

Analysis of Constraints to Smallholder Farmers' Involvement in Rubber production in Edo and Delta States, Nigeria: Implications for Rural Policy Development

Balogun, F.E 1, Esekade, T.U 1 and Omo-Ikeroda, E.E*

Rubber Research Institute of Nigeria, PMB 1049, Benin City, Nigeria

*e-mail: eomoikerodah@yahoo.com

Abstract: The study analyzed the constraints and motivation to smallholder farmers' involvement in rubber production in Edo and Delta States of Nigeria. A multistage process involving simple random sampling technique was used to select 216 farmers. A structured questionnaire, administered through interview schedule was used to obtain the data. Relative importance of each of these factors was analyzed with percentage counts and regression at 0.05 level of significance (t-test). Findings revealed that respondents generally participated moderately in rubber production with 15.3%, 74.0%, and 11.1% in high, moderate and low groups respectively. The respondents considered constraints to involvement in rubber production as high labour cost, shortage of labour, lack of credit, inadequate land, lack of improved planting materials at 94.9%, 94.9%, 86.6%, 72.7% and 71.8% respectively. Farmers' level of involvement was determined by income from rubber ($\beta=0.229$), labour cost ($\beta=0.217$), market availability ($\beta=0.184$), extension contact ($\beta=0.162$) and education ($\beta=0.134$). It was recommended that maximum involvement of smallholder farmers in rubber production should be encouraged by addressing the low impact factors and then strengthening the high impact factors. This will facilitate the contribution of rubber production to the attainment of the Millennium Development Goals in Nigeria.

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1. Introduction

The Nigeria rubber industry has enormous potential for sustainable growth and development. According to Aigbekaen and Alika (1984), natural rubber is a dependable source of raw material for local industries, it also provides employment opportunities for farmers, tappers, manufactures and other personnel in marketing. Natural rubber has diversity of uses. Latex and coagula are important in automobile industries for the manufacture of tires and tubes. Latex is also useful in the manufacture of surgical gloves, condoms and other products while the rubber seeds are processed into rubber seed oil and alkyd resins for industrial uses. Furthermore, rubber is environment-friendly and helps to protect the soil from soil erosion (Fasina, 1998). The development of natural rubber plantation in Nigeria was almost stagnated around 240,000 hectares between 1966 and 1996 (CBN 1997). Recent estimates are 200,000 ha by the mid 1980s and 154,000 ha in the 1990s. Available data shows that about 247100 ha are under rubber production in Nigeria, out of which approximately 172970 ha are under smallholdings while about 74130 ha are in estate. However, most of the estate plantings are

between 20-52 years old (RMRDC, 2004). Mgbeje (2005) pointed out that Nigeria rubber output has declined sharply. According to him, production grew from 68, 000 metric tonnes in 1975 to 116,000 metric tonnes in 1995 as a result of the Structural Adjustment Programme of the Federal government (SAP). It later started a steady decline to 46,000 tonnes in 2004.

Several attempts have been made by the Federal Government to promote rubber production in Nigeria. The promulgation of the Agricultural Research Institute Decree in 1973 led the Federal Government to take over the organization of Rubber Research Institute and mandated it to conduct research into genetic improvement, improved agronomic practices and utilization of rubber. In 1986, the commodity board was abolished with the introduction of SAP, making it possible for farmers to sell their produce directly to the highest bidder, thereby getting the best prices for their produce (CBN/NISER, 1992). The concern that the decline in rubber production will lead to future shortages further led the Federal Government to come up with incentive programmes such as the National Accelerated Industrial Crops Production (NAICP) programme in 1994. This made

improved planting materials available to farmers at highly subsidized rate. Despite these interventions, it is quite worrisome that supply of rubber produce lags behind increasing demand (Kpolo, 1999). The objective of this study is therefore to analyse constraints limiting involvement of small holder farmers in rubber production in two rubber producing states of Nigeria.

