

Gum Arabic: Certification and Assessment of Marketing Opportunities

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Introduction

Certification envisages recovery of degraded Sudanese gum Arabic production and the opening of new market opportunities abroad, since it assesses the extent of institutional, socioeconomic, and safe environmental management aspects of trade products from natural resource origins against certain international set quality standards. As has been highlighted by Fall Brook Center. Website: <http://www.web.net/fbcja> the assessment extends across management plans, monitoring and rating, ecological harvesting activity, biodiversity conservation, soil and water conservation, protection of high conservation value areas, regulation of chemical substances, integrated pest management, tenure and customary use rights, air returns and adequate benefits, safe and healthy working environments, impact on local and indigenous communities, and economic viability.

The gum Arabic commodity has dominated the world markets for generations, as it is a basic ingredient to many food and medicinal items. Sudan dependence on the export earnings of gum Arabic has been threatened in recent years by poor production and marketing policies that discouraged small producers from producing large quantities with good quality that fit with the international standards. The [Forest Certification Handbook \(1995\)](#) provides the principles for forest products certification, while three international organizations carry out implementation of the assessment of nontimber forest products (NTFPs); these include the Forest (timberland) Stewardship Council (FSC), the International Federation of Organic Farming Movements (IFOAM), and the Fairtrade Labelling Organization (FLO). The three are of interest because they each have a set of generic standards in their specific field of expertise, they play a coordinating role for organizations working in their sector, and they each accredit or coordinate certification organizations that do the actual assessments of the product chain.

Gum Arabic is a strategic NTFP of Acacia trees of the Sudano-Saharan region of sub-Saharan Africa that grows naturally in the Sudan. The inherent characteristics of gum Arabic are exemplified by its emulsification, low viscosity at high assiduousness concentration, acid stability, adhesive and binding properties, and good mouth feel, which make it widely used in beverages, insecticides, pharmaceuticals, ceramics, lithographic plates, candies, and countless other applications ([Karama, 2002](#)).

The marketing policy of gum Arabic in Sudan was unstable and had been partially responsible for the ongoing deterioration of production and foreign trade of this product. The marketing of gum Arabic had a complicated market chain associated with fluctuating demand and supply prices (Karama, 2002). There was no reference to product quality and grade price differential to producers of gum Arabic. The effect of those policies resulted in increased smuggling of gum Arabic, severe deforestation of the gum belt, reduced income, and substitution of the gum trees by other crops such as sesame, groundnuts, and rosella. The application of certification to gum Arabic had been considered as essential, since the small producers of this NTFP have been subjected to increased poverty and their land exposed to continued environmental degradation.

Absence of certification is assumed to be one of the critical factors causing fluctuations and nonsustainability of domestic and international supply and prices of gum Arabic of Sudan. This concern calls for exerting more effort to analyze the basic factors for the failure in market, institutions, and policies that had led to such problems in order to study whether certification and current certification initiatives are of real use in slowing the Gum Arabic Belt loss and deterioration and assuring the objectives of sustainable management practices. The identification of quality forestry as an interim and achievable goal regarding social, economic, and environmental costs and benefits is crucial in this respect. The socioeconomic impact of gum Arabic production and marketing are social impact and migration of gum Arabic producers in search of work, which leads to loss of indigenous knowledge, change of welfare, and change in production credit and marketing relationships at the field level. The environmental impact includes the movement of the gum belt southward, where there is absence of indigenous knowledge and expertise, effects of climate change on gum production even under rehabilitated areas, depletion of soils, and decline in crop production under shifting cultivation of the Acacia crop. All of these affect the quality of tapped gum Arabic (certification) and sustainability of products, so the key challenges are the management information system, effect on production–marketing chain (chain of custody in certification system), and international market demand and prices (fluctuations and development of synthetics substitutes to reduce dependence on natural gum Arabic).

The aim of this chapter is to highlight the factors that may facilitate the certification of gum Arabic to access more assured marketing opportunities worldwide.

Gum Arabic production policies

The policies and strategies adopted by the state since the dawn of the last century and the National Forests Plan were directed toward the protection and development of the tree resources and increasing gum Arabic production to the level that secure the foremost position of the Sudan in the international trade. Section 6 of the 1932 Forests' Policy reads that the role of the provincial authorities is focused on the maintenance and protection of the existing (gum) areas, supervision over the markets, improvement of communications, afforestation, and encouraging the opening up of new areas.

Governors of provinces are entrusted with supervision of the markets; the role of the forestry units in the provinces is restricted to technical aspects concerned with surveys and the provision of field data on all factors that affect gum Arabic production.

The amended forest policies of 1986 prescribed the development of gum forests, increasing their productivity by forestation in forest areas and gum gardens, selection of high-yielding strains, improvement of production methods, and encouragement of the rural dwellers to restock the gum gardens. The Comprehensive National Strategy of 1993 was deeply concerned with gum Arabic and developments of its production, setting a production target of 60,000 tons per year. The government policy encourages local and foreign capitals to invest in gum Arabic production and industries by granting concessions to export raw gum to those who plant 50,000 feddans of hashab or invest five million tons or more in the gum industry. Thus, there are many companies involved in gum Arabic export besides those of the concession company (Elnasri, 2000).

