Food and Agriculture Organization
of the United Nations

POTENTIALS OF NON-WOOD FOREST PRODUCTS (NWFP) FOR

VALUE CHAIN DEVELOPMENT, VALUE ADDITION AND DEVELOPMENT OF NWFP-BASED RURAL MICROENTERPRISES IN SUDAN

CONSULTANCY REPORT

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CONSULTANCY REPORT

Tarig Elsheikh Mahmoud

Food and Agriculture Organization of the United Nations

Regional Office for the Near East

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

KHARTOUM, 2016

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FOREWORD

There is global recognition that forests are not only about trees but also about the people who live in and around them. Empirical evidence on the role of forests in food security, poverty reduction through income and employment generation, and addressing the challenges of climate change is increasingly being generated and documented. Over 1.6 billion people worldwide depend heavily on forest resources for their livelihoods, of which 1.2 billion people in developing countries use trees on farms to generate food and income.

For the Near East and North Africa (NENA) region where forest resources are scarce and the potentials for timber production are limited, non-wood forest products (NWFPs) such as fruit, bark, roots, tubers, corms, leaves, flowers, nuts, gums, sap, resins, dyes, honey, mushrooms, medicinal and aromatic plants, and wildlife animal products are becoming ever more important. Local people use these products to meet their daily needs; as a source of food, fodder and medicine, and to generate income. However, current production of NWFPs represents a small fraction of what it could actually be in most countries in the region, and its full potential for poverty reduction, livelihood improvement and environmental sustainability has yet to be harnessed to help local people in the region out of poverty and food insecurity. Although the commercialization of NWFPs in the NENA region runs deep in the region's history and has done for thousands of years, local producers still remain on the side-lines and receive a much smaller commercial margin compared to what other actors receive.

In this context the FAO, through its Regional Initiative for Small-Scale Family Farming (SSFF), supported country studies in selected NENA countries on the potential of NWFPs for value chain development and value addition to generate evidence-based data on the valorization of NWFPs in the NENA region. The aim is to support policy recommendations, strategies and actions that can increase benefit retention and poverty reduction by commercializing NWFPs at the local level and boost their contribution to the well-being of rural communities, national economies and to the sustainable development of the NENA countries overall.

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ABBREVIATIONS AND ACRONYMS

BA	Baobab
FAO	Food and Agriculture Organization of the United Nations
FNC	Forest National Corporation, Sudan
FOB	Free on Board
GA	Gum arabic
GAB	Gum Arabic Board
GAC	Gum Arabic Company
GAPA	Gum Arabic Producers Association
GDP	Gross Domestic Product
H.P.S.	Hand-Picked and Selected
IFF	Inter-Governmental Forum on Forests
IGARDS	Institute of Gum Arabic Research and Desertification Studies
IVI	Importance Value Index
KSC	Kenana Sugar Company-Sudan
NENA	Near East North African Countries
NTFP	Non-timber Forest Product
NWFP	Non-wood Forest Product
REDD	Reduced Emissions from Deforestation and Forest Degradation
RRA	Rapid Rural Appraisal
RSGAPMP	Revitalizing the Sudan Gum Arabic Production and Marketing Project
SCBS	Sudan Central Bureau of Statistics
SDG	Sudanese Pound (UN rate at November 2015: SDG 1 = USD 00.157)
SPSS	Statistical Package for Social Science
SSMO	Sudanese Standards and Metrology Organization
TA	Tamarind
ToR	Terms of Reference
UN	United Nations
UNSO	The United Nations Sudano-Sahelian Office
USD	United States Dollar
VCA	Value Chain Analysis

EXECUTIVE SUMMARY

The term non-wood forest product is generally used to mean forest products other than wood. Using this definition, the current study was undertaken to research "Potentials of NWFPs for value chain development, value addition and development of NWFP-based rural microenterprises in Sudan" to contribute comprehensively to the development of a regional project proposal on small scale rural micro-enterprises in four NENA countries; Lebanon, Morocco, Sudan and Tunisia. The study identified at least 84 types of NWFPs used for food, medicine, fodder and others. These products range from locally and traditionally-used non-commercial goods to commercial items that broaden the economic base of many states inside the country. However, the commercial development of NWFPs can place substantial pressures on the availability of a resource, food security and other socioeconomic aspects in the country.

To achieve the stated objectives, the study sites were selected from five states in Sudan, West Kordofan, North Kordofan, Blue Nile, Sinnar and Khartoum, as a geographical framework for gathering the data. The results revealed that farming was the main activity throughout the first four states, with farmers producing multi-crops and allocating their resources according to the relative farm income generated from each crop. Thus, NWFP activities are one potential alternative occupation across the different states. NWFPs are always collected during the period extending from November to March, which varies slightly from product to product. This period does not clash with the calendars for other cash and food crops in the different states, which start in April and end in October. Accordingly, the income generated from these NWFPs could be invested in food and cash crops. In general, the division of labour when collecting NWFPs is gender balanced, despite the prevalence of men in the collection of some NWFPs, which require more strength, whereas women are observed to be more active in collecting fruits. Regarding trading NWFPs, the gender distribution favoured men over women, as men were found to be very active in major trade activities. NWFP processing activities are mostly found in Khartoum and dominated by men despite the considerable contribution of women as workers in most of the processing units.

The most important NWFP products in the states studied, regarding their IVI values are those obtained from the following species*: Acacia senegal, Acacia seyal*, *Adansonia digitata, Tamarindus indica* and *Zizyphus spina-christi.*

The significant contribution of NWFPs to local communities was recognized in different forms, including for food, fodder, medicinal materials and other uses. The results showed that the majority of the NWFP collectors interviewed are middle aged or older adults who have a wealth of experience and indigenous knowledge. The findings indicated that a high percentage of NWFP collectors, followed by processors, and then traders have finished primary education.

The distribution of main occupations among those interviewed highlighted that about three quarters were agricultural producers, while the rest were middlemen, petty traders, animal raisers, producers' agents, casual labourers, tribal leaders and students. The results confirmed the significant participation of all family members in NWFP collection including men, women and children. Regarding gross income obtained by the collectors from the three top NWFPs in the states studied, gum arabic ranked first, followed by baobab and then tamarind fruit. The gum arabic, baobab and tamarind collection areas exceed 50 percent in the states studied. The NWFP collectors use traditional tools to perform their work.

Many actors are involved in controlling NWFP communal lands, including tribal leaders, the local community, landlords and the Forest National Corporation in Sudan. Concerning methods of establishing NWFPs, the results revealed that *Adansonia digitata* and *Tamarindus indica* are naturally regenerated across all of the states studied, while *Acacia senegal* is usually established via natural regeneration and to some extent through planting. Not all NWFPs have collectors' associations, other than the gum arabic producers' associations (GAPAs). The problems encountered when collecting NWFPs are the harsh conditions at the collection sites, long distances, conflicts due to the land tenure system, high taxes and fees, lack of capital, pests and diseases, overcutting, overgrazing, collection of immature fruits and outbreaks of fires.

The results show that six NWFPs obtained from *Acacia senegal, Acacia seyal*, *Adansonia digitata, Tamarindus indica* and *Zizyphus spina-christi* are commonly marketed in rural, urban and/or central markets. These markets comprise village traders, producers' agents, city merchants, and sometimes company agents. The processing activities pertinent to NWFPs across the states are found only in Khartoum.

The price mechanisms for gum arabic on the market were dependent on minimum floor price in the past. According to the current liberalization policies of the gum arabic trade, the market nature could be described as 'somewhere between' a competitive and/or oligopoly market, hence the price is determined in most cases by a few powerful buyers. The marginal analysis for the four categories of gum arabic investigated revealed that H.P.S. graded gum ranked first followed by kibbled gum, mechanical powdered gum and clean graded gum. The baobab fruit market is mostly unorganized in nature and demand fluctuates; unreliable record-keeping makes it difficult to know the quantities and prices of the commodity over time in the past. The margin obtained for the two categories of baobab fruit show that the processed product acquires a very high margin relative to that obtained for the raw product.

The overall assessment of the NWFP sector, revealed that most NWFPs (with the exception of gum arabic) in Sudan have remained underdeveloped in comparison to their huge potential because of some serious deficiencies. Shortcomings at the policy level are mainly due to reasons such as a lack of an obvious national policy for developing the NWFP sector, unfavourable environmental conditions in remote areas where NWFPs are collected, conservation and regeneration of NWFP species do not receive adequate attention from concerned entities, and poor infrastructures and services at most of the collection sites. Shortcomings at the institutional level can be attributed to a lack of a central organization to

coordinate the fragmented developmental efforts of the NWFP sector and the nonexistence of effective NWFP associations. At the market level there are problems related to some factors, such as the unorganized nature of NWFP market places, the uncertainty and seasonality of the NWFP market demand coupled with a lack of real activities (grading and processing) that could generate value addition from these NWFPs in the rural, urban and, to some extent, central markets in the country.

SUMMARY OF RECOMMENDATIONS

A set of recommendations for developing NWFPs in Sudan is summarized below based on the results obtained and discussion held:

- NWFPs should receive special consideration from the government and other actors involved throughout their value chains to commercialize and institutionalize the sector.
- The production and consumption of different types of NWFPs should be surveyed in order to link their supply and demand to the forest stock and forest growth within the National Forest Inventory (NFI).
- A resource base should be developed of forest species bearing important NWFPs, such as *Acacia senegal, Acacia seyal*, *Adansonia digitata*, *Tamarindus indica, Balanites aegyptiaca* and *Ziziphus spina-christi*. This should also include endangered nature species such as *Borassus aethiopum* and *Hyphaene thebaica*.
- Resolve land tenure and land use system conflicts by establishing regulations based on win-win arrangements to be agreed upon between tribal leaders, landlords, peasants and NWFP collectors, pastoralists, local communities and government authorities.
- Raise awareness of the socio-economic importance of commercializing NWFPs across the country.
- Improve infrastructure and services at NWFP collection sites and the rural and urban markets. This includes improving water services as well as storage and transportation facilities.
- Encourage intermediate technology developers to design and manufacture suitable tools for collecting NWFPs.
- Start up NWFP microenterprises based on the activation, mobilization, market-orientation and expansion of existing GAPAs (exclusively dealing with gum arabic) to include other NWFP stakeholders through the following mechanisms:
    - Establish smart partnerships between proposed NWFP associations and the private sector on the basis of benefit sharing or power sharing. This could be implemented as part of the recent *Five Year Economic Stability Programme* in Sudan.
    - Capacity building programmes on NWFP pre and post-harvest cultural practices, recommended scientifically for maximizing the quality of the product and minimizing total losses (storage conditions, packing, loading and offloading, group transportation, displaying the commodity at markets, marketing advertisement and promotion).

  - Special training in some marketing activities that maximize value addition through grading and processing of NWFPs.
  - Facilitate NWFP microenterprise access to credit by providing collateral for institutional finance with greater emphasis on microfinance mechanisms.
  - Provide adequate marketing facilities and pricing policy to encourage NWFP microenterprises to produce and market their products efficiently.

- Markets should be pushed towards more realistic and competitive transactions in the sense that the prices of NWFPs should be determined by market forces (supply and demand). The NWFP value chains are always seen to be buyer-driven, led by big traders and processing companies in the downstream end of the value chains. This could be done by improving the bargaining power of NWFP collectors by encouraging NWFP associations to play an active role in price setting. Through this mechanism, the role of middlemen and externalities in price setting could be minimized.
- Endorse processing activities across all NWFP areas to acquire more value added in and to improve income for all actors via field exchange visits and learning by actors from different states.
- Managing market information system should be considered as a real asset. Experience requires duly recorded data related to the activity in gum arabic and baobab fruit as well as other potential NWFPs, especially on volumes and prices
- Certifying some key NWFPs offers a way of improving market access, capturing a greater share of benefits at local and community levels, and promoting wider conservation objectives.

