

Research Paper

Analyses of Farmers' Level of Awareness of Improved Rubber Technologies in Edo State, Nigeria

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Agriculture is the largest employer of labour in Nigeria. It also contributes more than 30% to the total annual Gross Domestic Product. Nigeria used to be the leading rubber producer in Africa in the 1960s, but has been overtaken by countries like Cote d'Ivoire, Republic of Congo, Cameroon and Liberia. Some of the reasons for low productivity include lack/poor awareness of value addition, poor participation of the youths, use of low yielding planting materials, and low competitive character of the rubber industry in an economy dominated by oil and gas. Rubber Research Institute of Nigeria has developed rubber technologies among which are improved rubber clones (NIG. 800 series), recommended rubber spacing, intercropping under immature rubber plantations, tapping techniques, integrated mini-livestock farming under matured rubber plantations, rubber quality improvement practices, pest and disease control techniques, soil and agronomic practices. The study therefore analyzed the level of farmers' awareness of these technologies among farmers

in Edo State in order to determine what could have led to the low productivity of rubber in the recent times. The results of the analysis show that the mean age of the respondents was 52 years, dominated by male (96.6%). Most of them had no formal education (47.5%), School certificate (42.5%), OND and NCE (7.8%) while HND and Degree (2.3%). The Bi-annual extension visit had the highest score (40.2%), and awareness of Rubber Research Institute of Nigeria (RRIN) Technologies was high with the exception of 'rubber quality improvement' (17.9%), 'soil and agronomic practices' (24.6%) and 'the use of latex meter technology' (29.1%). The study recommended that farmers should be cooperatives, as it had a significant influence on awareness of new technologies and also to assess institutional credit especially from micro-finance banks.

Key words: Awareness, farmers, improved technologies, Rubber.

INTRODUCTION

Agricultural sector is the largest employer of labour in Nigeria and it serves as a source of income for majority of the population (Central Bank of Nigeria, 2003, Onucheyo, 2005). It contributes more than 30% to the total annual Gross Domestic Product and accounts for over 70% of Nigerian non-oil export (Adeboye, 2004). However, agricultural production in the past three decades has drastically declined as is evidenced by the low standard of living of these small-scale farmers (Dongon-dayi, 2005). The advent of crude oil in the early 70's caused a

sharp diversion of government attention from agriculture to petroleum, due to the huge amount of revenue generated by crude oil exploration and exportation (Ewuziem *et al.*, 2010). This led to a rapid decline in government revenue from agriculture. According to Daramola *et al.* (2007), the percentage of agricultural total exports between 1970-1974, fell from about 43% to slightly over 7%. From mid-1970s to 1980, the average annual growth of agricultural exports declined by 17%; and by 1996, agriculture accounted for only 2% of exports

(Daramola *et al.* 2007). In terms of foreign exchange, the sector contributed an average of 5.3% annually between 1971-1985 and less than 4% from 1980- 2001 (Central Bank of Nigeria, 2003).

According to Omonoma *et al.* (2007), the high revenue from oil exports coupled with the implicit taxation of agricultural export commodities by the government and the restrictive agricultural price policies that shifted the terms of trade against the agricultural sector were responsible for the dismal performance of the agricultural export sub-sector. For instance, Nigeria which used to be the highest rubber producer in Africa during the 1960s, has since been overtaken by other countries like Cote d'Ivoire, Republic of Congo, Cameroon and Liberia (Umar *et al.*, 2011). According to Mokwunye and Omokhafa (2007), some of the reasons given for low productivity include lack/poor awareness of value addition, poor participation of the youths, use of low yielding planting materials, and low competitive character of the rubber industry in an economy dominated by oil and gas.

Nigeria has 247,100 hectares of land under rubber cultivation, majority of which are owned by small-scale farmers (Aigbekaen *et al.*, 2000; International Rubber Research Development Board, 2006). Edo and Delta States have the largest area of small holder farms while Cross River has the largest size of rubber estates in Nigeria (Aigbekaen *et al.*, 2000). According to FAO (2013), the current production of natural rubber stands as follows; 143,500 mt as at 2011, 143,500 mt as at 2012 and 143,600 mt as at 2013.

