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Research Paper

Assessing the Information Needs of Farmers: A Case Study of Smallholder of Rubber (*Hevea brasiliensis*) in Edo and Delta States, Nigeria

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The study analyzed the information needs of smallholder rubber farmers in Edo and Delta States, Nigeria. Specifically, the study examined the socio-economic characteristics of the farmers, determined their level of information and factors associated with farmers information needs. Data were collected from 270 respondents, comprising of 151 from Edo State and 119 from Delta State. The data were analysed using percentages; frequency distribution, Mann-Whitney test and logit regression. The results indicated that the mean age for Edo and Delta States being 48 and 47 years, respectively. All respondents, in the study area were male; majority of them (94.8%) were married with a mean family size of 8. As for educational qualification, majority of the respondents (91.1%) had formal education. The mean farming experience of the respondents was 34 years. The mean plantation size was 4.7 hectares while the mean annual revenue was N734, 440.70. The analyses also revealed that most respondents (73.7%) had contact with extension agents. Rubber Research Institute of Nigeria (RRIN) (77%) and Rubber estates (61.1%) were the major sources of information available to the respondents in the study area. The major information needs of the farmers included source of improved planting materials (mean = 3.90), current price of rubber latex/coagula (3.87), improved processing method of rubber latex (3.80), tapping methods (3.82) and pest and disease management methods (3.75). Mann Whitney test reveals significant differences existed in the information needs of rubber farmers in Edo and Delta State for all the tested technologies. The study recommends that regular training of the rubber farmers be embarked upon by the agencies generating rubber technologies to enhance their skills in the use of rubber technologies.

Key words: Rubber, technologies, mann-whitney test, logit regression.

INTRODUCTION

Rubber (*Hevea brasiliensis*) is a perennial dicotyledonous plant, belongs to the family Eyphorbiaceae. According to Kochhar, (1986) and Agwu (2006), nearly 52,000 or more different products are made directly or indirectly from it. The most important part of the rubber tree is the bark, which contains the latex producing tissues. The latex is a milky juice substance obtained from the rubber tree through tapping. It contains about 25 to 45% rubber by

weight which is processed into products such as crepe crumb and sheet rubber for onward processing into finished goods. Apart from latex, the rubber tree produces seeds and wood, which are also of economic value to the grower.

Nigeria has a total land area of 98,321 million hectares of which only about 200,000 hectares are under rubber cultivation which yields about 90,000 tonnes of rubber coagula per annum mainly coming from old and aging plantations (Kpolo, 1999). In an attempt to promote rubber production in Nigeria, the Federal Government initiated policies and programmes to motivate farmers to increase rubber production. The establishment of National Accelerated Industrial Crops Production (NAICP) programme in 1994 made improved planting materials available to farmers at highly subsidized rate. Similarly, Federal Government initiated a support on tree crops, and about 62,000 budded stumps capable of planting 124 hec were distributed in some rubber growing states between 2004 and 2005 (Giroh *et al.,* 2007). Again, due to the rise in world consumption/utilization of natural rubber as well as corresponding rise in price in the world market, Federal Government of Nigeria inaugurated the presidential initiative on rubber production, utilization and export in the year 2005 which took off in 2006. The overall objectives of the programme were to increase both local production and utilization of NR, export and to generate rural employment, increase farmers' income and standard of living.

The target of the Presidential Initiative was to cultivate 360,000 hectares of land to be planted or replanted in Nigeria in a 12-year period, from 2006 to 2017. Starting with 20,000 hectares in 2006 and progressively increasing to 40,000 hectares per year up to 2017. The impact the Presidential Initiative on natural rubber production in Nigeria is however yet to have the expected impact despite the 2017 is almost at hand.

Nigeria is endowed with great potentials for a highly productive and profitable agricultural sector (Central Bank of Nigeria, 2002). This enormous resource base, if well managed, could support a vibrant agricultural sector capable of ensuring self sufficiency in food and raw materials for the industrial sector as well as providing gainful employment for the teeming population (Oriakhi, 2006). However, agriculture is faced with myriad of problems among which is low utilization of technologies. This may be ascribed to inadequacy of information and poor communication approaches. Effective communication is an essential tool for the establishment and maintenance of good social and working relationships that would enables people to exercise control over their environment (Oriakhi, 2006).

