

# PrOpCom

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Making Nigerian Agricultural Markets Work for the Poor

**Monograph Series # 2**

**Sub-sector Strategic Framework**

**Detailed Cassava Report**

**Prepared By**

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Victoria Island, Lagos**

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# **DFID PROPCOM PROJECT – INCEPTION PHASE STUDY**

## **SUB-SECTOR STRATEGIC FRAMEWORK – DETAILED CASSAVA REPORT**

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## **DFID PROPCOM PROJECT – INCEPTION PHASE STUDY**

### **SUB-SECTOR STRATEGIC FRAMEWORK – DETAILED CASSAVA REPORT**

#### **EXECUTIVE SUMMARY**

New Nigeria Foundation was contracted by PrOpCom for the inception phase study of the project to study the cassava chain and develop interventions that will enhance access of the poor, including women to the market.

The total world production of cassava in year 2000 was about 177million MT with Nigeria being the highest producer in the world, producing about 34 million MT all of which are locally consumed, with about 85% of it being consumed as food while only 15% is used for industrial purpose. Cassava is perceived as women's crop in most areas of the Southern and North Central States where it is grown and considered to be of strategic importance in improving food security and sustainable livelihoods. Its strong potential to contribute to national economic growth and enhanced foreign exchange earning has also being repeatedly chanted by government. However Nigerian cassava is considered not to be competitive internationally because of low productivity.

The major group of stakeholders in the cassava chain were identified to include the farmers, intermediate processors, industrial users, merchant and marketers and end users. The factors responsible for the non-competitiveness as well as constraining access of the poor to the market include low productivity, nature of cassava –its bulkiness and perishability, poor processing facilities, lack of consistency in product quality, and price structure among others.

On-going initiatives by Federal and State government as well as by international agencies and NGOs to improve productivity of cassava improve the commodity chain and enhance pro-poor market opportunities were reviewed. It will appear that none seems to march the market-driven focus of PrOpCom with a holistic overview of the cassava chain from production through processing and marketing to the end user (consumer and/or industrial).

Guided by the goals and pro-poor principles of PrOpCom, NNF has identified facilitative intervention initiatives that have potential to transform the cassava sector from a largely low input traditional sub-sector operating on subsistence to one that will not only be market driven and aimed at income generation, but globally competitive. For example, though only 15% of the cassava produced in Nigeria is committed to industrial uses, analysis suggest that improvement in capacity of the intermediate processors and fabricators of equipment for flour, chips and grit are considered to have systemic effect and capable of steering cassava towards competitiveness, with an enhanced market access for the poor.

The emerging initiatives will support a market based system with appropriate drivers of change and stakeholders working with farmers, processors and end users to increase productivity, thereby lowering cost per unit of produce (tuber, chips, starch, flour, etc.), hence enhancing competitiveness.

## ACRONYMS AND ABBREVIATIONS

ADP	-	Agricultural Development Project
ARMTI	-	Agricultural and Rural Mechanisation Training Institute
CBN	-	Central Bank of Nigeria
DAIMINA	-	Developing Agricultural Input Markets in Nigeria
FAO	-	Food and Agriculture Organisation
FDA	-	Federal Development Agencies
FIIRO	-	Federal Institute of Industrial Research, Oshodi
FGN	-	Federal Government of Nigeria
IFAD	-	International Fund for Agricultural Development
IFDC	-	International Fertilizer Development Company
HA	-	Hectare
IITA	-	International Institute of Tropical Agriculture
MT	-	Metric Tonne
NACRDB	-	Nigeria Agricultural Cooperative and Rural Development Bank
NAFCON	-	National Fertilizer Company of Nigeria
NAFDAC	-	National Agency for Food and Drug Administration and Control
NDDC	-	Niger Delta Development Commission
NGO	-	Non-Governmental Organisation
NNPC	-	Nigeria National Petroleum Corporation
PCU	-	Projects Coordinating Unit
RTEP	-	Root and Tuber Expansion Programme
RUSEP	-	Rural Sector Enhancement Programme
SON	-	Standards Organisation of Nigeria
SPFS	-	Special Programme on Food Security
USAID	-	United States Agency for International Development

## **OVERVIEW OF THE CASSAVA SECTOR**

### **Historical Perspectives**

- Cassava was brought to Africa in the late sixteenth century by Portuguese explorers and soon became a major food crop. During the first half of the twentieth century in Nigeria, the area devoted to cultivation of cassava remained small because of labor bottlenecks at the cassava processing stage which constrained expansion of planted area. However in the 1940s interest in the crop grew and led to an accelerated pace of the farmer-to-farmer transfer of cassava varieties. This was sustained over the decades by a strong and growing urban demand and now it is a reliable food crop and contributes more cash income to households than any other crop. In the early and mid 1980s production remained steady but between 1988 and 1993 there was a significant increase in production that can be attributed to improvements in production efficiency through the introduction of high yielding, disease and pest resistance cultivars to farmers. Since 1993 production has increased slightly primarily owing to increase in the area cultivated. Estimated world production of cassava in 2000 was 176.9 million metric tons. Africa produced 92.7 million metric tons, 33.9 million of which were grown in Nigeria, the world's largest producer since 1990.

### **Overview of the sub-sector**

- The production increases of the last five years have been due to increase in the hectareage of land cultivated with cassava. Over the years, yields per Ha (productivity) have remained low compared to world average. This is probably due to low use of improved input package recommendations. The use of improved cuttings particularly in the South East and South South states has helped prevent the attack of the cassava mosaic disease.
- Although there are high price variations across the states and between seasons, producer price of cassava has increased substantially in the last five (5) years. This is due largely to increased demand for cassava as staple food occasioned by change in food habit, rapid increase in population, high rate of urbanization and its increased use as animal feed and industrial raw material.

### **Importance in the Economy**

- Nigeria is the largest producer of cassava in the world with a total production of about 34 million MT cultivated over an area of about 3.1 million ha with an average yield of about 11 MT/ha (FAO, 2002). It is the most widely cultivated crop in the country and is predominantly cultivated by small holder farmers who cultivate less than 2 ha each, using low quality/inadequate inputs and rudimentary technology and suffering high post-harvest losses.
- Cassava is Nigeria's largest crop in terms of output and the 6<sup>th</sup> in terms of planted area. Since 1999, output has increased by 17%, increasing at an average annual growth rate of just over 3% per annum, broadly in line with population growth. Growing urbanisation and increased industrial use have boosted demand. Prices have therefore risen faster than the majority of staples (53% between 1999 and 2003).
- Cassava is cultivated in almost all the states in Nigeria but the major cassava producing areas of the country are the Southern and North Central zones. Major producing states being Kogi, Benue, Cross River, Rivers, Delta, Imo, Enugu, Ogun, Osun, Oyo, Ondo, Abia and Akwa Ibom. Production data varies depending on whether it is obtained from the FAO, CBN or the PCU. Table 1 presents 2002 data for all the states from the PCU.

**Table 1: Production of cassava by zone and state**

S/N	Zone	State	Production Level (MT)	Zonal Production (MT)
1	South South	Rivers	2,291,000	7,371,340
		Cross River	1,881,000	
		Delta	994,500	
		Akwa Ibom	904,000	
		Edo	786,900	
		Bayelsa	513,940	
2	South East	Imo	2,940,500	7,705,700
		Enugu	2,465,000	
		Abia	1,793,400	
		Ebonyi	442,900	
		Anambra	63,900	
3	South West	Ogun	1,923,400	7,474,110
		Osun	1,467,000	
		Oyo	1,459,000	
		Ondo	1,357,000	
		Ekiti	854,100	
		Lagos	413,610	
4	North Central	Kogi	4,399,000	9,606,500
		Benue	2,467,000	
		Kaduna	884,000	
		Niger	879,000	
		Kwara	856,700	
		FCT	120,800	
		Nasarawa	0	
		Plateau	0	
5	North West	Zamfara	129,900	239,600
		Kebbi	33,800	
		Kano	18,900	
		Jigawa	24,800	
		Katsina	21,400	
		Sokoto	10,800	
6	North East	Adamawa	195,400	1,304,700
		Bauchi	58,900	
		Gombe	41,500	
		Taraba	974,000	
		Borno	20,900	
		Yobe	14,000	
<b>TOTAL</b>			<b>33,701,950</b>	

- A recent study, an Assessment of Nigeria's Agricultural Policy (ANAP) (IITA, et al 2003) identified cassava as a commodity with a comparative economic advantage in the domestic, regional or world market in four out of the six geo-political zones of Nigeria. Stakeholders involved in the study (exporters, processors, farmers associations, policy makers) ranked cassava very high as a priority commodity in the south-south, south-east, south-west and north-central zones of the country.
- It also plays an important role in food security being the main source of dietary calories and family income for millions of farmers and is widely consumed in rural and urban areas with a per capita consumption of over 120kg/person/year

(Nweke, et al 2002)<sup>1</sup>. It is very important as cash earner for rural and urban dwellers, and lately raw material for the livestock feed, starch, alcohol and flour industries, thereby providing livelihood for over 30 million farmers, processors and traders.

- Cassava provides different opportunities for both men and women farmers and processors. Men work predominantly in land clearing, ploughing, and planting while women work predominantly in weeding, harvesting, transporting and processing. The roles change from one part of the country to the other and are affected by the level of technology application for the different processes.

### **Benchmarking and global competitiveness outlook**

- Cassava is cultivated significantly in countries in Africa, Asia and Latin America and consumption has increased significantly in Africa with Nigeria being the largest producer of cassava in the world. Cassava in Nigeria is not competitive globally in terms of productivity, cost of production and prices. The yield in Nigeria is about 10 tonnes/ha compared to 25.9 tonnes/ha in India, 21 tonnes/ha in Niger, 17.1 tonnes/ha in Thailand and 16.2 in China. This leads to high product cost with the local price of cassava products being about international market price.

### **Prospects for the future**

- Several products are obtained from cassava for human consumption and industrial utilisation. The marketing chains for these products have different characteristics but the demand for all these products are increasing thereby driving prices upward. Increased population and urbanisation is driving up demand for cassava food products particularly gari and fufu. Opportunities therefore exist to develop new markets for cassava particularly if the distribution system that links producers to urban consumers is efficient and there is consistent supply of good quality products at competitive prices. Also, demand is increasing in the flour industry particularly with the government edict on the 10% inclusion in flour for bread making. Similarly, increases in the price of maize have encouraged the livestock industry to use more cassava as part of the substitute for maize in livestock feed formulation. Animal nutritionists have confirmed that cassava could be substituted for as much as 20% of the maize requirement in the livestock feed industry.
- Demand for use of cassava in the alcohol industry and in the production of starch for adhesives etc. is increasing. Promotion of the use of dried cassava products in the production of industrial materials such as starch, alcohol, etc. will eliminate the trading in wet tubers, reduce transportation costs, encourage on-farm value addition thereby increasing farmers' earnings and reducing cost to end users.

### **Justification for selection of the commodity**

- Cassava is cultivated in at least 26 States by at least about 5 million farm families (mostly poor farm families on small disaggregated farms with limited on-farm value added processing). It is processed mostly by women using low level technology into food products and some industrial raw materials. Food products such as gari, lafun and fufu account for about 85 % of processed cassava while livestock feed in the form of chips and other industrial raw materials such as flour and starch account for about 15% of processed cassava. Post harvest losses are high because technology applied in processing cassava are inefficient and product quality is poor.



- The role of women and poor people in the cassava market chain is substantial. It is produced and processed with a lot of labour input from women. Also, marketing of the major food products is undertaken by women and it is a major food security crop consumed in large quantities by the poor and the rich. Recent consumption data revealed that the income elasticity of demand for cassava products among rural households was greater than zero and in some cases greater than one. Surprisingly, the cassava estimates were about the same as estimates for maize. The estimate for *gari* was significantly higher than that of maize, even among high income rural households.
- There is increasing demand for cassava products due to rapid population increase, high rate of urbanisation and increased use of cassava products in the livestock, confectionery and starch industries. The increase in the demand from the industrial sector in the last few years partly due to increase in prices of alternatives to cassava and increased knowledge about the use of cassava. The recent government actions of banning poultry imports and directive for the 10% inclusion of cassava flour in the production of bread have further increased demand resulting in rising prices.
- The response of farmers to bridge the demand supply gap has been to increase the area under cassava cultivation but yield (productivity) remains low at an average of about 10 MT/ha compared to yield levels of 17MT/ha in Thailand. This has led to producer prices that are about twice those of other cassava producing countries such as Thailand, India and Brazil. In effect Nigeria cassava products are globally uncompetitive. Increasing area under cassava cultivation is not sustainable more so with the growing average age of the Nigerian farmer which currently stands at about 60years. Farmers need to improve productivity by adopting improved agronomic practices and increased use of inputs and mechanisation.
- Demand for cassava products in the Nigerian industrial market is not being met in terms of quantity and quality of products from intermediate processors characterised by low efficiency and low capacity utilisation occasioned by inadequate supply of cassava, inefficient technology used for processing, high cost of cassava tubers, high transportation costs particularly of wet tubers, and inadequate knowledge of the quality requirements of the end users. The prices of cassava products supplied to the industrial end user are comparatively high but the income earned by farmers is relatively low compared to cost of production.
- These constraints have been analysed severally and there are government and other programmes that are designed to improve the situation. There are also industrial end users including livestock feed manufacturers, alcohol producers, starch producers, flour millers who have indicated their willingness to champion the changes required to improve the cassava commodity chain. There is need to partner with stakeholders in the cassava commodity chain to effect increment in productivity towards increasing the volume in the market, reduce unit price whilst increasing farmers' earnings; improved intermediate processing to improve quality, reduce post-harvest losses, reduce transportation cost and assure sustainable supply of appropriately priced raw materials to the industrial user.

## **BACKGROUND**

### **Significance of domestic and/or export markets:**

- The cassava export markets are primarily Europe and North America and a number of smaller and growing markets such as China, Korea and Japan. The major products traded are cassava chips, pellets and starch and the markets are characterised by high price and quality competition with the major exporters being Thailand and Indonesia. Nigeria has not been able to operate in the export market because of non-competitiveness in price and quality. There is however some export of cassava (<1%) in form of gari targeted at Nigerian immigrants in big European and North American cities. This may change with the recent signing of agreements between Nigeria and China for the supply of 1 million tonnes of cassava chips annually.
- Domestic demand for cassava products has been increasing due largely to increased population, increased urbanisation, and increased use of cassava in the production of livestock feed, starch, and bakery and confectionery products. In the urban areas, cassava food products - gari, akpu, lafun, or fufu - constitute major staples with about 85% of total cassava production going into the production of these food products. Demand is growing and the supply system seems to be well established. Cassava is becoming a food of choice in the urban areas and its consumption is increasing even among the urban elites.
- Current demand for cassava by the flour mill industries is about 200,000MT of cassava flour per annum, which translates to about 800,000 – 1 million MT of cassava tubers annually while in the livestock feed industry, about 450,000 tonnes of cassava chips is currently used for feed production (~ 1.8 million MT of cassava tubers). Effective national demand for alcohol stands at about 139,000MT, which translates into about 600,000 tonnes of cassava. New alcohol manufacturing companies are being established and existing ones changing to cassava as major source of raw material for alcohol production. About 465,000 MT of starch is required in the country with cassava starch accounting for about 38,000 MT. (10% for chips, 5% for syrup concentrate for soft drinks, 1% for high quality flour used for biscuits and confectionery, etc.)

### **Major players, systems of organisation**

- The major players in the cassava commodity chain are farmers, merchants, intermediate processors and consumers including industrial end users. Cassava farmers are mostly the rural poor, majority being women cultivating small holdings of less than 2 ha each of mixed crops of both arable and perennials. Women typically carry out about 70 percent of the work; planting, weeding, harvesting, transporting cassava from the farm, peeling, soaking, bagging and selling. Men carry out about 30 % of the work; land preparation, harvesting, transporting and grating. Very little value addition takes place for cassava on the farm with the farmer selling cassava in stands or as harvested tubers after processing some for personal household consumption. Harvesting is usually done when needed since cassava can be left on the field until needed.
- In most cases, intermediate processing to food products such as gari, fufu takes place in homes and cottage processing units owned sometimes by small groups or cooperatives but mostly by individual farmers and processors. Processing is in small quantities mostly by women using low technology equipment, their earnings are usually small and they usually belong to an association through which they access some micro-credit.

- Merchants dealing in cassava products are mostly men who move from one community to the other to purchase different products including cassava. They are intermediaries between the processors and the end users making most of the profit along the chain, exploiting the producers/processors and selling at high prices to the end users.
- Marketers are mostly women and serve as the intermediaries between the processors, merchants and the end users. Marketers usually buy from the merchants and their marketing is limited to the areas/communities in which they reside. End users of cassava products are rural and urban consumers of cassava food products and industrial end users in the livestock, starch, alcohol and flour industries. Table 2 shows the stakeholders in the cassava commodity chain according to gender.

**Table 2: Stakeholders in the cassava commodity chain by poor/rich and gender**

Stakeholders	Major Products				
	Gari, Lafun, Akpu etc.	Flour	Chips	Starch	Alcohol
Producer	Poor farmers	Poor farmers	Poor farmers	Poor farmers	Poor farmers
Marketers	Women	Men and women	Women and men	men	men
Local Processors	Poor women	Poor women	Poor women	Poor women	Poor women
Merchants	Rich women and men	Rich men and women	Rich men	Rich men	Rich men
End users	<ul style="list-style-type: none"> <li>• Poor and rich households</li> <li>• Poor urban dwellers</li> <li>• Others</li> </ul>	<ul style="list-style-type: none"> <li>• Flour mills</li> <li>• Biscuit manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>• Livestock feed industries</li> </ul>	<ul style="list-style-type: none"> <li>• Starch factories</li> </ul>	<ul style="list-style-type: none"> <li>• Distilleries</li> </ul>

#### **Significance for the poor, rural and urban:**

- Cassava is very important for employment and food security in urban and rural areas. Table 2 shows that the poor are very significant stakeholders in the cassava commodity chain. In the rural areas, the poor form a very significant percentage (more than 70%) of cassava farmers and processors and the poor in the rural and urban areas are major consumers.

#### **Critical Issues, Constraints, Opportunities**

- Cassava is vegetatively propagated using cuttings that are bulky and need to be properly stored to remain virile. In the past six years, cassava production has stagnated. Although the area planted with cassava increased by 14% between 1999 and 2004, there was an actual decline of 10% in yield per hectare. This is probably a consequence of inadequate use of production inputs and poor agronomic practices. However, some states have recorded some increases in productivity.
- Cassava is mainly produced by subsistence farmers on small disaggregated farms which do not allow for easy application of mechanization inputs. Inadequate mechanization consequently necessitates labour-intensive production and processing thereby constraining production where labour is in short supply while raising costs at the village level.

- Farmers do not have access to inputs and micro-credit at the right time as input delivery system is weak and not effective. Moreover, cassava is usually a minor crop in the cropping system and there is general incorrect belief by farmers that since it thrives on poor soils it does not require complimentary inputs. Hence fertilizer is rarely used and agronomic practices are poor.
- There is limited on-farm value added processing by farmers and income to farmer is low (if there is no value added at farm level). Transportation of tubers over long distances is very expensive because it contains between 60 to 70 % water that still has to be discarded during processing which must take place within 24 – 48 hours after harvest to avoid deterioration. This requirement for immediate processing creates technical and practical problems for processors of cassava tubers.
- There is little cassava product diversification beyond traditional products, such as gari, fufu and lafun and intermediate processors are faced with unreliable, irregular and inadequate supply of cassava products leading to low and seasonal capacity utilization. Technologies used in their operations are mostly inefficient leading to high levels of waste and poor product quality, and drying is a major bottleneck in the production of flour and chips, particularly during the rainy season in the Southern part of the country. This is compounded by poor enterprise management capacities of the processors resulting in low profitability. The result of these is that products of intermediate processors do not meet quality and price requirements of industrial processors particularly flour millers and livestock feed manufacturers.
- Industrial end users are faced with unreliable and inadequate supply of cassava products, inconsistent, expensive and substandard raw materials leading to underdeveloped and ineffectual supply link. Those that are processing tubers are further faced with high transportation costs, unable to adopt flexible production schedules and are usually underutilised.
- Stakeholders along the cassava commodity chain particularly farmers have poor access to market information. This is significant because there are large variations in prices of cassava products across the cities and states. The lack of market information makes it difficult for stakeholders to properly explore and exploit market opportunities.

#### Opportunities:

- There seems to exist significant opportunities for the development of a viable cassava sector that can meet domestic food and industrial demands, and eventually lead to global competitiveness. There are varieties of cassava that can yield between 25 – 40 tonnes/Ha with application of improved agronomic practices. These varieties have been tested and there is ample evidence that under normal farmer conditions this target can be met. These varieties are being promoted through some national programmes such as RTEP and SPFS. There are also simple and tested technologies that can improve processing into several products. These can be promoted to ensure more efficient processing.
- There is evidence of increasing local demand for cassava-based products such as chips, for the livestock feed industry; native and modified starches for the beverage and pharmaceutical industries; dextrin and other adhesives for packaging industries, and ethanol for distilleries. This increase is attributable to increased urbanisation, increase in prices of alternative products like maize, increased demand for cassava products in the West African sub-region, development of new products that lead to generation of less waste using technology that is already available (cassava grits, which is acceptable to the

livestock feed industry) and new government directives promoting the use of cassava products.

- Some recent actions of government such as the directive for 10% inclusion of cassava flour in bread, ban on importation of livestock feed, inclusion of gari in the strategic reserve and imposition of duty tariff on starch imports is expected to substantially increase the demand for cassava products hence more processing activities. The size of the potential additional market for cassava is estimated as 1 million tonnes of tubers to satisfy 10% inclusion of cassava flour in bread; 30 million tonnes of cassava starch for syrup concentrate in soft drinks' manufacture; 1 million tonnes of cassava for the production of syrup concentrate; 80,000 tonnes of cassava for production of dextrin required in the production adhesives, packaging, footwear and wood industries; 450,000 tonnes of cassava chips in the production of poultry feed; 600,000 tonnes of cassava in the production of alcohol and 240,000 tonnes to replace imported cassava starch.
- Other opportunities include the favourable policy environment promoting production and utilization of cassava including a Presidential Cassava Initiative which targets income of \$5 billion annually from domestic and export growth markets! The growing demand for cassava chips and pellets for use in poultry feed and flour for the bakery industry, as a result of the Presidential edict on cassava flour, offer opportunities for expanding MSME production of chips. Cassava is a very viable source of ethanol production. Yield of alcohol per tonne is much higher from cassava ((150liters/MT of fresh roots) than from sugar cane (48liters/MT). Nigeria currently imports about 90 million litres of alcohol annually. Reproducing this from cassava will require about 600,000 tonnes of cassava. The main issues are establishing supply chains that do not incur high collection costs, access to finance and limited improvements in technology (drying).
- In addition to these, markets for modified and new cassava products are likely to develop for example Phillips et al (2004) states that the makers of Indomie Noodles needs 60,000 tonnes of cassava flour per month for production of noodles and some oil companies have shown interest in using cassava starch for drilling mud.

These opportunities can be exploited (to improve productivity and efficiency in the commodity chain and meet the demand that will be created for cassava products) in ways that will increase incomes of stakeholders along the chain particularly poor farmers and processors.

### **Changes presently in evidence, drivers of change**

- Demand for cassava is on the increase (flour mills are looking for flour of the right quality; livestock feed mills are increasing demand) and in the last 2 years, farmers had been expanding acreage cultivated in order to meet the growing demand. However, farmers need to be assisted to channel increased production towards increasing productivity per hectare as against increased hectareage under cultivation. Achieving this may require supporting private sector supply of extension services and inputs through building integrated (seeds, fertilizer, agro-chemicals, extension knowledge) input supply chains in conjunction with the primary suppliers, including the privatised NAFCON. There are moves underway to strengthen the association of agric input producers, distributors and suppliers to be able to service farmers using lessons learnt from DAIMINA<sup>2</sup>.

