



EMPIRICAL REVIEW OF PROBLEMS AND PROSPECTS OF BANANA (*Musa Sapientum* L) AND PLANTAIN (*Musa Paradisiaca* L) PRODUCTION ENTERPRISES

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Abstract

The present study examined the existing cropping systems and identified problems and prospects of banana and plantain production enterprises. Data were collected from a sample size of 180 farm households by means of well structured and pre-tested questionnaire, personal observation and focus group discussion. The data were analyzed using descriptive statistical tools and Likert scale rating technique. The findings showed that mixed cropping system accounted for 65% of the farmers. Major crop mixtures were banana/yam/ vegetable, banana/cassava/ vegetable; plantain/cassava/ vegetable; plantain/ sugarcane/ vegetable among others. Family and hired labour accounted for 56.25% and 43.75% respectively. Major problems of banana and plantain production enterprises among others were disease, maggot/nematode attack; inadequate capital; high cost of input; paddling/trecking long distances to/from farms and effect of climate change. It was recommended that the prospects of banana and plantain production enterprises could be enhanced by the provision of credit/ loan, farm inputs, farm equipment, good rural roads, and improved varieties of suckers as well as ensuring improved farming systems among others by Government, Non-Governmental Organisations (NGOs) and institutions alike through genuine political will.

Keywords: Empirical, Review, Problems and Prospects, Banana and Plantain, Production Enterprises.

Introduction

At the first decade of independence, Nigeria's agriculture contributed nearly 60% of the Gross Domestic Product (GDP) and more than 70% of foreign exchange earnings. The sector provided employment for over 70% of the country's total labour force. More importantly, it provided food for the country's teeming population (NISER, 2000). Notwithstanding, Nigeria became a net importer of food and dependent on imported agricultural raw materials for her industrial sector due to dwindling agriculture in 1970s when crude oil became a major export earner (NISER, 2000). Plantain and banana are among the most important staple food crops in the humid forest zone of west and central Africa due to the crop contribution to food security, employment, Gross National Product and diversification of income sources in rural and urban areas (Nkendah and Akyeampong, 2003; Faturoti, Madukwe, Tenkouano and Agwu, 2007). FAO, (2004) stated that banana is the world's second most important fruit crop after oil palm. Nigeria was ranked fifth of the eight highest world plantain producers and not among the first ten world producers of banana despite the conducive weather and resources for the crop. Comparatively, while banana is presently of higher importance in terms of world trade, plantains are rarely exported but are used locally in various forms by humans (Faturoti *et al*, 2007; Babatunde, 1991). One major limitation identified in plantain and banana production is the fact that a vast majority of producers world-wide are small scale farmers growing the crops either for home consumption or for local markets (Babatunde, 1991a; Faturoti *et al*, 2007). According to Allison-Oguru, Zuofa and Berepubo (1999), rapid population growth which has increased pressure on land, have reduced fallow periods in the predominant bush fallow farming system. In this system an area is cultivated for 1 – 2 years and then abandoned for 4-10 years to enable the forest regenerate. But fallow period has been reduced to 2 – 3 years, thereby declining soil fertility and productivity.

Agricultural lands have been reduced owing to increased oil and gas exploration and exploitation activities in the study area (Rivers State Government, 1994). Studies in plantain and banana production have also shown that land under plantain production in Nigeria over ten years period 1996 – 2005 increased by 24.6%, while a yield reduction of 21.8% was recorded during the same period (FAO, 2005). Yield of plantain will reduce drastically as the chances of increased land is very remote as a result of increased population growth and higher rates of urbanization (Faturoti *et al*, 2007). Based on available records of plantain production in Nigeria in almost the last two decades (1990 – 2009), it is very obvious that the yield per hectare in plantain production took a down-ward trend for almost a decade (Table 1). The trend of plantain production in Nigeria between 1990 and 2009 showed that the yield per hectare has consistently made a down ward move from 7.54 tonnes per hectare in 1992 to 4.94 tonnes per hectare in 1999; then 5.10 tonnes in 2000 to 4.90 tonnes in 2001 and 6.31 tonnes in 2007 to 5.90 tonnes in 2008. Conversely, an unsustainable increase in the area cultivated / harvested steadily rose from 162,000 hectares in 1990 to 481,000 hectares in 2009. However, increase in price per tonne rose from N5, 300 in 1991 to N116, 597 in 2008 (Table 1).

