

# PRICE AND MARKET-STRUCTURE ANALYSIS FOR SOME SELECTED AGRICULTURAL COMMODITIES IN SUDAN:

## MARKETING COSTS AND MARGINS



FOOD SECURITY TECHNICAL SECRETARIAT / MINISTRY OF AGRICULTURE (FSTS)  
FAO- SUDAN INTEGRATED FOOD SECURITY INFORMATION FOR ACTION (SIFSIA)

This study is one of the papers selected for funding by SIFSIA for the support of food security research and capacity building initiatives identified at the local/state level. The main purpose of the research is to improve understanding of food security issues in Sudan and inform decision makers about the evolving food security situation in the selected States. The main expected outcome of the selected papers should be an enhanced decentralized capacity in food security analysis and in food security policy and planning.

May 2011



**SIFSIA project:** is funded by European Union Stabex Funds and jointly implemented by the Government of Sudan and the Food and Agriculture Organization of the UN(FAO). The project aims at strengthening the government capacity in collecting, analyzing, disseminating, and utilizing food security information.

## **Preface**

The Sudan Integrated Food Security Information for Action (SIFSIA) is a GoNU/GoSS programme funded by EU STABEX funds and implemented by the Food and Agriculture Organisation of the UN (FAO). This study is selected for funding by SIFSIA for the support of food security research and capacity building initiatives identified at the local/state level. Its main purpose of the research is to improve understanding of food security issues in Sudan and inform decision makers about the evolving food security situation in the selected States. The main expected outcome of the study should be an enhanced decentralized capacity in food security analysis and in food security policy and planning.

This paper builds on the original work by the Agricultural Economics directorate of the Ministry of Agriculture. Dr. El Fadil Ahmed Ismail, Agricultural Marketing Expert, Department of Food Economics and Marketing Food Research Centre (FRC), Agricultural Research & Technology Corporation (ARTC) a review of previous research works in domain of market performance in changing the original drafted document.

Despite the overwhelming coverage of the concept of Structure, Conduct and Performance, these sets of analyses have limited use in analysis of agricultural markets in Sudan and limited researches conducted along the costs, margins involved, and the participants' behaviour therein. To fill in these gaps, this study made special focus on marketing costs and margins and how they influence the value chain for selected crops/commodities rather than examining how marketing actions influence consumer prices at specific point of time. Nonetheless, the final aim of the study is not to obtain precise costs and margins estimates for the conventional marketing functions of selected agricultural crops/commodities, but rather to make this information usable to devise a policy framework for an effective marketing strategy and improve the efficiency of agricultural markets in Sudan.

SIFSIA N and the Ministry of Agriculture have jointly endeavoured to bring out a number of research documents as it relates to food security. The target of these series of studies is to provide information on food security to help decision makers make informed decisions and build the capacity of Government counterparts in the area of research. It is also believed that agricultural entrepreneurs will benefit from this study for their agribusiness decisions, including the various transfers, transactions and other marketing services.

As a continuation to SIFSIA's regular market related supports, this study attempts to outline some of the key features and challenges that have emerged by the previous study on costs and margins made in 2009 and broadened its scope to cover other aspects of market performance. The purpose of this study is to develop an overall framework for improving market performance and describes how the marketing costs and margins influence the value chains for selected agricultural commodities with particular focus on crop markets.

## **Acknowledgements**

SIFSIA-N acknowledges the efforts of all those who contributed to this research work. Special thanks go to Dr. Abdelatif Ijaimi, Under Secretary of the Ministry of Agriculture, who tirelessly supported the research activity and have done an excellent job of editing the document. Dr. Elfadil has committed his invaluable time in giving the paper the current shape. This paper utilized the original draft document prepared by Department of Agricultural Economics (DAE). Thanks to Bakhita Mahgoub El Shafei, Hassab Elrasoul Hag ElSaeed, Dr. Salah Sharf Eldein Sumeya, and Dr. Ali Abdelaziz (Consultant) who gave special dedication to the research. The Food Security Technical Secretariat (FSTS) members have also meticulously edited the original document – thanks to Ali Khalil, Rihab Nimir and Sara Elsafi. Particular acknowledgements go for the SIFSIA-N Program Support Unit (PSU), whose input was most invaluable. *Yahia, Sara* and *Sadig* merits special words of thanks for their keen follow up until the draft showed light.

The DAE staff whose basic material was shared for revised readings have special place for this study. The document has also greatly benefited from comments received from experts of the Food Research Centre. We would like to thank those who shared their opinion or comments, which have, no doubt enriched the document.

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### **List of Acronyms, and Conversion Factors**

ABIC	Agribusiness Investment Centre (of the Ministry of Agriculture)
ARP	Agricultural Revitalization Programme (ARP)
ARTC	Agricultural Research & Technology Corporation
CBoS	Central Bank of the Sudan
CAS	Codex Alimentaris Standards
DAEM	Department of Agricultural Economics
EU	European Union
FAO	Food and Agriculture Organization
FEWS-NET	Famine Early Warning System NETWORK
FRC	Food Research Centre
F.O.B.	Free on Board prices
GAC	Gum Arabic Corporation
GDP	Gross Domestic Product
HACCP	Hazards Analysis of Critical Control Points
HGC	Higher Grain Council
HPS	Hand-Picked Selected
MIS	Market Information System
MoA	Ministry of Agriculture
MoFT	Ministry of Foreign Trade
NGOs	Non-Governmental Organizations
SCP	Structure, Conduct and Performance (Analysis Approach)
SDG	Sudanese pound
SIFSIA N	Sudan Integrated Food Security Information for Action
SRC	Strategic Reserve Corporation (SRC)
TYNCs	The Ten-Years National comprehensive Strategy (1992-2002)
USA	United states of America
WFP	World Food Programme
WTO	World Trade Organization
Zakat*	Zakat or alms giving, is one of the five pillars of Islam (Monotheism, justice, prophethood, leadership, and last judgment). It is the giving of a small percentage of one's possessions (surplus wealth) to charity, generally to the poor and needy. It principally serves as the welfare contribution to the poor and deprived Muslims, although others may have a rightful share.

#### *Conversion Factors*

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##### *List of Conversions*

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One hectare (ha) = 2.381 Feddans = 2.476 acres  
One Makhamas (local unit in Kordofan (ma) = 1.73 Feddans  
One US \$= 2.5 Sudanese pound (SDG) in September 2009  
One US \$= 2.5 Sudanese pound (SDG) 2003-2004  
One kantar = 44.628 kg.

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##### *Units of food crops*

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One sack of sorghum feterita equals to 91.5 kg, mugud type 88 kg, and white sorghum varieties 94.35 kg.

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One sack groundnuts in shell = 45 kg.

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One sack of sesame = 73.7 kg.

One sack groundnuts in shell = 45 kg.

One sack of millet = 94.35 kg.

One ardab = two sacks of equivalent food grains (sorghum, millet, etc)

One kela = 12.58-11.83 kg for millet and most of sorghum varieties.

One kela = 9.83 kg for sesame and 6 kg for groundnuts in shell.

One kela = four malwas; which approximates to 3.15-2.96 kg for millet and most of sorghum varieties.

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The term Rayka in Kordofan is equivalent to one sorghum sack.

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The term "Mod" in Kordofan is equivalent to one malwa

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The conversion factor of HPS unshelled to extracted oil is 6:1. Extractors are mainly located in Khartoum, Medani, Elbagair, Managil and Elobeid areas.

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## **Executive Summary**

The analysis on this study was based on the data and reports made by the Department of Agricultural Economics of the Ministry of Agriculture in 2009 - using multi-stage random sampling techniques for traders and other market participants. The sample of the study covered 1,310 respondents along the market value chain covering 5 - 6 crops, including livestock in five states. The data was analyzed using descriptive statistics, and simple margin analysis supplemented by bivariate analysis. The study focuses on Gedaref, Khartoum, Kordofan, and Sinnar markets. The retail, wholesale and exporters' marketing margins, and pricing efficiency of selected agricultural crops/commodities were assessed.

According to the study, marketing costs vary considerably among crops and across states, but remain moderately acceptable within the given market conditions, except for few cases. However, there are no significant differences between marketing costs of various marketing functions (storage, transport, and handling) among the different states/regions.

The relatively higher marketing costs of cash crops (gum Arabic, sunflowers and Hibiscus karkaday) is attributed to the various fees and levies at Port Sudan and across the way to the destination. Therefore, there is a need for improvement via adoption of a set of policies that can lead to an improvement in yield and productivity and reduce production costs.

Some of the crops that tend to have higher marketing costs and fewer returns will obviously have less comparative advantage in domestic as well as the international markets and hence would need to improve before they enter into trade cycle as this affects farmers negatively. However, some agronomic and institutional constraints need to be resolved to make commodities competitive in the world market. To increase farmer's share in the retail market value of oil seeds (sesame and groundnuts), cooperative rings seems to be appropriate to help sesame producers to bridge the period of critical harvest needs to develop strong bargaining power at the later stages. This would make revenue shares more equitable with potential wholesalers and big traders.

A comparison between farm gate and retail prices reveals that sorghum price spreads in Blue Nile state was the widest and this reduced the producer share to 47% of consumer's price as compared to other states in which the producer's share was in the range of 77% and 91% of the retail prices. Hence, any abnormal increase in price spreads can inflate retail prices and consequently deflate farm gate prices. On the other hand, the relatively low price spreads in White Nile, Sinnar, and Gedaref suggests less transport and storage differentials in addition to low margins for intermediaries.

According to the analysis done on selected cash crops, the producer's share to total earning varies significantly among states. Gedaref and Sinnar are comparable in the farmers share in consumer's price, marketing costs, and hence have equal farm-to-retail price spreads. However, the most affected by these price differentials are farmers in North Kordofan who get only 48% of consumer's price compared to farmers in the Blue Nile who reached a level of 93% of export prices (F.O.B.). In another note, except for Gedaref, the sesame exports prices (SDG/ton) are almost equal to prices of domestically traded oil at specific conversion rates. This discourages the tendency to export sesame as long as domestic market can give same price or even higher.

Gedaref state has the biggest share in sorghum production in the country; therefore, assessment of marketing shares of various intermediaries in the State is of particular importance. Like the country aggregates, Gedaref showed the same pattern of margins distribution. Assemblers have the biggest share in net margins accounting to almost 4.3% of the producer's prices and 3.6% of consumers' price. Although wholesalers share the highest marketing costs among the three partners, yet they receive less net margins compared to assemblers and retailers. Differences in net margins shares between assemblers and wholesalers were within the limit of (2% of both sorghum producer's and consumer price). Worth to note is that, most of the traders assume no opportunity costs for their tied up capital, family labour or own employment.

The analysis of marketing costs and margins of survey data shows returns (in SDG/ton) to assemblers, processors, wholesalers and retailers for trading one-ton of sesame oils produced and retailed in Gedaref in September 2009. According to the survey results, producing oil out of sesame seed is not profitable for processors. However, retailers enjoy the biggest share in net margins as compared to wholesalers. Despite their high marketing costs, assemblers might have same returns obtained by wholesalers.

The role of Strategic Reserve Corporation in making successful interventions to stabilize prices was not observed in all the markets studied. Thus, and in the absence of reliable stock reserves policy and lack of its implementation, producers will incur serious losses at the beginning of every supply season, and good profit margins go for traders, particularly to sesame and groundnut traders, especially at the peak of the lean season.

The study suggests, establishing a marketing agency to help exporters in international marketing and export trade, which requires special type of skills, incentives, incubation and support. In conclusion, improving market communication and market information systems as well as reduction in transport costs, increase storage capacity, and improvement in handling means will improve the marketing margins, reduce transaction costs and hence leads to improved market efficiency.

## **1. INTRODUCTION AND BACKGROUND TO THE STUDY**

### **1.1 Agriculture and Agricultural Markets**

#### **1.1.1 Agriculture and its Relation to Markets**

Despite the general decline in its contribution to the total GDP (from 49.8% in the year 1999 to 38.7%, 35.3% and 31.1% in 2003, 2007 and 2009, respectively) (CBoS, 2009), it is still the mainstay in the economic growth, maintains livelihood to about 70% of the population and provides about 50% of the non-oil export earnings.

Agriculture's declining contribution to the country's GDP is ascribed to the focus provided to the oil sector, which had masked off the overwhelming contribution of the agricultural sector<sup>1</sup> to the national economy. The oil sector, which contributes about 23.8% to the country GDP, take more than 90% of total export earnings and leaving the remaining 10% for other exports including agricultural exports (Ibid, 2009).

The overall performance<sup>2</sup> of agriculture depends, not only on efficiency of production or supply, but also on marketing efficiency, particularly the agricultural markets that play an important role in this regard. It is believed that, if marketing infrastructure, which is essential to agricultural markets, is adequate, the performance of the entire agricultural sector planning can eventually improve.

#### **1.1.2 Agricultural Markets Structure**

Agriculture markets in the Sudan could be categorized according to the structure, periodicity, location and types of crops sold. For most crops, the present marketing arrangements for agricultural commodities consist of tertiary markets (at the village level), wholesale assembling markets, and primary or terminal markets usually located in cities and urban centres. Regarding periodicity, most markets at the village level are held on weekly basis whereas some of them are held on daily basis. In areas with easy access to transport, markets held twice a week where difficulty in access to markets can extend its periodicity to even every fortnight.

Generally, marketing systems have three main broad functions: a logistical function, an informational function and a distributional function. The logistical function includes not only transformation of goods over time (storage), but also embraces place (transportation), and form (processing) activities. Therefore, marketing can eventually generate ownership, form, time, and

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<sup>1</sup> The total arable land is estimated to be 84 million hectares, 20% of it is under rain fed cultivation (15 million hectares) and the rest is under irrigation (1.7 million hectares). Forest resources cover about 63 million hectares and the pastoral land covers almost same area (63 million ha).

<sup>2</sup> Marketing productivity, efficiency and effectiveness are synonymous terms that show various aspects of the performance of the marketing system (Wind, 1968).

place utilities that can meet the ever-increasing consumers' demand, particularly for food commodities.

In this context, understanding the structures and types of the agricultural markets, the conduct of market participants, and the physical performance -including the delineation of their relationships to ideal market economies- is a prerequisite and a requirement for any market development and growth in Sudan. This argument seems obvious for some markets still might behave differently compared to other markets under same conditions. For this reason, the importance of studying the market structure, conduct and performance becomes of value as it gives an indication of how the situation on which markets stand is, and gives further knowledge on their operational mechanisms in order to provide recommendation for improvement.

Market information usually provides hints to policy makers on the overall performance of agriculture- the driving momentum - through price signals and thus subsequently links food deficit areas to surplus areas, domestic markets to international markets and vice versa. Moreover, the study of marketing costs and margins serves in the evaluation of the marketing performance for both input and output markets and across the entire market or value chain. Yet, in the environment of Sudan, it has been extremely difficult to answer questions as whether farmers, agribusiness suppliers, traders and other middle-men receive fair share of prices paid by the consumers. In addition, it could be even more difficult to judge whether each actor is satisfied with the type of product services provided by other market participants, thus comes the question of the importance of margins' analysis to marketers.

The importance of marketing costs and margins is quite evident in agribusiness planning and strategy design. This study shall provide a consistent theoretical foundation on their usefulness as evaluation techniques could help researchers in generating sensible alternative measures that answers the most important questions in relation to performance and efficiency criteria in Sudan's agricultural markets, both crop and livestock.

## **1.2 Rationale of the Study**

Despite the many marketing studies made on dry and irrigated farming, few of them have focused on revising agricultural markets' efficiency, performance, and market development. Consequently, there is limited information on marketing costs and margins, and price spreads of agricultural commodities in Sudan. Therefore, the study comes to fill in these information gaps and form basis on agricultural markets and links further between knowledge on marketing margins, pricing efficiency and market development to other spheres that contribute, at large, to agricultural development and economic growth.

This study shall add to the growing literature on marketing efficiency analysis and addresses specific issues in relation to the agricultural markets in Sudan. In this regard, the study shall verify the reasons mentioned by Richards et al (1998) that usually make retail-farm margins of interest to agribusiness entrepreneurs and policy makers. In this direction, their observations, which need to be verified, tend to include the following arguments:

- a) Wider margins mean that growers obtain a smaller share of the retail price, and hence mean lower farmers revenue.

- b) The extent to which margins' growth is not due to higher marketing costs can suggest inefficiencies somewhere in the marketing chain/channel as due to market powers<sup>3</sup>, on either the buying or the selling side, downstream from the farm.
- c) The degree of uncertainty in returns to a crop is of vital importance in farmers' decisions—particularly to growers who may not have access to future markets or crop insurance.

Considering the aforementioned reasons/arguments for margins' analysis, the rationale to this study would be to seek new options to promote alternative strategies for those disadvantaged farmers, which face high costs because of tangible physical obstacles and or other reasons. Along this line of argument, the government interventions in production and marketing of many crops had been reduced, notably with respect to the abolition or curtailing of public marketing boards as the case of oilseeds and gum Arabic corporations. Other examples include the wheat import policy and the recent deregulation of the Gum Arabic Company monopoly, and a shift away from pan-territorial and pan-seasonal crop pricing strategies and pre-announced prices (Project document, 2009).

The challenge ahead for this study -next steps- is how to make use of available data to better explore price formation of the commodities sold in these markets and eventually evaluate the technical and policy options for improving their marketing efficiency.

### **1.3 Objectives**

The major goal of this study is to analyse the operational efficiency and effectiveness of the marketing chain of the main agricultural commodities in Sudan to arrive at some remedial policy options.

Specific objectives of this study:

- a) Apply an agreed upon methodology in computing price spreads viz. marketing costs and margins for selected agricultural commodities in order to understand why and when prices rise or fall and the potential factors influencing that phenomena,
- b) Determine the market share –costs and margins– for market participants (wholesalers, traders, traders and middlemen),
- c) Determine the marketing channels and analyze the value chains for selected crop/commodities in order to reveal constraints and suggest remedial actions,
- d) Draw conclusions on marketing efficiency of selected crop commodities, recommend actions for improvement and indicate areas for further analysis and research.
- e) Assess the various policies that influence exports and the domestic market performance (viz. taxes, levies, etc.).

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<sup>3</sup> Market powers and informational asymmetries are often cited as reasons for slow margin adjustment in response to change in underlying supply and demand conditions. Whereas retail prices respond quickly to price increases, farm prices often take time to adjust (Richard et al 1998).

## **1.4 Scope, Plan and methodology of the Study**

Building on previous experiences, the study will provide generic information on costs and margins in agricultural markets. The required information covers various market levels, typically local, national, regional, and international markets. The analysis relies on information from a survey carried out by DAEM in 2009 in both the semi-mechanized and traditional rain-fed areas including assemblers, wholesalers, exporters, processors and retailers in Gedaref, Blue Nile, White Nile, North Kordofan, Sinnar and Khartoum states in addition to Port Sudan Harbour for exports. Additional information from various secondary sources is also used.

This study should be viewed as an integral part of the former report made by DEAM in 2009 (Marketing cost margin, February 2010), which finally supports the comprehensive food security programme initiated by SIFSIA North.

The study raises many questions in market area and gives specific answers to some policy issues, which relate to costs and margins for selected agricultural crops/commodities. Using the functional and system approach in market analysis, the scope of the study permits both vertical analysis within each crop/commodity sector and horizontal analysis between the similar agricultural commodities of same transaction patterns. The scope of the study goes to a wide variety and multifaceted perspectives in marketing functions (transportation, storage, and processing, institutional and regulatory issues) that help decision-makers, traders, and intermediaries in their decisions.

In general, the study attempts to provide generic overview of agricultural markets' structures, channels, commodity flows, along the market value chain of selected crops and markets. Focus is made on information and analysis on marketing costs and margins, factors influencing the price structure, and state of market competitions for these selected crops and markets.

Where data availability on price permits, time series analysis and qualitative analysis will be used to strengthen and support the findings of the cross-sectional data.

