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An Overview of World Natural Rubber Production and Consumption: An Implication for Economic Empowerment and Poverty Alleviation in Nigeria

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ABSTRACT The study examined natural rubber (NR) production and consumption worldwide with emphasis on Nigeria. Data were collected from local and international journals on rubber production and consumption, which were analysed using descriptive statistics to evaluate the performance of the sector globally (1951 – 2005). Natural Rubber (*Hevea brasiliensis* Muell. Arg.) was first discovered by Christopher Columbus during his visit to South America in about 1493. It is an environmental friendly cash crop grown in Africa and Asian Continents. The product is mostly consumed by Europe and America and was believed to have been domesticated in about 1876, gained global awareness in 1913. Currently, Thailand, Indonesia, and Malaysia are the leading producers of natural rubber in the world. The global demand growth rate is about 3.4% annually. Africa produces about 408,000 tonnes annually, out of which Nigeria accounted for over 90,000 tonnes in the 1990s, but now only about 66,500 tonnes annually. This shows about 26.1% decrease in NR production from Nigeria during the period under review. Recently however ,research on NR production showed some achievements on high yielding rubber clones and the introduction of intercropping with arable crops has encouraged (NR) production in Nigeria. Inconsistence in Federal Government policies on agriculture, synthetic rubber (SR) production, ecological factors and socio-economic problems were found to be the major factors affecting rubber production and consumption in Nigeria.

INTRODUCTION

Christopher Columbus first discovered Natural Rubber (NR) during his visit to South America in about 1493. Mr Austine Coate first defined it in 1500 as a milk-like juice, which is found in the bark of *Hevea* tree that becomes golden brown and thicker on exposure to air. He called the tree a "CAOUTCHOUC," meaning weeping wood (Ogowewo 1986). One of the first uses of rubber was to "rub" off graphite or charcoal marks on paper and parchment; hence the name "RUBBER" was coined to the substance (Uraih 1980). Today, Natural Rubber (NR) is one of the largest industries in the world, and is an indispensable sub-sector in the modern technology.

Domestication and cultivation of NR is believed to have started in about 1876 and spread round the World by 1913. Sir Henry Wickhan was among the first planters of NR in 1876. He selected about 70,000 rubber seeds from Brazil and introduced them in his garden in Singapore. In about 1903, there were many established rubber estates and small rubber farm holders in the world among which was Nigeria, which had her first rubber estate in 1903 at Saponba, Edo state (Williams 2006).The plant continued to gain awareness among farmers worldwide and in 2004, the percentage production growth rate of NR in the world was about 7.2% or higher if not for the 'threat' posed by the utilization of synthetic rubber (SR) production (Rubber Asia 2004). The rapid growth rate in the production of the crop ought to have been triggered by the increasing ratio of NR to the SR consumption in the world (4:6, respectively). It is however disheartening to note that African contribution to the production and consumption of NR is still very low as Africa only account for 5% of world supply of NR and with only about 2% production growth rate (Table 2), while South –East Asia supply 90% with about 6.2% production growth rate and 6.4% consumption growth rate (Rubber Asia 2004). This paper therefore attempts to examine the production and utilization of NR in the world with Nigeria as a case study to serve as a guide to policy makers in their quest to improve agricultural production and more employment opportunities for economic empowerment and poverty alleviation among rubber farming communities.

GLOBAL PRODUCTION OF NR (1951 – 2004)

NR production globally increased from 1,915m/t in 1951 to 8,358m/t in 2004 indicating about 336.45% increase (Table 1). This may be due to the technological growth and advancement in the developed countries which created more

Table 1: World production trends of NR (Metric Tonnes)

Year	*Total production*	*% Change in production*	*Net export*
1951	1,915	-	NA
1952	1,855	-3	NA
1953	1,755	-5	NA
1987	4,840	30	3,940
1988	5,120	6	4,070
1989	5,120	2	4,150
1990	5,120	0	3,990
1991	5,350	3	3,970
1992	5,580	4	4,080
1993	5,340	-4	3,890
1994	5,670	-6	4,220
1995	5,880	4	4,230
1996	6,340	8	NA
1997	4,695	-3	NA
2003	7,800	70	NA
2004	8,858	7	NA