In Nigeria, the main plantain and banana producing states are the South-eastern States (Onuh, Ohazurike and Ogbuehi, 2008). Globally, South American and Asian countries, notably Brazil, Columbia, Ecuador, India, the Philippines, China and Indonesia are the World leading producers of bananas, most of which are exported to the developed world. North and Central America and Africa are the other leading producers of bananas. In Africa, Cameroon, Kenya, Cote d'Ivoire, Tanzania and Uganda are the leading producers of bananas. Africa leads all other

regions in the production of plantains, with Cameroon, Nigeria, Rwanda, Tanzania, Uganda and Zaire being the main producing countries, while South America (Colombia, Ecuador) and North and Central America (Costa Rica, Honduras, Mexico, Panama) are the other main producers (Babatunde, 1991; Afro news, 2003). According to IITA (1996) West and Central Africa produce about 60% of the world's plantains. The varieties in the area include the French plantain (many hands but small fingers); French horn (large fingers) false horn (large fingers) and horn plantain (few hands, few but large fingers) (IITA, 1990). A wide range of local varieties are still being cultivated by farmers throughout Africa and Asia (Afro News, 2003). According to Frison and Sharrock (1999), producing areas in the globe have experienced pest and disease pressures which have increased considerably in recent years and a number of important pathogens are causing severe yield losses by 30% – 50%. Black Sigatoka (a leaf spot plantain/banana disease identified in the early 1980s) was considered to be the most serious constraint to plantain and banana production globally. Small-scale plantain production has been reduced by 40% as a result of the disease as farmers are unable to afford the high cost of fungicides needed to control black sigatoka. High cost of the fruits is also attributed to the effects of sigatoka, which has turned the crops into delicacies even in the urban areas of neighbouring states such as Imo State as a result of reduced production (Onuh *et al.*, 2008). The objective of this study was to empirically review the existing cropping systems; problems and prospects of banana and plantain production enterprises.

Research Methodology

The Study Area

The study area was Bayelsa State in south-south Nigeria, which is situated between latitude 04⁰15" N to 05⁰23" N and longitude 05⁰22" E to 06⁰45" E. The state covers an area of about 21,110 square kilometers, out of which more than three-quarter is occupied by water, with moderately low land (BYSG, 2008). By the 2006 census (NPC, 2006), the state had a population of 1,703,358 people spread over the land area most of which is wetland. Bayelsa State has a humid semi-hot equatorial climate based on the Koppen's system of climate classification. Mean annual rainfall ranges from 2,000 to 4,000mm, with a maximum temperature of 30⁰C (Oyegun, 1999).

Sampling Technique and Data Analysis

The period of data collection was 2009 to 2010 cropping seasons. A three stage sampling technique was used in drawing the sample for this study. The first stage involved purposive selection of four (4) of the eight (8) local government areas (LGAs) in Bayelsa State on the basis of predominance of farming activities. The LGAs so selected were Southern Ijaw, Yenagoa, Sagbama and Ogbia. In each of these LGAs so selected, nine (9) villages were randomly selected from a list of villages in the LGA. In each village sampled, five (5) farm households who engaged in banana and plantain based farm enterprises were randomly selected and studied. This gave a sample size of 180 farm households. The data for this study was analysed using descriptive statistical tools and likert scale.