Rubber Research Institute of Nigeria has developed rubber technologies among which improved rubber clones (NIG. 800 series), recommended rubber spacing, intercropping under immature rubber plantations, tapping techniques, integrated mini-livestock farming under matured rubber plantations, rubber quality improvement practices, pest and diseases control techniques, soil and agronomic practices. The study therefore analyzed the level of farmers' awareness of these technologies in Edo State in order to determine on their socioeconomic status.

METHODOLOGY

The study was conducted in Edo State of Nigeria, located in the South-South geo-political zone of the country. The area is predominantly made up of rain forest and the mangrove swamp. The total land area of the state is 17,902 km² (NPC, 2006), with food and tree crops such as cassava, yam, maize, plantain, oil palm, cocoa and rubber predominantly cultivated. Edo State lies between latitude 50 44" and 70 34" N of the equator and longitude 50 04" and 60 43" E of the Greenwich Meridian. The State shares boundary with kogi State in the South, Delta, in the west with Ondo State and in the East by kogi and Anambra State. Edo State covers

a land area of about 17,902 km² with a population of 2,159,848 (NPC, 2006). The State is divided into eighteen Local Government Areas. Edo State is characterized by a tropical climate which ranges from humid to sub humid at different parts of the year. Three major distinct vegetations identified in the state include, mangrove forest, fresh swamp and savannah. In the Northern parts of the state, a mean annual rainfall of between 127 to 152 cm has been recorded while the southern part receives about 252 to 254 cm respectively. The mean temperature in the state ranges from a minimum of 24°C to a maximum of 33°C. Most of the people in state are farmers, growing varieties of crop such as cassava, rice, yam, pineapple, plantain and tree crops such rubber, oil palm and cocoa.

Sampling procedure

A multi-stage sampling technique comprised of both purposive and random sampling was used in the data collection. Five Local Government Areas (LGAs) each in Edo State in which rubber production is dominant were purposively sampled for the study. The LGAs are shown in Table 1. Three communities were purposively selected from each of the five Local Government Areas based on number of registered small scale rubber farmers in these communities. The communities are shown in Table 1. Small scale rubber farmers from each of the community were proportionately and randomly selected from the total registered rubber farmers in the communities. This was made possible from the Tree Crop Unit of the Ministry of Agriculture of Edo State, Rubber Research Institute of Nigeria (RRIN) and Rubber Farmers Association of Nigeria (RUFAN) in Edo State. Thus, the total sample size of registered small scale rubber farmers used for the study was one hundred and seventy nine (179).

Table 1. Number of communities and respondents used.

Local Gov. Area	Communities to be sampled	Respondents
Ikpoba Okha	Obayantor,	10
	Obagienevbosa	14
	Iyanomo	8
Ovia North East	Iyowa	16
	Odighi	11
	Okokpon	13
Ovia South West	Iguoriakhi	9
	Iguelaihor	15
	Udo	7
Urhumwonde	Ugha	17
	Errua	6
	Okeze	18
Orhiomwon	Sapkonba	13
	Ugo	11
	Evbuobemwen	10
Total	15	179

Data Collection

Structured questionnaire and interview schedule were used for the data collection. The questionnaire schedule was divided into two sections: demographic and non-demographic sections. The questionnaire consists of questions eliciting information about the respondent's age, sex, occupation, religion marital status, household size, farm size (hectare) level of education, non-farm occupation, respondent's economic activities, income, living standards, access to credit, access to agricultural or production information such as rubber technology awareness and adoption levels and constraints.

Data Analysis

Descriptive statistics was used to analyze the data. The descriptive statistical tools included frequency tables, percentages and mean scores.

RESULTS AND DISCUSSION

Table 2 shows that 36.3% of small scale rubber producers in Edo State were 51–60 years old, which is the modal age range. The mean age was 52 years, suggesting that the farmers were within economically active age group. This agrees with Giroh *et al*, (2007), who found that small scale rubber producers in Edo State fell within this age range. Tanko and Opara (2010) and Bandura, (1986), asserted that age range of 45–55 years is an important factor in enhancing income among farming units because farmers within this age range are still possess energy for farming work. The result also shows that only 2.8% of the farmers were less than 30 years. This signifies that young people were not so much interested in the production of rubber in Edo States.

