

Assessing Local Community Awareness Of The Socio-Economic Importance Of Gum Arabic Under Production Challenges In Northern Upper Nile State

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Abstract

*This study examines the economic significance of Gum Arabic (*Acacia senegal*) among local people in northern Upper Nile State, South Sudan. A total of 120 respondents representing different age groups, genders, and economic activities were surveyed to assess their demographic characteristics, income sources, and level of awareness regarding the economic role of Gum Arabic.*

The findings reveal that youth constitute more than half of the respondents, reflecting the demographic growth in the region. Agriculture remains the primary economic activity, accounting for 40%, while Gum Arabic production and marketing contribute significantly, at 30%, to household income. The majority of respondents allocate Gum Arabic revenues to food, education, and health, underscoring its direct impact on improving living standards. Moreover, over half of the participants (55%) demonstrated a high level of awareness of the economic importance of Gum Arabic, though 15% exhibited limited awareness, highlighting the need for further awareness programs. The study concludes that Gum Arabic is not only a vital source of livelihood but also a strategic natural resource with significant potential to support rural development and economic stability. It recommends strengthening awareness campaigns, improving value chains, and integrating Gum Arabic into local development policies as a sustainable economic and environmental asset.

Keywords: Gum Arabic, Upper Nile, South Sudan, Awareness, Income Source, Rural Development, Local Population, *Acacia senegal*, Hashab trees

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I. Introduction

Dry forests and woodlands in sub-Saharan Africa, despite their fragility, are endowed with rich biodiversity and provide economic and ecological benefits for society (Chidumayo, 2010). The resources are known for their wide variety of high-value environmental products (working paper, FAO, 2010).

Forests play a vital role in sustaining livelihoods, supporting biodiversity, and providing essential ecosystem services worldwide. In many rural communities, forest resources play a direct role in contributing to household income, food security, and cultural practices. Among the non-timber forest products, Gum Arabic, obtained primarily from *Acacia senegal* trees, is one of the most economically valuable products in semi-arid regions. Its high quality, recognized both locally and internationally, makes it a strategic resource with significant socio-economic importance.

The role of forestry, in general, and the commercialization of non-timber forest products (NTFPs), in particular, for rural livelihood improvement and poverty alleviation in the developing world has been discussed extensively in the specialist literature. (Angelsen, 2003 & Belcher, 2005).

According to the FAO, 2025. A lack of domestic value-added contrasts with Africa's dominance in gum Arabic supply. Most of the economic gains are captured by importing countries, such as the European Union, the United States, and India, which also demand certified, traceable, and sustainably sourced products (Multi-Teach Wireless, 2022; WSN, 2021; and Adebisi, Dev, 2022).

Gum Arabic is an *Acacia Senegal* exudate as defined by the FAO/WHO expert committee for food additives (Phillips, 2008). Cannot be digested either by humans or by animals (Adiotomre *et al*, 1990). Gum Arabic production is a key source of income for communities in several African countries (Dayoub, 2025).

The value of resin production contributes to rural livelihood by diversifying income sources, reducing vulnerability in times of crop failure, and providing materials for traditional medicine and crafts (Asmamaw & Tarig Elshikh, 2014).

Gum production benefits producing nations in terms of sustained agroforestry development, foreign exchange earnings, climate change mitigation, and desertification prevention (Carneiro *et al.*, 2013; Chen *et al.*, 2023; Li, X. *et al.*, 2018; Liang *et al.*, 2021; Phillips, 19198; Sarabandi *et al.*, 2019; Williams & Phillips, 2021).

South Sudan, particularly the Northern Upper Nile State, possesses one of the Country's largest stocks of *Acacia senegal* (Hashab) trees. The Payam of Renk, Jalahak, and Shamodi are renowned for their dense Gum Arabic forests, where most residents engage in tapping and collecting Gum Arabic as a primary or supplementary source of income. The region's reliance on this resource underscores the importance of understanding both the economic significance of Gum Arabic and the level of community awareness regarding its vital importance.

Justification

Gum Arabic is widely used in food, pharmaceuticals, cosmetics, and textiles, with global demand projected to double by 2035 (UNCTAD, 2018).

Although Gum Arabic (*Acacia senegal*) represents a strategic natural resource that plays a vital role in the livelihoods of communities in Northern Upper Nile State, providing significant economic and social value locally, regionally, and internationally, the sector faces several challenges. These include limited community awareness of its economic importance, scarcity of field-based studies documenting its role in improving household income and creating alternative employment opportunities, and the absence of effective policies and sustainable production practices. Such conditions threaten the long-term viability of the Gum Arabic sector and have created a clear knowledge gap regarding its contribution to livelihood improvement and the level of local community awareness of its economic significance.

This study was therefore conducted to address this gap by assessing the awareness of residents across Renk, Jalahak, and Shamodi areas characterized by dense *Acacia senegal* (Hashab) coverage regarding the economic importance of Gum Arabic, while also identifying the key challenges facing its production and marketing.