CHAPTER 1

Introduction

1.1 Background

Sudan is located between latitudes 8° and 22° north and longitudes 22° and 38° east in the north-eastern part of Africa. The referendum of Sudan took place on January 2011 (Figure 1), and accordingly the country retained an area of 1 886 000 km² and some 50 percent of the forest and woodlands. It borders seven countries, namely Egypt, Libya, Chad, Central Africa Republic, Republic of South Sudan, Ethiopia, Eritrea and the Kingdom of Saudi Arabia across the Red Sea (Figure 2). The country has been divided to 18 states. Each of which has a legislative body and a state government. Lower levels of government exist in each state. These states are: Northern, River Nile, Khartoum, White Nile, Blue Nile, Sinnar, Gezira, North Kordofan, West Kordofan, South Kordofan, North Darfur, West Darfur, South Darfur, East Darfur, Central Darfur, Gedaref, Kassala and Red Sea.

Figure 1. **Sudan pre-referendum 2011**

Source: Adapted from Abdelnour (2011)

Figure 2. **Sudan post referendum 2011**

Source: Adapted from USAID (2012)

The Sudan Central Bureau of Statistics estimated the population of Sudan as 39 million, growing at the rate of 2.7 percent, with more than 30 million people living in rural areas (SCBS, 2011). Over 80 percent of Sudan's employment takes place in the agricultural sub-sector of the economy, the majority of the population are farmers and pastoralists living on subsistence farming and livestock herding in a nomadic way of life. Sudan is rich in both underground and surface natural resources that have remained mostly under developed because of political and economic constraints. The country's important natural resources include forests, wildlife, water, pasture and rangelands, coastal and marine resources, and arable lands. Sudan is endowed with petroleum and a range of metallic and non-metallic minerals, including gold, silver, copper, iron ore, manganese, zinc, gypsum, salt, marble and granite. Recently, the contribution of gold to national export portfolio in country is flourishing. Gross Domestic Product (GDP) in Sudan was worth USD73.82 billion in 2014 as reported by the World Bank (2014). This GDP of Sudan represents 0.12 percent of the world economy. It averaged USD16.87 billion from 1960 until 2014, reaching an all-time high of USD73.82 billion in 2014 and a record low of USD1.13 billion in 1960. Agriculture (including livestock, crops and forests sectors) was responsible for 26 percent of GDP, and industry and services 34 and 40 percent, respectively.

1.2 Terms of reference (ToR)

Under the overall supervision of the FAO Representative in Sudan, in close coordination with the TCIA LTU Focal Point/ Senior Adviser (Consultant), the TCI Investment Officer SNE Office/Project Lead Technical Officer (LTO) and the National Senior Policy and Programming Consultant, the National Project Coordinator (NPC) was appointed to launch a consulting report on "**Potentials of NWFPs for value chain development, value addition and development of NWFP-based rural microenterprises in Sudan**" to contribute comprehensively to the development of a regional project proposal on small scale rural micro-enterprises based on selected non-wood forest products (NWFPs) in four NENA countries; Lebanon, Morocco, Sudan and Tunisia. A National Consultant was nominated to deliver the following outputs:

- A complete value chain analysis for selected NWFPs in Sudan.
- Information and findings on production potentials of the selected NWFPs in the country.
- Information and findings on NWFP domestic market structure, behaviour and performance, main barriers to trade and investments.
- Recommendations on NWFPs with respect to improving production and quality, infrastructure and services, producers' capacities, market performance, removing key barriers, reducing costs, enhancing standards and grades, and improving economic benefits.
- Propose tools for enhancing value addition in the NWFPs and strengthening the role and involvement of forest users and rural communities in the sustainable management of the forest resources. Recommendations were also requested on key policy and legislative reforms necessary to maximize economic gains and improve the income of small producers and forest users in rural areas.

- Finally, the National Consultant was appointed to present the study findings and recommendations in a workshop format and to discuss them with major actors in NWFP chains in the country.

1.3 Study objectives

The overall objective of this study is to collect and analyse information on the potential of Sudanese NWFPs to develop the value chain, value addition and NWFP-based rural microenterprises. This was planned mainly because most of the people dependent on the forest, men and women, and local rural communities living close to the forests, are among the poorest sectors of society. They use NWFPs on a daily basis as a source of food, fodder, shelter, medicine and for income generation. To fulfil this objective, the following tasks were formulated to be performed by this study:

1. Identify and gather information on the most potential NWFPs in Sudan that are widely produced, used and traded nationally, and are considered promising for export.
2. Distinguish the existing NWFPs in the country.
3. Depict the history of the country's involvement in some selected NWFPs regarding resource ownership, production techniques and potentialities, trade involvement and opportunities, and key actors.
4. Indicate the methods, stages and key actors dealing with the traded NWFPs and their value addition.
5. Describe the value chain of NWFPs: market types, infrastructure, services, regulations, administrative setups, market forces (supply and demand), market channels, pricing mechanisms, fees and commissions, quality and standards, processing, physical losses, advertising and publicity, etc.
6. Explain the value chain of the three selected potential NWFPs with respect to:
   - Production and handling, collection, grading, cleaning, packing, transport, processing and export-related activities.
   - The vertical commodity system of NWFPs (flow of commodity from production though local marketing and processing to exports or local consumption;
   - Taxes and fees applied to the product from production to the end use;
   - Public and private sector roles in delivery of the products and marketing services (seedlings, extension, research, quality control, market information, if any);
   - Investment and finance system for small-scale producers, traders and processors (if any);
   - Impact of other factors on transaction costs along the value chain (labour, regulations, infrastructure, etc.).

1.4 Theoretical framework

The term non-wood forest product (NWFP) is a relatively new term used generally to mean forest products other than wood. From a legal point of view, forest products are defined in some countries as all those products found in or brought from a forest; and forest is any land classified as such under law. Under this definition, forest products other than wood would include soil, sand, stones, and also water in some cases (FAO, 1995).

The empirical context of this study could be derived from several theoretical frameworks that comprehensively contribute to better understanding the production potentials and commercialization of NWFPs and their impact on rural livelihood and economic development. The core of these frameworks depends heavily on the Value Chain theory, including value added, and other related concepts, which discuss the perspective of contribution of NWFPs to rural development. The term 'Value Chain' was used for the first time by Michael Porter (1985) in his book "Competitive Advantage: Creating and Sustaining Superior Performance". The value chain analysis describes the activities within and around an organization, and relates them to an analysis of the competitive strength of the organization. Therefore, it evaluates which value each particular activity adds to the organization's products or services. This idea was built upon the insight that an organization is more than a random compilation of machinery, equipment, people and money. Only when these things are arranged into systems and systematic activities is it possible to produce something for which customers are willing to pay.

1.5 Scope of the study

The study starts at a macro level highlighting the historical background of the country's involvement in the NWFPs and their contribution to rural livelihoods based on an analysis of secondary data obtained from different sources. Then, main focus and consideration are given to small-scale NWFP perspectives of rural development contributions. It qualitatively discusses the implications and likely effects of increased commercialization on the sustainable management of the NWFPs in question across the diverse socioeconomic and environmental contexts.

1.6 Methodological aspects

1.6.1 Methods of data collection

First a **checklist** (Annex 1) was developed based on the detailed objectives specified by the study ToR to achieve the mission's findings. The checklist used encompassed a number of specific lines of enquiry that were undertaken by the National Consultant according to the recommended data collection methods. Afterwards, primary and secondary data were collected using different methods including key informant interviews, semi-structured interviews, personal observations with the aid of digital devices (e.g. camera) and a literature search.

1.6.1.1 Key informant interview method

The RRA approach was used for conducting key informant interviews due to the short time allotted for the National Consultant to obtain the results (42 working days), and to reduce costs that are always incurred when formal surveys (e.g. case studies) are being done and to increase levels of data reliability due to non-sampling errors. Because it is a bridge between formal surveys and unstructured research methods, RRA with a focus on group discussions, interviews, free listing and key informants techniques were applied. The key informants consulted were tribal and village leaders (*sheikhs*), traders, processors, FNC staff, government officers, NWFP association leaders and customers. The study interviewed 45 key informants to obtain qualitative and quantitative information regarding the diversity of NWFP species and their main products and uses (multiple uses were categories within the four main uses). The investigation also looked at demographic features of the respondents, different land use types, land tenure systems, production and productivities of existing NWFPs, market structures, existing actors, nature of markets, taxes and fees, quality measures, quantities, prices and suggestions for the future. Detailed questions were provided within the key informant interviewing sheet (Annex 2 A). The key informants were, to a great extent, gender balanced (24 males, 21 female), selected from nine sites in the five states. These sites were Elobeid, Errahad, Elkhewei, Enuhud, Abuzabad, Damazin, Rosaries, Sinja and Khartoum. The respondents provided the information using the local names for species, which were then matched with the literature to identify the scientific names.

1.6.1.2 Structured questionnaire method

Based on the research tools provided by the project consultant, a sample size of 185 respondents was studied using structured questionnaires. The study used a stratified purposive sampling technique to study the three main categories of NWFP actors (73 collectors, 78 traders and 34 processors), due to their willingness to respond to most of the questions. One of the major benefits of stratified purposive sampling is that it justifies the National Consultant making generalisations from the sample being studied, whether such generalisations are theoretical, analytic and/or logical in nature. The three strata differ significantly as regards their role, function, income and geographical location. The first questionnaire, designed for NWFP collectors, comprised 53 different questions covering socio-demographic information on respondents, income sources, gender involvement in collection, existing NWFP species, land use practices, prevailing tenure systems, harvesting practices, NWFP associations, NWFP costs and revenues, marketing and processing activities, problems encountered, and ideas for developing the NWFP industry (Annex 2 B). The second questionnaire, structured for traders, encompassed 34 various questions covering different aspects of NWFP marketing activities (Annex 2 C). The third questionnaire was administered to NWFP processors and covered different topics related to processing and marketing activities (Annex 2 D).

Due to the large sample size and the scope of the questions, the National Consultant was assisted by four researchers from the IGARS and KSC. A detailed timeline for preparing and implementing the field and market surveys is attached at the end of this study (Annex 3).

1.6.1.3 Literature review method

The literature was gathered from different sources and studies. A large range of literature was reviewed for possible new information about NWFPs. In this context, different types of existing NWFPs in Sudan were covered with full identification and nomenclature. It also highlights geographical distribution and coverage of NWFPs in the country with more emphasis on the ecological zones, habitat, climatic conditions, existence in pure stand or mixed, population stability/vitality, pests and diseases, and natural regeneration. The literature review also looked at qualitative and quantitative records and reports on the NWFPs. These were obtained from FNC federal and state authorities, Bank of Sudan foreign trade statistics, information units at the Elobeid, Enuhud and Damazin crop markets, and customs administration at the state levels. Moreover, the data explored the exported quantities and values for raw or processed NWFPs.

1.6.2 Analytical framework

Descriptive statistics were used to describe the basic features of the primary and secondary data that were used for the different data gathering methods (key informant interviews, structured questionnaires and some variables derived from the reviewed literature). SPSS program version 18 was applied for data entry, processing and analysis. About 137 variables were coded within the SPSS variable view sheet for the collector questionnaire versus 33 and 49 different variables for traders and processors, respectively. About 67 percent of the variables in the three categories were nominal measures, 26 percent were scale and 7 percent were ordinal measures. The study used the descriptive statistics options. The variables concerned with costs and revenues obtained for the different activities were moved to excel sheets to calculate partial budgets. The analysis provides simple summaries about the sample and the measures needed for the study outputs. Together with a simple graphics analysis, the National Consultant was able to explain the raw variables that articulated quantitative and qualitative datasets in a manageable form. Part of the final results was described in the results section while others were attached as annexes.