The draft of Sudanese forest policy in 2006 devoted appreciable space to gum Arabic as the most important nonwood forest product in the Sudan. The policy option focused on increasing the benefits to the land owners and producers by encouraging the establishment of local societies, cooperatives, and producers' unions and improving their investment and industrial capabilities, increasing productivity and their competitive abilities through the provision of loans and finance, and increasing investment in infrastructures and services in the production areas. The policy focuses also on encouraging the private sectors and setting out the organizational frameworks that safeguard the gum quality and the upkeep of the Sudanese position in the international markets, securing supplies and market stability through the protection and stocking of the gum belt, expanding the production base, and the establishment of reserve against fluctuations in production. Unfortunately, all of these policies did not mention the certification of gum Arabic as a policy tool for the sustainability of the products or as a market-base instruments for the gum trade, the nonsustainable supply and prices of gum Arabic of the Sudan were the obvious result of adopting arrangements and policies in addition to the way that producers practice the business. Advancement of gum exchange gum—liberalization of the gum foreign trade—and the foundation of direct connection among gum Arabic business stakeholders. That would help to clarify the aspects in supply and demand that would prompt great benefits for both the tree owners and producers (Abdelazim, 2007).

The role of stakeholders involved in gum Arabic business

In the gum Arabic certification process, there is a wide range of players (stakeholders), varying from the local community to the government; each group has its own goals and aims. These players are:

1. *The community*: These are people who live in and around the woodlands (local people). They depend on the woodland for their livelihoods and are usually poor rural dwellers. In practice, they are the owners of the lands, and any decision on forest matters affects them directly. Economic development efforts in the rural areas are aimed at improving the life of this lot. Apart from subsistence farming, there are no industries in rural Sudan, and the infrastructure

is undeveloped. Their goal is daily sustenance. What they have been told during the visit is that certification will bring increased incomes from the *A. senegal* trees that they sell through identified system and organizations. In view of this, the group has welcomed certification, with high expectations. Local communities are organized into villages that are headed by traditional leaders (tribal sheikhs) who come under a chief. In some villages, there is a gum Arabic producer association.

2. *The chiefs and traditional leaders*: These form the traditional authorities (tribal sheikhs) and have a significant influence among their subjects. They administer natural resources in their respective chiefdoms. Their goal is socioeconomic improvement in the lives of their subjects. They welcome certification as long as it does not usurp their powers.
3. *Local government*: The local government system is made up of state governments and municipalities. Their goal is provision of services to the local communities in their areas of jurisdiction. They are only interested in certification because it will bring more commerce to their areas, which will lead to raising their revenues through taxes.
4. *Forest department*: The department is the government arm; its task is to manage and supervise the usage of forest resources. Its goal is the sustainability management of the forest resources. Hence, any measures that promote sustainability are welcome. The concern of the department is the redistribution of powers that will result from the certification process as the certificate holder becomes more involved in the forest management plan. It is therefore the desire of the department to be closely involved in the process of certification so that their role is not sidelined.
5. *Donors and NGOs*: These have been involved in improving the livelihoods in rural areas. In Sudan, they have recognized and are well aware about the important role that NTFPs can play in order to improve rural incomes. To this end, they have to promote processing and marketing of all products nationally with the aim of maximizing income from NTFPs, including from *A. senegal* gum. In doing this, they will understand the fact that the source of NTFPs should be managed sustainably, but this can only be achieved when forest users receive adequate incomes or have access to credit and funds. This group adopts certification in order to access the more lucrative foreign marketplace.
6. *Private companies*: These are in business for profits and include Acacia Company and Dar Savannah. However, due to the size of the internal market, it is not possible to increase production without seeking external port markets, which are inaccessible without gum certification. From the foregoing information, it is evident that the goals of all players have not been a source of conflict.

Trading channels

With the exception of Sudan, which exports small quantities of kibbled gum, most other producing countries export only raw gum Arabic (Elnasri, 2000). Some of this is used by end-use industries without further processing, but in most cases, kibbled or spray-dried gum is used. For many consuming countries, principally where a small amount of gum is involved or where there is no domestic processor, imports are mainly processed gum that come from an intermediate country, or from any other secondary source, rather than the conventional producers. A significant proportion of gum Arabic in international trade is therefore in the form of reexports from countries such as France, the United Kingdom, and the United States, which have large processing capabilities and capacities.

There is much to be gained, therefore, by examining export statistics for these intermediate destinations, as well as those (where they exist) for primary producers. This situation can be represented schematically as thus: once the gum Arabic reaches its final destination, it is either sold promptly to other, smaller brokers, prepared and processed by the similar organization which imports it, and afterward sold on to the end-use industries or utilized by the importer himself, who additionally happens to be an end user. In some cases, such as the importation of Sudanese gum Arabic into Germany, Italy, and the United States, some agent facilitates the transaction between exporter and produced country but does not otherwise physically intercede in the transfer of goods.

