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The Forest Products Industry in Nigeria

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Abstract

The forest industry in Nigeria is undergoing a difficult period as a result of a multiplicity of factors. This study evaluates the performance of the industry, and results indicated that capacity utilization in the sawmill subsector was 6,994,660m³, 6,031,922m³, 7067145m³ and 3,800,000m³ respectively in 1988, 1992, 1996 and 2010. In the veneer and plywood mills, capacity utilization was 72,240m³, 54,600m³, 14,900m³ and 10,250m³ respectively in 1988, 1992, 1996 and 2010 respectively while particle board production has also been dwindling in recent years. The total particle board produced in 2010 was only 9,736m³ as against an installed capacity of 45,000m³. In the safety matches subsector, capacity utilization increased from 7,500 in 1988 to 16,200m³ in 1992 and 52,980m³ in 1996. Capacity utilization in the subsector was 11,496 in 2002 and 2010 respectively. Wood treatment subsector also witnessed a decrease in capacity utilization from 52,980m³ in 1996 to 11,496m³ in 2002 and 2010 respectively. There is the need to locally promote industrial clusters, cooperatives and private forestry through policy initiatives in this sector.

Key words: Capacity utilization, installed capacity, sawmill, plywood, particleboard, safety matches

Introduction

The forest products industry in Nigeria was one of the most developed within the Nigerian economy in the 1960's to the early 1970's. During this period, export of wood products and agricultural commodities provided more than 70% of the country's Gross Domestic Product (GDP). However, the oil glut of the 70's led to gregarious exploitation of round logs for export until its ban in 1976. The over exploitation of the wood resources has impacted negatively on the development of the forest products industry. This, coupled with several other factors such as old age of equipment, etc; has resulted in the dwindling fortune of the country's forest industry. This paper discusses the results of a study conducted to examine the structure and performance of the Nigerian forest industry and suggests recommendations to enhance industry stability and competitiveness.

Forest resources availability and exploitation in Nigeria

The present public forest estate which was acquired between 1900 and 1970 embraces 100,000 km or 11% of the total land of the country. Only about 26% of this is in the high forest area. It is estimated that an additional 90,000km² of high forest is available outside the forest reserves. The forest resources have served as an engine of growth and propelled economic activities in Nigeria as far back as 1792 when pit sawing operation commenced, followed by the establishment of a power sawmill in the Delta area in 1902 (Aribisala, 1993). These developments led to a substantial increase in wood exploitation for utilization in domestic industries and for export. Wood export peaked in 1950's with log and sawn wood and subsequently, veneer and plywood. This trend was maintained and sustained in the 1960's and early 1970's. However, by mid 1970's, the toll of intensive exploitation has started showing and volume of wood export which peaked at 700,000m³ in 1964, decreased steadily to 290,000m³ in 1970 (Aribisala, 1993).

Among the factors that led to the reduction in forest resources availability is intensive exploitation of the resources. As far back as 1899, the perspective planning for economic development was to exploit forest resources (Adeyoju, 1975). The export revenue from forestry grows at 4.1%, 8.0% and

28.8% between 1950-60, 1960-70 and 1970-80 respectively (Aribisala, 1993). The period witnessed the development of a virile forest products industry made up of well structured saw mills, wood panel industries, furniture industries, match factories and pulp and paper industries. The development of the forestry sector is characterized by mechanically processing of timber into sawn wood, veneer and plywood. This promoted the vast growth of the economy by making positive contribution to raw materials production and supply for construction, furniture and packaging.

Impact of forest over- exploitation on wood industry

More recently however, there have been changes in the structure of the forestry sector. The forest resource survey, 1996-1998, revealed that the forest cover has decreased by 20% over the preceding 18 years. According to Adeyolu (2001), the total forest estate which stood at 10% of the country's land area in 1996 is now less than 6%. Ola Adams and Iyababo (1977) estimated that about 26,000 ha of forest land are destroyed annually in the rainforest zone during the conversion of natural forests to plantation forests and other forms of land use. World Wildlife Fund estimated that over 90% of the natural vegetation had been cleared and over 350,000 ha of forest and natural vegetations are lost annually (WWF, 1989),

These occurrences have significant impact on the operations of the forest industries leading to a decline in the contribution of the industries to national industrial development. Studies by RMRDC (2009) indicated that the total volume of usable wood down to 30cm cutting diameter in the forest reserves is 239,775,500cm³. This is not significantly different from 437,507,205.9m³ reported by Akindele *et al* (2001). Various studies (RMRDC, 2003; Aribisala, 1993, and Oriola, 2009) have reported a decline in the performance of the forest industries in Nigeria. Thus, there is the need for constant assessment of forest industries in Nigeria in order to promote initiation of policies that will lead to rejuvenation of the sector. This study provides one of such attempts.

