

# C:AVA

Cassava: Adding Value for Africa



## **Linking smallholders to markets:**

**Lessons learned from past projects and implications for C:AVA**

**Helena Posthumus**

**April 2010**

**Natural Resources Institute  
University of Greenwich**

## Linking smallholders to markets

The Cassava: Adding Value for Africa (C:AVA) Project develops value chains for High Quality Cassava flour (HQCF) in Ghana, Tanzania, Uganda, Nigeria and Malawi to improve the livelihoods and incomes of smallholder households as direct beneficiaries. It promotes the use of HQCF as a versatile raw material for which diverse markets exist. C:AVA is supported by a grant from the Bill and Melinda Gates Foundation to the Natural Resources Institute, University of Greenwich. For further information contact: [k.adebayo@greenwich.ac.uk](mailto:k.adebayo@greenwich.ac.uk)

## **Executive summary**

The 'Cassava: Adding Value for Africa' (C:AVA) project aims to develop value chains for High Quality Cassava Flour (HQCF), as a means of increasing smallholder incomes. This report reviews past experiences on crop commercialisation and market development for pro-poor development, in order to extract lessons learned and implications for C:AVA. The literature is reviewed, as well as two case studies on developing cassava value chains: Cassava-SMEs project in Ghana and the IITA/CFC project in Tanzania.

The following success factors for linking smallholders to markets for cassava-based products have been identified, based on the literature review and case studies:

1. Create comparative advantage through:
  - ✓ Finding a market niche
  - ✓ Lowering production costs
2. Involve the private sector:
  - ✓ Involve intermediaries
  - ✓ Enhance competitiveness HQCF
3. Lower transaction costs through:
  - ✓ Building trust along the value chain
  - ✓ Improving infrastructure, transport and distribution systems
  - ✓ Improve access to information through industry forum.
  - ✓ Partnership facilitation
4. Create an enabling environment, supported by Government, providing:
  - ✓ Access to credit
  - ✓ Market institutions
  - ✓ A public sector with a conducive business environment
  - ✓ Promote cassava-based products

Profitability at all levels, however, is a prerequisite for a value chain to succeed. One unviable business within the value chain can cause its collapse. Quality assurance and consistent supply of intermediate products are also essential when developing cassava value chains. This can be achieved by involving intermediaries, but also requires intensive training of processing groups in processing technologies and business management. The importance of other success factors depends on the context. Partnership facilitation may be needed if there is a dormant market, but there are no established value chains yet and processing groups lack the means and skills to find buyers. However, it is not necessarily a prerequisite. The creation of an enabling environment is important to encourage the out-scaling and replication of value chains but may be initially less important to establish new value chains.

The C:AVA project was developed based on the experiences of the Cassava-SMEs project. The lessons learned in that project are thus incorporated into the C:AVA strategy. In addition, attention to more intangible factors that determine the project's outcomes should be given. Therefore the following recommendations are given:

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- Advocacy and publicity campaign: efforts have to be made to raise awareness and create support amongst politicians as well as consumers. Activities to do this have to be defined (project objective 3, activity 3.4)
- Establish permanent producer platforms to strengthen linkages between value chain actors, disseminate market information and new technologies.
- Raise awareness on costs and reasonable prices for HQCF and intermediate products.
- Develop grading & quality assurance systems to avoid products of inferior quality and guarantee food safety (project objectives 2 and 3).

The list of success factors presented here is arbitrary, based on experiences of previous attempts to link farmers to markets. However, it is not said that a project can only succeed if all these factors have been addressed. Some factors may not be relevant in particular situations whereas other factors may be essential that are not included in the list. Linking farmers to markets cannot be done according to a formula; one has to work with the opportunities and constraints which are unique for each situation.

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# 1 Introduction

Lack of competitiveness of smallholders in agri-food markets, including for cassava derived products, is a common constraint across Africa. The 'Cassava: Adding Value for Africa' (C:AVA) project aims to develop value chains for High Quality Cassava Flour (HQCF), as a means of increasing smallholder incomes (box 1). There have been various other attempts to increase smallholder incomes by improving their integration into markets, some being more successful than others. Valuable lessons can be learned from these past experiences and projects to better understand risks and appropriate strategies to assure the success of the C:AVA project. This report reviews past experiences on crop commercialisation and market development for pro-poor development, in order to extract lessons learned and implications for C:AVA.

## *Box 1. Brief description of Cassava: Adding Value for Africa (C:AVA)*

C:AVA develops value chains for High Quality Cassava flour (HQCF) in Ghana, Tanzania, Uganda, Nigeria and Malawi to improve the livelihoods and incomes of at least 90,000 smallholder households as direct beneficiaries including women and disadvantaged groups. It promotes the use of HQCF as a versatile raw material for which diverse markets have been identified in pilot studies. The project focuses on three potential intervention points: (i) ensuring a consistent supply of raw materials; (ii) developing viable intermediaries acting as secondary processors or bulking agents in value chains and (iii) driving market demand and building market share (in, for example, bakery industry, components of traditional foods or plywood/paperboard applications). Farmers and farmer/processors are supported in production and primary processing activities through partnership with NGOs or other extension services. Business development and other specialists support intermediaries to meet the requirements of end users. End users are supported technically in adopting HQCF. Benefits include: increased income of smallholder farm households, employment at the village and intermediary level, reduced raw material costs for end users, reduced need to import wheat, development of the capacity to upgrade other, similar food ingredient value chains, and, where comparative advantage exists, aggressive exporting.

This review is written as part of answering research question 4 of the C:AVA project:

What are the most effective strategies for market development (input markets, avoidance of supply glut, and import crop substitution)?

- a. How do you ensure reliable supply of farm inputs and yield-enhancing technology that is affordable to smallholder farmers without distorting the market and therefore creating dependence on unsustainable government-supported input supply programmes?
- b. How do you create incentives for substitution of imported staple crop derivatives such as flour and starch?
- c. How do you ensure that productivity and market efficiency interventions do not have unintended consequences that result in supply glut and lower prices for smallholders?

The main objective of this report is to review the economic principles and past experiences of market development in order to draw lessons for C:AVA. In particular, this report aims to:

- Review economic literature on the development of literature;
- Review experiences of previous projects on linking smallholders to farmers;

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- Analyse two pilot projects, Cassava-SMEs in Ghana and TFNC project in Tanzania, that developed and promoted cassava processing techniques in order to open up new markets for smallholders;
- Draw lessons from the reviews and make recommendations for C:AVA.

This report is structured as follows. Chapter 2 contains a generic literature review on value chain development as a poverty alleviation strategy. Chapter 3 gives more detailed descriptions of two case studies on past projects that sought to commercialise cassava in Ghana and Tanzania respectively. Chapter 4 synthesises the lessons learned and the implications for C:AVA.

## **2 Literature review**

For many developing countries, smallholder agriculture underpins their food security, export earnings and rural development (FAO, 2002; Kydd, 2002). Most countries in sub-Saharan Africa have untapped agricultural potential (De Louw et al., 2008). Growth in agricultural production and smallholder participation in higher-value agri-food markets are seen as essential to the improvement of rural livelihoods and the development process of a country (Aliguma et al., 2007; Barham & Chitemi, 2009; Colman & Young, 1989; Shepherd, 2007). In order to unleash the agricultural potential, progress has to be made on three fronts: raising and sustaining productivity and competitiveness, diversifying production and trade, and improving access to (domestic and foreign) markets (FAO, 2002). The issue of connecting poor smallholders to markets has become increasingly important as i) many developing countries have liberalised the agricultural markets over the past 20 years; ii) exchange rates have been adjusted and international trade has been liberalised to provide greater incentives to exporters; iii) income growth and urbanisation cause a shift in consumer demand; and iv) supermarkets and processors are playing an increasingly important role in food marketing in response to new technology and changing consumer preferences (Minot & Vargas Hill, 2007).

Some fear, however, that strategies for commercialising agriculture will benefit primarily large-scale farms rather than poor smallholders, since there is no level playing field, in particular in the export markets. Smallholders require more pre- and post-harvest services than large-scale farmers (Leavy & Poulton, 2007). For large-scale farmers, it is easier to internalise these services (Poulton et al., 2008). Smallholders have a comparative advantage over larger farms for agriculture that is less technologically advanced but has access to low-cost labour. However, as the use of capital intensive technology and labour cost increase, the advantage shifts to larger farms (Hazell et al., 2007). Smallholders therefore typically supply to markets where safety and traceability are not yet major issues and technological standards are less important; for example, domestic markets for staple crops. But rural food markets in Africa are risky with seasonal price variations and smallholders thus prioritise growing subsistence crops. An adequate enabling environment thus has to be created by the Government to reduce risks and provide the services required (Leavy & Poulton, 2007).

Barrett (2008) reviewed several studies on participation of smallholders in markets. Common factors found that impede smallholders to participate in staple crop markets are: i) the fact that many smallholders are not net staple crop sellers; ii) the strong associations between households' asset holdings (in particular land) and geographic factors (market access, agro-ecological zone, and household-level market participation); and iii) high transaction costs associated with weak institutional and physical infrastructure which distort production and marketing behaviours significantly. According to De Louw et al. (2008) small-scale farmers have the following options under such an adverse market situation:

- Improve the competitiveness of their products in local, national, and regional markets;
- Achieve economies of scale through collective action for production and marketing;
- Gain access to business development services that improve access to higher-value and/or more competitive markets and that provide employment opportunities;
- Diversify into higher value crops and/or livestock that are linked to growth markets;

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- Add value to products by changing farming practices to access higher income markets, enhancing product quality and incorporating processing activities;
- Enter into new types of business agreements based on forward sales (contract farming) or 'appellation' that 'locks in' buyers over longer time periods at advantageous rates;
- Find off-farm work options or migrating to more lucrative employment areas, such as urban centres.

The liberalisation policies of recent decades seem to have failed to deliver the expected agricultural growth and poverty reduction in sub-Saharan Africa (Dorward & Kydd, 2005; Shiferaw, et al., 2006). Smallholder farmers in developing countries need access to productive technologies and adequate private and public goods in order to produce a marketable surplus, but they often lack the resources to make the initial investments. In addition, the public sector has to invest in the institutional and physical infrastructure needed for a broad-based, low-cost access to competitive, well-functioning markets, for which it requires tax revenues. These interdependent conditions for market participation create multiple market equilibria. One low-level equilibrium, the poverty trap, is associated with semi-subsistence production and staple food markets (Poulton et al., 2008). Other, higher-level equilibria associated with technological advance, increased commercialisation and asset accumulation can exist simultaneously. In order to stimulate the inclusion of smallholders in markets, interventions should aim at facilitating smallholder organisation, at reducing costs of intermarket commerce, and at improving poorer households' access to improved technologies and productive assets (Barrett, 2008). It is now thus acknowledged that institutions and services necessary for markets to work have to be supported, paradoxically often by the State, to strengthen property rights, regulatory systems, information access and communications (Dorward & Kydd, 2005; Hazel & Poulton, 2007). Both public and private sectors have legitimate roles to play in linking smallholders to markets. Governments are in particular seen as facilitators creating enabling conditions (e.g. policies, institutional frameworks, infrastructure, support services) to encourage the private sector to involve smallholders in the value chain. The private sector's role is seen as to invest in the value chain infrastructure and transfer technical and market information to smallholders (Henson et al., 2008).

Positive impacts of market inclusion of smallholders are generally associated with income generation, employment, and access to credit and technical assistance. The negative aspects relate to the institutional characteristics of the value chains and wider socio-economic and environmental impacts. Critics of the pro-poor market development approach warn that it is severely constrained by the requirements of more discerning consumers and supply chain 'gatekeepers', resulting in high transaction costs and the need for economies of scale. There is a risk that participation and specialisation locks smallholders into relationships that are unfavourable for them, or that poorer smallholders are excluded resulting in social differentiation (Henson et al., 2008). Shepherd (2007) also warns that, although the value chain approach is currently popular, successful market linkages tend to work against the poorest. Poor and often remote farmers, with limited land, limited on-farm investment and financial resources and low education levels are generally not well equipped to exploit the new market orientation. To make market linkages successful, business sustainability has to be prioritised over the poverty reduction goal. In many cases the poorest farmers will struggle to link to integrated value chains. However, traditional marketing channels will have to become more sophisticated if they are to compete with modern chains, and they will continue to offer considerable market opportunities for the poorer farmers.