Marital status of respondents

Most respondents (94.4%) were married, which is not unexpected because of the importance attached to the marriage institution and family labour which is still very important for many small-scale rubber farmers. Married individuals are considered to be more financially responsible and productive. This finding is in line with Lapar, (2009) who found that rubber farmers were married.

Educational qualification of respondents

Most respondents (40.2%) have at least secondary school education (Table 2). This shows that rubber farmers in state are literate, and with this high level of education, it is expected that the level of awareness of

Table 2. Socio-economic Characteristics of the Respondents.

Characteristics	Freq	%
Age	5	2.8
≥30	13	7.3
31 – 40	41	22.9
41 - 50	65	36.3
51 – 60	55	30.7
≥60	5	2.8
Sex		
Male	6	3.4
Female	173	96.6
Marital status		
Single	7	3.9
Married	169	94.4
Widow	3	1.7
Educational qualification		
No formal education	85	47.5
WASSC/GCE/NECO	76	42.5
OND	7	3.9
NCE	7	3.9
HND	3	1.7
Postgraduate	1	0.6
Membership of social organization		
No	2	1.1
Yes	177	98.9

Source: Field Survey, 2013.

WAEC:West African Senior School Certificate, GCE:General Certificate of Education, NECO:National Examination Council.

OND:Ordinary National Diploma, NCE:Nigeria Certificate in Education, HND:Higher National Diploma.

rubber technologies will be high. This is in line with the studies carried out by Kpolo, (1999), who found that education is positively correlated with awareness/adoption of improved rubber technologies. Also, Ogunfeditimi (1981) found that the level of education of small scale farmers in Oyo and Ondo States of Nigeria have positive significant relationship with awareness/adoption of improved varieties of cassava, maize and cocoa. He contended that the more the farmers advanced in their level of education, the more they tend to understand the importance, intricacies and need for adopting new improved farm practices. Also, supporting this view, Omonoma et al. (2007) found that educational level of farmers had a positive and significant effect on farm productivity.

Membership of social organization

Most respondents (98.9%) belonged to social organizations. Social organizations are meant to serve various purposes, not only for socializing as it were, but also to share ideas, thoughts and experiences especially on their jobs or sources of livelihood. Membership of a social organization can boost awareness/adoption of new technology especially among small scale rubber farmers as it expose farmers to information such as source of

credit and inputs (Giroh *et al.*, 2007). This agrees with the findings of Tanko and Opara, (2010) who reported that being a member of social organization has a positive and significant relationship with awareness/adoption of new rubber technology.

Farming experience of respondents

The results show that majority of respondents (78.2%) had 11 – 20 years of farming experience of rubber (Table 3). This implies that the farmers have been in the business of rubber farming for quite a long time. Long years of farming experience may be due to awareness of new technologies among the respondents which encourage them to stay in the business. The finding corroborate a previous study that noted that farmers with higher experience appear to be more informed and better able to evaluate the advantage of the technology (Chipaude, 2007). Also, the longer the rubber farming experience of the farmers, the more skills and knowledge they acquire which enable them to adopt rubber farming practices.

Table 3. Farming experience of respondents.

Years of experience	Freq	%
10 and below	18	10.1
11-20	140	78.2
31-40	20	11.2
>40	1	.6
Total	179	100.0

Source: Field Survey, 2013.

Sources of capital / funds

Sources of capital/funds indicate where funds/capital was made available for the establishment of rubber plantation in the study area. The results (Table 4) shows that most respondents had capital/funds from friends/relatives (81%) acquired their capital/funds for rubber farming from relatives/friends. Those respondents who acquired capital/funds from personal savings were only 17.9% of the total respondents. Bandura, (1986) reported that friends/relatives, including farmers' personal savings, were sources of capital/funds for most small scale rubber farmers and could promote adoption of improved rubber technology.

Table 4. Distribution of Respondents by Source of Capital/Funds.

Source of Capital/Funds	Freq	%
Personal saving	32	17.9
Community banks	-	-
Cooperatives	2	1.1
Friends/relatives	145	81.0
Total	179	100.00

Source: Field Survey, 2013.