The data collected on NWFP species were entered into an excel sheet. Information on the species, names, parts, uses was included. The importance value index (IVI) method was applied (according to Balal *et al.*, 2014) to reflect the cultural significance of species and use category. The importance value was calculated as IVI= ni/N where IVI is importance value index for a species (or use category), ni = number of informants who consider that species (or use category) most important and N = total number of informants. The total IVI for the NWFPs was calculated by adding up the IVIs of each studied species for the different NWFPs being studied, and then they were ranked.

1.6.3 Criteria for selection of NWFPs study sites

The study sites were selected from five states (Figure 3) as a geographical framework for gathering the data. Accordingly, the field and market surveys were conducted in some rural, urban and central sites from the states: Elobeid and Errahad in North Kordofan State; Eldowdia, Elkhewei, Ennhud, Talib, Umdarota and Abuzabad in West Kordofan State; Damazin, Rosaires and Ganees in Blue Nile State, Sinja and Sinnar in Sinnar State; and Khartoum,

Khartoum North and Omdurman in Khartoum State. The selected sites were described and analysed institutionally and functionally to achieve the tasks agreed to within the ToR. The study area was selected based on some institutional and economic arguments concerning the NWFPs in the country, as stated below:

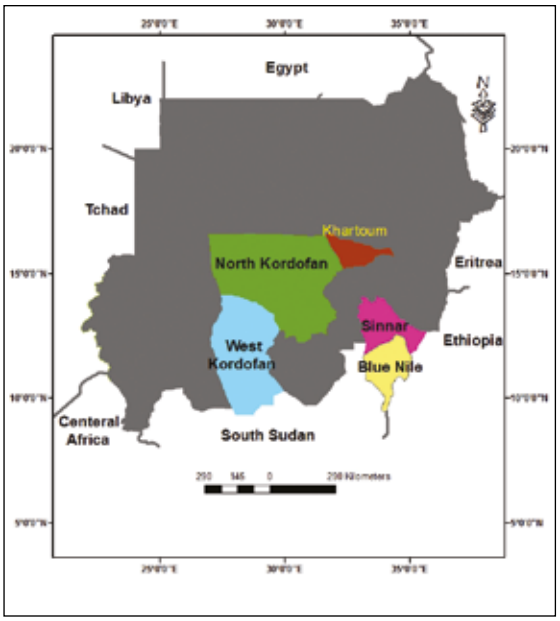
- Some of the selected states represent potential sources of NWFPs in the country. For example North and West Kordofan supply more than 50 percent of Acacia senegal gum arabic volume in the country, whereas Enuhud, Elkhewei, Abuzabad and Errahad are the main sources (Taha, 1999; Mahmoud *et al.*, 2014). Similarly, Blue Nile and Sinnar (e.g. Damazin, Roseries, Boot, Wad Abouk, Sinja, and Sinnar) are important production centres of commercial *Acacia seyal* and *Acacia polyacantha* (IFAD/WB, 2012). Therefore, the findings from this study could successfully be expanded and scaled up for reviving most of the NWFP-producing areas in the country.
- Some of these states constitute the core of NWFP trade supply from peripheral rural and urban markets and represent efficient domestic and promising export markets in the country (North Kordofan and Khartoum) (Awoda, 1999; Mahmoud, 2004; Mahmoud *et al.*, 2014)
- Prevalence of a large number of NWFP actors in these states (IFAD/WB, 2012).
- Existence of relatively well-established administrative and helpful marketing units in most of these states, which offer time series data on quantities and prices of some NWFPs.
- Moreover, a description of diverse contexts shaping resource conditions as well as the production and market systems of NWFPs requires important criteria for such selection. The selected sites represent gradients of resource access and management, production systems, and the level of commercialization.
- Furthermore, logistic issues such as location accessibility, timeframe and security status were considered as additional criteria for the selecting study sites.

1.6.4 Study area

1.6.4.1 North Kordofan State

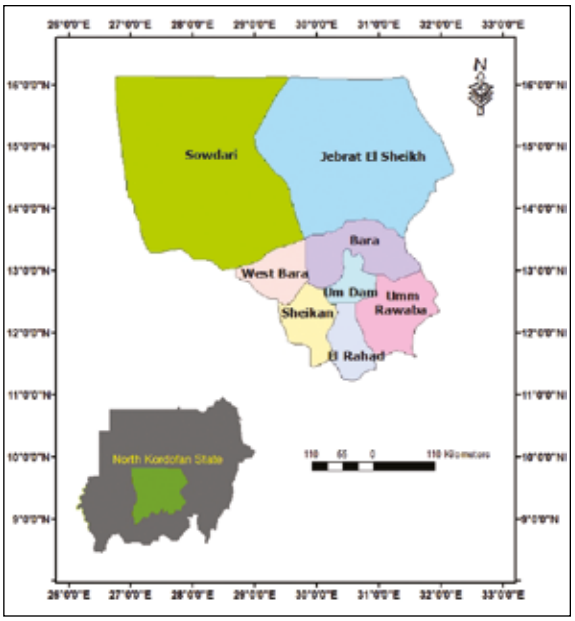
North Kordofan state situated at the centre of the gum belt area of Sudan. The state lies between latitudes 12° 15′ and 16° 32′ North and longitudes 27° and 32° East (Figure 4). The region is situated within the Gum belt strip dominated by sandy soil. The state consists of eight localities: *Sheikan*, *Elrahad*, *Um Rawaba*, *Bara*, *West Bara*, *Um Dam*, *Sodari* and *Gabra*. The climate of the study area is tropical with a seasonal and short rainy season (250-400mm). The average minimum and maximum temperature ranges from 20 - 30 °C (Mahmoud *et al.*, 2014). The soil is classified into four main types: '*goz*' soil, '*gardud*' soil, alluvial flood plain, and fluvial. The '*goz*' soil is the natural home for *Acacia senegal*. North Kordofan State was selected for this study mainly for two reasons. First, the state is internationally known for its quality and volume of gum Arabic production. More than 40 percent of the gum Arabic exported from Sudan is sourced from North Kordofan State (Awouda, 1999). The establishment of GAPAs was also initiated in this region and expanded to other regions (Ramly, 2006).

Figure 3. **The states selected for the study in Sudan**



Source: Adapted from World Map (2015)

Figure 4. **Location of North Kordofan State**



Source: Adapted from NK-SMG (2012)

1.6.4.2 West Kordofan State

West Kordofan (Figure 3) is located in the western part of Sudan. It borders North Kordofan to the north, North Darfur to the northwest, South Darfur to the west, and South Kordofan to the south. The average annual rainfall is about 400 mm per annum. The predominant soil is a stabilized sandy soil, with a limited area of a sandy pediplain (*gardud*). Rural farmers make up the majority of the population. The main forms of livelihood in the study area include traditional crop farming, village-based livestock raising and income from labour migration to agricultural areas and urban centres. Three towns were selected as a sampling frame (Enuhud, Elkhewei and Abuzabad) along with some rural villages (Eldowdia, Talib and Umdarota) for their high potentials of NWFPs.

1.6.4.3 Sinnar State

Sinnar (Figure 3) lies between latitudes 11° 45′ North and 14° 03′ North and longitudes 32° 28′ East and 35° 43′ East. The State covers 4 076 million hectares. It is situated in central Sudan and shares borders with Gezira to the north, Blue Nile to the south and east, Gedaref and Ethiopia to the east and the White Nile to the west. The capital of Sinnar is Sinja. The location of Sinnar opens the doors for the movement of forest products between these states and others. Sinnar has many types of forest sites (*Gerf*, *Maya*, *Dahara* and *Karab*), which yield a wide variety of forest products. Based on geographical, ecological and ethnic variables, the area is divided into seven towns (Daly and Mazmom, Sinnar, Eastern Sinnar, Sinja, Elsoki, Abu hojar and Eldinder). Sinja and Sinnar represent the study area. The total population of the state is 1 285 058 inhabitants with an annual growth rate of 3.68 percent (SCBS, 2011).

Most of the population is concentrated in large towns along the banks of the Blue Nile and Dinder rivers, while others are concentrated in agricultural production areas of the state and areas of mechanized farming. The forest resources in the state were administratively divided into five forest circles consisting of riparian and dry land forests, both natural and plantation.

1.6.4.4 Blue Nile State

Blue Nile is located between longitudes 33° and 35° and latitudes 10° and 3° in the southeast part of the country (Figure 3) and borders Ethiopia to the east and southeast, Sinnar to the north and northeast and Upper Nile to the south and southwest. The Blue Nile runs through the state from far south to far north. The state covers 38 500 km^2 and the population is 832 311 according to the 2008 census. The state depends mainly on agriculture and the area suitable for cultivation is 2.5 million *feddans*. The state is endowed with huge natural resources in terms of agricultural, livestock and forest potentials and offers attractive investment opportunities. The state is composed of six towns; Damazin, Rosaries, Bao, Giesan, Kurmok and Tadamon.

1.6.4.5 Khartoum State

Khartoum is one of Sudan's 18 states. Although it is the smallest state by area (22 142 km^2), it is the most populated (5 274 321 according to the 2008 census). It contains the country's largest city by population, Omdurman, and the city of Khartoum, which is the capital of the state as well as the national capital of Sudan. The state comprises three towns; Khartoum, Khartoum North and Omdurman. The capital city Khartoum is home to government offices, governmental and non-governmental organizations, cultural institutions and the main airport. The city is located in the heart of Sudan at the confluence of the White Nile and the Blue Nile, where the two rivers unite to form the River Nile. The northern region of the state is mostly desert because it receives very little rainfall, whereas the other regions have semi-desert climates. The weather is rainy in the summer, and cold and dry in the winter. Average rainfall reaches 100–200 mm in the north-eastern areas and 200–300 mm in the north-western areas. The temperature in summer rises to 40°C and drops to 15°C in winter. Most of the NWFP processing activities in Sudan are concentrated in Omdurman around the Omdurman Popular market which is called *Sooq Sha'abi*.

CHAPTER 2

Literature review

2.1 Demography of the Sudan

The Sudan Central Bureau of Statistics, 2011 estimates the population of Sudan as 39 million, growing at 2.7 percent, with more than 30 million people living in rural areas. Over 80 percent of Sudan's employment takes place in the agricultural sub-sector of the economy, the majority of the population are farmers and pastoralists living on subsistence farming and livestock herding in a nomadic way of life.

In 2011, the Sudan Central Bureau of Statistics estimated the population of Sudan to be 39 million, growing at 2.7 percent, with over 30 million people living in rural areas. Over 80 percent of employment in Sudan is based in the agricultural sub-sector, the majority of the populations are farmers and pastoralists living on subsistence farming and nomadic livestock herding.

Sudan is rich in both underground and surface natural resources that have remained mostly underdeveloped because of political and economic constraints. Sudan is the 120th largest export economy in the world and the 113th most complex economy according to the Economic Complexity Index (ECI). In 2013, Sudan exported USD3.92 billion and imported USD7.83 billion, resulting in a negative trade balance of USD3.91 billion. In 2013 the GDP of Sudan was USD66.6 billion and its GDP per capita was USD1.75 thousand. Sudan's main exports are crude petroleum (USD2.43 billion), sheep and goats (USD423 million), other oily seeds (USD377 million), insect resins (USD117 million) and gold (USD73.3 million), using the 1992 revision of the HS (Harmonized System) classification. Its top imports are wheat (USD683 million), raw sugar (USD464 million), packaged medicaments (USD260 million), cars (USD196 million) and rubber tires (USD144 million). The top export destinations of Sudan are China (USD1.92 billion), Saudi Arabia (USD516 million), Japan (USD412 million), India (USD306 million) and South Korea (USD116 million). The top import origins are China (USD2.39 billion), India (USD832 million), Egypt (USD526 million), Saudi Arabia (USD518 million) and Germany (USD298 million) (ECI Report, 2014).