The analysis goes beyond domestic markets illustrating further the relative price relationships using terms of trade for selected agricultural commodities for international price comparisons (F.O.B. prices). Again, the available information can be used within the framework of study ToRs to assess markets integration, gross margins and cereal price spreads analysis to show how spatial price variation could affect surplus and deficit markets<sup>4</sup>.

The survey conducted consisted of a set of questionnaire forms where each form was used at a particular market level. The data sources include Ministry of Agriculture, Department of Agricultural Statistics, Ministry of Animal Resources and fisheries, the Central Bank of Sudan, the Strategic Reserves Corporation and SIFSIA Market Bulletins, and World Bank reports. Most of the data and analysis made for costs and margins in this study relied heavily on this survey and whose results were shown by a study made by the Department of Agricultural Economics – Marketing Section DAEM– (2009).

Three rural markets feeding their respective state-central- markets were selected in the survey of 2009. About 50 questionnaires per rural market, totalling 150 questionnaires for the Gedaref rural markets were chosen assuming 10 questionnaires per each commodity. These covered sorghum, millet, sesame, sunflower, and gum Arabic in Gedaref state. For the wholesale market of Gedaref, there were 15 questionnaires per each commodity, totalling to 75 questionnaires (five commodities \*15 questionnaire respondents) for the Gedaref wholesale market only. Similarly, there were options for sesame, sunflower, and gum Arabic for retail market in Gedaref since they were exported abroad or sold to the manufacturing industry domestically. Twenty respondents (two commodities\*10 questionnaires) were chosen for the remaining commodities (sorghum and millet). This was repeated for the rest of the markets and the commodities. In addition, questionnaires were designed for export and manufacturing factories and were filled duly. The sample size will be 1510 (see Annex).

A conceptual framework for data needed in costs, margins and returns for selected crop/commodities were derived followed by a comprehensive desk review of the existing literature in relation to marketing costs and margins. Data<sup>5</sup> collected from previous survey reports were revisited, revised, and validated to accomplish the mission of the study as prescribed by the terms of reference (Annex 1.1).

Various approaches and techniques were used in the analysis of marketing costs and margins. In particular, the positive analysis approach was used for this purpose, and a range of standardized procedures and simple statistical tools were used. In this regard, the measures of central tendency (as the means and averages) and measures of dispersion (standard deviations and the range were used). For efficiency and behavioural analysis, the markets Structure, Conduct, and Performance approach (SCP) is found more appropriate in understanding how costs and margins interact as related to market behaviour<sup>6</sup> (Annex 2.2). To achieve the study objectives, focus was made on information from selected traditional surplus and deficit region(s)/ state(s).

## **1.5 Organization of the Study**

The study is divided into four main chapters. The first Chapter starts by an introduction and background to agriculture and agricultural markets in Sudan with particular focus on market structures, costs, margins and returns. It describes the importance of costs and margins analysis to agribusiness planning and strategy design and goes further to justify and provide the rationale for making the study in addition to the delineation of the scope and plan of working out this paper.

Chapter II describes the conceptual framework and methodological approaches, definitions, and concepts in relation to marketing costs and margins. The chapter highlights the conceptual problems of computing the marketing costs and margins and comments on spatial pricing efficiency of selected crop and agricultural commodities.

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<sup>5</sup> Data consistency, reliability, timeliness, was assumed for data obtained by the DEAM survey (2009). Historical data was used to complement the overall picture of price analysis. Additional information of price and market databases was taken from SIFSIA N, FAO.

<sup>6</sup> Structure Conduct Performance (SCP) is an analytical approach or framework used to study how the structure of the market and the behaviour of sellers of different commodities and services affect the performance of markets, and consequently the welfare of the country as a whole (FEWS-NET, 2008)



Details on marketing channels, price structures and returns (to market participants) and the various components that affect the supply chain are discussed in chapter III. These elements are analyzed in various sections to include transport costs, handling costs, storage costs, and other marketing costs and services. The chapter devotes entire sections to analyze returns and margins to farmers, traders, and intermediaries by state. The distribution of gross margins per commodity and the impact of productivity on costs and returns are also highlighted in chapter III. Conclusions, recommendations, policy implications, and the way forward for the marketing cost margins' analysis is given in chapter IV. References and annexes are cited where appropriate together with recommended readings and further research.

## 2. CONCEPTUAL FRAMEWORK AND METHODOLOGICAL APPROACHES

### 2.1 Definitions and Concepts

*Margins* represent the price charged for one or a collection of marketing services. For example, the difference between producer and consumer prices is the amount charged for all the marketing services rendered between production and consumption, including buying, bulking, transports, storage, processing, etc. In this circumstance, the *market margins* are the difference between prices at two market levels. *Marketing margin* is defined as the difference between the price paid by consumers and that obtained by producers. It is also called the '*Farm-Retail Price Spread*'. Margins can be calculated all along the market chain and each margin reflects the value added at that level of the market chain (FEWS NET 2009-b).

The aim of the marketing margin analysis is to show the relative importance of the marketing costs in order to reveal real differences between and among markets (inter-market variations) to allow further market integration. The target remains the *producer's share* that revolves and gears up the production and marketing mechanisms for the achievement of food security and social welfare objectives.

For the purpose of this study, a distinction is made between *Gross Market Margins* and *Price Spread*. Funke (2006) cited a difference between spreads and margins. *Price Spread* is the difference between *the retail price* and *the farm value of a product*. Thus, the spread represents the payment of all costs involved after the product has left the farm plus the profit margins. *Marketing margins* on the other hand, represent the difference between the sales of a given product and the costs of the product sold. In this case the *margin* is typically the *profit* made under a given market condition.

#### a) Concepts

Agricultural marketing costs can be differentiated into three distinct types of costs a) *direct costs* that involve direct marketing functions and services viz. transportation and assembly costs, handling costs (loading, unloading, repackaging, etc.), processing and storage costs as well as other costs as taxes, levies, customs and duties. b) The *operating costs*, which include the opportunity cost of the tied-up capital (usually taken as percent of annual profits as determined by the Central Bank and c) *physical losses* arising from transportation, storage loss or processing (in value terms) as a percentage of the initial market crop value.

The concept of margins analysis offers, in principle, the chance for better understanding of Sudanese market conditions such as different priority setting among decision makers and concerned shareholders, administrative and bureaucratic hurdles, capacity constraints and the uncompromising delays in the transfer of resources to conduct costs and margins surveys by concerned bodies. These problems have significantly reduced the efficiency and the effectiveness of results obtained from research work on marketing performance.

## **2.2 On the Concept of Marketing Costs and Margins**

Theoretically, the analysis of marketing costs and margins would reveal how efficient pricing in domestic markets is, and gives an indication of the importance of transaction costs facing traders, farmers and intermediaries (middlemen) and help in identifying and solving bottleneck thus assist in reducing marketing costs. Understanding the concept of market costs and margins requires a priori understanding of the marketing chains or channels under question and a prescription of how long is it. Details on this issue are given in a separate section in chapter III.

In practice, the flow of agricultural commodities usually starts at the farm, (sometimes passed through a storage phase) and/or goes directly to rural (tertiary) markets where stored or passed to secondary markets where intermediaries (middlemen) and wholesalers start purchase sizable stocks and convey it to primary or main markets and/or to storage. From this final marketplaces the goods usually sold for retailers/wholesalers and big companies for export. Smith (1992) has made an elaboration on the concept of costs, margins and mark-ups. Following his elaborations, the farmer's share of retail price can be shown as a percentage of the retail price as:

$$\text{Farmers' share (\%)} = \frac{\text{Farm gate Price} \times 100}{\text{Retail Price}}$$

As we are interested in the total costs of marketing, the percentage total gross margins can be obtained by the formula

$$\text{Total Gross Margin (\%)} = \frac{\text{Retail price} - \text{Farm gate Price} \times 100}{\text{Retail Price}}$$

Alternatively, the difference between the retail price and the farm gate price can be computed as a percentage of the farm gate price to give the percentage total mark-up<sup>7</sup>:

$$\text{Total Mark - up (\%)} = \frac{\text{Retail Price} - \text{Farm gate Price} \times 100}{\text{Farm gate Price}}$$

A complete analysis of price spread or marketing margin is only possible through an analysis of the complete set of market-behaviour equations (Carambas, 2005). However, and based on data constraints, the study made focus on the above reduced form of equations to estimate and draw implications on price spreads, producers' share from available data.

Theoretically, the level of mark-up is related to the market structure of a particular industry i.e. it is particularly higher in concentrated industries than in least concentrated ones. The Mark-up ratios can be used as indicators of competitive pressure as well as an indication of innovation rents (Riadh, 2001). In general, variations in percentage of any of the three formulae do not necessarily mean efficiency as there is some technical information that should be taken into consideration. Worth to take into account both spatial and temporal differences when computing costs and margins.

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<sup>7</sup> From above relationships, one should be keen to know whether the gross margins or mark-ups are used in computations in any negotiation report. This is because a percentage of mark-up will always be greater than a percentage gross margin if they refer to the same situation. Policy makers must be aware, that trade unions usually sensationalize the cost of marketing by using the mark up calculations rather than the gross margins in their allegations.

### **3. MARKETING CHAINS, COSTS, PRICE STRUCTURE & RETURNS**

#### **3.1 Marketing Magnitude and Production Quantity**

The patterns of production, stocks, imports, exports and food aid; including also surplus/ deficit production areas both at national and state levels are key indicators to availability of food (WFP, 2008). However, there is no reliable data at the national level for the marketed surpluses; since home consumption, storage and trade information (border illegal smuggling, waste) are mostly subjective estimates. Even though, an attempt is made to quantify the magnitude and volumes of trade flows of sorghum, millet, wheat, groundnuts, sesame, sunflowers, watermelon seeds and Roselle (*Hibiscus sabdarifa* 'Karkaday'). However, available statistics on quantity of marketed volumes of these crops focus on quantity and ignored most of the quality aspects<sup>8</sup> due to technical difficulties in assessing these parameters.

By tracing the marketing channels for each crop, an estimate of the magnitude and quantity traded can be arrived at from the official records though by themselves are production estimates and not actual market data records (Table 3.1). Likewise, it is found difficult to decompose the main cereal commodity crops (as sorghum) by variety since data on this aspect is not widely available across the country except in Gedaref and ElObeid markets. Therefore, adjustment for this problem is only possible by taking sorghum cultivars as one sellable commodity irrespective of its variety origin.

The study tried to trace the changes in the direction and volume of commodity flows between states/regions, but information is meager and sometime unavailable. However, comparing the present data with previous years; together with the potential and/or actual movement of food from surplus to deficit areas; including the quantity of stocks held by parastatal organizations, wholesalers and producers; is important in market analysis (WFP, 2007). Worth to note is that, most of factors determining the magnitude of trade flows across states– in this vastly expanding country - are also prominent determinants of the export decision of both food (sorghum ) and cash crops (gum Arabic, oil seeds and watermelons) and also the informal flows -as smuggling trade- explains their *market structure*. However, and due to lack of data, it is occasionally feasible to estimate the direction, and not the magnitude of trade flows across states for most of the aforementioned crops.

Lack of information on marketed surpluses leaves a room for estimation with regard to seeds and wastes. The usual assumption of taking 10% of the produce as seeds and wastes is ignored herein; as there is evidence -from previous studies- that even losses and seeds will not affect the quantity traded, as there are other informal channels including the smuggling trade, which support this evidence. Overall, and despite the criticism made to official records and/or estimates, yet are considered useful in filling the data gaps, as they remain the mere information source available (Table 3.1).

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<sup>8</sup> Quality characteristics of agricultural commodities (appearance, taste, grading and standardization cleanliness etc), safety measures (pesticides and artificial hormones, microbial contents) and authenticity that guarantee the use of traditional process and geographical origin, which are important for agriculture and agribusiness in Sudan remain only hypothetical (Giovannucci, 2001).

Table 3.1 shows drastic variations in both cereals and oil seeds production quantities in 2009/2010 compared to average of the periods 2002/2003-2006/2007 where production dropped by 33% and 18% respectively. However, season 2008-2009 was better than that of 2009/2010 where a sharp drop in cereals and oil seeds accounted for 32% and 44%, respectively. Reasons for the sharp declines in production relate to poor land productivity attributable to hazardous natural conditions viz. low rainfall precipitation and pest infestations beside others. In addition, there are other manmade causes as poor policy formulation, lack of technology, inadequate and untimely supply of inputs, and labour shortage due to migration to urban centres. Of course, the lack of market for agricultural output as well as uncoordinated research and extension also remain crucial factor. Such variations are obvious and require no further confirmation by measures of dispersion (coefficient of variation).

On the side of export crops, as watermelon, the latter has surprisingly shown an unbelievable reduction in quantity produced in season 2009/2010 by almost 90% compared to average of the periods 2002/2003-2006/2007. However, production of watermelon has more than tripled in the period 2009/2010 compared to the production of 2008/2009 but still far behind the figures of the five years average (Table 3.1).

**Table 3.1: Quantity produced for Major Crops (in 000 MT) in the Sudan During the period 2002/03-2009/2010**

Crop	Yield Kg./fed.				Production (000 MT)							
	2010/2009				2008/09				(2002/03 - 2007/06)			
	yield	Prod.	harvest	Planted	yield	Prod.	harvest	planted	yield	Prod.	harvest	planted
Sorghum	197	2630	13364	24908	246	3869	15754	19857	262	4053	15496	19982
Millet	98	471	4800	8554	111	630	5659	9303	111	768	6894	9734
Wheat	753	403	535	564	668	641	960	993	1009	402	399	417
Maize	583	35	60	75	742	66	89	94	<u>793</u>	<u>70</u>	<u>88</u>	<u>95</u>
Groundnuts	200	549	2742	3617	415	942	2269	3112	290	676	2330	3094
Sesame	82	248	3031	4573	107	318	2962	3973	89	308	3462	4325
Sunflowers	393	46	118	191	338	247	730	785	560	46	83	92
Watermelons	11	17	1654	2537	22	4	1086	2588	61	161	2660	3842
Roselle Karkady	38	25	651	893	38	18	476	698	<u>38</u>	<u>21</u>	<u>533</u>	<u>737</u>
<b>Total cereals</b>	<b>1631</b>	<b>3539</b>	<b>18759</b>	<b>34101</b>	<b>1767</b>	<b>5206</b>	<b>22462</b>	<b>30247</b>	<b>2175</b>	<b>5293</b>	<b>22877</b>	<b>30228</b>
<b>Oils seeds</b>	<b>675</b>	<b>843</b>	<b>5891</b>	<b>8381</b>	<b>860</b>	<b>1507</b>	<b>5961</b>	<b>7870</b>	<b>939</b>	<b>1030</b>	<b>5875</b>	<b>7511</b>

Area (000) Feddans

Underlined data relate to season 2007/2008

Data on gum Arabic is not adequately available, however, production ranges between 24-26 thousand metric tons/annum during 2002-2004. Production reached 20 thousand and 27 thousand MT in 2008 and 2009, respectively, two third of it is from Hashab tree (CBoS, 2009)

Source: Department of Agricultural Statistics, August 2010. Khartoum. Sudan. Gum Arabic Corporation (GAC).

Unlike the other commodities, Karkaday (rosella) kept an increase in production by 19% in 2009/2010 compared to average of the periods 2002/2003-2006/2007. This cash crop, which has a good export potential, showed a sizable increase in 2009/2010 (by more than two-thirds) compared to previous year (Table 3.1). However, the table, which gives information on production, still requires market flow maps to complement this analysis in order to identify which areas will be most affected by tracing typical commodity movements but statistics are still meagre in this respect. However, an attempt is made to fill in this information gap by tracing illustratively the market chains for each crop/commodity.

### **3.2 Transport and Storage Capacities**

Basic transport, storage, processing, markets, information and communication infrastructures are necessary for agricultural marketing. However, available information on transport sector and storage was long time ago and needs updating by concerned authorities.

Of the 18,000-km transport network, 3,500 km is paved, 4000 km gravelled and the remainder is sand or earth tracks. Reports show that, the 4800-km railway lines are obsolete except in few major lines (Ismail, 2004). River transport is almost very minor, while airfreight of goods is limited for light and essential goods for the substantially higher costs. Road quality (km of tarred roads per resident) is by far very low compared to figures in developing countries and road restrictions arise only during the rainy season in some parts of the country (seasonal restrictions). Most of the transport means are largely owned by private sector.

Under variable seasonal conditions, supply and demand forces determine the value of transport costs. The government permits exemptions from tariffs and taxes for newly competing companies to develop the transport sector and this have contributed largely to the relatively reasonable transport freight costs prevailing. Transport capacity number, type, and modes are not adequate.

The estimated intake of storage was found to be 6 million tons including various commodity items at that time (1988); with varied regional availability and distribution, sizes, and numbers and since has not been updated. The temporal dimension of available storage capacity cannot be guaranteed for few months. Due to the current poor storage conditions and handling procedures (mostly in bags and not in bulk), availability and accessibility to proper storage must be revised. Of the different storage modes<sup>9</sup> and capacities available, the public sector contributes by almost 65% in contrast to 35% to the private sector. Most of the traditional and conventional facilities are inadequately ventilated, often overfilled with improper storage and handling systems. No concrete data is available with regard to an on farm storage. The available statistics estimated the on-farm storage to be in the range of 1.3 to 1.7 million metric tons. Storage cost and fees for agricultural products constitute rational figures as compared to commodities price values.

The sizable storage facilities are located, historically, in places following the strategy “Think Big” irrespective of minimizing the combined assembly and distribution costs (Gedaref, Rabak & Port Sudan silos are examples of 100 and 50 thousand tons respectively). Thus, storage density does not reflect even distribution of facilities nor optimality in cost minimization. On another hand, the storage qualities are still under question as storage losses fall in the range between 5-15%.

There is no reliable data about the capacity of processing industry related to the processing of agricultural products, but most of these facilities are concentrated in state capitals, particularly Great Khartoum Area.

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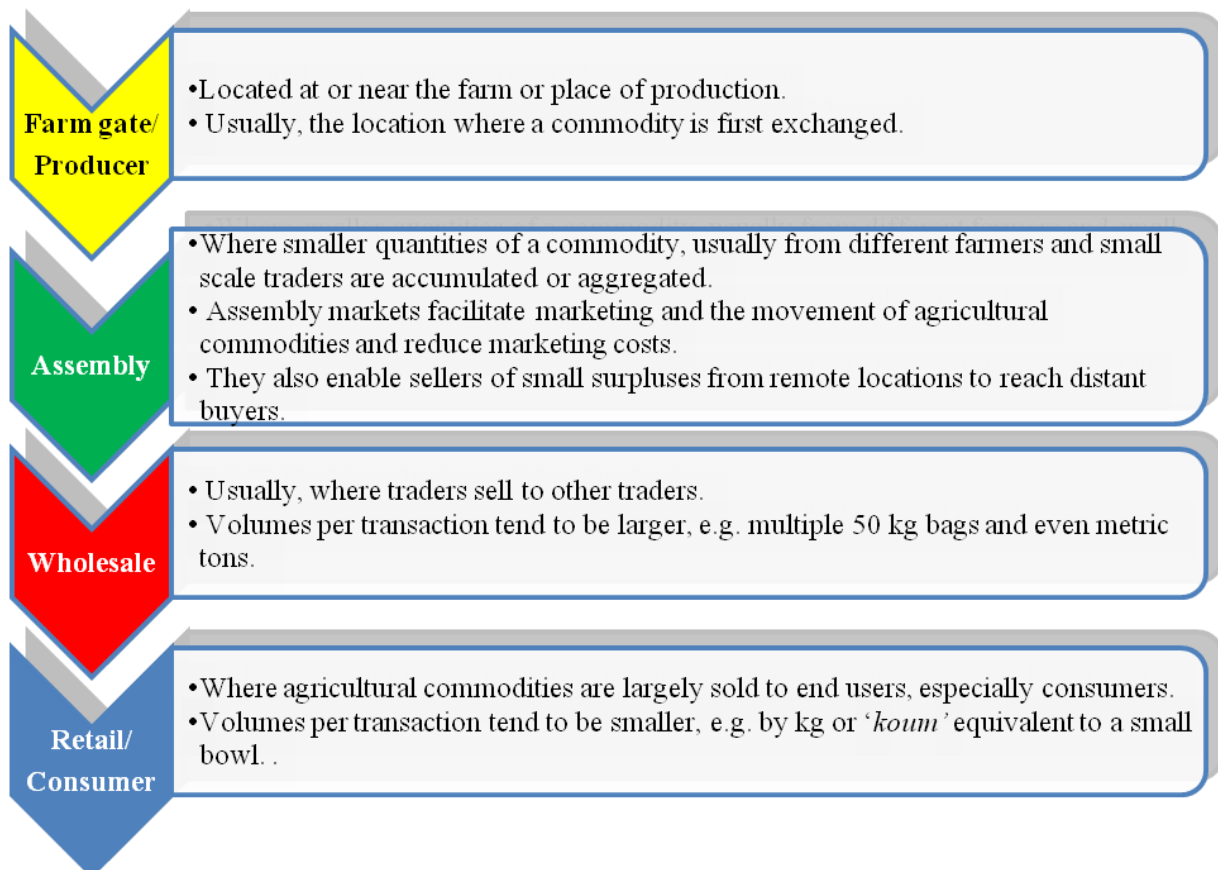
<sup>9</sup>Silos, modern warehouses, conventional warehouses, traditional warehouses, open air plat-forms (shunnas), granary, and underground pits. Cold stores for fruits and vegetables are generally estimations

### 3.3 The Marketing Chains, Margins and Mark-Ups

From previous definitions in chapter II, it has been understood that, market chains (market channels) involve a group of people or organizations that direct the flow of agricultural commodities from producers to consumers vertically. As such, any commodity chain, be it sorghum, millet, sunflowers, or whatever should describe the flow of all activities and/or services provided from the primary producer to the final consumer (Fig.3.1). Consequently, it includes all market levels and actors that have a role in the distribution and transformation of the commodity.