## **2.1 Markets, transaction costs and institutions: some theoretical concepts**

Markets exist to facilitate the transfer of ownership of goods from one owner to another. Each time exchange of ownership is taking place, a price is determined. Neoclassical economics assumes that markets move towards equilibrium through competitive interactions between buyers and sellers, while each acts to maximise their utility or profit. However, this only happens when markets are perfectly competitive, having the following properties (Colman & Young, 1989):

- Producers are independent profit maximisers and consumers are utility maximisers with independent tastes;
- There are many sellers (producers) and buyers (consumers), both are price takers;
- All firms have identical technology, production functions and management ability;
- The product is homogeneous so that consumers are indifferent between the produce of alternative suppliers;
- Production factors are freely mobile in the economy, so that there are no barriers to firms wishing to enter or leave the market;
- Sellers and buyers have perfect knowledge and foresight about market conditions, and adjust their decisions accordingly.

These assumptions rarely hold in reality, even less so in sub-Saharan Africa (Omamo & Farrington, 2004; Shiferaw et al., 2006). Information and knowledge is often limited and asymmetrically distributed, future market conditions may be uncertain, competition is limited, and markets are missing or failing. Because of these constraints, transactions in the market place can be costly. One of the main criticisms towards neoclassical economics is that it does not consider these transactions costs. Transaction costs are costs associated with trade, such as: searching and screening of business partners, negotiating a deal, monitoring performance and enforcing the deal, incurred losses when an agreement is broken, transport costs. Coase was the first to consider transaction costs in the 1930s. He argued that where economic co-ordination could be organised more cheaply within the firm than through the market, this form of organisation would be chosen. That is, if internal production costs are lower than the sum of external production costs and transaction costs, firms will integrate activities that could have been subcontracted to other firms otherwise. Firms are less likely to integrate functions if transaction costs are absent or low, so they can specialise in one activity and reap benefits of the economies of scale, hence reducing production costs. Other activities are then sourced out to other firms who have a comparative advantage in those activities (Himmelweit et al., 2001; Jarillo, 1988).

North (1990) extended the Coase theory to trading activities of societies, exploring why some people and societies develop strong trading activities whilst others participate primarily in localised economic activity and exchange. North argues that transaction costs rise as the complexity of exchange and the distance over which trade is conducted increase. Transaction costs are extremely high for smallholders in poor rural areas mainly because of the high risk of transaction failure (consisting of coordination risk and risk of opportunism). This, in addition to risks related to vulnerability to natural (weather, disease, pests) and market (price) shocks, makes it difficult for smallholders to participate in markets (Dorward and Kydd, 2004).

Where markets fail, hierarchies have to be established to perform the market functions because of the high transaction costs that make market transactions inefficient. Value chains can reduce

transaction costs by establishing arrangements and trust between different trading partners (Himmelweit et al., 2001; Jarillo, 1988). Whether value chains are efficient depends on factors such as technology, quality, information and organisation, which require collective action and interdependencies that are not regulated by prices (Bourgeois, 2007). Institutional economics calls the means or instruments to establish trust within a network to lower transaction costs 'institutions'<sup>1</sup>. Institutions are the rules of the game in a society, and can be formal (rules devised by humans) or informal (codes of behaviour) (see North, 1990). Efficiency and effectiveness are the basic conditions of the existence of strategic networks such as market chains. The basic conditions for effectiveness are technology (so that external production costs are lower than internal costs) and the lowering of transaction costs. The basic condition for efficiency is that the gain to be accrued by being part of the network is superior to the profits that can be obtained by other arrangements. This efficiency is achieved when belonging to the network gives superior performance and when the sharing mechanisms are fair (Jarillo, 1988; Williamson, 1975).

## ***2.2 Inclusion of smallholders in markets: building market linkages***

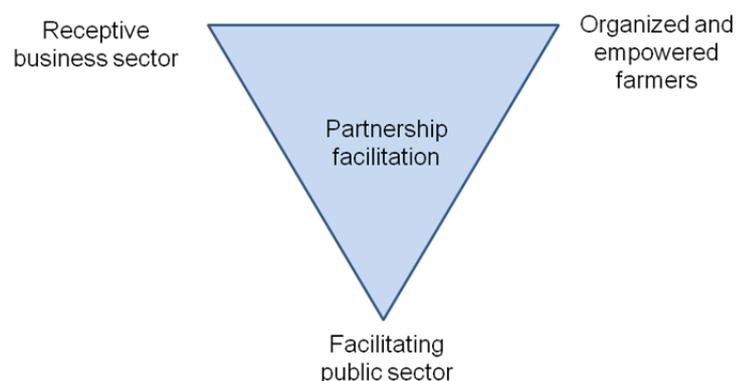
Inclusion of smallholders in the marketplace is determined by three processes: market access, network governance and chain upgrading (Ruben et al., 2006). With the expansion of agro-processors in sub-Saharan Africa in recent years, many companies shifted their procurement channels from wholesalers to growing contracts. As a result, the governance of supply chains has changed from 'spot markets' (ad hoc transactions) to 'hierarchies' (chain contracts). These supply contracts are generally better suited to large-scale than small-scale farmers. Small-scale farmers are inhibited from participating in modern markets, due to low productivity, poor quality of produce and high transaction costs. Markets have become more demanding and structural adjustment programs have left many smallholders without adequate access to key inputs and services as state agencies no longer provide marketing and service functions to smallholder farmers (De Louw et al., 2008). The private sector has not yet filled this vacuum, resulting in a marketing paradox where buyers (e.g. supermarkets or agro-processors) complain about inadequate supply while farmers complain about lack of markets (Shepherd, 2007).

Peppelenbos (2008) summarises the success factors of smallholder inclusion in markets in Figure 1. The quintessential factors underlying success are thought to be: i) farmers who are trained, organized, and empowered to deliver the quantity and quality of produce required in a consistent and cost-efficient way; ii) a receptive business sector; iii) a public sector with a conducive business environment including infrastructure, contract enforcement mechanisms and financial intermediation; and iv) partnership facilitation which can be done by a third party (e.g. an NGO) or a value chain champion.

De Louw et al. (2008) point out that there are no clear frameworks on smallholder inclusion which can be used to design programs, project or policies for linking smallholders to markets. In general, three entry points are suggested by the authors: i) collective action among smallholders to improve their bargaining power and economies of scale; ii) business models for the different private supply chain actors to procure from smallholders; and iii) deliberate public policy interventions that lobby (or force) value chain actors to include smallholders.

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<sup>1</sup> Institutional economics focuses on understanding the role of human-made institutions in shaping economic behaviour and reducing transaction costs.



**Figure 1 Successful partnerships for smallholder inclusion in market value chains** (Peppelenbos, 2008)

### **2.2.1 Linking smallholders to markets: the importance of collective action**

The majority of the African farmers are small-scale producers. It has been found that small farms have significant advantages over larger units where labour costs are important and part of the production is for subsistence. However, once agriculture becomes more integrated into markets and thus more intensive in transactions beyond the farm gate, larger farms typically have the advantage (Wiggins, 2009). Farmer groups (also called Producer Marketing Groups or Producer Organisations) are often proposed to bridge market imperfections and lower transaction costs. As development programmes shift from production-related programmes to market-oriented interventions, there is an increasing interest in collective action, such as farmer groups, to enhance market access (Barham & Chitemi, 2009; De Louw et al., 2008; Kaganzi et al., 2009).

The rules of institutional economics also apply to farmer groups: collective action in marketing is likely to occur if expected benefits (e.g. lower transaction costs, better prices for inputs and outputs, empowerment or capacity enhancement) outweigh the, partly hidden, costs of complying with collective rules (Shiferaw et al., 2006; Coulter, 2007). Examples of hidden costs of collective action include loss of autonomy, opportunity cost of time spent in meetings, and costs of enforcing agreed behaviour (Coulter, 2007). Collective action based on membership depends on the potential to improve the members' expected net benefit streams above what can be achieved individually. The benefit streams (collective and individual) are likely to differ for individual households, and as a result participation in farmer organisations varies across households. Trust between members lowers the cost of cooperative behaviour, and interventions that enhance trust (e.g. rules of engagement) contribute to successful collective action (Shiferaw et al., 2006). Past experiences with cooperatives and rural organisations have shown that farmer organisations seem to be more successful when: i) management is autonomous; ii) farmers participate actively in decision-making; and iii) activities are profitable (Shiferaw et al., 2006). Group market performance can be improved by a combination of strong social cohesion within the group and specialised management roles (Kaganzi et al., 2009).

However, collective action in itself is not enough; external shocks and structural constraints that limit the volume of trade and access to capital and information require investments in complementary institutions and coordination mechanisms to exploit scale economies. Strong public sector support is critical in creating an enabling environment to assist these groups in gaining market

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access (Shepherd, 2007; Shiferaw et al. 2006, 2008). The public sector could also support the technological and financial problems these groups face (Shiferaw et al., 2008).

### **2.2.2 Linking smallholders to markets: business models**

In order to link smallholders to markets, they have to innovate at a faster rate than their competitors to give them a comparative advantage. This innovation is often referred to as 'upgrading'; common forms of upgrading are (Dunn et al. 2006; Kaplinsky & Morris, 2001):

- *Process upgrading*: increasing the efficiency of internal processes. Process upgrading often happens in response to competition and the need to cut costs. Both vertical and horizontal linkages are important sources of information (technical assistance and learning). Lack of capital is often an important constraint.
- *Product upgrading*: introducing new products or improving old products. Product upgrading is often in response to changes in consumer demand. Information on consumer preferences is transmitted to producers through a well-functioning market value chain and price signals.
- *Functional upgrading*: increasing value added by changing the mix of activities conducted within the firm or moving the locus of activities to different links in the value chain. Functional upgrading is motivated by the desire to decrease market power of intermediaries and improve the flow of market signals to producers. Moving to another level in the value chain entails risks associated with shifting relationships, changing power balances and the need for new knowledge and skills. If critical chain or market functions are not well performed, a new layer of firms may be (re)introduced.
- *Channel upgrading*: moving to a new value chain. Channel upgrading happens in response to the desire to improve risk-adjusted returns (risk management through diversification) or in response to changing market conditions.

The upgrading behaviour is the result of a dynamic response to the value chain conditions and different types of upgrading can happen simultaneously. Constraints to upgrading include lack of skills and knowledge, and physical or social distance (Dunn et al., 2006). Creating market linkages through upgrading is not sufficient; the market chains also have to be profitable and competitive for the entrepreneurs as well as for the smallholders. Furthermore, smallholders need to be able to supply the quality required and the reliability of supply expected by the buyer, which involves additional investments to enhance the smallholders' capacity to do this (Shepherd, 2007).

### **2.2.3 Past experiences on linking smallholders to markets**

Based on a survey among 160 practitioners (donors, agribusiness, research institutions, and NGOs), Henson et al. (2008) analysed practitioners' opinions based on their field experiences on inclusion of smallholders. The impacts of smallholder inclusion in value chains were thought to be: access to resources and knowledge, economic and social gains, and environmental and health impacts. The constraining factors at the supply side for inclusion of smallholders were summarised as: weakness of support services, prevailing farming structure (e.g. lack of scale, insecure land tenure), access to finance and risk management, and producer knowledge. The constraining factors at the demand side were summarised as: access and cost of infrastructure, supply chain management, and food safety and quality control. Factors influencing the success of interventions were thought to be: prevailing external conditions, project management, effective institutions, role of the private sector,

level of farmer experience, and the ability to adapt to local conditions. Based on their field experiences, the practitioners thought that the challenges of efficient transactions between smallholder farmers and the market 'gate-keepers' were more important constraints than production level constraints. However, farmer knowledge about market opportunities and requirements was frequently mentioned as a constraining factor.