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<sup>2</sup> Developing Agricultural Input Markets in Nigeria, a USAID project implemented by IFDC.

- More processors are emerging, especially in the production of flour, starch and chips but there is a need to establish the quality requirements for the different products and train processors on how to meet these market requirements.
- The drivers of change would be the flour mills, livestock feed industries, farmers' cooperatives, alcohol manufacturers, etc. who are willing to work to ensure that the chain functions well in terms of delivering the products they require and have indicated their willingness to work with the project in ensuring the production of good quality cassava products.

**Government initiatives, donor initiatives, private sector institutions:**

- There are various government and donor programmes on cassava in Nigeria. While some are on-going, some had been completed. Major cassava programmes being implemented include the following.
- *Cassava Enterprise Development Project (CEDP):* The International Institute of Tropical Agriculture (IITA), with headquarters in Ibadan (Nigeria), is implementing the Cassava Enterprise Development Project (CEDP) with focus on selected communities of eight states of the South-East (Abia and Imo) and the South-South (Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers) geopolitical zones of Nigeria, an especially impoverished area of the Niger Delta Region". CEDP is funded by a public-private partnership agreement between Shell Petroleum Development Company (SPDC), USAID and IITA, and aims to increase economic opportunities through sustainable and competitive cassava production, marketing and agro-enterprise development in selected communities in eleven states of the South-East and the South-South states of Nigeria. The CEDP supports the Nigeria Presidential Cassava Initiative (NPCI) and involves producer and processor associations, local NGOs, commercial banks, government, oil industry, donor, private investors and other stakeholders.
- CEDP is the first program initiated under the USAID-Shell GDA and implemented by IITA. The Project includes three activities; 1) reduce the impact of the Cassava Mosaic Diseases, 2) increase the productivity of cassava, and 3) develop and expand post-harvest processing and marketing outlets for cassava products.
- *Cassava Mosaic Disease (CMD) Project:* The CMD project was initiated by the International Institute of Tropical Agriculture (IITA) as a defence against the CMD which is advancing rapidly from East Africa by introducing along the Southeast flank of Nigeria resistant varieties that will give double the present yield of cassava in the areas. The project is being funded by the Federal Government of Nigeria, the Niger Delta Development Commission (NDDC), USAID, NNPC and 12 States in Southern Nigeria while IITA is the leading executing institution.
- The CMD project implements its activities through partnerships with relevant public institutions, non-governmental organisations, private-sector agribusiness firms, farmer and processor associations and groups, as well as organised communities in Nigeria. The Niger Delta Development Commission, NDDC committed N420 million to the successful implementation of the Cassava Mosaic Disease, CMD, in the South-South region. The chairman of the commission, Chief Onyema Ugochukwu, made this known at the launch of Integrated Cassava Project and the Cassava Mosaic Disease, CMD, scheme in Akwa Ibom State.

- The objectives of the CMD project include to mitigate the impact of CMD and prevent its spread throughout Nigeria and West Africa; increase cassava production by deploying high yielding cultivars and proven sustainable crop and soil management technologies; promote the adoption of improved and profitable postharvest and processing technologies as well as new product development; improve value adding to cassava through increased private-sector investment in production, processing, storage and marketing; increase incomes and livelihoods in rural areas by developing effective and active market information acquisition and dissemination systems, and increased commercialization; strengthen human and institutional capacity to produce, process, and market cassava efficiently. The project operates in 12 states of Abia, Akwa Ibom, Anambra, Bayelsa, Cross River, Delta, Ebonyi, Edo, Enugu, Imo, Ondo and Rivers. It is funded by FGN, NDDC, USAID, NNPC and the 12 state governments.
- *Rural Sector Enhancement Programme (RUSEP)*: RUSEP was set up to provide a coordinated and synergistic approach with existing public and private support (input and credit) institutions to increase the effectiveness and impact of research. This was to expand opportunities in output markets beyond their present capacity in order to transform the rural economy from subsistence to commercial agriculture. A conscious development of Nigeria's domestic and regional agricultural markets will help create wealth, generate employment, diversify incomes, and increase food security in both rural and urban areas.
- The primary objective of RUSEP was to develop domestic and regional agricultural markets through the identification of market opportunities, dissemination of market information, training, technology transfer, and the development of linkages that will enhance profitable agribusiness entrepreneurship and agroindustrial expansion in Nigeria. The project was implemented from July 2001 through March 2004 as a pilot program in four states: Oyo, Katsina, Kano, and Adamawa. The project brought together public and private sector groups in an integrated approach to agricultural development.
- The funds for RUSEP was provided largely by USAID, Nigeria country office. The Federal Government of Nigeria and IITA provided counterpart funding for provision of senior project staff. The lead organization was the International Institute for Tropical Agriculture (IITA), in collaboration with the State government Agricultural Development Programs (ADPs), Winrock International, and local NGOs.
- *Root and Tuber Expansion Programme (RTEP)*: International Fund for Agricultural Development (IFAD) is funding the Root and Tuber Expansion Program, i.e. yams and cassava in selected states. The program serves as testing ground for IFAD commodity-based approach for poverty alleviation. The project seeks to increase production of cassava, yam and Irish potatoes; adopt improved technology for processing and storage and provide education for marketing. About 3.2 million farming households selected from 18 of the southern and middle-belt states are participating. Total estimated cost is USD\$36.1 million.
- *Cassava Competitiveness Programme (CCP) in Akwa Ibom State*: A cassava competitiveness project is being implemented by New Nigeria Foundation (NNF), Citizens International (CI) and Akwa Ibom State Government with sponsorship from United States Agency for International Development (USAID) and United Nations Foundation (UNF). The project is to promote a profitable multi-stakeholder

cassava development programme that is made up of production, processing and marketing activities. The overall goal of the project is to promote profitable cultivation, processing and marketing of cassava and cassava based products in Akwa Ibom State. The project is demand-driven and competitive; it illustrates the beneficial partnership that could be forged between public and private sectors in promoting sustainable rural and agricultural development in rural communities. The project is expected to be for 2 years from March 2004 – February 2006.

- *Special Programme on Food Security (SPFS):* The Nigeria's National Special Programme for Food Security (NSPFS) was developed together with FAO, which began in January 2002 with government funding of \$45.2 million. The programme in Nigeria spans all 36 states with one site in each senatorial district.
- The programme has two broad objectives. The first is to improve national food security by increasing food production on an economically and environmentally suitable base. The second is to reduce the annual variability and fluctuations in agricultural production, thereby improving consistent access of people to food.
- The SPFS programme covers both crops and livestock inclusive of fisheries. Each State was to select a number of crops and livestock suited to the natural and ecological endowment. The increasing popularity of cassava as both a food basket contributor and cash provider was demonstrated as more than 70% of the States included cassava in their choice.



## MARKET STRUCTURE

### The products in the marketplace, differentiate as necessary

- The major uses to which cassava is put are food, livestock feed, starch based products and flour. About 85% of total cassava utilisation is for food in the form of gari, fufu, akpu and lafun; about 10% of is used in producing livestock feed (chips, grits); about 5% goes in to the production of starch based products (starch, adhesives, alcohol, glucose syrup) and less than 1 % goes into the production of flour for bread, biscuits etc.
- The cassava based food products constitute the staple food in many parts of the country. These products are produced by rural households, micro and small processors in rural areas and transported to urban centres where they are marketed in well established but simple markets. There are some medium sized processing plants producing gari using more modern technology and feeding the upper end of the consumer market. The products which used to be considered the food of the poor are now consumed by the middle class and the urban elites. Consumption of these products is growing at a fast rate.
- Cassava flour is mainly utilised in the bakery industry for the production of confectioneries such as biscuit, bread, etc. Production of cassava flour however is currently minimal and being carried out by emerging small and medium-scale processors. These processors are not very familiar with the requirements of the flour mills and therefore do not produce enough good quality flour to meet the demand. A flour mill recently indicated that out of the 20 flour samples supplied to it, only two met the quality requirements needed to produce good quality bread. The recent directive of FGN on the inclusion of 10% cassava flour in the production of bread has resulted in increased demand for high quality flour which is not being met.
- In the livestock feed industry, cassava chip is being used as partial replacement for maize as the source of carbohydrates/energy. Recently a new product, cassava grits, is being used in the production of poultry feeds as a source of energy.
- Starch-based products from cassava are getting back into the market after the closure of many starch factories in the late 90s and early 2000s. Starch is being produced by a few medium-scale processors. This will only be sustained if the transportation of tubers over long distances is avoided and drier products such as chips, flour or cake is used as raw material in the factory. A few medium scale factories located in Kogi and Ogun States have gone into or about to start production of ethanol using cassava.

### Characterisation of the market – domestic and export

- The export market for cassava is virtually non-existent as Nigeria cassava products are not competitive globally. However, there is a huge domestic market for cassava, mainly in the form of food products such as garri, fufu, lafun, akpu, and industrial products such as flour, chips, grits, starch and alcohol. Table 3 provides a breakdown of the domestic market/demand for cassava products:

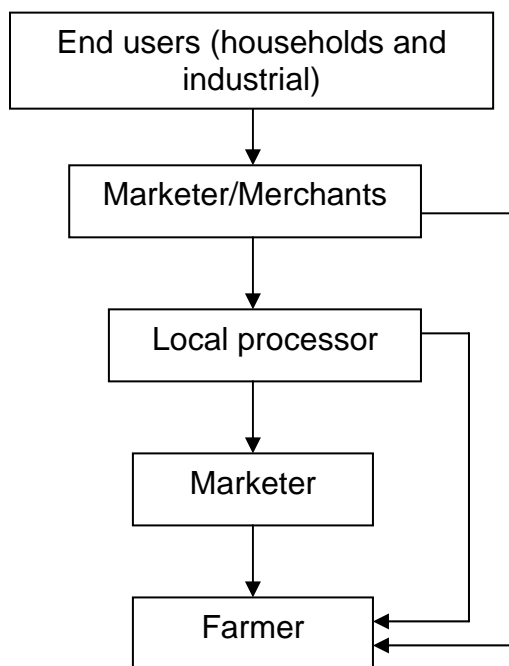
**Table 3: Expected annual demand for cassava products**

	Food (gari, fufu, etc.)	Flour	Livestock feed (chips*)	Starch & starch derivatives	Alcohol
Quantity of cassava tubers required per annum	28.9 million MT	1.2 million MT	1.8 million MT	.240,000 MT for imported cassava starch; .1 million MT for syrup	600,000 – 2 million MT for production

				concentrate .30 million MT for syrup concentrate for soft drinks	of ethanol
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\* This does not include the contract signed recently by the FGN to supply China with 1 million tons of cassava chips which will require 4 million tonnes of cassava tubers.

**Figure 1: Sub-sector map showing the major relationships in the commodity chain**



### Key players active in the market

- The major players in the cassava market/industry are the farmers, processors who are mainly small and medium-scale, marketers, merchants and the industrial end users. Support services are provided by input suppliers, associations/cooperatives providing micro-credit and other services, transporters, etc.
- Traditionally, in the past (three to four decades ago) in many parts of Nigeria, cassava farming and regular consumption of cassava products was associated with poverty. The notion was probably because cassava was produced on marginal lands, plots that were unproductive for preferred crops such as yam, melon etc. While cassava and its food products can no longer be described as synonymous with poverty, findings from our field study show that most of the cassava farmers are poor. Cassava production was gender biased and associated with poor farm households. The typical cassava farming household cultivates less than 2 hectares of land. Their capital asset base is poor with no access to subsidised production resources such as tractors, fertilizer; agro-chemicals etc. Such production inputs are obtained from more expensive sources that have high risk of adulteration. Very few of the farmers surveyed had ever had access to tractor. Less than 5% have ever used fertilizer or insecticide on their cassava farm and only about 15% have at one time or another used herbicides. Additionally, less than 20% of farmers have had access to improved high yielding varieties. They merely plant whatever is available and usually have three or four varieties of cassava on their farms.

- The second category of stakeholders is the processors. In this group are those who undertake basic value addition activities or render services that assist the cassava farmers and their families to achieve value added benefits. These category include those who engage in peeling, grating/or chipping, frying, drying, bagging and assorted activities leading to production of various cassava products. Processors are individuals or social and business cooperative groups. Their resource endowment also varied. For example while those who peel and fry cassava (usually women and girls) belong to the poorest of the poor, those (individuals or cooperatives) who own the cassava grating mills are usually a shade better than the cassava farmers.
- The mode of operation within this category is so varied that consistency of the quality of the end product cannot be guaranteed from one group to another. Even, within the same group consistency of products quality cannot be guaranteed from one person to another or from one day to another. Also, product branding is very scarce although when it exists, it commands higher prices. Appropriate processing can substantially improve margins in cassava. For example, during our field study, we found that those who bought cassava chips from the farmers early in the morning in the market for N950/bag later sold same for N1,150 in the same market on the same day in Sabongida Market at Gassol in Taraba State. Seemingly more scandalous was the situation seen at Zaki Biam Market, Ukum L. G. A, in Benue State where a woman claims she buys a bag of chips at N1,300 from middlemen. She undertakes simple value added activities by sorting and properly cleaning and “grading” the chips. Thereafter she sells those “graded” for human consumption for between N2,700 – N3,000/bag and sells the choicest/best meant for industrial use of N3,500. A value added initiative yielding over 200% increase.
- Marketers/merchants form the third category of stakeholders. In terms of the cassava stakeholder chain, the broad category referred to as marketers include the middlemen, wholesalers and retailers of cassava and its products and by-products. Marketers also include those who market services and inputs that are meant to facilitate cassava production. The action or inaction, the moderation or excesses, the greed or abasement, etc. of this group will be vital in achieving the goals of PropCom in respect of cassava. Initiatives will have to be evolved to reduce the imbalance in the distribution of the rewards accruable from the efforts of the poor cassava farmers. For now it is over loaded in favour of the marketers whether they are retailers, middlemen or wholesalers.
- Industrial end users of cassava are relatively few and are largely limited to the production of ethanol, industrial starch and glue many of them having closed down in the last 10 years. Most of the existing plants have capacity under utilization problems arising from inadequate supply of cassava based raw materials. Information obtained show that Duraclean (formerly NIYAMCO), Bacita is currently operating at about 35% capacity utilization, Matna in Ondo State is operating at about 50% capacity, even after establishing a 300 hectares cassava farm to supplement its local purchases, Peak in Abeokuta operates at about 40% capacity. There are however indications that some new big processing plants are about to be either resuscitated or established in Oyo, Benue, Kogi and Kwara States. The plant in Kwara said to belong to the Dangote Group (one of the biggest indigenous companies in Nigeria), is nearing completion.
- Other industrial players include livestock feed industries such as Grand Cereals, Livestock Feeds Ltd., as well as flour mills that now have to include cassava flour to the tune of 10 % in the flour for bread.

- Transporters render services that are crucial to the chain and are regarded as stakeholders and not just as a service provider. Cassava and cassava products are bulky and transportation expenses could account for as high as 70% of what the consumers pay for their products depending on the distance of the farm from the market or factory and the terrain and condition of the roads. For example, transportation cost for a pick-up load (one ton) of cassava ranged between N1,000 – N3,000 and Matna (an industrial starch producer in Ondo State) pays N5,000 per ton of cassava thus the farmer is left to earn a mere N2,000. Transporters claim that the high cost of fuel, poor rural roads, high cost of vehicle repairs and replacement parts, high cost of vehicle (usually obtained on credit) etc. are responsible for the very high cost of transport.
- Many small-scale farmers, irrespective of the crop being produced, usually require some credit to pay for essential farm inputs and for labour hired to supplement family labour. In spite of government efforts and claims, official credit from either the commercial banks (CB) or the specialized development banks (SDB) such as NACRDB remain elusive to the genuinely poor farmers – a group to which most cassava farmers belong. Many cassava farmers need credit to cover the cost of hired labour, transportation, and to undertake some value added activities. They are however unable to secure credit from the official sources including MFIs except from unofficial sources such as friends and relations.

### **Characterisation of industrial buyers, their product requirements and procurement systems**

- Table 4 provides details on major industrial buyers of cassava products, their product requirement and procurement systems:

**Table 4: Characteristics of industrial end users of cassava**

<b>SECTOR</b>	<b>CASSAVA PRODUCTS</b>	<b>PRODUCT REQUIREMENTS</b>	<b>PROCUREMENT SYSTEMS</b>
Livestock Feeds	Cassava chips	<ul style="list-style-type: none"> <li>• Properly peeled, washed and cleaned</li> <li>• Good physical condition</li> <li>• MC - 10% maximum</li> <li>• Ash content – 3% max</li> <li>• Crude fibre – 3% max</li> <li>• Total acidity – 1% max</li> <li>• Cyanide – 10mg/kg max</li> <li>• Starch content – 75% min.</li> </ul>	<ul style="list-style-type: none"> <li>• Buys through the merchants</li> <li>• Products are supplied to the factories by merchants</li> <li>• Merchants are responsible for transportation and all landing costs</li> <li>• Current prices are between N25,000 – 30,000/MT</li> </ul>
	Cassava grits	<ul style="list-style-type: none"> <li>• Absence of sand, stone or other impurities</li> <li>• Properly toasted like garri</li> <li>• MC - 10% maximum</li> <li>• Cyanide – 25mg/kg max</li> </ul>	
Flour Mills	Cassava Flour	<ul style="list-style-type: none"> <li>• Particle size of 180 microns or less</li> <li>• Free from bran, germ and fibre</li> <li>• MC - 10% maximum</li> <li>• Ash content – 0.6m/m</li> <li>• Crude fibre – 2% max</li> <li>• Total acidity – 1% max</li> <li>• Cyanide – 10mg/kg max</li> <li>• Starch content – 65 -70% min.</li> </ul>	<ul style="list-style-type: none"> <li>• Buys from both medium-scale processors and merchants</li> <li>• Product is supplied to the mills by the processors or merchants, who are responsible for all landing costs including transport</li> </ul>
Starch Factories	Raw tubers	<ul style="list-style-type: none"> <li>• Wholesome, not affected by rot, mould or deterioration</li> <li>• Whole and firm</li> <li>• Free of mechanical damage and</li> </ul>	<ul style="list-style-type: none"> <li>• Buy directly from farmers</li> <li>• At times farmers are responsible for transporting the tubers to the processing site</li> <li>• At times, processors go to the farms to buy</li> </ul>

SECTOR	CASSAVA PRODUCTS	PRODUCT REQUIREMENTS	PROCUREMENT SYSTEMS
		pests <ul style="list-style-type: none"> <li>• Free of foreign smell and/or taste</li> </ul>	directly from farmers and even go as far as paying for uprooting the tubers and paying the transportation costs
	Cassava cake	<ul style="list-style-type: none"> <li>• Absence of sand, stone or other impurities</li> <li>• White in colour</li> </ul>	<ul style="list-style-type: none"> <li>• Buys from both medium-scale processors and merchants</li> <li>• Product is supplied to the processing plants by the processors or merchants, who are responsible for all landing costs including transport</li> </ul>
	Cassava chips	<ul style="list-style-type: none"> <li>• Properly peeled, washed and cleaned</li> <li>• Good physical condition</li> <li>• MC - 10% maximum</li> <li>• Ash content – 3% max</li> <li>• Crude fibre – 3% max</li> <li>• Total acidity – 1% max</li> <li>• Cyanide – 10mg/kg max</li> <li>• Starch content – 75% min.</li> </ul>	<ul style="list-style-type: none"> <li>• Buys from merchants</li> <li>• Product is supplied to the processing plants by the merchants, who are responsible for all landing costs including transport</li> </ul>
Alcohol Factories	Cassava chips	<ul style="list-style-type: none"> <li>• Properly peeled, washed and cleaned</li> <li>• Good physical condition</li> <li>• MC - 10% maximum</li> <li>• Ash content – 3% max</li> <li>• Crude fibre – 3% max</li> <li>• Total acidity – 1% max</li> <li>• Cyanide – 10mg/kg max</li> <li>• Starch content – 75% min.</li> </ul>	

### The competitive environment

- Cassava is currently competing with maize in the livestock industry and with wheat flour in the flour industry. In the livestock industry, due to the high price of maize, cassava is currently competitive and more cassava is being demanded in this area. However, due to high processing cost and cost of tubers, cassava flour is not as competitive with wheat flour as it is with maize hence the greater enthusiasm of livestock feed producers as compared to flour millers' adoption of cassava as substitute.

### Location issues in production, processing, and consumption:

- Cassava is mainly grown in the North Central, South South, South East and South West with the major producing states being Benue, Kogi, Imo, Enugu, Rivers, Ogun, Cross River, Abia, Osun, Oyo and Ondo States. Processing plants are usually located close to the areas of production while industrial end users are located close to the consumption areas in the urban centres. Greatest consumption of cassava takes place in urban centres with high populations and high concentration of industrial end users.

### Analysis of margins (waterfall charts in annex)

- Prices and margins for cassava products differ from one state to the other. In most places, margins made by farmers are low but margins are higher when cassava is processed into other products. Analysis of water fall charts for different products in the major producing states indicate that margins obtained from the production of chips are high in the North Central region while those on grits are higher in the South. In general, margins obtained in the production of gari were

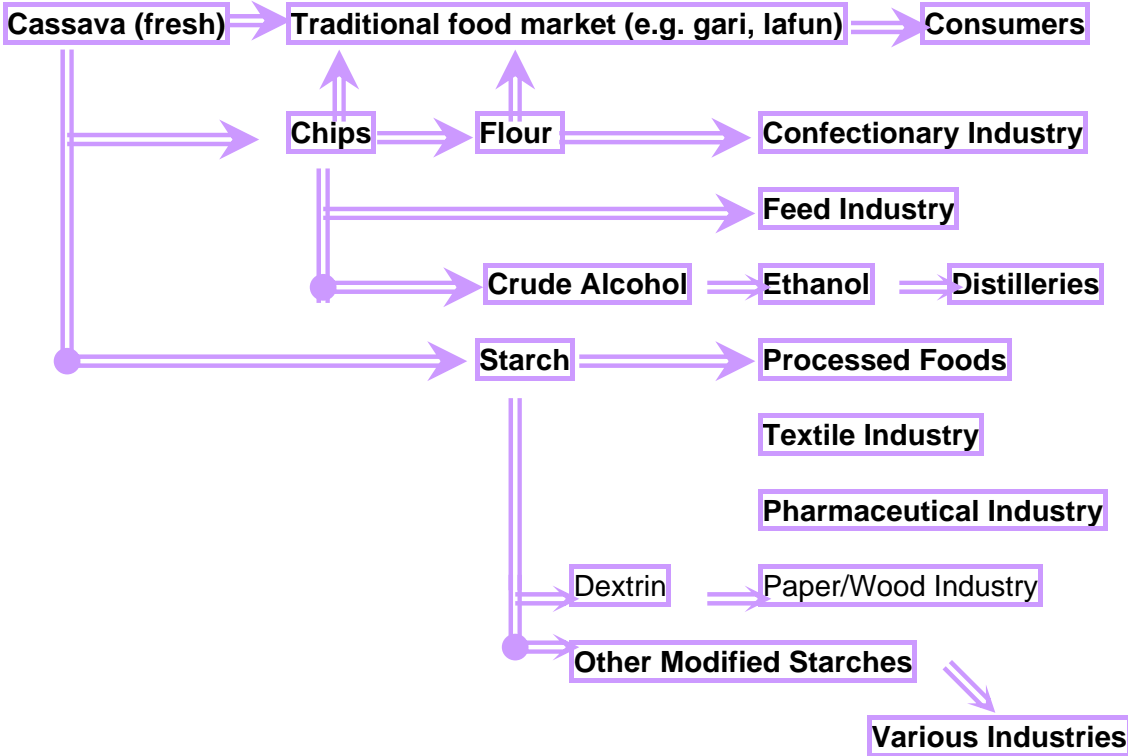
high. A summary of the margins for farmers and processors is provided in Table 5 while waterfall charts for different cassava products in different states are provided in Annex.

