

COMPARATIVE ADVANTAGE AND PROTECTION OF GUM ARABIC PRODUCTION IN WEST KORDOFAN STATE, SUDAN (2010-2015)

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Abstract

This study aimed to measure the level of protection and comparative advantage of producing gum Arabic in West Kordofan State, Sudan during the period 2010-2015. It employed the Policy Analysis Matrix (PAM) technique as a quantitative tool of analysis. The secondary data used were obtained from different sources. The finding indicated that gum Arabic production in West Kordofan State is profitable and has a comparative advantage. Despite that, the government policies have been taxing gum and discouraging its production during the period under the deterioration in the exchange rate. The study recommended that reducing direct and indirect taxes is the essential issue.

Key words: comparative advantage, gum Arabic, Sudan

INTRODUCTION

Forestry in Sudan includes wood products in form of firewood, charcoal and timber and non-wood products in form of wild fruits and gum products, particularly gum Arabic. Forestry also provides protection of watershed, fodder for domestic animals and wildlife.

Sudan is considered as a key supplier of raw gum Arabic in the world as it used to provide more than 80% of high quality gum Arabic in the world market [7], [8] and [9], gum Arabic is defined as the gummy exudates from the trunks and branches of *Acacia senegal* and *Acacia seyal* in the family leguminosae [6] and [10], produced in which known as gum Arabic belt, that extend through tropical areas of Sudan as well as in Chad, Nigeria, Senegal, Ethiopia, and other African countries (Fig. 1).

Gum Arabic production from *Acacia senegal* and *Acacia seyal*, is one of the most important activities of the savanna forests of Sudan. It does not only offer an opportunity to work and indemnity to the producers against fluctuations of seasons, but is also considered as an important source of country's hard currency, it is used in many manufacturing industries such as pharmaceutical, cosmetic, lithography, textile, pastries and sweets industries.



Fig. 1. Gum Arabic Belt through Sudan.

Gum Arabic Belt passes through Sudan in a wide areas from west to east, and gum Arabic is produced intensively in three ecological regions namely Kordofan, which contributed more than 50% (on average) of the total production, followed by Darfur and Eastern states. West Kordofan State was selected to conduct the study as most parts of it situated

in gum Arabic belt which have high productivity of gum Arabic (Fig. 2).

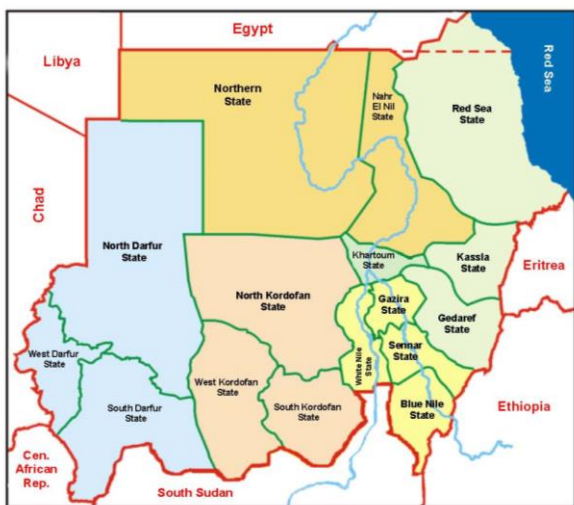


Fig. 2. West Kordofan State situation

The main importing countries of Sudan gum Arabic were France, India, USA, Germany, Italy and Japan during (2010-2015), on average France imported about 30% of total Sudan gum Arabic exports (Fig. 3).