Likert Scale Rating Technique

Four- point Likert scale is an even number scale, which normally force a choice on the respondents since there is no mid-point to make the respondent indifferent (Wikipedia Likert scale, 2012; The Market Universe, 2012). Likert scale rating of a four- point rating was used in this work to measure the severity of problems facing banana and plantain production enterprises in the area. The ranking was in this order: very serious = 4; serious = 3; less serious = 2; and not serious = 1. While the level of desire of factors that would enhance the projects in banana and plantain production enterprises were ranked in this order: Very strong = 4; strong = 3; moderate = 2; not strong = 1. Both ranking were based on weighted mean (\bar{x}). The mean score of the respondents based on the four-point scale was $4+3+2+1=10/4=2.50$ (The set criterion). Any mean value above 2.50 indicated a very strong tool while any mean value below 2.50 was considered as not a strong tool. An interval scale of 0.05 was used; and an upper limit cut-off point was $2.50+0.05=2.55$. The lower limit was $2.50 - 0.05=2.45$. Based on the limit, any mean score below 2.45 ($MS < 2.45$) was taken as "not serious" or "not strong"; those between 2.45 and 2.55 ($2.45 \leq MS \leq 2.55$) were considered either "serious" or "less serious" and "strong" or "moderate"; while any mean score greater than 2.55 ($MS > 2.55$) was considered "very serious" or "very strong".

Results and Discussion

Existing cropping systems and pattern in banana and plantain production

The findings showed that mixed cropping is the predominant cropping system practiced in the area accounting for as much as 65% of the farmers surveyed. About 117 representing 65% of the farmers prefer to practice mixed cropping, while 41 representing 22.8% prefer to cultivate banana and plantain as sole crop respectively. On the other hand, 22 representing 12.2% practiced both sole and mixed cropping system. The crop mixtures in the area showed that plantain is a major base, second to none. The major banana based crop mixtures include banana/yam/ vegetable, banana/cassava/ vegetable among others while plantain based crop mixtures include plantain/cassava/vegetable; plantain/sugarcane/vegetable among others. The banana based mixtures include banana/yam/vegetable (17.2%); banana /cassava/vegetable (12.2%); banana/sugarcane/vegetable (10.6%); banana/cassava /cocoyam (5.6%) and banana/cocoyam/vegetable (3.3%) in that order according to predominance. While plantain based mixtures include plantain/ cassava/vegetable (37.2%); plantain/sugarcane/vegetable (20%); plantain/yam/vegetable (17.2%); plantain/cocoyam/vegetable (11.7%); plantain/cassava/cocoyam (7.8%); and plantain/banana (7.8%) in that order according to predominance. Though, utmost traditional and Socio-cultural value is attached to plantain than banana, sole cropping was associated more with banana production in the study area. Furthermore, the crop mixtures in the area showed that plantain is the major crop component. This is in agreement with the finding of Beets (1982), Allison-Oguru *et al* (1999), who said plantain is a major crop in Sub-Saharan Africa. The commencement of cropping activities in the study area was influenced by two major factors. They are the annual flood and location of farm. For instance, land

preparation and planting take place on farms soon after the flood recedes in November to December. Though plantain and banana are perennial crops, the idea is to ensure that crops were planted and harvested before the succeeding flood season. Moreover, most cultivable land in the study area is low with high water table. On the dry land or areas with low water table, farming activities could start in January to March, whereby crop harvest is not necessarily subject to the annual flood season. Hence, dry land areas were sought for banana and plantain production. But such areas are highly constrained in terms of land availability for banana and plantain cultivation in the study area. Figure 1 shows period of cropping activities. For instance Land preparation was carried out either in January, February or March or in November to December. Planting was carried out in March to April or in November to December or in January. While weeding and slashing was carried out in May to June or in August or January to February. Harvesting and marketing of plantain and banana was carried out anytime of the year from January to December. While the application of external inputs such as fertilizer was not a common practice mainly due to non-availability of the product. For instance, only 4 farmers used fertilizer and chemicals which were loaned by Shell Petroleum Development Company. Deliberate use of organic manure was also not common. However, the marketing of the banana and plantain products at the farm gate shows that they are costly at peak period between March and April, considered as off season period. While between August and September the products become cheaper. The findings on cropping calendar was in agreement with Allison-Oguru, (2004) whose earlier findings showed, slashing/ harvesting/ marketing in January to February; land preparation/ planting/ harvesting/ marketing in March to July; weeding/ staking/ harvesting/ marketing in August to November; and harvesting/ marketing in December.