**Table 5: Margins for Cassava Farmers and Processors (N/MT of tuber)**

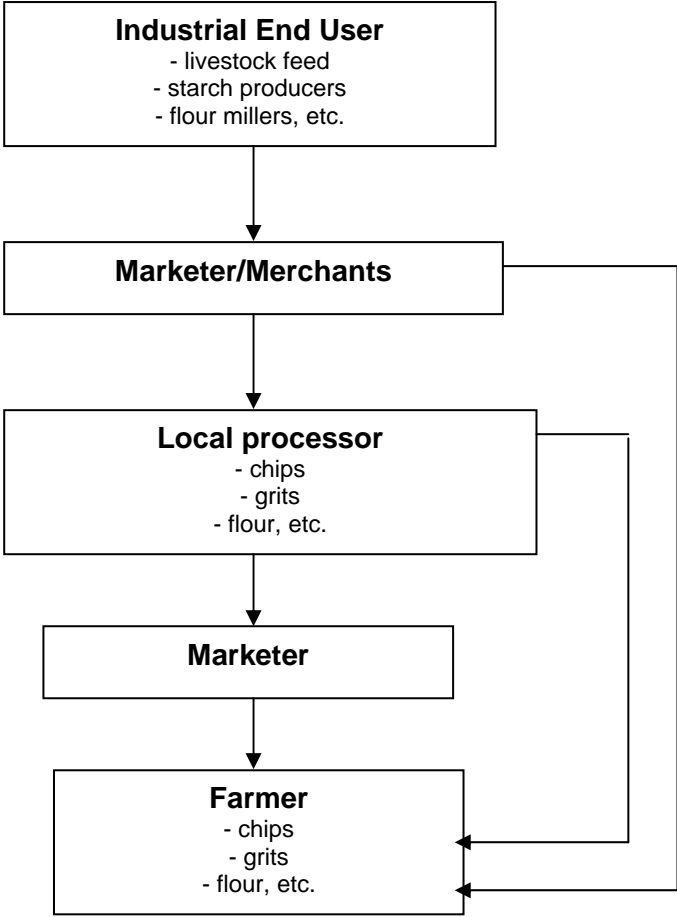
State	Pop	Poverty level	# involved in cassava	Margins per MT of raw tubers used						Major cost items
				Tuber (farmer)	Gari	Flour	Chips	Starch	Grits	
Benue				150	1,450 gari 2,240 akpu		50		1,800	Processing cost usually more than 45 %
Kogi						2,000	1,500			
Kwara					3,625	1,857				33,870 margin on alcohol
Enugu			160,252 ff (92,500 women, 70% poor)	1,300	275				2,775	Processing cost is 39 % is product cost Production of tuber costs about 40 % of product cost
Imo			303,333 ff (75% poor)	2,270	333 gari 10,500 akpu				400	Processing cost for gari is about 22% and production cost is about 54%.
Delta				1,375	1,033			3,800 local 2,100 ind..		Production cost is about 65%. Processing cost is 15 %.
Rivers				3,000	3,000				200	Production cost is 46%.
Cross River										
Ogun			260,000 ff (75% poor)	1,400	1,675				1,380	Production cost is 44%
Oyo				1,000	1,405 gari 933 lafun				-3,147	Production of tuber costs about 60 % of product cost
Ondo				0						Transportation costs are high

(Obtained from waterfall charts)

**Figure 2: Value chains, supply chains, trading patterns**



**Figure 3: Major players in the commodity chain**





**Review of major trend in volumes and prices, seasonality and quality issues**

- Cassava production increased marginally between 1999 and 2003 from 32.6 million MT 33.70 million MT, and this has increased to 38 million MT in 2004. Prices of cassava have risen faster than the majority of staples (53% between 1999 and 2003).

**The role of the financial sector in the industry**

- Provision of micro-credit to identified stakeholders in the value chain, especially farmers and processors

## MARKET OPPORTUNITY

### Market opportunity(ies) that will create incentives for intervention

- The agricultural sector is barely able to meet demand for cassava which has grown as a result of urbanization and the expansion of poultry (as a result of the ban on poultry imports). The new FGN directive on using at least 10% cassava flour inclusion in bakery products will lead to further increases in demand and prices are rising. There is a Presidential Initiative on cassava that aims to export \$3 billion of cassava. This is unlikely to be realized if the Nigerian price of cassava remains at about double the world (Thai) price and the demand for cassava in the world market is less than \$700 million and falling. The recent contract to supply China 1 million tonnes of cassava chips is however a boost to the Presidential initiative.
- Bridging the competitiveness gap requires increasing yields from about 10 tonnes to closer to the Thai average of 16-17 tonnes. Although one of the crop's main advantages is that it grows in a variety of agronomic conditions though not optimally in the absence of needed inputs. However, it is clear that cassava responds to fertilizer. Studies have found that with new high yielding and disease resistance cuttings and fertilizer, it is the best crop on which to invest in Nigeria.<sup>3</sup> Higher output would help to meet demand from existing and emerging uses. The crop provides excellent food security as it can be left in the field for many months, thus enabling farmers to sell when the price is right. It is grown widely in Nigeria across the Southern and Central regions mainly by smallholders (0.2ha - 3.2ha.), inter-cropped with others. Therefore increase in output and enhanced productivity of cassava will help to improve incomes for large numbers of the poor.
- Opportunities exist in the livestock feed industry to replace maize with cassava at some level in the provision of energy, more so with the recent increase in the price of maize; in cassava flour production for inclusion in wheat flour for the bakeries and confectionery making industries; in the starch industry due to the high tariff imposed on imported corn starch and in the food sector caused by increasing urbanisation.

### Outlook for the market and the motivation it provides for change

The challenge is to transform the cassava sector from a largely low input traditional sub-sector, geared for subsistence, to one that is market-driven and aims at income generation. This will require the development of the identified market opportunities which depend on **reliable supply** of raw materials; **competitively priced** cassava; and **appropriate quality**. These three issues constitute problems in many of the markets as presented in Table 6.

**Table 6: Analysis of raw materials supply to end users of cassava products**

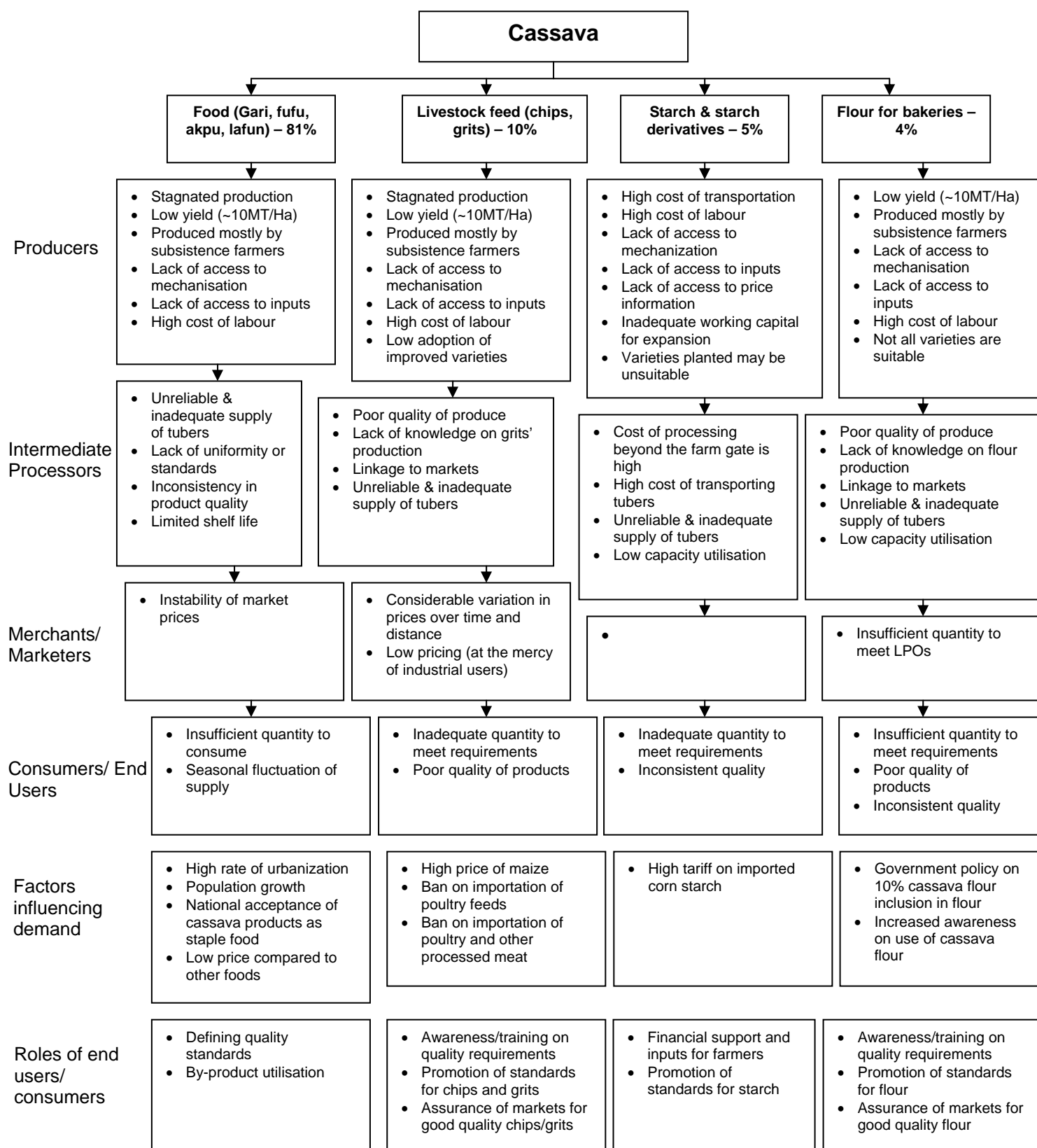
	<b>Food (gari/fufu/ lafun/akpu)</b>	<b>Food (flour)</b>	<b>Livestock feed</b>	<b>Starch</b>	<b>Alcohol</b>
<b>Reliable supply</b>	Adequate	Not adequate	Not adequate	Not adequate	Not adequate
<b>Competitively priced</b>	Adequate	Average	Average	Average	Not adequate
<b>Quality</b>	Adequate	Not adequate	Average	Average	Average

<sup>3</sup> Agriculture in Nigeria. Main Report, IITA and University of Ibadan, Nov. 2003. For USAID

**Constraints, bottlenecks, leverage points that offer potential for significant improvements (systemic change) in the market system:**

Details of constraints, bottlenecks, leverage points that offer potential for significant improvements (systemic change) are presented in Figure 4, key players in the commodity chain that can be useful to PrOpCom are presented in Table 7; and potential drivers of change are presented in Table 8.

**Figure 4: constraints, bottlenecks, leverage points that offer potential for significant improvements**



**Systemic intervention:** Although the intervention of PrOpCom at the intermediate processors' level will be focused on those that feed the livestock feed, flour mills and starch and its derivatives industries, which is less than 20% of the present production, the improvement obtained in working with these intermediate processors and fabricators is systemic because it will positively impact the other components of the chain (i.e. the 81% that deals with other food products), since these same intermediate processors are involved in the production of the food based cassava products. Addressing productivity issues with the farmers is also a systemic intervention as increasing productivity of cassava farmers will impact productivity of other commodities being cultivated by the farmer. This is a systemic change beyond the commodity. Increased productivity will also result in lower prices of other goods and lessen the burdens that had hitherto made Nigerian cassava uncompetitive in the global market.

**Table 7: Key players who provide points of contact for ProCom**

S/N	STATE	LGA	COMMUNITY	NAME	POSITION	ADDRESS	TELEPHONE
1.	Benue		Makurdi	Dr. P. I. Ater	Director of Project M&E	Benue State Agric & Rural Devt Programme	08043136167
2.	Benue		Makurdi	Mr. Celestine Pine	Deputy Director (IFAD)	Benue State Agric & Rural Devt Programme	044-532298
3.	Benue	Vandeikya		Mr. Donatus	Merchant	Gbem market	08043444869
4.	Benue	Vandeikya	Kponku	Farmers' group led by Mr. Ayila Kyase & Akaha Mishe	Farmers	Kponku community	
5.	Benue	Vandeikya	Adikpo	Mr. Augustine Idnum	Marketer	Mbauler market	
6.	Benue	Vandeikya	Ihugh	Mr. William	Marketer	Ihugh market	
7.	Benue	Ushango	Alien	Farmers' group led by Mr. Iorgbidye Tyover	Farmer		
8.	Benue	Vandeikya	Ihugh	Mr. Iorber Audu	President	99 Micro Credit Society, Ihugh, Benue State	08043280896
9.	Benue	Gboko	Gboko	Mr. Edward	Merchant	Gboko Main Market	08038836308
10.	Benue	Ukum	Zaki Biam		Farmers' group		
11.	Cross River	Ogoja	Mbagide	Farmers' group led by Chief Lawrence U. Ajap	Community Chief		
12.	Taraba	Gassol	Namne		Farmer		
13.	Taraba	Gassol	Commissioner	Farmers' group led by Mr. Azembe Gbakon	Head		
14.	Taraba	Gassol	Sabongida		Merchant	Sabongida Market	
15.	Taraba	Gassol	Dinya	Farmers' group led by Zaki Kumaku Duna	Community Head		
16.	Anambra		Onitsha	Mrs. Ngozi Obosi	Trader	34 Akunnia Njote, Ochanga Market, Onitsha	
17.	Abia		Aba		Admin. Manager	Cascamite Glue Ltd. (Tanu Group of Companies), Aba	
18.	Ogun		Abeokuta	Mr. Ayo Olubori	Processor	Peak Products Enterprises, Masaba Industrial Complex, Ita-Oshin, Abeokuta	08033342174
19.	Kwara		Bacita	Mr. Gabriel	Operations manager	Duraclean Chemicals and Allied Product, Bacita	
20.	Kwara		Bacita	Mr. Idowu	Agric Engineer	Duraclean Chemicals and Allied Product, Bacita	
21.	Kwara		Bacita	Mr. M. K. Olaleye	Quality Control Manager	Duraclean Chemicals and Allied Product,	08034873290

S/N	STATE	LGA	COMMUNITY	NAME	POSITION	ADDRESS	TELEPHONE
						Bacita	
22.	Kwara		Bacita	Mr. Oshoffa Gabriel	Agric. Manager	Duraclean Chemicals and Allied Product, Bacita	08033793399
23.	Kwara	Ifelodun	Kajola		Farmers' group	Kajola	
24.	Kwara	Ifelodun	Amoyo		Farmers' group	Amoyo	
25.	Kwara	Ifelodun	Gbedege		Farmers' group	Gbedege	
26.	Lagos		Lagos	Mr. Ayodeji Ibisiola	Marketing manager	Matna office, Lagos	
27.	Ondo		Ogbese	Mr. Ibosiola		Matna office, Lagos	
28.	Ondo	Owo	Isua		Farmers' group	Isua	
29.	Ondo	Owo	Ukpeme		Farmers' group	Ukpeme	
30.	Ondo	Owo	Iyere		Farmers' group	Iyere	
31.	Ondo	Akure South	Akure	Processor		Fembos Nig. Ltd	
32.	Ondo	Akure South	Akure	ADP staff		ADP office, Akure	
33.	Ondo	Akure South	Akure	FUTA Staff		Federal University of Technology, Akure	
34.	Ondo	Owo	Owo	ADP staff		ADP office, Owo	
35.	Plateau		Jos	Mr. Adedeji	Purchasing manager	Grand Cereals & Oil Mills Ltd, 17 Zawan Roundabout, Jos	073 – 280314 – 7
36.	Rivers	Ahoada	Ahoada		Farmers' group		
37.	Rivers		Port-Harcourt		Processors		
38.	Edo		Agenebode		Farmers/processors groups		
39.	Ogun	Abeokuta	Abeokuta	Prof. Elemo	Lecturer	College of plant sciences	
40.	Ogun	Abeokuta	Abeokuta	Prof. Olasotan	Lecturer	College of plant sciences	
41.	Ogun	Obafemi Owode	Siun	Mr. Akinbode Adelari	Manager	Obafemi Owode LG livestock feeds, Siun	
42.	Ogun	Ota	Ota	Mr. Oyebimpe Kehinde	Feed Mill Manager	Obasanjo Farms, Ota	08054510272
43.	Ogun		Ijebu Itele	Otunba Ogunleye		SORALEY Investment Company Ltd, Ijebu Itele	08055370147 08055370302
44.	Ogun		Ogere-Remo	Dr. Segun Olarewaju	MD	Animal-Care Services Konsult (Nig.) Ltd, Ogere Remo	08038150856 08035810551
45.	Lagos	Apapa	Tin Can Island Apapa	Mrs. Olubukola Okelana	R&D/Quality Control Manager	Tin Can Island Port, Apapa, Lagos	01-8949853 08023288515
46.	Enugu		Enugu	Mr. Egba Romance	Director, RID	Enugu State ADP, Enugu	08033074934
47.	Enugu		Enugu	Mr. Onuzulike N. Nathaniel	Programme Manager	Enugu State ADP, Enugu	

**Table 8: Drivers of change, key players with the will and resources to effect change**

S/N	TYPE OF ORGANISATION	PRODUCT	ORGANISATION	CONTACT PERSON	ADDRESS	PHONE NUMBER
1	Industrial Processor	Livestock Feeds	Grand Cereals & Oil Mills Ltd	Mr. W.A. Adedeji Procurement/Planning manager	Grand Cereals & Oil Mills Ltd, KM. 17, Zawan Roundabout, Jos Plateau State	080-33579618 073-280314-7 073-280173 073-280357
2	Industrial Processor		Livestock Feeds	Mr. Peter Alike	Livestock Feeds, Aba, Abia State	0803-3403588
3	Industrial Processor		Obasanjo Farms Feed mills	Mr. Oyebimpe Kehinde Feed mills Manager	Obasanjo Farms Feed mills, Ota, Ogun State	0805-4510272
4	Industrial Processor	Flour & Starch	Peak Products Enterprises Industrial Agro Producer	Mr. Ayo Olubori	Peak Products Enterprises Industrial Agro Producer, esabe Industrial Complex, Ita-Oshin, Abeokuta	0803-3342174
5	Local Processor	Flour	SORALEY Investment Company Ltd	Otunba Ogunleye	SORALEY Investment Company Ltd, Ijebu Itele	08055370302 08055370147
6	Industrial Processor	Starch	Nigeria Starch Mill		Nigeria Starch Mill, Ihiala, Anambra State	
7	Industrial Processor	Alcohol	Duraclean Chemicals and Allied Product	Mr. Gabriel Operation Manager	Duraclean Chemicals and Allied Product, Bacita	
8	Industrial Processor		Allied Distilleries	Mrs. Owoeye	Allied Distilleries, Ota, Ogun State	
9	Cooperative Society	Farmer/Input Supplier	99 Micro-Credit Society	Mr. Iorber Audu	99 Micro-Credit Society, Ihugh, Benue State	08043280896
10	Farmers' Association	Farmers	Apex Farmers Association	Chief Remy Nwodo Chief Farmers, Apex Farmers Association of Nigeria, Enugu & Director, Enugu Cooperative Federation (ECOFAD)	Obollo, Udenu Local Government, Enugu State	08043122205
11			Adani Farm Settlement	Mr. John Nnadozie, Apex Chairman	Adani Farm Settlement, Uzo Uwani Local Government, Enugu State	
12	Local Processor	Flour chips &	Cassava Processors & Market Cooperative Society Ltd	Mr. Hensin Ona, Secretary	Cassava Processors & Market Cooperative Society Ltd, Enugu	08037407511

## **THE PLAYERS**

### **Role of Government in the market**

- The role of the government is to create an enabling environment by making policies that would foster local production and marketing of cassava products and develop infrastructure such as roads, electricity, water, etc. to ease transportation and reduce costs of production and processing.

### **Presidential Initiative related to the market**

- There is a Presidential initiative aimed at promoting the production, processing and marketing of cassava even in the export market. This initiative targets an income of \$5 billion from domestic and export earning from cassava by 2007. There is also the recent contract to between Nigeria and China for Nigeria to supply China 1 million tonnes of cassava chips, which is a boost to the Presidential initiative.

### **Policy issues that affect the market**

- There are government directives that have direct impact on cassava such as the directive to the bakeries and flour mills that stipulates the inclusion of 10% cassava flour in bread and confectioneries' production. There are also directives that are designed to encourage industrial users to switch from some products to cassava products such as the imposition of tariffs on the importation of corn starch and the ban on the importation of cassava starch and livestock feed and livestock products.

### **Federal and state government agencies and key individuals involved in the commodity chain**

- Government agencies, both state and federal involved in the commodity chain include Central bank of Nigeria (CBN), Agricultural and Rural Mechanisation Training Institute (ARMTI), FIIRO, State Agricultural Development Projects (ADPs), FDA-Tech transfer stations, National Centre for Agricultural Mechanisation (NCAM), and PCU.
- Key individuals involved in the cassava commodity chain include Mr. Ayo Olubori of Peak Products, Abeokuta; Mr. Iorber Audu, the Chairman of the farmers cooperative society in Ihugh, Benue State; Mrs. Owoeye of Allied Atlantic Distilleries, Ota; Mr. Peter Alike of Livestock Feeds, Aba; Mr. Adedeji of Grand Cereals, Jos; etc.

### **Key Institutions with an interest in the commodity chain, their current activities and objectives:**

- Private Sector, Business, Industry and Trade Associations
  - Leventis Foundation – working with cassava farmers and processors in Edo State through the provision of training and model processing centre
  - Manufacturers Association of Nigeria (MAN) – Provision of technical assistance to its members, who include cassava processors and industrial processors
  - Apex Farmers' Associations – These refer to umbrella bodies for farmers in Nigeria, with cassava being one of the commodities grown. The bodies facilitate the access of their members to micro-credit, training on application of inputs, etc. The bodies also help members with access to markets



- Cassava Growers' Association of Nigeria – This is an umbrella body for cassava farmers in Nigeria and it's helping members in the adoption of improved cassava varieties
- NGOs
  - New Nigeria Foundation (NNF) – implementing Cassava Competitiveness Programme in Akwa Ibom State, which focuses on boosting production through access to improved varieties and inputs; improving processing through the adoption of improved technologies; and linking processors to the markets/end users. NNF is also about to commence the implementation of Cassava Competitiveness Project in Bauchi State
- Donors and Projects
  - USAID – Funding the implementation of the Cassava Competitiveness Project (CCP), Cassava Enterprise Development Project (CEDP), Cassava Mosaic Disease (CMD) Project, and RUSEP
  - UNF – Currently co-funding the CCP in Akwa Ibom State
  - SPDC – Working with USAID to fund the CEDP, which IITA is implementing
  - NDDC – CMD Project
  - IFAD - RTEP
- Financial Institutions
  - CBN
  - Commercial banks - Union Bank
  - NACRDB
- Research Institutes
  - IITA – CEDP, CMD Project, RUSEP
  - IAR&T, IAR, NRCRI
  - ARMTI – Training and capacity building for extension officers, processors and farmers
  - FIIRO – involved with SON in coming up with standards for some cassava products; provision of training to cassava processors, development of new technologies in cassava processing and fabrication of equipment, laboratory testing and analysis of cassava products, etc.
  - NCAM – fabrication of cassava processing equipment; training of cassava equipment fabricators
- Business Support Services
  - STEYR
  - Input Suppliers in different states
- Training Institutions
  - Several Federal-owned schools and colleges of agriculture
  - Several State-owned schools and colleges of agriculture
  - Leventis Foundation Nigerian Agricultural Training Schools

**Table 9: Major players and their interests**

<b>Major players in commodity chain</b>	<b>Interests in promoting systemic change in the market</b>	<b>Proposed activities in which they will be involved</b>
Producer and producer associations	Increased productivity of cassava will increase their incomes	
Input suppliers	Increased use of inputs will enhance their business	
Merchants and marketers	Increased volume of cassava traded will increase their incomes	

<b>Major players in commodity chain</b>	<b>Interests in promoting systemic change in the market</b>	<b>Proposed activities in which they will be involved</b>
Intermediate processors	Improved linkage and trade with industrial processors will increase their capacity utilisation and their incomes. Improved capacity to process good quality cassava products will enhance their incomes.	Develop technology profiles for production of identified products Train intermediate processors on the production of good quality products that meet requirement of end users Facilitate acquisition of appropriate technology for producing products
Industrial end users	Supply of adequate quantity of good quality cassava products as raw materials will improve their capacity utilisation and incomes	Identify their needs – quality and quantity. Develop standards for the products Assist on the conversion of process technology to using dried products for those still using wet tubers
Fabricators	Increased processing of cassava will improve demand for their products. Improved capacity will allow them meet the increased demand.	Develop design drawings manufacturing plans for production of identified machines Train fabricators on production of identified machinery Facilitate linkage between fabricators with credit sources
Service providers	Efficient functioning of the market will lead to increased demand for their services.	

