

PLANTAIN (*MUSA ACUMINATA*) VALUE CHAIN ANALYSIS IN ONDO STATE, NIGERIA

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Abstract

This paper analyzed the plantain value chain in Ondo State, Nigeria. It identified the various actors in the plantain value chain and their functions, mapped out the various segments, their linkages and the overall plantain value chain and identified the value added at each segment of the value chain. One hundred and seventy seven respondents were selected using multi-staged sampling technique and interviewed using structured questionnaire, informal interview and observation techniques to obtain the primary used. This was analyzed using functional and analysis. Result from the functional analysis, amongst other characteristics, showed that there were eight major actors or segments in the plantain value chain in Ondo State, Nigeria. They are the input suppliers, farmers, processors, marketers, consumers, transporters, cooperative societies and farmers association. This paper concluded that plantain farming is still lowly mechanised and processing has not been fully developed to explore the various value addition options available in this sector. More value can still be added to the product and more upgrading could still be done in the chain. More actors can also take advantage of the prevalence of plantain in the state. In addition, the government and private research institutions should pay attention to the training needs of the farmers so as to properly harness the comparative advantage that the state has above others states in the production of plantain.

Key words: actors, segments, Plantain, value chain

INTRODUCTION

Kaplinsky and Morris (2002) defined the value chain as “the full range of activities, which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), to delivery to final consumers, and final disposal after use”. As shown in figure 1, the value chain can generally be separated into five stages: input supply, primary production, processing, marketing and consumption. On every stage one to several different actors can be found. The input supply considers everything from the seeds to the technical equipment that is needed for the production of the concerned product. The primary production meaning all activities (sawing, fertilizing, and harvesting) needed to produce raw material like grain or vegetables follows input supply. The next stage in the process is trade and marketing. The processed products have to be transferred to the places of demand and distributed and sold there. Marketing can be done directly by the

producers or processors, but the higher the amount and quality of the traded goods the higher are the requirements about marketing. The last stage is consumption of a good. Even though the consumer does neither participate in the production process nor add value to the product, he is part of the chain as in most cases the consumer is the driving power of the whole process. Therefore consumer demand is the determining factor for the kind, amount and quality of a product. [11]

Plantains (*Musa acuminata*) is an important food crop in the humid forest and mid-altitude zones of sub-saharan Africa. Plantain is one of the major staple food in Nigeria, it had the highest percentage increase in output over years 1999 to 2003 - implying the existence of market potential and increase production in the country. Plantain has become a key source of revenue as they are not only traded within the country, but also exported to other continents including Europe. The status change from food to food/cash crop enhances its importance [9]. In terms of gross value of production, plantain is one of the most important fruits in developing world [1]. Plantain yields,

however, have been seriously declining, threatening food security and the livelihoods of millions of subsistence farmers and their

families in the country. Production needs to be intensified to realize value-added chains, while sustaining the natural resource base.

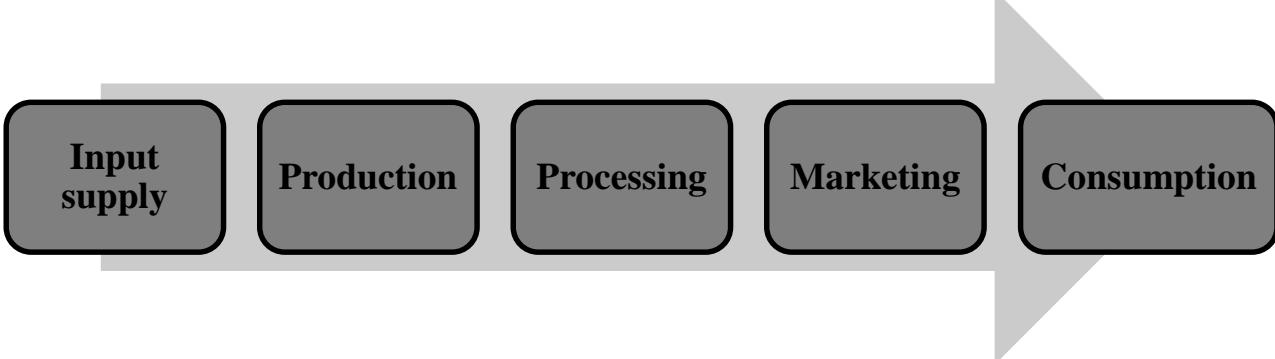


Fig. 1. Five stages of a value chain

Source: [1]

From time immemorial, agricultural development in Nigeria has always been hampered by lack of efficient and viable agro-processing and storage facilities resulting into post-harvest losses, particularly in the plantain value chain. The annual post-harvest losses recorded by the Nigerian farmers constitute greater threat to food security, socio-economic living conditions of the populace and by extension sustainable growth and development of the Nigerian economy especially in the face of the global financial crisis bedevilling national economies. Post-harvest losses have been a constraining factor in plantain production such that increase in yield brought about by advances in technologies through research did not make any significant impact on the economy of small scale farmers. This is why analysis and strengthening of the agricultural value chain become imperative.

