

Restoring Nigeria's lead in Gum Arabic Production: Prospects and Challenges

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Abstract: Gum arabic is a leguminous tree species that is well adapted to sudan and sahalian agro-ecology of Africa. In Africa, gum arabic plays a significant role both in the rural life and economic activities of the people. The tree is valued for its high quality gum which is a foreign exchange earner. Nigeria is a major producer in the world. Her production declined in recent times from second world producer to third due to some challenges that could be controlled. The reasons for the decline and possible remedies are herein suggested. [Report and Opinion 2010;2(4):7-13]. (ISSN:1553-9873).

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1.0 Introduction

Gum arabic is a leguminous tree species that is well adapted to sudan and sahalian agro-ecology of Africa. There are over 300 species in this family. Notable among them is *Acacia senegal* because it produces grade 1 quality gum (FAO, 195). Its distribution is localized in Africa. Studies have shown that genetic variability exists among the *Acacia senegal* genotypes growing across Africa. For example, it has four different varieties found in Africa. In Nigeria and Sudan variety *senegal* is relatively abundant, whereas in Kenya and Senegal, the variety *karensis* exists, in South Africa and Zimbabwe, variety *rostrata* is found while the fourth variety, *leirhochis* is found in most other African countries (Aghughu *et al*, 1997; Chikamai, 1995). The other species of note also found in Africa is *Acacia seyal* that produces grade II gum.

Both gums are used in confectionery products as emulsifier and to fix flavor, in pharmaceuticals, brewery, cosmetics, textile, paints, and lithographic industries. Gum arabic has huge foreign exchange potentials.

For example, in the year 2008 alone, Nigeria exported a total of 20,000 metric tons of gum arabic estimated at US\$43.55m (N6.5325b). (Commodity Network Ltd., 2008).

The gum is obtained as dry exudates from the stem and branches of *Acacia senegal* and/or *Acacia seyal* when the plant is injured (Fig.1). This injury could be organized and controlled (tapping), natural cracks/ stem burst or injury resulting from either pruning of the lateral branches or cutting of the branches as livestock fodder.

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branches or cutting of the branches as livestock fodder. Nigeria is a major gum arabic producer in the world. Her production has declined in recent times from second world producer to third position due to neglect of agriculture by successive Governments at all levels (Chidume, 2009). This paper focuses on such challenges and the prospects of restoring production to its enviable height in Nigeria.

1.1 Place of gum arabic in Africa economy

In Africa, gum arabic plays a significant role both in the rural life and economic activities of the people. In the arid and semi arid region where this *Acacia* species grows, Wickens *et al*, (1995) reported that the total precipitation in this region varies widely from year to year and its distribution within a year is also varied.

This low, erratic and poor distribution of rainfall means that the productivity of annual crops, especially in areas with less than 400mm, is unpredictable, placing even greater value on perennial vegetation, especially multipurpose trees such as the *Acacia* species. These acacia trees, that are predominant in this region, help to ameliorate the ecosystem which is losing about 350,000m² of land mass to desert conditions and increases at a rate of 0.6km per annum (Chuntai, 2009).

Apart from this ecological function which gum arabic performs, its gum is the economic livewire of some African countries such as Sudan and lately Chad. From available records at the International Trade Center, Geneva, Africa supplies over 98% of world gum arabic requirements (Table 1) with Sudan being the largest producer.



Fig. 1: Gum exudates from *Acacia senegal* tree.

Table1:World Raw Gum Arabic Export (1991-2002)

Year	Sudan	Chad	Nigeria	Others	Sub total	Asia	Total
91	25,909	2,228	6,706	1,463	36,306	809	37,115
92	17,061	2,450	8,358	3,073	30,942	726	31,668
93	13,475	3,701	7,042	2,243	26,461	756	27,217
94	23,341	4,558	9,822	3,751	41,472	684	42,156
95	18,143	7,001	9,914	2,821	37,879	814	38,693
96	17,671	7,365	12,164	3,349	40,549	435	40,984
97	17,342	8,527	10,199	5,301	41,369	696	42,065
98	25,053	12,584	8,166	2,296	48,099	384	48,483
99	19,305	11,312	8,598	3,399	42,614	912	43,526
2000	21,916	11,682	8,239	4,009	45,846	2,251	48,097
2001	26,105	12,881	8,747	2,137	49,870	471	50,341
2002	34,162	10,664	6,556	2,724	54,106	258	54,364

Source: International Trade Center, Geneva

With a combined export capacity of about 54,106mts in 2002 (Table 1) by the African countries of gum arabic and with an estimated combined potential production capacity of about 180,000mts at full exploitation, the African producing countries can

meet the total world demand for gum arabic which could be anything between 55,000-70,000mts as at 2002, given the right support by both the private and public sectors as well as the Internationalcommunity.