2.2 Governance and administration

Sudan was divided to 18 states. Each of which has a legislative body and a state government. Lower levels of government exist in each state. These states are: Northern, River Nile, Khartoum, White Nile, Blue Nile, Sinnar, Gezira, North Kordofan, West Kordofan, South Kordofan, North Darfur, West Darfur, South Darfur, East Darfur, Central Darfur Gedaref, Kassala and Red Sea.

2.3 Natural resources legislation, management and institutions

Matters relating to the exploitation of natural resources are incorporated in the responsibilities and terms of reference of the central government departments. Each department takes responsibility for the management of a single resource, i.e., forestry, wildlife, rangelands, water, agriculture, throughout the country. The gradual processes of decentralization and devolution of power seems to have has very little impact on this basic set up as sector-based legislation, professional practice and tradition continue.

2.4 Land tenure legislation and land use

The Land Settlement and Registration Act, issued in 1925, provided for individual rights and interests over land, including cultivation, pasture, woodcutting and holding. In 1970, the government promulgated the Unregistered Land Act that bestowed ownership of any wasteland, forest or unregistered land on government. Private ownership of land is limited to rights registered before the Unregistered Land Act of April 1970 came into force. Almost 95 percent of the land area in Sudan is unregistered. Although the government has formal ownership of unregistered land, it has not been able to exercise effective control over land allocation and use.

The land allocation and judicial powers, which provided a certain measure of control, regulation and conservation, were taken from the native administration and vested in the local government officers and later in the state government. Neither level of government has the knowledge of the traditional use of land, nor the means to plan and control land use. This has resulted in an uncontrolled expansion of mechanized farming, which has wreaked havoc on the country's natural resources. At present, Sudan has no national land use policy, nor is there legislation that deals with land use.

Sudanese authorities believe that it is the absence of a land use plan that is the cause of conflict between farmers and pastoralists over the use of natural resources.

Sector-based legislation that influenced land use has been issued over the years: The Crop Control Act 1972, Food Protection Act 1973, Pesticides Act 1974, Environmental Health Act 1975, Wildlife and National Reserves Conservation Act 1986, Forestry Act 1989, Seeds Act 1990 and the Land Disposition and Construction-Planning Act 1994. The basic feature of Sudan legislation pertaining to environmental issues is that it is sector-based. The greatest proportion falls in the agriculture, forestry, fisheries, public health and animal resources sectors. One notable exception is the pasture and range departmental sector. There has been no central legislation regulating the use of pasture, although recently, state legislations and local government orders defined demarcation of grazing routes and fire lines. At present, the line ministries and administrations with direct mandate on various aspects of the environment and natural resources are agriculture and irrigation, forests, animal resources, internal affairs, energy, mining, water resources, health and industry.

Their mandate covers biological diversity as defined in the international convention. The number of institutions, ministerial units, semi-state public corporations, with direct or indirect authority over biological diversity, has been put at 90. Their functions range from planning and management, training and extension to research and data gathering. More than 50 percent of these institutions have their environmental mandate backed by laws. However, the law in question usually assigns responsibility to the ministry or to a corporate body. By-laws and regulations then outline and detail the ToR in accordance with the organizational structure of these bodies. There is also dual affiliation. For example the department of wildlife is affiliated to both the Internal Affairs Ministry and the Environment and Forestry Ministry. Law governs the first relationship. The second is prescribed in the warrant establishing the Environment and Forestry Ministry.

At the state level after the launching of the federal system of government, environmental matters and concerns became divided between the portfolios of the state ministries for agriculture and animal resources, health and engineering affairs. The Agriculture Ministry has responsibility for agriculture, forests, and the environment and animal resources. The mandate of the Engineering Affairs Ministry includes overseeing land and surveys, construction and housing, roads and public waters, transportation and communication, water resources and energy and electricity. The Health Ministry is responsible for preventive and curative medicine. Legislations dealing with natural resource management have several shortcomings. There is no coordination or interactive mechanism that brings these bodies together over a joint issue and common concern. There is also duplication of responsibility between federal and state institutions.

2.5 Climate, vegetation and topography

Rainfall in some areas of the country has been steadily decreasing over the last 40 years and the desert is advancing at a rate of about one mile a year, eliminating grazing land and water holes. Forest ecosystems throughout Sudan have been degraded due to fire, uncontrolled grazing, overcutting and encroachment by agriculture. Drought and increasing pressure on land from the expansion of mechanized and rain-fed farming have restricted rangelands, and overgrazing is a growing problem.

2.5.1 Temperature

Mean annual temperatures vary between 26°C and 32°C across the country. The most extreme temperatures are found in the far north, where summer temperatures can often exceed 43°C and sandstorms blow across the Sahara from April to September. These regions typically experience virtually no rainfall.

2.5.2 Rainfall

Rainfall, on which the majority of the country's agricultural activity depends, is erratic and varies significantly from the north to the south of the country. The unreliable nature of the rainfall, together with its concentration in short growing seasons, increases the vulnerability

of Sudan's rain-fed agricultural systems. Rainfall is also very variable, and is becoming increasingly unpredictable. The coefficient of rainfall variability, or the percentage deviation from the norm, decreases from north to south (190 percent to less than 15 percent). Summer is the main rainy season, extending from May to October, with precipitation ranging between less than 50 mm in the extreme north to more than 1 500 mm in the extreme south.

2.5.3 Ecological zones

The ecological zones of Sudan can be used as a basis to describe the biodiversity and populations, as follows:

- Arid regions (coastal and arid region mountain ranges, coastal plain, stony plains and dune fields);
- The Nile riverine strip;
- The Sahel belt, including the central dryland agricultural belt;
- The Marra plateau;
- The Nuba mountains;
- Savannah;
- Wetlands and floodplains;
- Subtropical lowlands;
- Subtidal coastline and islands.

The vegetation of Sudan was first described by Harrison and Jackson (1958) and then in studies by different institutions such as FAO (2006).

2.6 Agriculture sector

The agriculture sector comprises agrarian and animal production (animal resources and fisheries), and its contribution to the GDP increased from 30.8 percent in 2009 to 31.3 percent in 2010 due to the increase in the area cultivated. Traditional farming accounts for 60-70 percent of the agricultural output, and is basically subsistence production based on shifting cultivation and livestock rearing. This sector is characterized by low productivity. The extreme rainfall variability has made traditional farmers highly vulnerable to drought, while the extensive farming and slash and burn practices pose serious environmental threats.

The government of Sudan has promoted mechanized rain-fed agriculture since the 1960s, as part of its policy to encourage agricultural investment. The 1976 and 1980 Acts are considered to be instrumental for the expansion of rain-fed mechanized agriculture. Nevertheless, this unregulated expansion has wreaked havoc on the country's environmental resources resulting in the extensive removal of trees, land degradation and destruction of habitats.

2.7 Livestock production

Livestock represents a capital reserve for farm households throughout the country. The latest livestock population census in 2009/2010 shows there are 43.7 million sheep, 52.3 million goats, 42.3 million cattle and 4.7 million camels throughout the country. Over-grazing has now become one of the main causes of land degradation in Sudan. Livestock production comprises pastoralism, sedentary, semi sedentary and commercial fattening, and dairy. Pastoralists are concentrated in two states: Kordofan and Darfur. Mainly camel and cattle owners, the pastoralists in these two states account for 80-90 percent of the total number of cattle and 100 percent of camels.

2.8 Sudan's forestry sector

Sudan can be broadly characterized by vast plains interspersed by a few hill and mountain ranges, with the Red Sea washing along 500 miles of the east coast and the Blue and White Nile flowing north to meet in Khartoum as the River Nile. Sand and heavy cracking clay soils form the triangular central easterly plain which makes up more than 30 percent of the country. Red soils of different types are characteristic of the remaining south-western portion. The rainfall varies from zero in the northern desert to more than 1 000 mm in the South Sudan. The arid northern parts of the country have scattered vegetation; woody species are limited to a few species of Acacia in the seasonally flooded areas. The central part of the country with a rainy season of three to five months is dominated by deciduous drought-tolerant tree species. The influence of the soil type is marked; *Acacia senegal* is found in areas with a rainfall of 400 mm in sandy soils, while it requires 600 mm in heavy clay soils areas. In the lower rainfall savannah the main species currently found in the riverine forests are *Acacia senegal* and *Acacia nilotica*. Other important species are *Anogeissus leiocarpus*, *Terminalia spp*. *Combretum spp*, *Bowswelia spp*, and some palms, mainly *Hyphaene* and *Borassus spp*.

2.8.1 Definition of NWFPs

The term non-wood forest product (NWFP) is a relatively new term generally used to mean forest products other than wood. From a legal point of view, forest products are defined in some countries as all those products found in or brought from a forest; and forest is any land classified as such under law. Under this definition, forest products other than wood would include soil, sand and stones (FAO, 1995b).

One attempt to define NWFPs reads as follows: "NWFPs can be defined as all goods and services for commercial, industrial and subsistence use, other than wood, derived from forests and their biomass which can be sustainably extracted, i.e. extracted from a forest ecosystem in quantities and ways that do not alter its basic reproductive functions." (FAO, 1992). By implication, this definition is concerned with products of plant origin, from natural forests. Also, the use to which the product is put, ways of sustainable extraction and basic reproductive functions are extraneous to product definition (FAO, 1995).

Based on discussions at several levels of the different proposed definitions, a modified version for international use is suggested as follows, to be considered by the Consultation (FAO, 1995): "Non-wood forest products include all goods of biological origin, as well as services, derived from forest or any land under similar use, and exclude wood in all its forms."

One working definition of NWFP for this study is "Non-wood forest products consist of goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests." (FAO, 1999). The term NWFPs differs from the commonly used non-timber forest product (NTFPs) in excluding all wood while NTFPs includes wood for uses other than for timber, although there are still many grey areas (FAO, 2001).

2.8.2 Uses of NWFPs

NWFPs are used in Sudan for a variety of purposes (Ezeldeen and Osman 1997). Some of the products are used as food: e.g. Dom Palm (*Hyphaene thebaica*), Daleib (*Borassusa ethiopum*), Gudiem- Grewiatenax, Aradeib-Tamarindus indica, Gongleiz - fruit from Baobab trees (*Adansonia digitata*), Laloub - fruit from Heglig tree (*Balanites aegyptiaca*), Nabag - fruit from *Ziziphus spp*., medicinal plants (e.g. Gongleiz, Aradeib, Gudeim), Garad - pods from *Acacia nilotica*, Sena maeca - *Cassia senna*, Arak - (*Salvadora persica*), fibres (e.g. Saaf - leaves from *Borassusa ethiopum*), Tannins (e.g. Garad- Acacia nilotica), Dye stuffs (e.g. Henna - dried leaves from *lawsonia inermis*) and bees wax. The important NWFPs at the local level are: Fodder (e.g. *Ziziphus spp*., *Acacia spp*.), edible oils (e.g. Shea butter – *Butyrospermum parki*, Laloub - *Balanites aegyptiaca*) and honey. NWFPs started to gain considerable importance in Sudan for the following reasons (Sulieman and Eldoma, 1994): NWFPs are developing good market value; the use of NWFPs as food is becoming more familiar; during the critical periods of droughts and famine some of the NWFPs were the only available foodstuff; increased public awareness about the socio-cultural use of the NWFPs and; the exponential development in the use of NWFPs in many industries.