Analysis of the plantain value chain in Nigeria, as contained in this paper, looks at the whole process of effective utilization of resources in the plantain value chain to create a competitive advantage that would provide a lower cost and higher profit. This study is important because, as opined by Sanusi (2011), “with value addition (in the plantain value chain), post-harvest losses will be reduced to the barest minimum, farmers can earn more income from their endeavor and food security can be better enhanced as it removes the effect of seasonality in the food supply chain and promote export”. There is no doubt that backward and forward

linkages of plantain plantation would ensure steady supply of plantain fruits which would further stimulate the establishment of plantain processing industries. This would open opportunities for businessmen in marketing plantain products. These activities result in new commercial ventures translating into other new demand and savings which are the key factors in economic growth [5].

MATERIALS AND METHODS

The study area is Ondo State. Ondo State is located in the South-western Zone of Nigeria. The State lies between longitudes $4^{\circ}30'$ and 6° East of the Greenwich Meridian, $5^{\circ} 45'$ and $8^{\circ} 15'$ North of the Equator [12]. The respondents for this study were various categories of actors in the plantain value chain. A multi-staged sampling technique was used to select these respondents from six villages which were purposively selected due to the prevalence of plantain production. They are Ogbese (Akure North), Akponmu (Akure South), Idanre (Idanre), Laje (Ondo west), Odigbo (Odigbo) and Ode Irele (Irele) respectively. Seven farmers were selected from each of these communities, making a total of 42 farmers in all.

Also, six major commercial nerve centers were purposively selected. They are Akure, Ondo, Owo, Ikare, Okitipupa and Ore. One input supplier, 5 processors, 5 consumers and 1 exporter each were interviewed from each

local government giving a total of 5 input suppliers, 30 processors, 30 consumers and 5 exporters. Furthermore, three major produce market where plantain is predominantly sold were selected namely, Ogbese, Emure-Ile and Owena Markets respectively. Fifteen (15) marketers were interviewed from each of the produce market making a total of 45 marketers interviewed. Primary data were collected with the aid of well-structured questionnaire, interview format and observations. Secondary data were collected from the Ministry of Agriculture, Ministry of Commerce and Industry, Agric Input Supply Agency (AISA) and from the internet. Functional analysis using descriptive statistical tools such as tables, charts and percentages were used to analyse data collected. Functional analysis was used to identify, upstream, the principal providers of inputs and services which feed into production. The roles and functions of these agents were

identified. [4]. The functional analysis table shows the principal functions in the chain, the agents, (or aspects of agents) carrying out these functions and the principal product of the chain (the various forms into which it is transformed throughout the chain).

RESULTS AND DISCUSSIONS

There were several actors in the plantain value chain in Ondo State, Nigeria. The various segments and actors are discussed below.

Input Supply Segment

The input suppliers in the plantain value chain were involved in the lease and sale of farm machineries and implements, fertilizers, pesticides, herbicides and fungicides to the plantain farmer. They also met the training needs of plantain farmers in the State in terms of the use of appropriate agrochemicals and improved suckers varieties.

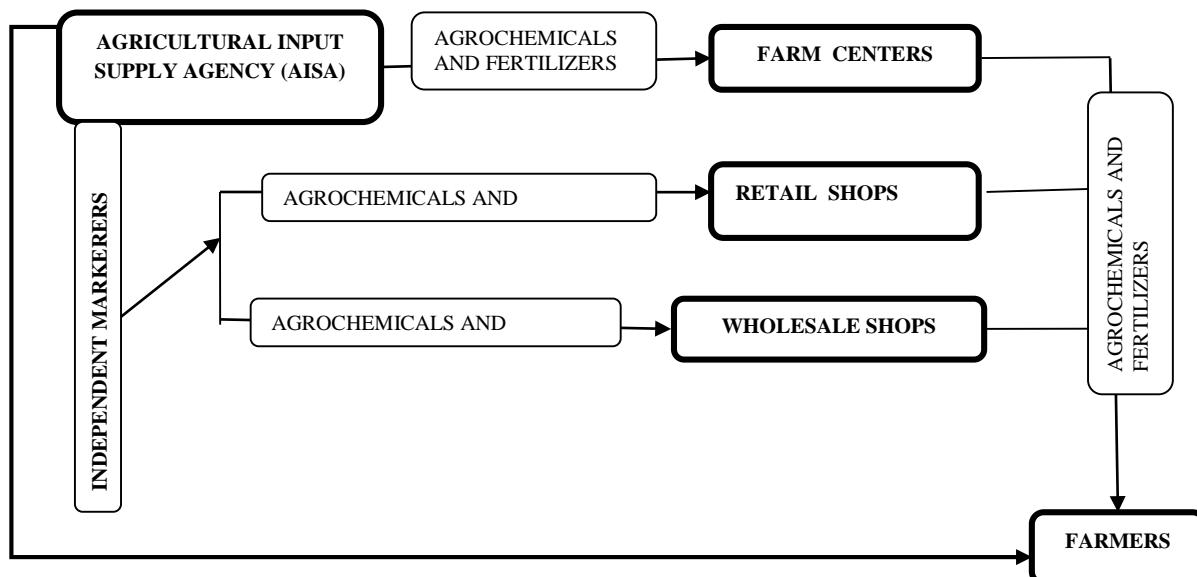


Fig. 2. Value chain diagram showing activities in the input segment of the plantain value chain

