

Socio-economic Factors Associated with Gum Arabic Production in Nigeria

G. A. Sagay and C. S. Mesike*

Rubber Research Institute of Nigeria, P.M.B. 1049 Benin City, Edo State, Nigeria

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ABSTRACT The study analyzed the socio-economic factors associated with gum arabic production in Nigeria. Data were collected using structured questionnaires administered to 1184 gum arabic farmers in 15 States using a simple random method. The data were analyzed using descriptive statistics. The results show that 47.4% had no formal education and it was also revealed that 94.8% of farmers' lands were freehold and 10.8% of the farmers had over 20 hectares of land in reserve. The study also revealed that gum arabic production in Nigeria is mainly from the wild as there are 2.45 million hectares of wild grove in forest reserve while 1625 ha and 9766 ha of organized planting were owned by government and private sector respectively. Recommendations for improvement are provided.

INTRODUCTION

Gum Arabic (*Acacia species*) is the exudates obtained from the various species of the genus *Acacia*. There are about 1100 spp distributed over tropical and sub-tropical areas of Africa, India, Australia and America. However, only *Acacia senegal* (grade 1) and *Acacia seyal* (grade 2) yield gum of economic significance (Sean 1997; Odo and Oleghe 1998). The optimum conditions for the growth and performance of the plant are excessive heat, high elevation and sandy soil with scarcity of moisture (Yakassai 1998; Sagay et al. 2007). Production of gum arabic in Nigeria is largely from the wild except in Borno, Jigawa and Yobe State where plantations of several hectares were established. Gum arabic production is exclusively from gum bearing trees and local producers are typically peasant farmers picking gum exudates as a secondary or complementary source of revenue (Sagay et al. 2007). Stiles (1988) also reported that picking of gum exudates is a source of revenue in rural areas and gum arabic tree indirectly contributes to the improvement of the environment in areas threatened by desertification.

The commercial use of gum arabic can be traced back to the year 2000 BC, when the Egyptians used it in foods, adhesive and paint industries (Abdul 2002). Presently, Nigeria is second to Sudan in the world production of gum arabic. The world production of gum arabic and contribution by countries are shown in Table 1.

The tapping of gum arabic from the plants is done by wounding the stem deliberately or accidentally. The gum oozes out and is ready for collection after 3–4 weeks. Subsequent collections are done bi-weekly, two to three times from the same wound (Abdul 2002; Abdullahi 2004). Production of gum arabic in Nigeria is largely from the wild (Oleghe 1998; Abdullahi 2004). However, many efforts are made in the gum arabic growing states in the country to establish gum arabic plantation on a large scale. The demand for gum arabic is on the increase worldwide. Of course, the major determinant of the production of any industrial crop is its demand and the revenue derivable from it. That is, the better the market situation of a crop, the more the desire for higher production among farmers. Odo and Oleghe (1998) reported a diversity of users of gum arabic in the areas of food, and beverage industries, pharmaceuticals, printing and cosmetic industries. Hayward (2004) reported other uses to include the production of charcoal, resin and manufacture of farm and household implements. The world demand for gum arabic is increasing while production in Nigeria is stagnated (Wuranti and Giroh 2005). Considering the importance of gum arabic, this paper therefore seeks to describe the socio-economic factors associated with its production in Nigeria.

MATERIAL AND METHODS

Sixteen states considered to have potential for gum arabic production in Nigeria were visited. The states were further grouped into four zones on geographical locations and ease of coverage.

*Author for correspondence:
E-mail: sammesike@yahoo.ca

The States include:

- Zone 1 - Kaduna, Kano, and Jigawa;
 Zone 2 - Sokoto, Kebbi, Zamfara and Niger;
 Zone 3 - Bauchi, Gombe, Plateau and Nasarawa;
 Zone 4 - Taraba, Adamawa, Borno, Yobe.

Within these zones, the states were further grouped into medium and low production densities based on the information obtained on intensity of gum arabic activities in the states both in the wild and organized plantings. Four Federal Government Agencies, including the Rubber Research Institute of Nigeria (RRIN), Forestry Research Institute of Nigeria (FRIN), National Tree Development Unit (NTCDU) and Federal Department of Agriculture (FDA), Abuja were involved in the survey. The agencies worked with a team of officer from each of the relevant states' ministries who were very conversant with the entire survey area and were well-acquainted with gum arabic activities in the states. A total of 1184 structured questionnaires were administered to farmers using a simple random method. Simple blocking of states based on density of *Acacia* species either in the wild grove or organized plantations was done to ensure reasonable accuracy of estimates. Descriptive statistics such as frequency distribution tables and percentages were used to analyze the data collected