Information, in a broad context, refers to organized data recorded in various forms. It could also mean definite knowledge acquired or supplied about something or somebody. Information could also be messages that have perceivable and recognizable value to the receiver. Information is therefore a vital tool for empowerment of individuals to enable them take a decision or action for self or at community level (Oriakhi, 2006). However, information only becomes useful if it is relevant, timely and appropriate. The choice of medium or channel which transmits information must also be appropriate, perceivable and affordable to the user. It must allow a two-way communication to occur (Yahaya, 2003). Therefore, for farmers of different agricultural zones to adopt a new agricultural technology, they must be aware of the technology, have valid and up – to – date information on the technology, understand the applicability of the technology to their farming system and receive the technical assistance necessary to adopt the technology (Asiabaka *et al*., 2001). In an agricultural environment, relevant and timely information helps farmers to take right decision for a sustainable growth of agricultural activity.

The study therefore assessed the information needs of small-scale rubber farmers in Edo and Delta States of Nigeria in order to identify factors associated with the farmers' information needs and constraints in rubber production in the study area.

METHODOLOGY

The study was carried out in Edo and Delta States of Nigeria. The states were carved out of the defunct Bendel State in 1991. The vegetation of the area is mainly rainforest and mangrove swamps. The two states occupy a total land area of 35,342 km^2. The arable crops grown in the states include cassava, maize, yam, groundnut, pepper, tomatoe and plantain; while the major tree crops grown includes – rubber, oil palm, cocoa, citrus, native pear (Dacryodis edulis)**.**

Edo state lies between latitude 5° 44" and 7°34" N of the equator and longitudes 5° 04" and 6°45"E of the Greenwich Meridian. The state share boundaries with Kogi State in the north, Delta in the south, in the west Ondo State and in the east Kogi and Anambra States. Edo State occupies a land area of about 17,902 km^2 with a population of 2,159, 848. The state is made up of 18 local government areas. The annual rainfall in the northern part is between 127-152 cm; while in the southern part, about 252-254 cm of rainfall. The temperature ranges from a minimum of 24°C to about 33°C (Oriakhi, 2006). Majority of the people in Edo State are farmers, other occupation of the people includes, small and medium scale businesses and jobs by artisan and civil servants who engage in farming on part-time basis (Emokaro and Erhabor, 2006). Delta state lies within latitude 5° 00" and 6^0 30" N of Equator and longitude 5° 00" and 6° 45°E of the Greenwich Meridian. The state occupies a land area measuring 17, 440 km^2 which has about one third of the land water logged and swampy. Delta state is bounded in the north by Edo

Table 1. Sampling distribution.

LGA	Sampled communities	Farmers population	Sampled farmers (50%)
EDO STATE			
Orhionwon	Sakponba	24	12
	Ebozogbee	16	8
	Orogho	20	10
Uhunmwode	Okeze	18	9
	Ugha	14	7
	Errua	28	14
Ovia south west	Iguoriakhi	22	11
	Urhezen	12	6
	Udo	26	13
Ovia north east	Osasivbionba	18	9
	Odighi	22	11
	Iyowa	20	10
Ikpoba-Okha	Imasabor	16	8
	Obayanto	26	13
	Iyanomo	18	9
DELTA STATE			
Aniocha south	Egbudu-Aka	26	13
	Ndemili	14	7
	Ejeme	18	9
Aniocha north	Isele-uku	24	12
	Idumuje-Unor	16	8
	Mbiri	20	10
Ethiope west	Ovade	16	8
	Otefe	28	14
	Otumara	16	8
Ughelli north	Ozoro	26	13
	Emevor	22	11
	Owevwe	12	6
Ndokwa west	Utagba-Uno	24	12
	Ogo-Ikilibe	22	11
	Osuogo-Utegba-Uno	14	7
	30 communities	600	300 respondents

state, east by Anambra states and Rivers state and in the south by Bayelsa state. The Atlantic ocean forms the western boundary while the north west boundary is Ondo State. The State is made up of 25 local government areas. It has tropical climate marked by dry and raining seasons the raining season, starts in April and ends in October while the dry season starts in November and ends in March. The monthly rainfall ranges from 190.5-266 cm. The temperature ranges between 24°C-34°C with an average of 30°C. The major occupation of the people is farming. Other occupation of the people includes trading, craftsmanship and fishing.