Agrochemicals were either supplied by wholesalers and retailers in the open market at the prevailing market rate or by the State Government through the Agricultural Input Supply Company (AISC), which has its head office in Akure, the State's capital. The latter supplied these inputs at prices subsidized by 40 - 50% but faced the challenge of inadequate supply due to lack of finance. Except for individual efforts by few farmers, sucker multiplication was not done in the state.

Farmers rather procured suckers from existing farms. Information delivery from research institutes to farmers was very poor and at its lowest ebb as private individuals involved in input supply saw it as a profit making business and the government arm (AISC) saddled with this responsibility was short of funds for operation.

The map of this segment of the value chain is shown in Fig.2.

Production Segment

Farmers carried out land preparation for planting of the suckers, farm maintenance and management and harvesting of the plantain bunches when they matured. They were also involved in processing (for sale and household consumption) and marketing of plantain. Although both men and women produced plantain in Ondo State, the enterprise was highly male – dominated as 98.0% of the pooled farmers was made up of men. Similarly, bulk (93.0%) of the farmers was married. This probably suggested that family labour was an important input in the enterprise. Thirty one (31.0%) per cent of the farmers had secondary education while 29.0% had tertiary education. Farmers with tertiary education took to plantain farming after schooling as a means to make ends meet while they searched for other better paying white collar jobs. Those with secondary education were older men who either farmed as their major occupation and other sources of income to support it. This generation of older men would soon pass on, leaving the younger generation who only saw farming as a last resort and as a way to make ends meet rather than as a business and gainful means of employment.

Results showed that 26.2% of respondents had their farm sizes between 0.5 to 0.99 hectares. Mean land area cultivated per farmer was 2.81 ha. This revealed that land area cultivated in plantain production in Ondo State was still low. The cocoa/plantain intercrop and the bush plantain farming systems was practiced by 45.0% of farmers interviewed respectively. About thirty five (34.97) hectares of the total land area cultivated was under the plantain / cocoa intercrop system while 74.05 hectares was cultivated under the bush plantain farming system. The farm sizes and production systems of plantain farmers in Ondo State had a lot to say about the attitude of farmers to plantain farming and the reason for the observed low yield in plantain farms across the State. The implication of this was that there was no focus on the cultivation of plantain as a cash crop with great export value. Plantain was only cultivated at subsistence level or at best to generate income for the farmer's family notwithstanding the fact that the state had great

potentials, in terms of climate and soil texture, for the production of this crop. Results also showed that 50.0 % of farmers had their houses from 6km and above away from the farm. Proximity of farm to market lessened the cost of transportation and losses through inappropriate loading in the bus while long distance resulted in product loss, low profit and value added.

Respondents who cultivated plantains for the dual purpose of consumption and sale had the largest proportion (83.3%) of the pooled farmers as well as the highest hectarage of 80.5 ha.

On the other hand, farmers who cultivated the crop for consumption purpose alone were fewest (2.4%) and operated an almost negligible hectarage of 0.8ha. It is interesting to observe that although the farmer who planted plantain solely for commercial purpose accounted for approximately 14.0% of total respondents, they operated a land area of approximately 35 ha. This indicated that commercialization of crop production made the farmers have relatively large farm sizes. About sixty percent (59.5%) of the farmers interviewed sold suckers to other farmers either in bits or as a business. 40.5% of the farmers interviewed didn't sell suckers. They either gave them out as gifts or used it to expand their farms. The sale of suckers was also an additional source of income for the farmer's family. Source of capital was an important determinant of the size of farm holdings and whether the farm was subsistence or commercial. Result showed that 76.1% of the farmers interviewed farm with their own capital alone. This further explained the subsistent nature of plantain farming in Ondo state. Inadequate access to credit, high interest rate and fragmentation of farm holdings accounted for this. Also, 76% of the farmers interviewed had no access to formal credit at all while only 23.8% have access to formal credit for plantain farming. The reason attributed to this by some of the farmers was that the farmer's union, which loans money to its members and liaise with the government to make credit available to its members, no longer existed. Also, because farmers did not have the

required collateral security, it was extremely difficult, if not impossible, to get loans from commercial banks.