2. Materials and Method

Data were collected from primary source. Well structured interview schedule were pre-tested and used to obtain relevant information from 216 respondents. Respondents were selected through multi-stage sampling techniques. Five rubber producing Local Governments Areas in Edo State and six Local Government Areas in Delta State were randomly selected based on the list obtained from Rubber Research Institute of Nigeria (RRIN). Two communities were randomly selected from each of the selected local governments and 10 rubber farmers were in turn selected from each community giving 220 farmers for administration of the questionnaire of which 216 copies were valid for use on retrieval. Data were collected on the following variables viz:

- Age measured in years,
- Farm size in hectares,
- Educational status measured by the number of years spent in schools,
- Years of experience in rubber farming,
- Number of extension contact per year
- Cost of labour measured as the amount paid in Naira for a particular task executed per man day.
- Market availability measured on a 3 point scale of; readily available – (3), available- (2), unavailable- (1).
- Level of application of management practices: Respondents level of involvement was measured using management activities on a four point scale of every year (3 points), once in two years (2 points), once in 3years (1 point) and not at all (0 point). The weighted mean was determined by multiplying the frequency of response to each scale by the scale value. Sum up to get the total response score for each practice and divide by the total number of respondents/frequency.
- Total involvement score for each individual was also computed, the mean and the standard deviation were also determined. Base on deviation from the mean, the involvement score was described as low, moderate and high
- Constraint was measured on a 3 point scale of major (3), moderate (2) and minor (1).

The weighted mean was obtained by multiplying the frequency of response to each scale by the scale value. Sum up to get the total response score for each practice and divide by the total number of respondents/frequency. Respondents' mean score higher than 2.5 was regarded as major constraint, the mean score of 2.0 - 2.4 was regarded as moderate constraint, while mean score lower than 2.0 was regarded as minor constraint.

Data were analyzed using percentage and regression coefficient, which was tested at $p = 0.05$ (t – test).

3. Results and Discussion

3.1 Socio-Economic characteristics of respondents

Table 1 shows that majority (76.4 percent) of the respondents were within the age range of 51 and above years. The mean age of the respondents was 58 years, which suggests that rubber farmers in the study area are ageing. The low representation of youth and middle aged might be due to their unfavourable attitude towards agriculture and this is consistent with findings of Aghimien (1997). Table 1 also reveals that rubber production is male dominated as 100 percent of the respondents in the study area are male This might be due to cultural factors such as male inheritance of landed property and perceived drudgery associated with rubber production in the study area.

The majority (86.1 percent) of the respondents were literate in the study areas (Table 1). The finding of this study contradicted past studies in which farmers were found to be illiterates (Aku, 1982, Olayide, 1980). It can be assumed that the high literacy level will assist in sharpening the focus of the respondents, and also broaden their knowledge to accept innovations. Education among farmers should therefore be encouraged through adult education and training workshops to be organized by extension services, in order to further enhance their understanding and appreciation of rubber production innovations. An investigation of rubber farming experience as shown in Table 1 reveals that most of the respondents (70.8%) had between 25 and 35 years, while 29.2 % had between 1 and 24 years' experience. Increased years of farming

experience just like education furnished more knowledge that increased the farmers' rationality in the use of innovations. Results in Table 1 shows that majority of the respondents are small holders. Most farmers in the study area are small scale farmers as 64.8% cultivated less than 2 ha while 13.4% cultivated above 3 ha. The average farm size was 2.5 ha. This confirms the prevalence of small scale rubber farming in Nigeria as observed by Amoebi (1983), and Balogun et. al (2008). Table 1 also indicates that most (64.4 percent) of the respondents realized a monthly income of \$266 and below from rubber coagula, while 5.1 percent reported that they realized between \$540 - \$800. Only 3.7 percent earned more than \$800 monthly. The mean monthly income of the farmers was \$240 from mean matured farm size of 2.5ha. This is quite low considering the socio-economic realities of farmers' environment.

