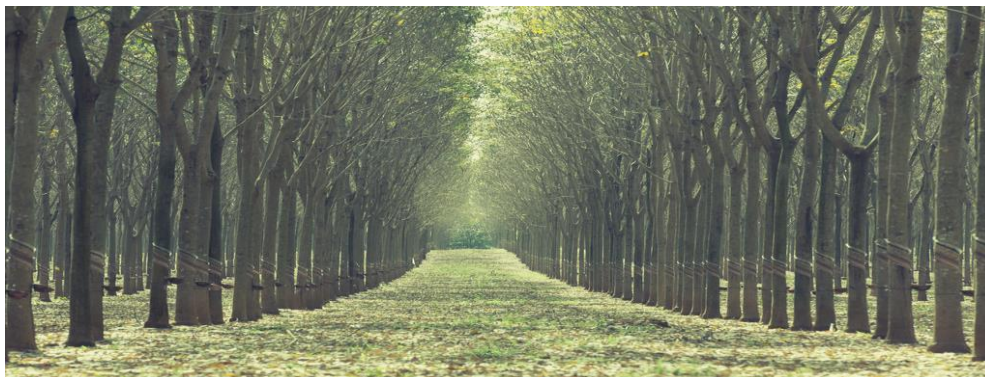


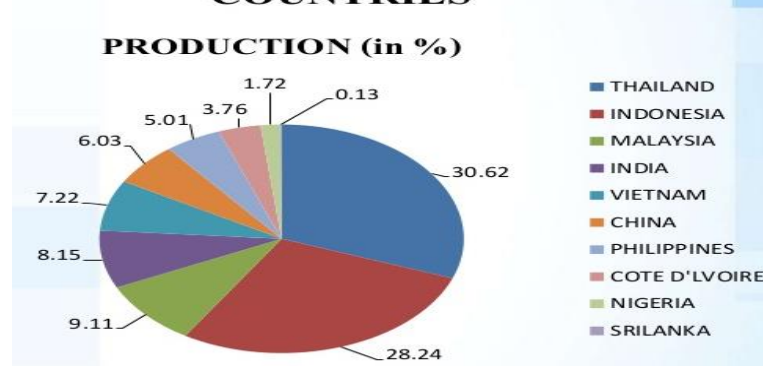
The Rubber Value Chain: Limitations and Prospects to Rubber Production in Nigeria

Think of rubber and you probably think of elastic bands, car tires, or pencil erasers. But this super-stretchy material actually finds its way into tens of thousands of different products—everything from rubber stamps and waterproof shoes to surfing wetsuits, swimming caps,



and dishwasher hoses. Rubber, which has been commonly used for over 1000 years, once came entirely from natural sources; now rubber products are just as likely to be made artificially in chemical plants. That's largely because we can't produce enough natural rubber to meet all our needs. And that, in turn, is because rubber is so fantastically useful.

TOP 10 RUBBER PRODUCING COUNTRIES



What is Rubber?

When people talk about "rubber", they don't usually specify what kind. There are many different kinds of rubber, but they all fall into two broad types: natural rubber (latex—grown from plants) and synthetic rubber (made artificially in a chemical plant or laboratory). Commercially, the most important synthetic rubbers are styrene butadiene (SBR), polyacrylics, and polyvinyl acetate (PVA); other kinds include

polyvinyl chloride (PVC), polychloroprene (better known as neoprene), and various types of polyurethane. Although natural rubber and synthetic rubbers are similar in some ways, they're made by entirely different processes and chemically quite different.

Natural rubber; Natural rubber is made from a runny, milky white liquid called latex that oozes from certain plants when you cut into them. (Common dandelions, for example, produce latex; if you snap off their stems, you can see the latex dripping out from them. In theory, there's no reason why we couldn't make rubber by growing dandelions, though we'd need an awful lot of them. Although there are something like 200 plants in the world that produce latex, over 99 percent of the world's natural rubber is made from the latex that comes from a tree species called *Hevea brasiliensis*, widely known as the rubber tree. This latex is about one third water and one third rubber particles held in a form known as a colloidal suspension. Natural rubber is a polymer of isoprene (also known as 2-methylbuta-1,3-diene) with the chemical formula $(C_5H_8)_n$. To put it more simply, it's made of many thousands of basic C_5H_8 units (the monomer of isoprene) loosely joined to make long, tangled chains. These chains of molecules can be pulled apart and untangled fairly easily, but they spring straight back together if you release them—and that's what makes rubber elastic.