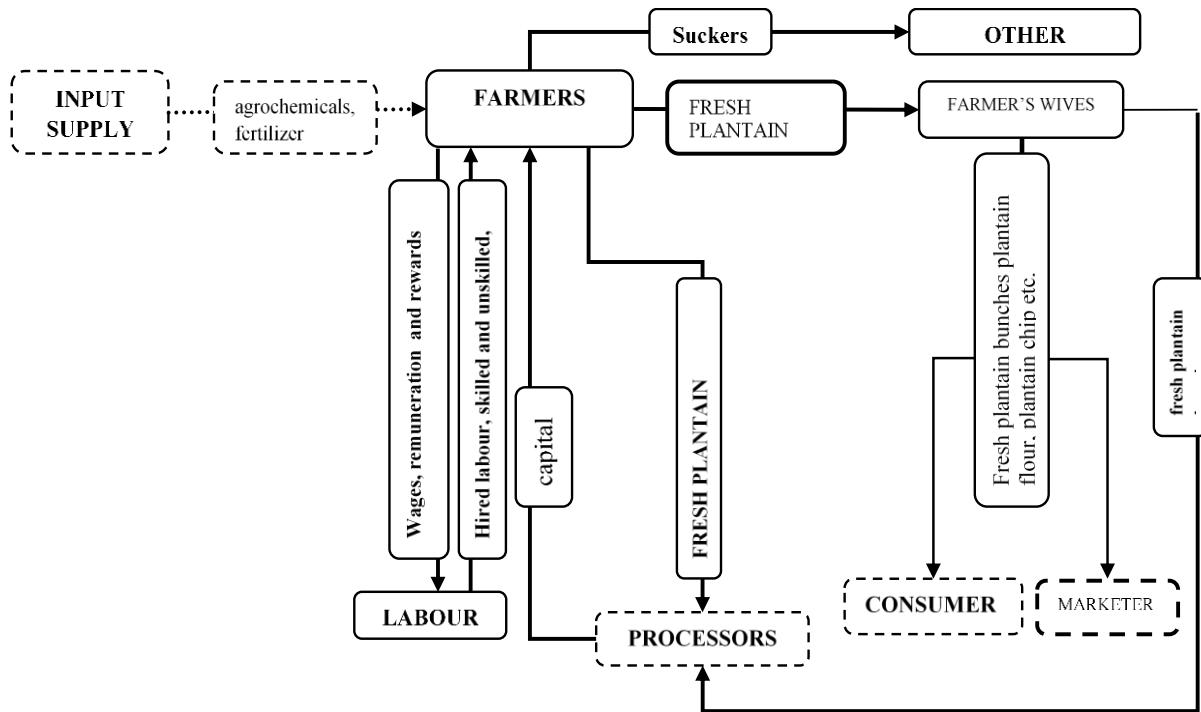


Fig. 3. Value chain showing activities in the farmer's segment of the plantain value chain

Processing Segment

Processors were involved majorly in adding form value to plantain by transforming it into various products. Majority of these processors (80.0%) were fried plantain chips processors. This was because plantain chips is a major snack consumed and there was high demand for it. Small scale processors of plantain processed between $1\frac{1}{2}$ to 4 (four) bunches every day. Processing was often manual and plantain was sourced from their own farm, neighbouring farms or from neighbourhood markets. Other sources of income for small scale processors were farming and sale of provisions. Seasonality in plantain supply and the consequent rise in price during the off season had great impact on several small scale processors survival and their stay in the value chain. Large scale processors of plantain chips processed between 40 to 50 bunches of plantain every day. They visited local produce markets or made arrangement with farmers such that they harvested on the days they had been pre-informed of their coming to purchase plantain. Plantain chips made by large scale processors

was often sliced in round flat or diced, fried at designated factories, and packaged in 80g packets or packaged in a bigger pack of four dozens of 80 g each. It was then distributed by the processors (to various parts of the state or by various other distributors) or wholesalers (to markets and supermarkets). Peeling of plantain was manual with hired labour while frying and packaging was partly manual and industrial.

Small scale processing of plantain into dried chips and subsequently plantain flour was done by consumers and farmers, either for household consumption to avoid waste of unsold harvest. However, the commercial nerve center for large scale industrial processing of plantain into dry chips and subsequent packaging in flour form was the State capital, Akure. Small scale processors of plantain flour processed one or two bunches into flour as the need arose but large scale processors had a daily plant capacity of 45 – 100 bunches of plantain. Plantain flour was packed after processing into 1 and 2 kg bags and delivered to sales outlets. The skilled

labour force of large scale processors ranged from 1 -3 while the unskilled labour could be 4 or more. Seasonality of plantain during the year affected the price of plantain flour as scarcity caused an increase in its price while the rainy season reduced demand such that more effort had to be put into advertisement. Roasted Plantain, popularly known as “*Boli*”, is a common snack made from plantain and consumed all. It is a small scale processing business where an average of 1 – 2 bunches, of varying sizes , was processed every day,

depending on the season. During the dry season (when plantain was scarce, expensive and gave way to roasted corn and yam respectively at the onset of their seasons), price of roasted plantain increased for some processors, while for others the business stopped. Size of labour force at most was two (processor and a family member to help) and the business was often accompanied with the sale of fried groundnut, which a common accompaniment for roasted plantain.