Various projects have been reviewed to understand the factors of 'success' when linking smallholders to markets. However, these studies often do not define the term success and give little information on the benefits (e.g. profitability or business management) of the new market linkages for the actors involved. A large part of the literature is on the functioning of farmer groups in the market place; a critical assessment of market conditions and functioning is less common. But the following factors are thought to enhance success of smallholder inclusion in market value chains based on project evaluations:

- *Upgrading of smallholder production, organisation and marketing* is essential to enable smallholders to meet demands (in terms of quality, quantity and consistency) of dynamic markets, which usually requires external support for prolonged periods of time (Aliguma et al., 2007; Berdegué et al., 2008; De Louw et al., 2008; Dunn et al., 2006; Kaganzi et al., 2009; Narrod et al., 2009; Shepherd, 2007).
- *Collective action* amongst smallholders in the form of producer groups (formal or informal) is important to lower transaction costs, enable economies of scale, increase the effectiveness of capacity building activities and increase the bargaining power of smallholders (Berdegué et al., 2008; Kaganzi et al., 2009; De Louw et al., 2008; Narrod et al., 2009; Shepherd, 2007; Shiferaw et al., 2006; Wiggins, 2009). The following characteristics were identified that enhanced to collective action and contributed to the successful operation of producer groups:
  - Trust (Aliguma et al., 2007; De Louw et al., 2008)
  - Commitment (Aliguma et al., 2007; De Louw et al., 2008)
  - Homogeneity (Coulter, 2007; Shepherd, 2007)
  - Limited group size (Coulter, 2007; Narrod et al., 2009; Shepherd, 2007; Shiferaw et al., 2006)
  - Natural assets, in particular access to water and land (Barham & Chitemi, 2009; De Louw et al., 2008; Shepherd, 2007)
  - Enhancing technological and marketing skills through capacity building, education and training (Aliguma et al., 2007; Barham & Chitemi, 2009; Berdegué et al., 2008; Coulter, 2007; De Louw et al., 2008; Shepherd, 2007; Tuan & Cuna, 2005)
  - Group maturity / history of collective action (Aliguma et al., 2007; Barham & Chitemi, 2009; Kaganzi et al., 2009)
  - Strong and effective leadership (Aliguma et al., 2007; Barham & Chitemi, 2009; De Louw et al., 2008; Kaganzi et al., 2009)
  - Agreed and enforced rights & responsibilities of group members (e.g. group statutes) (Coulter, 2007; De Louw et al., 2008; Narrod et al., 2009)
  - Partnerships with R&D or NGOs (Aliguma et al., 2007; Barham & Chitemi, 2009; Berdegué et al., 2008; Coulter, 2007; De Louw et al., 2008; Kaganzi et al., 2009; Narrod et al., 2009)

- *Access to credit (financial services)* for smallholders and processors. Financial arrangements (e.g. microfinance organisations) have to be made to address how best smallholders can fund their start-up and ongoing costs (Coulter, 2007; Dunn et al., 2006; Tuan & Cuna, 2005; Shepherd, 2007). Processors may require cash capital to pay for produce on delivery (Shiferaw et al., 2006). Greater capital availability also allows wholesalers and retailers to expand the scale of their businesses and spread their overhead costs over a greater volume of trade (Collinson et al., 2003). However, subsidies and marketing services such as transport should be limited as these usually lead to problems when the external assistance ends (Shepherd, 2007).
- *Improvement of the market information flow* leads to better spatial integration between markets and a reduction of transaction costs through the marketing chain, particularly to the benefit of farmers (Collinson et al., 2003). Agricultural growth happens when existing demand is transmitted effectively to the farm gate (Wiggins, 2009).
- *Involvement of the private sector* (e.g. public-private partnerships) is important to draw upon their business management skills (Narrod et al., 2009; Shepherd, 2007). The private sector can bring along economic benefits for smallholders plus technical capacity-building, although generally it does not result in a lasting empowerment of smallholders beyond the trade relationship (Berdegué et al., 2008). Protection of intellectual property rights is crucial to the private sector (NGI, 2009)
- *Trust* between smallholders and buyers is essential, and can be promoted by exchanging information and involve smallholders in contract negotiations (Shepherd, 2007). A high level of trust allows the trade partners to communicate efficiently, and develop and implement a shared vision (Aliguma et al., 2007).
- *Government support* is needed to 'regovern' agricultural markets with pro-poor and pro-market policies (Berdegué et al., 2008; Braun & Kennedy, 1994; Hazel & Poulton, 2007; NGI, 2009), correct market failures in the market value chain without protecting the chain itself (Narrod et al., 2009) and create an enabling environment (Hazel & Poulton, 2007; Wiggins, 2009). Local authorities can also assist in improving market facilities (e.g. sanitation, road infrastructure) to reduce marketing costs (Collinson et al., 2003).
- *Partnership facilitation* by a third party to enhance the participation and coordination of different agents in the market value chain, including collaborative arrangements between trained and organised farmers, information sharing, a receptive business sector, and conducive public policies and programmes (Aliguma et al., 2007; Berdegué et al., 2008; Narrod et al., 2009; Tuan & Cuna, 2005)

### **2.3 Summary: important elements for linking smallholders to markets**

Based on the literature review, the steps or factors thought to be important to successfully link smallholders to markets can be summarised as follows:

1. Find market niche through upgrading:
  - Product upgrading (adapt product in response to consumer demand)
  - Functional upgrading (increase value added by changing the mix of activities)

- Channel upgrading (move to a new value chain)
- 2. Lower production costs through:
  - Process upgrading (increase efficiency)
  - Economies of scale, e.g. by using collective action (farmer groups)
  - Training of farmers
- 3. Involve the (receptive) private sector;
- 4. Lower transaction costs through:
  - Building trust
  - Access to information on markets and technologies,
  - Partnership facilitation, either by a third party (e.g. an NGO) or a value chain champion
- 5. Create an enabling environment, supported by Government, providing:
  - Access to credit (financial services),
  - A public sector with a conducive business environment including infrastructure, contract enforcement mechanisms and financial intermediation.

### **3 Linking smallholders to cassava value chains: lessons learned**

#### **3.1 Case study 1: Cassava-SMEs in Ghana**

The pilot project Cassava-SMEs ran for four years during the years 2003 till 2006, led by NRI in collaboration with the Institute of Advances Studies (IAS) in Austria, University of Agriculture Abeokuta in Nigeria, Food Research Institute (FRI) in Ghana, University of Ghana, and Food & Flour Ghana Ltd (FFGL). The overall objective of the project Cassava-SMEs was to develop selected cassava-based food products that are convenient, of high quality and safe, to meet the changing and growing urban demand. Cassava-SMEs took a holistic approach to provide "best practice" tools and technologies to develop the chain from production to consumption (Westby et al., 2007). The experiences of the Cassava-SMEs project with regard to the success factors identified in chapter 2 are discussed below. These findings are summarised in Table 1.

##### **3.1.1 Market niche: HQCF**

The Cassava-SMEs project identified High Quality Cassava Flour (HQCF) as a market opportunity to link smallholders to markets. The project's strategy consisted of a mix of product upgrading (from traditional cassava flour to HQCF), functional upgrading (promote value-adding activities at community level) and channel upgrading (develop new HQCF value chains with the industrial sector).

##### *Product upgrading*

Based on previous experiences, Ghanaian manufacturers perceived a large untapped market for improved cassava food products, both locally and for export. In particular the new or improved cassava-based products are perceived to have a high growth potential within the domestic market if demand for instant *fufu* in urban markets grows as expected, driven by the identified demographic factors and rising urban per capita income (Onumah, 2007). Consumer tests revealed that HQCF could be a highly acceptable substitute for starch based instant *fufu*, and could significantly reduce the overall cost of production of the product. 80% of the respondents affirmed their desire to buy such a product on a regular basis for use at home. It is likely, however, that the percentage of consumers who can afford to purchase such products at current prices is in fact significantly smaller; market demand will be mainly influenced by price (Westby, 2004).

##### *Functional upgrading*

In Ghana, two market chain models have been tried for the cassava sub-sector in response to these emerging markets for the improved products of cassava starch and HQCF:

- One model involved a prominent role for relatively larger (medium-scale) enterprises in primary processing of cassava starch. The President's Special Initiative for Cassava Starch promoted this model by establishing the Ayensu Starch Factory. Farmers in the catchment area of the factory had started scaling up production in response to the expected demand from the factory. Unfortunately, it proved near impossible for the factory to penetrate the export market for high quality cassava starch. As a result of the low uptake of its products, the factory was unable to absorb the fresh roots produced by farmers. The participating farmers had difficulty in selling the fresh roots into alternative marketing channels and were consequently discouraged (Onumah, 2007).

**Table 1 Lessons learned on success factors for value chains, Cassava-SMEs project Ghana**

	<b>Success factors</b>	<b>Project strategy / intervention</b>	<b>Problems</b>	<b>Project solutions</b>	<b>Lessons</b>
<b>Market niche</b>	Product upgrading	Production of High Quality Cassava Flour as replacement for traditional cassava flour and instant <i>fufu</i>	Although consumer tests had positive results, market demand will be determined by price and general public perception.	N/A	Large-scale campaign to promote HQCF and other cassava-based products is recommended.
	Functional upgrading	Value-adding activities at community level: production of dried cassava grits	The solar-drying technique poses challenges for constant production because of seasonality and inconsistency in quality.	Bulking, storage and product grading is done by intermediary / miller. A centralised and mechanised drying process would resolve the challenges (see also process upgrading).	Logistics, technical support and quality control are essential when applying decentralised processing based on solar drying. The alternative of centralised and mechanised drying has to be pursued further.
	Channel upgrading	New value chains were explored with bakeries as end-users of HQCF.	HQCF was uncompetitive in price and supplies were unreliable; bakeries thus preferred wheat flour.	Stocks were built up at intermediary level to guarantee reliable supplies to end-users.	Competitiveness of HQCF remains a challenge because of high costs of raw materials and high production costs (see also process upgrading).
<b>Production costs and efficiency</b>	Process upgrading	Improved technologies for primary processing (grating and pressing); centralise and mechanise drying process.	Intermediary could not release funds (loan) to implement mechanical drying facility. High price for raw materials (cassava roots).	Decentralised solar drying at community level.  Introduction of high-yielding varieties to lower cassava price.	Decentralised solar drying is cheaper and more flexible (can intervene more rapidly when weather changes) but has challenges with quality control and scaling up of production.
	Economies of scale	Centralisation of drying process at intermediary level using mechanical drying techniques	See above (process upgrading)	See above (process upgrading)	See above (process upgrading)
	Training smallholders (technical & business skills)	FFGL trained community processing groups in technical skills and quality control.			Processors must be trained to meet the buyers' specifications in terms of product quality & consistency, quantity, timeliness of delivery, price and reliability of supply.

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	<b>Success factors</b>	<b>Project strategy / intervention</b>	<b>Problems</b>	<b>Project solutions</b>	<b>Lessons</b>
Private sector	Involvement private sector	Involvement of private sector as intermediary (FFGL) and end users (bakeries and plywood industries).	Inconsistent supply (see above) and low wheat prices made HQCF uncompetitive. FFGL lost money on investments in the value chain, thus temporarily stopping the production HQCF.		Attractiveness of HQCF for end users depends on price of alternative raw materials such as wheat flour. Risk assessment of the new value chain and development of risk management strategy is recommended.
Transaction costs	Trust	Use of intermediaries to facilitate / negotiate supply and demand of HQCF and improve trade relationships	Because of high price for cassava and low price for wheat flour, HQCF was uncompetitive in 2005.		Because of the stop-start nature to FFGL's activity, community based primary processors have not gained the confidence that grits production is a reliable business.
	Transport	None	Poor roads and badly organised distribution systems increase marketing costs.		Improvement in logistics is recommended.
	Information	Provision of training on technologies and marketing.	Key constraints in cassava marketing included: weak linkages between R&D and manufacturers; lack of forum for information sharing	Enhancing local research and development capacity	The project partners were the main providers of information; a third party might be needed initially to pass on information.
	Partnership facilitation	The project facilitated partnership between research institutes, intermediary, end-users and processing groups.			
Enabling environment and institutions	Finance		SMEs had limited or no access to finance / credit		Inform financial service providers and SMEs on prospects and challenges. Introduce innovative mechanisms to reduce financial risks.
	Supportive policy				There is a need for a consistent policy framework that supports SMEs.

- The alternative model decentralises primary processing of cassava roots into grits to rural-based SMEs. Relatively larger players, who may be urban-based, carry out secondary and further processing. This model is in particular applicable for HQCF but less so for cassava starch given the complexity of starch processing. The decentralised model offers increased opportunities for rural non-farm employment and potentially provides rural households with sustainable, commercially-driven livelihoods options. It is also inherently flexible, allowing entrepreneurs (who may be farmers) to enter or leave processing activities depending on the market (Onumah, 2007).

Initially, the Cassava-SMEs project was going to apply the first, centralised, model in Ghana. The company FFGL was to centralise and mechanise the drying process of cassava grits to assure better quality and all weather production. However, FFGL did not succeed in securing funds to purchase the necessary equipment – a spin flash dryer. The drying was thus decentralised to individual small-scale processors (Westby, 2004). FFGL replaced the traditional grating and de-watering methods of the SMEs with community-owned mechanical graters and de-watering presses. This increased the speed of cassava processing substantially. Product quality also improved, as the more efficient de-watering process reduced drying times. The processors continued to undertake sun-drying. FFGL trained the participating SMEs in improved drying techniques, using improved but relatively low-cost materials (Onumah, 2007). To process cassava grits for FFGL, candidate communities had to have: regularly engaged in the production of cassava, facilities for grating cassava installed, and a source of safe/potable water. Additional criteria were used for the location of drying platforms to reduce the risk of inferior quality. The quality criteria applied to the dried grits before the purchase were: colour – acceptable dried grits must appear white; dryness – dried grits for sale must pass the ball test; smell – acceptable quality dried grits must have no mustiness or other smell; and taste – quality dried grits must be bland to the taste (Westby, 2004).