Sampling technique

The study employed multi-stage sampling technique which comprised both purposive and random sampling.
Stage 1: Five local government areas (LGAs) each in Edo and Delta states, in which rubber production is dominant, were purposively sampled for the study. This make up a total of (10) local government areas (LGAs) used for the study.

Stage 2: Three communities/villages were purposively selected from each of the (10) local government areas (LGA's) of the states. The criterion for selection was the predominance of rubber production in the area.

Stage 3: Registered smallholder rubber farmers from each of the communities/villages were proportionately and randomly selected. This was made possible from the Tree Crop Unit of the Ministry of Agriculture of Edo and Delta States, Rubber Research Institute of Nigeria (RRIN) and Rubber Farmers Association of Nigeria (RUFAN).

The population of registered small holder farmers in both states is 600, comprising 300 for Edo State and 300 for Delta State. Fifty of the farmers were proportionally sampled to give a total of 300 farmers targeted for the study (Table 1).

Data collection

Questionnaire was used to gather information from the respondents on the following variables: age, sex, marital status, household size, educational level, primary occupation, farming experience, farm size, extension visit and income.

Information farmers needs

Information needs of the respondents was measured on a 4 point rating scale as follows:- Highly needed with a code of 4, Needed with a code of 3, Little needed with a code of 2, and Not needed with a code of 1. The mean score of 2.50 was used to establish respondents' level of needed information with respect to rubber production technologies. The score of 2.50 was obtained as follows (4+3+2+1)/4 = 2.50. Any needed information item with a mean score of 2.50 and above means that the respondents need the information with respect to that particular technology, while a score less than 2.50, means that the respondents do not need information in that area.

Data analysis

The data collected were subjected to both descriptive and inferential statistics. Descriptive used statistics include frequencies, percentages and mean. Inferential used statistics include logit regression and Mann Whitney.

Model specification (Logit Regression)

Logit regression model is a binary choice econometric technique was used which allows for the prediction of effects of the farmers socioeconomic characteristics on their information needs in utilization of rubber technologies (Giroh et al., 2007). It is mathematically represented as follows:

$$Z_1 = a + b_1x_1 + b_2x_2 + b_2x_2 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + U_1$$

Z_1 competency needs of rubber farmers (competent = 1 non competent = 0)
a=intercept/constant
X_1=Age (in years)
X_2=Sex (dummy 1 male, 0 female).
X_3=Educational status (measured in years spent in school)
X_4=Farm size (in hectares)
X_5=Family size (number of people in household)
X_6=Farming experience (years)
U_1=error term.

Mann Whitney

Mann-Whitney test was used to test whether two independent groups have been drawn from the same population. This is one of the most powerful of the non-parametric tests and it is a very reliable alternative to some parametric tests. The statistic is applied when the researcher wishes to avoid the t-test's assumptions or when the measurement in research is weaker than interval scaling.

$$Z = \frac{\mu - E(\mu)}{E\mu}$$

Where:

$$\mu = n_1n_2 + \frac{n_1(n_1+1)}{2} - R_1$$

$E(\mu) = n_1n_2$

$$EU = \frac{\sqrt{n1n2\,(n1+n2+1)}}{12}$$

Hypothesis analysis

The following null hypothesis were tested:

Ho_1: There is no significant difference between information needs of smallholder rubber farmers in Edo and Delta States. This was analysed using Mann Whitney Statistic.
Ho_2: There is no significant relationship between the socio-economic characteristics of respondents and their information needs on rubber technologies. This was analysed using Logit regression.

RESULTS AND DISCUSSION

Table 2 shows the socio-economic characteristics of the respondents.

Age of respondents

The results indicated that many respondents' ages in Edo (67.5%) and Delta (68.1%) states were above 41 years. The pooled result (43.7%) were above 50 years and the average being 47 years. The mean age for Edo State and Delta State rubber farmers were 48 and 47 years, respectively, suggesting that majority of the respondents were moderately advanced in age. Studies have indicated that older farmers dominate production of natural rubber (Abolagba and Giroh, 2006). This is because

Table 2. Socio-economic respondents characteristics.

