are practiced in this area, other areas
b. Put number of pebbles representing intensity of use of those methods in the indicated areas
c. What happens in the areas left blank?

5.1.4 Priority processing technology ranking

a. Show priority ranking of the processing technology methods for the different areas
b. Why this particular priority ranking?
c. How do men and women rank?

5.1.5 Value chain assessment of Food Safety

a. Do you consider your cassava or cassava products safe to eat/give to animals?
b. How do you know that they are safe?
c. Could they be unsafe – or represent a risk?
d. Which risks?
e. How/why (under which situation could that happen)?
f. Have you seen any incidents related to the consumption of unsafe cassava?
g. If yes – describe
h. How was it dealt with

5.2 PART II: Key Informant or Knowledgeable Persons (Field technical staff, middlemen, local businessmen/women) Cassava Processing and Food Safety Questions

5.2.1 Existence of Different Technologies

a. Do the different processing technologies mentioned by the FGD actually exist?
b. If yes, are they similarities in them?
c. What causes or perpetuates the difference?
d. Are there any gender influences involved?
e. Do terminal illnesses like HIV/AIDS have an influence on existing technologies?
f. Would change be helpful to the terminally ill?

5.2.2 Bottlenecks for absence of assured technologies

a. Do you face any technology problems?
b. If yes, what are they and how can you alleviate them?
c. Can you suggest ways of timely identifying and solving cassava processing problems
d. Does gender play a role in these problems?

5.2.4 Efforts to Accelerate Cassava Processing Commercialization

a. Are there current efforts to accelerate cassava processing commercialization?
b. If yes, by whom and where is it happening?
c. What are the constraints?
d. Any other issues raised during discussion?

5.2.5 Value chain assessment of Food Safety

i. Do you consider your cassava or cassava products safe to eat/give to animals?
j. How do you know that they are safe?
k. Could they be unsafe – or represent a risk?
l. Which risks?
m. How/why (under which situation could that happen)?
n. Have you seen any incidents related to the consumption of unsafe cassava?
o. If yes – describe
p. How was it dealt with

6.0 PART III: INDUSTRY PROCESSING AND FOOD SAFETY KEY INFORMANT QUESTIONS

6.1 Processing Value Chain Assessment

a. Do you know of the actual existence of the different processing technologies of the cassava products you purchase?
   b. Do you know or perceive the existence of bottlenecks due to absence of assured technologies?
   c. Do you have suggestions on ways of timely identifying and solving cassava processing problems?
   d. Are there current efforts to accelerate cassava processing commercialization?
   e. If yes, by whom and where is it happening?
   f. What are the constraints?
   g. Any other issues raised during discussion?

6.2 Food Safety

   a. What did you or your company learn from that?
   b. Is safe products part of your company/product reputation and how do safe guard that?
   c. Is the safety of your products part of your advertisement(s)?
   d. Could it be an important component for in the future?

e. If yes – as opposed to which products?

6.3 Food Processing Technical Assessment

a. How do you rate the processing technologies currently used by your cassava suppliers
   b. Are these technologies adequate to meet your current and future needs?
   c. If no, what would be ideal

6.4 Food Safety Technical Assessment

a. Is the safety of your products part of your advertisement(s) now or could it be an important component for in the future

b. If yes –which qualities do you evaluate?

c. Does that quality tell you something more about the root or product?

d. How do roots taste – please describe?

e. Do you classify further than OK/not OK; good or not good?

f. If yes, please describe the classification that you use and why?

g. Do roots from a certain cultivar/landrace always taste nearly the same (fall into the same class) no matter where grown/growth period/time of year?

h. If no – when do you mostly see these differences ?

7. Summary results

In both the high and medium cassava consuming areas, communities were knowledgeable of the local and improved varieties available in the area. In such areas many local varieties were listed and the characteristics of sweet, mild or bitter varieties were well articulated. The different varieties were clearly stated as having different functions; the bitter varieties were preferred for making flour as a staple food while the sweet varieties were mostly produced for snacks which are eaten raw or cooked. The bitter varieties are preferred for food security purposes; the sweet varieties are desired because they do not need elaborate processing before consumption. In both countries fermentation is the most common and popular method of processing. This is a traditional processing method. In Zambia, very little knowledge has been disseminated on modern processing technologies and the use of mechanization. Where the use of chippers or graters was mentioned in the baseline study areas, these were introduced as pilot schemes by research, NGOs or Government agents for demonstration purposes. In Malawi machine processing technology was found to be more advanced due to the work by SARRNET and IITA. People participating in the survey pointed out that that machine processed cassava is easy to dry and does not get infested with weevils. It is easy to pound and cook. When chips are made using a grater or chipper it take less time than when using hands. Using equipment is user friendly for male, female and children.

The field study highlighted the inadequacy or non availability of processing technology and lack of assurance on the quality and food safety of products currently produced from cassava. The lack of labor saving technology was clearly identified as the main reason for limited cassava products. The lack of technology has made cassava scarce, expensive and the marketing of un-assured cassava products.

Looking at food safety perceptions in the cassava value chain the study concludes that although it was well expressed that bitter varieties are hazardous to health, it was apparent that the cyanide relationship to bitterness and the cyanide content of the various varieties are not known and the level of cyanide and its effective harmful dose are not known. It was also reflected in the interview responses that the terms sweet or mild and cool were relative and the cyanide content varied with season and soil type. The analysis of cyanogenic glycoside content of sampled cassava cultivars and products shows that some processed products contain unacceptably (WHO 10 mg equivalent is maximum) high levels of residual cyanide after processing. It is possible that with commercialization, farmers and processors may be tempted to use shortcuts during processing in order to meet the demand by industry as indicated in grates supplied to universal industries on one hand while on the other hand unfermented whole roots actually pose a great health hazard to consumers. The processing method needs to be further investigated and the short and long term effects of hydrogen cyanide on consumers determined.

Through Focused Group discussions and Key Informant Interviews the Task 4 study also addressed the potential impact of processing technology change on household labor demand and deployment, with a focus on gender roles. This analysis also included the dynamics that are occurring in HIV/AIDS stricken households. During discussions, the women indicated that time and labor saving processing equipment such as hammer mills would be appreciated and that any improvement in the process would be welcome. It was acknowledged that the traditional processing technologies were too labor intensive for people that were sick or terminally ill such as those suffering from AIDS. However, it was also stated that terminally ill patients or households with such patients would benefit from cassava production since husbandry of growing cassava was not as labor intensive as that of maize and other staple foods. HIV/AIDS was said to be a problem that has negatively

affected processing activities for HIV/AIDS affected households because most of the time is spent nursing the sick and in turn food security is compromised.