#### *Channel upgrading*

A wide range of industries is beginning to recognize that cassava, and particularly the processed products derived from it, can replace imported raw materials (Onumah, 2007). Earlier attempts to promote new HQCF value chains in Ghana, however, have been held back by unreliable supplies. The result was that many potential end-users, particularly bakers and pastry-makers, who expressed initial interest in HQCF went back to using wheat flour which was always available. Rising raw material costs made HQCF less attractive to the baking and plywood industries. To address this, stocks (at least one month's equivalent of sales) were built up such that any orders following the promotions could be met. FFGL was particularly careful that the promotional and marketing activity did not run ahead / outpace the capacity to reliably deliver a quality product, and that both were sustained within the limits of the finances (Westby, 2004). However, in 2005 trade was difficult because of the high price for cassava and low price for wheat flour. In 2005, the production cost of HQCF was estimated at ₵4,122/kg. FFGL pricing policy was to sell HQCF at between 20% to 25% discount to wheat flour. For 2005 the wholesale price of wheat flour averaged ₵4,250/kg. To compete, the maximum wholesale price for HQCF could thus not exceed ₵3,400/kg. The high costs of raw materials made HQCF uncompetitive as a wheat replacement in bakery products or as a glue extender for plywood. The key challenges for the medium-scale processor FFGL in the medium term thus remained: high prices of cassava roots, maintaining high quality with sun drying, mechanising

drying in processing, and raising investment capital in the face of accumulating losses (Westby, 2005).

### **3.1.2 Production costs and efficiency**

In order to make HQCF competitive with similar products such as wheat flour, it is essential to lower the production costs. The Cassava-SMEs project tried to achieve this through process upgrading, economies of scale and the training of farmers in new processing technologies.

#### *Process upgrading (increase efficiency)*

The two major costs of HQCF are the costs of raw materials and drying (Westby, 2003). The introduction of high yielding varieties and more efficient agronomic practices can reduce the cost of raw materials by increasing the efficiency of cassava production (Westby et al., 2007). Drying is the single most expensive unit operation facing processors. Sun-drying is the cheapest drying technology, but only well suited for small-scale production by individuals and households. Small-scale processors can make production decisions according to local weather conditions, and adjust rapidly to changes in the same. They can expand production capacity by adding on additional drying platforms and plastic drying trays/mats at no more than \$100 each. However with centralised operations and hired employees it had many drawbacks and limitations (Westby et al., 2007). Development of a cost effective and efficient mechanical drying process was central to FFGL's business development strategy. However, FFGL did not achieve this because of the following obstacles (Westby et al., 2007):

- Financing - problems with mobilising promoter/shareholder funds and delays in accessing grant funds under the project.
- Doubts about suitability and cost competitiveness of initial technology proposed for Mechanical Dryer and shutdown of the manufacturer/ supplier company. The Spin Flash Dryer was subsequently selected as most appropriate.
- The drying technology selected by FFGL required higher investments than the initial budget.

Poor quality of locally manufactured equipment and inappropriate technologies led to additional production costs (Westby, 2003). A desk-based review explored the underlying causes of the lack of efficient processing technology resulting in high production costs. The causes were identified as (Westby, 2004):

- Limited R&D capacity;
- Use of outdated low-tech equipment resulting in low efficiency and poor quality;
- Appropriate technology, when available, is not affordable;
- Lack of technical skills to manage new technology.

Despite attempts to address these constraints through training and improved processing equipment, the price of competing products – such as wheat flour in Ghana and the price of cassava remained a major risk (Onumah, 2007).

#### *Economies of scale*

The initial attempt to achieve economies of scale was by centralising the drying process through an intermediary (FFGL). However, this strategy failed as explained above. The alternative strategy,

decentralised solar drying, still allowed for economies of scale as the intermediary would aggregate the grits for milling. Compared to centralised sun-drying by the company, community-based small-scale individual processors were better able to adapt to local variations in the weather thus providing a better quality product. Because individual households carry fewer overheads their costs were also much lower (Westby, 2004).

#### *Training of farmers*

In order to meet the more stringent demands for high and consistent product quality as well as regular supply of relatively large volumes of intermediate products for industrial utilisation, small-scale processors required training in quality assurance and business management. Indeed, the lack of access to training opportunities for small-scale processors was identified as a major constraint related to upgrading processing technology. There was also a dearth of opportunities to train processors in product quality assurance. FFGL trained the SMEs in basic product quality assurance, including instituting an informal grading standard, which was enforced – using a relatively subjective grading process – by its buying agents (Onumah, 2007).

### **3.1.3 Private sector**

The Cassava-SMEs project collaborated with the private company FFGL to establish the market linkages. Development of a cost effective and efficient mechanical drying process was central to FFGL's business development strategy. The unexpected difficulties in obtaining a loan for a mechanised dryer resulted in big losses for FFGL. The overriding imperative for FFGL was to go forward with its business – with or without project grant support. As an interim strategy and to keep the business afloat FFGL opted to decentralise processing to community based small-scale processors (Westby et al., 2007).

Based on the experiences of the Cassava-SMEs project, it was concluded that there is considerable scope for economic involvement by SMEs in the emerging value chains in the cassava sub-sector. The decentralised processing model, which creates space for rural households/SMEs to undertake primary processing while relatively larger players (intermediaries), who may be urban-based, carry out secondary and further processing, should be supported to contribute to poverty reduction. Using this model, the intermediary FFGL had a 69.4% cost saving in direct costs (Westby et al., 2007). However, the risks involved in entering new value chains may deter the private sector to get involved and invest heavily initially.

### **3.1.4 Transaction costs**

Transaction costs can be a big obstacle for smallholders in developing countries. The major issues encountered by the Cassava-SMEs project that contributed to high transaction costs related to lack of trust between trading partners (expressed in disrupted trade due to inconsistent quantity and/or quality of the product), poor infrastructure and lack of partnerships.

#### *Trust*

During previous experiences manufacturers found that it was difficult to secure a consistent supply of raw materials locally; they perceived problems with high costs, seasonal price volatility, quality and appropriate varieties (Westby, 2003). A desk-based review identified bulking difficulties, poor transport and logistics, and quality uncertainty arising partly from poor logistics management, as

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additional constraints (Westby, 2004). This has forced a number of manufacturers to establish their own farms. However, vertical integration for a small enterprise is not necessarily a good idea, and manufacturers themselves acknowledge that farming involves a lot of additional work and diverts resources from the company's core operation. Other manufacturers have found it cheaper - and more reliable - to import semi-processed raw materials, such as cassava starch, potato granules and plantain flour, than to rely on local suppliers. However, such approaches do not benefit the livelihoods of local cassava farmers. The Cassava-SMEs project therefore developed mechanisms to integrate farmers into the production system by involving intermediaries, in a way that is beneficial to the rural economy as well as the manufacturers (Westby, 2003). Intermediaries (small and medium scale enterprises) act as a guaranteed market for cassava farmers and reliable suppliers for end users (Westby et al., 2007). To make the value chain work, processors must be able to meet the buyers' specifications in terms of product quality, consistency, quantity, timeliness of delivery, price and reliability of supply. Equally, attractive product price and prompt payments are very important for ensuring a smooth flow of products along the value chain (Graffham, 2006; Westby et al., 2007). The regular evacuation of purchased grits from northern to southern Ghana, however, has been a huge problem on account of the low volumes and long distance. This, together with poor sales and cash flow difficulties, has lent a stop-start nature to FFGL's activity. As a consequence, community based primary processors have not gained the confidence that grits production is a reliable business that requires their full time attention (Westby et al., 2007).

Upgrading a product or moving into a new market channel also may imply more stringent quality criteria imposed by the market. With growing demand in overseas markets that have stringent food safety and quality standards, and greater awareness amongst local consumers, cassava processors need to improve upon their quality assurance management and develop HACCP systems for their processes (Westby, 2003). Linking smallholders to markets and industries that use HQCF requires training in processing technologies, quality assurance and food safety, and process control and laboratory equipment to support this.

### *Transport and marketing costs*

Poor roads, inappropriate means of transport and a badly organized distribution system are factors leading to elevated marketing costs, which in turn result in high consumer prices. Some oligopolistic market behaviour existed among traders, wholesalers and processors. However, retailers seemed to exhibit competitive market behaviour. There were virtually no barriers to entry for the marketing agents (Westby et al., 2007). It was noted though that improvements to rural infrastructure enabled village processors to take a larger slice of the profit by arranging transport and selling directly to retail outlets (Onumah, 2007). It was recommended that investment in rural infrastructure should be aligned with SME development programmes (Westby, 2004).

### *Information and partnerships*

During a workshop with Ghanaian manufacturers the following constraints, among others, were highlighted: lack of industry forum for information sharing and lobbying, weak linkages between R&D and manufacturers, and lack of promotion of products. A desk-based study identified additional constraints with regard to information, such as limited capacity to carry out market research and inadequate information on changes in consumer preferences (Westby, 2004). Effective dissemination of R&D information was seen as essential to enable processors to benefit from

existing knowledge, both financial and technical. For example, it was thought that processors would benefit from assistance in basic financial analysis, to enable them to cost their products accurately. It was also thought that the creation of an industry forum would improve their access to information and strengthen their position in terms of accessing loans, lobbying etc. (Westby, 2003). It was further recommended that business support is provided to SMEs (for example, FRI should address process management as well as product development). Cooperation with SME organizations and other business development providers was also recommended in order to reduce risks and costs and combine financial with non-financial services (Westby, 2004).

### **3.1.5 Enabling environment and institutions**

#### *Finance*

Traders, wholesalers and retailers encountered in the study virtually employed no credit. Borrowing was mainly informal; a few processors borrowed from banks. Lack of credit, presumably, is the most serious handicap to growth in entrepreneurship. Weak property rights and poor contract enforceability were identified as the main obstacles to financial market activity (Westby et al., 2007). From a bank's perspective, SME lending is high risk, involves acute information asymmetry problems, entails high transaction cost, and suitable collateral is missing. SMEs view bank lending as difficult to obtain, involve voluminous documentation, processing time is long and uncertain, and cost of borrowing is high (Westby, 2004). Cassava-SMEs therefore recommended that, in order to improve access to finance by SMEs, it is important to provide information on available financial institutions and what they have on offer. Equally, financial sector players should be better informed about prospects and challenges in the sub-sector as well as innovative mechanisms they can utilise to mitigate financing risks. An institutionalised process of assessing opportunities and risks in the sub-sector and informing financial institutions and other players would help ensure better-informed financing decisions (Onumah, 2007). Other recommendations were (Westby, 2004): simplifying the loan application process (simple cash flow forms instead of Business plans); encourage linkages to ease financing risks; and sharing risk with third parties (loan guarantees).

#### *Supportive policy*

Policy-related constraints that were identified during the Cassava-SMEs project included (Westby, 2004):

- Policy clarity and stability are often absent;
- Trade liberalisation and influx of cheap imports create considerable competitive pressures;
- Financial liberalisation (tight prudential regulations and deregulation of interest rates) made formal finance more difficult to access and more costly;
- Supportive institutions are often missing e.g. reliable QA systems; and
- Operators lack a voice in policy.

Sub-sector policy therefore need to be transformed from ad hoc interventions, for instance to promote particular schemes, to a more sustained and consistent policy framework that proactively supports SMEs, in part because sector players effectively participate in policy formulation, through relevant trade associations (Onumah, 2007).

*Promotion of cassava*

Till recently, improved cassava products had a limited distribution within Ghana, backed up by little promotion or marketing. They were generally available only in petrol stations and the small number of supermarkets catering to the urban middle-classes. As a result, many potential consumers were not even aware of their existence (Westby, 2003). A desk-based review identified the following underlying causes of the marketing constraints (Westby, 2004):

- Limited capacity to carry out market research;
- Inadequate information on changes in consumer preferences;
- Traditions entrench consumer preferences;
- Negative public perception of quality of products;
- Competition from cheap imports;
- Weak capacity in packaging and branding; and
- Limited resources for product promotion and/or developing markets for new products.