NA= Not Available
Source: Enabor (1986), I.R.S.G. (1993), Rubber Asia (May-June, 2004)

demand for NR, and hence the demand for higher production. Statistical report on world's NR production on individual country basis shows that Thailand, Indonesia and Malaysia are the patriotic nations in NR production (Table 2). Africa is lagging behind other regions in the production of NR. However, between 2005 and 2006, Nigeria had NR production growth rate of 5.7% while on the average Africa has only 2.2% production growth rate. The general low output of NR in Africa may be attributed to the low demand of NR from the African NR as it usually falls short of world standard. Efforts to reverse this trend led to the establishment of Quality Control Laboratories to certify the quality of the product in Nigeria, Cameroon and Cote d' lvore. Other factors identified to be responsible for this low production and demand of African NR include the destruction of the biggest rubber

Table 2: Rates of NR production changes in the world (000' tones)

Production regions	*2003*	*2004*	*% Change*	*2005*	*% Change*
Thailand	2,873	3,055	6.3	3,245	6.2
Indonesia	1,761	1,905	8.2	2,020	6.0
Malaysia	678	741	9.4	785	5.9
Other Asia	1,807	1,862	3.0	1,920	3.1
Africa	375	383	2.2	391	2.2
Latin America	161	164	2.4	170	3.2
World	7,800	8,358	7.2	8,792	5.5

Source: Rubber Asia (May-June, 2004)

estate in Africa, the firestone rubber estate of Liberia during the prolonged civil war in the country, systematic felling of rubber trees for the growth of other crops especially oil palm and arable crops in many parts of Africa, its labour intensiveness and the long gestation period (7 years).

GLOBAL CONSUMPTION OF NR (1951 – 2005)

The general increase in rubber production in the world is in consonance with its demand growth, as is shown in Tables 3 and 4. This may be due to increase in the world technology especially the automobile industries which require more of NR for tyres than SR. Pacific Asia was highest in consumption growth rate (6.4%) while Africa shows only 2.6% consumption growth rate. The low consumption of NR in Africa might be due to the fact that there are fewer NR consuming factories in the region compared to other parts of the World. North America, however, recorded the least consumption growth rate (1.1%) of NR in the world in 2004. This may be due her comparative advantage policy on the consumption of SR to NR.

Table 3: Percentage of world consumption of NR to SR (1975-2003)

Country	*1975*	*1980*	*1985*	*1990*	*1995*	*1996*	*1997*	*1998*	*2002*	*2003*
USA	25.3	22.8	28.0	30.7	31.6	31.4	31.0	33.0	NA	NA
UK	39.1	34.6	38.5	37.9	34.3	32.6	33.7	43.2	NA	NA
France	35.9	35.5	33.3	33.8	29.0	29.5	31.6	33.1	NA	NA
Germany	35.4	30.0	33.0	29.0	33.2	28.8	29.7	31.9	NA	NA
Italy	34.9	31.4	31.4	29.5	25.8	25.6	28.7	34.5	NA	NA
China	80.4	68.7	62.9	62.4	50.6	48.2	47.8	45.6	NA	NA
India	80.1	78.8	76.9	78.7	79.5	79.8	78.3	78.9	NA	NA
Brazil	25.1	24.9	32.3	30.3	35.7	34.8	34.0	34.8	NA	NA
Japan	32.8	32.5	36.3	37.4	38.9	38.9	38.0	38.8	NA	NA
Republic of Korea	37.9	54.4	51.6	47.8	44.7	40.5	42.7	51.0	NA	NA
World	32.4	30.3	33.0	34.9	39.3	39.0	39.6	40.2	40.02	40.06

Source: IRSG (1999), Rubber Asia (2004)

Table 4: NR Consumption growth rate in the world

Region	*Percentage growth*
Asia/Pacific	6.4
North America	1.1
Africa	2.6
European Union	3.1
Latin America	3.2
Other Europe	3.9
World	3.4

Source: Rubber Asia (May-June, 2004)

PRODUCTION OF NATURAL RUBBER IN AFRICA

Natural Rubber Production in Africa started between 1883 and 1905, while modern cultivation of NR is just about 50 years old due to the effect of Second World War, which slowed down the process. Africa accounts for only 5% of the world NR supply against 90% from South East Asia under the period of study. It was, however, observed that production of NR in Africa is on the increase (Table 5) with Cote d' lvore as the major producer which has a total of 9, 500ha under NR cultivation and production of 107, 000 tonnes per annum. Out of this 65, 000 tonnes were from the estates while 42, 000 tonnes comes from the small - holdings (The Rubber International 1999). Nigeria was next to Cote d' Ivore with a total production of 90, 000 tonnes annually from a total of 200,000ha, accounted for 3.2% of NR supply in the world in early 1960s, but declined steadily both in hectrage under production and total production output since 1970 to date at the rate of 0.03% annually (Aigbekaen et al. 2002).

