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Socio-economic Aspects of Gum Arabic Production in Dalanj Area, South Korodofan, Sudan

¹A.O. Koli, ²A.M. Eltayeb, ²E.M. Sanjak, ³M.H. Mohammed

¹Faculty of Agricultural Sciences, University of Dalanj, Sudan

²Faculty of Forestry, University of Khartoum, Sudan

³Faculty of Natural Resources and Environmental Studies, University of Kordofan, Sudan

Abstract: *Acacia senegal* (locally: Hashab tree) is one of the most important tree species in Sudan as it considers the main Gum Arabic producing tree. The objective of this study is to investigate the socio-economic aspects of gum Arabic production and to assess contribution of gum Arabic to sustainable livelihood of local people in Dalanj Locality, South Kordofan State-Sudan. Social survey was carried out by using structured questionnaire for 80 respondents (gum producers) on random sample basis in eight villages, 10 respondents from each village. Issues pertaining to socio-economic factors affecting gum Arabic production and contribution of gum Arabic to sustainable livelihood of local people, in Dalanj Locality, were assessed. Results of the study revealed that expansion of agriculture lands at the expense of hashab trees, fires and illegal felling are the most important factors constraining gum production in the area. The results also indicated that agriculture is the main source of income and gum Arabic is a supplementary source of income. The importance of gum Arabic becomes apparent during (off farm season) the period between crops harvest and the preparation of the next agricultural season. Establishment of producers' associations and provision of loans to producers are highly recommended to ensure sustainability of gum production.

Key words: *Acacia senegal*, gum Arabic production, Hashab tree, socio-economic factors

INTRODUCTION

Acacia senegal, locally Hashab tree, is one of the most important trees in the sahelian-Sudan zone with wide range of uses (El-Dukheri, 1997). Hashab trees serve as windbreaks (World Bank 1976) and produce gum Arabic which contributes significantly to the livelihood of rural people and national economy of the Sudan. Sudan is the main Gum Arabic producer in the world as it contributes to more than 60 percent of world gum production. Gum Arabic is one of the principal sources of revenue for semi-nomadic people (NAS, 1979). The species is widely distributed in the so called Gum Arabic Belt of the Sudan on sand and clay soils. In Southern Kordofan State, Hashab is considered as a natural extension of the Gum Arabic Belt which extends from north to south Kordofan and is highly adapted to various soil types of the state. There are hashab stands in the south west of Kadugli (the capital of the state) and Dalanj localities. Some scattered hashab trees are also exist in some areas of the eastern part and in the sandy soils of the northern parts of the state. Despite the abundance of hashab in Southern Kordofan since long time, the production processes are still practiced by traditional means and have minimum consideration from the government and the Gum Arabic

Company. In Southern Kordofan, the contribution of hashab tree in the livelihoods of rural people is not yet known. This study is intended to investigate the socio-economic aspects related to gum Arabic production and to assess the contribution of gum Arabic to sustainable livelihood of local people in Dalanj Locality, South Kordofan State-Sudan.

MATERIALS AND METHODS

The study area: Dalanj locality covers an area of about 9300 km² and situated at latitudes 11°00'-12°20' N and longitude 29°28'-30° 00' E in the northern part of South Kordofan State within the woodland savannah of the Sudan. The average temperature ranges between 25-40°C and the annual rainfall of about 500 mm and extends from May to October with peak in August. The vegetation is varying in species and density according to soil type and amount of rainfall.

Data collection and analysis: Social survey was carried out by using structured questionnaire for 80 respondents (gum producers) on random sample basis in eight villages, 10 respondents from each village. The respondents were interviewed in issues pertaining to socio-economic factors

affecting gum Arabic production and contribution of gum Arabic to sustainable livelihood of local people, in Dalanj Locality. In addition to individual questionnaire and for the sake of enriching the collected information and to reveal ambiguities of the collected data, focus group discussions were conducted. SPSS software package was used for data analysis. Descriptive statistics was used in terms of percentages and the results were summarized in tables and figures.