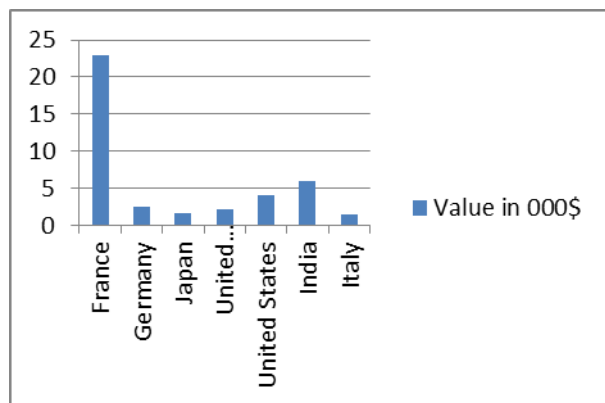


Fig. 3. Average value of Gum Arabic exports by major importing countries (2010-2015)

Source: [1]

Historically Sudan is the leader gum Arabic producer and exporter in the world, but in 1990s and early 2000 Sudan exports fluctuated due to unstable production and unstable policy of Gum Arabic Company that had a monopoly of Sudan gum Arabic trade, beside the competition from other exporting countries as well as synthetics. As a result of poor performance of exports of this strategic commodity in the world market and the need for improving in the future, the exclusive

export concession granted to the Gum Arabic Company (GAC) has been removed in 2009, in an effort to revitalize the external gum Arabic trade.

The government established Gum Arabic Council for free gum and trade in domestic and export markets.

This policy is expected to rearrange Sudan gum Arabic production and trade based on its comparative advantage.

The challenge that Sudan will face, is how to reduce the cost of gum Arabic production and increase its competitiveness in the world market.

So this study aimed to study the effects of various government policies on gum Arabic production in one of the essential area (West Kordofan State).

-Evaluate the profitability of gum Arabic in West Kordofan State Sudan.

-Evaluate the comparative advantage of gum Arabic.

-Estimate the protection measures of gum Arabic that may limit its production and export.

MATERIALS AND METHODS

Study Area: The study was carried out in west Kordofan state. Geographically, the state is in Semi-Arid zone with annual rain fall and temperature suitable and promotes the production of gum Arabic.

Data collection: secondary data used were obtained from different formal sources, and primary data from direct interview.

The study employed the Policy Analysis Matrix (PAM) technique that developed by [5] and augmented by [4], for measuring input use efficiency in production, comparative advantage, and the degree of government interventions.

The basic format of the PAM as shown in (Table 1) is a matrix of two-way accounting identities.

This study used the following calculations of policy analysis matrix:

1. Private profitability: $(D=A-B-C)$

2. Social profitability: $(H=E-F-G)$

3. Nominal Protection Coefficient (NPC) = A / E

4. Domestic Resource cost (DRC) = $G / (E - F)$ (in the local currency)

Table 1. Policy Analysis Matrix

Item	Total Revenue	Total Cost Tradable inputs	Domestic inputs	Profit
Private Prices	A	B	C	$D=(A-B-C)$
Social prices	E	F	G	$H=(E-F-G)$
Policy Transfer	$I=(A-E)$	$J=(B-F)$	$K=(C-G)$	$L=(I-J-K)=(D-H)$

Source: [5].

The data in the first row provide a measure of private profitability (PP), defined as the difference between observed revenue (A) and costs (B+C). Private profitability demonstrates the competitiveness of the agricultural system, given current technologies, prices for inputs and outputs, and policy. The second row of the matrix calculates the social or Economic profitability (EP) that reflects social opportunity costs. Social profits measure efficiency and provide a measure of comparative advantage. In addition, comparison of private and social profits provides a measure of efficiency. A positive social profit indicates that the country uses scarce resources efficiently and has a static comparative advantage in the production of that commodity at the margin. Similarly, negative social profits suggest that the sector is wasting resources, which could have been utilized more efficiently in some other sector. In other words, the cost of domestic production exceeds the cost of imports suggesting that the sector cannot survive without government support at the margin. The third row of the matrix estimates the difference between the first and second rows. The difference between private and social values of revenues, costs and profits can be explained by policy interventions. The nominal protection coefficient NPC is a ratio of commodity revenue at market prices to its world value. This ratio indicates the impacts of the policy that causes a divergence between the two prices, NPC can be calculated for both output (NPCO)=A/E and input (NPCI)=B/F.