There are different institutions and institutional structures involved in the marketing process for agricultural products in the Sudan, namely, village traders who work in periodic markets, intermediaries/middlemen, agents and brokers in addition to wholesalers in central and/or auction markets (Fig. 3.1). Public marketing agencies are well common in some crop markets (like cotton and Gum Arabic, etc.).

**Fig. 3.1: Typical Commodity Chain/Channels**



Adapted from SIFSIA-N Training Material, Markets and Price Monitoring, 2010.

The importance of the market chain is that it facilitates understanding and allocation of the many costs incurred along the value chain to the corresponding transaction levels. Therefore, adequacy in information and knowledge obtained on market costs and margins by different players<sup>10</sup> help not

<sup>10</sup> Market information is essential for all information users and providers and they include traders, consumers, government policy makers, and non-government relief planners, donors, academicians and other users.

only in understanding market situations but also in enhancing competition along the food chain and reducing price volatility and costs (Fig.3.1).

As costs and margins analysis shall be the focus, an understanding of chain functionality is desirable, particularly, how the flow of these agricultural commodities is performed. Fig.3.1 portrays an overall picture (or framework) for the marketing chain, which describes the links between different transaction levels that are virtually inseparable though are completely separated and located in different places (e.g. farm-gate level, wholesale level, retail level (standard and non-standard units), and the international level. Efficiency is an important element in chain flows. Whilst referring to efficiency criteria we usually mean availability of transportation and storage facilities; efficient communications; common grades and standards that facilitate trading at distance; legal codes to enforce contracts; and credit availability to finance short-run inventories and processing operations. These requirements, when adequately provided, can lead eventually to a smoothly functioning marketing system. In contrast, market inefficiency or market failure is, certainly, associated with lack, poor or non-availability of some of the aforementioned services and activities.

Throughout this section, emphasis on market chains/channels shall be made to facilitate understanding of the nature, direction and volumes of trading of any of these marketing systems. Details on marketing costs and margins for cereals (sorghum, millet, and wheat), oil seeds (sesame, groundnuts, and sunflowers) and cash crops as watermelons and Roselle (*Karkaday*) shall follow in a separate section including information on livestock. Of course, the analysis of the *production costs*<sup>11</sup> and margins of these agricultural commodities would complement the *marketing costs* and *margins* analysis and would pick up collectively more insights into the economic situation of the agribusiness cycle regarding these aforementioned agricultural commodities/crops.

### **3.3.1 An Overview of Marketing Chains and Related Policy for Selected Commodities**

This section helps to identify the constraints and bottlenecks facing markets, and eventually propose solutions and remedial actions to improve their marketing efficiency. However, a major determinant of the channel structure for any agricultural commodity is whether the crop is produced for direct consumption or to be marketed for further agro-industrial processing. This is because the produce intended for agro-industrial processing is usually sold directly to the manufacturer whereas by most food commodities, the consumers make their own purchases from retail or wholesale markets spread at different municipality levels. However, the geographic location and shifts in consumer buying patterns will also influence the channel decision.

Another important element in commodity chains is the perishability of products like fruits and vegetables. The characteristics of the product with short life cycle usually moves via a short

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<sup>11</sup> The study proposes an extra exercise in complement of marketing costs and margins, to include production costs in a cost allocation model. The model, which we propose to be made in a future study, should include besides these commodity groups, other vegetables and fruits, livestock. Among these concerns, the farm size, the farming systems, and income indicators are important for comparison with other farming sectors.



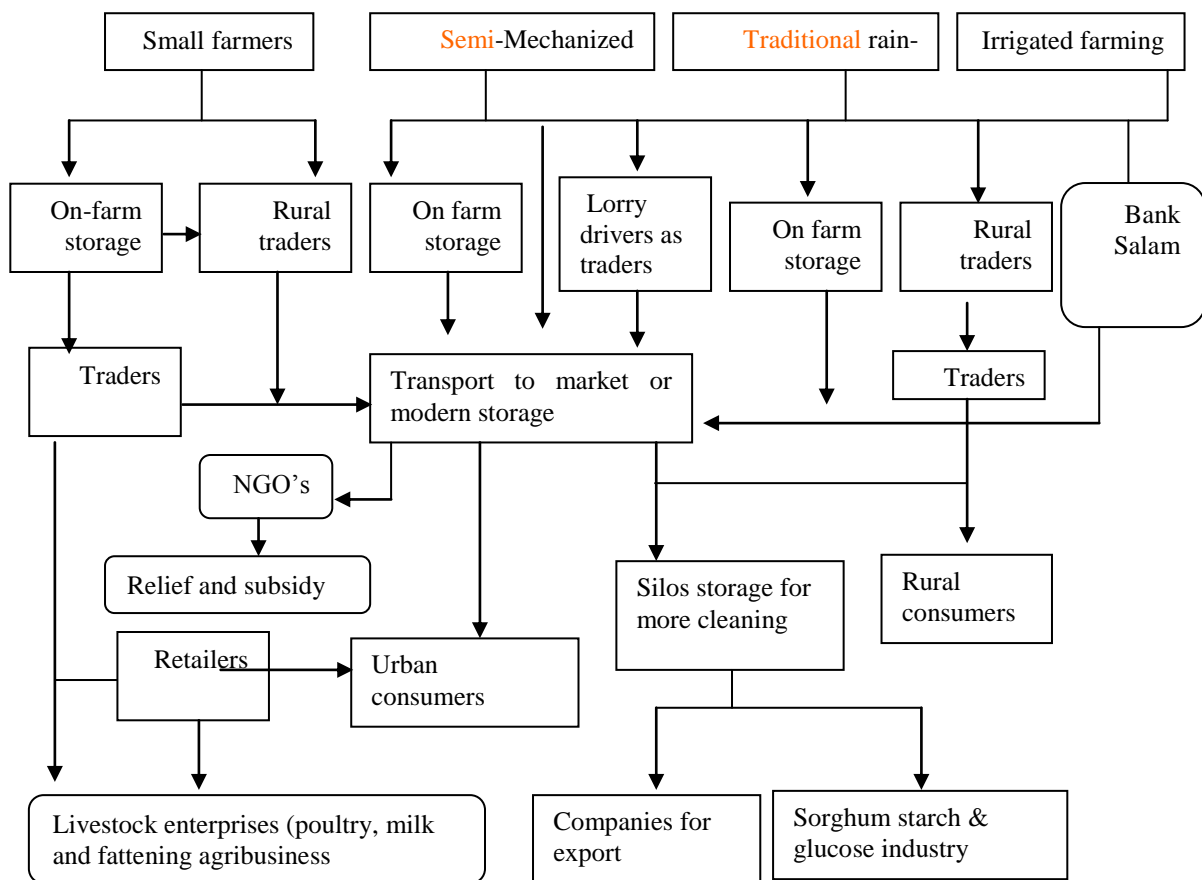
channel direct to retailers. The lower the unit value of the product is, the longer the channel or chain will be. Similarly, the more standardized a product is, the longer the chain/channel will be. Conversely, the nature and extent of competition is a second factor that can impose such a choice of channel elongation. Channel conflict may arise from a number of sources, as shall be given by a number of examples. In order to avoid such conflicts and make smooth performance of the system, transparency and adequate management performance for agricultural commodities is required.

*a) Marketing Chains/Channels for Sorghum and Related Policy Issues*

Sorghum, wheat and millet are the major staple foods in Sudan, and their production is primarily consumed domestically. Sorghum forms the major food among the cereal grains and its exports have been quite variable in amount and are often subject to restrictions in response to policies that have always had a priority target of ensuring its domestic availability. The crop is produced in traditional and semi-mechanized rain fed farming at variable quantities depending mainly on the rainy season and other factors (Table 3.1) in irrigated sector. The level of domestic production, which in turn is affected by natural and policy environments usually affect the marketable surplus.

Sorghum is often traded in large volumes via a well-defined marketing channel. The marketing chain of sorghum starts at farm gate level where rural traders (sometimes lorry drivers as brokers or agents) procure the crop to rural or periodic village markets. Well-off farmers tend to make on-farm storage (underground pits) until prices get improved (Fig.3.2).

**Fig.3.2 Sorghum Market Chain/Channels, (Adapted from Ismail, 2004)**



At the beginning of every harvest season, the produce either is moved to central/urban markets or finds its way to storage when prices are below production costs. Depending on the relief situation, some relief NGOs tend to buy significant amounts (usually late in the season rather than at the beginning of the marketing season Fig. 3.2) and transport it to the needy areas in Southern Sudan or other areas in the Western Sudan.

When harvest is good, some export companies usually tend to procure from primary/central markets and pass the sorghum through a cleaning process from impurities at silos – (either Gedaref or Port Sudan silos) to comply with international standards. However, considerable amount of sorghum goes for starch and glucose industry in Greater Khartoum Area while unknown quantities are smuggled through the eastern borders. Besides the quantity allotted for seeds and the losses (usually accounted for 10%), a significant portion is usually purchased by livestock entrepreneurs for poultry, milk and fattening agribusiness (Fig.3.2).

Currently, the government role in grain marketing is minimal and frequent purchases were usually performed by the Strategic Reserve Corporation (SRC) to either stabilize prices and/ or maintain a strategic buffer stock for emergencies. Over the last years, the government purchases from sorghum grain markets were variable but in all were not that much or can be considered even negligible.

Unlike in many countries, there is no Higher Grain Council (HGC<sup>12</sup>) for this strategic commodity, despite the substantial amounts produced and the relative importance of sorghum in food security and the grain industry. Therefore, the current situation suggests a real government body to account for the grain marketing policies, including provision of incentives to private sector investments such as processing, storage and transportation vessels. On the ground, a buffer stock is monitored by SRC under the Ministry of Finance & Economic Planning, but still with sub-optimal finance. However, fragmentation in policy design and strategy implementation remains a salient feature of planning in all agriculture related sectors and other economic sectors.

Until now, there is no obligatory rule to comply with unit measurements in grain markets, and the sack, which varies between 89-100 Kg, is still the acceptable volume for transactions in sorghum crop markets. All cereals are transported and/or stored in sacks, however, bulk storage is only economic when bulk transportation is available, efficient and feasible; which is not currently the case in Sudan. The capacity of the private's sector trucks and the handling procedures are not designed for bulk transport except for few big milling companies (Wheata & Sayga, and Seen; and even these privates' sector trucks are mainly for transporting imported wheat. Sudan railways bulk capacity and efficiency is retarding remarkably and is contributing less than trucking modes in flows of sorghum and other cereal.

The behaviour of market participants and their conduct in sorghum grain markets is governed by competition rules among the competing export traders, export companies, authorized NGOs agents and few local traders who form marketing rings; a kind of alliance of some farmers-traders on family and/or tribal basis to control market prices. The latter attitude influences the marketing mechanisms by giving false price signals to producers and/or consumers at every beginning of the marketing season. Such a phenomenon is evidenced in Gedaref and the nearby crop markets in the same state (Ismail, 2004).

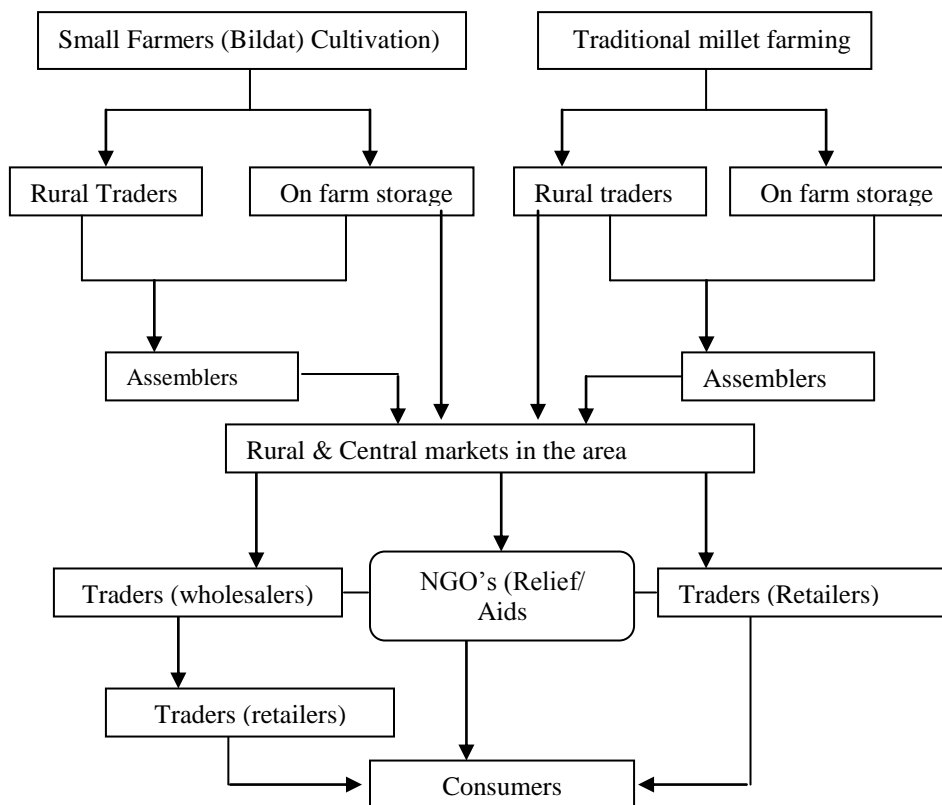
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<sup>12</sup> As a matter of fact, HGC was established in 1986 (by MoA) with a mandate to cover designing policy on production, marketing, pricing, storage and consumption of food grains, but has never come into effect and instead Strategic reserve corporation was born to perform similar functions.

*b) Marketing Chain/Channel for Millet and Related Policy*

The marketing chain of millet are only slightly different from that of sorghum for the crop is largely produced in traditional rain fed agriculture in western states and consumed locally and some is traded across states where preference to the commodity is persistent by racial factor. In most of the small farms in western Sudan, millet is part of the cropping mix that includes other essential crops that increase farmers' returns like gum Arabic, *Hibiscus sp.* (Roselle) "Karkaday" and other home garden (Bildat) crops for rural household consumption. Aggregated statistics of Table 3.1 showed that millet yields are in the range of 98-111 kg/Fed (see Table 3.1).

**Figure 3.3: Marketing Channels for Millet in Traditional Areas**



A typical route of the crop –as shown by Fig 3.3–goes from producers to rural markets where wholesale traders and retail traders purchase small quantities from farmers, and later on be sold to consumers in urban concentrations and/or rural markets. NGOs usually buy significant amounts to support farmers when they are in bad need of cash or to help low-income groups in conflict- and/or drought-affected areas in the western parts of Sudan. However, most farmers keep their household needs at the farm-village granary bins. The behaviour of participant in millet markets is competitive since the demand on crop equates the supply at reasonable interval periods (Ismail, 2004).

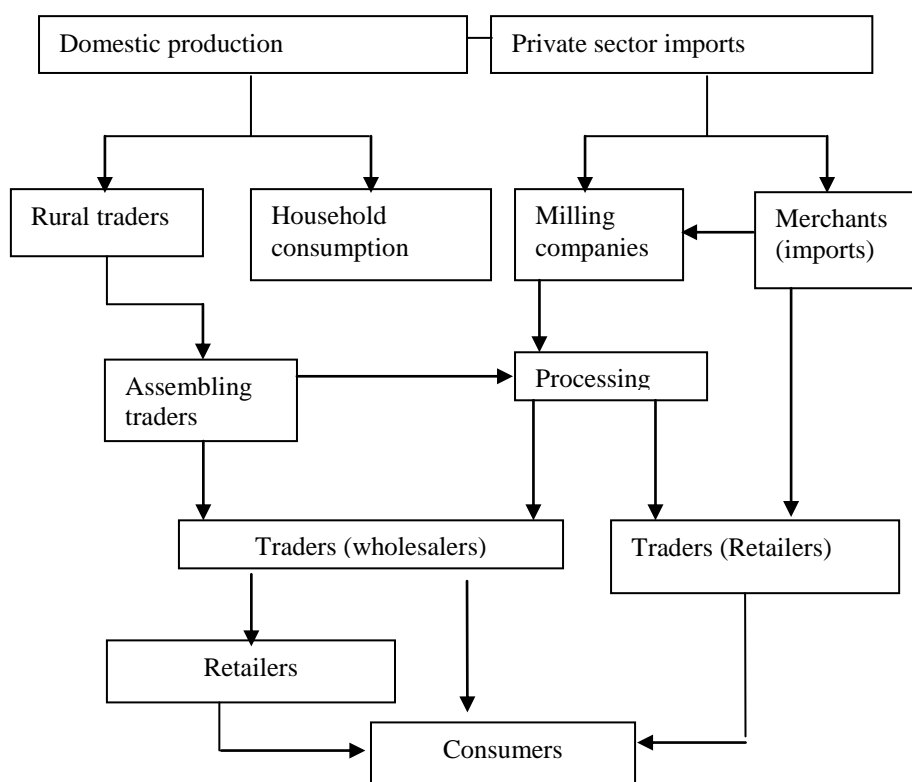
*c) Marketing Channels for Wheat and Related Policy*

Fig. 3.4 depicts the marketing chain for wheat, which gathers the domestic as well as the imports through the international chains and reflects the inter-linkages and interactions in this trade area. The marketing chain for imports starts at international markets (USA, Argentina, Australia etc.) for

both wheat grain and wheat flour, where few quantities of the latter are produced domestically (Table 3.1).

Most of the domestically produced wheat is confined to irrigated agriculture (Northern state, River Nile state Gezira and Managil Schemes and some parts of White Nile irrigated schemes) and as such, marketing channels start there and circulate to other consuming areas (Fig. 3.4). Significant amount of wheat, whether from domestic production or private sector imports, passes through a processing and milling phase that adds value and form utilities (Fig. 3.4). Wholesalers (or even mill processors) can sell to groceries, confectioneries and biscuits factories for further processing. Wholesale traders distribute also to retailers who sell directly to consumers.