Certification is driven by international markets. In Sudan, both the gum Arabic producers and consumers are not aware about certification, and certification itself is not yet developed. The idea of certification is to link trading channels to the sustainable management of forest resources by providing consumers with information on the current status of the production systems of the forests from which timber and other NTFPs products come.

International factors

The initiatives of timber certification began in 1992 following the Earth Summit, the United Nations Conference on Environment and Development in Rio de Janeiro. The Rio conference recognized that the issues of need, poverty, nourishment, and food security were connected to cutting of trees and indebtedness of developing nations. Numbers of intergovernmental approaches and protocols provide sets of principles and criteria for developing of certification standards all over the world (Bass, 1998). Groups concerned about the environment, NGOs, and other interested groups began the certification initiatives, leading to the foundation of the FSC in 1992 (Ng'andwe, 2003). Other certification schemes emerged from there. After Rio, global awareness, nature protection, and environment conservation expanded in many countries. Other studies' results also demonstrated that expanded harm and damage to the environment of the Earth in one territory influences the life quality of a person somewhere else. The alert was being raised about the ozone layer, and it warned of the global costs. All of these were acknowledged, realized, and had starting points originating in the uncaring manner in which the woodland assets and natural resources products were being utilized. For encouraging better management for wood and nonwood resources, it was thought about wisely, and the effort was to empower and enforce measures that would support and encourage the approach of sustainable management of these woodland assets. The consumers from Europe and the United States also began to demand more natural, as opposed to synthetic, products. The best way to strike a balance is to adopt and come up with certification. The thought and idea were to confine and control markets for the nations and institutions that administered and managed their resource environments in an unsustainable manner. With this confinement, it has turned out to be troublesome and very difficult for the national institutions that

are attempting to export timber and nontimber products to do so. National institutions are interested in either poverty alleviation or industrial development. Since the internal market is small and depressed, high income generations and salaries and increasing production from natural resource industries can only be attained through access to external markets for both timber and NTFPs. Sudan is a signatory of more than 22 local, regional, and global environment-related agreements, conventions, and treaties, some of which have been approved. The conventions and treaties provide for policy arrangement structures, which direct the country's worldwide policy on woodlands. The national forest strategy does not mention wood and Non-Wood Forest Products (nwfps) accreditation; the main topics and issues are sustainability of the management plan, conservation, and utilization (Felix, 2004).

Certification has turned to be the hottest and most debated issue in numerous natural resource sector. The harvest of NTFPs has recently become a topic of great interest for a variety of certification projects and programs.

Definitions of certification

Certification is a procedure by which a woodland owner voluntarily asks for an inspection to examine the forest and determine and decide whether predefined management principles, criteria, and indicators (standards) are being met.

Standards

The term standard is used generally to describe a quality or measure serving as a basis, example, or principle to which others conform or should conform, or by which the accuracy or quality of others is judged, as defined by the *Oxford English Dictionary*. Also, standards are documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics to ensure that materials, products, process, and services are fit for their purpose.

As defined by the International Organization for Standardization (ISO), there are different types of standards, which can be categorized as being either external or internal to the local forest management unit (LFMU).

External standards are those set by third-party independent bodies. These are usually international or national bodies, and all stakeholders usually participate in the standard-setting process. Internal standards are those developed by LFMUs to describe the level of performance that their forestry activities must reach.

Internal standards are interpreted from external standards and are specific to the LFMU. A vital part of the certification process is an assessment of this interpretation by the certification body.

The process for evaluating if the woodland is managed sustainably, and a way to impart natural data about woodland to consumer.

Definition of nontimber forest products

The FSC working group suggested a definition for NTFPs as “every biotic item other than timber that can be reaped and utilized for subsistence and additionally for exchange.” NTFPs may originate from different types of woodlands, such as primary, secondary, and natural forests, as well as forest plantations (FSC, 1997). Sorts of NTFPs incorporate sustenance, drinks, flavors, seasoning, fragrances, solutions, paints, shines, construction materials, and concentrates utilized as part of manufacturing chemicals. Recently, not less than 150 NTFPs have been significant in terms of worldwide exchange, for example, nectar, gum, rattan, bamboo, stopper, nuts, mushrooms, essential oils, and plants or creatures’ parts utilized for pharmaceutical industries (FAO, 1997).

Certification systems for NTFPs

NTFPs can be evaluated and labeled according to acknowledged principles, criteria, and indicators (standards) of the best management (certified). NTFPs can be certified according to the principles, criteria, indicators, and in view of the norms of the three frameworks, which are forest stewardship, fair trade, and natural farming.

Certification of NTFPs can create and enhance market access, add to the value paid to the collectors and processors through cost premiums, and educate purchasers. They provide conscientious buyers with clear evidence to choose the products, and they encourage sustainable utilizing approaches (Baharuddin and Simula, 1996) (Newsletter No. 43, November 2000). The FSC in Bonn, Germany, was established by NGOs and the private sector. The FSC is an accredited organization for certification bodies. This organization gives full authority to its individuals to carry out its central goal and vision. The enrollment is to professionals, experts in the fields of financial, environmental, and social affairs, since 1994, nine to ten FSC principles of Sustainable Forest Management (SFM) rules and related criteria. FSC standards are oriented to assess the execution of Forest Management Unit (FMU) performance standards (Table 5.1).