Objectives of the study

- To analyze the role of Gum Arabic as a primary income source and means of livelihood diversification among rural households
- To identify the major challenges and constraints facing Gum Arabic production and marketing in the study area
- To provide practical recommendations that enhance community awareness and inform sustainable policies and strategies for improving Gum Arabic production and its contribution to rural development.

II. Methodology

Study Area

The County is categorized as part of the Northern sorghum and cattle livelihood zone (FEWSNET, 2018).

The study area comprises the localities of Renk, Jalahak, and Shamodi, located in Northern Upper Nile State, South Sudan. These areas are characterized by dense stands of *Acacia senegal* (Hashab), making them among the most important Gum Arabic-producing zones in the country. Economically, the region plays a vital role in supporting local livelihoods, as a significant portion of the population depends on Gum Arabic tapping, collection, and marketing as a primary source of income, in addition to other activities such as farming, trade, and livestock rearing.

From an ecological perspective, the prevalence of *Acacia senegal* contributes to maintaining environmental balance by reducing desertification, stabilizing soils, and supporting biodiversity. The local communities possess long-standing experience in Gum Arabic tapping, passed down through generations, which has enabled them to develop practical knowledge in tapping, harvesting, and marketing the product in local markets. These combined characteristics render the study area an ideal setting for investigating the dynamics of Gum Arabic production, the challenges to its sustainability, and the level of community awareness regarding its socio-economic significance.

Study Population and Sampling

A total of 120 respondents were included in the study, representing the three main gum Arabic-producing areas. A stratified random sampling technique was employed to ensure proportional representation across key demographic and socio-economic factors, including age, gender, educational level, and economic activity (e.g., agriculture, trade, fuelwood collection, and other local livelihoods). This approach ensured that all relevant segments of the population were adequately represented, enhancing the validity and generalizability of the findings.

Data Collection

Primary data: Structured questionnaires and interviews were administered to residents in selected areas. These instruments were designed to capture information on demographic characteristics, income sources, economic activities, and awareness of the economic importance of Gum Arabic.

Secondary data: included previous studies, reports from regional, national, and international organizations, and relevant scientific literature related to Gum Arabic, forest resources, and rural livelihoods.

The collected data were analyzed using quantitative and qualitative approaches:

Descriptive statistics such as percentages and tables were used to summarize the data. Appropriate statistical tests were applied to examine the effects of different variables on respondents' awareness and participation in Gum Arabic-related activities.

Thematic analysis was conducted to identify recurring patterns, key ideas, and community perceptions regarding the economic importance of gum Arabic. This approach allowed the integration of respondents' perspectives and experiences with the qualitative findings, providing a comprehensive understanding of the study context.

III. Results And Discussions

Category	Frequency	Percentage %
20- 40 years	69	57.5
40- 50	35	29.2
Above 50	16	13.3
Total	120	100

Source: field survey, 2025

The results presented in Table 1 show that the youth category (20- 40) constitutes more than half of the respondents (57.5 %), while the middle-aged group (40- 50 years) accounts for 29.2 %. The elderly group (above 60 years) represents only 13.3% of the sample.

The disruption can be explained by the high population growth rate among youth in the area, a fact also highlighted in recent international reports that emphasize the demographic shift toward younger age groups in South Sudan.

The predominance of youth provides greater potential for active involvement in productive economic activities such as the collection and marketing of Gum Arabic.

The high proportion of youth in designing awareness and training programs that great these groups, as they are the most capable of driving future development initiatives and ensuring the sustainability of Gum Arabic production.

Table 2: Gender Educational Level of Respondents

Category	Frequency	Percentage %
Gender	83	69.2
Male	37	30.8
Female	120	100
Educational Level		
Illiterate	31	25.8
Primary	47	39.2
Secondary	31	25.8
University	11	9.2
Total	120	100

Source: field survey, 2025

Table 2 shows that males constitute the majority of respondents (69.2 %), while females represent 30.8%. The gender distribution may reflect the greater involvement of men in economic activities directly related to Gum Arabic production and marketing, which traditionally requires more fieldwork. However, the notable participation of women (over one-third of respondents) indicates their growing role in local economic activities in non-timber forest products and household-level income generation.

Regarding the educational level, the results reveal that about one-third of the respondents (39.2 %) have primary education, followed by 25.8 % with secondary education. Meanwhile, 25.8% are illiterate, and only 9.2 % have attained higher education. This implies that while a considerable proportion of respondents have basic literacy, higher education levels remain limited.

Since the majority of respondents have low to medium educational attainment, awareness campaigns about the economic value of Gum Arabic should be designed in simple, accessible formats.

The limited proportion of university-educated respondents highlights the need for capacity-building programs and technical training at the community level to bridge the knowledge gap and enhance local participation in sustainable Gum Arabic production.