**Fig. 3.4: Marketing Channels for Domestic Wheat and Imports**



Domestically produced wheat is currently facing a disadvantageous position compared to imported wheat in terms of price and other hedonic quality characteristics, as poor gluten contents that give bread the elastic nature. Due to these reasons, marketing channels for domestic wheat is confined to main producing areas in addition to few urban pockets in the northern states where transportation cost bring the difference.

The principles of self-sufficiency in wheat production made in the early 90's have now paved the way for a semi-privatised free market economy dominant by three main big companies (oligopolies<sup>13</sup>). However, the Agricultural Revitalization Programme (ARP) is pushing hard to

<sup>13</sup> The three large-scale millers (Seen, Syga and Wheata) are the only processors who deal with large volumes of wheat and do their own imports, processing, packaging and distribution. These millers are characterized by large-scale, capital intensive and modern roller-milling technology.

bring domestic wheat back into the crop rotation, a counteract strategy to reduce the dominance of full-fledged wheat free market and wheat-flour imports. In this regard, it is worth noting that, the imported wheat and wheat flour exceeds the quantities locally produced by almost three folds.

On the demand side, many factors have contributed to the shift from sorghum-millet diet to or the locally produced one to wheat imports for the high cost of production. There is evidence that, the imported wheat competes vigorously with local varieties and dominates over it economically. Not absolutely, but, there are claims that, the increasing preference of the newly emerging urban concentrations in the National capital to wheat bread and other wheat products over sorghum and other domestic cereals has contributed negatively leading to the decline in the domestic wheat production. In comparative advantage terms, wheat imports are cheaper than the locally produced wheat in addition to other quality characteristics. Other food grains (like maize and rice) which are usually grown in some areas in southern states and some irrigated schemes in White Nile are minor in quantity (Table 3.1). However, their magnitude and volume might influence the demand for food grain in food markets and as such need to be traced by future studies. However, maize is not widely grown in Sudan, and production (35 thousand tons in 2009/2010 compared to 66 thousand in previous season (Table 3.1)) is declining over years.

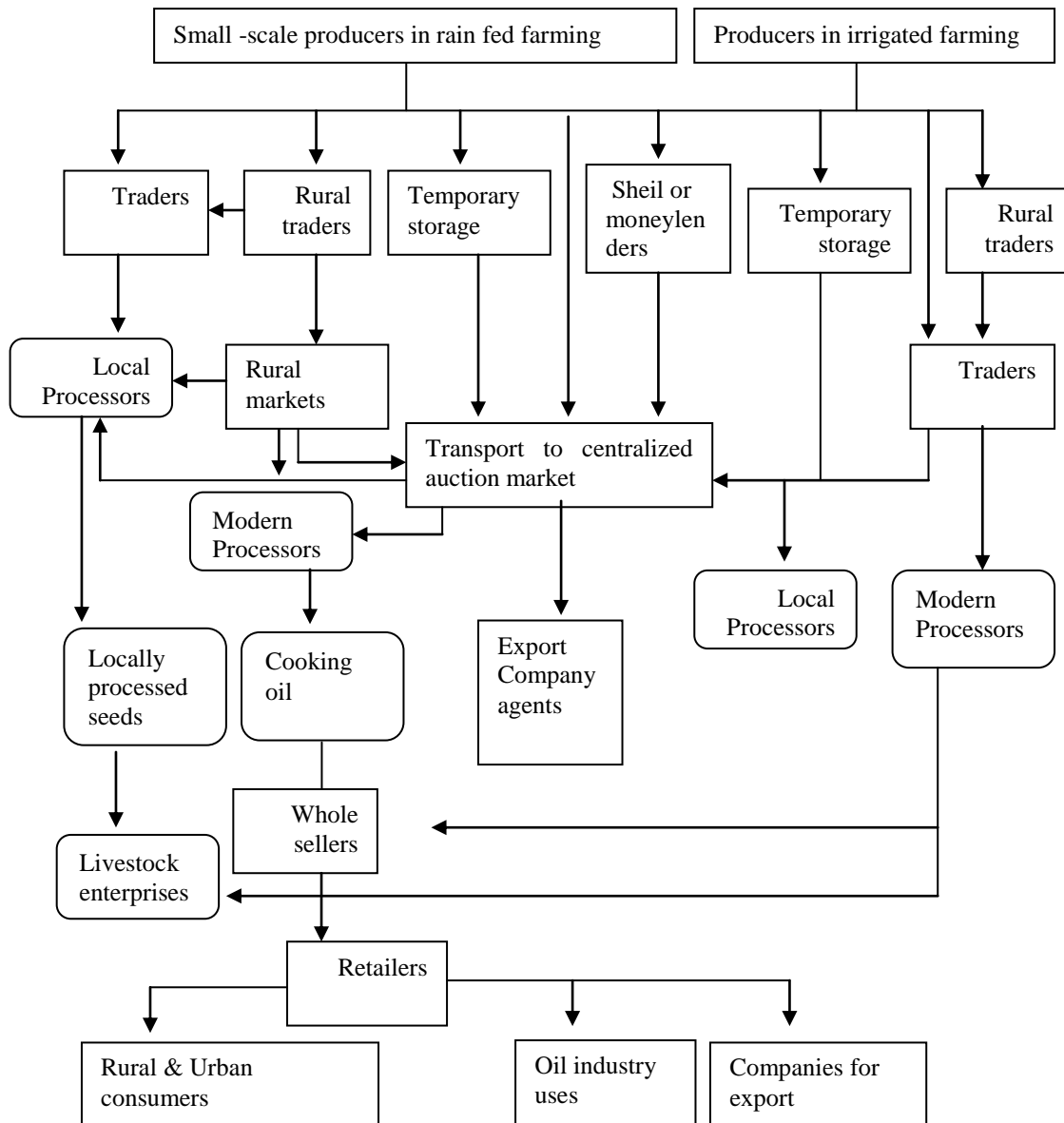
#### **d) Marketing Channels for Oil Seeds (Sesame, Groundnuts and Sunflowers)**

Sesame, groundnuts and, to a lesser extent, sunflower are the major oil seeds produced in Sudan, mostly under rain-fed agriculture. However, groundnut is an oil seed crop grown in both irrigated and rain fed agriculture, whereas sesame is confined mainly to traditional and/or mechanized rain fed farming. Sunflowers are grown as oil seeds crop in irrigated and rain fed areas as well but on a limited scale in the latter. The marketing chain for traditional small-scale oil seeds production starts at farm or village level where traders or informal moneylenders collect small amounts to be sold at auction markets (as intermediate markets) or large auction markets in urban cities as Gedaref and El-Obeid. The marketing channel for each oil seed crop is expected to differ one from another due to variation in production processes and areas of production as well as destination areas of sale.

#### **i) Marketing channels for Groundnuts**

The crop passes through a very long chain until it reaches final consumers. Similarities to sesame in the length of the marketing chain exist in particular regions but may also differ in other areas. The marketing chain for groundnuts is illustrated in Fig. 3.5. The figure traces the marketing and utilization chains of groundnut commodity including the processing phases. Producers in each sub-sector either sell their harvest to rural traders, agents of wholesale traders or store temporarily until the prices improve (Fig. 3.5). Producers/assemblers can proceed even further to sell to processors, company exporters or their agents. Sellers download the crop in lots “Numbers”, where the name of the seller, kind and quantity and quality of produce, area of production and the ‘lot’s number’ are registered for auction procedures. After purchases are completed, the produce goes for processing into cooking oil, processed as a seedcake, or exported as shelled/unshelled to the world market. Conventional (*Asarat*) and/or modern types of processing facilities are available for groundnuts. Post-processing the remaining residues sold as animal feed while the cooking oil is sold to wholesale and retail markets. The product reaches the consumer in different forms for different utilities (Fig. 3.5).

**Fig. 3.5: The Marketing Chain of Groundnut from Producers to End-Users**



Despite the cheap prices of other oil's substitutes (viz. palm oil), consumers still prefer the domestic types of oil seeds for many reasons, among which stand the pleasant taste and flavour. Studies on consumer's behaviour and preference can reveal essential information that can help in designing an effective marketing strategy for the domestic oil seeds and their by-products and exports to international markets as well. Traders, transport the crop to auction markets, in turn, where sold to wholesalers (Fig. 3.5).

*ii) Marketing Chain/Channels for Sesame and Sunflowers*

The marketing chains/channels for sesame and sunflowers do not vary greatly as to those of groundnuts since they are all sold by auction markets and go for processing through same route, with minor routings. After sesame purchases are completed, the commodity goes for refinement

and purification processes in silos and modern storage facilities where the service is available (Fig. 3.5). After this phase of purification, the sesame is taken for processing as cooking oil, seedcake or exported to the world market. Sunflowers are not an exception in these processes and usually follow the same pattern.

Local processors (*Asarat*) and conventional or modern types of processors are available for sesame in different regions/states. Post-processing, the cooking oil is then sold to either wholesalers and/or retailers whereas the remains go for feeding animals the same way as groundnuts (Fig. 3.5). The rural population usually prefers the local sesame processors (*Asarat*) for their high quality 'Walad' oil produced which enters as a medicament for many stomach and back-ache troubles. However, the market chain for watermelons, which is mainly for exports, is similar to that of oil seeds except for eliminating the phases of processing into oil.

#### *e) Marketing Chain/Channels for Gum Arabic and Related Policy*

Sudan is one of the leading Gum Arabic producing countries in the world. The commodity is mainly obtained from *Acacia sp.* and some trees of the family Leguminosae. In particular, two varieties are famous in gum Arabic markets namely *Acacia senegal* (Hashab or Kordofan type) and *Acacia seyal* (Talih) gum Arabic. Other African countries like Nigeria, Uganda, Tanzania, Kenya, Niger, Ethiopia and Chad produce minor amounts (20% of Africa's total produce) as compared to Sudan (80%) (Karam, 1996 and Forestry Reports 2007).

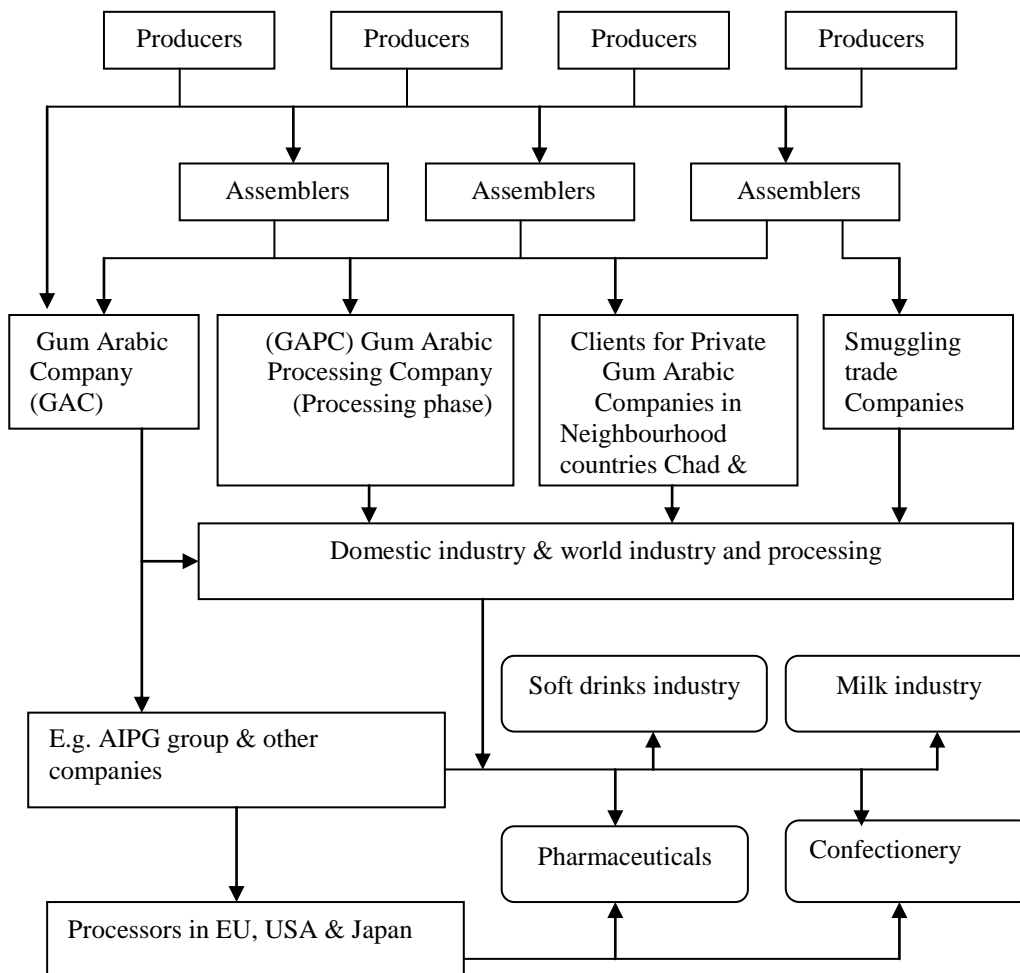
Historically, gum Arabic trade started since 1820 during the Turkish regime and is still continuing under the Sudan's leadership. The Gum Arabic Corporation GAC, which used to organize gum arabic export trade, was established in 1969. Along the market chain of gum arabic, the producers, who are usually farmers, procure their produce (Fig. 3.6) to local traders (assemblers) at free auction markets, and at an interim price declared by the authorities at the beginning of each harvest season. The local traders perform different processing activities (cleaning and grading) and then sell the commodity to the GAC (Gum Arabic Corporation).

After the liberalization of gum Arabic trade, there are still many agents for different exporting companies, some of them go for former GAC agents (Fig. 3.6). The assemblers have no alternative to export their gum to the world market other than selling to the GAC or any other domestic company. The law frees internal trade and monopolizes the external trade on natural gum Arabic only to the GAC! Recently, there are many companies engaged in Gum Arabic trade.

Gum Arabic has a multitude of uses that diversify its marketing channels after processing. Confectioneries, soft drinks and medical drugs are few examples of these types of uses (Fig. 3.6). Smuggling of gum Arabic to neighbouring markets affects (negative or positive) greatly the domestic production, marketing and consumption relations. Despite this fact, still there is no reliable source of information to confirm or even estimate the volume of such informal trade.

Various marketing avenues are now open for gum Arabic exports as shown by Fig. 3.6. Europe is traditionally the largest importer of gum Arabic. France, Great Britain, Italy and Germany are dominant markets. A considerable proportion of gum Arabic imported by Europe is processed and re-exported to the USA. Likewise, Japan imports the highest quality Hand-Picked Selected, (HPS) hashab gum Arabic. In this regard, India, South Korea and China are important emerging markets (Forestry Department, 2007).

**Fig. 3.6: The Marketing Chain of Gum Arabic from Producers to End-Users**



The processes of production, tapping, picking, drying, cleaning, grading and marketing tend to enlarge the gum Arabic marketing chain but each one adds value to the produce and brings high quality product that satisfies the international standards required by the food industry, both nationally and internationally. Pre-harvest storage technology (storage on trees) must be followed to minimize the hazardous fluctuations in production output in order to maintain a stable and continuous supply of gum Arabic.

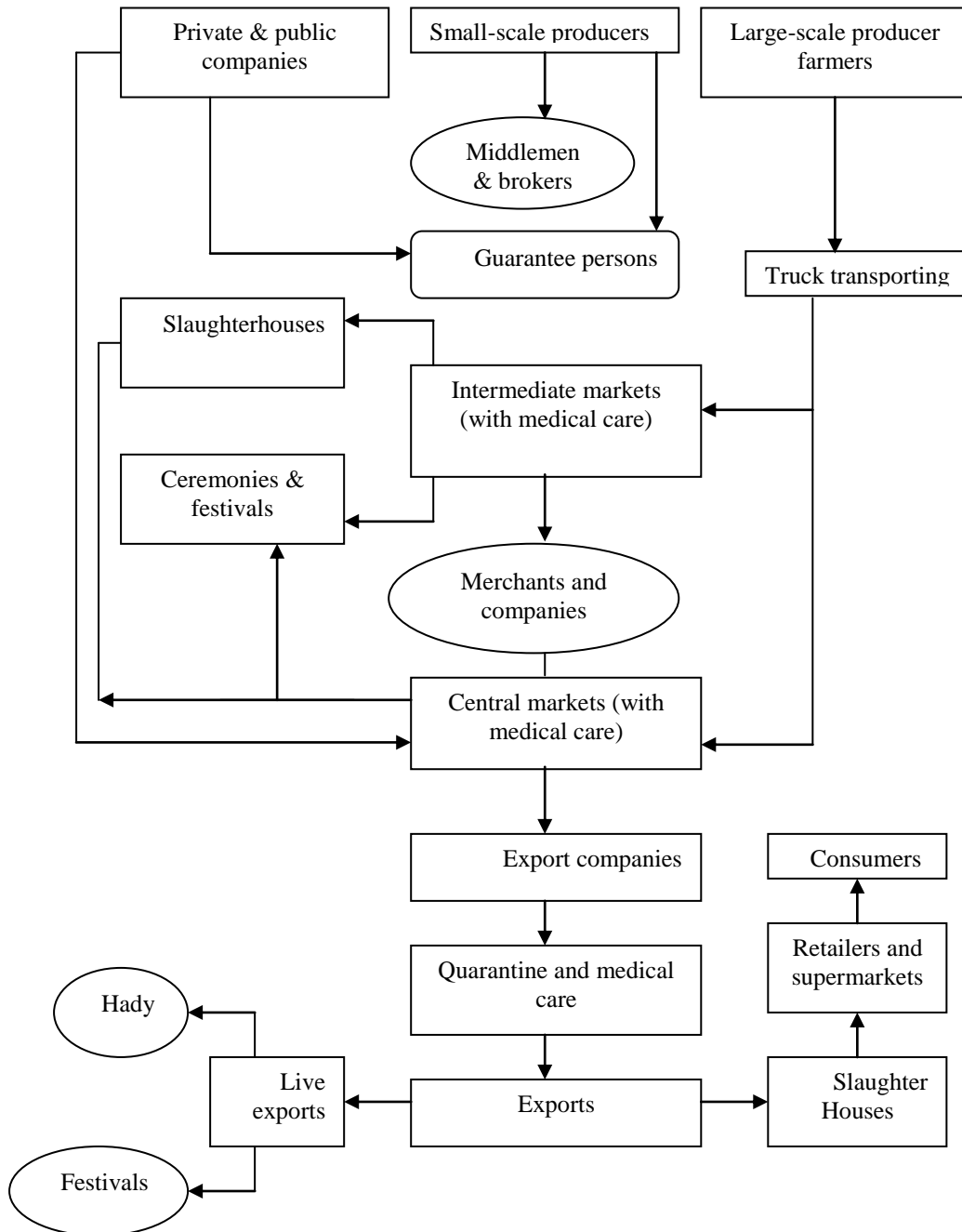
*f) Marketing Chain for Livestock and Related Policy*

In recent years, livestock shares almost 50% of agricultural exports where crops take the remainder share (CBoS, 2009). Despite the significant importance of livestock to Sudanese economy, still its markets are not well developed, the same as crop markets. No auction markets are available and sell is not on weight basis but depends on bargaining on ‘no rule’ basis. In addition, both formal and informal markets exist in the livestock trade. Informal markets exist in remote and rural areas where exchange process is done only arbitrarily and statistics concerning this type of trade and marketing



activities involved is not available. In contrast, formal markets are relatively well defined, where authorities and medical care and check-ups are supposed to exist, particularly for live animal exports. A typical example of livestock marketing chains is given below (Fig. 3.7).