FMU is defined as a clear, demarcated area of land covered predominantly by forests and managed according to a set of explicit objectives and a long-term management plan. Since it began, the FSC has grown rapidly. In 5 continents, it has over 800

Table 5.1 Separation of management and performance dimensions

Management dimension:

- a. Area management: area demarcation (compulsory requirements)
- b. Production management: performance (core activities)
- c. Organizational management: managerial quality (desired requirements)

Performance dimension:

- a. Production sustainability
- b. Environment sustainability
- c. Social sustainability

members in over 80 countries. The members vary from large players in forest sectors to small companies, also from community forestry groups, to local peoples' organizations and associations, and from organizations in which the environment is the specific concern to progressive forestry and wood retail companies. All members are working in a balanced partnership to improve and sustain forest management all over the world.

With certified forests in 80 countries on 5 continents, FSC is the leading standard for responsible certification. Currently, 7% of the world's forest area, around 180 million ha, as of June 14, 2013, are FSC certified (<http://www.greenpeace.org/>). The certificates enable promotion and rational management of forests. They promote well-managed forests through the application of criteria and indicators that address sustainable management aspects of ecology, social, and economics related to the forest sector. The FSC has relatively recent certification programs that resulted from concern over the fate of the world's forests, particularly in the tropics (<http://www.fscoax.org/>).

Table 5.2 shows how the management and production dimensions are combined and that each indicator represents a combination of dimensions.

Forest (timberland) Stewardship Council principles

Forest management certification under FSC has the most well-rounded criteria and is perhaps the most natural choice for NTFPs. The principles are:

- Principle 1: Compliance with laws and FSC principles
- Principle 2: Tenure and use rights and responsibilities
- Principle 3: Indigenous people's rights
- Principle 4: Community relations and workers' rights
- Principle 5: Benefits from the forest

Table 5.2 Matrix showing the management and production dimensions

| Management dimension (principles) | Production dimension (principles) | | |
|--|-----------------------------------|----------------------------|-----------------------|
| | Production sustainability | Environment sustainability | Social sustainability |
| Strategies for achieving results | | | |
| 1. Area management (Compulsory requirements) | Indicator | Indicator | Indicator |
| 2. Forest management | | | |
| 2.1 Production management | | | |
| 2.2 Environmental management | Indicator | Indicator | Indicator |
| 2.3 Social management (core activities) | | | |
| 3. Organizational management (desirable) | Indicator | Indicator | Indicator |

Source: Indonesian Eco labeling 5000 (LEI 5000).

- Principle 6: Environmental impact
- Principle 7: Management plan
- Principle 8: Monitoring and assessment
- Principle 9: Maintenance of high conservation value of the forest
- Principle 10: Plantation
- Principle 11: Nontimber forest products

Organic agriculture

Introduction

IFOAM is the equivalent world body for organic agriculture; the origin of IFOAM was of a global farmers' movement; its main focuses are on building soil fertility and the avoidance of chemicals in agriculture. Organic farming is referring to the production methods that do not use synthetic pesticides, chemical fertilizers, or genetically modified organisms. As highlighted by Falls Brooks NTFP, page 10, organic techniques focus on improving soil quality, assuring crop diversity, protecting the health of workers and consumers, and reducing the environmental impacts of production. Organic farming activities contribute to the millennium development goal of improved health and food security, environmental conservation, and economic development. Organic agriculture is characterized by two main features, which are the recycling of nutrients and natural means of pest and disease control according to both traditional and modern scientific knowledge. Nevertheless, organic farming is more than just a system of production that includes or excludes certain inputs, particularly agrochemicals and genetically modified organisms, because it builds on and enhances the ecological management skills of the farmers, fishermen, and pastoralists, and it includes soil standards. The organic principles and basic standards formulated by IFOAM are applied in both certified and noncertified organic agriculture and are adhered to and cherished.

Principles of Organic Agriculture

1. Health
2. Ecology
3. Fairness
4. Care

Fair trade: Fairtrade Labeling Organizations International

Introduction

FLO developed out of the alternative trade movement. They seek to ensure that business contributes to the well-being of workers and communities. Fair trade also considers that producers receive a fair deal and that they strive to reverse the usual tendency of international trade, which all too often increases global and regional inequality.

With the emphasis on the social components of production, fair trade–certified enterprises are often, though not exclusively, worker cooperatives or associations (Falls Brook Center’s NTFP Pages, 2008).

Concept of fair trade

Fair trade is a way of trading that seeks to reduce poverty and empower producers who are disadvantaged by the structures of conventional trade. Those involved in fair trade seek to empower producers by adhering to certain principles and standards of behavior in their trading relationships and also campaign to challenge mainstream trade structures. The goals of fair trade are to improve the livelihoods of producers (improve market access, provide fair terms of trade, and maintain long-term, stable trading relationships), promote development opportunities for disadvantaged producers, and protect children from exploitation in the production process in addition to raising awareness and educating and encouraging consumers to buy fair trade goods. They also aim to set an example of partnership in trade through dialogue, transparency and respect, challenging the rules and practice of conventional trade, and promoting social justice, sound environmental practices, and economic security.