Due to the above, intensive utilization has taken place leading to a negative effect on the resource base. Most of the NWFPs mentioned are exploited from natural resources (e.g. food and fodder products). Only henna (*Lawsonia inermis*) is cultivated. *Acacia spp*., besides growing in natural stands, has been widely planted (Ezeldeen and Osman, 1997). The NWFPs are collected by men, women and children during the harvesting season from natural forests in remote areas and nearby stands. The destination of the NWFPs (Doam, Saaf, Loban, Garad, Gunglaize, Aradeib, Senameca and Henna) is internal markets. NWFPs for export are Gum Arabic, Aradeib, Gumloban, Gunglaize, Henna, and Senamaeca. Trends of utilization increased rapidly from 1988 to 1998 due to fair rainy seasons (Ezeldeen and Osman, 1997).

2.8.3 Harvesting and collection of NWFPs

Harvesting of non-wood forest products (NWFPs), including food, medicines, kindling, fibre and other plant and fungal products, plays an important role in the livelihood security and poverty reduction of rural communities in many tropical countries (Belcher *et al*., 2005).

At the same time, it has been recently suggested that NTFPs may contribute to biodiversity conservation (Anderson, 1990, Arnold and Ruiz-Pérez, 2001). It has been proposed that increasing the value of forest products to local communities could lead to a win-win strategy to conserve ecosystems while improving communities' income (Shiva and Verma, 2002). Despite this initial optimism about the role of NTFPs in rural development and resource management, some authors have pointed out that harvesting NWFPs/NTFPs continues to face several economic and ecological challenges and NTFP exploitation does not necessarily lead to forest conservation (Chediack, 2008; Stanley, 2012). As a matter of fact, connections between biodiversity conservation and poverty alleviation are complex and dynamic processes, reflecting different geographical, social and political concerns among the human communities involved (Billé *et al.*, 2012).

As economic gains from NWFP/NTFP production are viable over time only if their collection has no long-term harmful impact on the regeneration of the harvested population (Stanley, 2012), assessing and monitoring the ecological sustainability of NTFP harvesting must be regarded as fundamental in order to guarantee the convergence of conservation and development goals (Cunningham, 2001). Ethnobotanical research can contribute to such a strategy by identifying patterns of plant use and management and analysing how these relate to biodiversity deterioration or conservation priorities. From this perspective, when recording local traditional uses NWFP/NTFP collection patterns should occur within the context of sustainable forest management (Bruschi *et al.*, 2014).

Field studies at the local level have proved to be useful in highlighting the relationship between the traditional use of forest resources and conservation issues (Stanley, 2012) and can offer valuable information for a better understanding of these complex processes. However, few studies have been carried out in Africa on the ecological consequences of extra activism; moreover, most are restricted to South Africa (Stanley, 2012).

In Sudan, NWFPs are the products of almost 76 indigenous species that include gums, bamboo, fruits, nuts, fibres, fodder, honey, flowers, medicinal herbs, silk, animal skin, ivory and others (Ibrahim, 1999). A list of more than 190 species bearing non-wood forest products in Sudan was prepared by Badi (1993); 90 species produce food, 61 species provide medicinal products, 19 species give fibres and 20 species constitute sources of industrial raw materials.

Despite the great variety in the NWFPs, only a few are considered to be of commercial value. Gum arabic which is mainly produced from *Acacia senegal* and *Acacia seyal* trees is the most important non-wood forest product. At present, almost all non-wood products are used in their raw (unprocessed) form. The most important role of NWFPs is that they provide self-reliance, employment and food security to the local economy.

Many communities in Sudan receive income from collecting, processing and marketing these products. Gum arabic, in particular, is the most important off-farm activity for the inhabitants of the Gum Arabic Belt. At the national level, NWFPs contribute to income through export earnings; on average, gum arabic export earnings amount to about 17 percent of all Sudanese exports. The rest of the NWFPs contributed less than two percent to the total export earnings.

An evaluation made in the South Kordofan region indicated that forest contribution to household income was about 21 percent, of which 40 percent comes from selling charcoal, 20 percent from gums and the rest from other NWFPs (Balal, 2006).

Due to the diversity of NWFPs and the actors benefiting from them, the markets for such products are segmented into rural, local, national, regional and international, with varying characteristics and potentials for poverty alleviation (Tieguhong *et al.*, 2004; MFE, 2007).

Moreover, there is a lack of information on links between traditional knowledge, use patterns and conservation issues, with a specific focus on the occurrence of species used by local communities within most of the Sudan ecosystem.

Therefore, it is essential to regulate collection practices and set up conservation priorities for plant species traditionally used by communities, in order to ensure the sustainability of Sudan woodland management.

Previous research carried out in the same area (Bruschi *et al.*, 2014) showed that local ethno-botanical knowledge of medicinal uses is still quite rich and alive, even if not evenly distributed among locals.

2.8.4 Marketing value and marketing margins of NWFPs

The basic business processes that relate to the economics of NWFPs are production and marketing. While production deals with the provision of the products, marketing consists of the activities by which the products flow from the producer to the ultimate consumer. Processing is considered as an appendage of marketing because it converts the resource into marketable products. Processing and marketing together form the tools with which the raw materials are converted to appropriate products to meet market requirements. They create some of the uses of time, place and form: packaging, advertising, transportation, sorting and stock piling (Tieguhong and Ndoye, 2004).

Marketing is basically a technology that is at the disposal of producers to identify market opportunities in the form of market needs and wants, analyse competition, develop appropriate approaches to reach the markets, and make profit. It uses a mixture of basic factors comprising products, channels of distribution, promotion and price through which it satisfies the needs and wants of the customers in the markets. Marketing operates in an environment that is created by economic, social, cultural, technological, political, regulatory, legal, institutional and infrastructural factors, all of which are beyond the control of the individual operators doing marketing (Lintu, 1995).

NWFPs provide a livelihood support system for forest communities in terms of food, medicines, income and employment. However, most forest communities remain poor, struggling to make a living rather than improving their status. This trend raises concern whether NWFPs constitute a “poverty trap”, a safety net or a real resource for rural development and poverty alleviation. The answer is not straightforward because the NWFP sector is influenced by several factors, including the varying nature of the products, and a number of economic, institutional, political and technological factors that are not easily discernible (Tieguhong *et al.*, 2009).

On the economic side, markets are usually fragmented and dispersed, knowledge and information systems are often poorly developed, and financial opportunities for investment are often limited. Because the markets are dispersed many suppliers are poorly informed of the market prices of products, or, when informed, have poor access to these markets due to poor infrastructure and high costs of transportation. In the light of these shortcomings, a three-tier market structure often evolves for different NWFPs with varying characteristics and pitfalls that are worth mentioning. These include: marketing by individual local producers, marketing through middlemen and marketing by village/community groups or associations (Pswarayi-Riddihough and Jones, 1995).

The lack of market information keeps local producers of NWFPs in a weaker position than the traders. A more transparent marketing chain would enable the local producers to be aware of price information from key points in the marketing chain including what the products fetch in foreign markets. This would give local producers a stronger bargaining power with the traders. Apart from a flow of information on markets, a thorough understanding of the resource base would enable both government and industry to plan and invest in NWFPs. Sound knowledge is, for example, required on the sources and various uses of NWFPs, their economic and social importance, and the volumes and values traded locally, nationally or exported. Therefore, keeping good statistics in each country on all aspects of NWFPs is crucial (De Silva and Atal, 1995).

Producers of NWFPs include the gatherers who collect the products from the forests. They also comprise those primary-level processors that buy the basic raw materials from the gatherers and convert them into primary products. Producers are also those that convert the semi-processed primary products to value-added, semi-finished products or to final consumer products at the successive stages of processing and marketing (De Silva and Atal, 1995).

Local producers marketing their products individually represent weak competition with meagre resources. This limits bargaining power in the market, which is further weakened by a poor financial position and inability to keep up with rapid changes in market conditions. Their small volume of sales makes it difficult for them to sell to companies interested in bulk purchases and steady supplies. Individual local producers are generally unaware of the most profitable markets for their produce and such ignorance is compounded by inadequate information on market conditions and prices. Due to the diversity of NWFPs and their beneficiaries, the markets for NWFPs are segmented into local, national/urban, regional and international, with varying characteristics and potentials for poverty alleviation. For example, local markets for NWFPs are usually small in size but with diverse products and the benefits going directly to the local households involved. The number of people involved are usually numerous and widely dispersed in different zones, and are often poorly organized and generally use simple tools for processing their products. The gathering and processing of locally traded products is generally seasonal in nature and labour intensive. The process of exchange takes place in village markets between the gatherers/producers and final consumers. Most of the products traded are consumer goods, i.e. they are not processed further by any industrial activity. The quantification of the local trade is extremely difficult due to its sporadic nature and because only a part of it is monetary-based (Lintu, 1995).

There are national markets that support trade of NWFPs in specific countries. National/urban markets are triggered by traditional food habits and local practices transferred from rural areas to urban centres or from one part of the country to another as people travel and resettle. In particular, the increasing number and income level of city dwellers make these markets expand and require particular marketing approaches, as people who have moved to cities often maintain their cultural habits. Significant opportunities could be identified through appropriate market and marketing studies (Tieguhong and Ndoye, 2004).

The international trade in NWFPs is composed of imports and exports of many products at different stages of processing. Some of these are unprocessed goods from the forest while others have undergone processing to a lesser or larger degree. Many of the products are often traded in rather small quantities compared to other commodities. Most NWFPs from Africa that enter the international market are often raw materials that will be processed abroad. There are also a number of value-added goods based on NWFPs that are internationally traded. The market size, growth and its specific requirements are determined by factors far from the supplying countries. The reliable availability of marketing information is a key factor for successful marketing in export markets (Tieguhong and Ndoye, 2004). Some NWFPs are eaten raw; some go through simple processing stages while others go through sophisticated processing before reaching the end user. The objective of processing NWFPs may be to extend shelf life, for value adding and/or for better hygiene (De Silva and Atal, 1995). Processing provides the physical characteristics of the goods while marketing adds all the necessary services and other immaterial features to make it a complete product for satisfying the values sought in the market (Lintu, 1995).

2.8.5 Socio-economic role of NWFPs

NWFPs had significant socio-economic benefits (FAO, 1995). These products play a crucial role in supporting community welfare as significant sources of edible products, fodder, fuel, fertiliser (mulch), fibres, medicines, gums and resins, oils and construction materials. Millions of people around the world living in the vicinity of forests subsist on these products. They help to provide opportunities for additional employment and income. Activities related to the collection and primary processing of NWFPs are opportunities for the equitable participation of women and indigenous people.

While some of the NWFPs have entered national and international trade, they tend to have a comparative advantage in supporting development of rural and backward areas. Planning for developing NWFPs should consider the trends and patterns in their use and their overall socio-economic contributions. The socio-economic benefits of NWFPs products play a role in supporting community-significant fertiliser (mulch), medicines and construction materials. They help to provide opportunities for additional employment and income. The participation of women and indigenous people is also significant. Planning patterns in their use and their overall socio-economic role is observed.

2.8.6 NWFP use in household and poverty reduction

NWFPs play an important part in household food security. They supplement household agricultural production are particularly important in reducing the shortages suffered during

the "hunger periods" of the agricultural cycle; help to even out seasonal fluctuations in availability of food; often contribute essential inputs for household nutrition and; are also valued as components of social and cultural identity. However, these uses and values vary enormously from one area to the next.