Labour Supply and utilization

The study identified hired labour and family labour as the two major types of labour inputs. Hired labour was paid for, while family labour was assumed to be the efforts contributed by the family members to the financial and subsistence needs of the household. The labour used for farm operations in the production of banana and plantain was presented as follows (Table 2). Family labour was observed to be the major source accounting for as much as 56.25% of labour requirements on the farm enterprises surveyed. This was followed by hired labour which accounts for the remaining 43.75%.

In banana production, the total family labour used was higher than the hired labour used. Family labour accounted for 80 mandays while hired labour accounted for 64 mandays per hectare (Table 2). The total amount of labour from both family and hired labour was 144 mandays per hectare. Land preparation, planting, weeding/slashing and harvesting operations were of equal proportion of the total labour used for both types of labour. They each accounted for 16 mandays respectively. While only family labour accounted for 16 mandays for sorting and grading operations. In plantain production, the total family labour used was higher than the hired labour used. Family and hired labour accounted for 208 and 160 mandays respectively (Table 2). Thus a total of 368 mandays for both types of labour was used. A breakdown showed that Land preparation, weeding/slashing, planting, harvesting and sorting/ grading accounted for 112, 96, 80, 64 and 16 mandays respectively. Furthermore, land preparation by family labour and hired labour accounted for 48 and 64 mandays respectively; planting operation by family labour and hired labour accounted for 48 and 32 mandays respectively; weeding/slashing operation was of equal status of 48 mandays each by both types of labour. Harvesting operation by family labour and hired labour accounted for 48 and 16 mandays respectively; while sorting/grading by family labour accounted for 16 mandays (Table 2) In relation to the availability of labour in the study area, the gender of the farmers showed that 84 representing 46.7% were males while 96 representing 53.3% were females. Further analysis of labour utilization on banana and plantain production showed that women were associated more with these enterprises (Table 3). The result showed that land preparation was more of male activity while planting and weeding/slashing and harvesting were both male and female activities (Table 4).

Distribution of crop yield and farm gate price of banana and plantain

The distribution of farm produce by the banana and plantain farmers for various uses was determined and is presented in Table 5. The distribution showed that a total of 87% of the yield from banana production was sold out by farmers, while 11% of the produce was consumed. The distribution also shows that 2% of the yield in banana production was given out as gift to friends and extended family members. Similarly, the Table showed that 87% of the plantain produced was sold, while 10% was consumed and 3% given to friends and extended family members. The average weight of banana and plantain bunch was estimated at 12kg and 14kg respectively. While the average farm gate price of banana and plantain was estimated at ₦98, 982.08 and ₦94, 923.88 respectively per tonne. Plantain being a perennial crop, farmers reiterated that its output could increase up to the 3rd year and 4th year due to increased regeneration with time and maintenance. In some seasons output could increase up to the sixth year before declining.

Problems of banana and plantain production enterprises

Farmers encountered numerous problems in the course of banana and plantain production. Likert scale rating of a four- point rating was used to measure the severity of problems facing banana and plantain production enterprises. The major problems among others in order of severity include (Table 6): Disease, Maggot/nematode attack; Inadequate Capital; High cost of input (such as labour, canoe and suckers); Paddling/Treking long distances to/from farm; Climate change resulting to high rains, high heat, absence of August beak leading to low yield; High rate of stealing/theft; Bee and snake attack; and Lack of and high cost of improved varieties/suckers. Others were Heavy storms; High transport cost as a result of bad roads; Rough River due to navigation by speed boats; Inadequate extension services; and Lack of functional markets. The most severe problems such as disease, maggot/nematode attack, high cost of inputs and lack of improved varieties of suckers agrees with Frison and Sharrock (1999) who reported that plantain and banana producing areas in the globe have experienced pests and disease pressures even in recent years which have caused severe yield losses by 30% to 50% including high cost of chemicals and lack of improved varieties of suckers. The findings also agree