Principles of fair trade

1. Principle 1: Creating opportunities for economically disadvantaged producers
2. Principle 2: Transparency and accountability within the activity
3. Principle 3: Assuring fair trading practices
4. Principle 4: Payment of a fair price
5. Principle 5: Ensuring no child labor and forced labor
6. Principle 6: Assuring gender equity
7. Principle 7: Ensuring good working conditions
8. Principle 8: Providing capacity building
9. Principle 9: Promoting fair trade
10. Principle 10: Respect for the environment

Current situation of gum Arabic business in Umm Ruwaba and El Rahad, Sudan production

The survey data (questionnaires and interviews with eight gum Arabic producers unions in Umm Ruwaba and El Rahad) were analyzed using simple statistical methods for estimating frequencies and percentages. The study findings revealed that a majority (86%) of the respondents were not aware of the policies. Despite the existence of policies, regulations, and laws, a very small portion (23.7%) were found to be acquired about laws and regulation regarding the illicit felling and grazing protection law, provision of certificates to safeguard land tenure, local decree for collection of gum Arabic in sacks, laws of restriction of a gum trade monopoly, taxes, customs, and fees.

The Sudan leading position of gum Arabic production was threatened in recent years by poor production and marketing policies and high competition from neighboring countries, and synthetic products posed another threat to the livelihoods of the small producing households in the gum belt of Sudan. The poor management of the production and conservation of the gum Arabic resources diverted the producers from growing gum into growing of other cash crops, and led to severe tree cutting for making charcoal and firewood. The end result was a degrading environment with southward movement of the gum belt. The social factors constituted one of the main elements that had influenced the performance of gum Arabic production and standardization.

The married status is high among the gum Arabic producers. This provides a positive sign of culture for carrying out sustained family responsibilities and searching for adequate income that would supply the basic needs of the household. This could be achieved by improving and maintaining the quantity and quality of production of gum Arabic. The early marriages result in extended families, which provide a good source for family labor that hedge against migration of young people out of the Gum Arabic Belt (Table 5.3).

The existence of young and middle-aged producers reflects willingness and experience in pursuing gum Arabic production system as a form of livelihood. Nevertheless, the decreasing numbers of old producers warns against depletion of indigenous knowledge about gum Arabic production, which needs to be augmented with intensive extension services to provide skills in the area of sustainable natural resources management (Elnasri, 2010). This has been supported by information on farmers' ages, which indicated the existence of young to middle-aged farmers, with ages ranging between 18 years and less than 60 years, which exhibits the presence of farmers with good experience who are willing to follow orders and regulations and are open to possibilities of accepting new innovations (Table 5.4). The data also detected the presence of farmers above 60 years old (28% of the sample).

Table 5.3 Distribution of households in Umm Ruwaba and El Rahad areas by family size

| Family members | Frequency | Valid percent | Cumulative percent |
|----------------|-----------|---------------|--------------------|
| 1–6 | 50 | 36.0 | 36.0 |
| 7–11 | 66 | 47.5 | 83.5 |
| More than 11 | 23 | 16.5 | 100.0 |
| Total | 139 | 100.0 | |

Table 5.4 Distribution of households in Umm Ruwaba and El Rahad areas by age

| Farmer's age | Frequency | Valid percent | Cumulative percent |
|--------------------|-----------|---------------|--------------------|
| 18–38 | 28 | 20.1 | 20.1 |
| 39–59 | 71 | 51.1 | 71.2 |
| 60–80 | 38 | 27.3 | 98.6 |
| More than 80 years | 2 | 1.4 | 100.0 |
| Total | 139 | 100.0 | |

Table 5.5 Distribution of gum Arabic farmers in Umm Ruwaba and El Rahad areas by level of education

| Level of education | Frequency | Valid percent |
|--------------------------------|-----------|---------------|
| Illiterate | 33 | 23.7 |
| An informal education (khalwa) | 28 | 20.1 |
| Primary school | 63 | 45.3 |
| Secondary | 15 | 10.8 |
| Total | 139 | 100.0 |

The responses among the gum Arabic producers ensured the high possibility of accepting new innovation, following rules and regulations for forest conservation and involvement in marketing operations. However, the present education level among gum Arabic producers (Table 5.5) warrants the use of appropriate means of communication for transfer of new knowledge and awareness programs. The use of audio-visual aids might be a recommended means of communication, given the prevailing status quo. This is because a large number of gum Arabic producers do not have access to radio and television facilities.

While involvement in crop production and animal raising forms the major source of income and social prestige, small producers depend on gum Arabic production as a second-best source of livelihood (Taha, 2000). This dependence occurs without realizing the benefits that can accrue from certification of their gum Arabic collections. Certification becomes a prerequisite for enhancing the socioeconomic status of the small households since it expands the opportunities for new markets, assures fair prices offered in the world market, and controls against unfair domestic marketing practices.