1.2 Production History in Nigeria.

During the Trans-saharan-Trade era, gum arabic, an article of commerce, was subjected to barter-economy (Aghughu and Ojiekpon, 1996; Saad, 1996). There were no organized plantations and gum collections were entirely from the wild grooves (Aghughu and Ojiekpon, 1996; FAO, 2007). These grooves are mostly found in the present Jigawa, Yobe and Borno States. Gum collections were done by peasant farmers and cattle Fulanis who sold the gum to middle men who in turn resold them to big merchants on barter-basis.

In the early 1970s, the supply of gum arabic was threatened by the following fact

a) Frequent clashes between farmers during gum collection in *Acacia* field due to lack of ownership of the wild grooves.

b) Rapid depletion of the natural forest due to activities of the natives who cut down the *Acacia senegal* and *Acacia seyal* trees for fuel wood, tool handles and agricultural implements as well as fodder and browse for livestock.

To ensure continued supply, however the private sector became involved in the gum arabic farming. This effort may have resulted from a combination of the Government of the Northern States of Nigeria who mounted campaigns for individuals to plant *Acacia senegal* trees and the Forest II project in 1987, which further promoted the planting of *Acacia senegal* resulting in many farmers establishing large farms of *Acacia senegal* (Aghughu & Ojiekpon, 1996). Since then, Nigeria has remained a major player in the global gum arabic business and in the gum arabic states; the gum arabic has assumed a major economic status becoming more pronounced since the eighties. The renewed zeal led to Nigeria producing more gum arabic and this earned her the second highest world gum arabic producer after Sudan in the 1980.

However, recently, Chad became very active in the business of gum arabic and displaced Nigeria as the second largest producer.

In Nigeria, production of gum arabic covers about 250,000 sq km in the entire sahelian region spreading across twelve states namely Bauchi, Borno, Gombe, Jigawa, Kano, Katsina, Kebbi, Sokoto, Yobe, Adamawa, Zamfara and Taraba (Fig. 2).

1.4 Federal Government efforts

The Federal Government of Nigeria's intervention dates back to 1928 when Mr. W.A.H. Weir was sent to Sudan under the British Colonial Administration to learn the tapping technique and apply it to the existing local grooves of *Acacia senegal* in the then Borno province (Aghughu and Ojiekpon, 1996). On his return, he established the

first ever Government Plantations in Geidam in Borno province. Later more plantations were established in Benesheik, Gubio and Damasak. Apart from the participation in gum arabic plantation establishment and development during the colonial era, Governments further efforts were nil, probably due to the oil boom in the 70s. However, in 1993, through the National Accelerated Industrial Crops Production Programme (NAICPP), the Federal Government renewed her interest in promoting and funding the raising and distribution of pure *Acacia senegal* planting materials. Through this programme, Government agencies were funded to produce a total of 2,741,474 seedlings of *Acacia senegal* as planting materials between 1995 and 2009 (table 2).

Initially these seedlings were distributed to the farmers free as incentive to boost production. Currently, farmers are charged minimally with RRIN providing technical assistance.

Another intervention by the Federal Government was the renewed mandate to Rubber Research Institute of Nigeria (RRIN) to conduct research into genetic and agronomic characteristics as well as product development of this crop. This led to the Establishment of a Gum Arabic Research Center in Gashua, Yobe state as a Substation of RRIN.

1.5 Rubber Research Institute of Nigeria, Gum Arabic Centre – Gashua

Gashua, Yobe State, is a prominent location where all species of gum arabic grow naturally. This station is dedicated to the Research and Development of gum arabic in Nigeria. The station is equipped with functional laboratories for quality assurance and soil analysis, agronomic, pathological and biotechnological studies.