## **PROPCOM'S ROLE**

### **A strategic approach to effecting change in the market system:**

- With the exception of feed, industrial uses of cassava have been declining. At the current cost of cassava, it is difficult for domestic starch manufacturers to compete with imported starch. There are very few starch manufacturers still producing (MATNA Ltd., Peak Ltd) and they operate below capacity. The major opportunity for increasing industrial use is to provide dried cassava products (chips, flour and grits) for cassava starch and feed. There is evidence that the intermediate processors of cassava into chips and flour needed for industrial uses lack appropriate technology, efficient procurement systems and marketing links with end users and these may be addressed through market based interventions.

### **The partners with whom PrOpCom can collaborate on this strategy:**

- CIDA
- USAID
- RUSEP Programme
- IITA
- NAMIS
- Presidential Initiative

### **An approach to achieving consensus and buy-in among the partners:**

- Stakeholders' fora to discuss similar activities and means of working together and Highlighting how the project would benefit the partners in terms of improved markets, quality and linkages bringing about increased income and better livelihoods for stakeholders and agreeing on cost-sharing mechanisms.

### **A stakeholder analysis of all those involved in the commodity chain, both potential winners and losers:**

- Farmers both men and women are mostly the poor households and located in the rural areas; therefore have weak capital asset base which need to be strengthened to ensure increase and sustainable production. They will benefit from expanded production.
- Processors who are mainly women do not have the skills for modern production techniques and do not have the capability to acquire modern equipment. They maybe displaced from their source of livelihood by the processing factories unless their capacities are enhanced to be able to meet quality requirements of industrial end users.
- Industrial users may have problem with quality control if processors are not trained to adhere to quality control measures.
- Significant increase in the processing of cassava into industrial products without significant increase in the production of cassava, can drive up the price of cassava food products thereby injuring food security for consumers particularly urban consumers.

### **Analyze the pro-poor benefits of the intervention**

- Through on-farm value addition, the project would reduce costs of transportation for poor cassava farmers, and the drudgery of transporting raw tubers over long distances. Interventions designed to improve productivity through greater use of inputs and improved varieties would bring about increased production efficiency, and reduced cost of production which translates to increased income earned by

poor farmers and enhances their asset base and thereby ensure sustainable livelihoods.

- Interventions designed to improve the products of intermediate processors will enhance their position in the market and allow them to respond appropriately to the demands of the end users in terms of quantity and quality. This will lead to increased capacity utilisation, improved income and improved livelihoods.

### **How the interventions affect the role of women in the commodity chain and their earnings**

- Through on-farm value addition, most women farmers would also become processors and get better earnings for their products. Additionally, most intermediate processors are women and assisting them to improve quality and quantity of their products and diversify their product base into new products will ensure sustainable increase in their income.
- Through promotion of market linkages among stakeholders, local processors, of which majority are women, would be linked to better markets and get better value for their products. With increased income and improved livelihoods, women would be able to contribute more to household income and children's school fees and undertake other domestic responsibilities.

### **Major obstacles and threats**

- Availability of finance in carrying out most of the proposed interventions could be a problem
- Inconsistencies in government policies. Over the years, past governments have been in the habit of changing existing policies whenever new governments take over.
- Inconsistency in government delivery mechanisms e.g. distribution of fertilizer and other inputs. Most time, fertilizers are sold by government to business men, who sell at higher rates to the poor farmers that need the fertilizers.
- Accessibility of tractors and availability of modern processing equipment at affordable prices.

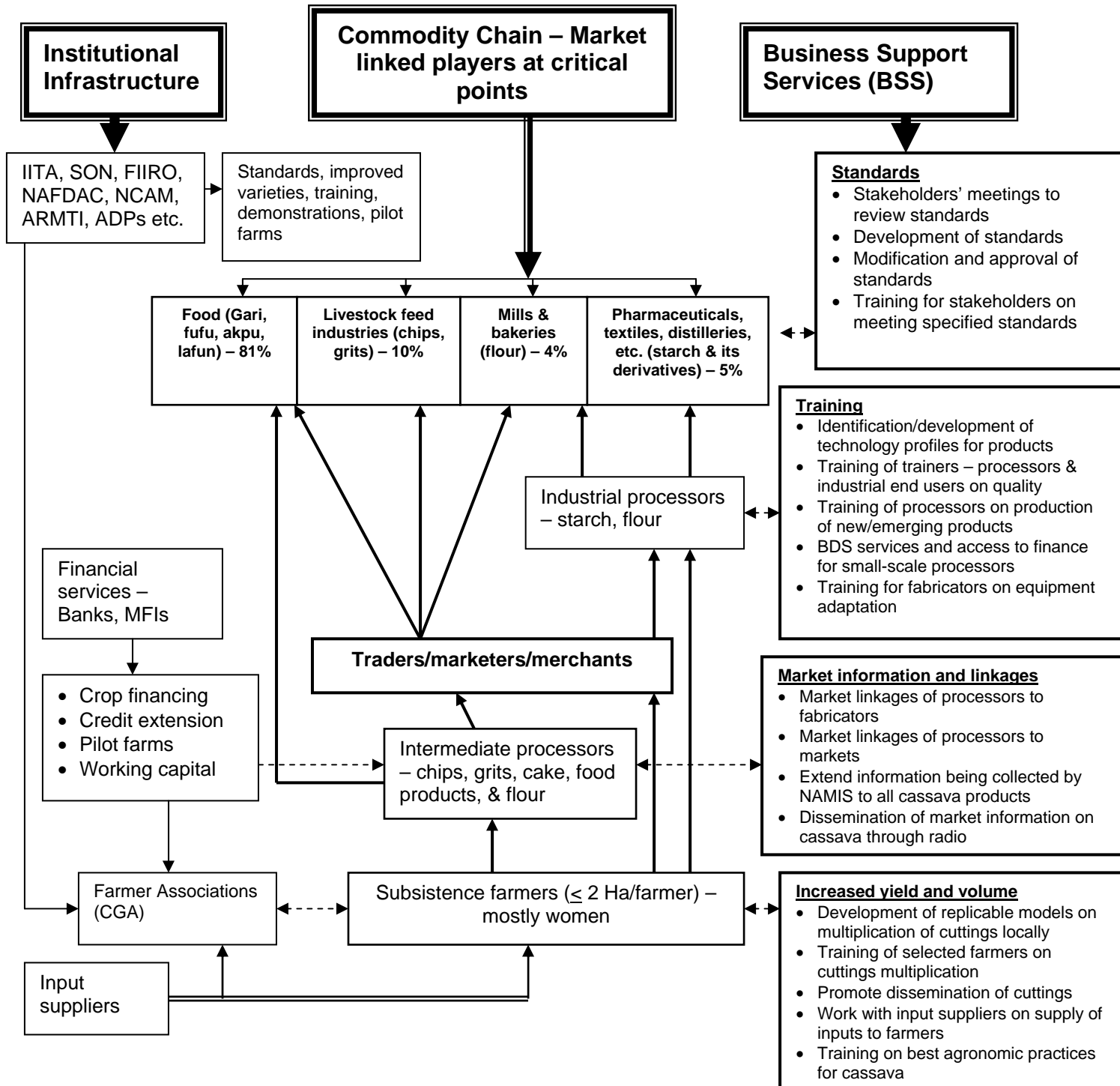
### **PrOpCom's role and contributions:**

- PrOpCom is expected to facilitate stakeholders' meetings
- Promotion of market linkages and market information for stakeholders
- Use of SAF to promote research in production, processing and marketing
- Facilitation and support for training programmes/capacity building activities for stakeholders
- Facilitation of access to financial assets by stakeholders

### **How PrOpCom can improve global competitiveness in this industry**

- Working with farmers to increase productivity, which will bring down the cost of production thereby ensuring lower prices for the tubers and promote on-farm value addition brings about reduced processing costs, making end products cheaper, hence more competitive

**Figure 5: CASSAVA SUB-SECTOR MARKET LINKED GROWTH SUPPORT MODEL**



PrOpCom is expected to work with the main drivers of change – farmers association(s), intermediate processors and industrial processors to position them to play critical roles within the value chain to encourage and promote the adoption of the use of dried cassava products in the production of animal feed, starch, flour and ethanol; increase in quality of cassava products such as flour, chips and grits; and increase in cassava yield in Nigeria. This would be achieved through training and capacity building for stakeholders, promotion of standards for cassava products, planting of improved varieties of cassava using adequate inputs and access to market linkages and information. An institutional infrastructure will be integrated into the sector growth process through involvement of SON, NAFDAC, IITA, NCAM, ARMTI, FIIRO, ADPs, Input suppliers, Banks, MFIs, etc. PrOpCom will leverage its resources – SAF by encouraging research into grey areas, developing technology profiles for some cassava products, and facilitating the private sector and other entities linked to the sector to assist farmers and processors access a variety of business support and financial services. The Cassava sub-sector coordinator will follow-up policy issues, institutional adaptation and monitor the interventions in order to ensure they operate to make a systemic change, make markets work for the poor, and ensure sustainability.

## **CROSS CUTTING ISSUES**

### **Gender Roles along the commodity chain and potential gender disaggregated benefits**

- Cassava was termed women's crop but shift in cassava from its status as food crop to cash crop has led to changes in gender roles in the chain. Cassava was mainly planted by women to feed the family but men are now planting cassava for sale. Changes in gender role are attributable to men's access to mechanization inputs as producers. The fact that men are dominant in machine production and are usually the operators of the processing equipment put them in control because of the nature of the technologies, although women have access.
- Farmers are both men and women but there is gender division of labour. Men are responsible for land clearing and preparations while the women are generally responsible for weeding, harvesting and transportation. Planting is carried out by men and women, including the children. Intermediate processing is dominated by women but introduction of technology has led to changes in gender roles that may require some investment in human capital development of women to address displacement that may be caused.

### **Environmental Issues**

- The water that seeps from cassava during pressing is quite poisonous as it contains cyanide and can constitute an environmental hazard. This however can be handled through the construction of septic tanks, which can be drained regularly. There is also high waste generation during processing particularly peeling. Peel can be converted to animal feed and there are indications that dried unpeeled chips may be preferred in some animal feed. The promotion of grits and unpeeled chips will eliminate this problem.
- Offensive odour from decomposition of cassava waste.

### **Potential Conflict Issues**

- Potential areas where conflict might be encountered in the implementation of the interventions include delivery mechanism, which if not properly planned, could be a cause of conflict. Conflict may also arise within the group e.g. fertilizer distribution and other inputs could lead to wrangling amongst beneficiaries.
- Rich persons in the community may want to corner the project e.g. they can absolutely contribute the counter funds in order for them to corner the project. Conflict may also occur between fulani cattle herders and cassava farmers over grazing land/farm, especially in the North Central region.
- Introduction of improved technology can cause conflict between women and men if not carefully handled.
- Land tenure system can cause conflict for establishment of large farms.

### **How HIV/AIDS Programs may be integrated into the program**

- North central and the south south zones which are the major cassava producing regions have the highest HIV/AIDS prevalence rate. It is likely to reduce the available number and quality of farm labour if not checked. Also, the establishment of large cassava farms by industrial users would encourage risk behaviour that may cause spread of HIV/AIDS.
- In order to ensure that labour both in the farm and the processor level are not at risk, there is need to integrate HIV/AIDS prevention and control activities in the programme design and implementation. Modules creating awareness and

educating people about HIV/AIDS can be developed and presented as an adjunct at every scheduled training/course in the PrOpCom project.

## **PROGRAMMING TOOLS**

### **PrOpCom Strategy**

PrOpCom's strategy could be a dual approach of increasing yields and supporting the growth of industrial uses to ensure that increased output does not result in gluts that cause prices to drop precipitously as happened in the past. The aim should be to allow inflation to erode the price of cassava with higher productivity compensating the farmer. PrOpCom could address yields through supporting a market based system of supplying improve cuttings and fertilizer and extension knowledge, providing an alternative to the current state based approach that is both inefficient and unsustainable in the long term by working on the input distribution chain. It could provide business development services to cassava chip processors and better established garri processors to take advantage of market opportunities.

### **Action Plan**

### **Task List and Assignments**

### **Timeline (Gantt Chart)**

### **Budget**

### **Monitoring and Evaluation**

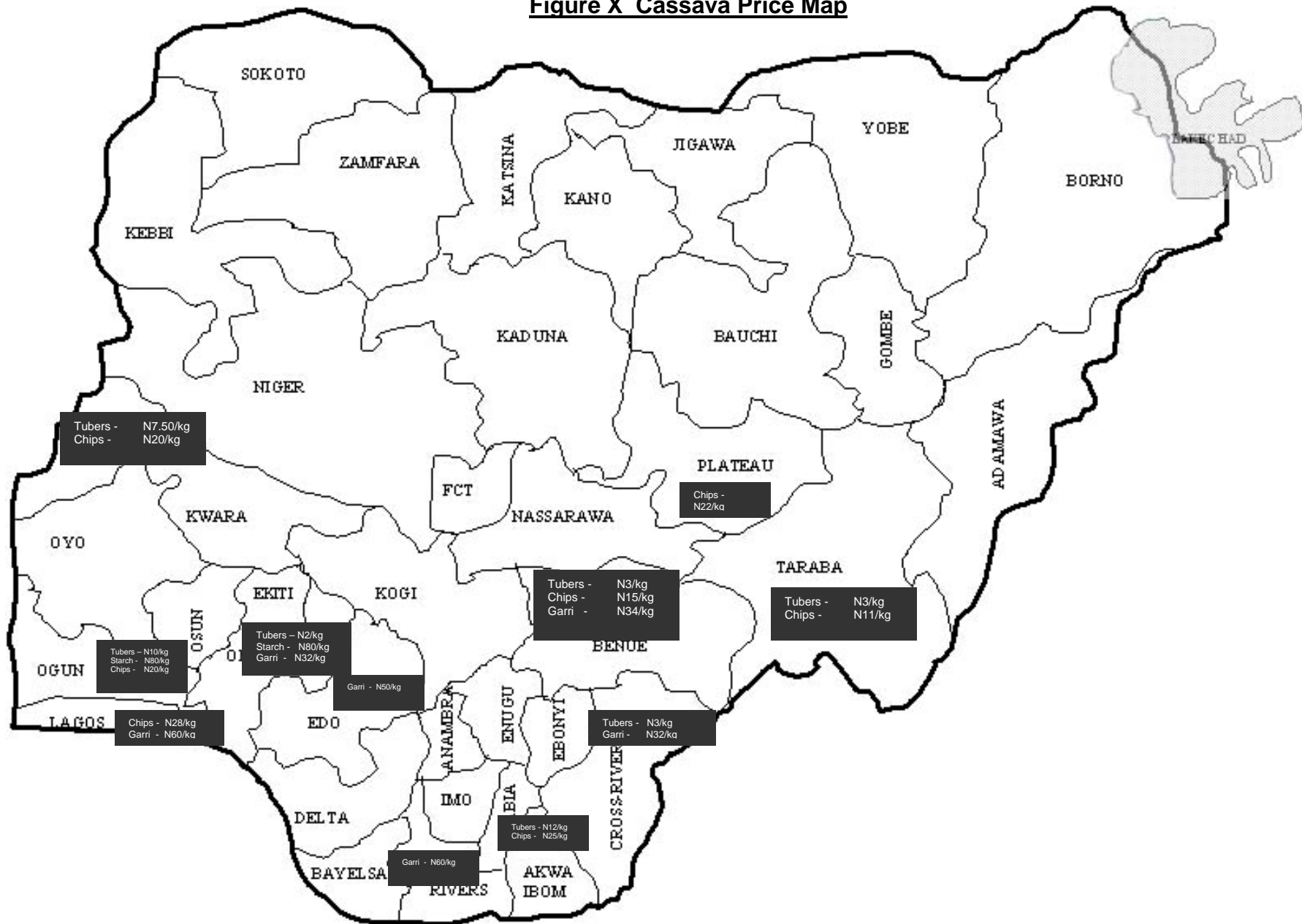
### **Information and Dissemination Program Suggestions**

- Given the interest in the commodity it would be possible to show impact in the processing and product diversification within 24 months and to increase productivity in 36 months.

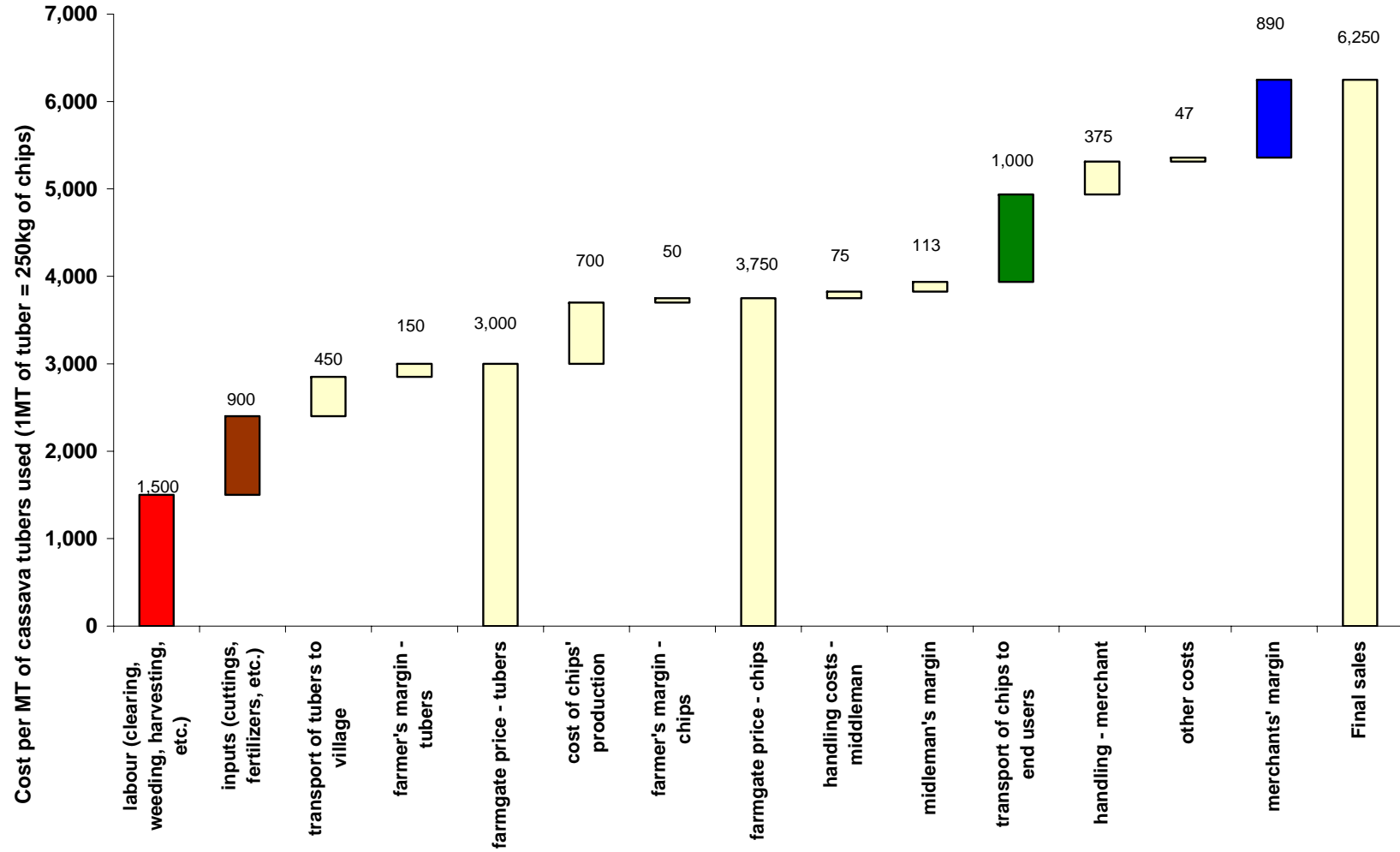


There are significant variations in cassava tuber prices across the country. Tuber prices seem to depend on proximity to areas of high demand (urban centres) and areas of high cassava production. Prices in states with high production levels but few urban centres are usually low while prices in states with many or large urban centres are high. Recent efforts at promoting cassava production, sensitization of processors and farmers about the importance of cassava and government initiatives designed to promote cassava utilization have not yielded productivity and production increases but have caused severe distortion in cassava prices across the country. Figure X shows prices of cassava and cassava products in some major producing states.