Characteristics	State					
	Edo (n=151)		Delta (n=119)		Total (n=270)	
	Freq.	%	Freq.	%	Freq.	%
Sex						
Female						
Male	151	100.0	119	100.0	270	100.0
Age (years)						
21 – 30	4	2.6	3	2.5	7	2.6
31 – 40	45	29.8	35	29.4	80	29.6
41 – 50	34	22.5	31	26.1	65	24.1
51 – 60	39	25.8	37	31.1	76	28.1
>60	29	19.2	13	10.9	42	15.6
Marital status						
Single	7	4.6	5	4.2	12	4.4
Married	144	95.4	112	94.1	256	94.8
Divorced		-	2	1.7	2	.7
Household size						
1 – 4	21	13.9	20	16.8	41	15.2
5 – 8	55	36.4	43	36.1	98	36.3
9 – 12	63	41.7	56	47.1	119	44.1
13 – 16	7	4.6	-	-	7	2.6
>16	5	3.3	-	-	5	1.9
Educational qualification						
No formal education	17	11.3	7	5.9	24	8.9
Primary education	41	27.2	24	20.2	65	24.1
Modern III/Secondary school	48	31.8	31	26.1	79	29.3
NCE/OND	21	13.9	42	35.3	63	23.3
HND	19	12.6	13	10.9	32	11.9
University education	5	3.3	2	1.7	7	2.6
Farming experience (years)						
1 – 10	3	2.0	5	4.2	8	3.0
11 – 20	19	12.6	32	26.9	51	18.9
21 – 30	34	22.5	11	92	45	16.7
31 – 40	45	29.8	26	21.8	71	26.3
41 – 50	32	21.2	37	31.1	69	25.6
>50	18	11.9	8	6.7	26	9.6
Plantation size (hec)						
1 – 5	100	66.2	88	73.9	188	69.6
6 – 10	45	29.8	31	26.1	76	28.1
11 – 15	5	3.3	-	-	5	1.9
16 – 20	1	.7	-	-	1	.4
Revenue (Annual) (₦)						
600,000 – 700,000	69	45.7	73	61.3	142	52.6
7001,000 – 800,000	21	13.9	6	5.0	27	10.0
8001,000 – 900,000	14	9.3	18	15.1	32	11.9
9001,000 – 1,000,000	9	6.0	5	4.2	14	5.2
1,001,001 – 1,100,000	14	9.3	7	5.9	21	7.8
1,000,001 – 1,200,000	4	2.6	6	5.0	10	3.7
1,200,001 – 1,300,000	11	7.3	1	.8	12	4.4
>1.3m	9	6.0	3	2.5	12	4.4

Source: Field survey, 2013.

the rubber belt of Nigeria coincides with the oil block were young and able body men migrate to the oil rich companies, leaving the farming activities to the older and aged people (Giroh *et al.,* 2007).

Marital status of respondents

Majority of the respondents in Edo (95:4%) and Delta (94.1%) were married. This shows that married people are more engaged in rubber production than singles. This agrees with the studies of Igbinosun, (2008) that married people are more engaged in rubber farming because, of family obligations.

Household size of respondents

Majority of the respondents in Edo (86.0%) and Delta

(83.2%) had a household size of 5 persons and above. Rubber farmers are characterized by large family sizes with mean family size of 8 persons in both Edo and Delta State. Large families could serve as a source of labour for both agricultural and non-agricultural activities. Nosiru, (2010) found that farmers with large household size were more productive than those with smaller household, because of the use of household members labour input in the farm enterprise.

Educational qualification of respondents

Majority of the respondents in Edo State (88.7%) and Delta State (94.1%) had a minimum of primary six as their level of education. The polled result shows that about 91% had formal education, indicating that the farmers were literate. The import is that adoption of rubber technologies would be easy as they can read and understand instructions on labels of chemicals, and can pass and receive agricultural information easily. Education has been found to be a catalyst in farmers adoption and productivity. Onemolease *et al.,* (2001) found that educational level of farmers had positive and significant effect on farm productivity and adoption. Ajayi, (2005) stated that there is a significant relationship between education, training, adoption of technologies and reception of agricultural information by farmers.

Farming experience of respondents

Most of the respondents in Edo State (85.4%) had a farming experience of 21 years and above, while majority of respondents in Delta State (68.8%) had similar farming experience. The mean farming experiences were 35 and 33 years, respectively with a pool average of 34 years, suggesting that the farmers were quite experienced in rubber farming. The longer the farming experience, the more skills, knowledge, experience and competencies they acquire in rubber farming. This positions them to embrace rubber technologies. Chilot, (2004) stated that farmers with higher experience in farming appear to be more informed and better able to evaluate the advantages of the technology passed on them. Atala and Abdulahi, (1988) and Igbinosun, (2008) noted that farming experience of the farmer influences his/her response to the adoption of improved practice, and that a farmer adopts a new practice more easily when it conforms to farmers' previous experience and skills.

