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## RESEARCH ARTICLE

### STUDY ON SUDAN'S GUM ARABIC INDUSTRY DEVELOPMENT

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#### ABSTRACT

Gum Arabic used to be the top cash crop before losing its grounds to A survey of mobile cloud computing: architecture, applications, and approaches of crop quality, were due to drought of mid 1970s and 1980s, plus political instability and the weakness of marketing structure. Those factors resulted in new gum Arabic producing countries such as Chad and Nigeria. The main objective of this study was to investigate, and evaluate constraints concerning gum Arabic production, processing and marketing in Sudan.

## INTRODUCTION

Sudan is the largest producer of Arabic gum in the world, and Arabic gum is one of the four most important agricultural exports in Sudan as well as livestock, cotton and sesame. Gum Arabic was at the top of Sudan's exports before losing ground to cotton and oilseeds. Sudan was supporting 80% of the world demand for Gum Arabic. However, fluctuations in production, export and degradation of crop quality were the result of drought in the mid-1970s and 1980s, as well as political instability and weak marketing structure. These reasons have resulted in the emergence of new gum Arabic producing countries such as Chad and Nigeria. During the past 20 years, Arabic gum exports have reached about 40 million US dollars. The government had previously intervened in the marketing of all agricultural exports but the situation changed for most of these crops, but Gum is still under government control through Gum. Gum Arabic is produced by small producers in traditional rained areas, where about 20 percent of Sudan's population is a member of the community. The current gum Arabic marketing policy was not feasible for this group of population, leading to a decline in production and therefore exports that have been declining in the last forty years by 2.2% annually.

## REVIEW

Gum Arabic was at the top of Sudan's exports before losing ground to cotton and oilseeds. Sudan was meeting 80% of the

global demand for gum Arabic. However, fluctuations in production, export and degradation of crop quality were the result of drought in the mid-1970s and 1980s, political instability and weak marketing structure. These reasons have resulted in the emergence of new gum Arabic-producing countries such as Chad and Nigeria (1) The aim of this study was to research and evaluate the obstacles related to the production, processing and marketing of gum Arabic in Sudan. To achieve the research objectives, the researcher used descriptive statistical analysis to analyze the initial data collected as a result of the field survey from the Gedaref region.

**Research Objective:** The main objective of the study is to assess and discuss the issues and problems of producing, marketing and manufacturing gum Arabic in the gum Arabic region of central Sudan. The study also aims to:

- Know the reasons that led to low productivity and revenue
- Assess the impact of government policies on Gum Arabic exports
- Assess the impact of government policies on Gum Arabic exports.

## RESEARCH METHODOLOGY

In order to achieve this research, the following approaches are adopted:

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- The deductive approach in formulating testable hypotheses.
- Inductive approach to test the hypotheses of research.
- Regression analysis to determine the factors affecting the production of gum Arabic in Sudan.

### Gum Arabic production in Sudan

Gum is found along the African Sahara from Senegal, Mali and Nigeria to the west of Ethiopia and northern Kenya. Sudan is the world's largest producer of Gum Arabic and most of its production is from the traditional rainforests in Western and central Sudan. Hashab trees are grown in the faltering land where crops are grown for a period of 4-5 years and after low productivity, they are replanted. Hashab trees resist rainfall, but the convergence of drought, population movements and changing farming practices have adversely affected the production of gum in the areas of the gum belt in western Sudan. As a result, the gum belt moved southward toward the more rainy clay lands. The tree begins to produce gum after 5-7 years of planting and begins production in the decline after 20-18 years.

**Table 1. Shows the distribution of the population in the Gum Arabic Belt 2017**

Year	Talih	Hashab	Sunut
52-48	2	12	12,132
57-53	32	308	11,485
62-58	230	12,564	15,593
67-63	241	35,514	15,620
72-68	-	16,070	11,953
77-73	-	88,827	10,427
82-78	55	16,328	5,805
87-83	79	107,476	8,393
92-88	44,031	190,683	27,551
97-93	38,358	94,998	21,723
2000-98	3,970	47,368	19,331
Total	86,998	610,148	160,013