Materials and methods

This study derived from a survey designed to assess quantity, production trend and status of forest industries in Nigeria. Data used for the study was obtained through the use of a structured questionnaire. The questionnaire was on installed capacity, capacity utilisation, equipment and production

processes, etc; in the forest industries in all the 36 states and the Federal Capital Territory. Respondents were either enterprise owners or upper level managers. The questionnaire was segmented into key areas in all the sub-sectors of operation within the forest industries sector. 300 questionnaires were administered. Complementary data were obtained from other sources of information such as from Food and Agricultural Organization and the Raw Materials Research and Development publications. These sources were supplemented with physical observations of mills and on-the-spot assessments were used to validate information obtained from various sources.

Data analysis

The data obtained on installed and utilization capacities by the different subsectors for 2010 when the study was carried out were tabulated and summed up. The results obtained for the different subsectors were juxtaposed with results of similar studies reported by the Raw Materials Research and Development Council in 1988, 1992, 1996, and 2002 to observe the variations in installed capacity and capacity utilization in different years. Where available, installed and capacity utilization reported by studies carried out by the Food and Agricultural Organisation experts in the sector were also used for comparison. The percentage capacity utilization was obtained as percentages of utilization capacity and installed capacity for the various subsectors.

Results

Results indicated that there are five major wood industries in Nigeria. These are the saw mill, wood based panel, furniture, safety match and the wood treatment industries. 129 furniture industries which represented 50.39% of total respondents completed the questionnaires while 116 sawmills which represents 45.31% of the total respondents completed the questionnaires. 2 companies each among the producers of plywood and veneer, safety matches and particle boards which represented 0.78% each completed the questionnaires. Five wooden doors producers which represent 1.91% of total respondents also completed the questionnaires (Table 1). In addition to these, there are a number of other industries such as toothpicks producers, pestle and mortar and wood carvers which are operating within the industry. Most of these other industries operates at cottage level and mostly belong to the informal sector.

Table 1: Subsectors response to the questionnaire

Subsector	No of respondents	Percentage of Respondents
Furniture	129	50.39
Saw mill	116	45.31
Ply & veneer mills	2	0.78
Particle board	2	0.78
Safety matches	2	0.78
Wooden door products	5	1.91
Total	256	100

Sawmill industries

The installed capacity and capacity utilization of sawmills in Nigeria are shown in Table 2. The table indicated that installed capacity in the sawmill industry in Nigeria rose from 8,831,750m³ in 1988 to 15,793,188m³ in 1992. It then decreased to 10,900,000 in 1996 and subsequently increased to 14,684,000m³ in 2002 and 11,734,000m³ in 2010 (Table 2). Capacity utilization within these periods was 6,994,660m³, 6,031,922m³, 7,069,145, and 3,800,000m³ respectively (Table 2). This represented 79%, 38%, 39%, 35% and 32% capacity utilization respectively. Total number of sawmills decreased from 1617 in 1990 to 910 in 1992. It rose to 1252 in 1996 and to 1259 in year 2002. In 2010, the number of sawmills in Nigeria stabilized at 1325.

Table 2: Installed capacity and utilization (round log equivalent) in the Sawmill industry

Year	No of sawmills	Total installed capacity M ³ /year	Utilization capacity M ³ /year	Capacity utilization %
1988	N/A	8,831,750	6,994,660	79
1992	910	15,793,188	6,031,922	38
1996	1252	10,900,000	4,200,000	39
2002	1259	14,684,000	5,177,700	35
2010	1325	11,734,000	3,800,000	32

Out of the 1325 sawmills that operated in Nigeria in 2010, about 300 are in swamp forests of Lagos and Rivers States which are fed with wood from the adjoining states by rafting or water transportation. About 945 sawmills are

in the rain forest zones, most of which are located Edo, Delta, Ondo, Ogun, Oyo, Osun, Cross River States. In the savannah zone, there are about 80 sawmills located mainly in Taraba, Adamawa, Benue, Kwara, Kogi, Kaduna, and Niger States.