Plantation size of respondents

Majority of the respondent in Edo (66.2%) and Delta(73.9%) states had a plantation size of (1-5) hectares. The pooled result shows that 69.69% had 1-5 hectares.

The mean plantation sizes in Edo and Delta States were 5.0 and 4.4 hectares respectively which indicated that the farmers were small-scale holders. This result is in conformity with the studies of Erie, (1996), Omohan, (1996) and Igbinosun, (2008) who stated that small farm holdings constitute more than 70% of all farming activities in Nigeria. Aghimien, (1997) and Aigbekaen *et al.,* (2000) also reported that majority of rubber farmers in Edo and Delta states have farm size of less than 5 hectares.

Respondents annual revenue

Majority of the respondents in Edo State (68.9%) and Delta State (71.4%) had an annual revenue of less than or equal to N 900, 000. The mean annual revenue for Edo State farmers was N754, 460.1 while, for Delta State it was N702.693.3. This result shows that the revenue from the sales of rubber in both states are low considering the socio-economic realities of the farmers environment. Incomes of farmers have been found to be a critical factor in agricultural production. The higher the farmers' incomes, the more they are able to adopt new farming practices, acquire agricultural information and competencies about rubber technologies. This view agrees with that of Ogunfiditimi, (1981), Giroh *et al.,* 2007 and Igbinosun, (2008), who stated that the more the famers are well of economically in terms of their ability to purchase necessary input such as insecticides, fertilizers labour etc, the more they are prone to adoption of new farming practices, and the more the farmers acquire information and competencies in rubber production.

Respondents contact with extension agents

Table 3 shows the contact and frequency of respondents contact with extension agents. From the pooled results, few (26.3%) respondents had no contact with extension agents, while 73.7% had contact. This shows most respondents had contact with extension agents in the study area and this is expected to influence adoption of rubber technology, acquisition of skills and competencies in rubber production. The results for the states reveal that Edo State rubber farmers had more contact with extension agents (76.8%) than Delta State farmers (69.7%).

With regards to frequency of contact with extension agents, the pooled results shows that 21.6% of the respondents in both states were visited by extension agents once a month, while 64.3% were visited twice a month. The frequency of contact with extension agents is expected to facilitate awareness of rubber technology among farmers as well as technology adoption. According to Igbinosun, (2008) and Owona *et al.*(2010), regular contact with extension agent, increases farmers acquisition of skill competences in rubber production.

Table 3. Respondents contact with extension agents.

Contacts options	Edo		Delta		Total	
	Freq.	%	Freq.	%	Freq.	%
No	35	23.2	36	30.3	71	26.3
Yes	116	76.8	83	69.7	199	73.7
Total	151	100.0	119	100.0	270	100.0
Frequency of contact (monthly)						
Once	18	15.5	25	30.1	43	21.6
Twice	80	69.0	48	57.8	128	64.3
Above 2 times	18	15.5	10	12.0	28	14.1
Total	116	100.0	83	100.0	199	100.0

Source: Field survey, 2013.

Table 4. Information sources of rubber farmers.

Sources	Edo Yes		Delta Yes		Total Yes	
	Freq.	%	Freq.	%	Freq.	%
RRIN organized workshop/seminar	118	78.1	90	75.6	208	77
Rubber Estates	113	74.8	52	43.7	165	61.1
Neighbour/friends	90	59.6	67	56.3	157	58.1
ADP/Ministry of Agriculture	90	59.6	48	40.3	138	51.1
Co-operative societies	6	4	55	46.2	61	22.6
Farmer field days/exhibition	30	19.9	27	22.7	57	21.1
Newspaper	1	0.7	27	22.7	28	10.4
Radio/Television	4	2.6	5	4.2	9	3.3
Trade fairs	-	-	6	5	6	2.2

Source: Field survey, 2013.