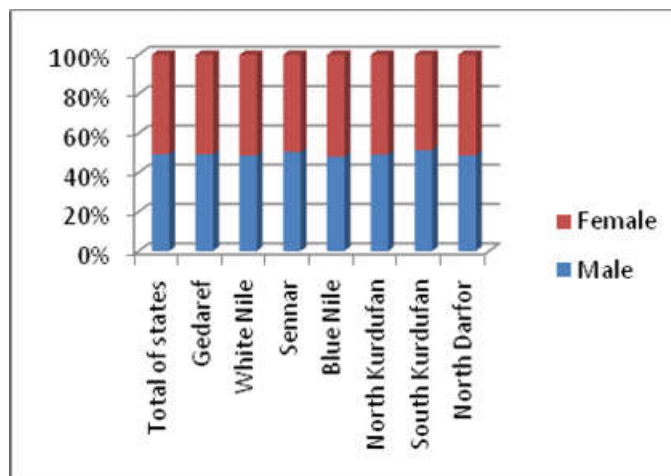
### Product hireling

It is the one who carries out the clearing, collection and deportation operations for a fare. The area depends on the area known locally as the fifth (about one and a quarter acres). It is not required that the same person who performs the act of acquittal should perform the collection process. This type of producer is a low-income, low-educated (illiterate, literate, and highly literate) type of producer, often paid for in kind (food supplies, etc.) and not cash, often equivalent to monetary value Much less.

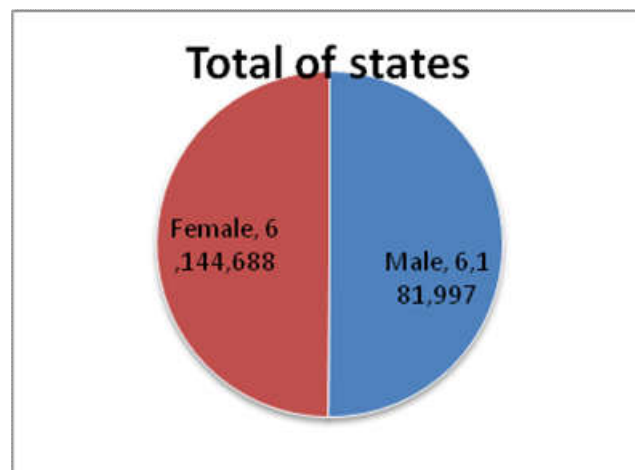
### Gum Contribution to Household Income in the Gum Region:

Gum Arabic is found along the African desert from Senegal, Mali and Nigeria to the west of Ethiopia and northern Kenya. Sudan is the largest producer of Gum Arabic in the world (see figure 2 and 3) and most of its production is from the traditional rained areas of western and central Sudan. The decline of productivity is the re-cultivation of grasslands, and the trees resist the scarcity of rain. However, the convergence of drought in the mid-seventies and eighties with civil conflicts and population movements The change in agricultural methods has adversely affected the production of gum in the gum belt areas of western Sudan, as a result of which the gum belt has moved southward towards the most rainy clay land, and the tree begins to produce gum after 5-7 years of cultivation and begins to decline after 20- 18 years old. It was found that gum was produced and exported to neighboring regions and

countries via old commercial routes. This came in the Sudan folder prepared by the inspectors of the English Centers in 2003, contributing 74% of the production of Sudan and the production of the states of Blue Nile, White Nile, Upper Nile and Gedaref according to the World Bank.



**Fig. 1.**



**Fig. 2. Total of states**

**Gum Arabic Development:** This study deals with the production of Gum Arabic in Sudan by analyzing the data collected on the production of Gum Arabic in Sudan, which includes gum production, gum production costs, gum product types, gum contribution to household income in gum Arabic region, The financing of Gum Arabic in Sudan The study used the methodology of extrapolation analysis and descriptive analysis, and the partial farm budget technique was used to derive the net return of Gum in the study area. The net return to the entity is defined as the result of deducting the variable costs from the total revenue while the total return is the value of the output obtained from the project. The figure shown the model of the cultivation Gum Arabic.

**Gum Arabic manufacturing in Sudan:** Companies are importing these goods and re-manufacturing them and then distributing them to end consumers in all countries of the world. This international monopoly has led to resistance to the manufacturing experience in Sudan by refraining from buying from companies that were established and established specifically for the manufacture of gum. These companies have made Europe and Western countries a central location for their proliferation and revitalization of their manufacturing

activities, and then redistribute these goods to the end consumers through a network of sub-agents located in the European, American and East Asian countries.



Fig. 3. The map of the gum belt areas in Sudan

#### The technical manufacturing specifications of Khartoum Company according to this company

The Sudanese specifications of the plant (Hashab, Talh) were issued by spray and mechanically according to the following:

**Spray dried spray:** The standard for powdered Gum Arabic is sprayed on the dry sludge produced by washes. Spray powder is sprayed. Spray powder is sprayed as a powder produced by the drying process of the water solution of the dry sludge extracted by the roots and branches of the grass. And spray powder sprayed is a yellowish white powder not exceeding the size of particles 100 microns. This powder is used as emulsifier, stabilized, thickened, helps to contain flavors, and has other general and specialized uses.