Since the inputs cost in gum Arabic production is minimal, only NPCO is dealt with here considered as just NPC.

If $NPC > 1$, it indicates that the private price of output is greater than its parity price, which means protection measures provide positive incentives to produce the commodity, If $NPC < 1$, it indicates that the product returns to the producer are less than the social returns that means the product implicitly taxed.

If $NPC = 1$, it indicates a neutral situation, means returns to producers are the same as returns from selling in a free market system using international prices .

Domestic Resource cost (DRC) has been widely used in developing countries to measure efficiency, comparative advantage and guide policy reforms.

The DRC is the tool to measure comparative advantage of different scales of broiler production, it is defined as the $(G/ (E-F))$ and it indicates whether the use of domestic factor is socially profitable ($DRC < 1$) or otherwise ($DRC > 1$).

If $DRC > 1$, it means that the opportunity cost of using domestic resources exceeds the value added at social prices, and the product will not be internationally competitive. It is better in this case to reallocate resources to an alternative product.

The reverse hold for $DRC < 1$ indicates that the economy saves foreign exchange from local production, because the opportunity cost of using domestic resources is less than the net foreign exchange it gains (in export) or saves (in substituting for imports).

$DRC < 1$ also indicates efficiency and international competitiveness.

If the DRC is above 1, the system has no comparative advantage; if it is below 1, the system has a comparative advantage.

RESULTS AND DISCUSSIONS

Private and Economic Profitability

Table 2 shows the private profitability and the economic profitability for gum Arabic production in West Kordofan State, in Sudanese pounds per ton, for the period 2010/15.

Table 2. Gum Arabic private profitability and economic profitability in West Kordofan State, in Sudanese pounds per ton during 2010/15

Season	Private profitability	Economic profitability	Profitability coefficient
2010	5,459.4	14,435.5	0.38
2011	1,620	5,151.6	0.31
2012	2,745	12,489.8	0.22
2013	5,468	32,479.9	0.17
2014	5,085	36,103.5	0.14
2015	4,117.5	38,457.5	0.11

Source: calculations from [2].

As the numbers read, both private and economic profitability were positive and economic profitability is more than private profitability throughout the period, which indicates gum Arabic has been taxed in form of direct fees or indirect taxation in form of overvalued exchange rate. This result indicates that government policy packages to gum Arabic production do not provide any incentives to producers during the period. The PP and EP, showed increasing trend during the period whereas EP exceeded PP, accusing government policies of being discouraging to producers.

Table 3. Nominal Protection Coefficient and Domestic Resources Cost

Season	NPC	DRC
2010	0.38	0.33
2011	0.31	0.82
2012	0.22	0.77
2013	0.17	0.69
2014	0.14	0.73
2015	0.11	0.8

Source: calculations from [2]

Table 3 shows the **Nominal Protection Coefficient (NPC) and Domestic Resources Cost (DRC)**. The NPC used to measure the level of protection to gum Arabic in West Kordofan State, the results of $NPC < 1$, it indicates that the returns to the producer are less than the social returns that means gum Arabic implicitly taxed during the period, as the values of NPC in decreasing trend, indicate that the level of taxation proved to be high. This could be attributed to the overvaluation of the exchange rate. Domestic Resources Cost (DRC), the values of DRC demonstrated the opportunity cost of using

domestic resources less than value added at social prices, so the product will be internationally competitive, the increasing trend in DRC values indicate the decreasing in comparative advantage of gum Arabic.

CONCLUSIONS

The Policy Analysis Matrix (PAM) was employed in this study as a technique to study the effects of different policies on gum Arabic profitability, level of protection and comparative advantage in West Kordofan State, Sudan. PP and EP were used to represent the profitability, NPC used to measure level of protection accorded to producers and DRC used to measure the comparative advantage. The results indicated that gum Arabic production in West Kordofan State has profitable. Although this profitability, the government policies have been discouraging its production by direct fees or indirect taxation in form of overvalued exchange rate.

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