Synthetic rubbers; Synthetic rubbers are made in chemical plants using petrochemicals as their starting point. One of the first (and still one of the best known) is neoprene (the brand name for polychloroprene), made by reacting together acetylene and hydrochloric acid. Emulsion styrene-butadiene rubber (E-SBR), another synthetic rubber, is widely used for making vehicle tires.

How is Rubber Made

It takes several quite distinct steps to make a product out of natural rubber. First, you have to gather your latex from the rubber trees using a traditional process called rubber tapping. That involves making a wide, V-shaped cut in the tree's bark. As the latex drips out, it's collected in a cup. The latex from many trees is then filtered, washed, and reacted with acid (acetic acid, formic acid, and alum) to make the particles of rubber coagulate (stick together). The rubber made this way is pressed into slabs or sheets and then dried, ready



for the next stages of production. By itself, unprocessed rubber is not all that useful. It tends to be brittle when cold and smelly and sticky when it warms up. Further processes are used to turn it into a much more versatile material. The first one is known as mastication (a word typically used to describe how animals chew food). Masticating machines "chew up" raw rubber using mechanical rollers and presses to make it softer, easier to work and more sticky. After the rubber has been masticated, extra chemical ingredients are mixed in to improve its properties (for example, to make it more hardwearing). Next, the rubber is squashed into shape by rollers (a process called calendaring) or squeezed through specially shaped holes to make hollow tubes (a process known as extrusion). Finally, the rubber is vulcanized (cooked): sulfur is added and the rubber is heated to about 140°C (280°F) in an autoclave (a kind of industrial pressure cooker).

Rubber Production in Africa.

Africa accounts for around 5 per cent of global natural rubber production; the French tyre giant Michelin is a major NR (Natural Rubber) player in Africa having rubber plantations in Nigeria, Cote d'Ivoire, Ghana and Benin. Japan's Bridgestone/Firestone Corporation has plantations in Liberia. Another NR plantation major is the Singapore-based Golden Millennium Group (GMG) owning 18,000 hectares of plantations in Cameroon.

According to projections by international NR plantation experts like Dr. S. Sivakumaran, Executive Director, Research & Development, Greenfield Berhad, Malaysia, the global scenario for natural rubber is very encouraging with projections of increasing demand till 2020 and possibly beyond. Attention is now turning to West Africa as a source of production growth. Like South East Asia, West Africa too has a highly suitable climate for rubber cultivation and a large pool of economically-priced agricultural labor. Though Liberia and Cote d'Ivoire are both potentially important producers, today they account for only around 2 – 4 per cent of global output. Liberia has some 10 million hectares of land available for agriculture of which oil palm developments are now expected to use at least one million hectares; but rubber plantations account for only 200,000ha today, something the Government of Liberia reportedly would like to see changed.

According to statistics of the Food and Agriculture Organization (FAO) statistics, among the African countries, Côte d'Ivoire ranks the 9th in global rubber production with an annual output of 310,655MT followed by Nigeria at 156,341MT ranking 12th in global production, Liberia at 73,710MT (14th), Cameroon at 55,510MT (16th), Gabon at 24,895MT (17th), Ghana at 22,427MT (18th), Ecuador at 20,308MT (19th), Guinea 16,566MT (20th), Democratic Republic of the Congo at 12,758MT (23th), Papua New Guinea at 8,092MT (24th), the Republic of the Congo at 2,365MT (26th) and the Central African Republic at 1,535MT (28th) (FAOSTAT, 2016). Most of these countries have massive unexploited areas highly conducive for natural rubber.

Predominant Area of production.

The major rubber producing states in Nigeria comes from the southern part of the country, where high rainfall are being experienced, although it is also been grown in Abia, Anambra, Akwa Ibom, Rivers, Ebonyi and Bayelsa, it is commercially been grown in Ondo, Edo, Ogun, Delta (Sapele) and Cross River state.

Uses of Rubber

Due of its elasticity, resilience, and toughness among other properties, natural rubber is the basic constituent of many products used in the transportation, industrial, consumer, hygienic, and medical sectors. Tires and tire products account for more than 50% of natural rubber usage, making transportation the leading single sector of the major uses of rubber, automobile tires which make up the prime outlet for natural rubber. Industrial products such as hoses and tubes, industrial lining, transmission and elevator belts, bridge bearings, and consumer products such as golf balls, erasers, footballs, footwear, and other apparel account for the remaining usage of rubber. Articles for use in the medical



Rubber boot

and health sector (condoms, catheters, and surgical gloves) as well as seismic materials (for instance, over 500 and 2,500 buildings are respectively fitted with seismic rubber bearings in China and Japan).