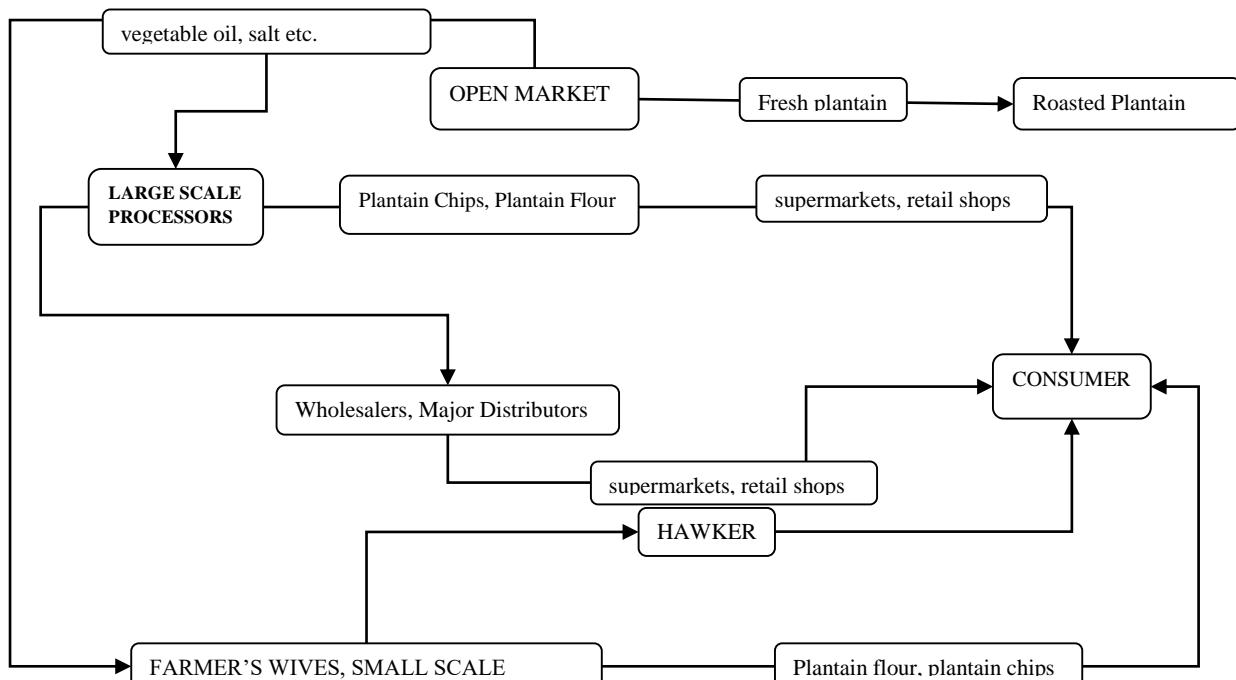


Fig 4. Processor's segment of the plantain value chain.

Marketing Segment

Fifty five (55) per cent of the marketers interviewed were retailers of plantain and its products. There was high concentration of marketers as the product moved from the processor to the final consumers. Wholesalers and major distributors of fresh plantain got their supply directly from the farmers or from produce markets on various market days while wholesalers or major distributors of plantain chips and flour got their supply directly from the processors. Wholesalers of fresh plantain sold in dozens of bunches while the retailers or the roadside marketers who served as the final link to the consumer sold in bunches or in group of disjointed sticks of plantain which sold for ₦100 and ₦ 200. About sixty three

(62.5) per cent of the marketers interviewed sold fresh plantain. This high percentage might have been due to the fact that fresh plantain was readily available much more than any other product and required no huge capital base compared to processing or because it could be sold in its ripe and unripe form as desired by the consumers. In produce markets, plantain chips (dried) and plantain flour was often sold alongside fresh plantain as wholesalers and retailers sought to avoid loss from incomplete sale of produce.

The use of family labour was not common in marketing of plantain and its products as only 30.0% used family labour at all. Often marketers of plantain and its products hired labour they needed. The use of family labour

was common with road side marketers, who are small scale producers and marketers of plantain chips and roasted plantain. Fifty (50) percent of marketers preferred to purchase the fresh plantain and plantain flour they sold from the produce markets and from farm settlements so as to take advantage of the lower price and thus a higher profit margin. This was only possible for retailers and roadside marketers who had enough capital base in the business. Road side marketers and retailer who could not afford to get fresh plantain from produce markets and farm settlements opted for wholesalers in the neighbourhood markets. These made less margin than other marketers. Marketers of plantain chips (fried) and “*Dodo*”

also preferred to buy directly from processors, as this increased their profit margin. Most (85%) marketers sold within the state, especially within their towns and local government areas. Only wholesalers and major distributors marketed across states of the nation such as Rivers, Kwara and the Federal Capital Territory.