**Figure 3.7: General Scheme of Livestock Marketing Channels in Gedaref State, (Adapted from Ismail, 2003)**



For the different types and livestock species, the selling procedure and process is almost the same where no auction markets and no standardized unit of measurements are common observations. Intermediaries, brokers, and ‘guarantee clients’ are key persons in the transaction processes for a known and agreed upon commission per livestock-head. Local authorities usually manage the markets and charge fees and customs for that matter. Records by livestock market, administrative

management and service arrangements are generally poor. However, the forward and backward linkages of the livestock industry (tannery, forage and fertilizers make, etc) can diversify and open new avenues for livestock-products marketing and consequently leads to the sector development

### 3.3.2 Systems Cost Structures along the Supply Chain of Selected Commodities

Having understood the market chains for the selected crop commodities, now it would be easier to discuss and analyze the cost structures along the supply chain of these selected commodities. Price transmissions along the supply chains have been computed and our main concern in this section is to reveal whether ‘there are’ or ‘there are not’ higher retail price spreads, and if any, and unpack the reasons behind the widening of marketing costs and margins for the given commodities.

To facilitate tracing the events related to costs and margins, the commodities were grouped in the sequential order in the way presented in the previous ‘marketing chains’ section as to cereals, oil seeds, livestock and other cash crops. This arrangement can allow the reader to frequently return to the flow diagrams and help in identifying the ‘nodes’ of the constraints and the bottlenecks. Detailed examples were given for each commodity where appropriate, and the illustrated examples were representative for the entire marketing system in the country.

#### *a) Systems Cost Structures for Cereals*

##### *i) Sorghum*

Information on Table 3.2 showed no greater differences in producers’ prices of sorghum among the main producing areas, typically Gedaref, North Kordofan, White Nile and Sinnar. Although no much difference in production methods of sorghum in Blue Nile compared to other states, the producer’s price was relatively very low in contrast to the gross margins earned by different market participants while retail prices shot to an extraordinary level compared to other states. Consequently, gross margins showed almost 53% of producer’s price thus indicating that market participants share most profit margins compared to producers.

**Table 3.2: Summary of Sorghum Price Spreads and Margins (SDG/sack) by Different States**

Particulars	States				
	Gedaref	N-Kordofan	Sinnar	Blue Nile	White Nile
Farm gate Price (SDG/sack)	92	93	89.8	71	95
Retail Price (SDG/sack)	110	121	106.8	152	105
Farm-retail Price spreads	18	28	17	81	10
Producers' share (%)	83.6	76.9	84.1	46.7	90.5
Total Gross Margins (%)	16.4	23.1	15.9	53.3	9.5
Total Mark-ups (%)	19.6	30.1	18.9	114.1	10.5

Source: MoA, Department of Statistics, Field survey, 2009

Informal trade with neighbouring countries was likely to influence retail prices in Blue Nile as long as smuggling trade continued. However, the high sorghum retail prices might also suggest problem of data collection at times when prices have shot up exceptionally.

On the producer's side, as can be observed from Table 3.2 that sorghum price spreads in Blue Nile state was the widest compared to among other states and this reduced the producer share to 47% of consumer's price as compared to other states in which the producer's share was in range of 77%-91% of the retail prices. Any abnormal increase in price spreads can be a result of an inflated retail prices or a deflated farm prices (Table 3.2 and Annex 3.1). On the other hand, the relatively low price spreads in White Nile, Sinnar, and Gedaref suggest less transport and storage differentials in addition to low margins for intermediaries. Theoretically, farm-to-retail price asymmetries may also be a result of government intervention through SRC (for instance, through purchases at higher prices to support producers).

### *ii) Millet*

Like sorghum, millet in Blue Nile showed less farm gate prices compared to other states (Table 3.3). Although retail prices seemed comparable to the average prices of other states, yet total gross margins remained high in Blue Nile (38%) compared to 21%, the average for other states. Generally, the producer's share in millet prices is less than his/her share in sorghum (Table 3.2 & 3.3). This might suggest a future shift of farmers in Blue Nile towards growing sorghum in the place of millet if their profit margins were to continue in deterioration with this crop. The farm-retail price spreads in Sinnar and Blue Nile exceed that of other states as shown by the fewer shares of producers on retail prices (Table 3.3).

Millet has the same average retail price, of 150 SDG/sack in three states, excluding Sinnar and North Kordofan. The less farm price in Blue Nile (93 SDG/sack), as compared to average of almost 120 SDG/sack in other states, has lead to substantial decline in producer share (62%) thus resulting in a relatively high mark-up in prices of millet in that state.

**Table 3.3: Summary of Millet Price Spreads and Margins (SDG/sack) by Different States**

Particulars	States				
	Gedaref	N-Kordofan	Sinnar	Blue Nile	White Nile
Farm gate Price (SDG/sack)	117	127.5	130	93	120
Retail Price (SDG/sack)	149	161	180	150	150
Farm-retail Price spreads	32	33.5	50	57	30
Producers' share (%)	78.5	79.2	72.2	62	80
Total Gross Margins (%)	21.5	20.8	27.8	38	20
Total Mark-ups (%)	27.4	26.3	38.5	61.3	25

Source: own computations from information of MoA, Department of Statistics, Field survey, 2009

### *iii) Wheat*

Except in Blue Nile, the farm gate price in other states is almost the same within the range of 95-98 SDG/sack (Table 3.4). The wedge in prices of wheat between retail and farm gate in Blue Nile is substantially high compared to North Kordofan and White Nile, but falls below the price spreads of Khartoum state. The high value of the producer's price in Blue Nile state, which is not a typical growing area for wheat, is attributable to low yield and high production costs. In another note, when linking information on domestic wheat production in Table 3.1 to information on consumption demand, one can conclude that the gap between domestic production and consumption is widening and this lead to the increasing imports. This shows the direct effect of the world market prices on domestic wheat prices (Faki, et al 2009).

**Table 3.4: Summary of Wheat Price Spreads and Margins (SDG/sack) by Different States**

Particulars	States			
	N-Kordofan	Blue Nile	White Nile	Khartoum
Farm gate Price (SDG/sack)	95	115	97	98
Retail Price (SDG/sack)	121	150	120	136
Farm-retail Price spreads (SDG/sack)	26	35	23	38
Producers' share (%)	78.5	76.7	80.8	72.1
Total Gross Margins (%)	21.5	23.3	19.2	27.9
Total Mark-ups (%)	27.4	30.4	23.7	38.8

Source: own computations from information of MoA, Department of Statistics, Field survey, 2009

From Table 3.4, one can observe that, the producers' share in White Nile reaches 81%, but differences are also minor. In Blue Nile consumer's prices is almost 25% more than average of other states.

#### *b) Systems Cost Structures for Oil Seeds & Vegetable Oils*

System cost structure for sesame and groundnuts is given in this part with farm-retail price spreads comparisons are made for Gedaref, North Kordofan, Sinnar, Blue Nile and White Nile states (Table 3.5).

##### *i) Domestically Marketed Sesame and Sesame Vegetable Oils*

Like the farm gate prices, sesame prices spread variably among the states ranging from 347 SDG in Blue Nile to almost 2329 SDG in Gedaref. Consequently, producer's share showed a drastic drop in Gedaref (49%) and North Kordofan (48%) compared to Blue Nile state, which has kept a level of 90% farmer's share of the retail price. Interesting to note is that, the market participants – wholesalers, retailers, and intermediaries- share almost 51% and 52% of the consumer's price in Gedaref and El Obeid markets respectively as reflected by the high percentages of gross margins. However, producer's share in Sinnar and White Nile states are almost the same and revolve around 68% and 69% respectively. With no obvious reason, the retail prices in Gedaref are exceptionally high (4600 SDG/ton) compared to other states which varies between 3250 and 3275 SDG/ton. However, the proximity of Gedaref to export outlet can increase supply prices. Moreover, the

drastic variation in prices can be attributed to seasonal influences or smuggling trade with neighbouring countries!

**Table 3.5: Summary of Sesame Price Spreads and Margins (SDG/ton) by Different States**

Particulars	States				
	Gedaref	N-Kordofan	Sinnar	Blue Nile	White Nile
Farm gate Price (SDG/ton)	2271	1558.2	2216	3005.1	2250
Retail Price (SDG/ton)	4600	3276	3276	3353	3276
Farm-retail Price spreads	2329	1717.8	1060	347.9	1026
Producers' share (%)	49.4	47.6	67.6	89.6	68.7
Total Gross Margins (%)	50.6	52.4	32.4	10.4	31.3
Total Mark-ups (%)	102.6	110.2	47.8	11.6	45.6

Source: MoA, Department of Statistics, Field survey, 2009

\*raw sesame is converted into equivalent oils (values) at 40-44% extraction rate

### ii) Sesame Exports

Despite the significant amount of sesame produced (Table 3.1), but only small quantities of sesame is usually exported. In 2008, exports raised to 97 thousand metric tons with value of 142 million US \$. However, total production accounted for 248 thousand metric tons (30% of oil seeds) in 2009/2010.

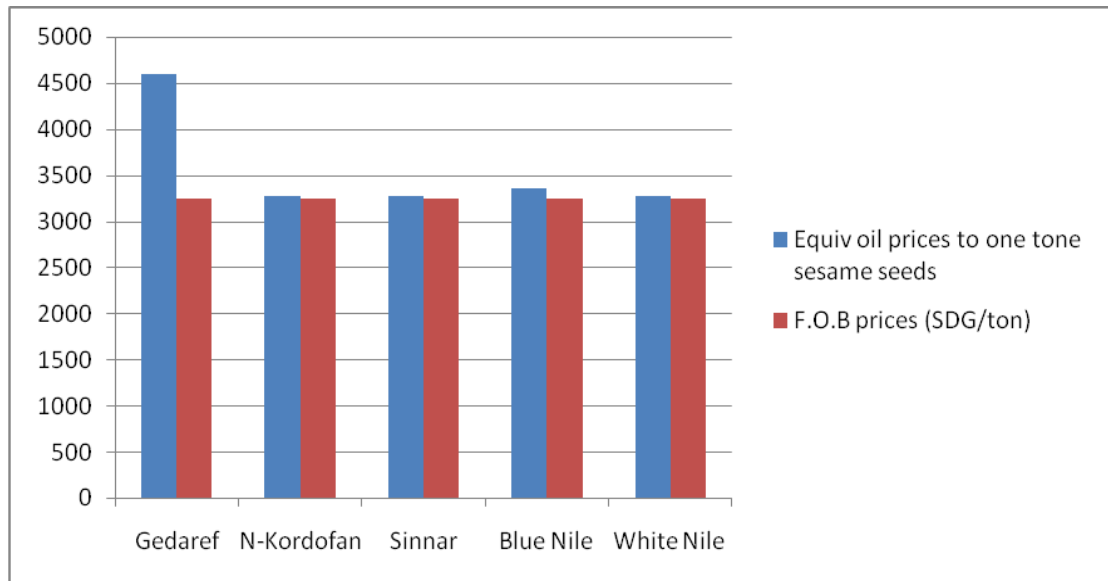
The producer's share, as shown by Table 3.6, varies greatly among states as so do the marketing costs and farm-retail price spreads. Gedaref and Sinnar are comparable in the farmers share in consumer's price, marketing costs, and hence have equal farm-to-retail price spreads. However, the most affected by these price differentials are farmers in North Kordofan who get only 48% of consumer's price compared to farmers in the Blue Nile who reached a level of 93% of export prices (F.O.B.). In another note, except for Gedaref, (Fig. 3.8), the sesame exports prices (SDG/ton) are almost equal to prices of equivalent to domestically traded oil at specific conversion rates (see conversion factors). This discourages tendency to export sesame as long as domestic market can give same price signals or even higher.

**Table 3.6: Marketing Costs and Margins for Exporting One Ton of Sesame Originating from Different States (SDG/ton)**

Particulars	States				
	Gedaref	N Kordofan	Sinnar	B Nile	W Nile
Farmer's price SDG/ton	2271	1558	2216	3005	2250
Marketing Costs SDG/ton	752	414.5	760	1597	371
Exporter's Profit margin (SDG/ton)	227	1277.5	274	-1352	629
Export Parity Price(SDG/ton)*	3250	3250	3250	3250	3250
Farm-retail Price spreads	979	1692	1034	245	1000
Producers' share (%)	69.9	47.9	68.2	92.5	69.2
Total Gross Margins (%)	30.1	52.2	31.8	7.5	30.8
Total Mark-ups (%)	43.1	108.6	46.7	8.2	44.4
% of Marketing costs to F.O.B. prices (%)	23.1	12.8	23.4	49.1	11.4

Source: 2009 marketing cost margin survey, MoA, Dept of statistics

\* F.O.B. price (SDG/ton)



**Fig. 3.8: Comparison of Sesame Exports Prices to Equivalent Domestic Oil Prices (SDG/ton)**

However, exporters still recall that the large quantities of sesame exports, which have been returned from Port Sudan due to failure in being compatible to international standards, this may automatically cause frequent ups-and-downs in its prices.

Due to the high farm gate prices for sesame in Blue Nile, exporters' profit margin (SDG/ton) were negatively affected (-1352 SDG/ton). North Kordofan has offered least farm prices and less marketing costs among other states (Table 3.6), which is reflected, consequently, on the high price spreads and the fewer farmers share in consumer or F.O.B. prices.

### *iii) Domestically Marketed Groundnuts*

Groundnuts production that peaked during the late 1990s has consistently declined thereafter due to constraints related to marketing and processing (Faki *et al* 2009). Currently, in 2009/2010, the produce reached 549 thousand metric tons (65% of oil seeds) in contrast to 942 thousand metric tons in 2008/2009 (MoA, 2010).

Faki *et al* (2009) reflected an erratic condition of groundnuts markets where signs of monopsony were apparent. They further reported that, serious losses were incurred particularly when taking groundnuts to processing.

On the marketing side, variable producers' prices were shown by different states, the minimum of which was shown in white Nile state (1125 SDG/ton) compared to Sinnar (2115 SDG/ton). However, North Kordofan and Blue Nile showed the minimum farm gate prices, which resulted in a relatively high price spreads compared to other producing states (Table 3.7). This is clear from the producer's share in Blue Nile (57%) and White Nile state (63%). The highest producer share is shown by Sinnar state as the wedge between the farm gate price and retail price is minimum compared to other states (97%). Despite this, the total gross margins for groundnuts in Blue Nile

was almost two-fold of that of in North Kordofan, because of greater price spreads in the former state as it is almost two-folds.

**Table 3.7.a: Summary of Groundnuts Price Spreads and Margins (SDG/ton) by Different States**

Particulars	States				
	Gedaref	N-Kordofan	Sinnar	Blue Nile	White Nile
Farm gate Price (SDG/ton)	1939.2	1440	2115	1302	1125
Retail Price (SDG/ton)	2259.2	1854.6	2192.2	2303	1800
Farm-retail Price spreads	320	414.6	77.2	1001	675
Producers' share (%)	85.8	77.6	96.5	56.5	62.5
Total Gross Margins (%)	14.1	22.4	3.5	43.5	37.5
Total Mark-ups (%)	16.5	28.8	3.7	76.9	60

Source: MoA, Department of Statistics, Field survey, 2009

Groundnuts price spreads and margins (SDG/ton) when processed into oils give a different view, as shown by table 3.7-b, by the five different states. The comparison is made to reflect the various price scenarios for groundnuts whether processed into oils or sold unshelled. Faki *et al* (2009) showed that, groundnuts domestic consumption (kernels and oil) accounts for the largest share of local production with most of it milled to produce cooking oils which is widely used in Sudan. However, importation of vegetable oils especially palm oil has significantly increased in recent years due to variable local supply of groundnuts and other oilseeds as well as problems encountered by the oilseeds industry (Ibid, 2009).

As shown in Table 3.7-b, the farm-to-retail price spread was found negative in Gedaref with serious losses on retailers' side, or even wholesalers along the value chain. More details shall be shown on this issue when discussing the role of marketing institutions in price formation in the upcoming sections.

**Table 3.7.b: Summary of Groundnuts Price Spreads and Margins (SDG/ton) when Processed into Oils by Different States**

Particulars	States				
	Gedaref	N-Kordofan	Sinnar	Blue Nile	White Nile
Farm gate Price (SDG/ton)	1939.2	1440	2115	1302	1125
Retail Price (SDG/ton)	1728	1728	3240	1728	1716
Farm-retail Price spreads	-211.2	288	1125	426	591
Producers' share (%)	112.2	83.3	65.3	75.3	65.6
Total Gross Margins (%)	-12.2	16.7	34.7	24.7	34.4
Total Mark-ups (%)	-10.9	20	53.2	32.7	52.5

Source: MoA, Department of Agricultural Economics, Field survey, 2009

The highest price spread is shown by Sinnar state (1125 SDG/ton) and the drastic fall in retail prices of groundnuts in Gedaref has ended up of in an exceptional producers' share that exceeds 100 percent by 12 points. There is no one reason that can justify such a dramatic fall in retail price

in Gedaref, except an excessive supply that dropped the price to this fatal level. Other than this odd situation, other states showed positive price spreads in the range of 288 SDG in N Kordofan to 1125 SDG/ton in Sinnar state. The exceptionally high retail price in Sinnar is due to the fact that a sudden rise of retail prices to match with export prices at that time. The mark up percentages, which reached 53% for Sinnar state, can support this argument.

*iv) Groundnuts and Export Parity Prices*

Sudan's exports of ground nuts accounted for 1167 and 842 thousand metric tons in 2007 and 2008, respectively with a total value of 793 and 503 million US \$ correspondingly. Such large volumes of trade suggest equivalent costs on transfer of commodity from production sites to export outlets. The various marketing services, costs and margins involved in the export of this strategic commodity are presented in Table 3.8.

From the table it is clear that, the producer's prices differ greatly among the states and the minimum prices are offered by the White Nile, may be for specific variety or cultivar. However, the marketing costs also vary for differences in transport costs and other fees and taxes as shall be seen later where appropriate. As there are differences in marketing costs among states, it would be obvious to have differences in export profit margins in the way they appear in Table 3.8. However, the total marketing costs for exporting a tone of groundnuts (as percentage of export parity price) fall in the range between 18 and 20% for Gedaref, North Kordofan, Sinnar and White Nile and 27% for Blue Nile (Table 3.8)

Comparing the export profit margins to export parity prices, exporters from White Nile found to take the biggest share (47%) compared to exporters from Blue Nile and North Kordofan and Gedaref exporters who share 30%, 34% and 24%, respectively. The share of exporters' profits to export parity pricing is minor for Sinnar exporters (11%).

**Table 3.8: Marketing Costs and Margins for Exporting One Ton of Groundnuts Originating from Different States (SDG/ton)**

Particulars	States				
	Gedaref	N Kordofan	Sinnar	B Nile	W Nile
Farmer's price SDG/ton	1685	1440	2115	1302	1125
Marketing Costs SDG/ton	608.1	541.5	548.3	798	615.4
Ex-profit margin(SDG/ton)	706.9	1018.5	336.7	900	1509.6
F.O.B. price(SDG/ton)	3000	3000	3000	3000	3250
Farm-retail Price spreads	1315	1560	885	1698	2125
Producers' share (%)	56.2	48	70.5	43.4	34.7
Total Gross Margins (%)	43.8	52	29.5	56.6	65.4
Total Mark-ups (%)	78.0	108.3	41.9	130	188.9
% of Marketing costs to F.O.B. prices (%)	20.3	18.1	18.4	26.6	18.9

Source: based on information from 2009 survey, MoA, Dept of statistics  
One Ton of Hand Picked Selected (HPS) Nuts

*c) Systems Cost Structures for Selected Cash Crops (Gum Arabic and Watermelons)*



Table 3.9 shows various cost types and margins for selected cash crops, namely gum Arabic, watermelon seeds, sunflowers and Karkaday. Despite the good world market prices for these aforementioned commodities, quantities produced (Table 3.1) are not comparable to the potentialities inherent in the Sudanese agriculture due to a number of factors stated elsewhere. Despite the small quantity of sunflowers produced (46 thousand metric ton) which constitutes 5.5%, of produced oil seeds, it showed a steady increase in production and prices over the past years reaching 5000 SDG/ton. In 2009, the price of sunflowers was almost equal to the export price of Karkaday and more than the export price of gum Arabic by one-fifth (Table 3.9).