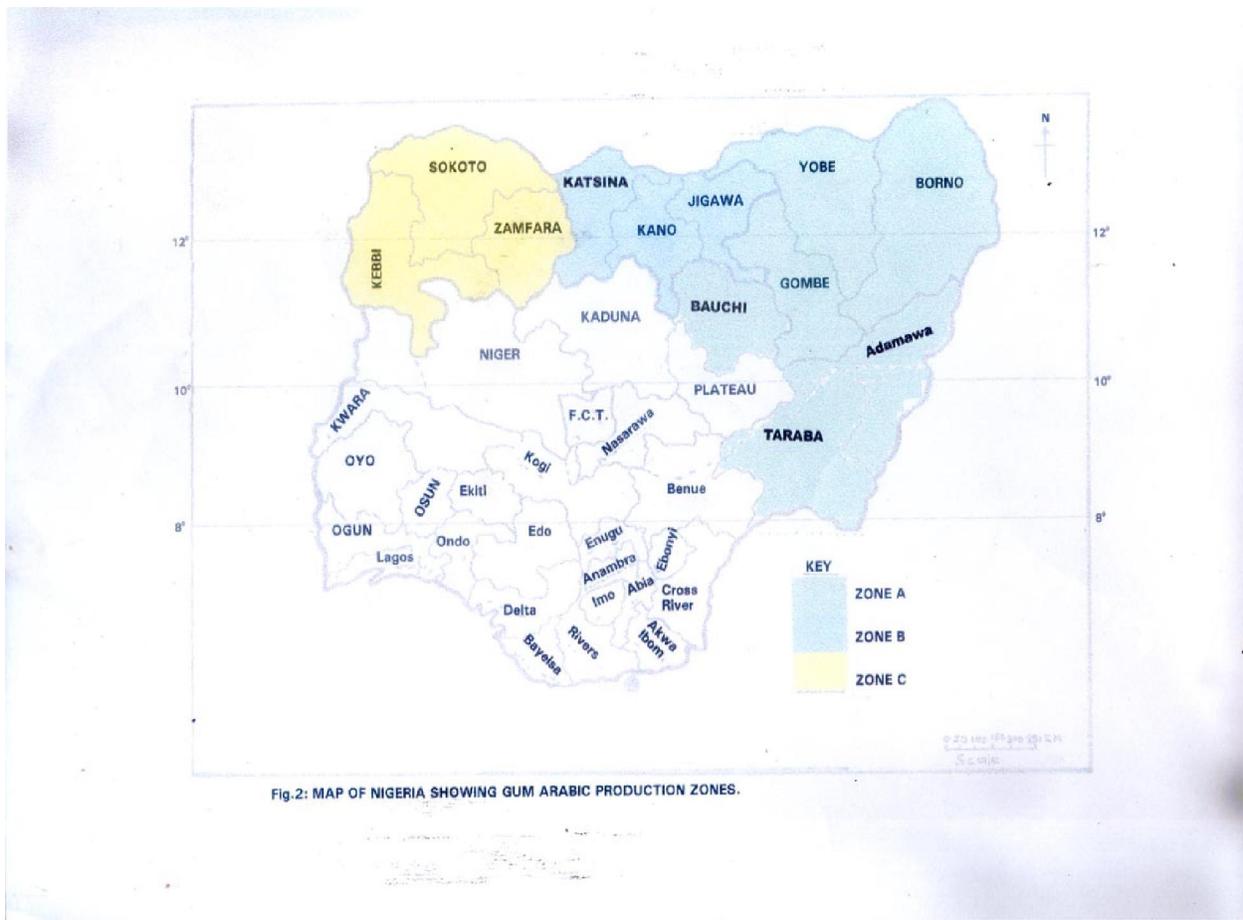
Research is also focusing on intercropping system, gum exploitation techniques and social economic studies. Hybridization process which began in 1996 to improve on the existing gum yield potential of the available provenance *Acacia* in Nigeria should be pursued with vigor by injecting huge government resources.

So far, RRIN has conserved gum arabic germplasm from two states out of twelve where the crop grows naturally for her genetic improvement efforts. More expeditions should be planned to enable her conserve gum arabic germplasm from other states. This future expedition should include collection of all gum producing species particularly, the highly sought after **black** and **white frankincense** producing species (*Boswellia neglecta*, *B papyifera* and *B frereana*) as well as *Commiphora myrrha* that produces **myrrh** which are relatively abundant in Jigawa state.