The Cassava-SMEs project therefore recommended undertaking generic promotion of new or improved cassava products, an activity that can be supported by Government and donors on the grounds of being a public good. A promotion campaign is thought to lead to expansion of economic opportunities for a large population; and the free rider problem detracts from the direct private benefits to entrepreneurs undertaking product promotion. The media, in particular radio, can effectively be used to encourage the consumption of products competing with well-established forms of traditional food (Onumah, 2007).

### ***3.2 Case study 2: cassava marketing in Tanzania***

Before the trade liberalisation of the 1980s, the marketing of cassava in Tanzania was under the control of the central government through its marketing agency the National Milling Corporation (NMC) and cooperatives. Since the Structural Adjustment Program started in 1986, the government has been gradually withdrawing from such commercial activities. It was assumed that the private sector would take over, but it was not well prepared and the markets for roots and tuber crops remained supply-driven rather than demand-driven. An attempt to produce livestock feed based on cassava in the mid 1980s failed because substitute crops like maize were cheaper than the unregulated cassava. Similarly, a starch processing factory was closed in the mid 1980s due to difficulties in finding a reliable source of raw materials. Since the adoption of trade liberalisation the performance of the cassava sub-sector has been dismal and little investment was made in cassava production. In contrast to Ghana, little processing of cassava is taking place and trade is very limited. In 2003, however, the Tanzania Food and Nutrition Centre (TFNC), International Institute of Tropical Agriculture (IITA), Sokoine University of Agriculture (SUA), the Ministry of Agriculture Food Security and Cooperative (MAFSC) and District governments, became fully involved in the development and pilot testing of novel processing methods and products again (Abass et al., 2009). The experiences of the TFNC project with regard to the success factors identified in chapter 2 are discussed below. These findings are summarised in Table 2.

**Table 2 Lessons learned on success factors for cassava value chains, TFNC project Tanzania**

	<b>Success factors</b>	<b>Project strategy / intervention</b>	<b>Problems</b>	<b>Project solutions</b>	<b>Lessons</b>
<b>Market niche</b>	Product upgrading	Production of High Quality Cassava Flour, High Quality Cassava Chips, and cassava starch	Problems with water availability (quantity and quality) resulted in reduced production and lower quality product.		Secure a good water source and train processors on the importance of using clean water.
	Functional upgrading	Value-added processing activities at community level.	Processing groups perceived labour costs too high and opted for products of lower value that required less labour inputs.		Profitability and opportunity cost of labour are important factors that determine farmers' willingness to invest effort in cassava processing. Processors need to be trained in costing the production activities.
	Channel upgrading	Processing groups were linked to new buyers, i.e. industrial end-users.	The processing groups struggled to meet the (unrealistic) demand (regular supply and consistent high quality) of the industrial end-users.		Demand and supply have to be carefully matched. Involving intermediaries allows the bulking, grading and storage of the intermediate product before it is sold to the end-users.
<b>Production costs and efficiency</b>	Process upgrading	Introduction of new technologies and equipment for cassava processing.	Lack of technical skills (e.g. maintenance of equipment), business skills (negotiation). Lack of potable water affects quality of final products as well as processing capacity at the pilot centres. Lack of water leads to poor quality cassava products not accepted by the major end users (Abass et al, 2008).		Various issues have to be addressed to assure stable and sustainable productivity: organising supply of raw material, and optimizing the processing groups themselves in terms of turnover, seasonality of processing and optimizing quantity and quality of outputs.
	Economies of scale	Organisation of processing groups to achieve economies of scale through collective action.	Lack of leadership and vision, large group size limits efficiency. Lack of water and weather restrictions limit scale of production.		Group characteristics and dynamics impact the functioning and efficiency of the groups. Homogenous groups of smaller size and with clear leadership,

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	<b>Success factors</b>	<b>Project strategy / intervention</b>	<b>Problems</b>	<b>Project solutions</b>	<b>Lessons</b>
					rules and vision have a higher chance of success.
	Training smallholders (technical & business skills)	Farmers were initially trained in processing techniques and business management.	One group had the impression that any work done at the processing centre was for charity.		Regular follow-up on needs and training is required.
Private sector	Involvement private sector	Private sector (medium-scale millers and biscuit manufacturers) was involved as end user.	Processing groups were not able to meet the demands of the end users (consistent supply).		Match supply and demand –processing groups cannot supply high volumes of high quality.
Transaction costs	Trust	The project brought the processing groups into contact with potential buyers (end users).	Disputes on price, failures to meet contracts and distance (processors and buyers rarely met eye to eye) diminished trust.		At initial stages it is important to monitor and review contracts on a regular basis, with an independent third party as facilitator if appropriate.
	Transport		Transport costs were very high due to poor infrastructure and lack of transport means.		
	Information	Processing groups received training in processing techniques, finance and business management			
	Partnership facilitation				
Enabling environment and institutions	Finance		Lack of cash forced some groups to buy raw materials on credit. No access to credit for investments.		Access to affordable finance for cassava farmers and processors is required as there is a lack of cash flow and payments are typically delayed.
	Supportive policy				

### **3.2.1 Market niche: HQCF, HQCC and starch**

#### *Product upgrading*

In 2005, TFNC and collaborators started a pilot project to upgrade cassava-based products such as High Quality Cassava Chips (HQCC), HQCF, and cassava starch. Four community processing sites, which had been established between 2003 and 2005 under previous projects, were selected. The four cassava processing groups were: the Sululu farmers' cooperative group in Bungu, Rufiji, producing cassava chips; Chisegu village, Masasi, producing HQCF; Mtimbwani village, Muheza, producing cassava starch; and Zogowale villabe, Kibaha, producing cassava chips and HQCF (Abass et al., 2008). TFNC and its collaborators provided the processing groups with new equipment and provided training in processing technologies and business management.

#### *Functional upgrading*

The project's strategy was to equip the community processing groups with the tools and skills needed to process cassava into intermediate products that could be sold directly to the industrial end-users. However, some of the groups felt that the return to labour was too low to justify the full-time operation of the processing site. Instead, some groups opted for processing technologies that were less labour intensive resulting in products of lower quality (e.g. the Zogowale group processed cassava into chips rather than grits which is more labour intensive). Also, most groups processed low quantities cassava, far below the production capacity, whenever an order came in.

#### *Channel upgrading*

The processing groups were linked with industrial end-users who wanted to buy the intermediate cassava products. However, the processing groups struggled to meet the contracts for the following reasons:

- The production capacity was lower than the demand of the end-user;
- The groups struggled to deliver the quality required by the end-users; and
- The solar drying technique limits cassava processing to the dry season while the end-users wanted to be supplied with the product all year round.

### **3.2.2 Production costs and efficiency**

#### *Process upgrading*

In order to keep production costs low, the sites were selected based on the following criteria: sufficient / moderate production of cassava in the area, availability of a water source, accessibility of the village from the main road and availability of a building to install the processing machines. In general, the selected sites were at the centre of many other cassava producing villages that provided optimum environments and potentials for highest yields for new cassava varieties to be supplied to farmers to be used as base for fresh cassava supply to the processing village (Abass et al., 2009). It was found that water availability however, or the lack of it, led to poor quality cassava products which were unacceptable to the major industrial end users. It also limited the processing capacity of the pilot centres (Abass et al., 2008). The sun-drying technique (being dependent on weather conditions) and the limited water availability are the main technical limiting factors that keep the production capacity of the processing groups low. Lack of profitability and perceived lack of markets

also limit the turnover of the groups. None of the processing groups is operating at full capacity, and three of the four are producing very low volumes if any at all, resulting in a very poor efficiency.

#### *Economies of scale based on collective action*

The project tried to achieve economies of scale by working with farmer groups. Although collective action can be an instrument to achieve economies of scale, it can also involve additional hidden costs. Group dynamics and group organisation can have a great cost implication to cassava processing enterprises when processors are operating in groups. The sizes of the processing groups ranged from 7 to 43 members – with the smallest group being the most organised and most successful. The effect of enterprising culture, group spirit, group motivation, commitment of members and group management (including leadership structure, accountability and decision-making) have a big impact on the group's success (Abass et al., 2008). Various processing groups that were set up during previous projects disintegrated because of disagreements on management and how to spend the revenues (Posthumus et al., 2009)

### **3.2.3 Private sector**

TFNC tried to link the processing groups directly with industrial end-users such as biscuit manufacturers and the textile industry. No intermediaries were involved. However, failures to meet contracts, lack of trust and misunderstanding made it difficult to sustain these relationships. For example, the processing group in Mtimbwani was to supply textile mills with cassava starch. However, the group did not have the capacity to meet the large volume of starch needed by the mill. Small-scale tie-and-dye and food processing enterprises were identified as alternative market opportunities needing small quantities, but their demands were irregular, and the processing group lacked the skills and means to actively search for other market opportunities. Similarly, the processing group struggled to meet the monthly demand for HQCF of the biscuit manufacturer. As the drying process, and hence the quality of the product, is dependent on weather conditions, the group was not able to supply the manufacturer with a product of consistent quality year-round. Involving intermediaries who can bulk and store cassava-based products and liaise with processing groups as well as end-users might overcome some of these problems.

### **3.2.4 Transaction costs**

Transaction costs were extremely high, and an important reason why the processing groups struggled to market their products. Due to low entrepreneurial culture and experience of farmers, most of the members of the processing groups showed general lack of ability to access available markets. While most of the pilot groups felt there were no sufficient markets for their products, the output market survey showed there was a huge dormant market for all the intermediate cassava products. In addition, the high transport costs, due to lack of access roads and poor transport systems, erode the gross profits (Abass et al., 2008). The processing groups did not possess means of transport, making it difficult for them to bring their product to urban markets. As a result, groups produced low quantities of cassava flour for the local market. The Sululu group in Bungu, however, came to an agreement with an urban-based miller that the miller would arrange transport for a regular supply of HQCC. This is the only group that successfully established a contract with a buyer and supplies the buyer on a regular basis. The capacity of the group to produce and run a viable business and the willingness of the buyer to support the group largely explain the success of this

particular trade relationship. The other groups may have benefited from intermediaries who could provide the missing links between the processors and the end-users.

Because current production of intermediate products such as HQCF is unreliable in terms of quantity and quality, end-users offer a low price for these products squeezing the profit margins for cassava processors. More reliable substitute products such as wheat flour are relatively cheap, given that most industry is based nearby seaports where wheat is imported. Failure of the processing groups to meet (unrealistic) contracts, the lack of quality control systems, delay in payments, and the low prices offered by buyers have resulted in mistrust between the processing groups and end-users.

### **3.2.5 Enabling environment and institutions**

Although TFNC and its collaborators supported the processing groups, there is little support available from other sources. Recently, more initiatives (e.g. CFC, UN-One, President's Initiative) have been launched to promote cassava processing (see Posthumus et al., 2009), but value chains are still missing, access to finance is limited and supportive policies are lacking. The following constraints to build cassava value chains were identified (Abass et al., 2008, 2009; Posthumus et al., 2009):

- Cassava processors are mainly constrained by inappropriate processing technologies, lack of clean water, unavailable credit services and unreliable market access.
- Traders lack capital for expanding their scale of operations in cassava trading.
- The unreliable transport system leads to rapid spoilage of roots and low market value of the products. The high cost of transportation, when available, combined with high market taxes significantly reduces traders' profit margins.
- No grading systems or quality standards have been developed for cassava roots and cassava-based products.
- For dried cassava, appropriate post-harvest handling (harvesting, storage, packing for transportation) and processing (particularly drying and fermentation) are still not widely known in Tanzania.
- The market for dried cassava is almost non-existent. Hence, processors and traders perceive the market to be unreliable since access is limited and market information is lacking. There are no formal organisations of cassava processors or traders than can link processors to traders or end-users of cassava-based products.
- Little advantage is taken of the opportunities to use cassava-based intermediate products in industries, due to low promotion of cassava products and lack of appropriate processing technologies.

Given these constraints, any attempt in building cassava value chains has to be combined with efforts to improve market infrastructure, access to credit, R&D and extension, and quality assurance.