Table 3: Economic Activities of Respondents in the Study Area

Economic Activity	Frequency	Percentage %
Farming (crop cultivation)	43	35.8
Livestock rearing	32	26.7
Gum Arabic, tapping, and collection	28	23.3
Small trade/ retail	12	10
Wage labor (casual jobs)	5	4.2
Total	120	100

Source: field survey, 2025

Table 3 indicates that farming is the most dominant economic activity among respondents, accounting for 35.8% of the sample. This finding reflects the predominantly agrarian nature of the Northern Upper Nile State, where crop cultivation remains the main livelihood strategy for rural households.

Livestock rearing comes second with 26.7%, confirming its complementary role in local economies, especially in pastoral and agro-pastoral communities. Gum Arabic tapping and collection involve 23.3% of respondents, which highlights its economic significance as a supplementary income source rather than the primary activity.

On the other hand, small trade and casual wage labour represent only 10% and 4.2 %, respectively, indicating their relatively minor contribution to household income compared to agriculture and forestry-based activities.

Sources of Income of Respondents

Table 4 below shows that 42.5% remains the primary source of income for households in Northern Upper Nile State, followed by Gum Arabic collection and marketing. Livestock rearing accounts for 26.7%, while small trade and other sources contribute 10% and 7.5%, respectively.

These results demonstrate that Gum Arabic is not merely a secondary activity but a significant contributor to households to cover essential needs such as food, healthcare, and education, especially during periods when farming income is insufficient or seasonal.

The findings also reveal that income diversification remains limited, as the majority of households depend on agriculture and Gum Arabic. This underscores the vulnerability of communities to environmental market and climate fluctuation.

Economic significance of Gum Arabic as a major source of income, it supports livelihoods and enhances financial resilience.

The need for value chain development, strengthening the collection, processing, and marketing of Gum Arabic, could increase household income and reduce economic vulnerability.

Table 4: Source of Income of respondents in the Study Area

Source of income	Frequency	Percentage %
Farming (crop cultivation)	51	42.5
Gum Arabic (tapping/collection)	32	26.7
Livestock rearing	16	13.3
Small trade/ retail	12	10
Other sources	9	7.5
Total	120	100

Source: field survey, 2025

Uses of Gum Arabic Income

Table 5 below indicates that the majority of Gum Arabic income is allocated to essential needs: food 39.3%, education 25.8%, and health 15.8%. Housing improvements account for 10.8%, while savings or other purposes also constitute 8.3% of the income.

The results demonstrate the direct impact of Gum Arabic on household well-being. The allocation to food, education, and health shows that income from this resource supports both immediate subsistence and long-term human and livelihood improvement.

Gum Arabic income contributes significantly to meeting essential household needs.

Allocation to education and health reflects a role in enhancing future economic opportunities.

Programs promoting sustainable Gum Arabic production should emphasize not only income generation but also its potential for improving living standards and resilience against economic shocks.

Table 5: Uses of Gum Arabic Income

Use of income	Frequency	Percentage %
Food	47	39.2
Education	31	25.8
Health	19	15.8
Housing/ Improvement	13	10.8
Saving / Other purposes	10	8.3
Total	120	100

Source: field survey, 2025

Level of Awareness of Respondents on the Economic Importance of Gum Arabic

Table 6 below shows that a majority of respondents, 50.8 %, possess a high level of awareness regarding the economic importance of Gum Arabic, while 32.5% have a moderate level of awareness. Only 16.7% of respondents display a low level of awareness.

These findings indicate that most community members understand the value of Gum Arabic, both as a source of household income and as a potential contributor to local and national economic development. The high awareness among over half of the respondents suggests accumulated traditional knowledge, reinforced by practical engagement in Gum Arabic production and marketing.

However, the 16.7% with low awareness highlights a gap that requires attention, particularly among less-educated individuals or those not directly involved in the collection and trade of Gum Arabic. This underscores the need for target awareness campaigns and training programs to elevate knowledge across all community segments.

Table 6: Level of Awareness of Respondents of the Economic Value of Gum Arabic

Level of Awareness	Frequency	Percentage %
High	61	50.8
Moderate	39	32.5
Low	20	16.7
Total	120	100

Source: field survey, 2025

IV. Conclusion And Recommendations

The study concluded that Gum Arabic (*Acacia senegal*) constitutes one of the most important and natural resources of the region for the local communities in Upper Nile State, South Sudan, and it significantly contributes to improving household livelihoods by providing cash income used to cover essential needs such as food, education, and health. The results also revealed that youth constitute the largest segment engaged in economic activities, and that a considerable proportion of respondents demonstrate high awareness of the economic importance of Gum Arabic, reflecting accumulated local knowledge, strengthening capacity, and integrating Gum Arabic into rural development strategies.

- Enhance community awareness programs to improve the economic and environmental value of Gum Arabic.
- Integrate Gum Arabic into local development policies as a strategic and sustainable economic resource.
- Invest in education and training programs to build the capacity of youth and other community members for sustainable management and utilization of Gum Arabic resources.

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