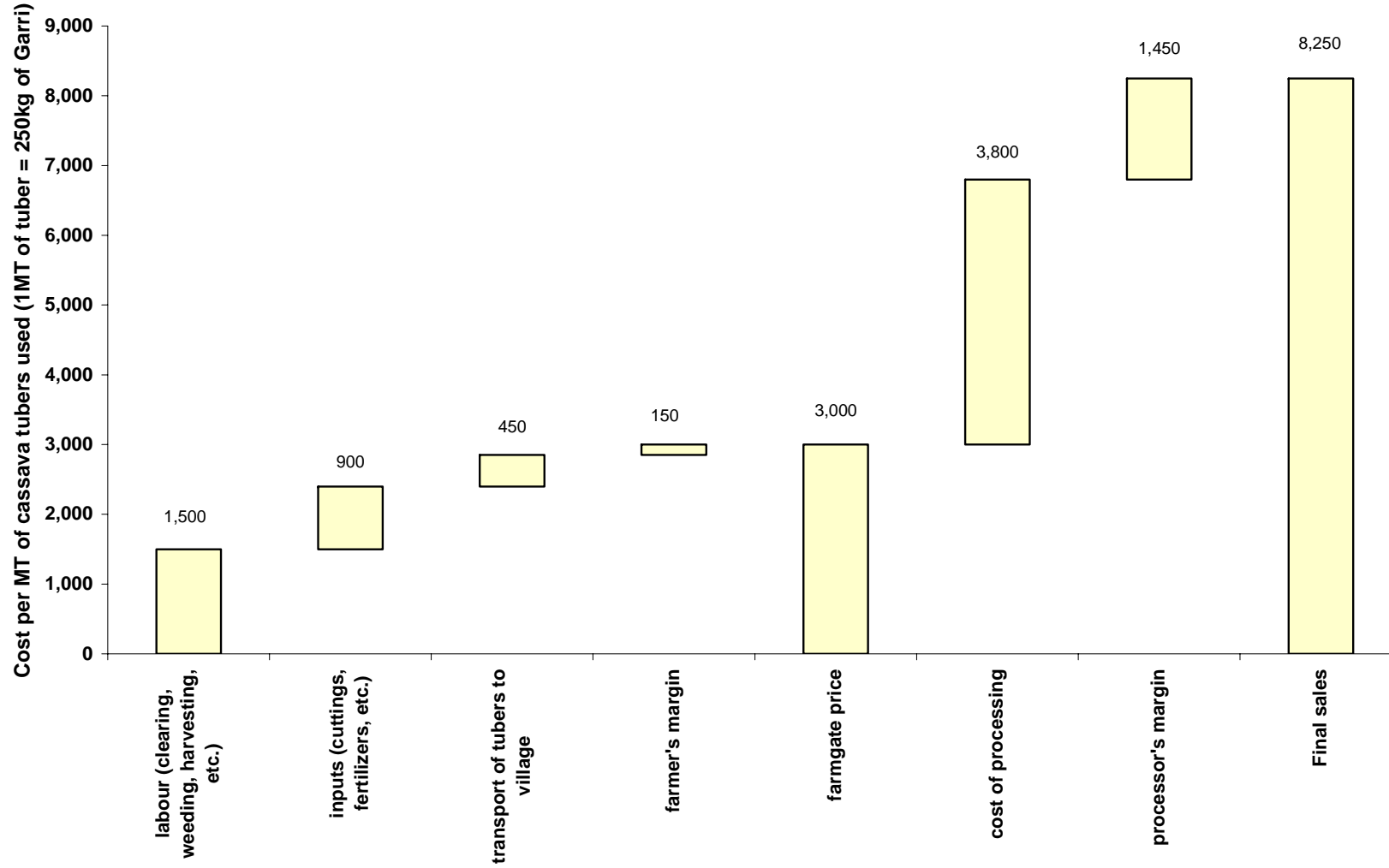
**Figure X Cassava Price Map**



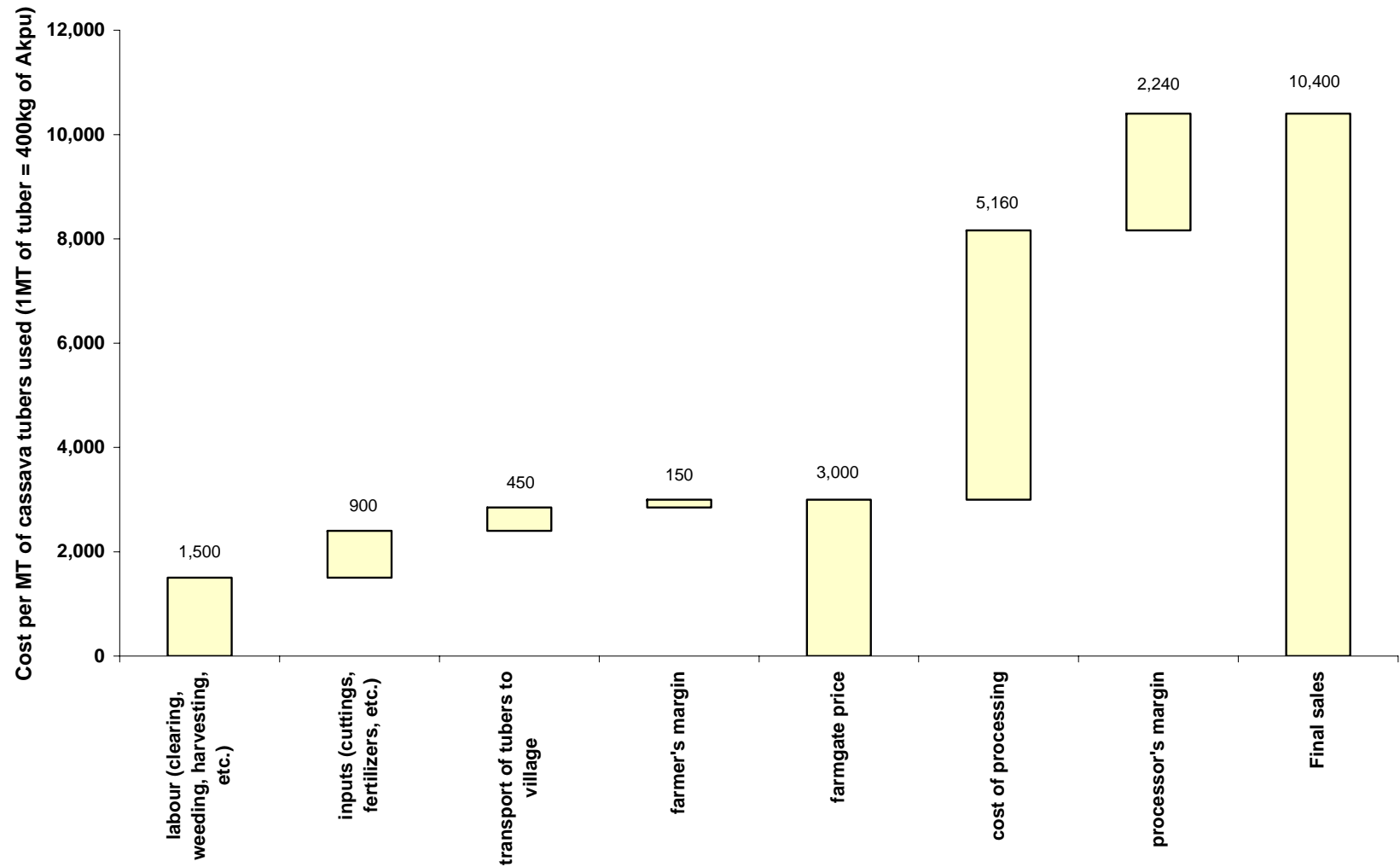
### Waterfall Chart for Cassava Chips' Production in Benue State



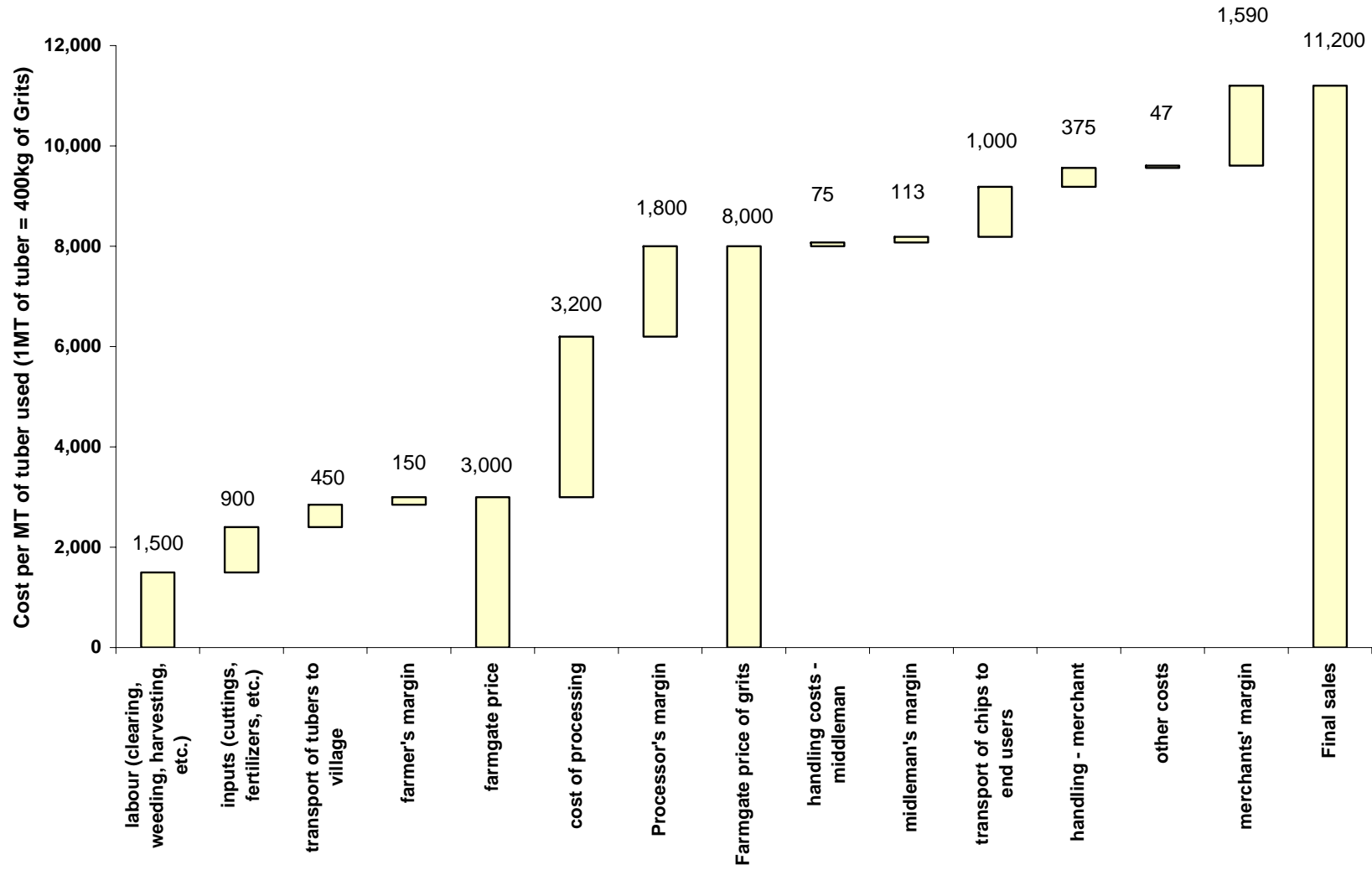
### Waterfall Chart for Garri Production in Benue State



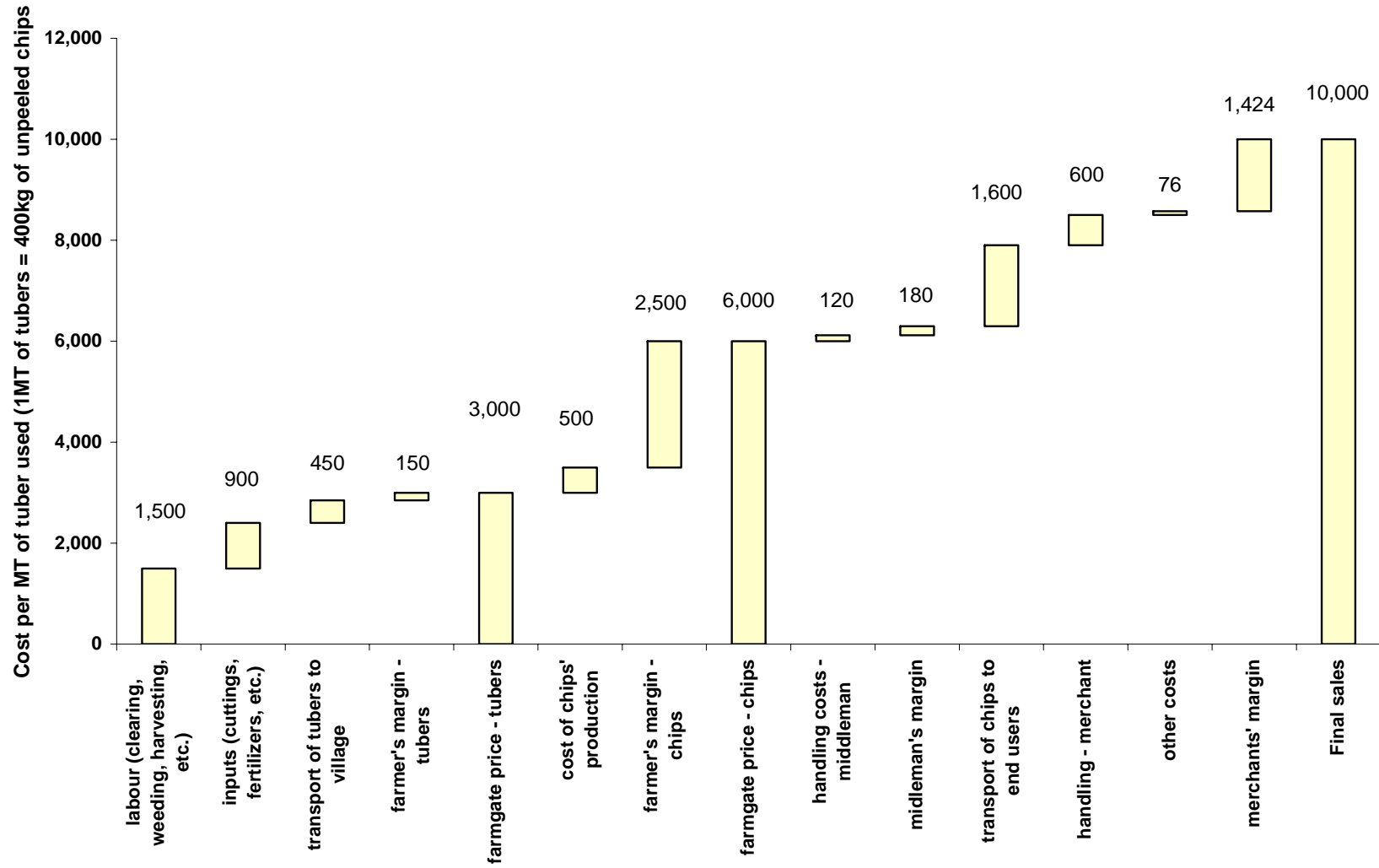
### Waterfall Chart for Akpu Production in Benue State



### Waterfall Chart for Grits production in Benue State



### Waterfall Chart for Unpeeled Chips Production in Benue State



**BENUE  
STATE**

1MT of cassava tubers = 250kg of chips New Nigeria Foundation (NNF) / DFID / ProCom Inception Phase Study on Cassava

<b>Cassava Chips Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	1,500
inputs (cuttings, fertilizers, etc.)	1,500	900
transport of tubers to village	2,400	450
farmer's margin - tubers	2,850	150
farmgate price - tubers		3,000
cost of chips' production	3,000	700
farmer's margin - chips	3,700	50
farmgate price - chips		3,750
handling costs - middleman	3,750	75
middleman's margin	3,825	113
transport of chips to end users	3,938	1,000
handling - merchant	4,938	375
other costs	5,313	47
merchants' margin	5,360	890
Final sales		6,250

<b>Starch Production 1</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
cost of processing		
processor's margin		
Local starch price		
transport		
cost of processing		
Industrial processor's margin		
final sales		

<b>Garri Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	1,500
inputs (cuttings, fertilizers, etc.)	1,500	900
transport of tubers to village	2,400	450

<b>Cassava Chips Production (Unpeeled)</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	1,500
inputs (cuttings, fertilizers, etc.)	1,500	900
transport of tubers to village	2,400	450
farmer's margin - tubers	2,850	150
farmgate price - tubers		3,000
cost of chips' production	3,000	500
farmer's margin - chips	3,500	2,500
farmgate price - chips		6,000
handling costs - middleman	6,000	120
middleman's margin	6,120	180
transport of chips to end users	6,300	1,600
handling - merchant	7,900	600
other costs	8,500	76
merchants' margin	8,576	1,424
Final sales		10,000

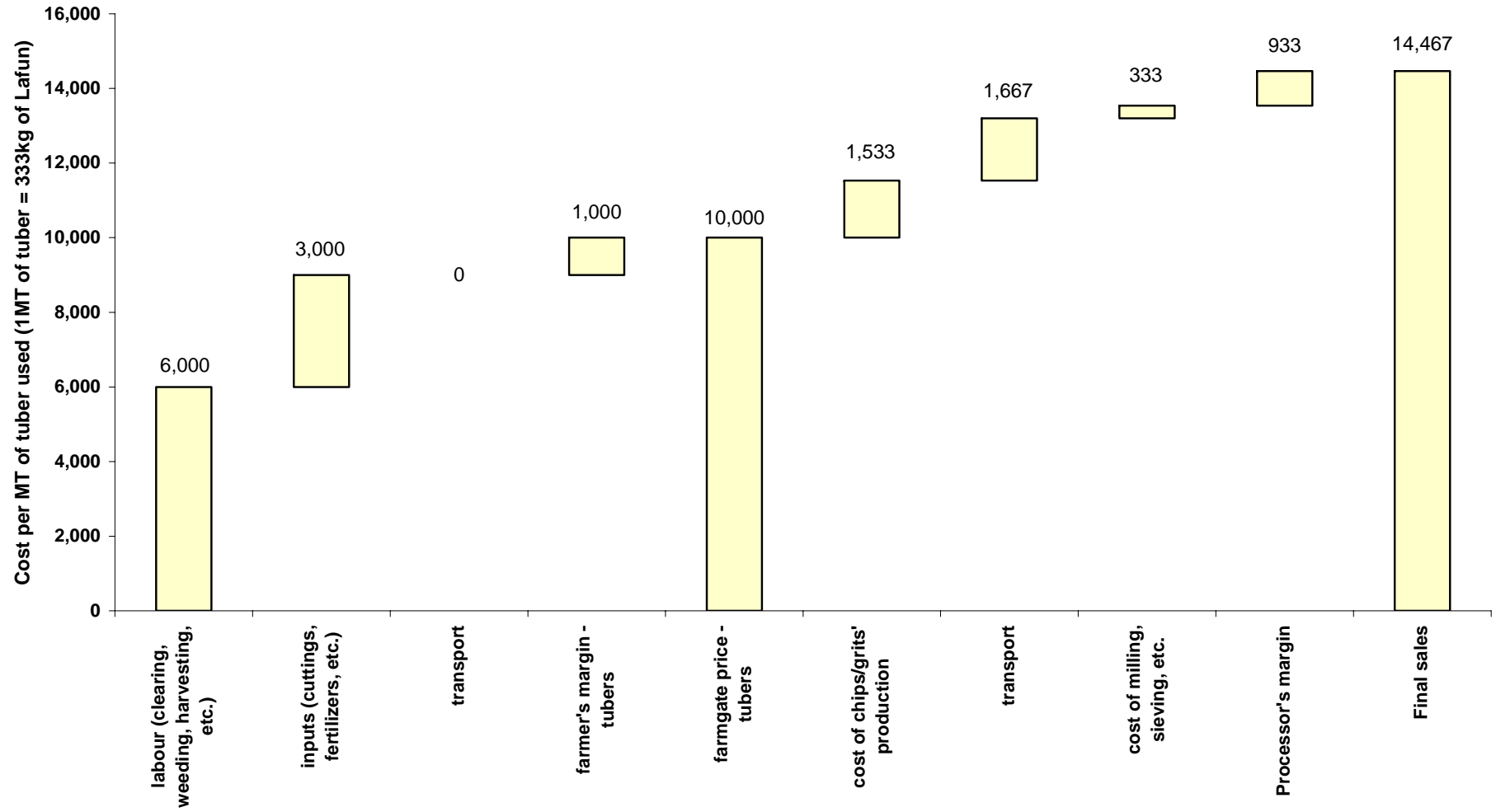
<b>Starch Production 2</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
transport		
cost of processing		
Industrial processor's margin		
final sales		

<b>Grits Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	1,500
inputs (cuttings, fertilizers, etc.)	1,500	900
transport of tubers to village	2,400	450

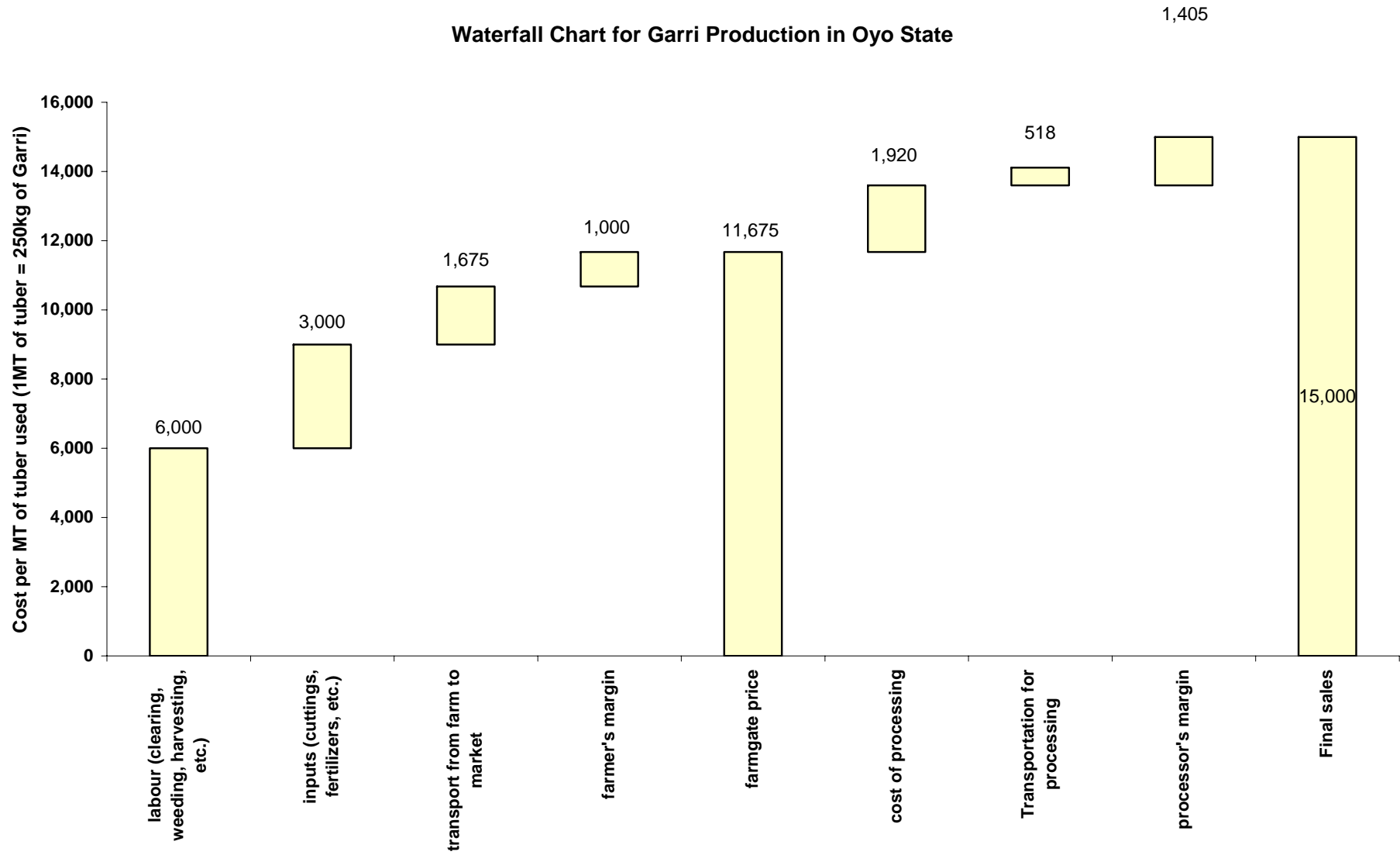




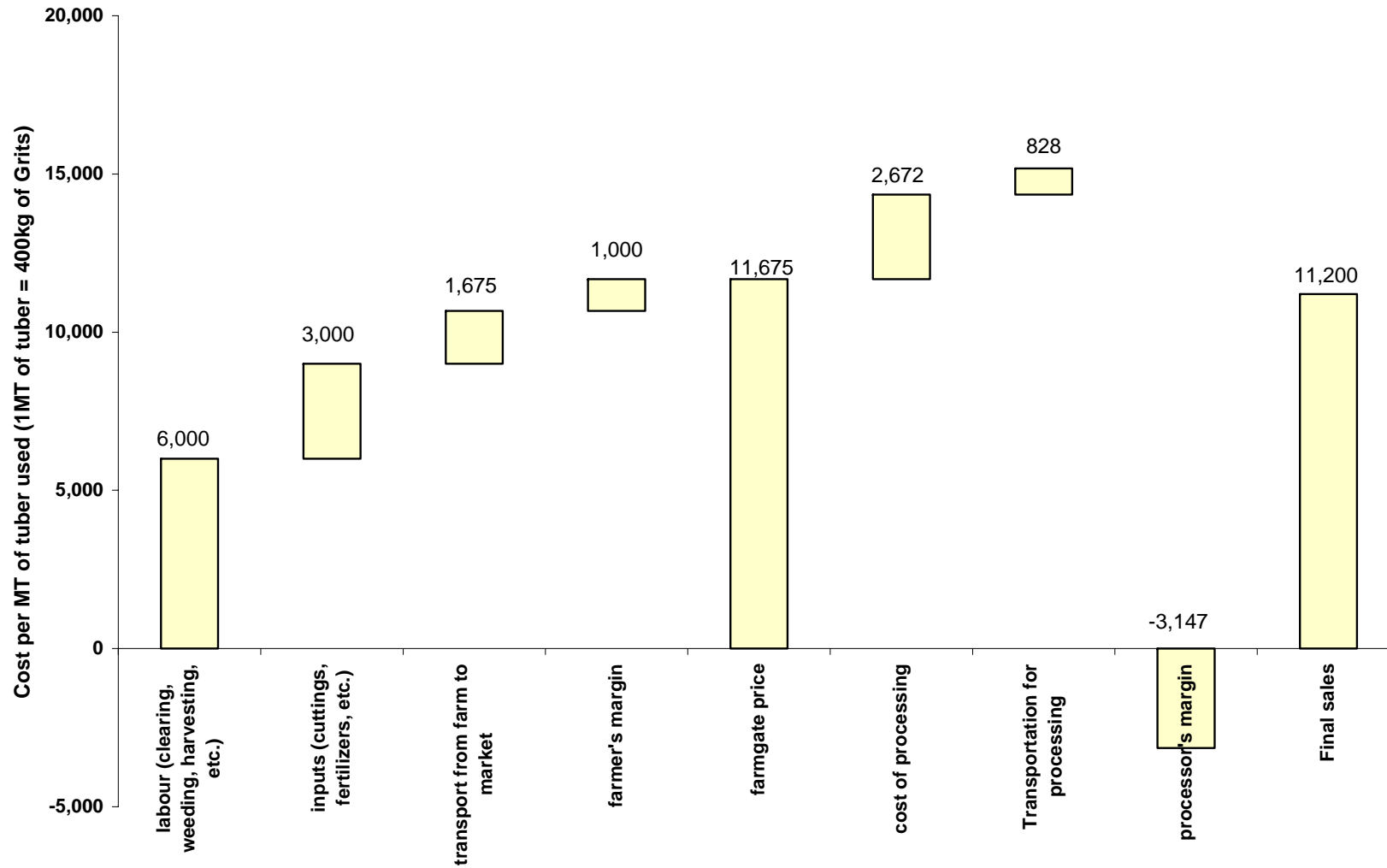
**Waterfall Chart for Lafun Production in Oyo State**