History of NR Production in Nigeria (1894 – 2005)

Natural rubber production in Nigeria begun around the year 1876 with the exploitation of the indigenous wild rubber (*Funtumia* elastica). The plant was found to be poor yielding in latex and poor bark regeneration after tapping, while the demand for NR product worldwide continued to rise. The Knuth mull (Hevea brasiliensis), which arrived Nigeria from Kew garden, England in 1895, was found suitable for better yield and easy bark regeneration after tapping (Ogowewo 1989). This encouraged the establishment of NR estates by Miller Brothers in 1903, followed by Ikotumbo Rubber Plantation estate in 1907 at Edo and Cross–River States of Nigeria respectively. The Federal Department of Agriculture first planted its rubber plot in 1906, and between 1909 and 1917, about 2,160ha of Hevea trees were planted in Nigeria (Williams 2006).

Table 5: Production of natural rubber in Africa

Country	*Total area under cultivation (Ha)*	*Total yield (tones)*	*Ratio of yield (tones)*	*% Production*
Cameroon	44,000	61,000	0.150	14.5
DR Congo	NA	12,000	0.030	2.90
Cote d'Ivore	9,500	107,000	0.290	26.2
Gabon	9,500	11,000	0.030	2.70
Guinea	6,000	45,000	0.108	11.3
Liberia	NA	80,000	0.191	19.6
Malawi/Congo	NA	2,000	0.005	0.70
Nigeria	200,000	90,000	0.220	22.1
Africa		418,000	1.00	100

NA = Not Available
Source: The Rubber International (January, 1999)

In the 1960s to early 1970s, rubber used to be the fourth most valuable Nigerian agricultural export commodity after cocoa, groundnuts and palm kernels. It used to contribute about 6% of Nigeria's total export earnings in the 1960s, until in the 1970s when crude oil was discovered. This pushed down the annual export earnings from NR to only about 0.02%. However, the boom in the rubber trade stimulated massive planting of natural rubber in Nigeria during and after the Second World War, but sooner, some farmers were discouraged due to lack of technical know–how in the agronomic practices required of the crop (Ogowewo 1986). Some small scale rubber farmers abandoned their rubber farms for other crops like oil palm and cocoa. This reduced the total hectarage of land under NR cultivation from 243,479 ha in 1965 to 154,000 ha in 2005 (Table 6). However, the efforts of the few farmers who remain in the system motivated the government and some individuals to invest in the rubber industry in Nigeria. The Federal Government established Rubber Research Institute of Nigeria (RRIN) located in Iyanomo, Benin City, Edo state in 1972, and some forty (40) NR processing factories, which process rubber into Rubbed Smoke Sheets (RSS) in Nigeria. The grades were, initially considered as poor in the International market. But with the new government policies on agriculture and the advancement in technologies in rubber production and utilization, Nigeria is now one of the recognised rubber societies in the world.

The trend of NR production in Nigeria shows a decline despite the general improvement in

Table 6: Distribution of area planted to NR and production from estates and smallholdings in Nigeria (1965-2006)

	Land (Ha) under NR production			*% Production to total area*		*% Proportion*	
Year	*Estate*	*Small-holdings*	*Total hectarage*	*Estate*	*Small-holdings*	*Estate*	*Small-holdings*
1965	36,084	207,395	243,479	15.00	85.00	14.82	85.18
1980	53,000	195,800	248,800	21.00	79.00	21.30	78.70
1995	43,541	165,354	208,895	21.00	79.00	20.00	79.16
2000	50,000	150,000	200,000	25.00	75.00	25.00	75.00
2004	58,000	96,000	154,000	38.00	62.00	37.66	62.34
2005	58,000	96,000	154,000	38.00	62.00	37.66	62.34
2006	48,194	96,000	144,194	38.00	62.00	33.40	66.60

Source: Samarappuli (2001), Rubber Asia (2004), Michael (2006), Raw Materials Research and Development Council Abuja: Report on Survey of Agricultural Materials in Nigeria; Rubber (Maiden Edition) 2006

agricultural production in the country with exception of 1992 which indicated the peak production in Nigeria under the period of study. Table 7 depicts the hectarage of land under NR cultivation, total yield, domestic consumption and quantity exported from 1965 – 2005.Furthermore, the land area under cultivation of NR has been reducing since mid-1970s from 248,800ha to 154,000ha in 2005 indicating 38.1% decrease during the period (Table 6). Nevertheless, NR in Nigeria is receiving Presidential Initiative programme on its production and utilization. This requires adequate implementation strategies such as farmers' enlightenment campaign, farm inputs subsidies, vigorous efforts to reduce the NR gestation period. As Aigbekaen et al. (2002) is reported to have said that lack of credit and poor awareness attribute to slow rate of adoption of research technologies developed by RRIN.