**Powder spray:** This Sudanese standard applies to the dry effluent produced from alfalfa trees. The spray powder is sprayed. Spray powder is sprayed with spray. It is the powder produced by the spray drying process of the water solution of the dry sludge extracted by the tufts and branches of the talha trees. And that this powder is a white powder yellow not exceeding the size of particles 100 microns and uses this powder as emulsifier, installed, helping to contain flavors and has other general and specialized uses.

**Mechanically processed hemp powder:** This Sudanese standard applies to dry sludge produced from grass trees. The powder type is mechanically supplied. It is defined as the powder produced by the mechanical grinding process of dry sludge extracted from the roots and branches of the hemp trees. The gum Arabic is mechanically formulated as white ash yellow powder with no more than 300 Micron. It is used as emulsifier, stabilized, thickened, helps to contain flavors and has other general and specialized uses.

**Mechanically-prepared talcum powder:** This Sudanese standard applies to dry sludge produced from wasps and is

defined as mechanically homogeneous granular granules. It is also described as an Arab gum that is crushed into homogeneous granules of a size that reaches between 14 mm high and 0.3 mm minimum, Granules 8 millimeters in the test sample. It is used as emulsifying material, thickening for textures, helping to contain flavors and has other general and specialized uses.

## RESULT DISCUSSION

The results of the research show that there has been a decrease in the production of Gum Arabic in Sudan during the past two years. However, Sudan remains the top producer and exporter of Gum Arabic in the world. The study also found that there was a large gap of 40% to 53% in Gum Arabic production among farmers and research centers due to mismanagement tree-logging techniques and a lot of farmers left cultivate the Gum Arabic and start looking for the gold in the mountains. In addition, the results of the study showed that the net Gum yield did not exceed 10% -8% of the total yield of the farmer due to high production cost, low price or both. It was also found that the al-Hashab gum produced and exported from Sudan exceeded the powder by 27.3%

Table 2. Comparison of some characteristics of Al - Hashab with Al -Talh

Characteristics	Al Hashab	Al Talih
The percentage of weight loss by drying	13.00%	13.04%
Percentage of total ash	0.34%	2.80%
Nitrogen ratio	0.27 to 0.39%	1 to 0.14%
Equivalent Weight	1050	1470

**Variable costs of producing acacia:** The research explained that the relationship of production prevailing in the study area is based on the agreement between the owner of the farm and workers in the tap and harvest of gum Arabic on the basis of percentages estimated at a quarter or a third of the total gum produced. In most businesses, the principle of a third prevails. Thus, the cost of production was paid in the form of a crop equivalent to one-third. The forest producer provides food, water and other aids and is cost in the form of glazes at the price of the day. It should be noted that most of the workers in the mining and harvesting hide large quantities of the product buried under the ground or smuggled behind the back of the product. The variable costs for the production of acacia were calculated as a percentage of crop yields. In the project under study, the ratio between project management and production and harvesting operation was one-third. The average production of a single tree is 500 grams and the ton of gum is approximately 22.25 quintals, while the average price of the kantar is about 140 pounds. Therefore, the variable costs are calculated as follows:

Average production of one tree of the hemp gum 500 grams and thus the average production of a thousand tree  $500 = 1000 \times 1000 \text{ tree} = 500 \text{ kg (0.5 tons)}$ .

0.5 tonnes are converted into quintals,

Making the production of 1,000 trees  $0.5 = 22.25 \times \text{Ct} = 11.125 \text{ quintals}$ .

So the return of the feddan  $11.125 = \text{Kantar } 140 \times \text{LE} = 1558 \text{ SDN}$  Therefore, the calculation of the variable costs for the production of acacia becomes as in the following table:

**Table 3. Variable costs of producing acacia**

No	Elements of marketing costs	Cost (SDN)
1	The cost of workers to planting and clean a thousand trees	519.3
2	Harvest and collect the gum from the number of thousand trees	155.8
3	Forests (5%)	77.9
4	Regional taxes (%5)	77.9
5	Others (%2)	31.16
Total variable costs of production of acacia		862.06

The cost of production of Hashab gum Kant = the cost of cleaning and harvesting of gum for 1000 trees the quantity produced from 1000 trees  $77.5 = 11.125 \times 86 \times 862.0 =$  pounds per quart.