Furniture industries

The furniture industry is strategic in the use of planks from the saw mills. It forms the major market for wood products in Nigeria and protects the continued existence of primary wood industries such as sawmills and ply mills. The capacity utilization of the furniture industry was 217,700m³ in 1988. This increased to 250,714m³ in 1992. In 2010, capacity utilization of the industry was 326,172m³ of round log equivalent (Table 3). More than 400 furniture companies of various sizes exist in the country. The shortfall in large furniture companies is made up by the numerous cottage and small scale furniture makers which numbers more than 10,000 outlets. This category of furniture makers usually operate in the informal sector and are found in the rural and urban areas where middle and low income earners reside. Wooden furniture parts and components are now being manufactured and exported by a few large companies in Nigeria. Wooden furniture represents the major market for wood products in Nigeria. Many of the industries suffer from high cost of production due to energy cost and lack of patronage.

One of the major specialties of furniture makers in Nigeria is wooden door; which is very popular in the country. Handmade carved doors are frequently seen exhibited along the roadside by carpenters. Only 5 companies gave their installed capacity. This amounts to 65,810 m³ with a current production level of 6580 m³ representing 10% capacity utilization.

Table 3: Installed capacity and utilization (round log equivalent) in the furniture industry

	No of furniture Industries	Total installed capacity M ³ /year	Utilization capacity M ³ /year	Capacity utilization %
1988	5000*	N/A	217,700	N/A
1992	7,500*	N/A	250,714	N/A
1996	10,000*	N/A	N/A	N/A
2002	10,000*	N/A	N/A	N/A
2010	810,000*	N/A	236,172	N/A

* estimate only

Plywood mills

In 1988, the total installed capacity was 126,000m³. This decreased to 106,000m³ in 2002 and further to 96,000m³ in 2010 (Table 4). Capacity utilization in this sub sector has also been fluctuating. It increased from 67,340m³ in 1988 to 72,240m³ in 1992. Since 1992, capacity utilization and number of industries operating within the subsector have been on decrease. Capacity utilization decreased from 72,240 in 1992 to 54,600m³ in 1996 and 14,900 and 10,250m³ in 2002 and 2010 respectively. The number of plywood mills increased from 8 in 1988 and 1992 respectively to 10 in 1996 (Table 4). This decreased to 4 in 2002 and to 2 in 2010. Plywood or veneer production requires input of logs of prime diameter and quality. Veneer slicing is all integrated within plywood mills.

Table 4: Installed capacity and utilization (round log equivalent) in the plywood mills

Year	No of Ply mills	Total installed capacity M ³ /year	Utilization capacity M ³ /year	Capacity utilization %
1988	8	126,000	67,340	53
1992	8	126,000	72,240	57
1996	10	126,000	54,600	43
2002	4	106,000	14,900	14
2010	2	96,000	10,250	11

Particle board mills

With an installed capacity of 85,000m³ in 1988, capacity utilization was a mere 11,496m³ in 2010 (Table 5). Capacity utilization in 1992, 1996, 2002 and 2010 were 34,290m³, 54,600m³, 12,900m³ and 11,496m³ respectively (Table 5). The number of particle board mills in the country has remained constant at 4 from 1992 to 2010 (Table 5.) The factor responsible for this low capacity utilization is competition with foreign particle boards which are of higher quality and comparatively lower prices. Production in this subsector is limited to what the domestic market can absorb. Apart from this, the small output capacities and higher investment cost per unit of capacity will not permit the present Nigerian particle boards mills to successfully compete on the export market.

Table 5: Installed capacity and utilization (round log equivalent) in the particleboard mills

Year	No of particle boards mills	Total installed capacity M ³ /year	Utilization capacity M ³ /year	Capacity utilization %
1988	2	85,000	N/A	N/A
1992	4	85,000	34,290	40
1996	4	67,150	54,600	81
2002	4	67,150	14,900	22
2010	4	45,000	11,496	26

N/A=Not available

Matches

Seven safety matches industries were identified to have been established in the country. These comprised of three (3) in Lagos State, one each in Rivers, Imo, Cross-rivers, Oyo and Kwara States (Table 6). This has however been decreasing in recent times. While 6 safety matches companies operated in Nigeria in between 1988 and 1996, the number of safety matches companies decreased to 3 from 2002. Capacity utilization in the safety matches subsector increased from 7,500m³ in 1988 to 16,200m³ in 1992 and 52,980m³ in 1996 (Table 6). Capacity utilization stabilized at 11,494m³ in 2002 and 2010 respectively. The importation of wooden matches from Asia is enormous. Most of the matches come from Malaysia, China, India and Indonesia where they are made from *Bombax spp.* The matches are of excellent quality with good appearance and are inexpensive. The continuous importation of cheap wooden matches from Asia is hampering the growth of this sub-sector.