NWFPs can also be a poverty trap. Rural people rely on NWFPs because they are poor, but it is also possible that they are poor because they rely on NWFPs as economic activities for which remuneration is low. Some characteristics of the forest environment and the NWFP economy make it difficult or impossible for those who depend on them to rise out of poverty. Natural forests are often inferior production environments with little infrastructure, high transport costs because of remoteness, few buyers and exploitive marketing chains. The net benefits of NWFPs are often too low to justify articulating property rights, and as a result there is limited incentive to invest and increase yields. In the few cases where NWFPs have a high value, the poor are often excluded from access (Dove, 1993). Furthermore, a sustained increase in the demand for NWFPs can lead to the collapse of the resource base, intensive production on plantations outside forests or the production of synthetics that are more competitive than NWFPs (Homma, 1992).

2.8.7 Contribution of NWFPs to household income and employment

The socio-economic impacts of NWFPs operations are enormous and range from local, national, regional to international levels. At the local level, many examples can be cited. The harvesters of *Prunus africana* bark in the Mt Cameroon area receive about 70 percent of their annual cash income from the activity (Ndam and Tonye, 2004).

Rural women are particularly involved in gathering and processing NWFPs and are likely to be the main beneficiaries or losers from forest resource management interventions in Central Africa that may affect free access to the forests (Ndoye *et al.*, 1997). In Cameroon, for example, women represent 51 percent of the population, but over 70 percent lives in rural areas and exploits natural resources to meet the livelihood needs of their families. More than 94 percent of the 1 100 NWFP traders surveyed in rural and urban markets in Cameroon were women (Ndoye *et al.*, 1997). In the Democratic Republic of the Congo, more women than men were observed participating in the bush meat trade (Tshombe *et al.*, 2000) and represented 80 percent of the bush meat traders in Kinshasa markets (Ndona, 2004).

In addition to the direct contribution to the forest and household revenues of African countries, NWFPs also make great contributions to income through employment. For instance, some 450 000 traditional healers that make use of medicinal plants are found in the Southern African Development Community (SADC) region. In Namibia, some 15 000 people are involved in the trade of Devil's Claws (Le Breton, 2001).

Moreover, the economic potentials of some NWFPs for local income generation and poverty reduction are currently higher than from traditional cash crops such as cocoa and coffee in Africa (Ndoye and Tieguhong, 2004).

Small-scale forest-based enterprises in Zimbabwe, which are mostly based on NWFPs, employed 237 000 people in 1991, compared to 16 000 employed in conventional forestry and forest industries in the same year (Arnold *et al.*, 1994).

About 150 NWFPs are used in Sudan (Badi, 1993).The total national value of trade amounts to SDG386 025 068, of which the fruit of *Tamarindus indica* (Aradeib) scores the highest trade value (SDG135 864 000) and the fruit of *Acacia nilotica* (Garad) the lowest (SDG1 464 7809) (Sulieman and Eldoma, 1994). At least six NWFPs are exported from Sudan: Gum arabic (*Acacia senegal*), gum loban (*Boswellia papyrifera, Commiphora sp.*), as well as aradeib fruit (*Tamarindus indica*) and gunglaize fruit (*Adansonia digitata*), senna leaves (*Cassia senna*) and henna leaves (*Lawsonia inermis*). The total value of foreign trade excluding gum arabic amounted to USD6 929 587 (Sulieman and Eldoma, 1994). Recent documents only report on gum arabic for which the export proceeds reached USD134.2 million in 2013 (GAB, 2015).

2.8.8 NWFP trade and contribution in Sudan

2.8.8.1 Local trade

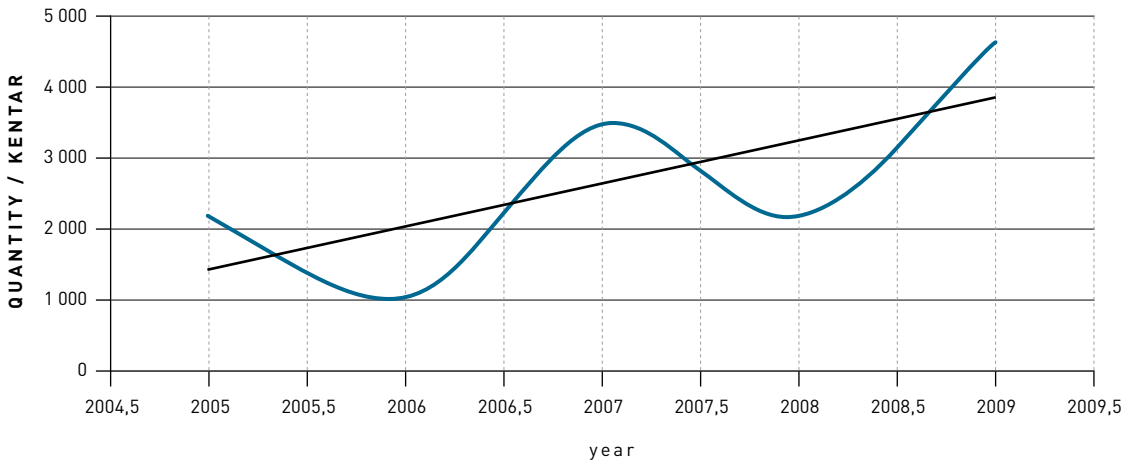
Trading non-wood forest products (NWFPs) for income generation is not new. Tree fruits are examples of some available NWFPs that may be found for sale in the vast majority of the rural markets and nearby towns and cities (Shacklenton, 2006).

Local markets can provide a guaranteed way of reaching some of the poorest people, and play a crucial role in improving rural economy. Despite some recent work on non-woo forest products (NTFPs), numerous gaps exist in understanding the role of NTFP local trade in rural economy, and there is a need for further empirical studies (Campbell and Byron, 1996; Arnold, 2002). Lawrence (2003) mentioned that there is still a need for case specific, systematic analysis of the potential or actual role of trading NWFPs on development. Indeed, in many countries little national level information exists, based on old empirical studies, that quantifies the contribution of local trade in tree fruits to household income and employment, reliably assesses their role or examines their potential for rural economic development (Sunderlin and Ndoye, 2004; Rose-Tonen and Wiersum, 2003). Although the local trade in tree fruits in the drier Savannah of Sudan is growing and its importance to households is being recognised, the contribution of the local trade to household cash income and employment is not acknowledged. Most of the literature on NWFPs in Sudan focuses on exported products (e.g. gum arabic). Therefore, efforts need to be made to develop an understanding of the role of local trade in tree fruit in the rural economy. This knowledge gap makes it difficult to design development programmes to build on what already exists. Accordingly, this study was initiated to investigate the contribution of local level trade to the rural economy, with special emphasis on household cash income and employment in relation to other economic activities, and to identify the factors that affect the cash income earned from local trade in tree fruits.

Local trade, although relatively small in quantities and values in the case of individual products and producers, is often of vital importance to local communities by allowing increased efficiency in resource utilization and opening up outlets for producers/gatherers with excess production, thus providing cash income to them and others involved in selling and distributing the products. The aggregate of a large number of NWFPs and their individual producers makes local and national trade in many instances more important than the international trade.

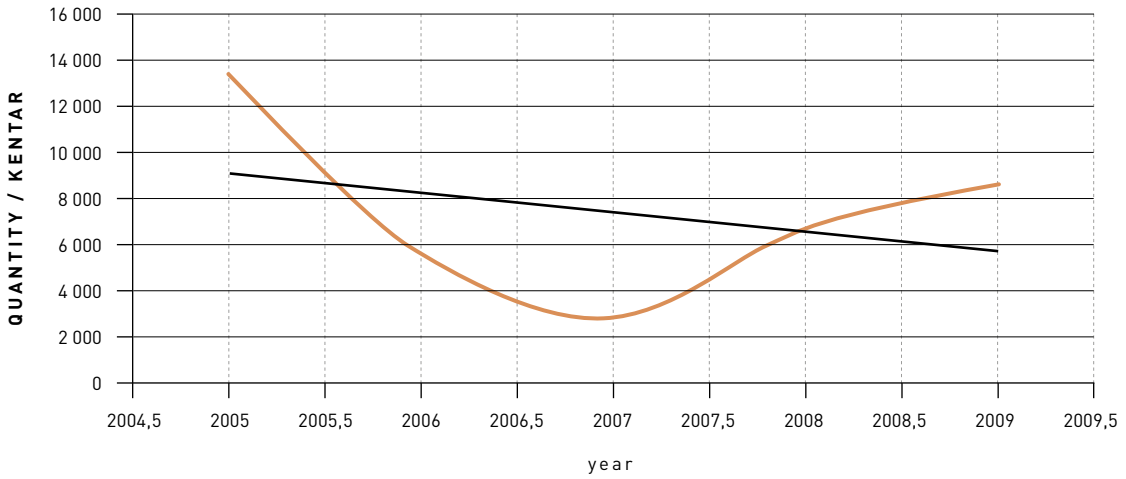
The report of Revitalizing the Sudan Gum Arabic Production and Marketing Project (RSGAPMP) showed different trends in quantities of some Acacia species in Sudan including *Acacia papyrifera* (Figure 5) and *Acacia polyacantha* (Figure 6), which are mainly produced in Sinnar, Blue Nile and South Darfur.

Figure 5. **Quantity of *Acacia papyrifera* in Blue Nile markets (2005-2009)**



Source: RVSGAPMP 2010

Figure 6. **Quantity of *Acacia polyacantha* in Blue Nile markets (2005-2009)**



Source: RVSGAPMP 2010

In order to assess the volume and reliability of potential supply, an analysis of what determines the marketable surplus is important. The business sector needs to estimate the supply volume for trading and processing. Policy-makers need to know how much income can be derived from these products in order to identify appropriate development strategies to target small farmers and other gatherers.

With the increase in economic well-being and the shift to monetary economies, factory-made products increasingly erode the local markets for NWFPs in their traditional uses. Under these circumstances, the contribution of trading these products to local economies starts depending on national and international markets. Of course, in many cases this will change the product range demanded and the marketing approaches applied. The barter and customary sharing of products which still exists at the local-level trade will gradually be replaced by money-based exchange systems.

2.8.8.2 National trade and contribution to national economy

There are national markets that support the trade of NWFPs in specific countries. Products classified for national trade include fruits, nuts, spices, raw materials for flavours and fragrances, medicinal plants, furniture, and many other products. For instance, traditional food habits demand spices and flavours on the national markets, which cannot be sold elsewhere. Herbal medicines is another category of products which are tied to local traditions and therefore to specific national markets. The increasing number and income level of city dwellers make these markets expand and require particular marketing approaches, as people who have moved to cities often maintain their cultural habits. Significant opportunities could be identified through appropriate market and marketing studies in these markets.

The internal trade in medicinal plant material is, in many countries, often considerably more important than international trade. In the United States, for example, imports represent only a small percentage of the value of internal trade in medicinal plants.

Many examples exist to show the importance of NWFPs to national economies. In Sudan, over 13 percent of the foreign exchange earned is generated from the gum arabic trade alone. The figure was updated to 15 percent in the recent period (2010-2014) according to GAB (2015).

2.8.8.3 International trade

International trade of NWFPs is composed of imports and exports of many products at different stages of processing. Some are unprocessed goods from the forest while others have been processed to a lesser or larger extent. Many of the products are often traded in rather small quantities compared to other commodities. For example, the quantity of cinnamon bark oil traded amounts to some 2.8 tonnes/year worldwide; cinnamon leaf oil 120-150 tonnes/year and rosewood oil 100 tonnes/year. On the other hand there are NWFPs which are produced and traded in considerably larger quantities like Brazil nuts (14 000 tonnes/year), orange oil, gum turpentine, rosin, rattan and gum arabic. Sudan is a major player on the gum arabic international market (Table 1).