Sources of information for rubber farmers

Table 4 shows the information sources available to the rubber farmers in the study area. They are engaged in RRIN organized workshops/seminar (77%), rubber estates (61.1%) neighbour/friends (58.1%) and ADP/Ministry of Agriculture (51.1%). At the state level, 78.1% and 75.6% of the respondents in Edo and Delta States obtained information from RRIN organized workshop/seminar. In Edo State, 74.8% of the rubber farmers obtained information from rubber estates while 43.7% of the respondents in Delta State obtained information from rubber estates. From these results, Rubber Research Institute of Nigeria (RRIN) organized workshop/seminar was the major source of information available to the respondents in the study areas. These results are in line with the studies of Giroh *et al.,* (2010), which stated that Rubber Research Institute of Nigeria is the major source of information available to rubber farmers as well as the major supplier of planting materials in the study areas. Non-governmental agencies such as rubber estates are making impact on rubber farmers as regards to information sources about rubber. In Edo State, 74.8% of the respondents obtained information from rubber estates such as Michellin and Okomu, while 43.7% of those in Delta State obtained information from rubber estates. This result is supported by the studies of Igbinosun, (2008) that rubber farmers in Edo State obtained rubber information from non-governmental agencies such as Michelin.

Information needs of rubber farmers in Edo and Delta State

The information needs of rubber farmers are presented in (Tables 4 and 5). Based on the mean benchmark of 2.50, the listed needs were considered important or needed by the rubber farmers since the means scores are greater than 2.50. However, the aggregate mean results shows that the major information needs of the farmers included source of improved plating material with mean score of 3.90, current price of rubber latex/coagula (3.87), processing of rubber latex (3.86), tapping methods (3.82) and pest and disease management methods (3.75).

At the state level, all the listed innovations were needed by the farmers. However, the grand mean or aggregate mean scores for Edo State was 3.32, while Delta State was 3.82. This suggests that Delta State rubber farmers had a higher information need than Edo State farmers. The possible reason for this is that the major source of information about rubber in the country is sited in Edo State. It is expected that Edo State farmers, by virtue of their closeness to rubber Research Institute of Nigeria

Table 5. Information needs of rubber farmers.

Needs	Edo Mean*	SD	Delta Mean*	SD	Total Mean*	SD
Source of Improved planting materials	3.83	0.51	4.00	0.00	3.90	0.39
Current price of rubber latex/coagula	3.78	0.55	3.97	0.28	3.87	0.46
Processing of rubber latex	3.79	0.55	3.93	0.43	3.86	0.50
Tapping methods	3.70	0.63	3.98	0.18	3.82	0.51
Pest and disease management	3.57	0.68	3.97	0.28	3.75	0.57
Opening of rubber plantation for tapping	3.24	0.65	3.98	0.18	3.57	0.62
Rubber latex quality assurance	3.27	0.60	3.96	0.20	3.57	0.58
Weeding methods, mechanical, chemical, biological and cultural	3.23	0.59	3.90	0.44	3.52	0.63
Intercropping of arable crops with rubber	3.14	0.79	3.94	0.24	3.49	0.73
Latex yield stimulation	3.54	0.65	3.41	1.06	3.48	0.86
Rubber plantation hygiene	3.19	0.57	3.82	0.40	3.47	0.60
Planting methods, holing/dibbling	3.11	0.59	3.87	0.34	3.44	0.62
Fertilizer application	3.11	0.67	3.86	0.35	3.44	0.66
Marketing information	3.15	0.55	3.77	0.48	3.43	0.60
Spacing of rubber seedlings	3.07	0.60	3.82	0.39	3.40	0.64
Land preparation practice	3.18	0.53	3.66	0.48	3.39	0.56
Weather information	2.99	0.67	3.76	0.43	3.33	0.69
Pruning techniques	3.04	0.67.	3.61	0.54	3.29	0.68
Soil information	3.17	0.59	3.30	1.13	3.23	0.87
Grand mean	3.32		3.82			

* Needed (Mean ≥ 2.50).,Source: Field survey, 2013.

(RRIN) will have greater access to rubber production information.

Test of difference in information needs between smallholders rubber farmers in Edo and Delta States

Table 6 compares and test the difference in information needs of smallholder rubber farmers in Edo and Delta States. Mann Whitney was used to test the significance of difference. Based on the t values, there is a significant difference in information needs of rubber farmers in both states, since all the results were significant as their t values were greater than the critical t values (1.96) at 5% level of significance.