RESULTS AND DISCUSSION

Risk confronting gum Arabic production: The production of gum Arabic is affected by several factors as indicated by the gum producers in the study area. Some of the respondents (39.2%) stated that over cutting is a major risk to hashab trees as they are cut to be used as fuel wood, charcoal or building poles. More than one third of the respondents (36.7%) stated that expansion of agriculture at the expense of natural stands of hashab is the greatest menace facing the production of gum Arabic in the area (Table 1). The expansion of agriculture at the expense of hashab trees is considered as a real challenge to enhance gum production in the study area. The expansion of agricultural land was not coupled with propaganda for the reservation of the natural stands of hashab and other natural tree species and without addressing the environmental, economic and social importance of these trees for the livelihood of the residents of the study area. Few respondents (24.1%) reflected that fires are among the factors that affect the gum Arabic production. Moreover, fires set by nomads frequently get out of control and damage hashab trees, particularly new seedlings developed through natural regeneration.

Benefits of hashab trees: Hashab tree is of a significant importance to the rural dwellers as well as for the national economy of the country as a whole. In the study area, 46% of the respondents appreciate the role of the trees in

providing fuel wood. The wood collected from hashab trees is of a preferred quality for fuel wood. The reliance on the hashab tree for fuel wood is not endangering the system if cutting is applied to the old trees (non-productive trees). According to several studies (El-Sammami, 1985; Mohamed, 2000), hashab tree is subjected to cutting before reaching twelve years of age for the sake of obtaining a quick return from fuel wood sales. This situation is accelerated with the decline of the gum Arabic prices and the deterioration of the environment. Some farmers shifted to the production of charcoal which has an attractive price, compared to gum Arabic. About one fifth of the respondents look at the hashab tree as source for charcoal production. Some respondents (12.7%) look to the hashab tree as a source of building materials. Hashab trees provide the necessary component of the local thatches (locally: *shiba*, *rassas*, *korki* and *matarig*), as the majority of the houses in the study area are made of local materials obtained from hashab tree and other natural tree species. Despite these findings, still all the respondents consider gum Arabic as one of the most valuable benefits of the hashab tree as shown in Table 2. The benefits of hashab trees are more than to be restricted to the above-mentioned items in Table 2. The respondents in the study area appreciate the role of hashab tree in offering additional benefits to the farmers and to the community as a whole as stated by 22.8% of the respondents. Other benefits are represented in the provision of fodder during the periods of fodder shortage. The pods of hashab tree are edible and of a great nutritional value to livestock. Pods are shed in summer, where there are no annuals or herbs available for the livestock. The respondents mentioned some other benefits of the hashab trees like the manufacture of ropes from the fibers of the roots of the tree and the construction of wells (this practice could be considered as destructive since they have to cut the roots of the tree). Moreover, hashab trees form a vital and integral part of the farming system and can increase crop yield and protect the soil from wind erosion.

Table 1: Main factors affecting Gum Arabic production in Dalanj area, South Kordofan, Sudan (N = 80 respondents, 10 in each village)

Village name	Confronting risk, Respondents (%)		
	Over cutting	Fires	Agricultural expansion
Nabag	90.0	10.0	0.0
Alfarshia	0.0	50.0	50.0
Alkarko	40.0	30.0	30.0
Katla	10.0	80.0	10.0
Hagrlagwad	80.0	10.0	10.0
Engargo	20.0	10.0	70.0
Habieila	70.0	0.0	30.0
Kortala	0.0	0.0	100.0
Average	39.2	24.1	36.7

N: Number of respondents

Table 2: Benefits of hashab trees receive by respondents (N = 80 respondents, 10 in each village) in different villages of Dalanj area, South Kordofan