Essential oils (comprising a number of individual products), which are traditionally used as basic raw materials in fragrances and flavouring, provide an example of international trade in NWFPs. In 1990, the value of total world imports of essential oils amounted to over USD1 billion. The principal import markets are the European Union, the United States and Japan, which together account for over 70 percent of the total trade. ASEAN, Hong Kong, Republic of Korea and India, with their share of some 12 percent of the world's imports,

indicate the importance of the Asian region in this trade. Consumer demand for natural flavourings and fragrances continues to grow despite the increasing market share of synthetic substitutes (ITC, 1993).

International trade means knowing the markets outside the country of production. Very often the trade is controlled by local and foreign brokers, agents, traders and other middlemen, all of whom have a vested interest in the business. Therefore, relying solely on the information provided by them does not guarantee that the gatherers and producers receive all the information that they need. Products which are for international trade are often raw materials to be processed in the countries they are destined for. There are also a number of value-added goods based on NWFPs which are internationally traded. The market size, growth and its specific requirements are determined by factors far from the supplying countries. The reliable availability of marketing information is a key factor for successful marketing in export markets.

Table 1. **Export quantities of gum arabic from Sudan and its share in the international market**

Year	Export quantities (tonnes)	Share in the international market
1980	33 301	76.9%
1981	35 553	76.9%
1982	30 321	76.9%
1983	41 248	71.4%
1984	33 235	71.4%
1985	26 828	71.4%
1986	18 717	71.4%
1987	17 744	71.4%
1988	18 603	66.7%
1989	19 352	66.7%
1990	26 912	66.7%
1991	24 978	66.7%
1992	14 068	64.5%
1993	15 730	66.7%
1994	22 755	66.7%
1995	16 847	62.5%
1996	13 722	62.5%
1980	33 301	76.9%
1981	35 553	76.9%
1997	22 548	62.5%
1998	20 989	58.8%
1999	19 928	58.8%
2000	24 178	55.6%
2001	20 322	55.6%

FOLLOWS ON THE NEXT PAGE →

Year	Export quantities (tonnes)	Share in the international market
2002	30 462	55.6%
2003	36 164	55.6%
2004	27 273	55.6%
2005	29 213	25.0%
2006	20 618	29.0%
2007	30 875	28.0%
2008	32 217	32.0%
2009	47 854	37.0%
2010	55 054	38.0%
2011	52 928	36.0%
2012	49 317	38.0%
2013	62 480	44.0%
2014	55 978	70.0%

Sources: Modified from GAC, Central Bank of Sudan and GAB

2.8.9 Constraints to the development of NWFPs in Sudan

Based on experiences from Sudan and comparative case studies from dryland Africa, the development of NWFPs in Sudan is challenged by several factors (Luukkanen *et al.*, 2006; Chandrasekharan 1993):

1. There is a lack of processing and storage technology and facilities; quality standards of products are often poor.
2. Most traditional NWFP activities are labour intensive and cheap, so they tend to be inversely related to general economic development. They tend to become early casualties in the process of economic development, and succumb to competition, unless measures are taken to improve them to the new needs and situations.
3. NWFPs are mostly of local/rural importance, small in scale, associated with traditional uses and low in technology; there is often a policy bias against them – they are considered as difficult to develop or unimportant.
4. There is serious lack of research and technology development related to NWFPs.
5. Information is scarce on all aspects of NWFPs. These products are not adequately dealt with (or not dealt with at all) in official statistics and surveys.
6. There is a general absence of an inventory of NWFPs and planning their development often lacks a scientific basis. The extent of variation in the nature, quality, characteristics and uses of the products compounds the problem. Products do not contribute significantly to the national economy tend to receive less attention.
7. The lack of a clear marketing policy for NWFPs may be considered as a major constraint.

CHAPTER 3

Study Output

The literature review in the previous section has made it clear that the contribution of NWFPs to rural development and poverty alleviation in Sudan was regarded as very promising despite prevalent traditional forest management, utilization and conservation practices. People's dependence on NWFPs is still debatable, and whether these products constitute major or supplementary sources of income and livelihood remains to be seen. The study outputs tried to present the results obtained from the analysis of the structured questionnaires with the three main actors involved with NWFPs in the country (collectors, traders and processors) together with the key informant interviews. The results obtained together with the attached photos were discussed and linked to the literature review to provide logical frameworks to the final outputs.

3.1 Socio-demographic information

3.1.1 Sampling distribution

With respect to the sampling distribution among the different NWFP collectors across the states, West Kordofan ranked higher (62 percent), followed by North Kordofan (16 percent), Sinnar (12 percent) and Damazin (10 percent) (Annex 4). The uneven distribution of the sample size in the study area was attributed to the following reasons:

- The unequal distribution of the targeted NWFP actors within the states and towns; most of the interviewed collectors were concentrated in West Kordofan and to a lesser extent in North Kordofan, followed by Sinnar and Blue Nile, while NWFP processors are found mainly in Khartoum.
- The purposive sampling technique used by the study was conducted successfully in the three towns (Elkhewei, Enuhud and Abuzabad) of West Kordofan (Annex 5), represented by six potential sites (Eldowdia, Elkhewei, Enuhud, Talib, Umdarota and Abuzabad) of NWFP collection in the study area.
- Unlike other regions, the NWFP associations studied were found in West Kordofan, particularly in Elkhewei town and Tablib village. No collectors were investigated in Khartoum, which does not appear to possess significant NWFP collectors.

The results (Annex 4) also demonstrated the sample distribution among NWFP traders in the study area; West Kordofan ranked higher (35 percent) followed by Khartoum (25 percent), North Kordofan (19 percent), Blue Nile (11 percent) and Sinnar (9 percent). This ranking order

could explain, to some extent, the magnitude of NWFP trade at upstream levels in the targeted rural, urban and central markets across the states.

Concerning the sample distribution among NWFP processors, all the respondents (34 respondents) were found in the three towns of Khartoum (Khartoum, Khartoum North and Omdurman). This was principally because the majority of the NWFP processing units are concentrated in Khartoum, particularly in Omdurman city. The frequencies and percentages of the sample distribution among the different towns of the study area were also presented in Annex 5.

3.1.2 Gender distribution

- The distribution of men versus women in the sample of the NWFP collectors (Table 2) was gender balanced (male:female = 51%:49%). This balance could be explained by the overall equivalent contribution of both genders collecting NWFPs in the study area. In this context, the discussion with some respondents revealed that men are more involved in the collection of some NWFPs that takes more physical strength (e.g. tapping and collection of gum from *Acacia senegal*). In contrast, women are somewhat more active than men in collecting NWFPs that require more agility (e.g. collecting fruit from *Zizyphus spina-christi* and *Balanites aegyptiaca*).
- Regarding trade, the gender distribution among the traders' sample revealed an imbalanced percentage favouring male over female (85%:15%). This gender imbalance may arise as a consequence of various factors including:
  - Non-existence of women at the main urban and central crop markets (e.g. Elobeid crop market, Enuhud crop market and Damazin crop market).
  - Women are very involved at rural markets or marginal markets in big cities (e.g. I*bn-Masoud* market in Elobeid, *Umdafaso* market in Enuhud and *Elmalaja* market in Damazin)
  - Women were observed to dominate some minor activities at the rural, urban and central markets studied (e.g. making tea/coffee, cooking food and petty trade) rather than trading cash crops, in particular NWFPs.
- The gender distribution pertinent to NWFP processing activities confirmed, to a great extent, a male-dominated sphere (male:female = 77%:23%). This could be explained by the following points:
  - Most of the NWFP processing units studied in Khartoum are owned by men.
  - Although women are active workers at the processing units, they are not allowed to disclose information or to participate in a study in the presence of men who are always the owners of these units.
  - Women are very active in primary processing, and therefore they were interviewed at the side of roads.

Table 2. **Gender distribution across different samples of targeted groups**

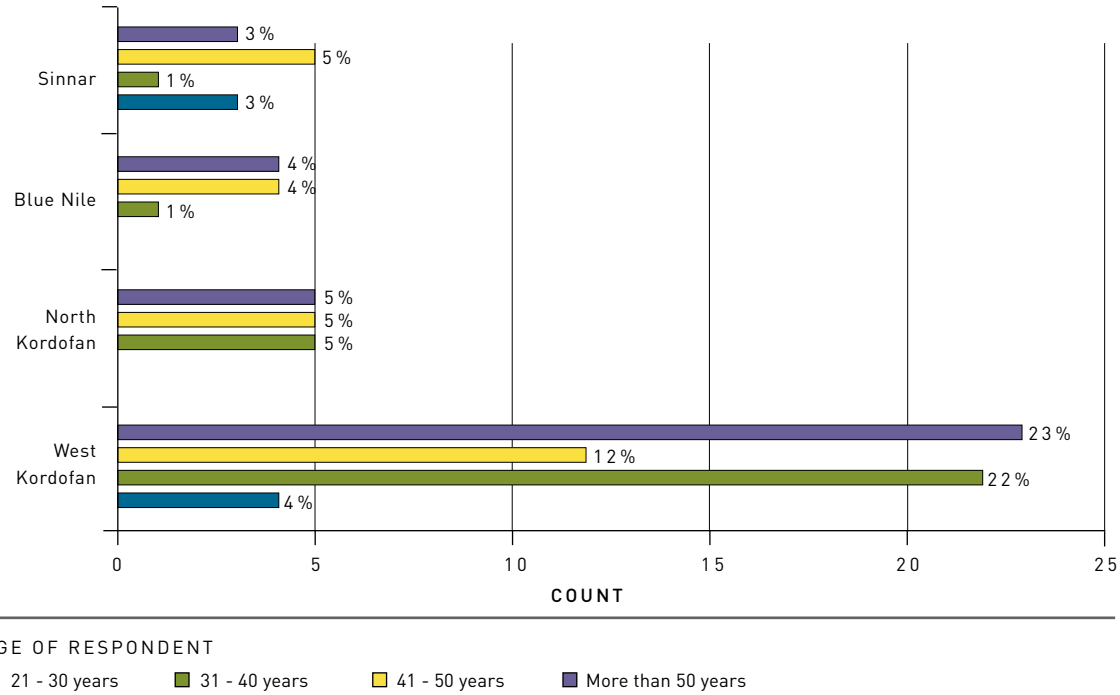
Sample distribution						
Gender	Collector		Trader		Processor	
	Frequency	%	Frequency	%	Frequency	%
Male	37	50.7	66	84.6	26	76.5
Female	36	49.3	12	15.4	8	23.5
Total	73	100.0	78	100.0	34	100.0

3.1.3 Age distribution

The age distribution of the three actors' categories (collectors, traders and processors) was obtained by age groups ranked according to the ordinal measures across the states. Figure 7 shows that the 'more than 50 years' age group represented the larger percentage (35 percent) among the NWFP collectors across all states. In this age group, West Kordofan ranked high, followed by North Kordofan, Blue Nile and Sinnar. The '31–40 years' age group comprised the second largest percentage (29 percent) with the same previous trend, with West Kordodfan coming first, followed by North Kordofan, Blue Nile and Sinnar. The '41–50 years' age group came in third place, whereas the '21–30 years' age group was hardly represented across the collectors interviewed. The result showed that the majority (90 percent) of the NWFP collectors interviewed are middle-aged or older people. This distribution might be due to rural urban migration among the younger age group (21-30 years) to big cities searching for job oppertunities or higher eduation faciltities. The UNDP Human Development Report (2011) stated that the overall economic growth in Sudan has not been translated into equivalent human development improvements and poverty reduction realities. Significant disparities between urban and rural areas are apparent, contributing to an increasingly urban informal sector which accounts for more than 60 percent of Sudan's GDP. In fact, investments and services are concentrated in and around big cities, which has encouraged a rural-urban migration that weakens agricultural productivity and intensifies poverty in both urban and rural areas.