RESULTS AND DISCUSSION

Data in Table 2 shows that 47.4% of the respondents did not acquire any form of

Table 2: Educational background, landholdings and plantable reserve

<i>Particulars</i>	<i>Percentage</i>
<i>Educational Background</i>	
No. formal education	47.4
First leaving certificate	8.8
Secondary school certificate	4.2
Tertiary education	9.4
Islamic/Quranic educators	25.0
Other	5.2
Total	100.0
<i>Land Holdings</i>	
Freehold	94.8
Lease	2.1
Forest reserve	2.1
Other	1.0
Total	100.0
<i>Plantable Land Reserve</i>	
No plantable reserve	31.2
1-5 hectare	35.5
6-10 hectare	12.9
11-20 hectare	9.7
Above 20 hectare	10.8
Total	100.0

education while 25% attended Islamic/Quranic schools. This may have affected awareness and subsequent adoption of the production techniques of gum arabic over the years. Although awareness and subsequent adoption were relative, the delivery of the various improved packages to farmers through various extension channels are known to be hampered by poor educational background. Farmers accept innovations with skepticism and hence do not adopt new packages completely from the point of awareness. Data in Table 2 also shows the

Table 1: World contribution of gum arabic and contribution by countries

<i>Year</i>	<i>Production (Metric Tonnes)</i>					<i>Percentage of total</i>			
	<i>Sudan</i>	<i>Nigeria</i>	<i>FWA</i>	<i>Others</i>	<i>World</i>	<i>Sudan</i>	<i>Nigeria</i>	<i>FWA</i>	<i>Other</i>
1956	44.0	2.3	5.7	1.7	53.7	81.9	4.3	9.4	4.7
1957	46.0	2.0	5.7	1.3	55.0	83.6	3.6	10.4	2.4
1958	44.0	2.7	5.7	1.3	53.7	81.9	3.7	9.4	5.0
1959	46.7	3.7	5.3	1.3	57.0	81.9	6.5	9.3	2.3
1960	47.7	4.3	5.3	1.3	58.6	81.4	7.2	9.0	2.3
1961	46.3	4.3	5.7	1.0	57.3	80.8	7.0	9.9	2.3
1962	44.7	3.7	6.0	1.0	55.4	80.7	6.7	10.8	1.8
1963	46.0	3.3	5.7	1.7	56.7	81.1	5.8	8.9	4.2
1964	52.7	3.3	5.3	1.7	63.0	83.7	5.2	8.4	2.7
1965	56.0	4.0	5.0	2.0	64.7	83.6	5.9	7.5	3.0
1966	53.0	4.7	6.0	3.0	65.9	81.9	7.3	9.3	1.5
1967	511.3	5.3	6.3	3.7	66.3	77.8	8.0	9.6	4.6
1968	49.0	5.3	8.0	3.0	64.3	74.2	7.6	12.6	6.2
1969	48.3	5.7	7.3	3.5	57.2	75.0	8.9	10.9	5.2
1970	39.7	6.0	8.0	-	158.0	69.4	10.5	14.0	6.1

F.W.A. French West Africa

Source: FDA 2002

Table 3: Organized government and private plantations of *acacia Senegal* and natural stands in Nigeria

State	Planting years	Government plantings	Private holdings(Ha)	Number of farmers	Forest reserves	Total (Ha)
Jigawa	1964 – 2001	425	45	120	480,000	480,470
Borno	1969 – 2001	485	-	400	584,000	583,485
Yobe	1991 – 2001	45	9000	250	540,054	554,054
Kano	1994 – 2001	160	100	100	150,000	150,260
Kebbi	1990 – 2001	130	288	60	70,000	70,418
Sokoto	1978 – 2001	120	87	38	50,000	50,209
Zamfara	1987 – 2001	300	69	11	90,000	90,367
Adamawa	1994 – 2001	-	94.5	100	50,000	50,094.5
Taraba	1978 – 2001	30	17	100	15,000	15,047
Kaduna	1989 – 2001	3.75	55	5	15,000	15,058.95
Bauchi	Not available	50	10	6	256,000	256,060
Gombe	Not available	5	26	4	150,000	150,031
		1,625.75*	9766.5*	1,184	2,449,000**	2,460,392

* Average of 625 trees/ha ** Average of 100 trees/ha

distribution of the respondents by land holding. About 95% of the farmers' lands were freehold while leasehold and forest reserved constituted 2.1% each. Undefined forms of land ownership constituted the remaining 1.0% in majority of the states, the forest reserved were leased out to farmer for gum production, while in some cases, high proportion of the farmers, about 35.5% had between 1 and 5 hectares of land reserves while 31.2% of the farmer had no plantable reserves. About 12.9 % had between 6 and 10 hectares, 9.75 had between 11 and 20 hectares and 10.8% had over 20 hectares in reserve (Table 2). This suggests that land is not a major constraint to gum arabic production in Nigeria.