Village name	Hashab benefits, Respondents (%)			
	Fire wood	Building materials	Charcoal	Fuel wood+building
Nabag	40.0	20.0	0.0	40.0
Alfarshia	30.0	0.0	40.0	30.0
Alkarko	20.0	30.0	50.0	0.0
Katla	50.0	20.0	20.0	10.0
Hagrlagwad	100.0	0.0	0.0	0.0
Engargo	60.0	0.0	0.0	40.0
Habieila	40.0	30.0	30.0	0.0
Kortala	20.0	0.0	10.0	70.0
Average	45.6	12.7	19.0	22.8

N: Number of respondents

Source of income: Source of income is an indicator of the main occupation of the respondents and expresses the degree of the reliance on the activities for the livelihood and welfare of the household. In the study area, most of the respondents practice more than one activity for income generation (Table 3). The majority of the respondents (77.2%) rely on agriculture in its different forms (traditional rain fed crop farming in conjunction with hashab trees) as major sources of income. About 44% of the respondents depend on agriculture alone. Some of the respondents mentioned that the financial returns from agriculture alone are not enough to satisfy their needs. Therefore, they rely on animal rearing through nomadic system as village based activity to support their incomes as asserted by 32.9% of the respondents. The animal rearing could be considered as a complementary activity to agriculture in the study area, where the agricultural residues provide the fodder to the livestock, while, the hashab trees provide fodder during the dry period. Some respondents (22.8%) rely on trading in addition to agriculture to support their incomes as shown in Table 3. Reliance on agriculture varies among the selected villages. Some villages rely completely on agriculture for income generation i.e., Alkarko village, while other villages as in Katla village about 60% of the respondents rely on agriculture and animal rearing. In Kortala village, the majority of the respondents rely on trading and agriculture, because this village is almost a town and it is a crossroad between South Kordofan and the White Nile States.

Types of land ownership in the study area: The land tenure is one of the most sensitive issues concerning forestry activities. Usually, private forest lands are acquired through inheritance. In the study area, there are three types of land ownerships; these are private, lease and share (Table 4). Twenty seven percent of the respondents showed that they own private agricultural lands, while the remaining distributed between the different forms of ownerships. About 14% possess the

land through the release of land from relatives and sharing of the land as well. The majority (55.7%) asserted that they possessed the land through inheritance, while (13.9%) through aptitude management of the tribal system. Only 2.5% of the respondents accentuated that they have possessed their land through purchasing. It is highly acknowledged that gum production is obtained satisfactorily under the traditional gum bush cultivation cycle which last for a period of 16-20 year. None of the respondents asserted that his rotation last for more than 10 years. Whether it is private, lease or share lands, farms tend to adopt a relatively shorter period for the rotation of hashab trees and agricultural crops, where more than 95% of the owners have a rotation of 5-10 years. On the other hand, land possessor through share cropping and leasehold, indiscriminately follow a rotation period of 5-10 years. This clearly indicates that not all the real owners of the farm are keen to adopt a large period for rotation of hashab trees compared to other types of ownership (Table 5).

Regardless of land ownership type, majority of the respondents (87.5%) stated that they rely on natural regeneration for hashab trees at their farms. Members of this group clarified that they have not attempted to raise seedlings or bring seedlings from other sources to enrich or rehabilitate their hashab trees in the study area. None of the real owners or lease-hold farmers attempted to

Table 3: Source of income for gum Arabic producers in Dalanj area as indicated by the respondents (N = 80 respondents, 10 in each village)

Village	Source of income		
	Trading and farming (%)	Agriculture (%)	Agriculture and animal production (%)
Nabag	10.0	60.0	30.0
AlFarshia	20.0	30.0	50.0
Alkarko	0.0	100.0	0.0
Katla	30.0	10.0	60.0
Hagralgawad	20.0	40.0	40.0
Engargo	20.0	60.0	20.0
Habeila	20.0	60.0	20.0
Kortala	70.0	0.0	30.0
Average	22.8	44.3	32.9

N: Number of respondents

Table 4: Type of land ownership in Dalanj area, south Kordofan as indicated by respondents (N = 80 respondents, 10 in each village)