## 4 Conclusions and lessons for C:AVA

Lessons learned in the two case studies on developing value chains for cassava-based products can be extracted and added to the list of activities and factors for successfully linking smallholders to markets as identified in literature (see section 2.3). The extended list of success factors of linking smallholders to markets for cassava-based products is summarised as follows:

1. Create comparative advantage through:
  - ✓ Finding a market niche through:
    - Product upgrading (adapt product in response to consumer demand).
    - Functional upgrading (increase value added by changing the mix of activities).
    - Channel upgrading (move to a new value chain).
  - ✓ Lowering production costs through:
    - Process upgrading (increase efficiency), in particular through:
      - Lowering costs of raw materials.
      - Securing good water supply for primary processing.
      - Reducing drying costs.
    - Economies of scale, e.g. by using collective action (farmer groups), but be aware of hidden costs (related to group dynamics) of large heterogeneous groups.
    - Training and organisation of farmers.
2. Involve the private sector:
  - ✓ Involve intermediaries to allow grading, bulking and storage of intermediate products.
  - ✓ Enhance the competitiveness of HQCF with regard to wheat flour. If HQCF is not competitive, it is not a viable business and private sector may pull out.
3. Lower transaction costs through:
  - ✓ Building trust along the value chain by:
    - Guaranteeing regular supply and demand of cassava-based products along the value chain.
    - Introducing a quality control and grading system to prevent disputes.
    - An independent arbiter to negotiate / solve disputes.
  - ✓ Improving infrastructure, transport means and distribution systems.
  - ✓ Improve access to information on markets and R&D, for example through industry forum.
  - ✓ Partnership facilitation, either by a third party (e.g. an NGO) or a value chain champion, or by creating formal organisations (platforms) to link producers, traders and buyers of cassava-based products.
4. Create an enabling environment, supported by Government, providing:
  - ✓ Access to credit (financial services).
  - ✓ Market institutions to prevent oligopolistic behaviour of traders and buyers.
  - ✓ A public sector with a conducive business environment including infrastructure, contract enforcement mechanisms and financial intermediation.
  - ✓ Promote cassava-based products under the general public through mass advertising campaigns.

It is difficult to rank these factors in order of importance as this is largely dependent on the product and the context. Profitability at all levels, however, is a prerequisite for a value chain to succeed. One unviable business within the value chain can cause its collapse. Profitability can be increased by lowering the production and transaction cost, or increasing the price of the product. The latter option, however, makes the product less competitive for the end-users. The experiences in Ghana and Tanzania showed that end-users are willing to pay a higher price for a more reliable product (in terms of quality and consistency of supply) such as wheat flour than for HQCF. Quality assurance and consistent supply of intermediate products are thus essential to link farmers into cassava value chains. This can be achieved by involving intermediaries, but also requires intensive training and support in processing technologies and business management of processing groups.

The importance of other success factors depends on the context. Partnership facilitation may be needed if there is a dormant market, but there are no established value chains yet and processing groups lack the means and skills to find buyers. However, as the experience with the processing group in Bungu in Tanzania showed, it is also possible that a processing group has a contract with a buyer that requires no involvement of intermediaries. The creation of an enabling environment is important to encourage the out-scaling and replication of value chains but may be initially less important to establish new value chains.

The C:AVA project was developed based on the experiences of the Cassava-SMEs project. The lessons learned in that project are thus incorporated into the C:AVA strategy. Table 3 presents an overview of the identified critical success factors, and how these are addressed within the C:AVA strategy; potential problems and solution are also identified. C:AVA focuses on improving the processing techniques, business skills of smallholders and help actors gain access to credit. In addition, attention to more intangible factors that determine the project's outcomes should be given. Therefore the following recommendations are given:

- Advocacy and publicity campaign: efforts have to be made to raise awareness and create support amongst politicians as well as consumers. Activities to do this have to be defined (project objective 3, activity 3.4)
- Establish permanent producer platforms to strengthen linkages between value chain actors, disseminate market information and new technologies, etc.
- Raise awareness on costs and reasonable prices for HQCF and intermediate products.
- Develop grading & quality assurance systems to avoid products of inferior quality and guarantee food safety (project objectives 2 and 3).

The list of success factors presented here is arbitrary, based on experiences of previous attempts to link farmers to markets. However, it is not said that a project can only succeed if all these factors have been addressed. Some factors may not be relevant in particular situations whereas other factors may be essential that are not included in the list. Linking farmers to markets cannot be done according to a formula; one has to work with the opportunities and constraints which are unique for each situation.

**Table 3 Mapping the C:AVA strategy against success factors to link smallholders to markets**

	<b>Success factors</b>	<b>Project strategy / intervention</b>	<b>Potential problems</b>	<b>Potential solutions</b>
Market niche	Product upgrading	Production of High Quality Cassava Flour	Smallholders and primary processors fail to deliver the right quality for HQCF	Quality assurance system.
	Functional upgrading	Increase value of cassava-based intermediate product for smallholders by establishing processing groups	HQCF value chain collapses.	Processing groups change focus to local market and local products.
	Channel upgrading	Support end-users in new applications of HQCF in industries (e.g. biscuits, plywood)	Competition from alternative products such as wheat flour or maize flour.	Reduce price of HQCF. Promote HQCF as part of pro-poor development policy.
Production costs and efficiency	Process upgrading	<p>1. Equipment (grater, press) of processing groups is to be upgraded to improve labour efficiency of primary processing.</p> <p>2. Cost of raw material (cassava roots) is reduced by improving planting material and cultivation practices to increase yield and lower production costs.</p> <p>3. Solar drying is the cheapest option, but limits scale. Flash drying is preferred as opposed to the costly bin drying; engineers seek to increase the fuel efficiency.</p>	<p>1. Lack of funds processing groups to invest in new equipment. Lack of technical skills to operate and maintain new equipment</p> <p>2. Failing harvests push up price for cassava. Farmers invest in other higher value crops.</p> <p>3. Fuel costs are high. Private sector not willing to invest in flash dryer because of high costs and risks.</p>	<p>1. Provide access to credit. Follow-up training and continuous technical backstopping of processing groups after initial training.</p> <p>2. Build up stock of intermediary cassava products (e.g. grits or HQCF) in case of shortage of raw materials. Focus on farmers that depend on cassava for livelihoods and have spare capacity (land and labour) to increase cassava production.</p> <p>3. Use alternative fuel sources (e.g. biomass). Identify investment risks and support private sector</p>
	Economies of scale	Community groups do primary processing, intermediaries will bulk for potentially drying and milling to achieve economies of scale.	Internal costs of group management are high, making them inefficient.	Work with existing groups, preferably of limited size and with clear identify and focus / objective.
	Training smallholders	Service providers are contracted to train smallholders in cassava farming and	Training contents / delivery unsatisfactory.	Monitor and evaluate performance of service providers.

	<b>Success factors</b>	<b>Project strategy / intervention</b>	<b>Potential problems</b>	<b>Potential solutions</b>
	(technical & business skills)	processing techniques, business skills, group organisation, and gender & diversity.		
Private sector	Involvement private sector	Private sector is involved as intermediaries and end users.	Private sector may pull out if HQCF value chain not profitable on short/medium term.	Work with research institutes to research, improve and demonstrate HQCF value chain.
Transaction costs	Trust	1. By introducing an intermediary in the value chain, cassava-based intermediary products can be bulked and stored to enable a regular supply. End users are involved to guarantee a regular demand. 2. Development of quality assurance system is in progress.	1. Intermediary controls value chain and sets prices.  2. Non-compliance with quality assurance system.	1. Transparency in contracts between intermediaries and sellers and buyers. Independent arbiter to support negotiations.  2. Have clear protocols on quality control and implications (e.g. price reduction) if the quality is below standard.
	Transport	No strategy		
	Information	Information will be passed on through C:AVA country offices, project partners and service providers	C:AVA assistance only temporarily, no follow-up.	Develop permanent platforms to continue information sharing after C:AVA.
	Partnership facilitation	C:AVA country offices (in particular the business development advisor) support the value chain.	C:AVA assistance only temporarily, no follow-up. Service providers only provide technical training but do not build up permanent linkages with value chain actors	Develop permanent platforms to continue partnership facilitation after C:AVA.
Enabling environment and institutions	Finance	Financial services, including loan guarantees.		
	Supportive policy	Country offices in Uganda (and Tanzania?) plan campaigns to promote cassava-based products.	Lack of funds. Perception of general public on cassava-based products remains negative.	Liaise with end users and government to finance advertisement campaigns. Use HQCF champions / ambassadors.

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## Appendix 1 Data collected on Cassava-SMEs project

Institutes involved:	NRI, IAS (Austria), University of Agriculture Abeokuta, FRI (Ghana), University of Ghana, Food & Flour Ltd (Ghana)
Duration:	4 years (2003-2006)
Budget	950,000 Euros
Objectives:	<p>Main objective: to develop selected cassava-based foods to meet the changing and growing urban demand through the production of products that are convenient, of high quality and safe. CASSAVA-SMEs has taken a holistic approach to provide "best practice" tools and technologies to develop the chain from production to consumption (final report)</p> <p>The objectives of the project were (annual report 2004):</p> <ol style="list-style-type: none"> <li>1. To develop and promote best practice guidelines for the commercialisation of traditional food products using cassava products as a model.</li> <li>2. To develop and test specific technologies for the commercialisation of cassava based products.</li> <li>3. To understand and optimise the impacts of commercialisation, specifically that based on SMEs, on the livelihoods of traditional processors.</li> <li>4. To assess the potential of traditional processors to produce high quality products that meet urban demand.</li> <li>5. Development of appropriate quality assurance (QA) systems for SMEs engaged in commercial processing of traditional food products.</li> <li>6. To development more cost-effective and environmentally sensitive processes that will make commercially manufactured cassava products more affordable</li> <li>7. To establish "best practice" for the establishment, support and promotion of SMEs producing traditional food products</li> <li>8. To examine and select marketing strategies and distribution systems which effectively target urban markets</li> </ol>
Activities / strategy:	<p>The project CASSAVA-SMES took a two stage approach over a four year period. The first stage was to develop improved versions of the product or at least to make improvements to processing. The justification for this was that urban consumers are demanding products of better quality that are safer and more convenient. The second stage involved validation of the improvements to processing on a case study basis in Ghana and Nigeria. The project activities focussed on two principal products, instant <i>fufu</i> in Ghana that is based on high quality cassava flour, and fermented <i>fufu</i> in Nigeria, based on the drying of fermented soaked cassava and two lesser products, <i>kokonte</i> in Ghana and tapioca in Nigeria. The project worked at a pilot level and with the private sector developing these products, developing quality assurance systems, and understanding the market opportunities. All these activities have been undertaken within the context of understanding the impact on the livelihoods of traditional food processors. Reflection on the commercialisation implications guided the selection of specific models for commercialisation.</p>
Target group:	Small-scale farmers and processors
Product:	fermented <i>fufu</i> , pounded <i>fufu</i> , <i>kokonte</i> , cassava grits and local "starch")
Risks & assumptions:	<p>The major risk for the project was the price of competing products – such as wheat flour in Ghana and the price of cassava. For a period of time in 2004/2005 it became uneconomic to produce cassava grits. It is therefore important that the introduction of these products is combined with efficiencies in cassava production to ensure competitiveness. It is also recognized that the grain, flour and starch sectors in many African economies are highly distorted by a combination of domestic subsidy and import tariffs and duties. A sharp fall in duty for a cassava substitute would, in effect, import agricultural subsidy from third countries into the domestic economy rendering cassava less competitive.</p> <p>Shortages in the supply of cassava roots since the commencement of the Initiative was a major concern for processors and an increase in the cultivation and availability of cassava roots may likely reduce this negative effect.</p> <p>A growing and potentially huge market for processed, convenient cassava food products is emerging, partly because of the impact of urbanisation on the volume and form in which food</p>

	products are demanded. There is also increasing scope for utilisation of cassava for industrial purposes and in the production of poultry and livestock feed. It was further noted that, unlike the market for the traditional cassava products, the emerging markets for new products is quality-sensitive. SMEs appear very well suited to exploit the new market opportunities, because of proximity to the supply of tubers and flexibility operators enjoy as cassava processing is often part of a rural livelihoods diversification strategy. However, the higher quality standards imposed by the market constitute a significant barrier unless other related constraints including technology, marketing, finance and policy are addressed. (Onumah, 2007)
Incentives used:	Technical support
Sustainability of scheme:	<p>The key focal technical institutions in Ghana and Nigeria have continued to support SMEs in their respective countries using technical advice.</p> <p>“This project should be a success story because it has developed a replicable model to link small scale farmers to growth urban markets by working through intermediary enterprises that act as secondary processors or bulking agents. The project has contributed to developing urban demand by developing two cassava products that are based on traditional products – but are more convenient and so reduce the time taken for food preparation by urban consumers. At a scientific level the development of these products has been underpinned by good science and a knowledge of the market for the products and also the implications on the livelihoods of the producing households.” (final report)</p>