Socio-economic Impact of Research Findings on the Status of Natural Rubber Farmers in Nigeria

The most sensible area that researchers paid attention to in the rubber industry in Nigeria is

Table 7: Trends of NR production in Nigeria.

Year	*Total cultivated land (ha)*	*Total production (Tonnes)*	*Domestic consumption (Tonnes)*	*Qty exported (Tonnes)*	*Value of export*	*Export ratio of Nigeria to world*
1965	243479	NA	NA	NA	22.0	NA
1970	243479	56250	5976	71024	17.6	2.1
1975	234379	67750	NA	NA	15.2	2.0
1976	248900	57199	NA	NA	14.4	1.8
1977	248900	66250	22134	4557	11.5	1.9
1978	248900	78000	22020	22056	12.5	2.3
1979	248800	67750	13354	26396	19.0	2.0
1980	248800	52500	25181	13759	16.3	1.5
1987	248800	59250	20065	22942	17.7	1.6
1988	248800	57500	17289	26716	96.1	1.5
1989	248800	56250	17516	28799	13.8	1.2
1991	248800	152000	19800	121000	16.3	1.2
1992	240440	155000	16000	139000	18.6	1.3
1993	240440	129000	19000	110000	NA	1.3
1994	240440	105000	18000	87000	NA	1.4
1995	208895	95000	19000	76000	NA	1.4
1996	200000	93000	22000	71000	NA	1.4
1997	200000	90000	NA	NA	NA	1.4
1999	200000	254000	NA	60000	91.00	1.4
2002	200000	254000	NA	NA	NA	1.4
2003	154000	254000	35456	NA	180.66	1.4
2005	154000	66500	16000	50129	NA	1.4

NA = Not Available
Source: Ogowewo (1986), Enabor (1996), I.R.S.G. (1997), The Rubber International (Jan. 1999). Rubber Asia (May – June, 2004), FAO (2003), Michael (2006), Williams (2006), NA= Not Available.

the maximization of yield per hectare, reduction of immaturity period of the rubber plant, intercropping of rubber with other crops and the industrial utilization of rubber seed. For instance, the locally grown Nigerian rubber trees yield between 300 - 400 kg/ha/year of dry rubber. The improvement in the genetic characteristics with emphasis on the yield of rubber started in RRIN in 1961. Some exotic clones were imported from Malaysia and Sri Lanka. The clones were evaluated and a few had mean yield of 1400 – 1600kg/ha/yr and were selected for further genetic improvement. Some of the clones are: RRIM 600, RRIM 501, PB 28/59, PB5/63, RRIM 628, RRIC 45, RRIM 614, AVROS 1581, and RRIM 605 AND PB 5/51. These imported clones formed the parent stock for hybridization at RRIN. The first selection, which commenced in 1968, produced fifteen clones with mean yields of 2000 – 2600 kg/ha/yr (Omokhafe et al. 2001) and they were coded NIG 800 series. The second selections were coded NIG 900 series with clones that can yield between 3000 – 3500 kg/ha/yr. Interlocational trials of NIG 800 and NIG 900 series were carried out at Akwete (Abia State), Calabar (Cross Rivers State) and Okho (Edo State) Nigeria. The results showed high rate of adaptability to environmental conditions, and were very encouraging Furthermore, better agronomic techniques, such as 6.7m by 3.34m planting spacing, ½ sd 1, 2, 3,4,5,6 and 7 tapping techniques have been introduced to rubber farmers (Aigbekaen et al. 2002). Also, studies on the utilization of the vast inter-rows of rubber before canopy closure through intercropping with annual and bi-annual crops to guarantee early return on capital invested and increase farm revenue generation to farmers as well as reduction of the maturity period has been successful (Esekhade et al. 2003). Currently, RRIN in collaboration with International Institute of Tropical Agriculture (IITA), Ibadan is trying the intercropping of immature rubber with cassava on a large scale at Iyanomo. RRIN has already commenced research into the possibility of intercropping rubber with shade tolerant crops (e.g. cocoyam) after canopy closure (Idoko et al. 2006) which has yielded a successful result. The purpose is to create additional income to rubber farmers especially the resource poor small scale farmers. Finally, utilization of rubber seed oil in the production of Alkyds and putty for various industrial uses has been successful in Nigeria. All these research results are expected to impact positively on the growth of NR industry in Nigeria and to have an upward percentage growth shift from the current 5.7% growth rate.