The distribution of marketers according to the frequency of marketing showed that 61.0% of respondents marketed every day. This was because in urban areas, there were more markets that operated daily than in rural areas where marketing was done every five days.

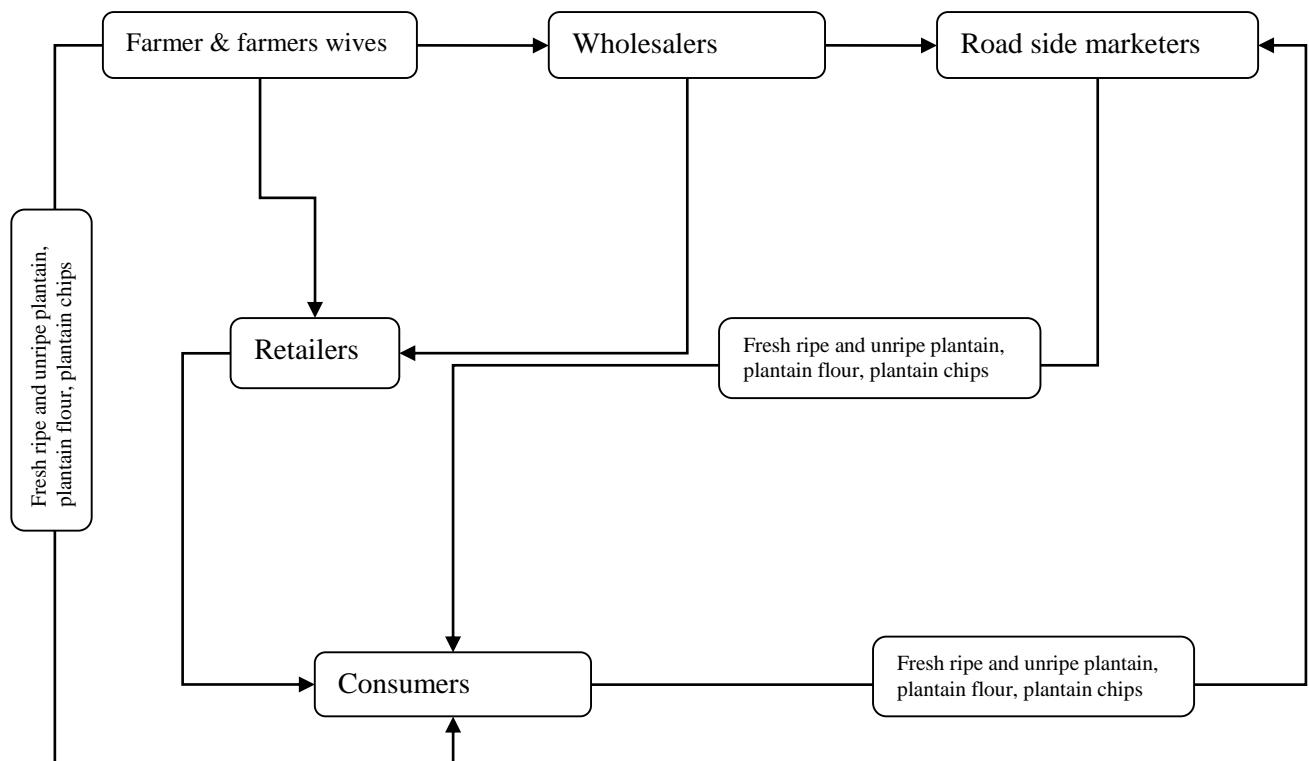


Fig. 5. Value chain diagram showing the marketing segment of the overall plantain value chain

Most retailers of plantain marketed six days in a week or every day of the week. Peak and off peak seasons existed for all marketers of plantain and its products. However, the timing and effect varied for each product. Fresh plantain and plantain flour marketers experienced off season during the dry season and at the onset of the rainy season. This led to an increase in price and scarcity of the product.

On season occurred when the rainy season had set out well. There was often a glut in the supply of fresh plantain and a reduction in the price of plantain flour. Plantain chips marketers often did not feel the effect of this change in season. Rather, proximity to higher institutions brought about seasonality in sales for plantain chips marketers. Several other factors that caused seasonality in the sale of

plantain and its products were the advent of maize and yam season and muslim fasting season.

Tax was often paid daily, monthly or yearly and most of the respondents interviewed belonged to trade unions to which they also

paid dues yearly. Most of the fresh plantain and plantain flour sellers also sold other farm produce like fruits and vegetables, pepper, maize etc. while plantain chips sale was usually accompanied with the sale of provisions.