**Waterfall Chart for Garri Production in Oyo State**



### Waterfall Chart for Grits Production in Oyo State



**OYO STATE**

<b>Cassava Chips Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		18,000
inputs (cuttings, fertilizers, etc.)	18,000	9,000
transport	27,000	0
farmer's margin - tubers	27,000	3,000
farmgate price - tubers		30,000
cost of chips' production	30,000	3,500
farmer's margin - chips	33,500	-1,350
farmgate price - chips		32,150
handling costs		
middleman's margin		
transport		
handling		
other costs		
merchants' margin		
Final sales		

<b>Starch Production 1</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
cost of processing		
processor's margin		
Local starch price		
transport		
cost of processing		
Industrial processor's margin		

<b>Cassava Flour production (Lafun)</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		6,000
inputs (cuttings, fertilizers, etc.)	6,000	3,000
transport	9,000	0
farmer's margin - tubers	9,000	1,000
farmgate price - tubers		10,000
cost of chips/grits' production	10,000	1,533
transport	11,533	1,667
cost of milling, sieving, etc.	13,200	333
Processor's margin	13,533	933
Final sales		14,467

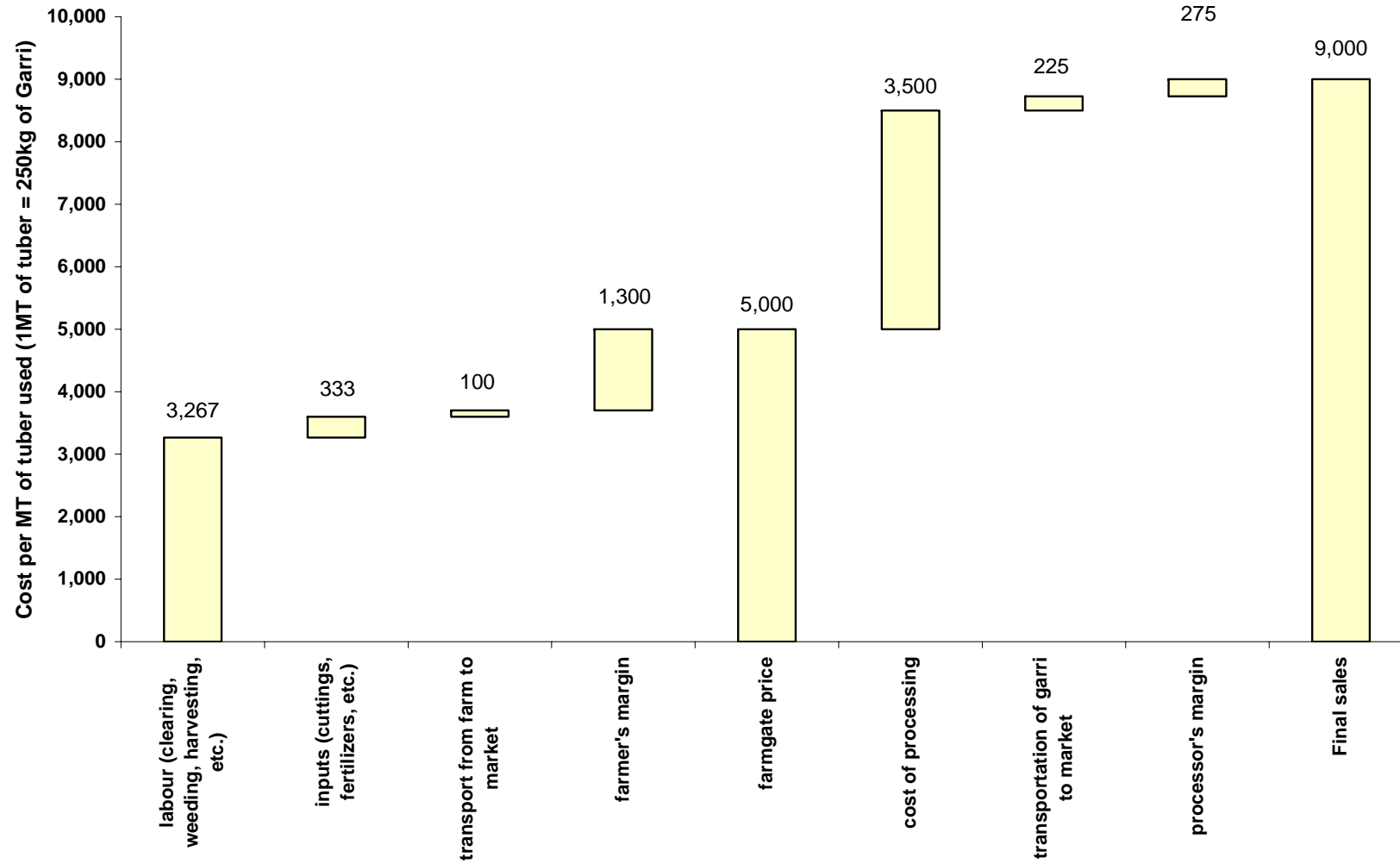
<b>Starch Production 2</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
transport		
cost of processing		
Industrial processor's margin		
final sales		

final sales		

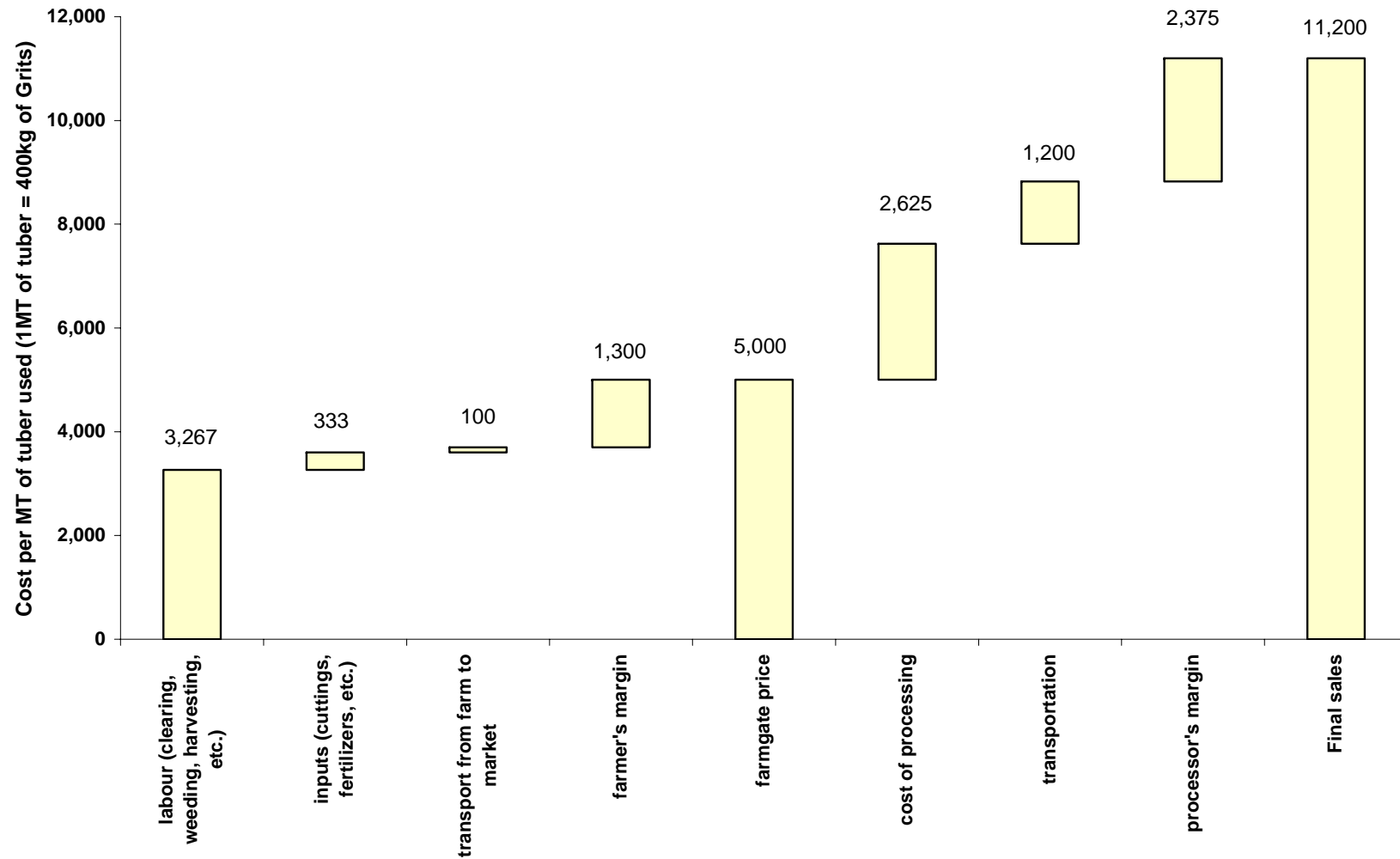
<b>Garri Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		6,000
inputs (cuttings, fertilizers, etc.)	6,000	3,000
transport from farm to market	9,000	1,675
farmer's margin	10,675	1,000
farmgate price		11,675
cost of processing	11,675	1,920
Transportation for processing	13,595	518
processor's margin	13,595	1,405
Final sales		15,000

<b>Grits Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		6,000
inputs (cuttings, fertilizers, etc.)	6,000	3,000
transport from farm to market	9,000	1,675
farmer's margin	10,675	1,000
farmgate price		11,675
cost of processing	11,675	2,672
Transportation for processing	14,347	828
processor's margin	14,347	-3,147
Final sales		11,200

**Waterfall chart for Garri Production in Enugu State**

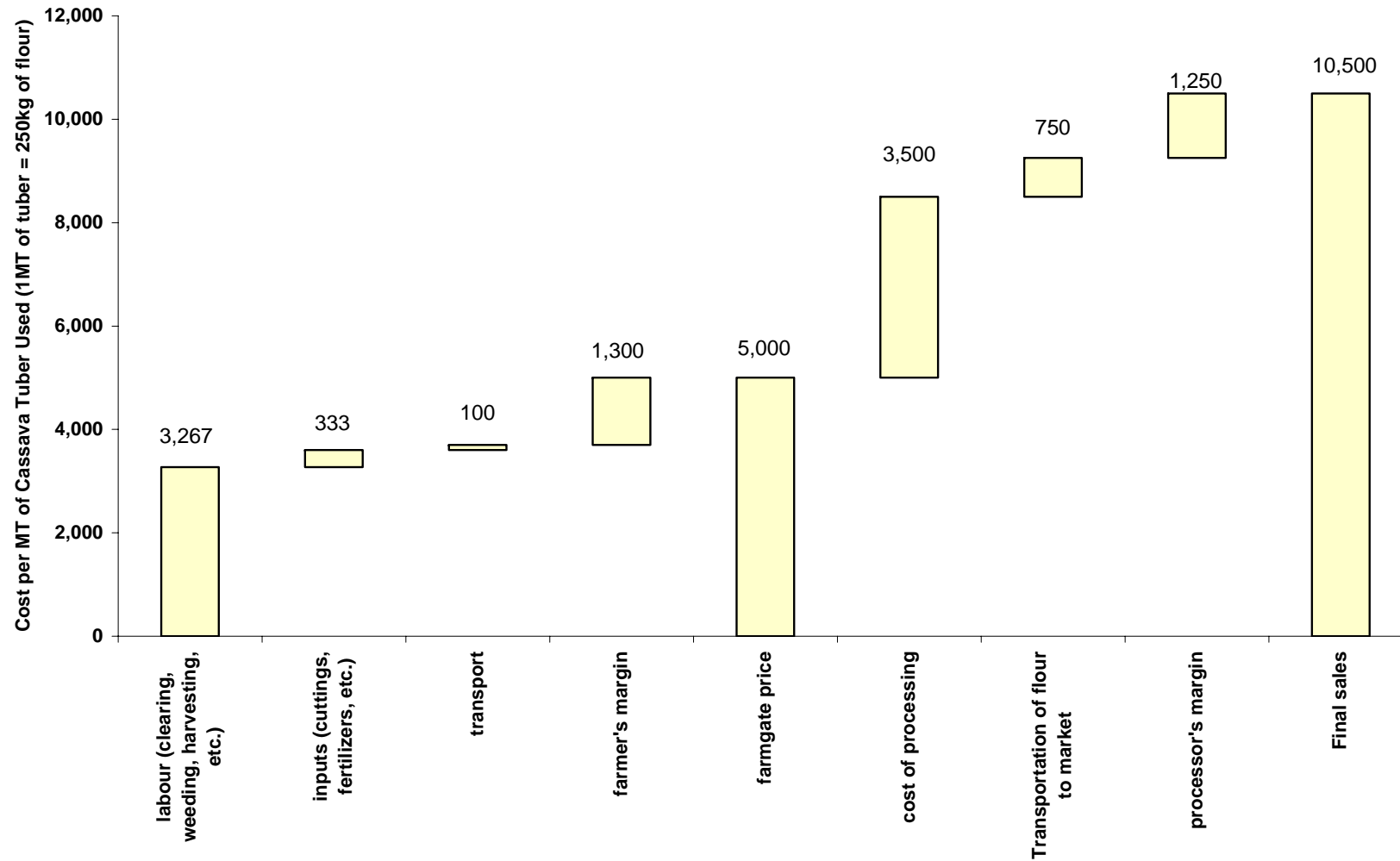


### Waterfall Chart for Grits Production in Enugu State





### Waterfall Chart for Cassava Flour Production in Enugu State



**ENUGU  
STATE**

3MT of cassava tubers = 1MT of chips

<b>Cassava Chips Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin - tubers		
farmgate price - tubers		
cost of chips' production		
farmer's margin - chips		
farmgate price - chips		
handling costs - middleman		
middleman's margin		
transport		
handling - merchant		
other costs		
merchants' margin		
Final sales		

<b>Starch Production 1</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
cost of processing		
processor's margin		
Local starch price		
transport		

<b>Cassava Flour production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin - tubers		
farmgate price - tubers		
cost of chips/grits' production		
farmer's margin - chips/grits		
farmgate price - chips/grits		
handling costs		
middleman's margin		
transport		
handling		
other costs		
merchants' margin		
cost of milling		
Miller's margin		
Final sales		

<b>Starch Production 2</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
transport		
cost of processing		
Industrial processor's margin		

cost of processing		
Industrial processor's margin		
final sales		

3MT of cassava tubers = 1MT of garri

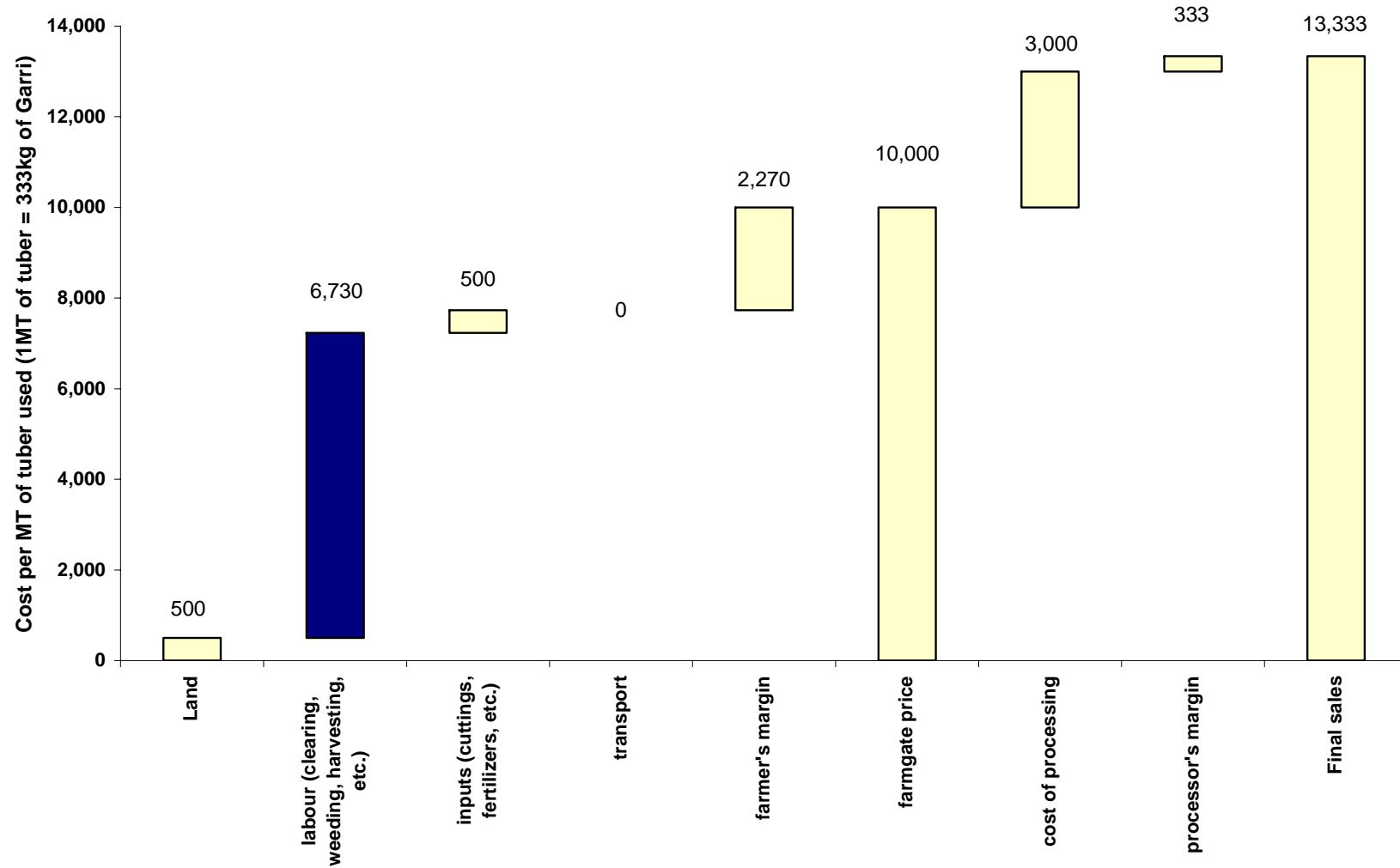
<b>Garri Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	3,267
inputs (cuttings, fertilizers, etc.)	3,267	333
transport from farm to market	3,600	100
farmer's margin	3,700	1,300
farmgate price		5,000
cost of processing	5,000	3,500
transportation of garri to market	8,500	225
processor's margin	8,725	275
Final sales		9,000

final sales		
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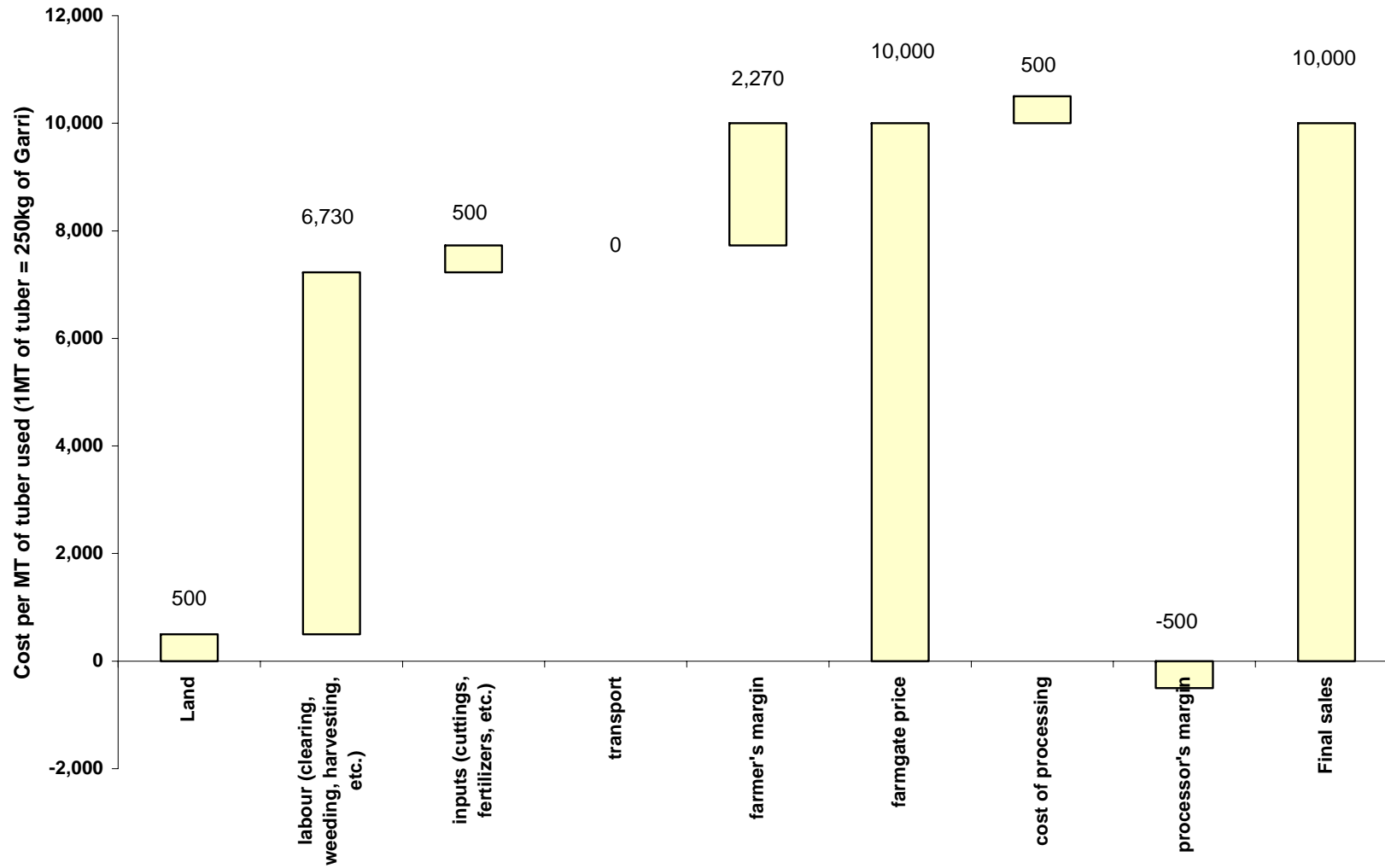
<b>Grits Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	3,267
inputs (cuttings, fertilizers, etc.)	3,267	333
transport from farm to market	3,600	100
farmer's margin	3,700	1,300
farmgate price		5,000
cost of processing	5,000	2,625
transportation	7,625	1,200
processor's margin	8,825	2,375
Final sales		11,200