The information in Table 3.9 showed that, the producer's share in export prices, and for all cash crops, was small compared to market actors, as for instance the exporters. The North Kordofan gum Arabic producers' share accounted for 27% of the export price while the farmer share reached 43% of export price (Table 3.9). Surprisingly, watermelon showed the least export prices (890 SDG/ton) among other cash crops and higher marketing costs (775 SDG/ton) that reached almost 89% of the producer's price leaving a wedge of 11% for exporters.

Exporters usually tend towards export of sunflowers, in contrast to other mentioned cash crops, for two main reasons. First, for high net returns which accounted for almost 80% of F.O.B prices. Second, for the less marketing costs involved, which accounted for 8% of the export parity price compared to Karkaday, which accounted for 23% (White Nile) and 42% (North Kordofan) of export prices depending on the production origin.

**Table 3.9 Summary of Selected Cash crops Price Spreads and Margins**  
**Crops by State**

Particulars	Gum Arabic N Kordofan	Gum Arabic W. Nile	Watermelons-N Kordofan	Sunflower -Sinnar	Karkaday White Nile	Karkaday- W. Nile
Farmer's price SDG/ton	1112.5	1781	890	560	1514	2226
Marketing Costs SDG/ton	1363	298	774	401	2073	1151
Ex-profit margin(SDG/ton)	1650	2046	1273.2	4110	1413	1623
F.O.B. price (SDG/ton)	4125	4125	2938	5060	5000	5000
Farm-retail Price spreads	3013	2344	2047	4500	3486	2774
Producers' share (%)	27	43	30.3	11	30	45
Total Gross Margins (%)	73	57	70	89	70	56
Total Mark-ups (%)	271	132	230	804	230	125
% of marketing costs out of F.O.B.	33	7	26	8	42	23

Figures are rounded to integer values

Source: based on information of MoA, Department of Statistics. Field survey data, 2009.

#### *d) Systems Cost Structures for Livestock*

Sheep and cattle represent the most important traded livestock both in domestic and export markets, with major emphasis on the former. Secondary information for costs and margins is obtained from various studies related to livestock (Ismail 2003, Idris 2008, and World Bank 2010) and are used to help understanding price spreads, costs and margins of livestock trade. Three distinct markets, Elobeid, Nyala and Omdurman markets are chosen for this price analysis.

Various cost types and margins for sheep and cattle from production sites to concentration markets or export areas are assessed and presented in Table 3.10. Table 3.10 shows that the producer's share in export prices, from El Obeid to Port Sudan accounted for 64% of sheep value compared to 78% when moved from Nyala to Omdurman for concentration and then transported to Port Sudan for export. Both ways, the exporters profit margins for sheep is relatively small (11%) and (7%) of the equivalent F.O.B price for the two markets, respectively. However, it can be observed that profit margins for moving sheep from Nyala to Omdurman are minor and accounts for only (0.5%). This could be understood as that, Omdurman is not a final destination for the sheep, and a second trip to Port Sudan shall be made, in which exporters recover their costs and maintain good profit margins.

The situation for cattle traders is better than sheep where traders gain almost 41% of markets prices in Omdurman. Cattle are mostly domestically traded where a large market of almost five million inhabitants in Khartoum state are demanding and are still needing more. However, it is worth to observe that, the producer's share in final market prices is less than that of sheep (48%).

**Table 3.10: Summary of Selected Livestock for Exports Price Spreads and Margins**

Particulars	Sheep-ElObeid-Port Sudan*	Sheep Omdurman-Port Sudan*	Sheep-Nyala-Omdurman*	Cattle-Nyala-Omdurman*
Producer's price SDG/animal	<b>136</b>	<b>190</b>	<b>135</b>	<b>720</b>
Marketing Costs SDG/animal	53.2	37	54	168
Traders' profit margin (SDG/animal)	23.8	18	1	612
Destination price(SDG/animal)	213	245	190	1500
Farm-retail Price spreads	77	55	55	780
Producers' share (%)	63.9	77.6	71.1	48
Total Gross Margins (%)	36.2	22.5	28.9	52
Total Mark-ups (%)	56.6	28.9	40.7	108.3
% of marketing costs out of Destination's price	25	15.1	28.5	11.2
% of exporter's profits out of destination's prices	11.2	7.4	0.5	40.8

Source: Based on information from the World Bank 2010. Study by Ahmed Abaker Mohammed Mina and Jack W. van Holst Pellekaan (forthcoming).

\* transport by trucks

### **3.3.3 The Major Costs Components Affecting the Supply Chain**

The increasing amounts of marketing services to meet modern consumers' demand for quality, hygiene and convenience have reduced farmers' share of the final retail price. This has often lead to complaints from farmers' organizations about excessive costs of marketing. In response, politicians mistakenly accuse traders of exploiting farmers and/or consumers. Measuring the costs involved in marketing –in this section- is meant to answer some of these differences of opinions.

It has been widely recognized that the farm gate price is only a fraction of the purchase price in any typical rural agricultural economy. Jayne (1994) stated that, the width of the wedge between these

prices is a function of transportation, storage and processing technology, infrastructure, policy-related factors, and institutions that coordinate exchange across space, time, and form.

The objective in measuring marketing margins and costs, by function, is to describe the structure of marketing chain (value chain), starting at the farm gate tracing the commodity through the various intermediaries until it reaches the final consumer or user. For this purpose, much focus is made to test contentious issue of ‘exploitation’ and ‘inefficiency’ on side of middle-men, intermediaries, wholesalers and retailers based on hard evidence.

The margins and the costs structure analysis is expected to help both entrepreneurs and policy makers<sup>14</sup> and help exporters to foresee their margins in the context of a changing economic environment under volatile price conditions.

The components of marketing costs and margin we deal with are simply all handling costs, transport costs, storage cost, taxes and marketing fees, physical losses equivalent in value terms, cleaning and the profit margins for the intermediaries involved in the marketing process.

### ***3.3.3.1 Transport, Handling, Storage and Other Costs***

Various transport modes and storage facilities, and consequently costs, are accessible for agricultural commodities. Two important things are to be considered for road transport trucking. First, the costs per tonne-kilometre is usually higher for shorter distances, where time spent, loading and unloading and waiting time is likely to be a high percentage of total hire time, and also for small loads where the vehicle are not being loaded to the capacity or taking consideration of the back hauling trip. The cost of handling involves labour to load and unload sacks to and from trucks and/or warehouses. Various types of storage facilities' for agricultural commodities are identified and use of each depend on commodity itself, but focus in this study is given to conventional and modern storage facilities.

- ***Sorghum as an Example of Cereals***

An illustrative example is taken for the majorly traded and consumed cereal, sorghum, to represent various marketing costs components (Fig. 3.9). The figure gives average values as percentage of overall marketing costs (by function or service) for Gedaref, Sinnar, North Kordofan, Blue Nile, Khartoum, and White Nile states. In addition, the share of marketing costs in relation to producer and consumer's prices are shown in percentage terms to allow comparability and tractability.

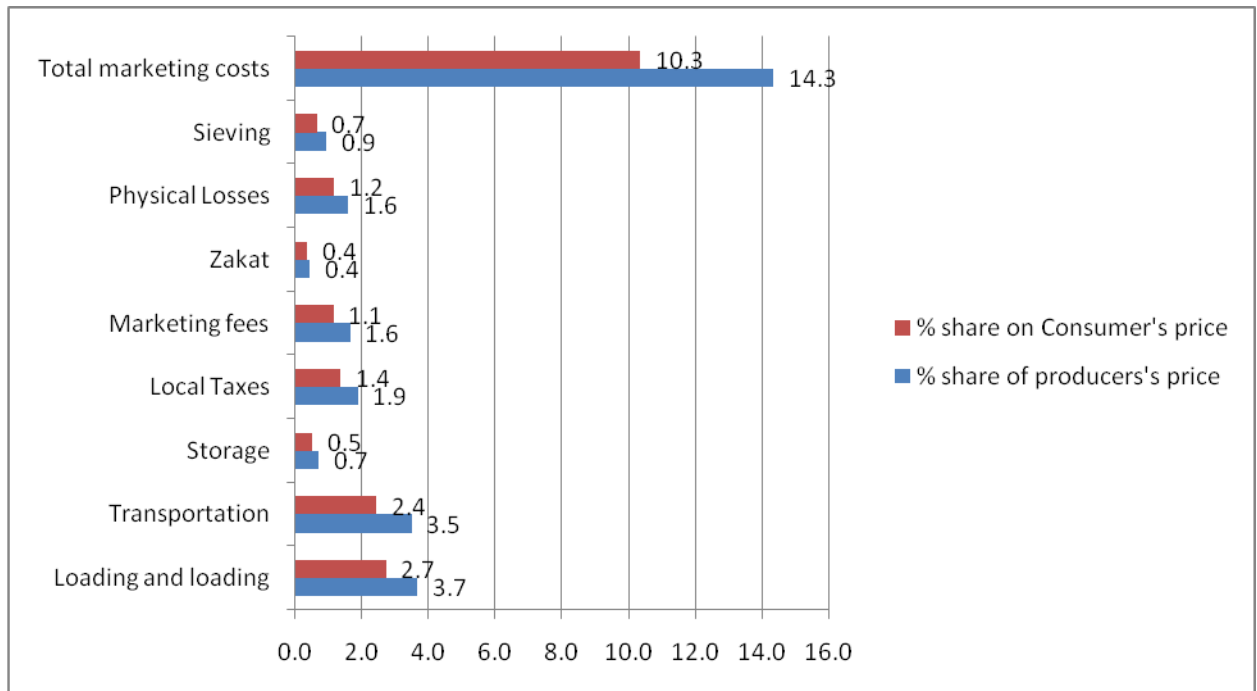
Generally, the total marketing costs involved in sorghum distribution in the country accounts for 10% and 14% of the consumer and producer's prices, respectively (Fig. 3.9). Surprisingly, sorghum loading and unloading costs exceed the costs of transportation<sup>15</sup> and constitute 2.4% and 3.5% of

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<sup>14</sup> Smeets et al (2010) cover the concept of country specific export decisions (the so-called extensive margin) and the country-specific export volume decision (intensive margin). They claim first, policy makers should recognize that “promoting exports” is as such an ambivalent policy goal. Differences between export decisions and export volume decisions require different strategies: is the goal of export promotion to stimulate firms to engage in exports or to stimulate current exporters to increase their export volumes? If the latter is the aim, should already existing trade relationships be intensified, or should new ones be established? (Ibid, 2010)

<sup>15</sup> Worth to note is that, when sorghum supplies were below average, private traders were required to acquire movement permit for varying quantities of the commodity to be transported

the consumer and producer's prices, respectively. Information shown by Fig. 3.9 has also shown local taxes next to transportation costs but fall in the range of 1.4% and 1.9% of consumer and producer prices. This substantially low figure denies the claims of high taxes on sorghum. However, marketing fees, other than taxes are almost equal to taxes in terms of share in both consumer and producer's price and figures are not worrying since they range between 1.1-1.6%. Zakat taken from traders (wholesalers or traders) is also minor (0.4%) (Fig.3.9). Traders are also eligible for other forms of Zakat not mentioned here and relate to the whole business activity performed.



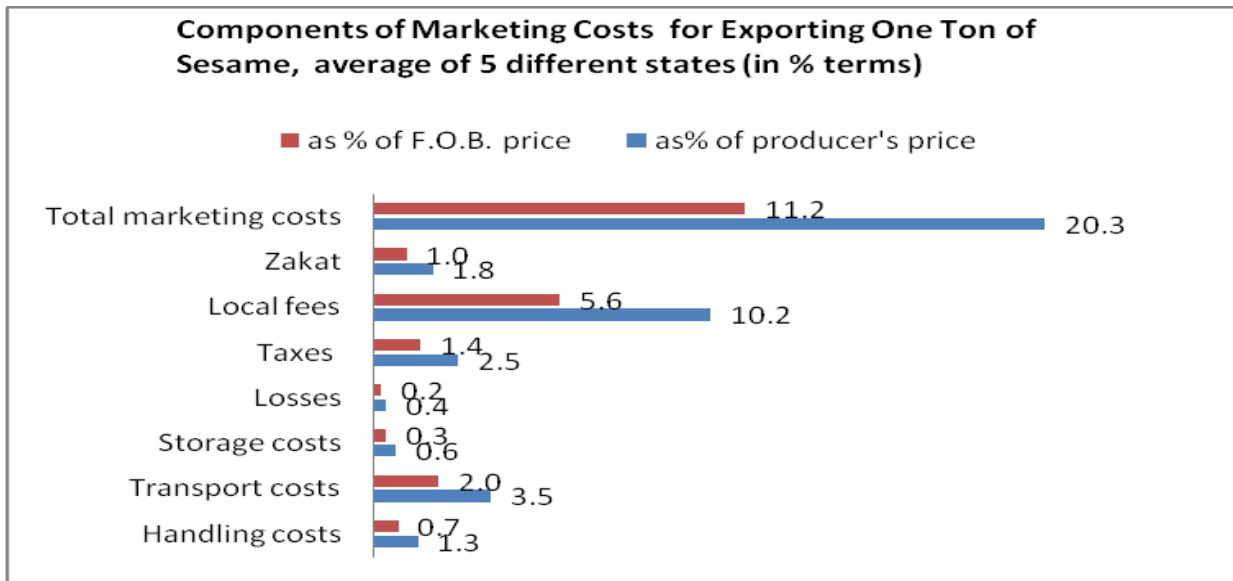
**Fig. 3.9: Percentage shares of marketing costs of sorghum as percentage of consumer's or producer's prices at local markets.**

The value of storage is minor compared to transportation costs and accounts for less than 1% of either prices. The sieving processes after storage exceeds the value of storage costs (Fig. 3.9). The quantity of loss is in the range of 1.2 - 1.6% of consumer and producer prices.

- *Sesame as an Example of Oil Seeds*

The example of cost components of oil seeds marketing is taken for sesame exports (Fig.3.10). The figure summarizes information on major items of marketing costs as percentage share of consumer and producer's prices, respectively.

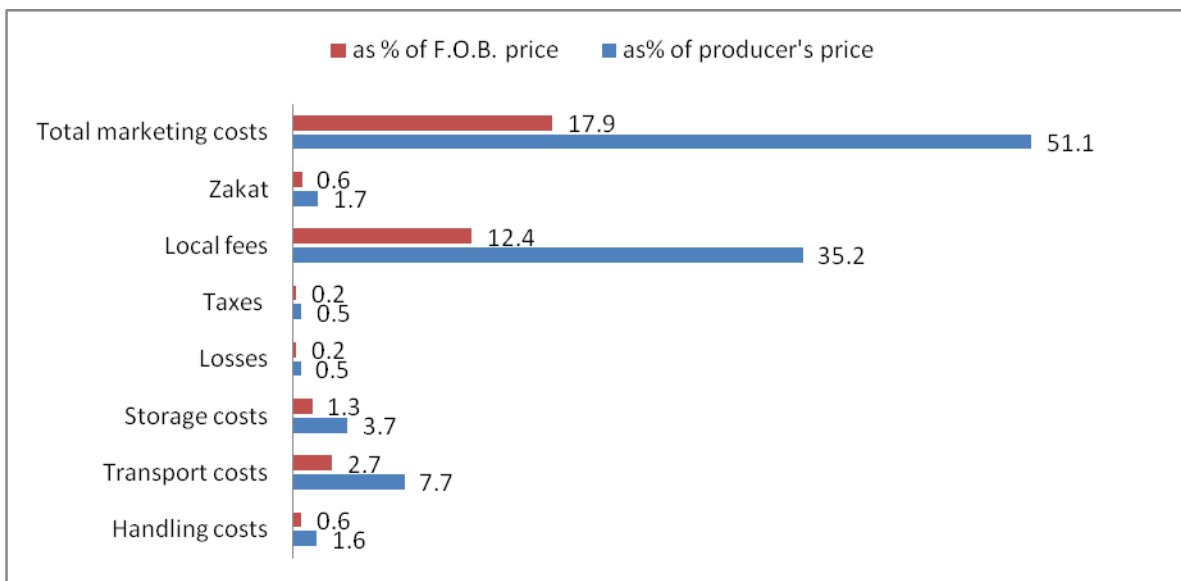
The sesame marketing costs were found to comprise about 11-20% of the export parity price and the producer's price, respectively. Local fees and taxes constituted the biggest share in marketing costs for sesame exports. Whereas export fees reached 6% to 10% of consumer and producer's prices, the taxes amounted to 1.4% to 2.5%, respectively. Storage costs and losses were minor for oil seeds and were in the range of 0.2% and 0.6% (Fig. 3.10). As the FOB prices were high, the relative value of transport costs was moderate as it was in the range of 2-3.5% of the producer's and export prices, respectively.



**Fig. 3.10: Percentage shares of marketing costs of exporting one ton of sesame oil seed as percentage of consumer's and producer's prices**

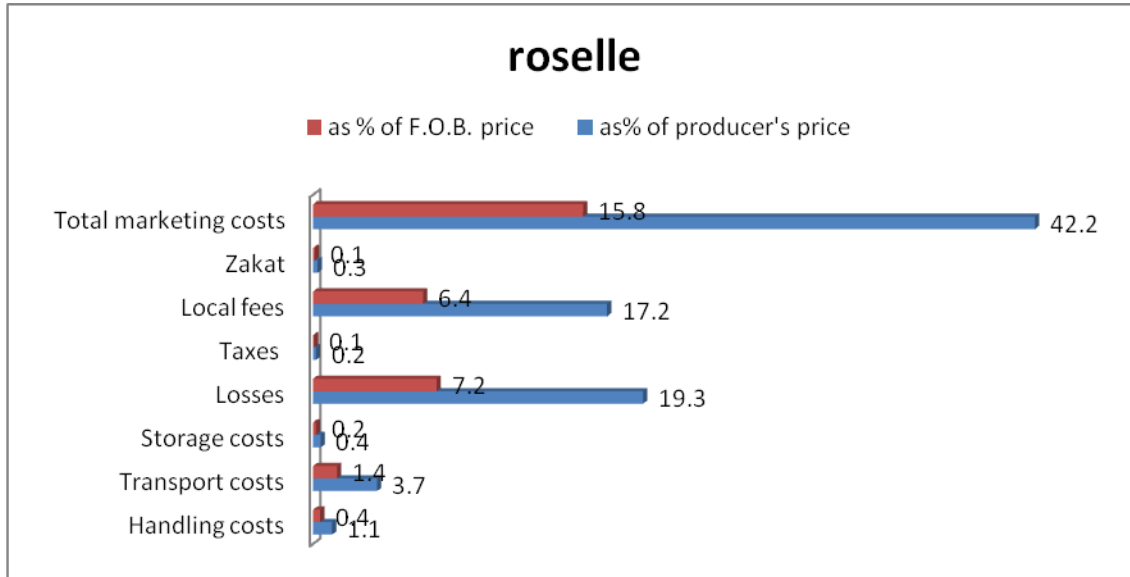
- *Gum Arabic and Karkaday as Examples of Exports*

Unlike other commodities, the marketing costs for exporting one ton of gum Arabic constitute about 51% of producers' prices and the value drops to 18% when compared to export parity prices at Port Sudan (Fig. 3.11). Local fees for Gum Arabic were double that of sesame and reached almost 35% of the producer's price. Losses and taxes for gum Arabic were negligible (0.2-0.5%), but storage costs shared almost 1.3% - 3.7% of consumer and producer's prices, respectively. Transportation of gum Arabic is also a critical component of the margin as it reached 8% of producer's price compared to 3% of export price (Fig. 3.11).



**Fig. 3.11: Percentage shares of marketing costs of exporting one tone of gum Arabic as percentage of consumers and producers prices**

On the other hand, the marketing costs for Karkaday slightly differ from that of gum Arabic in terms of distribution of cost items as percentage of export and producer's price. The situation for Karkaday was a bit different in terms of local fees and losses incurred. Losses along the trip to Port Sudan shared about 19.3% and 7.2% of producer's and F.O.B prices, respectively. Again, taxes, storage costs and Zakat for Karkaday were of minor concern (0.1-0.4%). Transportation and other related costs showed the same pattern of sesame and export crops (Fig. 3.12).