Table 6: Installed capacity and utilization (round log equivalent) in the safety matches producing plants in Nigeria

Year	No of Safety matches	Total installed capacity M ³ /year	Utilization capacity M ³ /year	Capacity utilization %
1988	6	N/A	7,500	N/A
1992	6	N/A	16,200	N/A
1996	7	N/A	52,980	N/A
2002	3	N/A	11,494	N/A
2010	3	N/A	11,494	N/A

N/A= Not available

Wood treatment

Capacity utilization has also been decreasing with time in this subsector. Capacity utilization decreased from 55,100m³ in 1988 to 37,750m³ in 1992 (Table 7). In 2010, capacity utilization dwindled to an all time low 12,370m³ in the subsector. The wood treatment plants in Nigeria should by now be experiencing increase in activity with the decreasing supply of durable wood from the natural forests. However, most of the wood treatment plants are no longer operational as a result of lack of spare parts and general maintenance problems. Consequently, most companies now depend on few ones that are working to treat their materials.

Table 7: Installed capacity and utilization (round log equivalent) in the wood treatment plants

Year	No of wood treat-ment plants	Total installed capacity M³/year	Utilization capacity M³/year	Capacity utilization %
1988	8	N/A	55,100	N/A
1992	8	N/A	37,200	N/A
1996	10	N/A	N/A	N/A
2002	4	N/A	N/A	N/A
2010	2	N/A	12,370	N/A

N/A = Not available

Discussion

The saw mill industry is characterized by small scale operatives which constitutes more than 90% of the entrepreneurs in the sector. A major characteristic of the subsector is increasing number of operatives and decreasing performance. The capacity utilization in the industry is averaged 37% and the lumber recovery rate 40-60% respectively as a result of old equipment. According to Olorunnisola (2000), the annual rate of return is between 15.2% and 44.3% while more than 70% of the workforces are manual laborers. The saw mills used outdated technologies while only less than 10% used advance technologies. Although, the sawmill industry has grown from the pit sawing to circular saw head rigs and French manufactured CD4, CD5, CD6 horizontal band saws, mighty mite, brenta vertical, kernali brand, antiglo machine, jevo machine, primultini vertical and forestor (Omoluabi, 1994), there are only few established saw mills that use the Numeric Controlled (NC) devices. Technological improvement in this industry will impact significantly on log to plank conversion efficiency.

Changes in the raw material characteristics such as decrease in log diameter in Nigerian forests also have a strong influence on conversion efficiency. Apart from energy supply, another major factor limiting growth in the industry is scarcity of economic timber resources. The short fall in installed capacity and actual capacity utilization occurred as the saw mills are structured to utilize large diameter logs which are now limited in the natural forest as small size timber, dominate the present composition of Nigerian forest resources (Larinde, 2010; RMRDC 2003). In Nigeria, round wood processing has reached the limits of available forest resources such that the future increase in wood production and revenue could be derived from further processing of saw wood rather than expansion in sawmill and exploitation of wood resources (Larinde, 2010). Consequently, Omoluabi (1985), Oyegade (1997) and Larinde (2008) recommended that efforts should be geared towards having most of the wood industries in Nigeria integrated to enable the wood waste or wood materials which are not suitable for one mill to be channelled to other mills that can process them.

While the domestic market for furniture is growing rapidly, the industry has not contributed significantly to foreign exchange earnings as the industry is dominated by small scale operators of about 3-5 workmen (RMRDC 2009; GWV Consultants, 1994). In Nigeria, the furniture industry uses simple technologies; they have low technical knowhow and low capital input. They are mostly made up of outfits with crude hand tools and equipment (RMRDC, 1991; 2003 and 2009), resulting in poor quality products (GWV Consultants, 1994). The small scale furniture producers are technically inefficient as they fall below efficiency level of 60% (Ako and Kuye, 2010). The implication is that the average furniture producer need 48% cost saving devices to attain the status of efficiency, while least furniture producer need about 88% cost saving devices to become an efficient producer. Most of the small scale operators in this subsector are more interested in quick profit rather than quality control and expansion (NACETEM, 2010). Other problems militating against adequate performance of operatives in this subsector are low level of demand (Arowosoge *et al.* 2010), poor workmanship (GWV Consultants, 1994), and high level of poverty and long lifespan of furniture products. Others include the inefficiency of the ban on furniture importation due to high level of smuggling (Aku, 2010), paucity of skilled manpower and in adherence to standard drying, preservative treatment and design procedures (Ogunwusi, 2011).