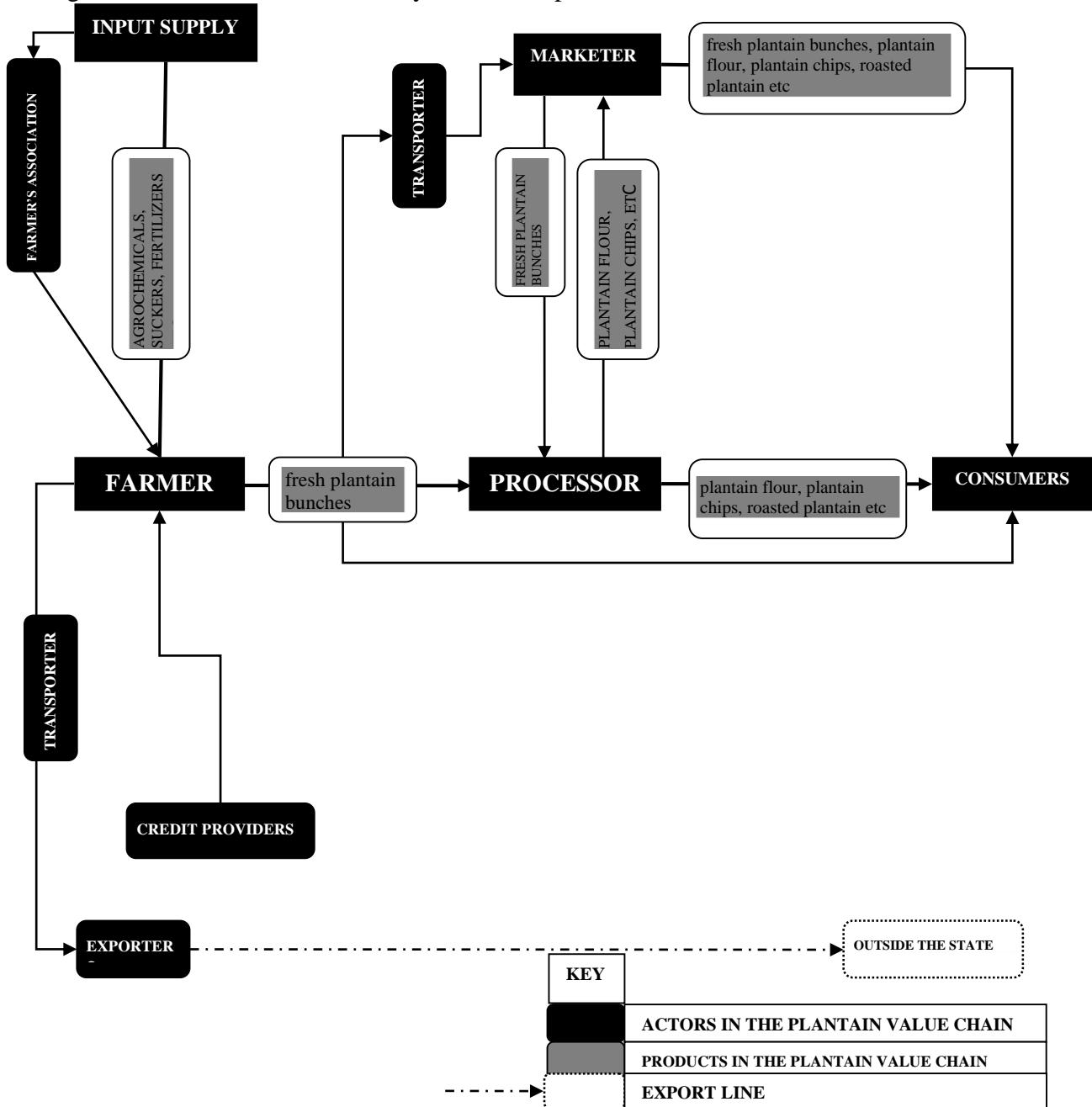


Fig 6. Overall plantain value chain in Ondo Stat

Consumers Segment

Plantain and its products was an important food in most of the families of respondents interviewed, whether male or female. It was also an important snack for students and individuals at all levels of education and

marital status (whether single or married). The frequency of consumption was however different for each individual. Plantain was eaten more often by families in the rural areas as a supplement for yam when yam is scarce. Quantity consumed by respondents

interviewed varied from 5 sticks per month to 4 bunches per month, depending on the family size. Although other varieties were consumed, the AAB group was mostly preferred because of its taste. Most consumers sourced plantain and its products from the market, retail shops and roadside marketers but some also had backyard farms of plantain. Seasonality often affected the demand for plantain because of the increase in price and scarcity that marks the off season.

Other actors in the Plantain value chain

Transporters

Transporters are an important part of the plantain value chain as they were found in each segment of the plantain value chain. They

helped farmers move plantain from their farms to the produce market each market day and also helped collectors of plantain who exported it to other states. Seasonality of plantain affected frequency of plying routes to transport plantain. During the on season some transporters plied their route twice to transport plantain while during the off season they only plied it once.