**Fig. 3.12: Percentage shares of marketing costs of exporting one tone of Karkaday (*Hibiscus sabdarifa* rosella as percentage of consumers and producers prices**

### **3.3.3.2 The Summary of Marketing Costs: Implications**

Marketing costs vary considerably among crops and across states, but remain moderately acceptable within the given market conditions, except for few cases. However, there are no significant differences between marketing costs of various marketing functions (storage, transport, and handling) among the different states/regions.

The relatively higher marketing costs of cash crops (gum Arabic, sunflowers and karkaday) is attributable to the various fees and levies at Port Sudan and across the way to the destination. Therefore, there is a need to improve the producer's share in market value of food via adoption of a set of policies that can lead to an improvement in the farmer's yield and productivity and reduces production costs.

Some of the crops that tend to have higher marketing costs and fewer returns have less comparative advantage in domestic or world markets. Some agronomic and institutional constraints need to be resolved to make commodities competitive in world market. To increase farmer's share in the retail market value of oil seeds (sesame and groundnuts), cooperative rings can help producers to bridge the period of critical harvest and price peak at the later stage. This would make revenue shares between potential wholesalers and big traders and producers at the other end.

Government tax on agricultural produce, which has never been entirely abolished (rather comes under various names other than taxes), should be institutionalized and directed only for breeding, research<sup>16</sup> and extension.

There is a great need in application of unified methodologies in assessment and computation of costs and returns. The way prices and costs are now computed requires a consensus on the technical methods as whether to use the usual arithmetic average or weighted average that involves quantities as well as prices. No meaningful conclusions can be drawn from current data if the quantity delivered at each purchase price is not known.

To reduce market costs and increase profit margins for farmers, an efficient market information system that provides information on world prices, and opportunities need to be accelerated. Although SIFSIA main task is on this front, dissemination of market information to a wider use has yet to materialize. Collaboration with ABIC (Agribusiness Investment Centre of MoA) needs to be initiated. Both institutions can conduct joint studies using comparative advantage analysis to build on decisions for competitiveness of these crops in international markets.

Additional means to improve market efficiency can be induced via bulk transport and bulk storage facilities. Most crop markets are not well equipped for marketing and trading activities such as weighing scales to large sorting and grading equipment, communication facilities, banking services as well as access to internet information within the market territory or market borders. Improvement of data quality, simple access to all market information to participants and at a reasonable cost is payable and affordable by market participants. In general, a strategic marketing policy that combines all partners and interest groups must be maintained.

### **3.3.4 Margins and Returns Analysis**

In this section, marketing margins are presented per trade participant (wholesaler, retailer and intermediaries). Averages of the main states have been considered to give insights to the magnitude and direction of changes in profits and margins. The difference between the price per unit of the commodity at the farm gate and the price per unit when sold to the final consumer (the retail price) is termed as the total gross margin or alternatively, the total price spread (Smith 1992). Only few examples are shown in this section.

#### **3.3.4.1 Margins & Returns to Farmers/Producers**

Although the data<sup>17</sup> was deficient in terms of verifying the reasons for variations in producer's prices, yet remain indicative as to the direction and magnitude of change in producers' prices.

Knowledge about production costs can tell about the margins producers can get with regard to sales. To know costs and returns incurred by farmers, a summary of results that relate to 2004 is the

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“green tax for research”<sup>16</sup>. The full framework can be developed when policy makers and trade unions primarily accept the idea.

<sup>17</sup> As was mentioned earlier, the study based its analysis of producers or farmers' prices on information collected by the DAEM survey in late 2009.

only available information (Table 3.11). The focus is on percentage shares rather than values, which were adjusted to be comparable to current prices.

**Table 3.11: Results of Production Costs SDG/unit and Average Yields/unit for selected Crops**

state	Crops	Sorghum (sacks)	Sesame (kantars)	Millet (sacks)	Groundnuts (kantars)	Gum Arabic (kantars)
Gedaref state	Production cost SD/unit	15.31	28.17	15.66	26.60	21.20
	Average Yield/sack/Fed	4	4.19	5	22.5	8
	Sale price at Gedaref primary market	27.15	134.42	36.63	40.00	20.21
	% of profit margins	77%	377%	134%	50%	-5%

\*Data of production costs was not available for Gezira and N Kordofan. Yields are shown for comparison with Gedaref

		Sorghum (sacks)	Sesame (kantars)	Millet (sacks)	Groundnuts (kantars)	Gum Arabic (kantars)
Gezira State	Average Yield/sack/Fed	8	NG	NG	19	NG
North Kordofan	Average Yield/sack/Fed	0.578	0.813	1.05	4.23	0.75
	Farmers net profits production costs to					

Source Field survey data, June-July 2004<sup>18</sup>

Productions cost in Kordofan SDG/unit are non-applicable, for reluctance and poor response towards this item; as most of the work is family labour.

\* NG: not grown

The above results show greater variations in terms of returns to farmers, which ranges between 77% of production costs on sorghum to 377% for sesame, which showed extremely high market prices at that time (2004). Conversely, gum Arabic producers were at loss where they incurred almost 5% loss added to their costs of production. Yield and productivity and for all shown crops was extremely variable. This shades light on the importance of productivity to cover farmers' costs and increase their returns, irrespective of crop type. As inferred from the table, farmers will continue to be indebted as long as production policies are not in favour of the producers. Currently many farmers were put into jail for failure in recovering their loans to banks.

### **3.3.4.2 Margins & Returns to Traders and Intermediaries**

- *Sorghum example*

Information shown on Table 3.12 reflects averages of various costs and margins incurred by assemblers, wholesalers and retailers across five states - Gedaref, Sinnar, Blue Nile, White Nile and North Kordofan. As indicated in the table, the retailers have the biggest share in net margins, which

<sup>18</sup> Production costs were converted to current Sudanese pounds (SDG) for comparison purposes. (SDG)/unit measurement. Average yields per unit area (makhamas in Kordofan and Feddan in Gedaref) are unified in terms of sacks or kantars/fed to avoid confusion.



accounted to almost 9% of the producer's prices and 7% of consumers' price. Differences in shares between assemblers and wholesalers are not much (4.8% and 5.8% of sorghum producer's price) since there was no distinction between the two, i.e. assemblers sometimes perform the role of wholesalers. The table also showed that the marketing costs by assemblers were less than that incurred by wholesalers, but remains with no much difference as it accounted only for 1% difference from producers' price.

**Table 3.12: Shares Distribution of Sorghum Marketing Costs and Margins among trade participants, Assemblers, Wholesalers and Retailers (SDG/sack) over five States**

Market Participant	Marketing Cost	Credit	Net Margin	Marketing Margin
<i>Values in SDG/sack</i>				
<i>Assembler</i>	2.4	0.0	4.3	6.7
<i>Wholesaler</i>	4.6	0.0	5.1	9.8
<i>Retailer</i>	4.3	1.3	7.8	10.8
<b>Totals</b>	<b>11.3</b>	<b>1.3</b>	<b>17.1</b>	<b>27.2</b>
<b>Shares as Percent of Producer's Price (%)</b>				
<i>Assembler</i>	2.7	0.0	4.8	7.5
<i>Wholesaler</i>	5.2	0.0	5.8	11.0
<i>Retailer</i>	4.8	1.5	8.8	12.2
<b>Totals</b>	<b>12.7</b>	<b>1.5</b>	<b>19.2</b>	<b>30.6</b>
<b>Shares as Percent of Consumer's Price (%)</b>				
<i>Assembler</i>	2.0	0.0	3.6	5.6
<i>Wholesaler</i>	3.9	0.0	4.4	8.3
<i>Retailer</i>	3.6	1.1	6.6	9.2
<b>Totals</b>	<b>9.6</b>	<b>1.1</b>	<b>14.4</b>	<b>23.1</b>

Source: Based on information from DAEM survey, 2009

Gedaref state has the biggest share in sorghum production in the country; therefore, assessment of marketing shares of various intermediaries is of particular importance (Table 3.13). Like the country aggregates of sorghum, shown on Table 3.11, sorghum in Gedaref showed the same pattern of margins distribution (Table 3.13). Assemblers have the biggest share in net margins amounting to almost 4.3% of the producer's prices and 3.6% of consumers' price. Although wholesalers share the highest marketing costs among the three partners, yet they receive less net margins compared to assemblers and retailers. Differences in net margins shares between assemblers and wholesalers were within the limit of 2% of both sorghum producer's and consumer price.

**Table 3.13: Marketing Costs and Margins (SDG/sack) by Market Participant for Procurement of Sorghum to Gedaref from Some Areas in the State, shown as a Percent of the Producer's and Consumer Price, September 2009**

Market Participant	Marketing Cost	Credit	Net Margin	Marketing margin
<b>Sudanese pound per Sack</b>				
<i>Assembler</i>	3	0	4	7
<i>Wholesaler</i>	6	0	2	8
<i>Retailer</i>	2	1	1	2
<b>Total</b>	<b>11</b>	<b>1</b>	<b>7</b>	<b>17</b>

**Shares as Percent of Producer's Price (%)**

*Price and Market-Structure Analysis for Some Selected Agricultural Commodities: Marketing Costs and Margins*

Assembler	3.3	0.0	4.3	7.6
Wholesaler	6.5	0.0	2.2	8.7
Retailer	2.2	1.1	1.1	2.2
<b>Total</b>	<b>12.0</b>	<b>1.1</b>	<b>7.6</b>	<b>18.5</b>
<b>Shares as Percent of Consumer's Price (%)</b>				
Assembler	2.7	0.0	3.6	6.4
Wholesaler	5.5	0.0	1.8	7.3
Retailer	1.8	0.9	0.9	1.8
<b>Total</b>	<b>10.0</b>	<b>0.9</b>	<b>6.4</b>	<b>15.5</b>

Source: Marketing Cost Margin Survey, 2009, MoA, DAEM.

Most of the traders assume no opportunity costs for their tied up capital, family labour or own employment. In real economic terms, subtracting these values from their net returns will let them negatively affected.

- *Example of Sesame*

Fig. 3.13 shows a summary of the marketing costs and returns (SDG/ton) to assemblers, processors, wholesalers and retailers for trading one-ton of sesame oils produced and retailed in Gedaref in September 2009. The figure shows that, the processors incurred losses in producing of oil out of sesame seed at that prevailing price at time of the survey. However, retailers enjoy the biggest share in net margins as compared to wholesalers. Despite their high marketing costs, assemblers might have same returns obtained by wholesalers (Fig. 3.13).

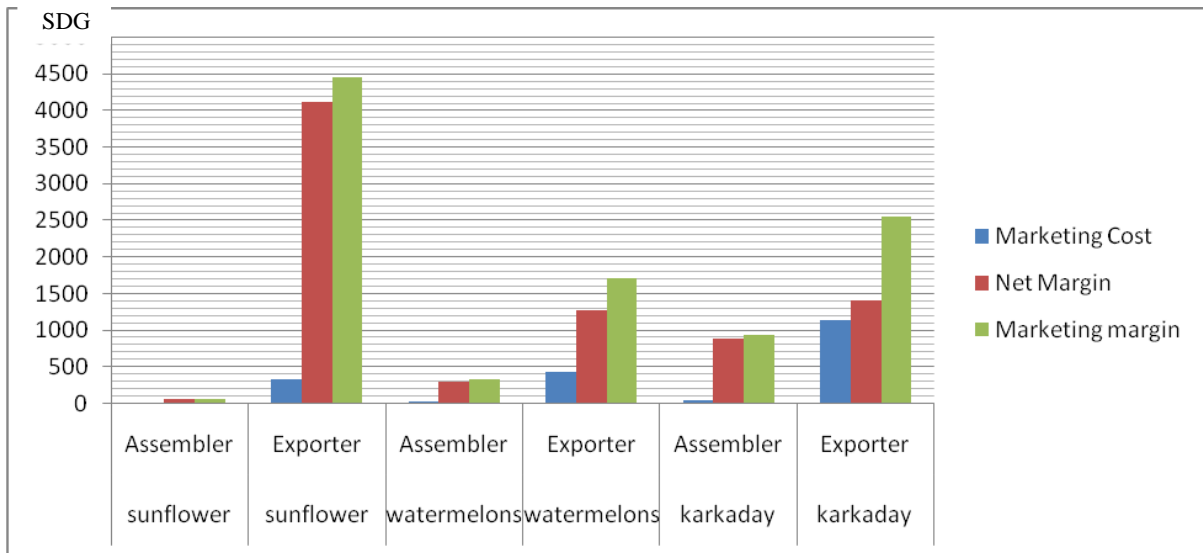


**Fig. 3.13: Summary of Marketing Costs and Returns to Intermediaries for One-Ton of Sesame Oil Produced and Retailed in Gedaref (SDG/ton)**

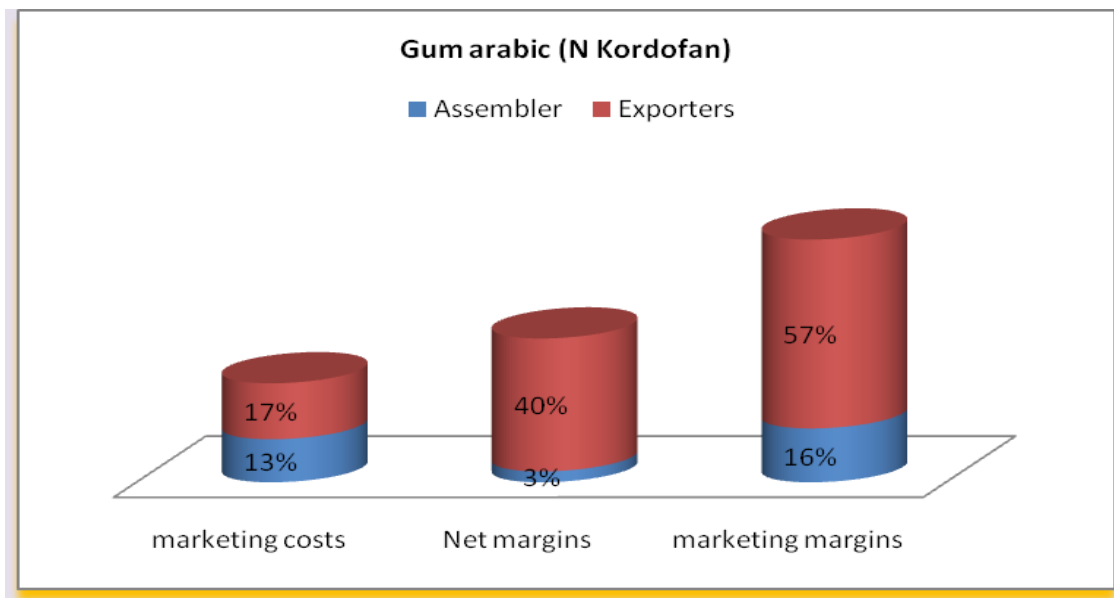
- *Examples of Cash Crops*

A summary of marketing costs and returns (SDG/ton) to intermediaries, assemblers, and exporters for exporting one ton of various cash crops from North Kordofan is presented in Fig. 3.14. The

information showed that exporters are main beneficiaries in cash crop trade (sunflowers and watermelons) compared to other market participants, particularly the assemblers whose net profits appear negligible as percent of export prices (Fig. 3.14). On the other hand, exporters of gum Arabic originating from North Kordofan share 17% of the marketing costs, 57% of marketing margins and 40% of net margins compared to assemblers who share 13%, 16% and 3%, respectively (Fig. 3.15).



**Fig. 3.14: Summary of Marketing Costs and Returns to Intermediaries for One Ton of various cash crops Exported from N Kordofan (SDG/ton)**



**Fig. 3.15: Percentage share of Marketing Costs and Returns to Intermediaries as a percent to F.O.B. prices for One Ton of Gum Arabic Exported from N Kordofan to Port Sudan**

### **3.4 Impact of Productivity on Costs and Returns**

Agriculture suffers from structural problems of high costs of production, low productivity and low and variable production caused by erratic natural and other factors with no sufficient proper policies in place to alleviate the situation (Faki et al 2009). These high costs of production, low productivity levels and the structure of taxes and levies tend to affect the final consumer prices in different ways. Faki et al (2009) have already confirmed that low productivity, high cost of production and cross-price substitution effects with other cereals are usually the main domestic factors that shape or derive the price increase of sorghum. Faki et al (2009) went further to give more evidence on the impact of productivity by examples from western Sudan, where the variable supplies and climate effects characterized the production of oilseeds. The disruption of supply in western Sudan (because of conflict which has aggravated the problem), the prevalence of small and fragmented markets that are poorly connected and stagnant, together with the declining productivity and poor organization of oilseeds market as key factors in affecting market efficiency.

Productivity enhancing technology remains the mere path to increase production<sup>19</sup> and reduce costs through modernization of traditionally based agriculture via distribution of HYV seeds of different crops, introduction of adaptable ploughing machinery, improvement of infrastructure in rain-fed areas and removal of fees and charges on commodities. Additional steps to strengthening research to raise productivity, initiation of cooperatives for small farmers, and development of mixed and organic farming through water harvesting for both crops and animals in dry areas would contribute substantially to lower production costs and increase farmers' returns.

Presuming productivity enhancement as a key factor for increasing domestic supply, reducing production costs, improving accessibility to consumers and boosting competitiveness of Sudanese products in the international market should be given equal importance in agricultural development planning.

Of the information needed, the so-called, Codex Alimentaris Standards (CAS), which are the internationally recognized benchmarks in the G & S (Grades and Standards). Important, prior to admission to WTO, is application of the ISO 9000 and HACCP (Hazards Analysis of Critical Control Points). These parameters are to be generalized to exporters to improve their profit margins through influencing the export parity price, which is usually a function of above mentioned parameters or indicators. Safety standards are now to be applied in marketing of agricultural produce to promote and develop exports.

### **3.5 Market Integrations**

This study managed to examine the pricing efficiency of selected agricultural crops/ commodities. The data was analyzed using bivariate correlation coefficients for market integration (Oladapo et al, 2007). While the bivariate price correlation showed efficient market and price communication –co

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Breeder scientists need to develop HYV with a hedonic price index that satisfies both quality characteristics and price rules. The implication of such a policy can be thought of since sorghum price vary irrespective of protein quality contents. For instance, Price of Tabat sorghum cultivar is high, with less protein content (8%) than price of Feterita, which contains almost 13% as compared to the former.

integration– between Khartoum market and other markets as El Obeid, Damazin and Gedaref for sorghum, the results were absolutely the reverse for millet markets (Table 3.14).

The result of market failure in the transport market is *market segmentation* -as opposed to market integration- when prices and market conditions are not strongly related between markets. Market segmentation is generally harmful to both producers and consumers and certainly increases the chances of localized hunger occurring. Again, and as shown in Table 3.14, the correlation between market prices showed that price changes for sorghum in Khartoum is significantly correlated with price changes in other surplus markets. Khartoum market shows sort of market segmentation with respect to ElObeid, Damazine and Gedaref markets as reflected by the poor correlation coefficients (Table 3.14).

**Table 3.14: Coefficient of Correlation of Monthly Bivariate Results between Main Wholesale Markets during the Period January 2001 through May 2010.**

Markets	Time Covered	Crops	Correl.	Sig.	(n)
ElObeid-Khartoum	Jan2001-May-2010	Sorghum	0.970	Yes	112
Gedaref-Khartoum	Jan2001-May-2010	Sorghum	0.975	Yes	112
Damazin-Khartoum	Jan-2004-May-2010	Sorghum	0.955	Yes	77
El Obeid-Khartoum	May 2009-May 2010	Millet	0.294	No	13
Damazin-Khartoum	May 2009-May 2010	Millet	0.165	No	13
Gedaref-Khartoum	May 2009-May 2010	Millet	0.196	No	13
Khartoum-ElObeid	May 2009-May 2010	Wheat	0.121	No	13
Dongla-Khartoum	May 2009-May 2010	Wheat	0.875	Yes	13
Dongla-ElObeid	May 2009-May 2010	Wheat	0.22	No	13

Source: Based on data from MoA, SIFSIA N, 2010.