Table 1 showed that there was availability of market for the sale of coagula in the study area. Majority (73.6 percent) reported that market was available for sale of coagula while 25.5 percent reported that market was readily available. Only 0.9 percent reported lack of market for the sale of their coagula. The finding shows that majority (91.1 percent) of the respondents had access to market in the study area. Farmers should therefore be provided with more market information and facilities to promote greater involvement in rubber production.

The cost of labour per man-day in the locality at the time of the study showed that majority of the farmers (56.5 percent) reported that they paid between \$ 3 - 4 per man-day while 39.4 percent paid between \$ 4 - 5 per man-day. Only 4.1 percent paid above \$ 5 per man-day. The mean labour cost was \$ 5. The findings show that the labour cost paid per man -day (\$ 3 - 4) by majority of the respondents was low. Results of the investigation of frequency of contact with extension agents shows that 82.9 percent of the respondents had contact with extension agents; however the highest frequency of contact was 2 - 5 times per year (32.9 percent). Contact with extension allows farmers greater access to information on technology (Carter 1995). Access to information on rubber production might enhance willingness to continue in rubber production.

3.2. Constraints to involvement in rubber production

Analysis of the constraints to involvement in rubber production (Table 2)

revealed that the major constraints range from mean value of 1.4 for unavailability of market to 2.7 for each of lack of credit and high labour cost. Constraint regarded as minor was unavailability of market while the the major constraints were more of financial factors than input mobilization. Rubber farmers should be encouraged to increase their scale of operation for higher income by making land, credit, variable inputs such as fertilizers and improved planting materials more available and affordable. This could be achieved through subsidies on land clearing and farm inputs needed by rubber farmers.

3.3. Level of application of farm management practices by small holder farmers involved in Rubber Production

The summary of farmers' level of application of farm management practices as presented in Table 3 and 4 shows that 11.1 percent of the farmers had low level of application. Majority (73.6 percent) had moderate level of application, while 15.3 percent had high level of application of farm management practices. This implies that majority of the respondents are moderately involved in application of farm management practices in the study area.

3.4. Contribution of determining factors to level of involvement

Table 5 shows that the five variables entered into the regression equation contributed significantly to respondents' level of involvement in the study area. With R² value of 0.242, it implies that all the factors could determine 24.2 percent of the variation in farmers' level of involvement. Respondents' income from sale of rubber exercised the greatest influence in determining their level of involvement with a regression coefficient (β) of 0.229. Others contributed in the following order: labour cost ($\beta=0.217$), market availability ($\beta=0.184$), extension contact ($\beta=0.162$) and education ($\beta=0.134$).

The regression equation is thus as follows:

$$Y = 7.928 + 0.229X_1 + 0.217X_2 + 0.184X_3 + 0.162X_4 + 0.134X_5$$

Where Y is the level of involvement in rubber production

X₁ = Income from rubber

X₂ = Labour cost

X₃ = Market availability

X₄ = extension contact DX

and X₅ = education

Table 1 Socio-economic characteristics of respondents

Variable	Frequency	Percentage
Sex		
Male	216	100.0
Female	-	-
Age		
31-40	4	1.9
41-50	47	21.7
51 and above	165	76.4
Educational Level		
No formal education	30	13.9
Primary education	103	47.7
Secondary education	71	32.9
Post secondary education	12	5.5
Marital Status		
No response	7	3.2
Single	8	3.7
Married	200	92.6
Farm size (ha)		
Less than 1	52	24.1
1.1 -2	88	40.7
2.1-3	47	21.8
3.1 and above	29	13.4
Total	216	100
Years of Farming Experience		
4-6	106	49.1
7 and above	15	6.9
Years of Farming Experience		
24 and below	63	29.2
25-34 years	101	46.7
35 and above	5	24.1
Farm Income per month (\$)		
256 and below	139	64.4
262 - 511	58	26.8
518 - 767	11	5.1
773 and above	8	3.7
Total	216	100
Market availability		
Readily available	55	25.5
Available	159	73.6
Not available	2	0.9
Labour cost/man-day (\$)		
3 - 4	122	56.5
4.1 - 5	85	39.4
Above 5.1	9	4.1
Number of Contact		
Not at all	37	17.1
6 - 11 times per year	41	19.0
3 - 5 times per year	71	32.9
Less than 3 times per year	67	31.0