Table 2: Gum arabic seedling production of the Federal Government('95-2009)

S/N	State	1995	1996	2003	2005	2006	2007	2008	2009
1	Kebbi	50,000	1,000,000						
2	Sokoto	35,000	60,000						
3	Katsina	40,000	40,000						
4	Kano	4,430	40,000						
5	Jigawa	30,000	40,000						
6	Yobe	30,000	80,000						
7	Borno	90,000	40,000						
8	Bauchi	30,000	40,000						
9	Adamawa	-	20,000						
10	TTS,Gashua	3,000	10,000						
11	TTS,Dan Hassan,Kano	-	10,000						
12	RRIN, Sub-Station, Gashua.	-	20,000	44,400	104,438	55,555	24,611	400,000	400,000
Total		312,430	1,400,000	44,400	104,438	55,555	24,611	400,000	400,000

Source: Rubber Research Institute of Nigeria (RRIN)



2.0 Prospects for increased production and challenges

2.1 Increase land area under cultivation and massive exploitation of local grooves of this crop.

To boost production there should be massive plantation establishment of the pure stands of both the *Acacia senegal* and *Acacia seyal*. Such pure stands are available at the specialized agencies that have the technical competence to identify and raise the planting materials for plantation development.

Data is not available on the size of the gum arabic resource in Nigeria. This region which is, marginal and supports little or no vegetation is about 43% of the total land area in Nigeria and has a population of over 49 million people. However, foresters in the 12 producing states estimated that only about 40% of Nigeria gum arabic is being exploited. This may mean that if concerted efforts are put in place to exploit what natural ecology endowed Nigeria with, the chances are that production will go up. A comprehensive survey of the Gum arabic resource in Nigeria is urgently needed.

Nigeria along with Chad has a comparative advantage over Sudan in the production of *Acacia seyal* and both countries have a very vast area of untapped *Acacia seyal* which produces grade II gum. Chad has given it a serious exploitation status whereas in Nigeria, little attention is given to it.

In 1998, *Acacia seyal* was certified by the **Codex Alimentarius Commission** of Food and Agriculture Organization (FAO), to have the same status with *Acacia senegal* in food and pharmaceutical applications. This explains the reason why Chad which produces more of *Acacia seyal*, has overtaken Nigeria in gum arabic production and it is now ranked as the second highest gum arabic producer in the world after Sudan (Fig. 3). The upgrading of *Acacia seyal* to have equal status with *A senegal* has threatened Sudan's leadership of the world market for gum arabic. There is the claim by Indian buyers that the colour of Nigerian *A. seyal* is superior to the colors of *A. seyal* produced from any other country and are willing to pay up to 10% premium for Nigerian *A. seyal* over the price paid for *A. seyal* produced in any other country. Nigeria can now capitalize on this singular advantage her *Acacia seyal* gum has over others to promote her production status and even top world production. This can be done through aggressive exploitation of the very vast areas of wild grooves of *Acacia seyal* that are abundant in the gum arabic belt of the country. Proper mobilization of farmers through campaigns can help in the exploitation of these wild grooves.

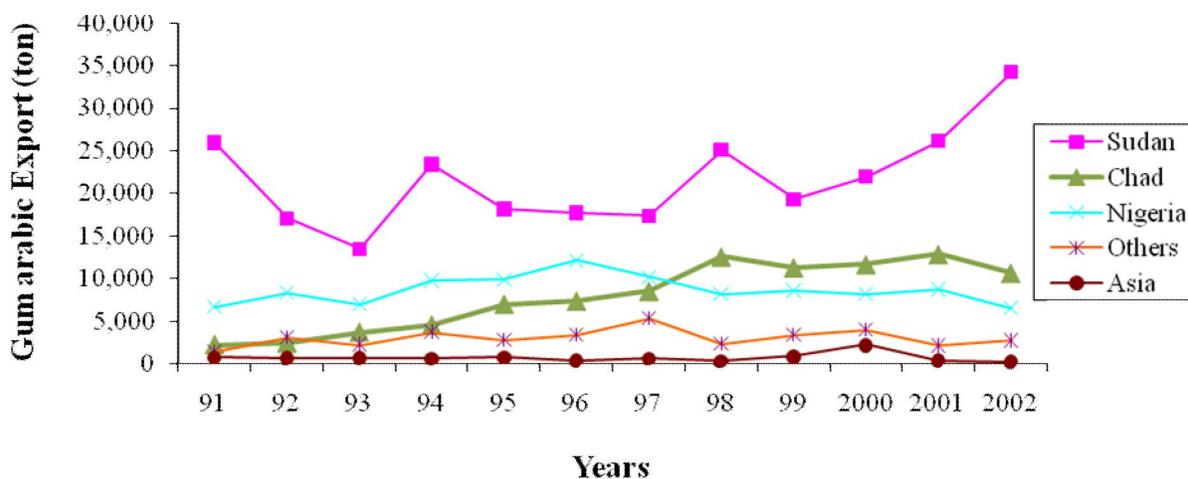


Fig 3: World Gum Arabic Export(1991-2002)

Source: International Trade Center, Geneva.