Cost of transportation also increased during the on season as the quantity transported increased. Appendix figures 10a and 10b shows the various means of transportation used by plantain transporters.

Table 1 shows the functional analysis of all actors in the plantain value chain.

Table 1. Functional analysis of the plantain value chain in Ondo State

S/n	Principal functions	Subdivisions	Agents	Principal products	Utility or value added
1.	Input supply	Distribution and marketing, training of farmers	Agric Input Supply Agency (AISA), Akure, farm centres (govt. owned)	Agrochemicals and fertilizers, simple farm implements such as knapsack sprayer etc. (subsidized)	Place value
		Distribution and marketing	Independent input suppliers and public shops	Agrochemicals and fertilizers, simple farm implements such as knapsack sprayer etc. (un-subsidized)	
		Lease	Equipment dealers, state and local government.	Tractors, ploughs, harrows etc.	
2.	On-farm production	Land preparation	Hired labour or farm machineries like tractors etc.	Plantation, plantain suckers and bunches, sheaths, petioles and leaves	Form value
		Planting	Farmer, hired labour, male members of farmer's household		
		Maintenance / management	Farmers/ hired labour		
		Harvesting	Farmers/ hired labour and family labour (farmer's wives and children)		
3.	Post-harvest handling	Transporting	Transporters, processors, consumers.	Fresh plain bunches, either delivered to processors, consumers or marketers	Time, price and place value
		Marketing	Wholesalers, retailers, roadside marketers, farmers' wives		
		Exporting	Exporters / major distributors		
4.	Product transformation	Processing	Plantain flour and chips processors (both industrial and small scale processors), consumers, farmers' wives, small scale eatery, road side marketers	Plantain flour, plantain chips, boiled plantain, plantain porridge, "ekuru", roasted plantain	Form value
5.	Product trading	Transportation	Wholesalers, retailers, major distributors, retail outlets and supermarkets, hawkers	Plantain flour, plantain chips, boiled plantain, plantain porridge, "ekuru", roasted plantain	Time, price and place value
		Marketing			

"Exporters" (Inter – State Marketers)

Plantain, as earlier said, was exported to other states of the federation by exporters who come from these other states, after making previous arrangement with the various farmers. They made use of transporters to gather the plantain from various farms where they meet the

farmers and buy the plantain stock that they may have. In Ore and Akure, there are plantain depots where these exporters gathered the plantain they have collected in heaps and got for either a bus or 9 11 truck to carry them to their destination. Each heap of plantain

contained 18 – 22 dozens of plantain bunches. Exporters also paid tax depending on the load. Farmers who had the means also exported plantain to other states to sell. Exporters came from Lagos, Delta, Abuja, Kwara, Edo, Oyo etc.

Credit Providers

Credit providers are formal institutions who offered credit to every segment of the plantain value chain. Credit institutions were not active in the plantain value chain. This was due to the risky nature of farming in general and plantain farming in particular. This might also be due thenlack of collateral and small business holdings. The only source of credit identified in one of the 6 local governments where respondents were interviewed was a revolving loan given to farmers by the Agric Development Bank (an international bank), through the government at 9% per annum.

Farmer's Association

Farmer's association existed only in one (1) e local governments. They met twice in a month and served as a medium to interact with and train farmers on good agronomic practices. No attention was given to plantain farmers in terms of their training needs.

Cooperative Societies

Cooperative societies that provide farmer's credit needs also existed sparingly. Difficulty in accessing credit made most farmers not to patronize them.

CONCLUSIONS

This paper examined the plantain value chain in Ondo State, Nigeria. Primary and secondary data were collected using a multistage sampling technique. Functional analysis was done on the data collected. Result from the functional analysis showed that there are eight major actors or segments in the plantain value chain in Ondo State, Nigeria. They are the input suppliers, farmers, processors, marketers, consumers, transporters, cooperative societies and farmers association. In the input supply segment, agrochemicals were either supplied by wholesalers and retailers in the open market at the prevailing market rate or by the State Government through the Agricultural Input

Supply Company, which has its head office in Akure, the State's capital. The latter supplied these inputs at about 40 – 50.0% subsidized price but faced the challenge of inadequate supply due to lack of finance. In the farmer's segment, functional analysis revealed that plantain production is male dominated in Ondo State and most plantain farmers are married. It was concluded that plantain farming is still lowly mechanised and processing has not been fully developed to explore the various value addition options available in this sector. More value can still be added and more upgrading could still be done. More actors can also take advantage of the prevalence of plantain in the state.

Based on the findings of this study, the following recommendations were made:

- (i)The government and private research institutions should pay attention to the training needs of the farmers so as to properly harness the advantage that the state has above others in the production of plantain;
- (ii)Financial institutions and other avenues through which credit can be offered to farmers and small scale processors should be empowered and enlightened;
- (iii)Government and non-governmental organizations should embark upon the commercialization of the processing and marketing segments of the plantain value chain and technological upgrading of the processing segment.

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