There are few laws that regulate gum Arabic production and trade in Sudan that can lay a foundation for implementing certification of the product. Such laws deal mainly with natural resource conservation, including the prohibition of illicit felling of trees and severe grazing. Domestic animals pose a great source of threat to gum Arabic trees, as they eat the crowns of the trees, nab and break the emerging branches, graze on the leaves, and trample on the soil. However, certification requires additional laws that provide for safeguarding land tenure system, issuing local decrees for collection of gum Arabic in sacks, and protecting of forests using fire lines. Long-term land tenure and usufruct rights to forest resources shall be clearly defined, documented, and legally established. Furthermore, there are other laws that restrict gum trade like monopoly of the gum Arabic Company (GAC), the royalties, taxes, and states fees that levied against the movement of gum Arabic across states. The different types of taxes, customs, and values, and the institutions are displayed in Table 5.6.

The Forests National Corporation (FNC) is responsible for the planning and management of forest trees and products, but remains nonfunctional when it comes to gum Arabic production, marketing and export policies, and management. The severe felling of gum Arabic trees for making firewood and charcoal and the construction of shelters, as well as the turnover of producers toward intensive cultivation of cash crops, reveal the noneffective policies followed by the GAC and conflict with the local forests authorities' mandates and functions. All of this severe natural resource

Table 5.6 The types of taxes, customs, values, and sources of fees collection

| Taxes or customs | Value SDD | Institution that received the value |
|------------------|-------------|-------------------------------------|
| Marketing taxes | 5000 | Locality |
| Production taxes | 7000 | State |
| Transport | 2000 | Locality |
| Zakat | 10,000/sack | Zakat |

Table 5.7 Type of land ownership for gum Arabic producers in Umm Ruwaba and El Rahad areas, Sudan

| Description | Frequency | Valid percent | Cumulative percent |
|---------------------------------|-----------|---------------|--------------------|
| Customary inherited land tenure | 99 | 71.2 | 71.2 |
| Rent | 2 | 1.4 | 72.7 |
| Purchased | 31 | 22.3 | 95.0 |
| Inherited and purchased | 7 | 5.0 | 100.0 |
| Total | 139 | 100.0 | |

degradation takes place irrespective of the available nonoperational laws forbidding tree felling. The involvement of the Gum Arabic Producers' Associations in trade aspects gives them a leverage of knowledge and experience of the negative outcomes of the GAC and taxes on their income and livelihoods.

The main land use systems practiced in the Gum Arabic Belt are composed of growing crops, forests, and usage of land ranges based on usufruct rights. The community chiefs grant the privilege of growing the crops and having the animals graze on the forests and gum Arabic gardens. The landholdings of gum Arabic vary among users (Table 5.7); less than 50% of the respondents were used to recording and documenting land ownership, and all lands are used under customary rights being inherited or purchased within the community system. It could be concluded that inheritance might lead to land fragmentation (small-size landholdings).

The traditional leaders protect the ownership rights on behalf of their people without receiving any payment in exchange. This role extends into the protection of land against illicit grazing and caring for conflict resolution among people and tribes using the same resources. They sometimes act as security guarantees for credit institutions in supplying loans to gum Arabic producers. Almost all of the producers are members of one of the gum Arabic producers' associations. Nevertheless, they suffer from close linkages and common communication grounds that can facilitate their effective organization into unions to protect their production and price rights and enhance their access to better credit and marketing services. It is difficult to find adequate access to credit since the main sources of credit are the GAC (Table 5.8), the Agricultural Bank of Sudan, and money lenders and merchants at the village level. The major alternative source to loan borrowing is the wide sale of animals for obtaining supplemental financing. The timing of repayment of loans varied among lending sources, according to prevailing situations, and the repayment takes place in kind and in cash.

Table 5.8 Credit accessibility for gum Arabic producers in Umm Ruwaba and El Rahad areas, Sudan

| Credit accessibility | Frequency | Valid percent | Cumulative percent |
|----------------------|-----------|---------------|--------------------|
| No answer | 4 | 2.9 | 2.9 |
| Yes | 33 | 23.7 | 26.6 |
| No | 102 | 73.4 | 100.0 |
| Total | 139 | 100.0 | |

Table 5.9 Types of services offered by the government in Umm Ruwaba and El Rahad areas, Sudan

| Types of services | Frequency | Valid percent | Cumulative percent |
|--|-----------|---------------|--------------------|
| No answers | 12 | 8.6 | 8.6 |
| Water, health, and education | 53 | 38.1 | 46.8 |
| No services provided by government for community development | 71 | 51.1 | 97.8 |
| Establishment of cooperative associations | 1 | 7 | 98.6 |
| Water, health, and education and establishment of cooperative associations | 2 | 1.4 | 100.0 |
| Total | 139 | 100.0 | |

There are many institutions that are involved with gum Arabic production and marketing in one way or another. These include the FNC, the GAC, local governments, the small gum Arabic processing private companies, banks, and traders. Given such a diversity of stakeholders, these institutions failed to provide their mandated services except for training in tapping and gum Arabic collection.

The gene bank policy of FNC to conserve the genetic characteristics of the gum Arabic trees (hashab, talha, and others) is not well implemented. The efforts to conserve the genetic characteristics included provision of certificates to safeguard land tenure, reforestation, extension services, provision of seedlings, and establishment of nurseries. Efforts of forest research and FNC used demonstration farms in the past, which are not in existence anymore due to financial and technical limitations.