Frequency of extension visit

The results (Table 5) indicate that most respondents (40.2%) had bi-annual visit by extension agents in the study areas. Those respondents that recorded extension visit trice annually were only 16.2%. The finding is in line with the work of Giroh *et al.* (2007) who stated that poor visit of extension personnel to rubber farmers posed great danger to possible awareness/adoption of improved rubber technologies.

Table 5. Respondents frequency of extension visit.

Extension visit	Freq	%
Bi-annual	72	40.2
No Visit	57	31.8
Thrice annually	29	16.2
Four times	21	11.7
Total	179	100.0

Source: Field Survey, 2013.

Respondents awareness level of improved rubber technologies

Eighteen (18) improved rubber technologies developed by RRIN were considered in this study (Table 6). The rubber farmers were asked of their level of awareness of the technologies and their responses were analyzed using frequency and percentage distributions as shown in Table 6.

The results show that the farmers were aware of almost all the technologies considered in this study to a great degree with exception of rubber quality improvement (17.9%), soil and agronomic practices (24.6%) and use of latex meter (29.1%) technologies. These findings are supported by the results of Agwu (2006) who acknowledged that fertilizer, improved rubber clones, recommended spacing of rubber, intercropping of arable crops with rubber, herbicides for weed control and use of clean coagulating pan were the technologies that ranked highest in awareness by rubber farmers.

T-test for level of awareness of rubber technologies

The null hypothesis was that there is no significance level of awareness of rubber production technologies among farmers in Edo State. The hypothesis was tested using t-test, and the result (Table 7) shows that Edo State rubber farmers are aware of an average of twelve (12) rubber production technologies. The T-test result, (10.430) is significant ($P < 0.050$). This means that Edo State rubber farmers are significantly aware of rubber production technologies. The reason for this may be that Edo State rubber farmers are in close proximity to the Rubber Research Institute of Nigeria, Benin City, and can easily

Table 6. Respondents awareness of improved rubber technologies.

Technologies	Freq	%
Improved rubber clones	178	99.4
Recommended spacing of rubber	178	99.4
Intercropping of rubber with arable crops	175	97.8
Recommended tapping techniques	149	83.2
Integrated mini-livestock farming under matured rubber plantation	106	59.2
Rubber quality improvement practices	32	17.9
Pests and diseases control techniques	25	14.0
Soil and agronomic practices	44	24.6
Formic acid for coagulation of latex	165	92.2
Clean coagulating pan	175	97.8
Fire trace	178	99.4
Metal spout and hanger	152	84.9
Latex sieve	55	30.7
Ammonia for preservation	96	53.6
Ethereal latex flow	85	47.5
Herbicide for weed control	174	97.2
Latex meter	52	29.1
Fertilizer	179	100.0

Source: Field Survey, 2013.

Table 7. Test of level of awareness of rubber technologies among farmers in Edo States

State	Awareness (total)		t-value
	Mean	SD	
Edo	12	2.616	10.438*

*Significant at 5% (critical t = 1.96). Source: Field Survey, 2013.

source important information on rubber production without much stress.

Conclusions

The study evaluated some farmers' awareness of improved rubber technologies in Edo State. Majority of the respondents in the study area were within the average age range of 50 years and majority were males (97%). Majority (91.9%) belong to membership of social organization. Majority (80.9%) obtained their budded stumps from Rubber Research Institute of Nigeria, Benin City while 66.8% has extension contract in the study area. The study identified that awareness of rubber technologies to include: fertilizer (98.8%), improved rubber clones (85%), recommended spacing of rubber (84.7%), intercropping of rubber with arable crops (80.3%), herbicide for weed control (79.8%) and use of clean coagulating pan (75.1%). Farmers' awareness level was low for 8 of the 18 technologies.

Recommendations

The study recommends that farmers should continue

liaising with Rubber Research Institute of Nigeria to get improved rubber production technologies since this had a significant influence on awareness of new technologies and also, in order to enhance their rubber outputs.

AUTHORS' DECLARATION

We declare that this study is an original research by our research team and we agree to publish it in the journal.

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