### Cost of local marketing

The research noted that the internal marketing channels of Gum Arabic for the sales process often start selling the product from the gum at the farm or the village market. The traders and the agents of the export companies come to the sites and collect the gum first, so that the farmer does not cost the known costs such as refilling, the price offered to the seller include the cost Q mentioned. Where the merchants of the village collect gum from the producers and then deported and sold at the auction, a market that collects traders of the various villages or the deportation and sale of gum Arabic. The auction market, in addition to local merchants, includes wholesalers from different regions who buy gum from the auction market and then sell it to the gum Arabic company and there are quantities used for local purposes. The gum Arabic company, after collecting the quantities of gum Arabic from different parts of the Sudan sold either to the gum Arabic manufacturing or exporting company and the gum manufacturer in turn sell the quantities manufactured gum either outside Sudan or for local consumption. In the case of the project under study, after reaching the cost of production of Al-Hashab gum, it is necessary to determine the cost of marketing borne by the product, which is the value of mobile packaging, and the cost of deportation to the market.

**Table 4. Marketing costs of tons of Hashab gum in local markets**

Elements of marketing costs	Cost per (SDN)
The cost of filling the ton 9 (Sacks)	65
The cost per ton transfer market crops	20
Total marketing cost	85

**Table 5. shows the analysis of the net yield of gum Arabic 2017**

No	Item	Arabic gum
1	Production costs (SDN / fed)	862.06
2	Productivity (ton / acre)	0.5
3	Average price (SDN / ton)	3116
4	Total yield (SDN / fed)	1558
5	Net yield (SDN / fed)	695.94

### Conclusion

The preparation of the plan or the budget is a work that must be done by all farmers, some of them do so by experience and memory and without the need to conduct such operations clearly and formally but in all cases some types of budgets are often concentrated on determining the foreseeable and unforeseen revenues of productive activity, Quantitative data that can be measured or estimated by conventional quantitative

methods. There are two types of Agricultural budgets that can be prepared: the total budget and the sub-budget:

### Total Budgets

The total budget preparation needs estimates for all crops, all livestock production, all production methods and all costs and returns for the whole farm. It may be possible to prepare a budget for a number of agricultural schemes, which include, for example, fruit production only or fruit and vegetable production together, or production of fruit, vegetables and fodder for different levels and proportions, which requires budgeting for a large number of alternatives. Only to prepare a partial budget instead of a total budget by estimating the increase in return useful lives and the value of that increase yield and productivity costs of another variable and estimate the net return of this variable.

### Partial Budget

The micro-budget is the backbone of many types of agricultural policy analysis and in its simple form; the partial budget gives the indicator to decision-makers about the profitability of the project and thus encourages farmers to produce specific commodities or crops. The basic information used in calculating the yield per feddan is the value of productivity, the revenue per acre is obtained by subtracting the total revenue from the total cost Variable.

### Net yield

The net profit reflects the profitability of the productive unit (farm-corporation-enterprise), taking into account that the cost is the cost used to generate inputs for the production of the product or services and can be expressed as a percentage. The net return is a good indicator of the profitability of the unit produced and the net yield The higher the financial capabilities, which enables them to spend on their activities and investments as well as improving the methods The crown. The general mathematical picture of the net yield can be calculated for each crop separately, as follows:

Net yield = Gross Return - Total Gross Cost, where: net yield, total revenue and variable costs per SDN / feddan

### Experience Outputs

The experiment was successful by all standards and came out as follows:

- Cultivation of 34 million trees of the Acacia, which represents Alhashab and Altalih 90% of them and became Are now ready for economic exploitation and contribute to the increase in production and exports of gum Arabic by a large proportion as well as the production of charcoal, firewood and sanitation of the agricultural environment.
- To be informed that the direct sowing of these species of trees is economical, cost-effective and easier to implement than the use of nurseries and the planting and transfer of seedlings, especially in clay lands.
- The experience was a successful example of restoring the agricultural environment of its old past, which was eroded by past mechanized farming practices, which eliminated the tree cover, making the experiment replicable in other parts of the country.

- d) The packages parallel to the asphalt road and adjacent to the natural protection of the same street against the drift by floods and rain, providing protection along the distance from the village, which reach 90 km long.
- e) The project is now ready to supply the country with the good seeds needed to supply other areas with improved seeds. The project can produce more than five thousand tons of seeds annually, amounting to about 20 billion pounds.
- f) There is a major problem related to the provision of productive workers, the reluctance of young people to produce and the need to recruit workers from the areas of Gum Arabic belt.
- g) Experience shows that only 10 per cent of the required labor can be provided.

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