Latex articles (condoms, gloves, threads, adhesives, and moulded foams) could be included in different categories in terms of end-use. Cured rubber is used for all types of rubber products. Seeds are source of Para rubber seed oil, recommended for manufacture of soap. Although poisonous, seeds



Balloons

can be eaten as a famine food after processing; boiling removes the poison and releases the oil that can be used for illumination. Seeds are sometimes eaten off the ground by cattle. Kernels (50%–60% of the seed) contain 40%–50% of a semidrying pale yellow oil, used in soap making, paints, vanishes, and is effective against houseflies and lice. Press cake or extracted meal can be cautiously used as fertilizer or feed for stock. Rubber is made into articles as diverse as raincoats and sponges, bowling balls and pillows, electrical insulation and erasers. People ride on rubber tires and walk on rubber heels. Rubber is also used in toys, balls, rafts, elastic bandages, adhesives, paints, hoses,

and a multitude of other products. The essential use of rubber is for tires. Most commonly, tires consist of several types of rubber including both natural and synthetic. Natural rubber has a greater resistance to heat compared to synthetic rubber, making its use vital in some types of tires. For example, as a result of the flexible sidewalls found in radial tires that produce a build-up of heat, radial automobile tires are composed of an increased percentage of natural rubber compared to other types of automobile tires.

Potentials of Rubber Sustainability in the Economic Development of Nigeria

The potentials of rubber sustainability to agricultural sector and overall economic development are immense (Rural Sector Enhancement Program, 2002). These include:

- i. Guaranteed supply of rubber products to the firms may stimulate expansion in farm production activities.
- ii. Value addition to primary commodities through domestic processing is given a dynamic rationale on the basis of the paper that postulates a structural tendency for the net better terms of trade to deteriorate relative to manufacturers.
- iii. Processing activities that are initially labour intensive can in the long-term conform to the dynamic comparative advantage of most developed nations; small holder farmers will escape from the syndrome of producing low value and poor quality products.
- iv. Value addition to agriculture produce may lead to export-oriented industrialization through chain upgrading.
- v. Diversification in terms of the products, technology as well as the size firms in the produce subsectors.
- vi. Improved postharvest system with strong linkages between crop producer and end users not only generate added value but also create employment opportunities in rural areas, thereby contributing to economic growth and poverty reduction.
- vii. Employment generation in all spheres of product marketing. The indirect advantage of reward able employment in farming activities is the reduction in rural-urban migration.

Rubber Export Market.

The major buyers of rubber from Nigeria include Canada, France, China, Netherlands, Italy, Germany, Malaysia, South Africa, Spain, and United Kingdom.

Players in the Sector

In Africa, Nigeria was once among the major exporters of natural rubber with much comparative trade advantage on its production with began in the year 1894. It was not only a source for cash crop or for foreign exchange but also a raw material for most agro-based industries, it offers employment especially to those in the rural areas and has improved the economy. Even though the cultivation of natural rubber has declined, there is still quite a good number of rubber producing and processing companies in Nigeria with vast natural rubber plantations such as;

- Enghuat Industries Limit
- Akamkpa Rubber Processing Company Limited.

Government Agencies in Nigeria Charged With Rubber Sustainability

- ***Rubber Research Institute of Nigeria (RRIN)***; established in 1961 at Iyanomo as Rubber Research Station of the then Western Region, was taken over by the federal government of Nigeria in 1973 with a merger of the Demonstration Centre of then Eastern Nigeria located at Akwete. The Institute assumed the name Rubber Research Institute of Nigeria (RRIN) with headquarters at Iyanomo. RRIN is the only government agency in the country mandated to conduct research into production and development of Natural Rubber (NR), gum arabic, and other latex-producing plants of economic importance.
- ***The Raw Materials Research and Development Council (RMRDC)***; The Raw Materials Research and Development Council (RMRDC) is an agency of the federal government of Nigeria vested with the mandate to promote the development and use of Nigeria's industrial raw materials. It originated from the recommendations of a Workshop on Industrial Matters organized by the Manufacturers Association of Nigeria (MAN) and the Nigerian Institute of Social and Economic Research (NISER) in July 1983. It was established by Decree (Now Act) No.39 of 1987 but commenced operation on February 10, 1988. It is today Nigeria's focal point for the development and use of the nation's vast industrial raw materials.
- **Other Nigerian government agencies that are involved with Rubber and Agricultural Research and Sustainability include:**

- 1) Institute for Agricultural Research (IAR)*
- 2) Institute of Agricultural Research & Training (IAR&T)*
- 3) National Agricultural Extension and Research Liaison Services (NAERLS)*
- 4) Nigerian Institute of Social and Economic Research (NISER)*
- 5) Agricultural Research Council of Nigeria (ARCN)*