Table 3 shows the number of farmers that engaged in the cultivation of *Acacia senegal* in Nigeria. Out of 1,184 farmers that were engaged in gum arabic cultivation, Borno State recorded the highest gum arabic farmers with about 400

farmers. This was closely followed by Yobe State with about 250 farmers while Jigawa and Kano States followed with 120 and 100 farmers respectively. This result shows that Borno and Yobe States have the highest potential for wild groves and organized cultivation of *Acacia senegal*, as well as being the fore runners in exploitation and marketing of gums. This result also conforms to Yakassai (1998) who reported that over 80% of the total grade 1 gums sold in Nigeria are sourced from Borno and Yobe States. The results also showed that Nigeria has about 2,460,000 hectares of gum yielding trees that is mainly *Acacia species*. Out of this number, Government owned plantations cover only 1,625 hectares, while 9,766 hectares are of organized private holdings whereas the remaining 2.44 million hectares are in natural forest reserved mostly in Borno, Yobe and Jigawa States. Farmers' participation varied from states to states, which could therefore be traced to the various efforts employed by the Government of the gum arabic producing states to popularize the crop. The disparities among states in organized planting could be traced to the lack of awareness of the economic importance of the plant to farmers and Government Departments in the poor performing states.

Data in Table 4 shows that 26.4% of farmers got their inputs from the open market, while 24% were from the Government Ministry of Agriculture and Ministry of Environment. On the major areas of expenditure in gum arabic cultivation, 13.6% of the respondents spent most on fencing, 12.7% on transportation, 11.4% on pruning, 2.7% on weeding, 21.4% on seedlings purchase and 37.7% on other areas of expenditure.

Table 4: Mode of sourcing inputs and areas of expenditure in gum arabic production

Particulars	Percentage
<i>Mode of Sourcing Input</i>	
Freehold	20.8
Market	26.4
Ministry	24.2
Leasing	11.2
Housing	7.2
Others	10.2
Total	100
<i>Areas of Expenditure</i>	
Fencing	13.6
Transportation	12.9
Pruning	11.4
Weeding	2.7
Seedlings	21.4
Others	37.9

Table 5 shows that 44% of the farmers were not visited at all by Extension agents. Some farmers were visited regularly while others were visited twice a month. The frequency of visits by Government officials depends on factors like proximity, Government interest in gum arabic farmers, need for assistance and available of transport for such visits. Table 5 also shows that 35% of farmers requested for financial assistance, 17% needed seedlings while 20% needed fencing material. To enable farmers participate in gum arabic cultivation, areas of assistance should include supply of quality seeds, tools and implements, protection materials like fencing wires, effective extension services, organized marketing incentive and strengthening of export promotion and other trade networks.

Table 5: Frequency of sourcing inputs and areas of expenditure in gum arabic production

<i>Rate of visit</i>	<i>Percentage</i>
Zero visit	44
Always	17
Once per month	5
Twice per month	7
Thrice per month	2
Quarterly	6
Twice per annum	18
Total	100
<i>Areas of assistance</i>	<i>Percentage</i>
Education	9
Finance	35
Information	7
Seedlings supply	17
Fencing materials	10
Others	21
Total	100

Farmers' Perceived Constraints: Table 6 shows that capital was the major constraint to gum arabic cultivation as indicated by 31% of the respondents. This was closely followed by access to information with 20%. Land was not a major constraint to production. Hence, with adequate incentives, farmers with large holding will be able to commit more lands to gum arabic cultivation.

Solution to Constraints: It was also reported by 31% of the respondents that provision of loans would go a long way to solve their problems, while 24% emphasized the need for frequent extension information. Eighteen percent felt that government intervention in entire production process would provide solution to the constraints in the overall production system.

Only 5 per cent indicated that provision of land by the various authorities would solve various constraints (Table 6).

Table 6: Major constraints of gum arabic production

<i>Major constraints</i>	<i>Percentage</i>
Land	6
Seedlings	19
Capital	31
Information	20
Market outlet	9
Others	15
Total	100
<i>Solutions to constraints</i>	<i>Percentage</i>
Provision of land	5
Provision of loan	31
Extension information	24
Government involvement	18
Provision of market outlets	6
Total	100

CONCLUSION

In conclusion, it is apt to note that gum arabic is presently being largely produced from the wild forest of Nigeria as over 2.5 million hectares exist in forest reserved while only 11,391 hectares are in organized plantings across the Sudan and Sahel Savanna regions of the country. Obviously, great potentials still exist for field expansion.

RECOMMENDATIONS

It is therefore recommended that both the Federal and the respective State Governments in gum arabic production zone of Nigeria should continue to promote the development of gum arabic in the Sudan and Sahel Savanna regions of the country. Also, deliberate efforts should be made to promote gum arabic in marginal land because the crop can survive in adverse climatic conditions and thrive well on marginal soils. Also, it is recommended that the respective State Governments in gum arabic producing States should promote seedling production and distribution to farmers.

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