As shown in [Table 5.9](#), the services provided by the local government are focused on the supply of drinking water and provision of health and education services. Still, the government support for community development is considered minimal.

All producers practiced intercropping to diversify their local economy and avoid dependence on a single forest product. The hashab tree offers several benefits during and after its life cycle period: it provides gum, wood for building, and furniture, firewood, and charcoal. The estimated income generated by the hashab tree ranged between Sudanese Dinnar (SDD) 100 and 57,000. The percentage share of the contribution of the hashab tree out of total income varied among producers.

Table 5.10 The percentage share of revenue out of total income accrued from the hashab tree in Umm Ruwaba and El Rahad areas, Sudan

| Category of revenue share | Frequency | Valid percent | Cumulative percent |
|---------------------------|-----------|---------------|--------------------|
| 0% | 1 | 0.7 | 0.7 |
| Less than 15% | 49 | 35.3 | 36.0 |
| 15%–30% | 59 | 42.4 | 78.4 |
| 31%–45% | 14 | 10.1 | 88.5 |
| 46%–60% | 11 | 7.9 | 96.4 |
| More than 60% | 5 | 3.6 | 100.0 |
| Total | 139 | 100.0 | |

Table 5.11 The percentage distribution of gum Arabic producers in selecting criteria for sorting gum Arabic nodules

| Criteria of sorting nodule | Frequency | Valid percent | Cumulative percent |
|----------------------------|-----------|---------------|--------------------|
| Volume | 55 | 39.6 | 39.6 |
| Color | 2 | 1.4 | 41.0 |
| Moisture content | 3 | 2.2 | 43.2 |
| No grading for gum | 54 | 38.8 | 82.0 |
| Others (purity) | 17 | 12.2 | 94.2 |
| All of the above mentioned | 8 | 5.8 | 100.0 |
| Total | 139 | 100.0 | |

The highest revenue accounted between less than 15% and 30% of the total income (Table 5.10).

Most of the producers sell their gum Arabic at village level and receive their payment of money on sales promptly, and the others receive their payment in advance or a year later. In all, the producers were not satisfied with the prices they received, as they did not cover the cost of production, especially the high cost of tapping the gum.

The concept of grading is familiar to the gum Arabic producers. The producers sort the gum granules by nodules volume, color, moisture content, and purity (Table 5.11). Most of the grading is done by the household members, relatives, friends, and by nafir.

The gum collected directly from the tree is more clean and pure than the other gum collected that had fallen on the ground. The purity of gum is the affected by the place of collection and mixing of hashab gum with other gum. The degree of purity affects the quality and prices of gum sold in the market. The less-pure gum would result in lower prices, penalizing the high-quality hashab gum. The concept of a management plan was conceived and implemented by the producers. The required criterion indicated in principle 7 was customarily applied, but not written. The gum Arabic producers are acquainted with the role of the tree and its value to the environment, economic, and social aspects. The economical values of the tree include profit out of tapping and collecting the gum and making of firewood and charcoal, and are rising with their standard of living. The average number of planted hashab trees in a typical

garden ranged between 100 and 1,000,000 trees, which were used as park area and arranged as windbreaks and hedges. Most of the gum Arabic producers adopted the shifting cultivation system for gum Arabic production, and the others adopted the fallow period system, while few practiced both systems.

The hashab regenerates naturally from seeds or uses direct sowing, gum-bush cultivation cycle, and artificial regeneration of seedlings. The limiting factors that determine the liability of the trees for tapping are temperature of the area, the age of the tree, and announced prices.

Regarding the tools used for tapping, the producers were found to prefer using the traditional axe, followed by both sonki and farar.

The right and the best time for tapping the gum trees is in October, as specified by 97 producers. They can tap in November, and if that fails, it will be redone preferably in December or February for the same production seasons. The gum Arabic producers tap the same tree only once per season. Tapping and picking is done mainly by household members, hired labor, nafir, and by assistance of relatives and friends (Table 5.12).

The producer usually taps between 40 and 10,000 trees per year. The number of people picking differs; it is determined by existing ecological factors, and it ranges between five and eight pickings. The period between tapping and picking differs according to ecological and physiological reasons (Karma, 2000). The minimum production of one tree ranges between 0 and 1.7 kg, while the maximum production may go up to 7.6 kg. Winter was considered to be the best time for collection of gum Arabic, but 15% preferred the summer collection.

On monitoring and assessing the performance of the gum Arabic tree, it was indicated that the number of gum trees had increased due to natural regeneration, use of seeds from mother trees, and reseeded by humans, while another view believed that the number of the trees had decreased due to illicit cutting, low rainfall, and attacks of pests and diseases. Management activities of high-value forest products shall maintain and enhance the attributes of such forests. The majority of the producers asserted the absence of exotic trees species in the area. All of the existing species are indigenous and dominated by *A. senegal*, *Balanites aegyptiaca*, *Azadirachta indica*, *Compretum hartmunimum*, *Faidherbia albida*, *Zyisphus spina-christi*, and *Acacia nubica*.