<b>Flour Production - Projected</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	3,267
inputs (cuttings, fertilizers, etc.)	3,267	333
transport	3,600	100
farmer's margin	3,700	1,300
farmgate price		5,000
cost of processing	5,000	3,500
Transportation of flour to market	8,500	750
processor's margin	9,250	1,250
Final sales		10,500

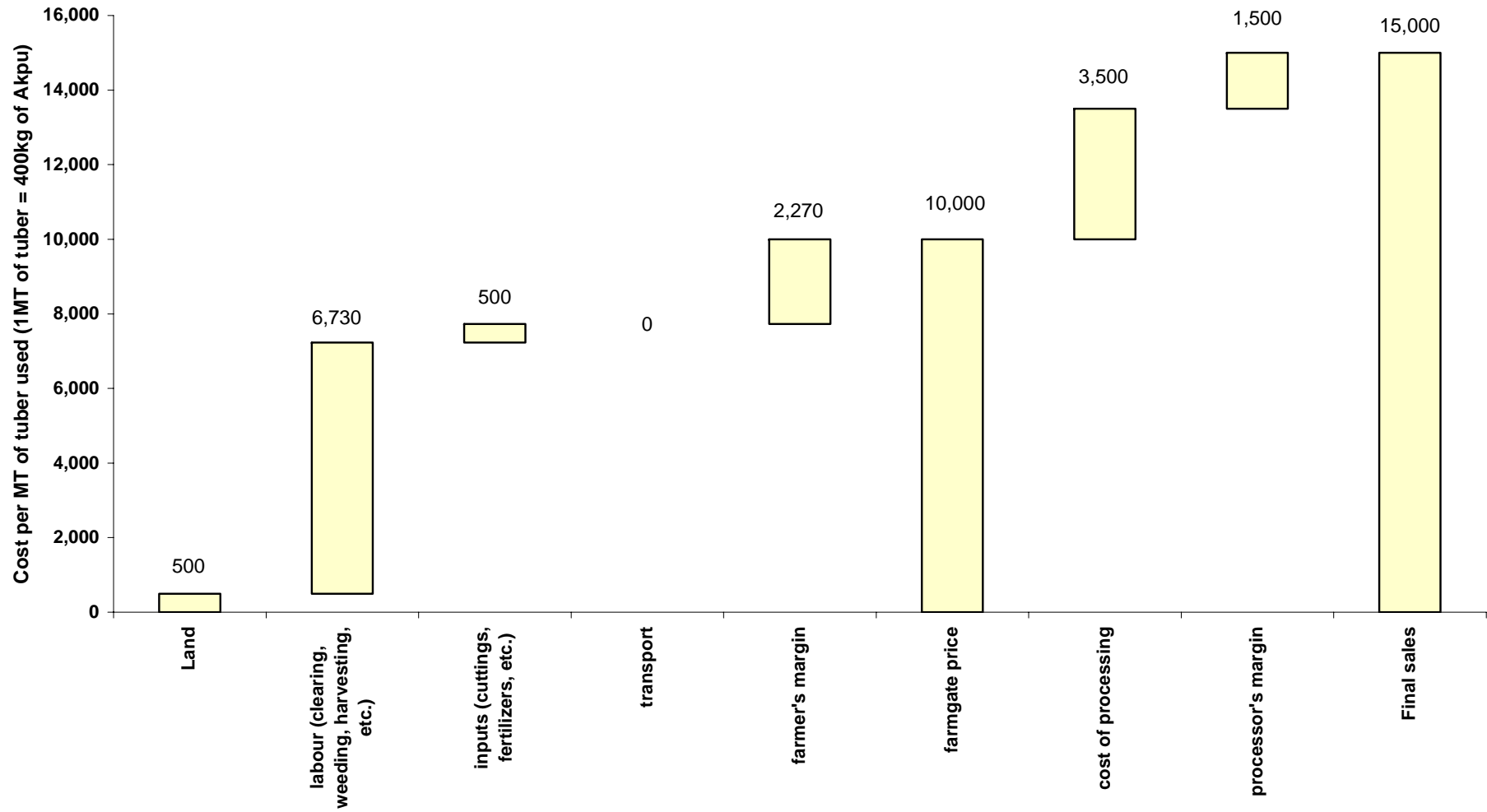
### Waterfall Chart for Garri Production in Imo State



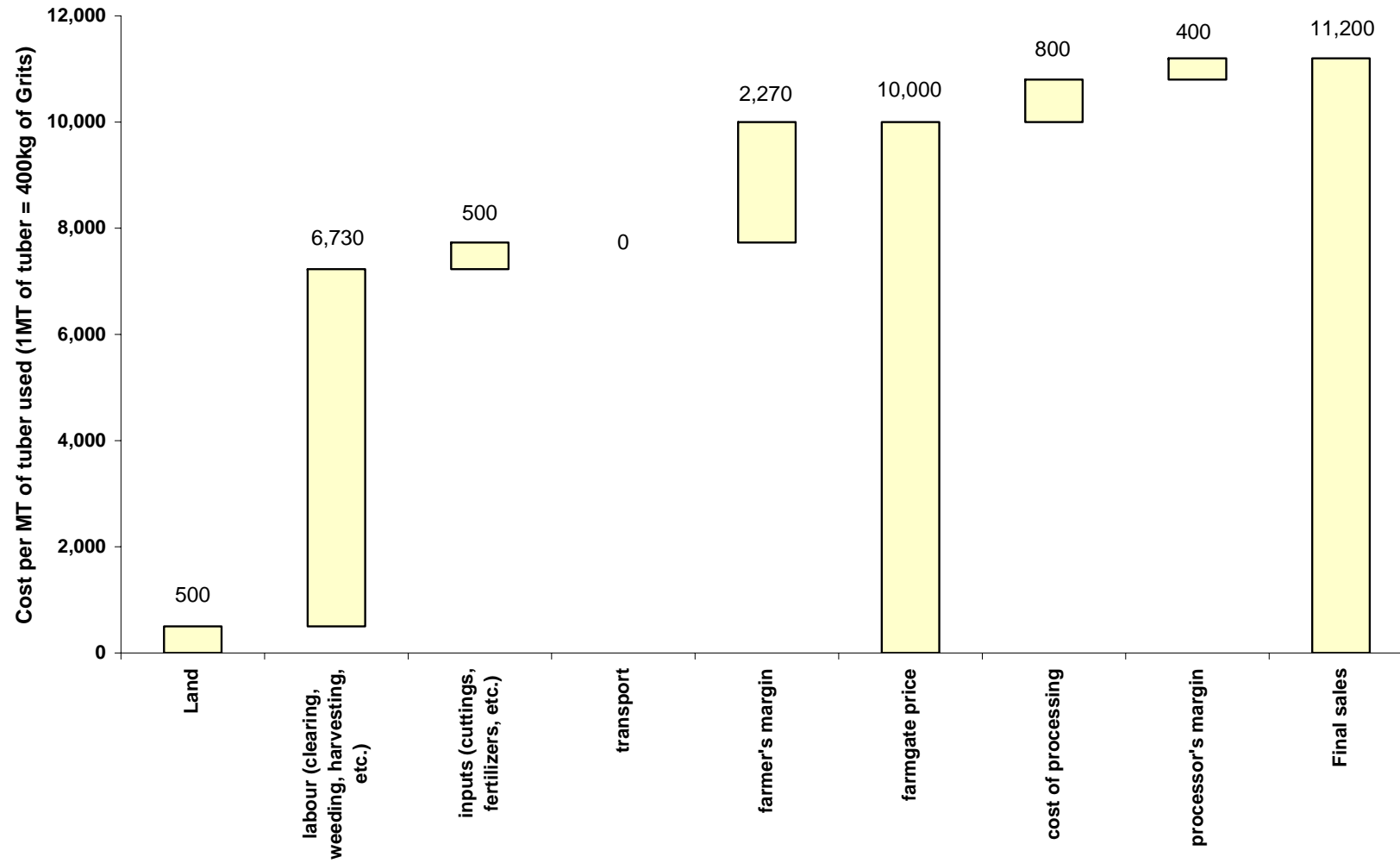
### Waterfall Chart for Garri Production in Imo State



### Waterfall Chart for Akpu Production in Imo State



### Waterfall Chart for Grits Production in Imo State



**IMO STATE**

3MT of cassava tubers = 1MT of chips

<b>Cassava Chips Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin - tubers		
farmgate price - tubers		
cost of chips' production		
farmer's margin - chips		
farmgate price - chips		
handling costs - middleman		
middleman's margin		
transport		
handling - merchant		
other costs		
merchants' margin		
Final sales		

<b>Starch Production 1</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
cost of processing		
processor's margin		
Local starch price		
transport		
cost of processing		
Industrial processor's margin		

<b>Cassava Flour production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin - tubers		
farmgate price - tubers		
cost of chips/grits' production		
farmer's margin - chips/grits		
farmgate price - chips/grits		
handling costs		
middleman's margin		
transport		
handling		
other costs		
merchants' margin		
cost of milling		
Miller's margin		
Final sales		

<b>Starch Production 2</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
transport		
cost of processing		
Industrial processor's margin		
final sales		



final sales		

3MT of cassava tubers = 1MT of garri

<b>Garri Production</b>		<b>Price/Cost/MT</b>
Land	0	500
labour (clearing, weeding, harvesting, etc.)	500	6,730
inputs (cuttings, fertilizers, etc.)	7,230	500
transport	7,730	0
farmer's margin	7,730	2,270
farmgate price		10,000
cost of processing	10,000	3,000
processor's margin	13,000	333
Final sales		13,333

4MT of cassava tubers = 1MT of akpu

<b>Akpu Production</b>		<b>Price/Cost/MT</b>
Land	0	500
labour (clearing, weeding, harvesting, etc.)	500	6,730
inputs (cuttings, fertilizers, etc.)	7,230	500
transport	7,730	0
farmer's margin	7,730	2,270
farmgate price		10,000
cost of processing	10,000	3,500
processor's margin	13,500	1,500
Final sales		15,000

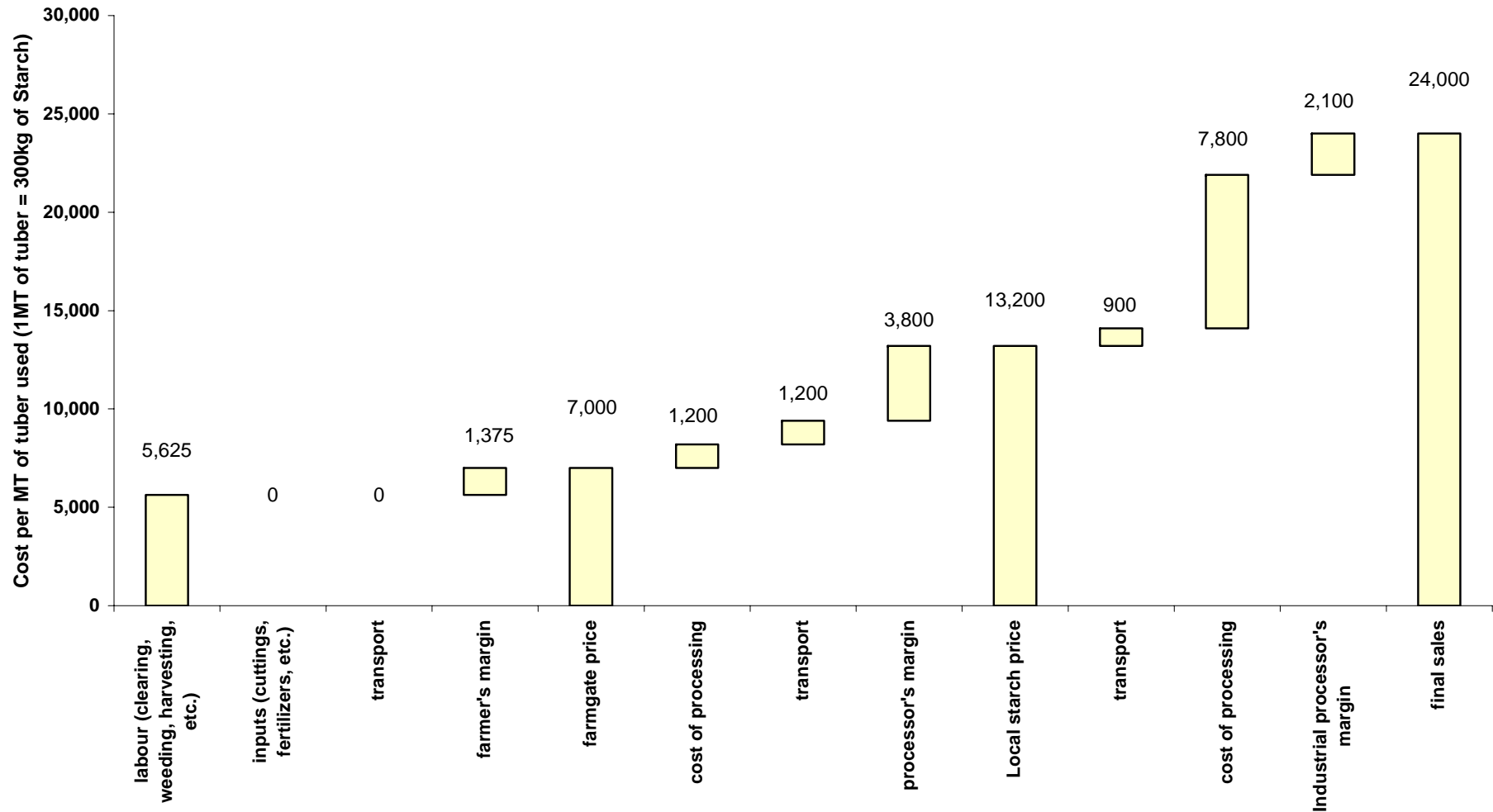
2.5MT of cassava tubers = 1MT of Grits

<b>Grits Production</b>		<b>Price/Cost/MT</b>
Land	0	500
labour (clearing, weeding, harvesting, etc.)	500	6,730
inputs (cuttings, fertilizers, etc.)	7,230	500
transport	7,730	0
farmer's margin	7,730	2,270
farmgate price		10,000
cost of processing	10,000	800
processor's margin	10,800	400
Final sales		11,200

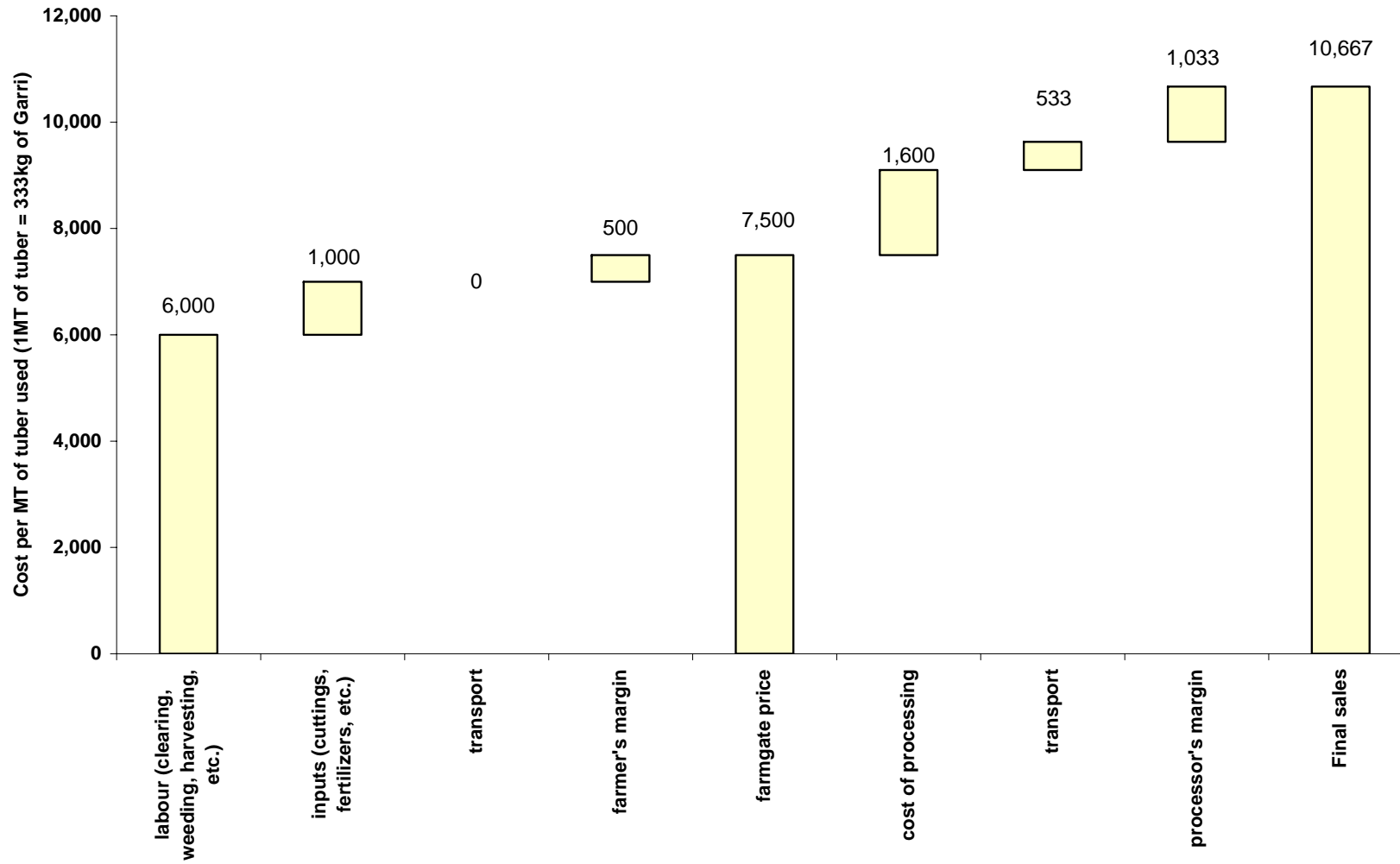
4MT of cassava tubers = 1MT of garri

<b>Garri Production</b>		<b>Price/Cost/MT</b>
Land	0	500
labour (clearing, weeding, harvesting, etc.)	500	6,730
inputs (cuttings, fertilizers, etc.)	7,230	500
transport	7,730	0
farmer's margin	7,730	2,270
farmgate price		10,000
cost of processing	10,000	500
processor's margin	10,500	-500
Final sales		10,000

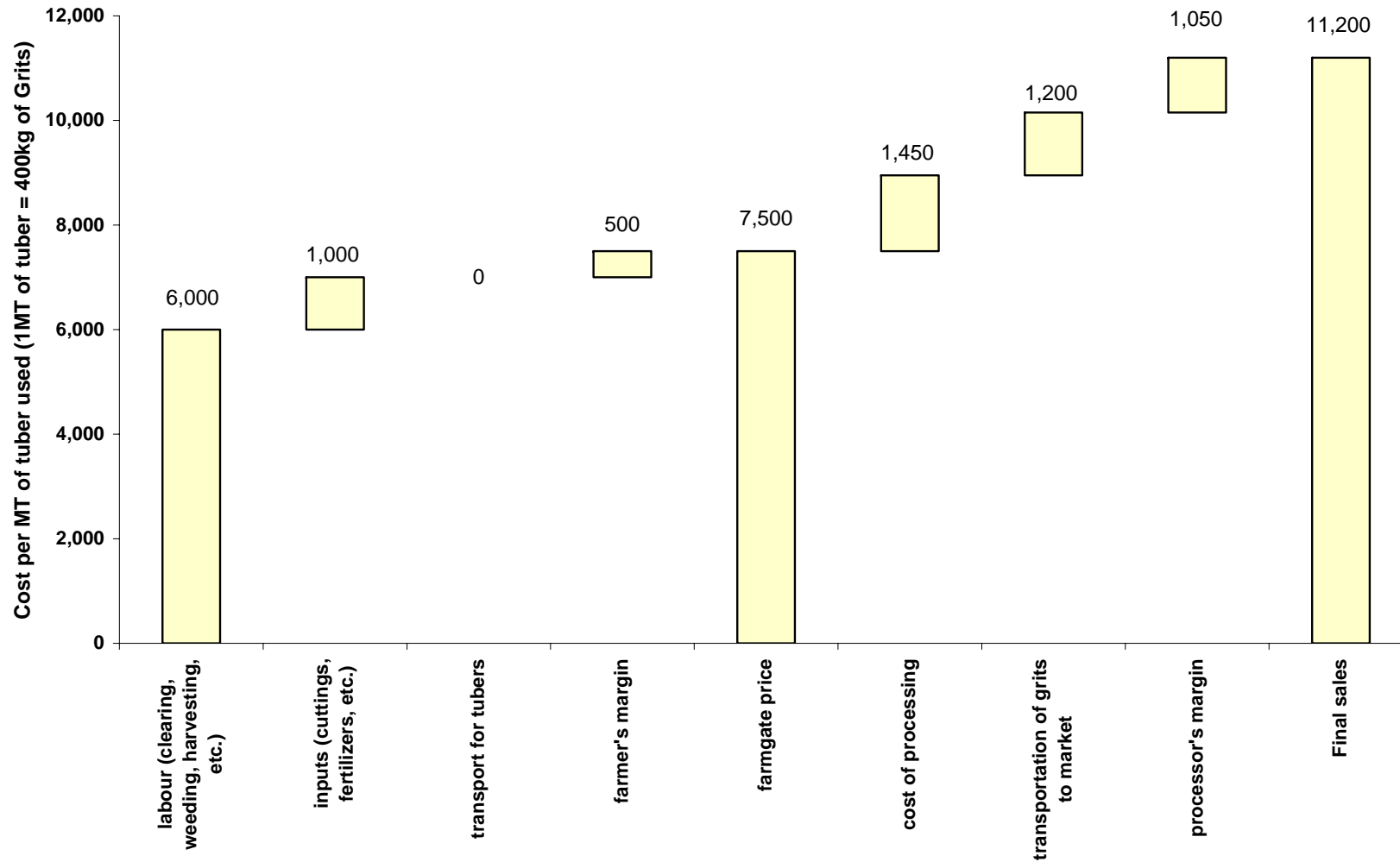
### Waterfall Chart for Starch Production in Delta State



### Waterfall Chart for Garri Production in Delta State



### Waterfall Chart for Grits Production in Delta State



**DELTA STATE**

3MT of cassava tubers = 1MT of chips

<b>Cassava Chips Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin - tubers		
farmgate price - tubers		
cost of chips' production		
farmer's margin - chips		
farmgate price - chips		
handling costs - middleman		
middleman's margin		
transport		
handling - merchant		
other costs		
merchants' margin		
Final sales		