with Nwaiwu, Eze, Amaechi and Osuagwu, (2012) who reported that the major problems in plantain and banana production were frequent and long period of drought, marketing challenges, lack of storage facilities, incidence of pests and disease and problem of wind storm.

Prospects of banana and plantain production enterprises

Banana and plantain production enterprises have great prospects. These prospects could be in the area of job creation and employment generation; contributions to national income and gross domestic product (GDP); wealth creation; poverty alleviation; economic and industrial growth; others are rural development; market stabilization and sustainable agricultural returns. The foregoing areas are imminent particularly in sub-saharan Africa. Results on factors that would enhance the prospects in banana and plantain production indicate that provision of credit/loan representing 76.1%; provision of farm inputs such as fertilizers, insecticides, pesticides, nematocides, etc representing 62.8%; provision of farm equipment representing 31.7%; provision of good motorable rural roads representing 26.1%; Access to extension services representing 22.2% and provision of improved varieties of suckers representing 20.6% were among others of utmost importance (Table 7. It therefore means that, if the foregoing factors are provided in adequate terms by government, Non-Governmental Organizations (NGOs), and stakeholders alike, the prospects in banana and plantain can be enhanced, consequently, outputs and profits will be increased in the study area. Other factors that would enhance prospects include: Provision of good and functional markets representing 8.3%; provision of engine boats representing 10% mainly at the riverine communities; reduction of input cost representing 9.4% and availability of flood free zones representing 6.1% for the cultivation of banana and plantain (Table 7).

Conclusion and Recommendations

The study showed that major problems among others in order of severity were disease, maggot/nematode attack; inadequate capital; high cost of input; paddling/trecking long distances to/from farms and effect of climate change. However, the factors that could enhance banana and plantain production towards agricultural transformation is not far fetched. They include provision of credit/loan; provision of farm inputs; provision of farm equipment; provision of good motorable rural roads; ensuring access to extension services; provision of improved varieties of suckers among others. In view of the foregoing, government, non-governmental organisations (NGOs), research institutes, commercial banks and other relevant financial agencies through genuine political will should encourage indigenous investors with the view to enable them increase production.

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Annexure

Table 1: Production Figures for Plantain in Nigeria (1990 – 2009)

Year	Qty Produced ('000 tonnes)	Yield/ hectare (tonnes)	Producer Price per tonne (₦)	Area harvested ('000 hectares)
1990	1,215	7.50	-	162
1991	1,339	7.52	5,300	178
1992	1,417	7.54	7,765	188
1993	1,623	7.06	12,261	230
1994	1,665	6.77	17,998	246
1995	1,632	6.53	30,916	250
1996	1,687	6.59	40,554	256
1997	1,744	6.71	43,886	260
1998	1,803	6.73	46,647	268
1999	1,902	4.94	45,898	385
2000	1,969	5.10	38,249	386
2001	1,999	4.90	49,590	408
2002	2,127	4.99	57,280	426
2003	2,263	5.20	65,535	435
2004	2,421	5.50	75,631	440
2005	2,591	5.80	87,874	447
2006	2,785	6.09	94,842	457
2007	2,991	6.31	101,924	474
2008	2,727	5.90	116,597	462
2009	2,910.68	6.05	-	481

Source: FAO, 2011.