Village	Type of ownership, Respondents (%)					
	Private	Lease	Share	Sale	Inheritance	Aptitude management
Nabag	0.0	0.0	100.0	0.0	0.0	0.0
ALFarshia	90.0	0.0	10.0	10.0	40.0	40.0
ALKarko	100.0	0.0	0.0	0.0	100.0	0.0
Katla	100.0	0.0	0.0	0.0	100.0	0.0
Hagralgawad	100.0	0.0	0.0	0.0	100.0	0.0
Engargo	100.0	0.0	0.0	0.0	100.0	0.0
Habeila	30.0	70.0	0.0	10.0	10.0	10.0
Kortala	60.0	40.0	0.0	0.0	0.0	60.0
Average	27.2	13.9	13.9	2.5	55.7	13.9

N: Number of respondents

Table 5: Type of ownership vs rotation of planting cross tabulation (N = 80 respondents)

Type of ownership	Hashab rotation	
	0-5 years	5-10 years
Private	5.2	94.8
Lease	0.0	100.0
Share	0.0	100.0
Average	3.8	96.3

N = number of respondents

Table 6: Origin of hashab trees owned by the respondents (N = 80 respondents) on their own lands, in Dalanj area, south Kordofan, Sudan

Type of ownership	Origin of hashab garden, Respondents (%)	
	Natural	planted
Own	100.0	0.0
Lease	100.0	0.0
Share	9.1	90.9
Average	87.5	12.5

N: Number of respondents

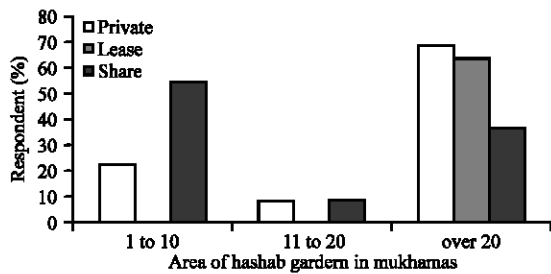


Fig. 1: Percentages of respondents (N = 80 respondents) own hashab gardens on their land ownership in Dalanj area, south Kordofan, Sudan, N = number of respondents

adopt artificial regeneration, while the majority of the sharecropping (90.9%) stated that they rely on artificial regeneration for enriching the hashab trees at the farms (Table 6). Almost all the lease-hold farmers practice agriculture in area of more than 20 Mukhamas (1 Mukhamas = 0.73 ha). This area is quite enough to practice the traditional gum-bush cultivation cycle. It seems that those farmers, since they are not the real owners of the farms, they tend to focus on crop production rather than gum production. This factor is supported by the findings of Table 6 which indicated that all the trees in the farms of the leasehold, owners are developed through natural regeneration. While most of the share-cropping farmers (63.6%) possess agricultural land of an area less than 20 Mukhamas which is not

suitable for the application of the gum bush cultivation cycle (Fig. 1). On the other hand, the majority of the real owners (69%) possess an area greater than 20 Mukhamas which is suitable for the application of the traditional gum-bush cultivation cycle, but none of them practice this type of activity. This could be attributed to ignorance or lack of extension service that sensitizes farmers to adopt hashab trees planting.

CONCLUSION

In the study area, farmers appreciate the environmental role of hashab tree and the direct benefits they gain from it. Despite their awareness of this fact, sometimes they find themselves obliged to cut the trees to their contingencies. Land ownership is mainly acquired through inheritance. Under the condition of inheritance, the ownership is subjected to changes in form of reduction of land size and as a result, trees have to be cleared to provide a vacant lot for the family. Gum Arabic production is no longer attractive to all the farmers despite existence of hashab trees in their lands. Farmers who possess lands through inheritance and purchasing are keen to produce gum Arabic contrary to those who possess lands through the aptitude management system. Sometimes the hashab trees are cut before the completion of the cycle and converted into charcoal or fuel wood. This situation is accelerated by the low prices of the gum Arabic in the study area.

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