In specific terms, for land preparation practice, Delta State farmers had a higher mean rank (168.68) than Edo State (109.35) farmers, showing that Delta State rubber farmers had a higher need for information on land preparation practices than Edo State farmers. The t value (7.19) indicates that this difference in information need is significant at 5% level, indicating that Delta State rubber farmers had a significantly higher need for information on land preparation practices than farmers in Edo State. Also, with regards to source of improved plantings materials, Delta State had a higher information need score of (mean = 145.5) than Edo State (mean = 127.62). Based on the t value ($t = 4.12$, $p < 0.050$) Delta State farmers had a significantly ($t = 4.12$) higher need than Edo State farmers for information on sources of improved planting materials. With regards to planting methods, holing/dibbling, Delta State farmers had a higher information need score (mean = 186.09) than Edo State rubbers (mean = 95.63) given a‘t’ value of 10.71. Delta State farmers had a significantly higher need for information on planting methods relative to Edo State rubber farmers. As for spacing of rubber seedlings, Delta State rubber farmers had a higher information need score (mean = 184.65) than Edo State farmers (mean = 96.76). Given a‘t’ value of 10.39, Delta State farmers had a significantly higher need for information on spacing of rubber seedlings methods relative to Edo State rubber farmers. With regards to intercropping of arable crops with rubber, Delta farmers had a higher information need score (mean = 183.47) than Edo State rubber farmers (mean = 90.77). Given a t value of 10.352, Delta State rubber farmers had a significantly higher need for information on intercropping of arable crops with rubber relative to Edo State farmers with regards to difference in information need. However, with respect to fertilizer application method, Delta State farmers had a higher information need score (mean = 183.07) than Edo State farmers (mean = 98.01). Given a ‘t’ value of (10.071), Delta State farmers had a significantly higher need for information on fertilizer application methods relative to Edo State farmers. With regards to soil information, Delta State farmers had a higher information need score (mean = 157.37) than Edo State farmers (mean = 118.26). Given a t value of 4.517, Delta State rubber farmers had significantly higher need for information about soil relative to Edo State farmers. The aggregate results for difference in information needs, reveal that Delta State farmers means = 189.63 had a higher information need

Table 6. Test of difference in information needs of respondents in Edo and Delta States.

Technologies	Information needs			Mann-Whitney (U)	T*	Decision
	Edo	Delta	Difference			
Land preparation practice	109.35	168.68	-59.33	5036.5	7.19	Significant
Source of improved planting materials	127.62	145.5	-17.88	7794.5	4.117	Significant
Planting methods, holing/dibbling	95.63	186.09	-90.46	2964.5	10.71	Significant
Spacing of rubber seedlings	96.76	184.65	-87.89	3135.5	10.39	Significant
Intercropping of arable crops with rubber	96.77	183.47	-85.77	3276	10.352	Significant
Fertilizer application	98.01	183.07	-85.06	3323.5	10.0771	Significant
Soil information	118.26	157.37	-39.11	6382	4.517	Significant
Weeding methods, mechanical, chemical, biological and cultural	97.89	183.23	-85.34	3305	10.293	Significant
Pruning techniques	107.78	170.68	-62.9	4798.5	7.442	Significant
Openings of rubber plantation for tapping	96.49	185	-88.51	3094	10.891	Significant
Tapping methods	121.9	152.78	-30.86	6931	5.403	Significant
Latex yield stimulation	132.06	139.86	-7.8	8465.5	1.965	Significant
Processing of rubber latex	127.74	145.35	-17.61	7812.5	3.537	Significant
Rubber latex quality assurance	97.74	183.41	-85.67	3283	10.515	Significant
Rubber plantation hygiene	101	179.27	-78.27	3775.5	9.347	Significant
Weather information	98.72	182.18	-83.46	3430	9.674	Significant
Pest and disease management	114.88	161.66	-46.78	5871.5	6.985	Significant
Current price of rubber latex/coagula	125.83	147.77	-21.94	7524.5	4.407	Significant
Marketing information	101.09	179.16	-78.07	3789	9.326	Significant
Information needs (total)	92.84	189.63	-96.79	2542.5	10.162	Significant

** Critical value of t at 5% = 1.96.*,Source: Field survey, 2013.

total, relative to Edo State (mean = 92.84). Given t value of (10.162), this shows that a significant difference exist between farmers in Edo and Delta State for all technologies examined.