<b>Starch Production 1</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	5,625
inputs (cuttings, fertilizers, etc.)	5,625	0
transport	5,625	0
farmer's margin	5,625	1,375
farmgate price		7,000
cost of processing	7,000	1,200
transport	8,200	1,200
processor's margin	9,400	3,800
Local starch price		13,200
transport	13,200	900

<b>Cassava Flour production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin - tubers		
farmgate price - tubers		
cost of chips/grits' production		
farmer's margin - chips/grits		
farmgate price - chips/grits		
handling costs		
middleman's margin		
transport		
handling		
other costs		
merchants' margin		
cost of milling		
Miller's margin		
Final sales		

<b>Starch Production 2</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
transport		
cost of processing		
Industrial processor's margin		

cost of processing	14,100	7,800
Industrial processor's margin	21,900	2,100
final sales		24,000

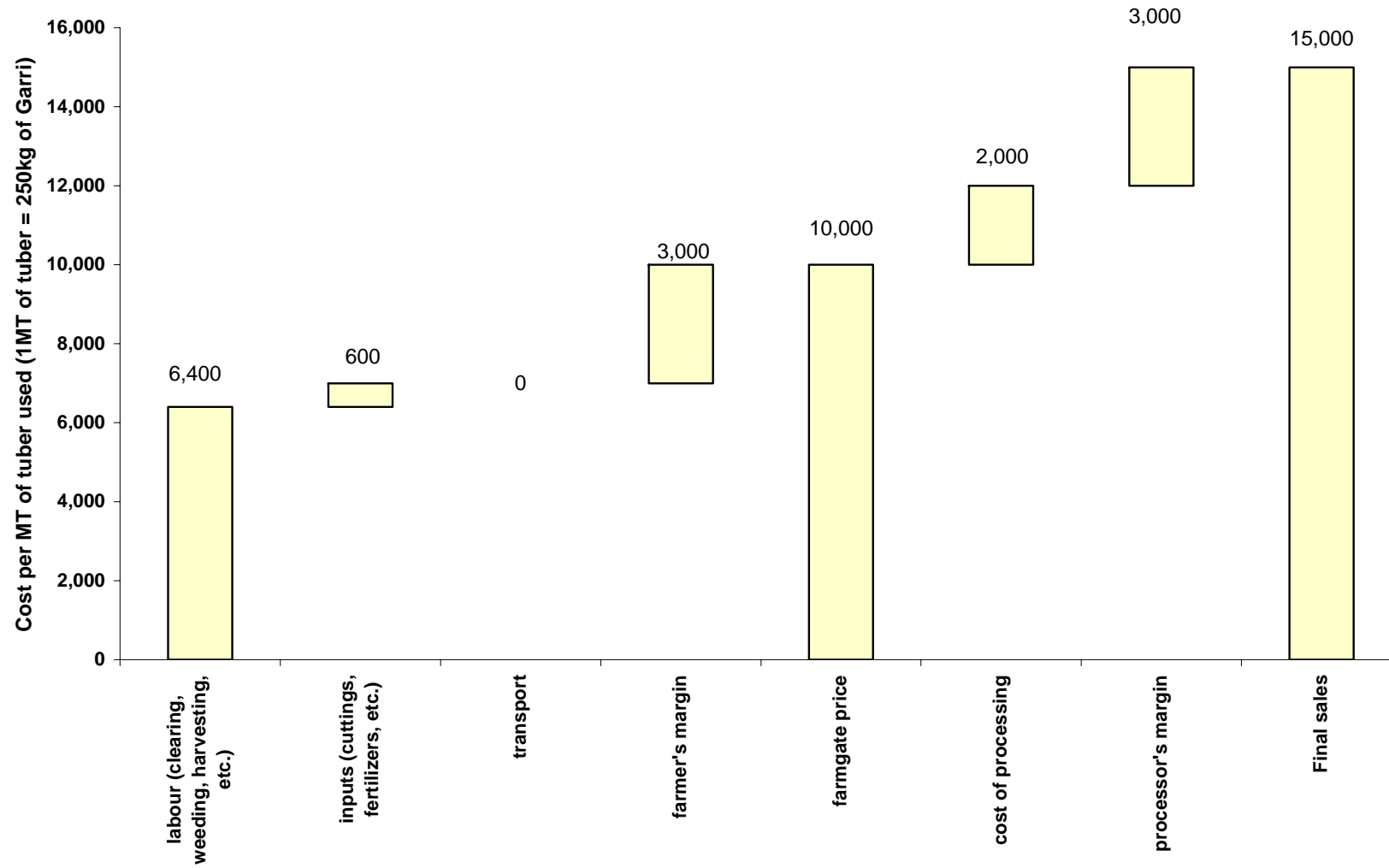
<b>Garri Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	6,000
inputs (cuttings, fertilizers, etc.)	6,000	1,000
transport	7,000	0
farmer's margin	7,000	500
farmgate price		7,500
cost of processing	7,500	1,600
transport	9,100	533
processor's margin	9,633	1,033
Final sales		10,667

<b>Akpu Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
cost of processing		
processor's margin		
Final sales		

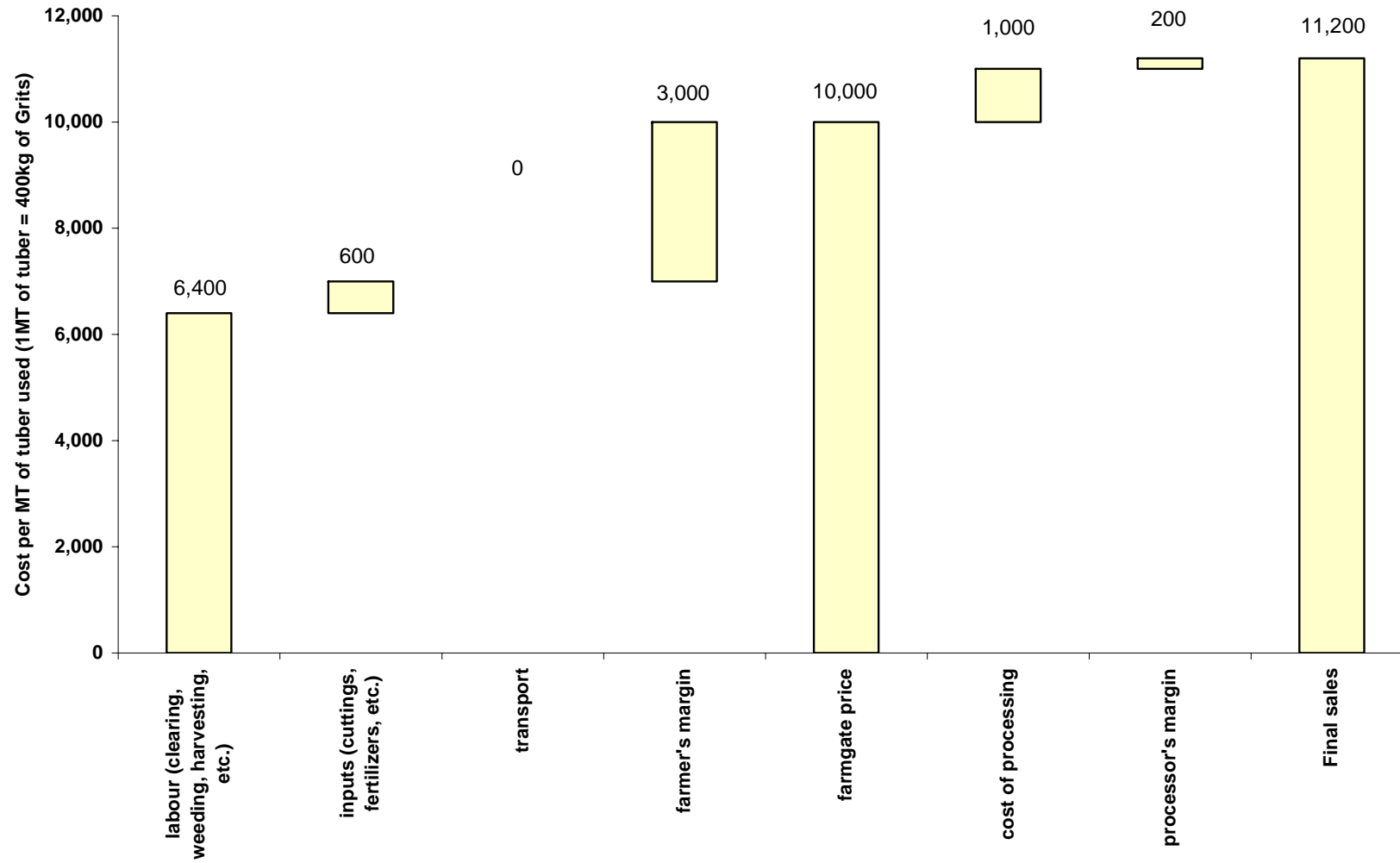
final sales		
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<b>Grits Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	6,000
inputs (cuttings, fertilizers, etc.)	6,000	1,000
transport for tubers	7,000	0
farmer's margin	7,000	500
farmgate price		7,500
cost of processing	7,500	1,450
transportation of grits to market	8,950	1,200
processor's margin	10,150	1,050
Final sales		11,200

### Waterfall Chart for Garri Production in Rivers State



### Waterfall Chart for Grits Production in Rivers State





**RIVERS  
STATE**

3MT of cassava tubers = 1MT of chips

<b>Cassava Chips Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin - tubers		
farmgate price - tubers		
cost of chips' production		
farmer's margin - chips		
farmgate price - chips		
handling costs - middleman		
middleman's margin		
transport		
handling - merchant		
other costs		
merchants' margin		
Final sales		

<b>Starch Production 1</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
cost of processing		
processor's margin		
Local starch price		
transport		
cost of processing		

<b>Cassava Flour production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin - tubers		
farmgate price - tubers		
cost of chips/grits' production		
farmer's margin - chips/grits		
farmgate price - chips/grits		
handling costs		
middleman's margin		
transport		
handling		
other costs		
merchants' margin		
cost of milling		
Miller's margin		
Final sales		

<b>Starch Production 2</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
transport		
cost of processing		
Industrial processor's margin		
final sales		

Industrial processor's margin		
final sales		

4MT of cassava tubers = 1MT of Garri

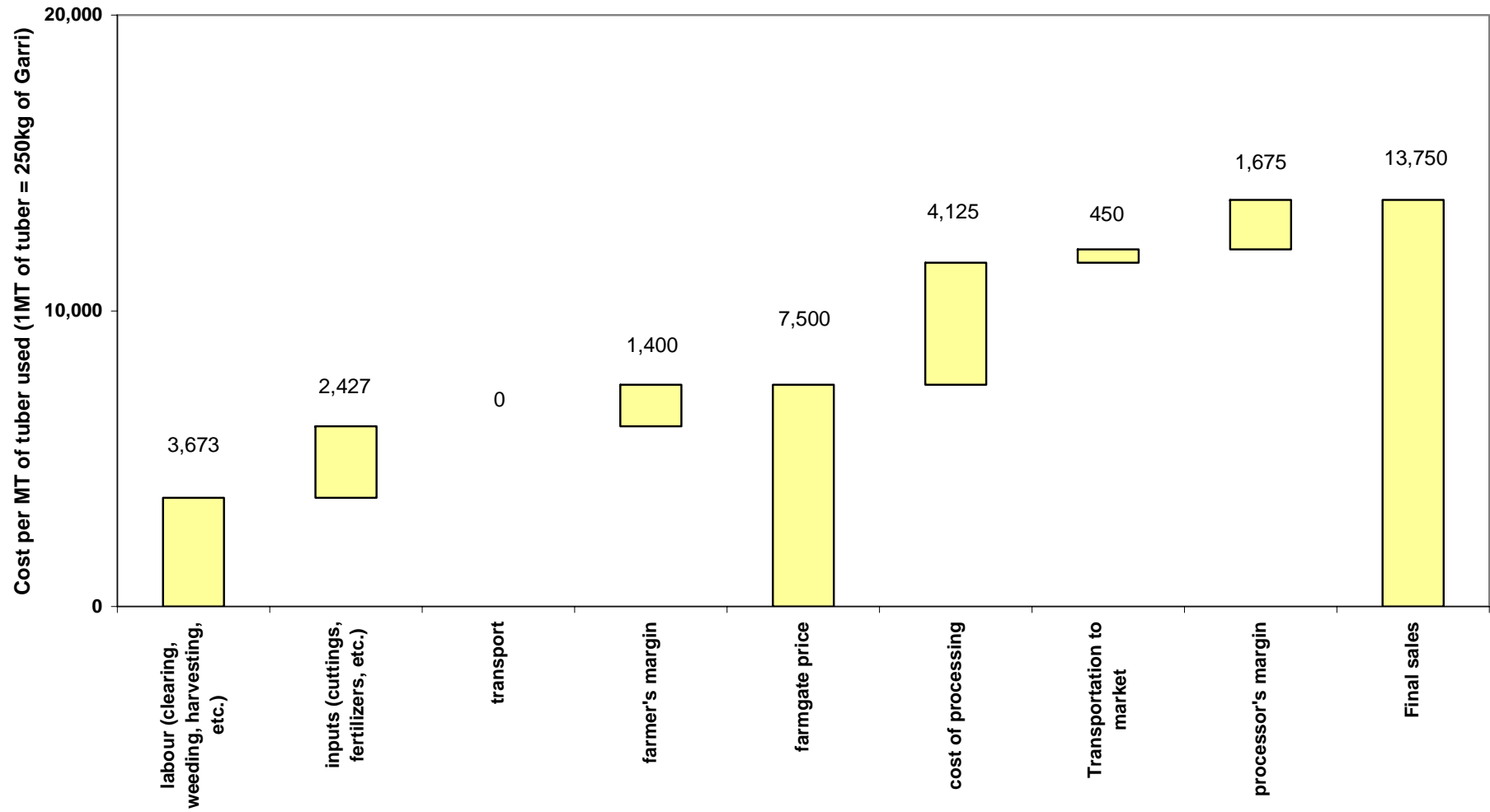
<b>Garri Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	6,400
inputs (cuttings, fertilizers, etc.)	6,400	600
transport	7,000	0
farmer's margin	7,000	3,000
farmgate price		10,000
cost of processing	10,000	2,000
processor's margin	12,000	3,000
Final sales		15,000

<b>Akpu Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
cost of processing		
processor's margin		
Final sales		

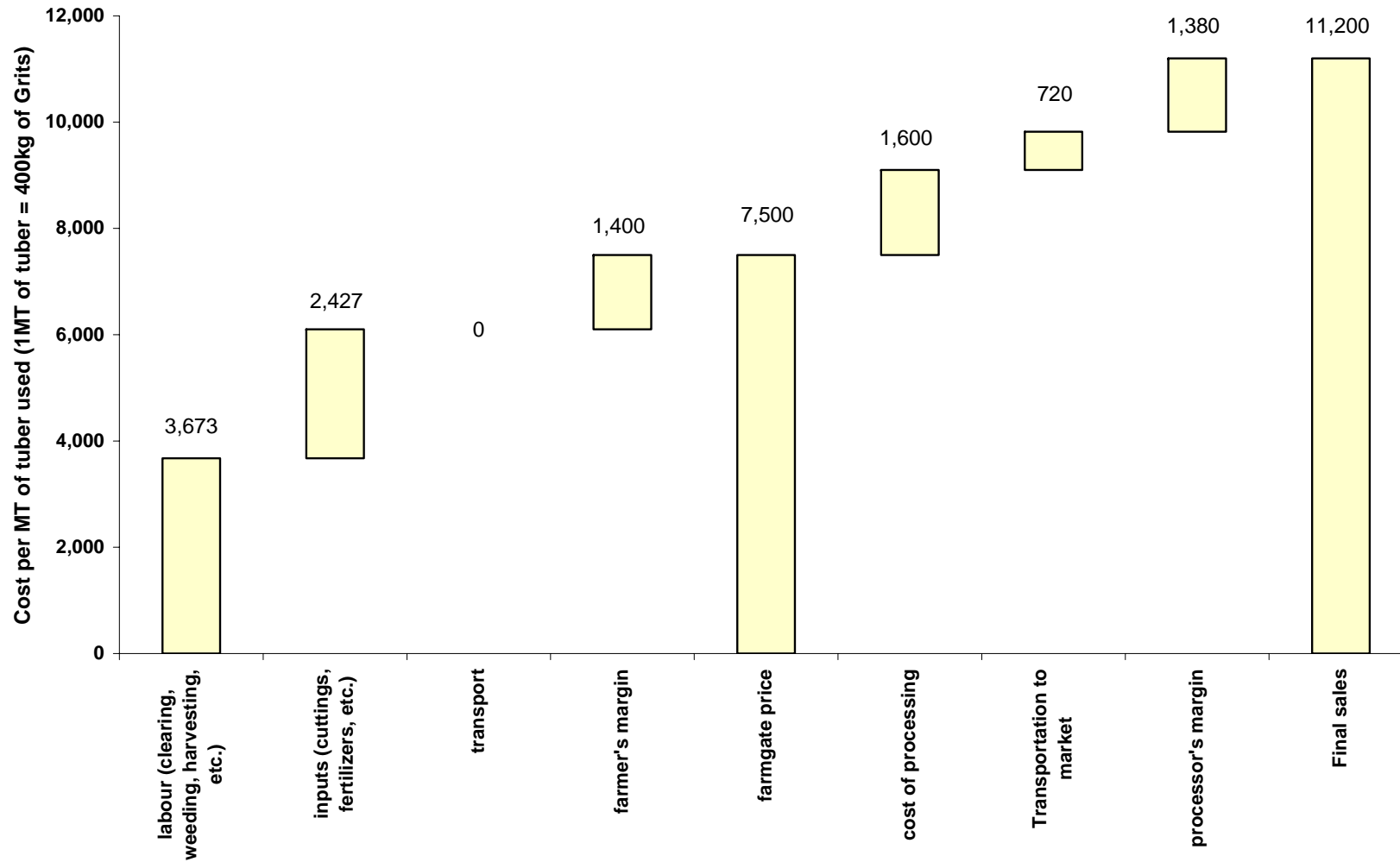
2.5MT of cassava tubers = 1MT of Grits

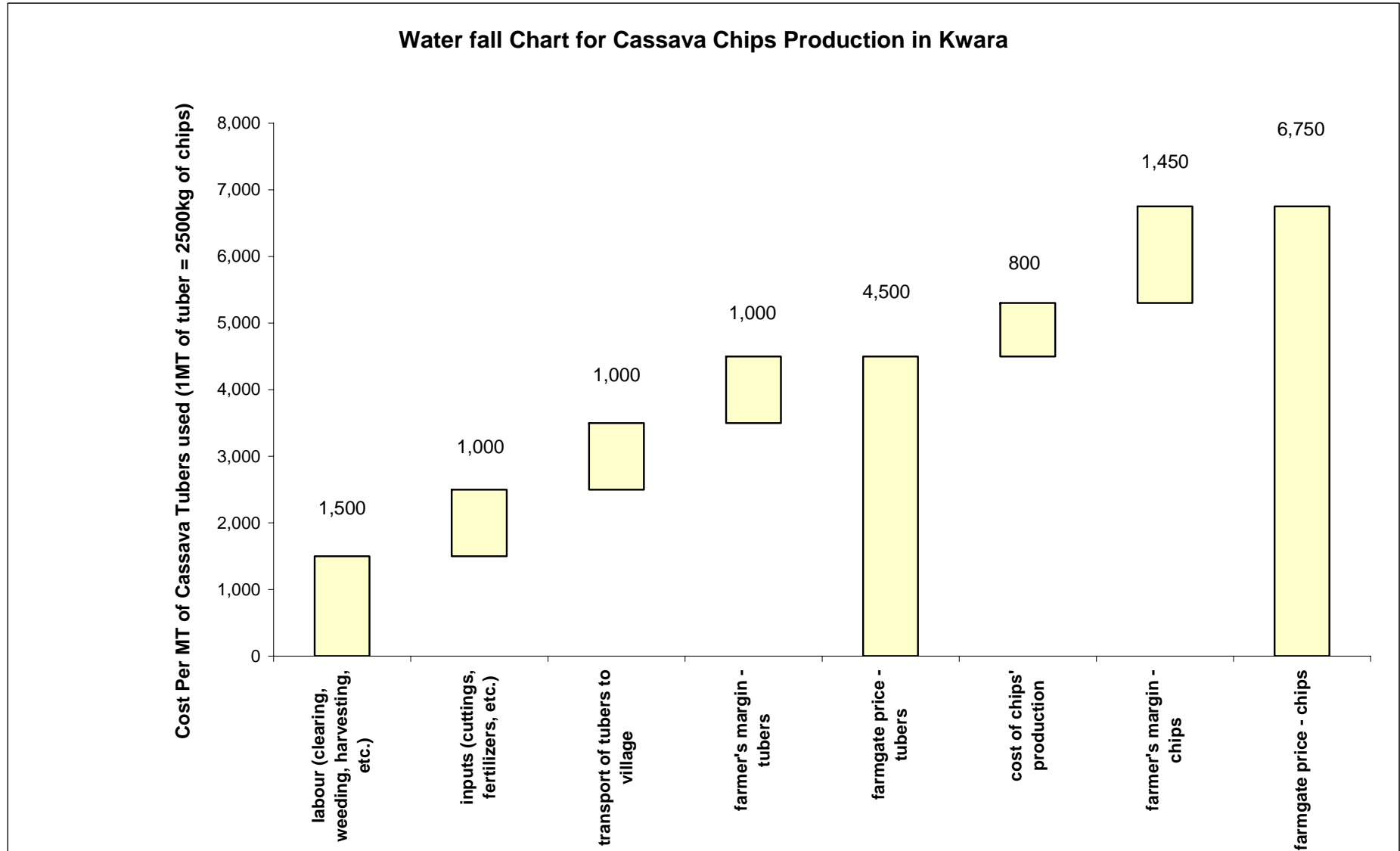
<b>Grits Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	6,400
inputs (cuttings, fertilizers, etc.)	6,400	600
transport	7,000	0
farmer's margin	7,000	3,000
farmgate price		10,000
cost of processing	10,000	1,000
processor's margin	11,000	200
Final sales		11,200

### Waterfall Chart for Garri Production in Ogun State



### Waterfall Chart for Grits Production in Ogun State





**KWARA  
STATE**

3MT of cassava tubers = 1MT of chips

<b>Cassava Chips Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	1,500
inputs (cuttings, fertilizers, etc.)	1,500	1,000
transport of tubers to village	2,500	1,000
farmer's margin - tubers	3,500	1,000
farmgate price - tubers		4,500
cost of chips' production	4,500	800
farmer's margin - chips	5,300	1,450
farmgate price - chips		6,750

<b>Starch Production 1</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
cost of processing		
processor's margin		
Local starch price		
transport		
cost of processing		

<b>Cassava Flour production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin - tubers		
farmgate price - tubers		
cost of chips/grits' production		
farmer's margin - chips/grits		
farmgate price - chips/grits		
handling costs		
midleman's margin		
transport		
handling		
other costs		
merchants' margin		
cost of milling		
Miller's margin		
Final sales		

<b>Starch Production 2</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport		
farmer's margin		
farmgate price		
transport		
cost of processing		
Industrial processor's margin		
final sales		

Industrial processor's margin		
final sales		

<b>Garri Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)		
inputs (cuttings, fertilizers, etc.)		
transport of tubers to village		
farmer's margin		
farmgate price		
cost of processing		
processor's margin		
Final sales		

<b>Grits Production</b>		<b>Price/Cost/MT</b>
labour (clearing, weeding, harvesting, etc.)	0	
inputs (cuttings, fertilizers, etc.)	0	
transport of tubers to village	0	
farmer's margin	0	
farmgate price		
cost of processing	0	
processor's margin	0	
Final sales		