For wheat market, ElObeid and Khartoum showed poor correlation indicating market segmentation. However, there exists perfect market integration for wheat between Dongla and Khartoum markets (Table 3.14). Hence, any policy change introduced in the Khartoum market may well be reflected in terms of price changes in all the surplus and deficit markets of the country over time. However, price correlations alone cannot be used as definitive indicators of market performance, and corroborative evidence is required to explain the resulting correlation characteristics.

In conclusion, improving market communication and market information systems as well as reduction in transport costs will improve marketing margins and hence price efficiency of marketers. It is suggested to have a Decision-Making Model that links between production costs and returns and the marketing costs and margins for agricultural commodities. The search should be on finding an integrated modelling approach of the ability to provide comparisons with alternate heuristic forecasting techniques and able to take into consideration the volatile nature of prices in Sudan. The idea is that, all decisions can be modelled using a simple farm model assuming that farmers act to maximize their gross margins each year, given constraints on land and water/rainfall, inputs and labour. This can be extended to include simultaneously a marketing model or sub-model that optimizes the margins of market participants, i.e. the assemblers, wholesalers and retailers at a time.

## **4. CONCLUSIONS AND RECOMMENDATIONS**

This paper provides an in-depth description and analysis of marketing costs and margins of the commodities under study. It appears that a variety of factors, as shown by the price spreads in relation to costs and margins and for the various market participants, influence markets and marketing performance. The analysis also showed that many factors that have an influence on gross margins and marketing costs relate to geographical locations (or spatial differences), policy decisions, seasonality factor and the usual inter-annual variations.

The various methodological approaches followed in this study (using structure, conduct and performance indicators) provided additional evidence of the importance of costs and margins on trade and market development. Moreover, the analyses made on costs and margins given evidence on the existence of gaps that need to be filled, particularly, on the various marketing services and related investments. The study calls for continuation on this line of research on marketing costs and margins based on an updated data. This requires improved efforts towards market data collection; and raise awareness of all market participants about the costs and margins process and their role in trade development.

In fact, many of the conclusions and recommendations of this study are not new as numerous marketing studies conducted over the last few years have revolved around the same area. However, the recent conclusions and recommendations are based on recent surveys and a thorough analysis of markets through a market conduct performance analysis.

### **4.1 General Conclusions and Recommendations**

The study has provided an in-depth analysis of marketing costs, gross and net margins and returns to various market participants and for a range of food and cash crops. The findings helped in examining the factors associated with the higher and lower end performance of market participants and offered specific recommendations for cereals pricing and trade policy.

The farm to retail price spreads were extremely variable and for different reasons. Recommendations provided will help decision makers to measure the equity aspects of the marketing system as how profits and margins are shared among the different market participants. Unlike commodity prices, which are extremely volatile, costs of marketing services- storage, transportation, taxes, etc. - are more stable due to institutional and traditional practices.

Most traders who are confined to local trade have investments with low capital requirement and minimal risks and as such cannot compete internationally with well-established trading companies. Long term contracting might be an option but even this is constrained by the high and unstable exchange rates (also Murabaha rates), high transport costs due to poor road infrastructure, lack of market information on export markets caused by underutilization of communication systems (as web sites) and uncertain government policy environment.

Improvements in necessary public services and market infrastructure are important for markets development. Improvement of feeder roads can promote agricultural marketing in remote areas.

This policy can be maintained through the encouragement of private sector investment in marketing services. As well documented, there is no accounting or bookkeeping principles across the entire country, and for farmers and traders as well, insistence to do it should be pivotal to policy makers.

### **4.1.1 General Recommendations and Policy Implications**

#### **Institutional and Information Systems**

- There is a need to develop a system of sample surveys that will take place each year and collect structural and accountancy data of farms with the aim of monitoring the prices margins, income and business activities of agribusiness activities to evaluate the impact of the yearly-enunciated agricultural policy.
- For consistency with the above, a framework that ensures data representative-ness of all types of farming, including livestock, fisheries and horticultural crops should be designed and all marketing costs and margins along the chain should be traced and assessed.
- As per a unanimous request from all trade participants, the establishment of auction markets is certainly a step towards improvement in markets performance if implemented in all markets in Sudan. This will facilitate the adoption of units' of measurements, improves the quality of the products at inlet levels, and make the entire marketing system more smooth and efficient.
- Government institutions must work towards standardization of units of measurements, which should then be implemented at the state and federal level.
- Further improvement of the information systems in crop markets to include traders concerns is required. For states in which the service is already there, it needs to be continued. The information disseminated must not be confined to prices but proper assessment of users needs is critical to tailor market information systems.
- Sustaining the timely dissemination of SIFSIA N market information can also help policy makers to monitor the evolving effects of market price changes, identify problems that require mid-course correction and to respond to impending supply fluctuations in a more timely fashion.

#### **Legislative and Legal Aspects & Conduct**

- A well-established legal framework for agricultural markets, which is currently not the case, is required to safeguard both farmers and traders and facilitate developing export markets. Proper and well functioning law enforcement would reduce transaction costs of inputs, faced by farmers and traders. Further initiation of legal and regulatory framework and quality standards that embrace legal, consumer, industry and international standards should be the way forward.
- Strengthening efficient and strong marketing institutions, where legislative aspects should be developed and effectively implemented, would help for efficient and safe warehouse systems which would help to administer movement of food commodities in and outside the country.

- Strengthen the ethics and morals of marketing channels in a multi-faceted approach that encompasses all aspects of marketing activities. In this regard, plans to combat anti-law practices and uncover farmers' misconduct (viz. "Kasir", "Rada" and "Katafali") and other cheating forms widely spread in crop markets need to be initiated through integrative extension campaigns. Seminars can accelerate the emergence of new effective laws that regulate most of the on going haphazard marketing practices in the country.

### **Domestic and World Trade Policies**

- Government should devise policies that could support the development of alternative marketing channels such as commodity exchanges and forward contracts, which could enhance exports.
- Strengthen mechanisms of specifying and enforcing farming contracts, and simultaneously help traders should create alliances for potential exports competitiveness with big and established international traders. The Government should also help by establishing proactive trading rules and procedures for developing the rules governing cash crop marketing activity.
- Prior to the admission to the WTO, both quality standards and integration of promotional plans and strategies (advertising and public relations in our consulates) are required. This requires also the improvement of domestic agricultural marketing information systems.

### **Investments and Market Infrastructure**

- A strategy that emphasizes and puts agricultural processing industry (agro-industry) at a forefront is to be maintained. Agro-processing industries like sugar refining, food canning, and sorghum flour milling; oil extraction industry are the most important areas.
- Enhance investment in feeder roads network to reduce transportation costs between the traditional surplus and deficit areas. Better and accessible roads are expected to improve, supply of inputs thus stimulating crop productivity, commodity delivery and consequently improve farmers bargaining power.

### **Farmers and Trade Unions**

- Traders and farmers need to be organized in a better way to serve and protect their interests, rather than the current structures, which are mostly serving few market participants.
- Safeguard farmers and traders interests by strengthening the local farmer organizations to sell and buy commodities on behalf of their members, thus reduce traders' transaction costs.

### **Research, Capacity Building and Training**



- Government institutions must be equipped with necessary resources, well-trained personnel to perform planning evaluation and follow up.
- The primary concern of DAEM should not be limited just to identify costs and margins, rather should go beyond to create outstanding knowledge that fills in gaps by future research work to support policy makers in their efforts to promote the development of market oriented food systems.
- Capacity building programmes in markets and price monitoring are needed in order to make the marketing information more useful and comparable. This is expected to improve data quality and computation procedures covering all markets in all states.
- Markets boards must be enriched with qualified members to design policies and improve markets and marketing activities.

#### **4.1.2 Crop-Specific Recommendations and Policy Implications**

- Cereals, particularly sorghum, are currently traded almost entirely in no auction market without engagements for other institutional marketing arrangements like forward contracts or commodity exchanges that has reasonable sustainability. Commodity exchange might exist, but confined to few cash crops. Small farmers selling relatively small quantities to traders/assemblers can benefit from the engagement of traders on the commodity exchanges through forward contracting which is expensive for individual farmers. This will open up a number of market-oriented mechanisms for reducing the risks of price and supply instability, both for food and cash crops.
- Most of the crop markets in Sudan are still deficient in necessary public services and market infrastructure. Concrete floors, paved roads in central markets in addition to shades from the sun, which also protect crops during rainy season, are essentials, particularly for crops sensitive to rains as gum Arabic and Roselle “Karkady”.
- Smuggling of gum Arabic to neighbouring markets greatly affects the domestic production – this other than affecting income earnings of the Government discourages improvement in the production and consumption of the product and hence should be abolished.
- Formal livestock markets are to be developed via improvement of market auctioning process and quality and measurement standards than the current per head transaction basis.

#### **4.2 Limitations of the Study and Further Research**

- As the study used survey data that was collected at a fixed point of time, price spreads which were expected to vary seasonally and greatly from one month to another, will not be captured systematically. However, available information allowed us to able to make partial examination of such variations, and hence identify part of the causes and not all.

- Different commodities have different prices and different relative weights of importance as far as different qualities of same type of commodity are concerned. The problem was how to put all these together in one basket to come up with practical significance, as for instance, sorghum has more than 13 cultivars, each has its own different price and quality characteristics, however, we focused only on one, Feterita as indicative to other varieties.
- In order to consider the marketing costs, gross and net margin returns at enterprise level appropriately, it is instructive to examine first farm level performance with regard to costs and margins and average them across the previous years. Unfortunately, available data was bound to marketing aspects and ignored largely farm productions costs and returns.

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## ANNEXES

### **Annex 1.1: Determining elements of market performance that affect food security and early warning Performance indicators/ attributes**

Performance indicators/ attributes	List of key research questions and probable sources of information
Price levels and stability in the short run over space	How do current food commodity prices compared with those in previous years during the same period of time? How have prices of food commodities changed in the recent past (days, weeks or months)? How do prices of food commodities vary across different markets during the same period of time?
Producer share	What proportion (share) of price that is paid by consumers gets to farmers from the sale of comparable food commodities? Information source: farmers & traders
Profits (net returns)	<ul style="list-style-type: none"> <li>• What is the profit margin from trading in a food commodity in a given area?</li> <li>• What risks do traders face when they trade in food commodities in a given area? Information source: traders, farmers, MoA, MoT, NGOs</li> </ul>
Margins and costs	What is the difference between consumer (retail) prices and farm gate prices of food commodities? To which extent do profit margins reflect transporting, marketing, processing and transaction costs? Information source: traders, farmers, MoA, MoT, NGOs
Volumes (quantities)	What is the level of supply of agricultural commodities that are entering markets from production areas? What are the food stock levels in private stores and government food reserves? What are the levels of imports and/or exports of food commodities in a given area? Various sources Traders, MOA, MOT, WFP, Food Reserves, reports, etc.
Product quality and variety	What is the quality of food commodities sold in markets? What is the nutritional level of food commodities on the market? How many varieties of food commodities are sold on the market? What is the perception of the population about the quality and varieties of food commodities on the market? Consumers, traders, MoA,
Equity (Distributional and Informational)	Is there a limit on the amount of food commodities households can buy? How is the maximum quantity that a household can buy determined? Who determines the maximum quantity a household can purchase? Source of info Consumers, traders, MOA, WFP
Access to Market Information	Do consumers and traders have access to market information including prices, quantities, grades and standards of crops and livestock products that are sold on the market? Source of information : Farmers, traders, MIS, MOA, NGOs
Adapted from FEWS NET, 2008	

### **Annex 2.1: The Description and Application of Basic Approaches in Studying Marketing**

<b>Approach</b>	<b>Description and Application</b>
Commodity	Categorizes all goods and services into some kind of a classification system and then suggests an effective distribution system for each
Functional	Studies the basic functions of marketing (buying, selling, transporting, storing, grading, financing, entrepreneurial risk taking, and issuing marketing information)
Institutional	Concentrates on the independent institutions in a marketing channel, such as retailers and wholesalers, etc
Managerial	Oriented toward a management and strategy viewpoint. Focuses on marketing manager's decision making process
Systems	Regards marketing as a functional element of the firm, which is, in turn, a subset of the business system
Societal	Views the marketing system from a macro viewpoint. It explores the various facets of the marketing-societal interface

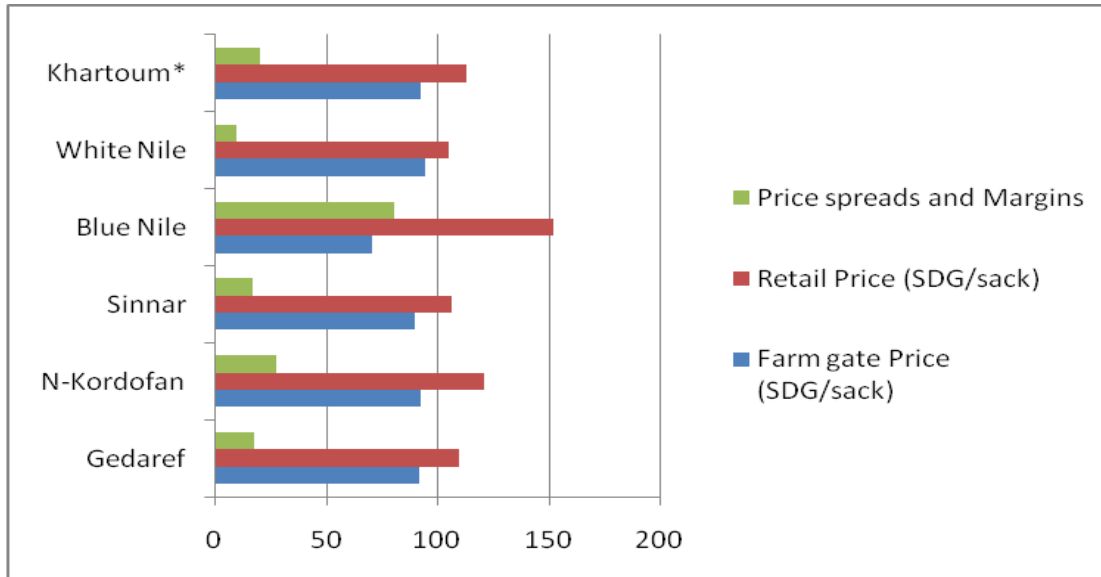
Adapted from Boone and Kurtz (1977)

### **Annex 2.2: Various Price Analysis Techniques Used in Market Assessment**

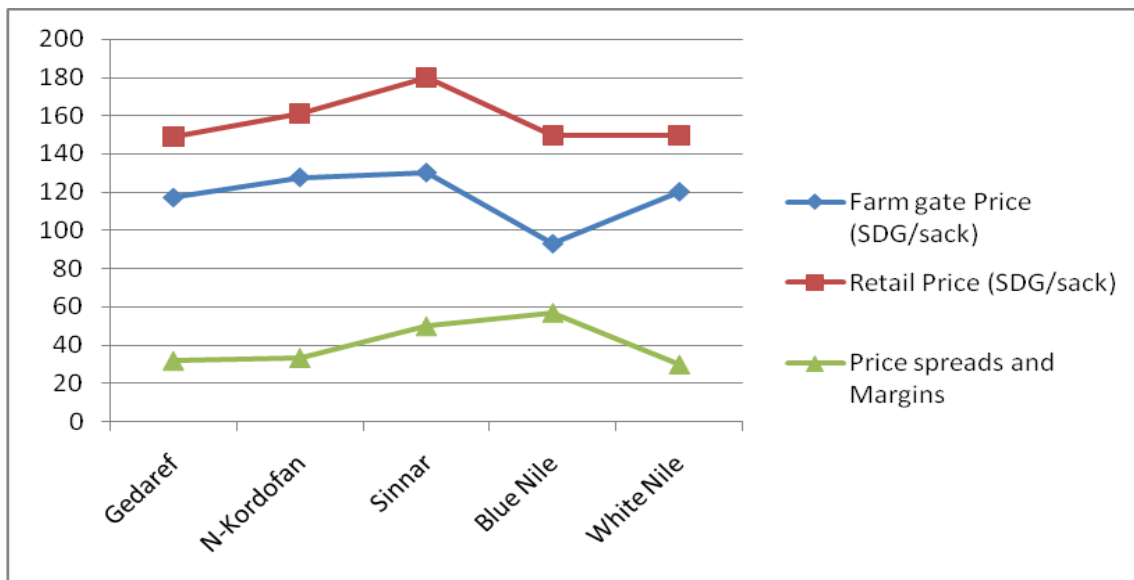
<b>Price analysis</b>	<b>Objectives</b>	<b>Data Requirements</b>
Trends in Real Prices	<i>Availability</i> - incentives to consumption- e.g. Cases or recent price trends	Producer, wholesale and retail prices and their deflators
Relative Price Relationships	Terms of Trade (tot), - <i>Access</i> case of Gedaref crop market	Sub and comp. prices and input prices
International/Domestic Price Comparisons	Comparative advantage-Cost Benefit Analysis- <i>Access</i>	IPP(Import Parity Prices and exchange rates
Seasonal Price Variation	Market integration, harvests and storability, supplies of subs, changes in government policies- <i>Shocks &amp; vulnerability</i> -E.g. Seasonality in given markets	Prices at different levels at the same place of the same kind of products
Inter-Spatial Price Variation	Correlation coefficient and grain flow- <i>sustainability</i> -E.g. Correlation coefficient of Gedaref, El Obeid or other markets.	Prices of different locations/markets
Inter-Form Price Differences	Integration over form-live animals, meat, and meat products. (joint products)	Various conversion ratios relevant to technology used
Gross Margins For Markets And Price Spread	Economic efficiency of marketing as related to availability of transportation, storage or due to lack of effective demand	Prices at different levels over time and space

Source: SIFSIA N (2010) Markets and price monitoring, Training material, 2010.



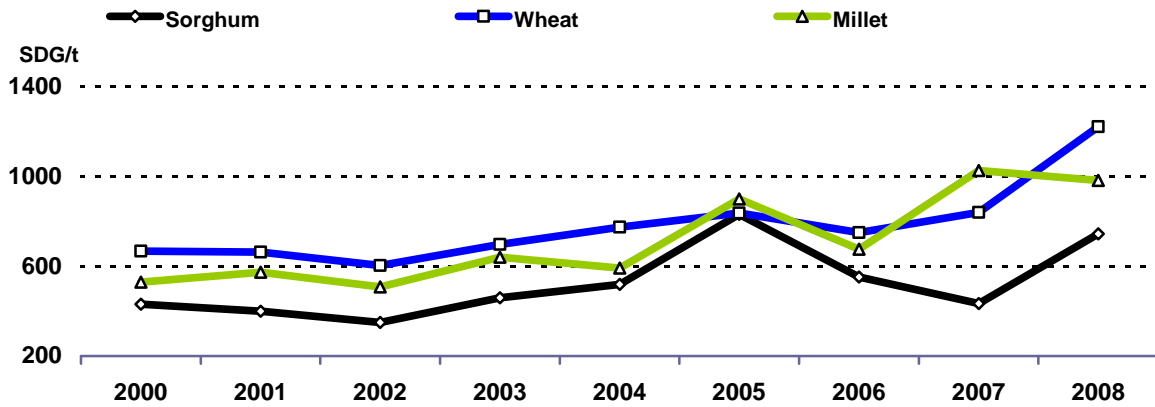


**Annex 3.1: Sorghum Producer price, Retail, and Price Spreads (SDG) by Different States**



**Annex 3.2: Millet Producers Price, Retail, and Price Spreads (SDG) by Different States**

**Annex 33: Development of average wholesale prices of main cereals in Sudan 2000-2008\***



\* Prices in 2008 are averages of the January-June period.

Sources: Price data from the Ministry of Agriculture and inflation from the Central Bureau of Statistics Borrowed from Faki, et al, 2009.