### Timeline

	Major project activities and milestones	Changes in external factors impacting project outcomes (e.g. policies, markets, technology)
<b>Year 1</b>	Start of project	
	Inception workshop Nigeria Project strategy Workshop and meetings with manufacturers in Ghana to identify constraints	
	Livelihood studies, market assessment study	
	Improvement of processing techniques, product samples	
	Hazard Analysis and Critical Control Points (HACCP) workshop, Nigeria Pilot testing village-based processing	
<b>Year 2</b>	Improvement of processing techniques, consumer tests	
	Milling of dried grits at pilot plant FRI	
	Mechanisation of drying process at FFGL	FFGL did not get access to a loan to install medium-scale processing unit
	Decentralisation processing & drying cassava grits to small-scale processors in rural communities	
	Development of quality assurance systems	
<b>Year 3</b>	Implications of commercialisation studies	
	Market tests, examine credit channels for marketing, cost-benefit analyses	
	Improvement processing techniques	
	Temporary stop of HQCF production by SMEs and intermediary FFGL	High prices for cassava and low prices for wheat flour suppressed demand for, and consequently production of, cassava grits

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<b>Year 4</b>		
	End of project	

### Product

Scale of production	Decentralised primary processing and (sun) drying at SME level, aggregation by FFGL
Skill requirements	Technical skills for mechanised graters and presses, and quality management
Labour requirements	Mechanical grater and presses reduced labour requirements in comparison to traditional processing
Quality sensitivity and assurance / control	Quality assurance is a major challenge when drying of cassava grits is decentralised. To process cassava grits for FFGL, candidate communities had to have: regularly engaged in the production of cassava, facilities for grating cassava installed, and a source of safe/potable water. Additional criteria were used for the location of drying platforms to reduce the risk of inferior quality. The quality criteria applied to the dried grits before the purchase were: colour – acceptable dried grits must appear white; dryness – dried grits for sale must pass the ball test; smell – acceptable quality dried grits must have no mustiness or other smell; and taste – quality dried grits must be bland to the taste (Westby, 2004).

### Technology

Scale	Mechanical grater – community level Mechanical water presses – community level Spin flash dryer – regional level
Complexity / level of innovation (skill requirements)	Mechanical grater – easy to apply Mechanical water press – easy to apply Spin flash dryer – technical assistance required
Labour requirements	Mechanical grater Mechanical water press: Spin flash dryer:
Investment and running/maintenance costs	Mechanical grater: supplied by FFGL Mechanical water press: supplied by FFGL Spin flash dryer:

### Financial support

Access to credit	“Traders, wholesalers and retailers encountered in our study virtually employed no credit. Borrowing was informal, i.e., from friends or relatives. A few processors borrowed from banks. Lack of credit, presumably, is the most serious handicap to growth in entrepreneurship. Weak property rights and poor contract enforceability were identified as the main obstacles to financial market activity. Newer developments signal a changing financial sector landscape and, with these changes, the potential benefits of financial sector reforms could be greater.” (final report)
Type and amount	
Beneficiaries and providers	
Conditions	

### Value chain actors

<p>Involvement suppliers, intermediaries, buyers (how were they involved? what were their constraints?)</p>	<p>Farmers were involved to process and supply cassava grits. They were limited by not having the knowledge (drying conditions to improve quality) and equipment (mechanical press) which was provided by FFGL, as well as technical support. FFGL was partner of project, but was constrained by lack of investment capital for a bin dryer which did not get resolved during the project.</p>
<p>What are the risks and incentives for actors to be involved?</p>	<p><i>Risks Intermediary processor FFGL:</i> competitiveness HQCF dependent on prices for cassava and wheat; acquiring loans for investment (invested time and money in loan applications but did not get anything)</p> <p><i>Incentives intermediary processor FFGL:</i> entering new market segment for processed cassava</p> <p>“Using the value chain approach (VCA) in the field study in Ghana, it was concluded that there is considerable scope for economic involvement by SMEs in the emerging value chains in the cassava sub-sector. The new chain produces new/improved products which are shelf-stable, convenient to prepare and of high and consistent quality. In Ghana this market segment is likely to grow dramatically over the next five years – from a low US\$4 million to over US\$135 million. This growth is being driven by such demographic factors as increased urbanisation. However, for the anticipated growth to occur and also benefit a wide section of the rural population, thereby contributing significantly to poverty reduction, the decentralised processing model, which creates space for rural households/SMEs to undertake primary processing while relatively larger players (intermediaries), who may be urban-based, carry out secondary and further processing, should be supported. This is the model adopted by FFGL (Partner 6) and the UNAAB commercial pilot operations (Partner 3), both with success. FFGL had a 69.4% cost saving in direct costs. The model offers increased opportunities for rural non-farm employment and provides rural households with sustainable, commercially-driven livelihoods options. It is also inherently flexible, allowing entrepreneurs (who may be farmers) to enter or leave processing activities depending on the market.” (final report)</p> <p><b>Risks smallholders:</b></p> <p><i>Incentives smallholders:</i> “Case studies of livelihoods of households engaged in the production and processing of cassava into flour, pounded fufu and kokonte was carried out in six locations in Ghana and an assessment of the impacts of commercialisation of the fufu power carried out in Accra where the product is mostly consumed. Also there was an assessment of the perceptions of the commercialisation of the fufu powder and the kokonte mini chips and cassava flour. It was observed that there is a gradual improvement on livelihoods of processors of fufu, kokonte and cassava flour. Major concerns raised were that the fufu powder is too expensive as compared to pounded fufu, lack of education on the preparation of the powder into paste and the fear of fufu powder displacing retailers of cassava roots. For the kokonte producers, limitations observed were: the lack of funds to buy the kokonte slicer and how to search for markets for the new product, They however accepted that the technology is time saving and produces high quality kokonte with less mycotoxins. Cassava flour processors also complained of lack of markets locations, inadequate training on the production of high quality flour and the minimal or non-use of the flour by local communities.” (final report)</p>

## Linking smallholders to markets

	<p>“In all cases, higher gross margins were obtained for the production of improved cassava products than for their traditional versions. The average gross margin gain was over 20 percentage points. The improved products benefited from lower production costs due to economies of scale. At the same time, improved products commanded price premiums due to their higher quality. Except for the case of <i>kokonte</i>, consumers found it cheaper to prepare cassava meals from the traditional products rather than from their improved versions. If convenience costs are taken into consideration, however, the latter case results might be reversed in favour of the improved products. Results of our cost benefit analysis indicate that the production of fufu and kokonte flours by SMEs is a viable venture. Given the potential sizes of both the improved fufu and kokonte markets, financial returns accruing to the private entrepreneur in terms of profits and to government in terms of tax revenues would be enormous. In addition, export sales of fufu and kokonte flours would earn the country foreign exchange. Besides, the activities of the cassava SMEs would impact positively on the employment situation through multiplier.” (final report)</p>
<p>Capacity building / strengthening requirements and activities value chain actors</p>	<p>Small-scale village processors required training in quality assurance (food safety) and business (consistent supplies). “The market for new/improved products is more demanding in terms of high and consistent product quality as well as capacity to maintain regular supply of relatively large volumes of intermediate products for industrial utilisation. Rural entrepreneurs, however, lack information on available technology, can often not afford the equipment, largely because of lack of finance. They also face difficulties accessing effective after-sale service in rural areas for modern equipment” (Onumah, 2007).</p> <p>SMEs face challenges regarding investment in new processing technology and procedures that are required to scale up and also assure products of high and consistent quality. Most SMEs are under-capitalised and lack access to formal finance. Lack of finance tops the list of constraints mentioned by most entrepreneurs interviewed. In particular, access to equity finance is virtually unavailable, except when provided by family and friends. The other constraint related to upgrading processing technology is the lack of access to training opportunities for personnel and managers of SMEs. There is also a dearth of opportunities to train SME personnel in product quality assurance. The cost of switching from traditional cassava products to the new/improved products can be justified only if the market for the latter is sizeable and growing. SMEs lack the capacity to effectively carry out new product promotion (Onumah, 2007).</p>
<p>Involvement of supporting actors (e.g. service providers, NGOs)</p>	

### Value chain

<p>Chain structure (components, national / international)</p>	<p>Smallholders – processors (SMEs) – intermediary (FFGL) – end users (national)</p>
<p>Value added / profitability at every stage</p>	<p>“Poor roads, inappropriate means of transport and a badly organized distribution system are factors leading to elevated marketing costs, which in turn result in high consumer prices. Some oligopolistic market behaviour existed among traders, wholesalers and processors. However, retailers seemed to</p>

	exhibit competitive market behaviour. There were virtually no barriers to entry for the marketing agents. Processors made the highest profits, followed by retailers.” (final report)
Competitiveness of product at every stage(compared to other similar products)	In 2005, HQCF could not compete with wheat flour because of high prices for cassava and low prices for wheat.
Governance: relationships & institutions between actors (contractual arrangements, communication, power)	FFGL decentralised drying of cassava grits to village processing units, subject to conditions

### Institutional and economic setting

Markets infrastructure	
Level of stability of markets / prices	<p>Prices for cassava went up, and prices for wheat flour down in 2005; HQCF was not competitive as a result</p> <p style="text-align: center;"><b>Figure 2. Cassava price at Agboglobshie (1) and Dome (2) markets between May 2003 and January 2004</b></p> <p style="text-align: center;">(annual report 2003)</p>
Government policies / regulations (supportive, hindering, changes)	The President’s Special Initiative applied a centralised primary processing model for cassava starch (note that because of the complexity of obtaining high quality cassava starch it is more challenging to apply a decentralised model for starch than for flour)

### Lessons learned

Positives	The market segment of cassava-derived products is likely to grow dramatically over the next five years, driven by such demographic factors as increased urbanisation. However, for the anticipated growth to benefit a wide section of the rural population, the decentralised processing model, which creates space for rural households/SMEs to undertake primary processing while relatively larger players (intermediaries), who may be urban-based, carry out secondary and further processing, should be supported. This is the model adopted by FFGL (Partner 6) and the UNAAB commercial pilot operations (Partner 3), both with success. The
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model offers increased opportunities for rural non-farm employment and provides rural households with sustainable, commercially-driven livelihoods options. It is also inherently flexible, allowing entrepreneurs (who may be farmers) to enter or leave processing activities depending on the market. To achieve this goal the following constraints still need to be addressed:

- SMEs, including relatively larger urban-based ones, lack the capacity to effectively undertake new product promotion.
- Process and product innovation is critical in the market for new/improved products but most SMEs lack the capacity to innovate.
- There is a dearth of opportunities for SME operators to upgrade their technical and management skills outside of Government/donor funded agencies, which like FRI face severe funding difficulties.
- Ghana has a diversified and competitive financial sector, which can for instance facilitate payments at relatively lower cost and risk under a decentralise system involving rural SMEs in primary processing. However, SME financing remains a challenge despite Government efforts, including negotiating credit lines targeting SMEs and setting up a venture capital trust fund.

The Cassava-SMEs Project has made significant contribution towards addressing issues related product and process innovation but has also demonstrated that technology-based interventions are not sufficient in promoting cassava processing with considerable scope for SME involvement in Ghana. A review of case study validation exercise of this project and related DFID funded project activities in Ghana identified the following factors as essential for success in cassava commercialisation:

- raw material supply must be sufficient and reliable in terms of volume and quality;
- raw material price needs to be low enough to make cassava-based products competitive;
- processors must be able to meet the buyers' specifications in terms of product quality & consistency, quantity, timeliness of delivery, price and reliability of supply;
- attractive product price and prompt payment are very for ensuring a smooth flow of products along the value chain;
- the need for access to affordable finance for cassava farmers and processors;
- and so means of resolving disputes in the value chain.

Developing a value chain for cassava flour thus requires the following steps:

- at the farmer/household level to ensure a consistent supply of quality raw materials
- at the intermediary level to ensure their ability to buy products from farmers and act as a bulking agent/secondary processor and
- at the end user level to ensure their confidence in using cassava-based products.

As part of consolidating the project outputs, the factors influencing the success of cassava-based SMES were reviewed (Graffham 2006) and the following were identified as important:

- Raw material supply must be sufficient and reliable in terms of volume and quality to sustain processing operations;
- Raw material price needs to be low enough to make cassava-based products competitive against existing products such as heavily subsidised imported wheat flour;
- The processor must be able to meet the buyers' specifications in terms of product quality & consistency, quantity, timeliness of delivery, price and reliability of supply;
- Attractive product price and prompt payment are very for ensuring a smooth flow of products along the value chain;
- Access to affordable finance for cassava farmers and processors;
- An independent arbitrator is required to resolve disputes within the chain.