Constraints Facing Natural Rubber Production in Nigeria

Over 60% of Nigerian population live in the rural areas characterized by low income and standard of living (Ewuola 2000). The poverty conditions invariably can be seen in the average Nigeria's consumption, income, savings, tool used, scale of operations and output. Agricultural production is largely on a small scale and the level of poverty limits the efforts aimed at increasing out put in Nigeria and rubber enterprise is not an exception. Other factors militating against the expansion of rubber industry in Nigeria include the following:

Effects of Nigerian Government Policies on NR Production and Development in Nigeria

The major role played by governments of every country in developing her nation is through proper planning. Planning serves as a guide to positive actions, which could have been, otherwise be unregulated course of events. It therefore becomes a necessary ingredient in any meaningful development. Nigerian governments since the discovering of crude oil in 1970s, have given lower priority to agricultural development until recently. As oil revenue rolled in throughout the 1970s, government started importing food, and indigenous agriculture was left to suffer. The federal government allocated less than 3% of her annual budget to the sector in the 1970s and this dropped to 1% in the late 1980s (Oyedipe 2001). This created laziness, dependence and poverty among Nigerians especially in the rural areas. For instance, between 1954 and 1964, Nigerian rubber export increased by about 4 times that, from 20,000 tonnes to 73,254 tonnes indicated a tremendous increase of about 266%. This presented a global export growth of NR of 13%. But after the advent of crude oil (1971-1979), the percentage out put to total World production of NR dropped to 0.7% (Ogowewo 1986). Also, the hectarage of land under rubber cultivation reduced from 247,479ha in 1965 to 154,000ha since 1996 with about 85% under smallholdings mostly under poor agronomic practices and management (Table 1).

In 1980, however, Federal Government of Nigeria attempted to break the country's depen-

dence on food imports and to increase local production by 3.5% per annum for five years. Thus, in 1986, Federal Government initiated the Agricultural Development Projects (ADP), which spread nationwide by 1990. Other projects embarked upon by Federal Government under the World Bank loan scheme include the First project on Forestry 1 and 11 in 1987 and 1989 respectively, National seeds by 1990, Tree crops 1971, National Agricultural Research project, 1992, Fadama project in 1993 and Environmental Management and National Agricultural Technical support project (NATSP) in 1993. The effect of these numerous programmes on NR crop is reflected in Table 7. The Table shows a record of 11,000 tonnes of rubber exported in 1977 and 31,644 tonnes in 1985, which indicates 1.9% annual growth. It was considered as a period of reactivation of the rubber sector. However, problems arose in the area of rubber product farm-gate prices. The Federal Government of Nigeria insisted that the Farm gate price of rubber was higher than prices anywhere else in Africa and could not be raised any further even though it was not profitable to the farmers (Ogowewo 1986). Another problem was the policy makers who started judging benefits from agriculture with oil sector. Many Nigerians abandoned farming for other cheaper and quicker ways of making money. The consequence of this on NR in Nigeria was a tremendous decline in total production and export (Tables 8 and 9). This scenario affected the socio-economic status of many rubber farmers in Nigerians, and may take time to reverse it. However the current programme on NR, tagged 'Presidential Initiative on NR Production and Utilization,' which started in 2005 is seen as a good step to regenerate the interest of farmers on NR production in the country when adequate machineries are put in place and maintained.

Table 8: Comparism of the NR export of Nigeria with other neighboring countries (NR) (ITC – 2004)

Country	*Quantity exported (tonnes)*	*Unit value (US$/unit)*	*Value exported (US$'000)*
Cote d'Ivore	80,979	1.321	106,966
Cameroon	NA	NA	38,393
Liberia	28,061	1.353	37,952
Nigeria	17,642	1.313	23,169

Source: Williams (2006).
TSNR: Technical Specified Natural Rubber
ITC: International Trade Centre

Table 9: Export revenue and the percentage share of Nigeria in the World Export of Natural Rubber (₦ millions)

Year	*Export*	*% share in the World export*
2005	13,244.48	12.50
2006	18,568.69	13.90

Source: Central Bank of Nigeria (CBN) Annual report and Statement of Accounts (31-12-2006)