Plywood production in Nigeria has reduced drastically in the country as a result of high reduction in the volume of economic wood species (RMRDC, 1991; Arowosoge, 2010). Face veneer is in short supply as one of the major producers; the government owned African Timber and Plywood has closed operations. It is expected that the privatization of this company will lead to the achievement of goals of the privatization exercise among which are technological innovation and improved productivity. Currently a considerable volume of face veneer is being imported from Ghana and various parts of Europe (GWV Consultants, 1994). Other problems of face veneer producers are old equipment and lack of spare parts.

The major factors limiting optimal production of particleboard in Nigeria are uncertain investment climate and low exchange rate of local currencies to import new equipment, spare parts and glue (GWV Consultants, 1994). Current production is hampered by high cost of production resulting primarily from high cost of imported resins.

The low cost of imported matches in juxtaposition with the high cost of those produced in Nigeria make local production an unprofitable enterprise. To protect this subsector it may be necessary to increase tariff on imported matches.

While the need for preservative treatment of wood is becoming germane locally as a result of decrease in ages and diameter of remaining wood species in the nation's forests, the treatment plants in the country are closing down by the day as a result of old age of equipment. Thus there is increasing utilization of hand brushed wood in the wood and wood products sector.

In general, the Nigerian wood industry is gradually declining in performance, efficiency and productivity due to the reasons already highlighted. High quality saw logs and veneer logs are limited with 97% of log production factoring into the lesser used wood species (Arowosoge, 2010). The shortage of domestic supply of round wood is a constraint to producing high quality final products that are competitive in international markets. As a result of this, a number of lesser used wood species are now widely available in plank markets in various parts of the country. In nearly all the ecological zones, the wood species mostly found in the timber markets are those that are widely available in the forests within the zones. For instance, *Irvingia gabonensis* wood is now very popular in the planks markets in the south east and south west zones while *Prosopis africana* and *Detarium senegalense* are now very

prominent in markets in the Northern parts of the country. The low acceptance of the lesser used wood species in international markets is indicated by poor patronage (Jayanelti; 1998; Eastin *et al*, 2003; Barany *et al* 2003). Research studies (Coleman, 1998; Barany *et al* 2003) have indicated that information on lesser known wood species availability, natural durability, physical properties, working qualities, and use range which are of utmost importance to manufacturers are lacking. Hence, efforts at promoting increased utilization of lesser known species will not be successful without well documented, readily available concrete information (Arowosoge, 2010).

Conclusion

The Nigeria wood products sector has traversed a variety of circumstances. From being a buoyant sector in the 1960's to the early 1970's, the sector is now a shadow of its former self. Nigeria used to be a major producer of exotic furniture for export in the 1960's to 1980's in view concrete investments in wood processing industries made by both the private investors, federal and state governments. With the downturn in the economy occasioned by oil glut and the introduction of the Structural Adjustment Programme, the federal government's investment in wood processing was bastardized and most of the companies such as Nigeria Romania Wood Industry, the African Timber and Plywood, etc; where government had controlling interests could no longer access foreign exchange for import of equipment and parts. These rendered them unprofitable and were forced to stop operating. This in turn stifled export development, resulting in a national foreign trade balance deficit in the sector. Deficiencies in technologies and finance, lack of qualified manpower and their rapid turnover are major problems militating against optimal development of this sector. Thus, technical training is a priority to promote production to international standard and customers requirements. Most enterprises surveyed in this study are unable to utilize maximum production capacity. Some of the main reasons behind this are scarcity of economic wood species and insufficient demand. An effort to develop a customer centric industry perspective, as opposed to production centric perspective can help to make manufacturers more competitive. This would include market research, customer satisfaction studies and a strategic perspective of industry development.

In addition, one key element that can contribute to success in the sector is to improve dialogue with university and research institutes. There is a wealth of information and resources that can be used to develop this sector; however,

this are currently not exploited to their fullest potentials. Likewise the formation of product specific clusters in this sector will help in alleviating problems of assessing finance for improved production and innovation. It has also become very important that government should encourage private sector participation in the establishment of economic indigenous wood species. This could be done through the installation of a regime of incentives and the formation of cooperatives to be backed by the constitution.

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