Relationship between the Socio-Economic characteristics of respondents and their information needs on rubber technology

The relationship between the socio-economic characteristics of respondents and their information needs on rubber technologies is presented in (Table 7). Spearman Rho correlation coefficient was used to test the relationship. Only 2 of the variables were found to be significant, since the calculated correlation coefficients are greater than the critical coefficient at 5% level of significance. The 2 variables were frequency of extension contact with respondents (rho = -0.228) and respondents revenue (-0.14). Respondents frequency of extension contact had a negative sign (rho = -0.228). The implication of this result

Table 7. Relationship between the Socio-economic characteristics of respondents and their information needs on rubber technology

Independent variables	Coefficient (rho)
Age	-0.083
Age of rubber plantation	-0.09
Educational qualification	-0.053
Farming experience	-0.087
Frequency of extension Contact	-0.228*
Household size	-0.016
Plantation size	-0.04
Revenue	-0.14*

* Significant at 5% level (Critical r = 0.139).

is that, rubber farmers who had less contact with extension agents, need more information on rubber technologies compared to those who had regular or more frequent contact with extension agents. Regular contact of farmers with extension agents affects farmers information level, since the agents disseminate information about rubber technologies to them (Otene, *et al.,* 2011). Respondent's revenue also had a negative sign (-0.14). This indicates that rubber farmers with lower revenue or income needed more information about rubber technologies than farmers with higher income. An explanation for this could be that farmers with higher income can access information easily. According to (Owona, *et al.,* 2010), farmer with higher income can source for information and can pay for expenses involved in seeking for agricultural information. The correlation for age is negative and not significant (rho = -0.083). The implication of this result is that the younger rubber farmers need more information about rubber technologies compared to the older farmers. A reason for this could be that older farmers may be well experienced in rubber production and may do not need much information about rubber technologies. Educational qualification though not significant, carries a negative sign (rho = -0.053). This implies that there is a negative relationship between educational qualification and rubber farmers information needs on rubber technologies, suggesting that rubber farmers with lower education need more information about rubber technologies compared to those with higher educational qualifications. It is possible that those with higher education are able to source for information from both print and electronic media. Formal education is known to enhance farmers' literacy and their capacity to understand information sources (Giroh *et al.,* 2010). Farming experience of rubber farmers has a negative but

non-significant correlation with their information need (-0.087). Farmers with less farming experience need more information about rubber technologies as compared to those farmers who are well experienced about rubber farming. This is because over the years, they would have acquired the act and skills of rubber farming. The longer the farming experience of the farmers, the more skills, knowledge and competencies they acquire in rubber farming. These acquirements position them to embrace rubber technologies easily (Igbinosa *et al.,* 2012).

Household size has a negative correlation (-0.016), with information need, implying that there is negative relationship between household size and rubber farmers information need. This means that smaller households needed higher information about rubber production technologies. It is possible that famers with larger households have wider social network, and as such they can source information easily as compared to farmers with smaller households. However, the result is not significant since the calculated coefficient is less than the critical coefficient. Plantation size is not significant and the coefficient is negative (rho -0.04), implying a negative relationship between plantation size and rubber farmers information needs. This result suggests that rubber farmers with smaller rubber plantations need more information about rubber technologies, than those with large rubber plantations. Farmers with larger plantation sizes by virtue of their large plantation and to enhance resource productivity may consciously seek for information to boost their production performance. However, the result is not significant.

Conclusion

This study reveals that the respondents in the study area highly need information in all aspects of rubber innovations. Although, the respondents in the study area are competent in some of the technologies associated with rubber production such as the use of intercropping arable crops with rubber plantation, rubber spacing, fertilizer application weeding methods and pruning; they, nevertheless lacked competence in the utilization of the following technologies: cover cropping, budding practices, yield stimulation methods, tapping methods and latex processing for value addition. Hence, the dare need for the skills of the respondents to be improved upon.

Recommendations

Based on the findings in this study, it is recommended that agencies mandated to disseminate information to rubber farmers should focus on how to improved planting material, current price of rubber latex/coagula, processing of rubber latex, tapping methods and pest and disease management methods. The Capacity development programmes for the farmers should address budding practices, yield stimulation, tapping methods and latex processing for value addition. The agencies (RRIN, ADP) should intensify efforts (information dissemination and capacity development) in Delta State. This is because the rubber farmers in this state are in significant need for information and skill development in rubber technologies. Generally, there should be intensification of extension outreach to rubber farmers to enhance their information about modern rubber production and related matters. This is because extension contact had a significant association with the farmers information need.

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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