Table 5.12 Labor force involved in tapping gum Arabic trees in Umm Ruwaba and El Rahad areas, Sudan

| Categories of tappers | Frequency | Valid percent | Cumulative percent |
|---|-----------|---------------|--------------------|
| Family labor (household) | 77 | 55.4 | 55.4 |
| Nafir (communal labors) | 3 | 2.2 | 57.6 |
| Assistance of relatives and friends | 2 | 1.4 | 59.0 |
| Hired laborers | 19 | 13.7 | 72.7 |
| Family members and hired labor | 30 | 21.6 | 94.2 |
| Family members, nafir and assistance of relatives and friends | 3 | 2.2 | 96.4 |
| All the above | 5 | 3.6 | 100.0 |
| Total | 139 | 100.0 | |

Cost of certification

The FSC is an expensive and time-consuming certification program, and it is easy to apply to many NTFPs since it fits the conventional forest harvest structure of FSC, i.e., large-scale industrial operations. Therefore, FSC is appropriate for large-scale, industrial NTFP operations. The FSC provides a better guarantee of price premiums for certified products and access to a range of specialized markets. It is important to remember that the major cost of getting certified is usually not the cost of the certification process itself, but rather the cost of improving operations to meet certification criteria. Some common examples of areas where improvement is needed are in the development of management plans and maps, better recordkeeping, and in addressing landscape management issues. The certification cost can be classified as direct cost of initial forest assessment plus required annual audit and reassessment, indirect cost of improved forest management practices (i.e., reduced harvest or increased expenditures), and cost of chain of custody audit.

Chain of custody auditing is the second major component of forest management certification, complementing a forest assessment. Chain of custody can be defined as “an unbroken trail of accountability that ensures the physical security of samples, data, and records.” Chain of custody is a critical element of any certification system, since it provides the ultimate link between the “consumers” and the “producers.” The term “consumers” is used here in a broad sense to indicate individuals, retail companies, or suppliers in countries where wood, wood products, and nonwood are distributed, sold, or used. The producers may be individual landowners; a community organization (such as a cooperative); a company that manages forests, brokers, and products and/or processes wood; or a government.

The desire by consumers to assure themselves that the wood or other forest products they sell or purchase are from well-managed sources is one of the key motivations underlying attempts to develop credible certification systems; if the consumers seeks assurance, the responsible producer provides this assurance through a certificate that the product does indeed derive from a certified, well-managed forest. Ideally, a secure chain of custody system will have the following basic elements (1) physical evidence (such as documents, tags, and labels) that the goods originate from a particular source; and (2) an “auditable” data recording and communication system that runs in parallel with and links to the physical evidence identifying each product [Groves et al., 1996](#).

Challenges of gum Arabic certification

The main challenges facing gum Arabic certification in Sudan are:

- The main challenges facing gum Arabic certification in Sudan are:
- High cost associated with forest certification,
- Poor roads and other infrastructure systems in the study area make forest certification costly to set up and maintained.
- Lack of certifiers with experience in the ecology and regeneration of gum Arabic.
- Lack of standard policies.

- Weak supervision of FNC (damages by animals, Illegal cutting and grazing by nomads)
- Weak forestry institutions especially for the implementing of forestry regulation and enforcement of forest laws
- Financing problems
- The low level of information on Forest Certification in general
- Political instability
- Poor capacity of local civil society organizations, in the rural community and local NGOs to monitor sustainable forest management.

The opportunities

- Rich in ecological, social, and economic knowledge about *A. senegal*;
- Available baseline data at the Sudan forestry sector;
- Assured minimum annual sustained harvest;
- Resiliency of specific ecological niche for the species dominant at the gum belt;
- Collaborative small producers who produced gum Arabic and other crops for cash and subsistence;
- The quality control measures (standards) for gum Arabic tapping, harvesting, and processing that are well developed;
- Based on traditional customary land tenure and access usufruct rights;
- Ability of the certified gum Arabic to command a price premium in the marketplace;
- Well-developed market for certified forest nontimber products that gives a value for standardized product;
- Increasing the numbers of environmentally and socially concerned customers who are asking for forest products that are friends to the environment and emanating from sustainable forest management;
- There are considerable areas of gum Arabic (the belt) that help to motivate efforts toward forest certification as a tool for both sustainable forest management and market-based instruments; and
- Government institutions are becoming increasingly open to the involvement of the civil society in forest management and monitoring.

Conclusions

The findings of the study revealed a rather bleak situation for gum Arabic in the Sudan. Gum Arabic is mismanaged and therefore depleted. The responsible institutions for conservation, development, and maintenance of these forests are weak. In spite of the existence of several policies, laws and regulations on their implementation are noneffective. The land tenure patterns reduce the economic incentives, and the marketing practices are not often conducive for achieving sustainable management and use of gum Arabic forests. National government and donor partners give low priority to forest issues. A result of all this is that the potential contribution of gum Arabic forest resources to poverty reduction, economic development, and ecological and hydrological stability are far from being realized. However, it is

possible to turn the present negative trend in the gum belt. One tool toward sustainability management is forest certification.

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