2.2 Smallholder seedling production Units. For the envisaged massive planting, Federal, State and Local Governments should embark on smallholder plantation development in the gum belt of Nigeria with RRIN and some selected certified growers

raising improved seedlings and providing the technical support. The seedlings raised will serve a twin purpose-first for income generation and for the reforestation programme.

2.3 Marketing structure

Until 1998, sale of gum arabic in Sudan was entirely by the gum arabic company of Sudan. This company enjoyed monopoly of the trade at the disadvantage of the overseas buyers. This lack of competition was their undoing as foreign buyers would prefer a situation where they could exercise a choice in the customers they deal with. However, with the continued quality and production improvement of the gum arabic in Nigeria and Chad and with strategic alliances, coupled with the current problems in Sudan, overseas processors and consumers are turning to Nigeria and Chad as major suppliers of quality gum. A particular advantage of Chad is that there is only one market centre located in **Sanfil** in **N'djamena** for gum arabic. This makes the work easier for buyers and all agents involved in keeping accurate records of gum purchased in Chad. Such market organization in Nigeria may help buyers and improve on record keeping of the gum produced and sold in the country. However, the vast land area of Nigeria may inhibit this. Therefore, if gum arabic markets are organized in a specific location in each of the producing states using organized farmer groups, it will certainly improve on the present status.

The following gums are sought after by International buyers in Nigeria: gum from *Acacia senegal* (grade 1), *A. seyal* (grade 2), *A. Polycantha* (Special grade) and *Combretum* (Grade 3). Others are **black** and **white frankincense** produced from *Boswellia neglecta*, *B papyifera* and *B frereana* as well as **myrrh** produced from *Commiphra myrrha* which are relatively abundant in Jigawa state in their natural habitat. Due to the number of products sought after by these buyers in Nigeria, more opportunities have been opened in the gum arabic business for Nigerians and could move her to the first status producer or restore her to the earlier position in the international market.

2.4 Legislation against cutting down of gum arabic trees.

Most of our peasant farmers who are involved in gum collection live in rural areas where good means of life is an occasional curiosity. They have no access to pipe borne or potable water nor kerosene for cooking. If they will remain in the villages, they will resort to cutting down the trees for fuel wood which lead to the depletion of these trees. There should therefore be legislation against cutting down of gum arabic trees for either firewood or for tool handle while the government will make concerted efforts at providing kerosene for their use and in addition to other good means of life so as to keep them in their natural habitation. There should be massive reforestation of existing Gum arabic

Forests and fresh plantations should be established in Nigeria with managed water conservation programs. This will boost production when the trees come to tapping maturity. Proper funding is needed and should involve all the three tiers of government. There should also be legislation against bush burning so as to protect the natural ecology that supports the growth of this crop.

2.5 Grazing reserve for both large and small ruminants

There is a natural coincidence that the region that supports the growth of gum arabic in Nigeria is also noted for livestock production. The seeds, pods and leaves are highly nutritious to these animals. They can easily be used as fodders. The alternative is the provision of grazing reserves by government at all levels, for these animals as source of food. This will in no small measure protect the existing gum arabic plantations or the natural forest. In years when there is the problem of Quail birds and locust invasion with devastating effects, government should move swiftly once it is noticed to arrest the situation.

3.0 Conclusion.

There is no doubt, however that the world production and demand for Gum arabic is increasing on a yearly basis since 1998. Nigeria has great potential in the production of gum arabic and could be elevated to the first position or retain her second position in the world market. Indian buyers prefer *A seyal* from Nigeria for reason of superior colors to *A. seyal* produced from any other country.

They are willing to pay up to 10% premium over the price paid for *A. seyal* produced in any other country. This is an encouraging development in the gum arabic business.

If the above proposals are taken seriously by both the government and the private sector, Nigeria will no doubt retain her position as the second world largest producer of Gum arabic, in the near future and eventually become the highest producer in the world.

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