Effects of Ecological factors on NR Production in Nigeria

Natural rubber (*Hevea brasiliensis*) is a tropical plant, grows well in deciduous rain-forest zone, with a temperature range of $21^0C – 30^0C$ and a well-distributed annual rain fall of 2000mm or more on a well drained soil (Aigbekaen et al. 2001). These specific climatic requirements of the plant have invariably restricted it from the more vast arable land in Nigeria, especially the northern and the central parts. This is a major challenge to the scientists to evaluate the existing clones in order to develop new clones that will be adaptable to areas considered as marginal for NR production in Nigeria. It is worthy to note that Kaduna and Taraba States (one of the northern and central states in Nigeria) are already taking the bold steps towards realization of this optimistic venture.

The Threat of Synthetic Rubber to Natural Rubber

The Synthetic Rubber (SR) is produced from the bi-product of crude oil, which has close characteristics with NR. It can thus substitute the NR in functions to some large extent. Production of SR was emphasized in the 1940s with the aim to complement the NR to meet the world demand. Due to the emphasis on SR production, it stood as a threat to NR since 1960s (Ogowewo 1986). In 1956, the share of SR in the global consumption was 40%, and by 1979, it was 70%. This created fear in the NR producers that soon NR would suffer total replacement by SR. In fact, by late 1950s, United States of America cautioned all NR producing countries against expanding NR production capacity in view of the galloping progress of SR. This warning however sent a positive effect in the NR producers, in that by 1960s the NR producing countries had to sort for methods to improve the NR product to compete with SR. This challenge resulted in building better rubber processing factories and Nigeria was not left behind. By 1980, Nigeria had installed eleven crumbs factories and improved the yield

of the existing clones from 300 – 13500 kg/ha/yr (Omokhafe and Nasiru 2005). Now, a couple of decades ago, it has been accepted worldwide that SR does not pose much threat to NR, rather both are necessary and can only complement each other. Hence, gradually, the SR has receded to reach a position of about 58% with NR 42 % in the overall world rubber consumption by the year 2000.

The IRSG is currently the only international organisation for both NR and SR intervention. It is with the influence of this body that NR consumption growth is forecasted as follows: Asia/pacific 6.4%, Africa, 2.6%, North America, 1.1%, European Union, 3.1%, Latin America, 3.2% and other Europe, 3.9% (Rubber Asia, May-June, 2004) (Table 4).

CONCLUSION

Natural rubber plant (*Hevea brasiliensis* Muell. Arg) is one of the most essential cash crops grown in different parts of the world since over 200 years ago.

The cultivation and domestication of NR started in about 1876, which spread round the world in about 1913. Massive production of SR started in 1940s with the aim of augmenting the NR in order to meet the world demand. In 1970s, the world consumption of SR outweighed that of NR in the ratio of 7:3; hence a threat to NR until of recent that is accepted as a complement to NR. However, the current ratio of world consumption of NR to SR is 4:6.

The world trend of NR production is on the increase with Thailand, Indonesia and Malaysia as the leading world producers. The growth rate of NR production worldwide is about 5.2%, while in Africa is 2.2% and in Nigeria is about 5.7%. Production of NR in Africa is spearheaded by Cote d'lvore, which have a total hectarage under NR cultivation of 9,500, yielding 107,000 tonnes annually. Nigeria is next to Cote d'lvore, with 154000 ha under NR cultivation and produces 6500 tonnes annually. Various efforts have been made to improve the production of NR in Africa over the years. These efforts have not yet yielded the desired result because of the effect of the Civil War especially in Liberia, ecological, political and socio-economic problems in the continent. However, there are a lot of efforts being made in Nigeria to revitalize and improve NR production in the country in order to enhance the socio-economic status of Nigerian farmers.

RECOMMENDATIONS

The major factor influencing the production of any crop is its demand. The demand is invariably proportional to its supply, and hence influences it price. Although SR is a close substitute to NR, it is undoubtedly that with the galloping nature of technological innovations and the world economic development, NR can never be phased out in the system. It is therefore a challenge to the researchers and government to arise the interest of farmers and consumers of NR through their research findings.

In Nigeria, it is a challenge to scientists to break the barrier of the climatic requirement of NR by developing the adaptable clones to the climatic conditions of the northern parts of the country in order to increase rubber production. No doubt, these would be a function of (among others) a good government policy on agriculture, proper funding, adequate manpower training and the improvement of infrastructural development especially in the rural areas.

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