Challenges and Limitations to Rubber production in Nigeria

a) Insufficiency of Political/Economic Will and Commitment: If enough political will was there, government owned banks and financial institutions would not have shied away from funding the development of estate plantations as well as smallholdings simply for reasons of long gestation period. In a similar manner, there would have been a remarkable increase in local consumption of the commodity if private and multinational agencies had invested much more than they have done in the cultivation of rubber and establishment of allied industry.

b) Land Acquisition Problems: It is only the forest reserves that can easily be converted to rubber plantations. All other lands are difficult to acquire due to land tenure systems. In recent times, population explosion and its attendant demographic factors have affected the availability of land. The aforementioned factors coupled with a land tenure system that is traditionally oriented have promoted small scale agricultural enterprises as portrayed in the ratio (3:1) of smallholdings to large estate plantations.

c) Inadequacy of Planting Materials and High cost of Inputs: Improved high yielding and disease insecticides are becoming too expensive for the average farmer.

d) Poor extension Services There is inadequate number of extension staff and working facilities. In addition, a good percentage of the available staff is not knowledgeable in rubber cultivation.

Future Prospects of the Rubber Industry in Nigeria

There is need for Nigeria to exploit the opportunity presented by increase in global demand for the rubber. The development of the rubber industry in Nigeria in terms of increase in production output seems to be largely dependent on the development of the smallholdings rather than on the large plantations because of the practical land tenure system in the country which favours the availability of greater land resource for smallholdings. Besides, the management and economics of rubber production in smallholdings are less cumbersome. However, judging by the rate at which smallholdings are being abandoned in some areas, it is envisaged that the large estates will represent a minimum of 40% of total rubber hectare in the next decade. A critical observation shows that the level of economic activities is highest in smallholdings located in areas around the large estates. This is because the smallholder farmers find ready market for their rubber as well as technical assistance from the large estates. With this trend, it is possible to triple the present production output of the

smallholdings if aggressive replanting programmes are carried out with high yielding and disease resistant planting materials.

- The problem of zero-economic return from rubber plantation during the long gestation period (7years) has been overcome in recent times, hence making rubber cultivation more attractive. The breakthrough is as a result of successes recorded in researches carried out in Nigeria regarding the integration of some economic viable and nutritious annual and semi-permanent crops in the first three years of plantation development (before canopy closure). The quality of agricultural commodities produced in Africa including natural rubber has for a long time been a subject of concern to all the stakeholders- Thus, the African rubber producers under the umbrella of the Professional Association of Natural Rubber in Africa (ANRA) attracted a grant (CFC Grant N° 28) from the Common Fund for Commodities (CFC) through the defunct International Natural Rubber Organisation (INRO) to execute a project in this regard.

Beneficiaries of the CFC-sponsored Quality Improvement and Quality Control of the African Rubber Project (1996-2003) were Cameroon, Cote d'Ivoire, Gabon, and Nigeria. The project embarked on the development of manpower as well as the strengthening of the Rubber Technology Laboratory at the National Rubber Research Institution in each of the aforementioned African countries. Michelin and Dunlop companies are the two tyre manufacturers in Nigeria. Interestingly, Michelin (Nigeria) in 1997 commenced the export of truck tyres made-in Nigeria and in 2003 added tyres for cars and vans to its exports.

Also, latex processes are getting some boost as demands for carpet under lays and floor tile adhesives are on the increase due to improved standard of living of some Nigerians. These developments increase domestic consumption and stimulate the drive to increase the production of natural rubber in Nigeria. The tempo is likely to continue throughout this decade. The benefits of this development to Nigeria are the expansion of non-oil exports; increase in employment opportunities and reduction in rural-urban population drift.

About 80% of Nigeria's 200,000 hectares of rubber are over 35 years and needs aggressive replanting. The Federal Government has recently subsidized the production of 260,000 planting materials for distribution to smallholder farmers. The Federal Government should bankroll the bulk of the venture capital for the replanting programmes under the supervision of tested management consortium. Despite the present ugly picture, there is a bright future for the rubber industry in Nigeria. This is due to the increasing domestic consumption (>35, 000 metric tonnes per annum) of the commodity coupled with improved prices of field materials since year 2003. The enormous land area available for the cultivation of rubber is also a great potential begging for exploitation. Furthermore, the management and technical skills rendered by the Rubber Research Institute of Nigeria, the Michelin and Pamol plantations, are invaluable. In the long term, the current increase in domestic consumption will stimulate increased production and export of high quality Technically Specified Rubber (TSR) grades as well as rubber products. At that time, the image of rubber produced in Nigeria would have improved considerably thus facilitating the generation of much needed foreign exchange.

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