Table 2 Labour used for farm operations

Farm Operation	Banana (Per ha)			Plantain (Per ha)		
	Total	Family labour (manday)	Hired labour (manday)	Total	Family labour (manday)	Hired labour (manday)
Land preparation	32	16	16	112	48	64
Planting	32	16	16	80	48	32
Weeding/Slashing	32	16	16	96	48	48
Fertilizer use	0	0	0	0	0	0
Insecticides/herbicides	0	0	0	0	0	0
Harvesting	32	16	16	64	48	16
Sorting/grading	16	16	0	16	16	0
Total	144	80	64	368	208	160

Source: Field Survey Data, 2009/2010.

Table 3 Labour availability according to gender

Gender	Frequency	% Frequency
Male	84	46.7
Female	96	53.3
Total	180	100.0

Source: Field Survey Data, 2009/2010

Table 4 Labour available to various activities according to gender

Activity	Male		Female	
	Freq	% Freq	Freq	% Freq
Land preparation	107	60.6	71	39.4
Planting	87	48.3	93	51.7
Weeding/slashing	91	50.6	89	49.4
Harvesting	88	48.9	92	51.1

*multiple responses

Source: Field Survey Data, 2009/2010

Table 5 Distribution of farm produce and farm gate price

Type of Product	Qty Sold Ton/Year	Qty Consumed Ton/Year	Qty Given out as gift Ton/Year	Total Output Ton/Year	Farm gate Unit Price/Ton (₦)
Banana	87%	11%	2%	4ton/ha	98,982.08
Plantain	87%	10%	3%	6ton/ha	94,923.88

Source : Field Survey Data , 2009/2010

Table 6 Problems of banana and plantain production enterprise.

Problems	Frequency	% Frequency	\bar{X}	Decision
Inadequate Capital	58	32.2	4.00	VS
High rate of stealing/theft	46	25.6	3.40	VS
Lack of and high cost of Improved varieties/suckers	25	13.9	3.10	VS
Inadequate extension services	12	6.7	2.60	VS
High cost of inputs	56	31.1	3.80	VS
Heavy storms	19	10.6	2.90	VS
Climate change	50	27.8	3.80	VS
Illiteracy	5	2.8	2.30	VS
High Transport cost	16	8.9	2.80	VS
Bee and Snake attack	39	21.7	3.20	VS
Disease, Maggot/nematode attack	59	32.8	4.00	VS
Lack of functional market	9	5.0	3.00	VS
Paddling/trecking long distances to and from farm	56	31.1	3.80	VS
Rough river due to navigation	13	7.2	2.65	VS
Erosion	5	2.8	2.54	VS
Water logging/flooding	8	4.4	2.55	VS
Inadequate land	8	4.4	2.50	VS
Land fragmentation	3	1.7	2.40	VS
Price fluctuation	2	1.1	2.20	VS
High cost of land/Rent	2	1.1	2.20	VS

* Multiple Responses VS= Very Serious, NS= Not Serious

Source: Field Survey Data, 2009/2010.

Table 7 Factors that Enhance prospects in Banana and Plantain Production

Factors	Frequency	% Frequency	\bar{X}	Decision
Provision of credit/loan	137	76.1	4.00	VS
Provision of farm inputs	113	62.8	4.00	VS
Provision of farm equipment	57	31.7	3.95	VS
Better Extension Service	40	22.2	3.90	VS
Provision of Improved varieties of suckers	37	20.6	3.80	VS
Provision of good motorable rural Roads	48	26.1	3.90	VS
Provision of good and functional markets	15	8.3	2.55	VS
Provision of Engine boats	18	10.0	2.60	VS
Provision of storage equipment	1	0.6	2.40	VS
Reduction of input cost	17	9.4	2.55	VS
Availability of flood free zones	11	6.1	2.50	VS

* Multiple Responses VS= Very Strong, NS= Not Strong

Source: Field Survey Data, 2009/2010.

Cropping Activity	Jan.	Feb.	March	Apr.	May	Jun	July	Aug.	Sept	Oct	Nov.	Dec
Land preparation												
Planting												
Weeding/ Slashing												

Figure 1 Cropping Calendar of Banana and Plantain in Bayelsa State.

Source: Field Survey Data, 2009/2010.