Table 2: Percent distribution of respondents according to constraints to involvement of small holder rubber farmers in rubber production

S/N	CONSTRAINTS	MINOR (1)	MODERATE (2)	MAJOR (3)	TOTAL SCORE	MEAN
1	Lack of credit	12 (6.4)	37 (19.8)	138 (73.8)	500	2.7
2	High labour cost	21 (10.2)	21 (10.2)	163 (79.5)	552	2.7
3	Shortage of labour	18 (8.8)	62 (30.2)	125 (61.0)	517	2.5
4	Unavailability of improved planting materials	14 (9.0)	47 (30.3)	94 (60.6)	390	2.5
5	Inadequate land	33 (21.0)	10 (6.4)	114 (72.6)	395	2.5
6	Fall in prices of rubber	36 (18.6)	40 (20.6)	118 (60.8)	470	2.4
7	High cost of inputs	30 (17.1)	55 (31.4)	90 (51.5)	410	2.3
8	Old age of rubber trees	32 (21.2)	54 (39.8)	65 (43.0)	335	2.2
9	Lack of information on rubber technologies	32 (23.9)	37 (27.6)	65 (48.5)	301	2.2
10	Unavailability of market	55 (71.4)	12 (15.6)	10 (13.0)	109	1.4

Table 3: Distribution of respondents according to level of application of farm management practices

Involvement Group	Percentage
Low (<10)	11.1
Moderate (10-18)	73.6
High (19-21)	15.3

Min= 6, Max= 21, Mean=14.4, SD= 3.8

Table 4: Percentage scores of level of involvement of small holder rubber farmers in rubber production

S/N	Management Practices	Every year (3)	Once in 2 years (2)	Once in 3 years (1)	Not at all (0)	Mean
1	Weed management	181 (83.8)	28 (13.0)*	3(1.4)	4(1.8)	2.8
2	Pruning of damaged stems	98 (45.4)	76 (35.2)	21(9.7)	21(9.7)	2.2
3	Fertilizer application	21(9.7)	56 (25.9)	20(9.3)	119(55.1)	0.9
4	Disease control	69 (31.9)	31(14.4)	39 (18.1)	77 (35.6)	1.4
5	Pest control	81 (37.5)	36(16.7)	57(26.4)	42(19.4)	1.7
6	Fire tracing	154 (71.3)	45 (20.8)	14(6.5)	3(1.4)	2.6
7	Tapping of Latex	189 (87.5)	13 (6.0)	14(6.5)	-	2.8

- Frequencies in parentheses

Table 5: Contribution of determining factors to level of involvement

Variable	Regression Coefficient (β)	t	Sig. t
Education	0.134	2.149	($p \leq 0.05$)
Income from rubber	0.229	3.650	($p \leq 0.01$)
Labour cost	0.217	3.551	($p \leq 0.01$)
Market Availability	0.184	2.972	($p \leq 0.01$)
Extension contact	0.162	2.670	($p \leq 0.01$)

Constant=-7.928 F=13.392 R²=0.242 Standard Error=3.325 significant at 1 percent.

4. Conclusion

The findings from this study showed that smallholder rubber farmers were old and predominantly male. Majority of the respondents were literate. Majority of the respondents were moderately involved in application of farm management practices. Major constraints to level of involvement include high labour cost, lack of credit, inadequate land and shortage of labour. The findings also suggest that as farmers' income from rubber improves their level of involvement in rubber production increases. Also as market availability, extension contact and education increases, their level of involvement in rubber production is likely to increase. Efforts to ensure sustainable rubber production should focus on these factors.

Correspondence to:

Edith E Omo-Ikerodah
Rubber Research Institute of Nigeria
PMB 1049
Iyanomo, Benin City
Nigeria
eomoikerodah@yahoo.com

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