These observations were within the context of work with an intermediary secondary processor to make the linkage between primary processors and end use industries.

	<p>These lesson-learning and successful pilot projects implemented by the NRI and partners have demonstrated the approaches for sustainable and profitable linkages between farmers, intermediary processors and end-users<sup>2</sup>. The three most important products, technologies and processes to scale-up/scale-out from these projects are:</p> <ul style="list-style-type: none"> <li>• Working with intermediaries (small and medium scale enterprises) to act as a guaranteed market for cassava farmers and reliable suppliers for end users;</li> <li>• Processing technologies; and specific knowledge about uses of HQCF: e.g. in improved versions of traditional products; and</li> <li>• Use of high yielding varieties to reduce production costs.</li> </ul> <p>Specific commercialization approaches and processes identified by these pilot initiatives that have contributed to success have included: working with farmers, processors, buyers and end-users to understand technical, economic/ business and social issues for problem solving; working in multi-disciplinary partnerships; taking a commercial approach recognizing the fact that technical feasibility is not enough - initiatives must make business sense, be cost-effective and sustainable; and the importance of integrating in the national system.</p> <p>Promoting the new/improved products in the domestic markets represents a major challenge, particularly because of competition with traditional products which are comparatively cheap. In addition, consumer preferences for these products are often influenced by entrenched traditions. The case of Neat Foods Ltd. (Box 1) shows however that the media can effectively be used to encourage the consumption of products competing with well-established forms of traditional food. It should be noted, however, the ability of Neat Foods is peculiar, in that it has access to relatively cheap air-time as the owners have controlling stake in three major private FM stations. With strong growth in listener-base, relative to other media such as television and the print media, private radio stations have emerged in Ghana as a very important vehicles for mass advertising (Onumah, 2007).</p>
<p>Negatives</p>	<p>It was observed that there is a gradual improvement on livelihoods of processors of fufu, kokonte and cassava flour. Major concerns raised were that the fufu powder is too expensive as compared to pounded fufu, lack of education on the preparation of the powder into paste and the fear of fufu powder displacing retailers of cassava roots. For the kokonte producers, limitations observed were the lack of funds to buy the kokonte slicer and how to search for markets for the new product. They however accepted that the technology is time saving and produces high quality kokonte with less mycotoxins. Cassava flour processors also complained of lack of markets locations, inadequate training on the production of high quality flour and the minimal or non use of the flour by local communities.</p> <p>Poor roads, inappropriate means of transport and a badly organized distribution system are factors leading to elevated marketing costs, which in turn result in high consumer prices. Some oligopolistic market behaviour existed among traders, wholesalers and processors. However, retailers seemed to exhibit competitive market behaviour. There were virtually no barriers to entry for the marketing agents. Processors made the highest profits, followed by retailers.</p> <p>Traders, wholesalers and retailers encountered in the study virtually employed no credit. Borrowing was mainly informal. A few processors borrowed from banks. Lack of credit, presumably, is the most serious handicap to growth in entrepreneurship. Weak property rights and poor contract enforceability were identified as the main obstacles to financial market activity.</p> <p>A major constraint to flour production is the high cost of drying.</p>

<sup>2</sup> Highlights are presented in the example boxes in the activities description in section III below.

	<p>A focus group discussion was held at Nyamebekyere on the commercialisation of the cassava flour in Ghana. The following observations were made:</p> <ul style="list-style-type: none"><li>• The training conducted for the group was not adequate and the skills were not properly acquired, thus the flour produced was not up to standard. The flour produced initially was being bought by KABISCO Ltd. for biscuit production. The factory was later on closed down for reasons not known to the four processors. When their products were put on the general market, there was nobody to buy as the first few bakers who bought the product complained of poor quality of the flour.</li><li>• They were of the opinion that with good acquisition of skills they can produce good quality flour.</li><li>• They can thus supply the major bread producers who use some cassava flour as a substitute to wheat flour.</li><li>• They also thought of going into local biscuit production to use the flour themselves during off season farming periods.</li><li>• They were improving on their incomes when KABISCO Ltd was buying from them.</li><li>• This made it possible for them to offset some debts, pay school fees and hospital bills</li></ul> <p>They went into flour production because sometimes there is a glut in the cassava roots market and if production is encouraged, they can prevent such gluts.</p> <p>Drying is the most critical unit operation in transforming fresh cassava into grits (coarse flour) and fine flour. It is also the single most costly. Sun-drying is weather-dependent and a low-cost capital investment option, especially well suited for small-scale production by individuals and households. Processors can make production decisions according to local weather conditions, and adjust rapidly to changes in the same. They can expand production capacity by adding on additional drying platforms and plastic drying trays/mats at no more than \$100 each. However with centralised operations and hired employees it had many drawbacks/limitations. These can be summed up as follows:</p> <ol style="list-style-type: none"><li>1. Production of cassava grits was weather-dependent, limited to sunny days and the hours of sun light. On sunny days processing was subject to rain interruption. At FFGL's initial production location production in effect was limited in aggregate to no more than 5 months in the year</li><li>2. It produced cassava grits of variable quality (the result of uncontrollable weather), with high levels of microbial and other contamination (the result of relatively extended drying times)</li><li>3. The combination of irregular production and permanent staff also meant very high unit costs. Ultimately it made our product not competitive.</li></ol> <p>Development of a cost effective and efficient mechanical drying process was central to FFGL's business development strategy. However, FFGL did not achieve this. Initially FFGL opted for the use of a mechanical air-heated belt dryer. The company obtained the design and a pro-forma quotation which formed the basis for our budget under the project. Subsequently a combination of problems led FFGL to drastically modify its approach. These were:</p> <ul style="list-style-type: none"><li>• Financing - problems with mobilising promoter/shareholder funds and delays in accessing grant funds under the project</li><li>• Doubts about suitability and cost competitiveness of initial technology proposed for Mechanical Dryer and shutdown of the manufacturer/ supplier company. The Spin Flash Dryer was subsequently selected as most appropriate</li><li>• Much higher investments than initially budgeted for the dryer technology FFGL finally selected as appropriate</li></ul> <p>The overriding imperative for FFGL was to go forward with our business – with or without project grant support. As an interim strategy and to keep our business afloat despite the funding and dryer technology difficulties FFGL opted to decentralise/devolve Stage 1 processing to community based small-scale processors.</p>
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	<p>The regular evacuation of purchased grits from northern to southern Ghana has been a huge problem on account of the low volumes and long distance. This together with poor sales and cash flow difficulties has lent a stop-start nature to FFGL's activity. As a consequence, community based primary processors have not gained the confidence that grits production is a reliable business that requires their full time attention.</p>
Adaptations in project strategy	<p>Decentralisation of sun-drying instead of centralised mechanised drying at intermediary level (see above).</p>
Key incidents	<p>Loss of staff of project partners to the private sector in Ghana has significantly contributed to uptake of the instant fufu and development of commercial businesses as a consequence. Unsuccessful attempts of the SME FFGL to obtain a loan to acquire a flash dryer changed the project strategy, adopting a decentralised model for the primary processing (in particular drying) of cassava. (CHECK THIS WITH ANDREW)</p>

## Appendix 2 Data collected on IITA SARRNET/CFC project

Institutes involved:	IITA, TFNC (SARRNET, Foodnet, CFC)
Duration:	4 years
Budget	<i>Typically total investment (mainly machinery) cost for a small-scale cassava flour processing centre as the ones established in this project could be \$2,344, \$4,757 for a starch processing centre and \$1,960 for a cassava chips processing centre.</i>
Objectives:	Novel processing techniques were introduced to small processors and other sub-sector agents to supply cassava to the markets of interest on a national, regional or international scale in order to enable the development of cassava products as widely traded commodity that contributes to the economic growth of cassava growing communities, and to strengthen the cassava sub-sector with sustained links between suppliers and users of cassava products. It is expected that if the links between small processors and industrial users of cassava products are sustained, resource poor farmers could be encouraged to take up improved cassava varieties developed through research more quickly. Abass et al. 2009
Activities / strategy:	The introduction of new technologies and machinery for processing cassava to HQCF through the setting-up pilot processing enterprises in selected locations in the Eastern and Southern Zones involving IITA and partners was carried out following an integrated production, processing and marketing system. It involved the identification of primary production area followed by introduction of the processing techniques to small groups of processors/farmers, training, and linkage of the processors to end-user industries. The criteria used for selection of a location included sufficient/ moderate production of cassava, availability of water source, accessibility of the village from the main road and availability of a building to install the processing machines. Abass et al. 2009
Target group:	Small-scale farmers
Product:	Cassava derived products: chips (Bungu), starch (Mtimbani) and HQCF (Chisegu, Zogowale)
Risks & assumptions:	<i>An input market study showed that important factors for these small-scale processing enterprises to flourish are: availability of sufficient raw material at low cost, access to product market, availability of water, and an efficient support infrastructure such as good roads and transport systems.</i>
Incentives used:	Equipment, training, technological support
Sustainability of scheme:	This was a pilot scheme. One of the four processing groups was still actively operating one year after the end of the project. CHECK

### Timeline

	Major project activities and milestones	Changes in external factors impacting project outcomes (e.g. policies, markets, technology)
<b>Year 1</b>	Start of project	
<b>Year 2</b>		
<b>Year 3</b>		
<b>Year 4</b>		

### Product

Scale of production	Average amount of cassava processed per day (kg) and number of people involved: Bungu (chips): 731 kg, 4 persons Zogowale (HQCF): 392 kg, 19 persons Chisegu (HQCF): 122 kg, 8 persons Mtimbwani (starch): 172 kg, 8 persons
Skill requirements	Technical skills on cassava processing, marketing & negotiation skills, business management skills, group work
Labour requirements	
Quality sensitivity and assurance / control	

### Technology

Scale	Pilot project; processing technology was developed for small-scale processing at community level
Complexity / level of innovation (skill requirements)	Technology was adapted to community processing, however techniques and equipment were new for the processors.
Labour requirements	
Investment and running/maintenance costs	

### Financial support

Type and amount	Procurement of equipment
Beneficiaries and providers	Farmer processing groups
Conditions	

### Value chain actors

Involvement suppliers, intermediaries, buyers (how were they involved? what were their constraints?)	
What are the risks and incentives for actors to be involved?	
Capacity building / strengthening requirements and activities value chain actors	Processing groups received training in processing techniques, finance and business management
Involvement of supporting actors (e.g. service providers, NGOs)	None?

### Value chain

Chain structure (components, national / international)	
Value added / profitability at every stage	

## Linking smallholders to markets

Competitiveness of product at every stage (compared to other similar products)	
Governance: relationships & institutions between actors (contractual arrangements, communication, power)	

### Institutional and economic setting

Markets infrastructure	
Level of stability of markets / prices	<i>Prices for fresh roots vary per season, high demand during Ramadan</i>
Government policies / regulations (supportive, hindering, changes)	

### Lessons learned

Successes	<p>Chips production is not water intensive, resulting in higher profitability exhibited in the Bungu farmers' operations.</p> <p>The Bungu group had a business outlook and members were paid based on amount of work done (Kg of cassava processed).</p> <p>Group dynamics and group organization have a great cost implication to cassava processing enterprises when processors are operating in groups. For example, the Bungu group being smaller is highly organized and thus able to reduce their costs unlike the other groups. It therefore follows that in entrepreneurship development, it is vital to recognize the effect of low enterprising culture, group spirit, group motivation, commitments within members and group's management (leadership structure, qualities, tenure, accountability and decision making, motivation etc) could have on project success. (Abass et al., 2008)</p>
Failures	<p>Low business entrepreneurial culture and experience of farmers impede them to access available markets.</p> <p>High transport costs, due to lack of access roads and poor transport systems, erode gross profits.</p> <p>Lack of potable water affects quality of final products as well as processing capacity at the pilot centres. Lack of water leads to poor quality cassava products not accepted by the major end users.</p> <p>Group characteristics and dynamics impact the functioning and efficiency of the groups. In Zogowale for instance, most of the group members were aged more than 50 years. Despite the training organised for this group on business management, the group members were still of the impression that any work done at the processing centre was for charity. (Abass et al., 2008)</p>
Adaptations in project strategy	<p>there are various issues to be addressed to assure stable and sustainable productivity. Among these issues are organising supply of raw material, assessing output markets and optimizing marketing strategies, and optimizing the plants themselves in terms of turnover, seasonality of processing and optimizing quantity and quality of outputs. These issues have to be addressed in business plans that will enable the CFC project to allocate credit schemes that have been set for the next phase of the project. Abass et al. 2008</p>
Key incidents	