Figures 8 and 9 show the distribution of different age groups among the interviewed traders and processors, respectively. In this context, the 'more than 50 years' age group was found to dominate both interviewed traders and processors, followed by other age groups with slight differences between them. The traders in West Kordofan showed a relatively high percentage regarding the age group 'more than 50 years' followed by North Kordofan and Sinnar.

Figure 7. **Age groups of NWFP collectors interviewed in the states**



(Note: For simplicity of presentation, the percentages were rounded down by removing two decimal points. This reduced the total percentage to slightly less than 100 percent.)

Figure 8. **Age groups of NWFP traders interviewed in the states**

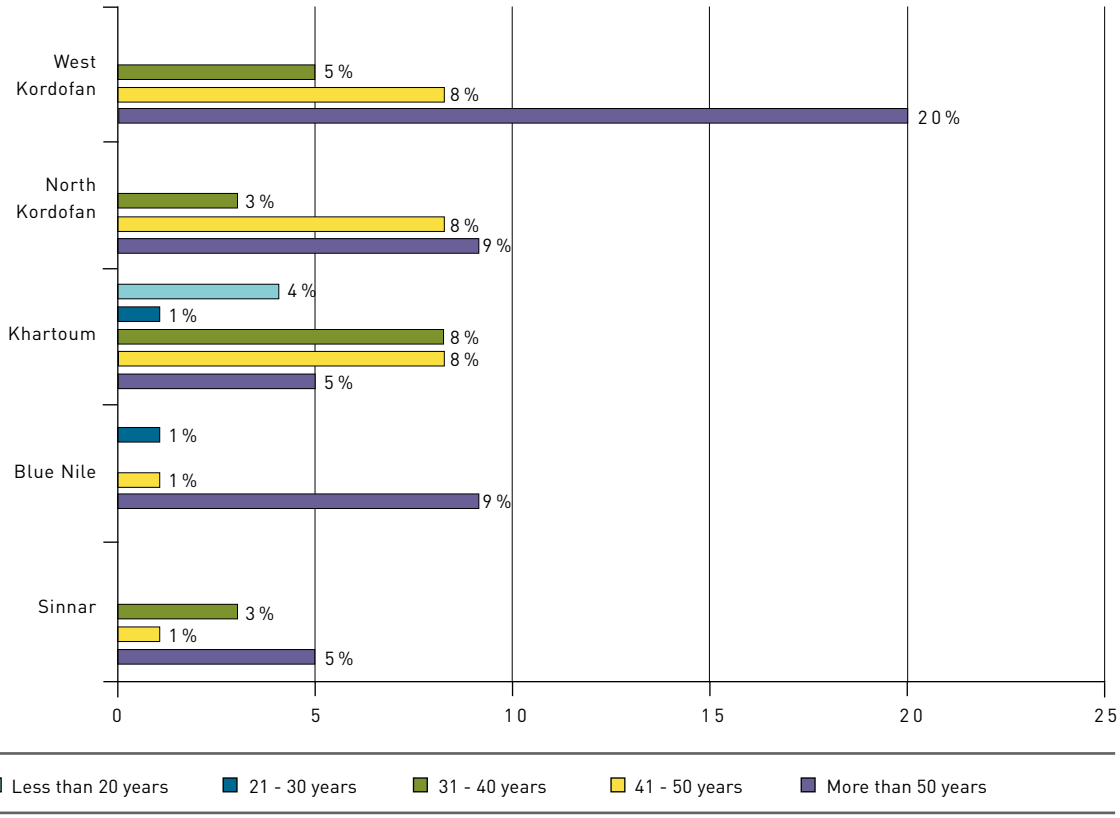
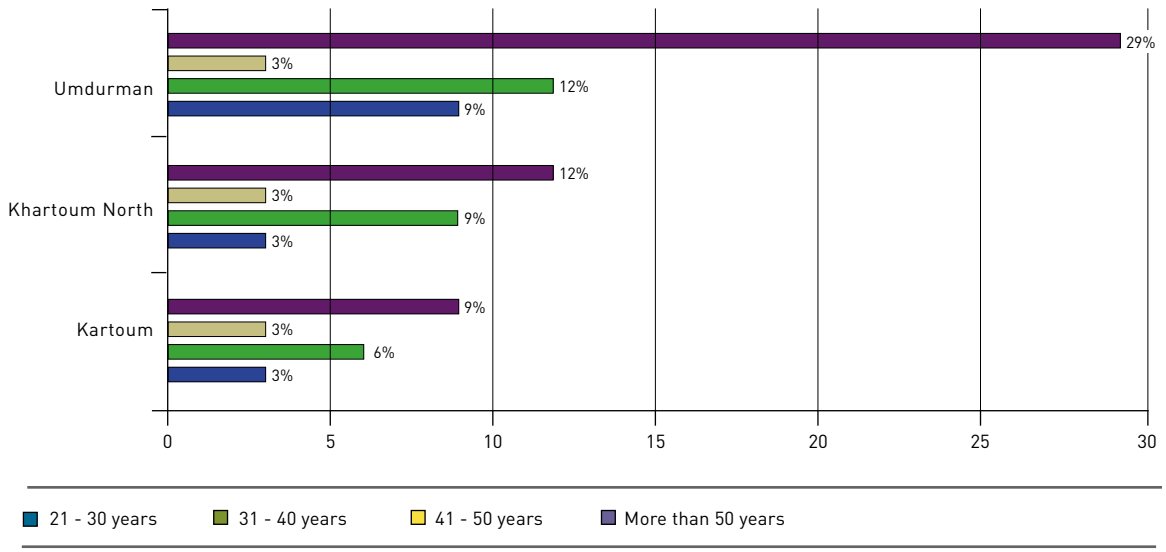


Figure 9. **Age groups of NWFP processors interviewed in Khartoum**

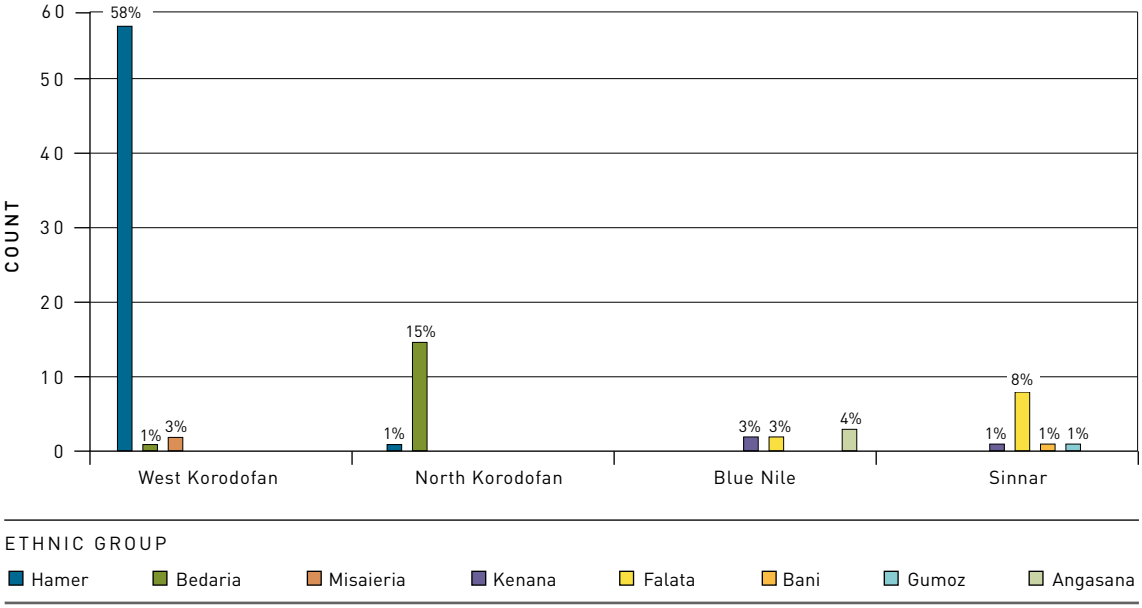


3.1.4 Distribution of ethnic groups

This section focuses on the distribution of ethnic groups across the different villages, towns and states covered by the field study and market surveys. This helped to understand the role of the tribal system in structuring land use and land tenure system across most of the rural and urban sites, which were covered by the study in North Kordofan, West Kordofan, Blue Nile and Sinnar. The key informant interviews revealed that the traditional leaders of the settled ethnic groups are commonly called *Sheikhs*. Historically, the position of *Sheikh* originated from the religious and spiritual power of grandfathers and this post upon their death is always handed down to their grandsons. The *Sheikh* is normally involved in land use and tenure systems at the request of his village. The *Umda* is the next level of leadership, and finally the *Amir* is the leader who has the final word in case of a contested decision made by the Umda. The distribution of ethnic groups among the NWFP collectors revealed the existence of 8 different tribes across the four states (Figure 10). The NWFP collectors in West Kordofan are dominated by the Hamar tribe, while the Bedaria tribe is more predominant in North Kordofan. Other ethnic groups such as the Misaieria and Kenana were also identified as NWFP collectors in the study area. The Falata, Angasana, Gumoz, Bani Amir and Kenana ethnic groups were present in NWFP collection in Blue Nile and Sinnar.

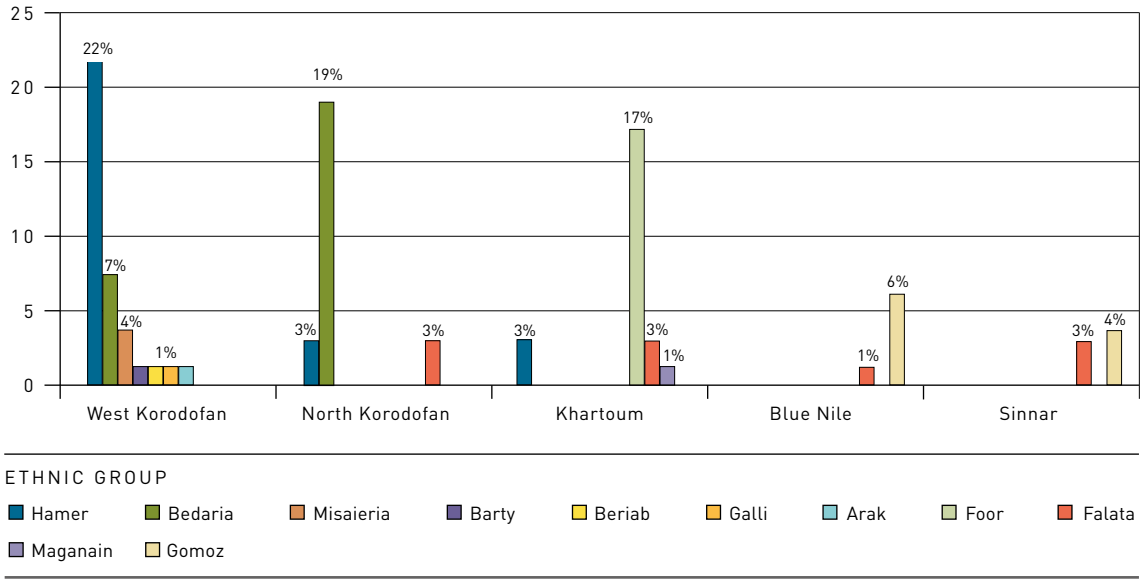
Figure 11 illustrates the presence of people from different ethnic groups as NWFP traders in the study area. Traders from the Hamar, Bedaria, Foor, and Gumoz tribes worked in West Kordofan, North Kordofan, Khartoum, Blue Nile and Sinnar, respectively.

Figure 10. **Ethnic groups of NWFP collectors interviewed in the states**



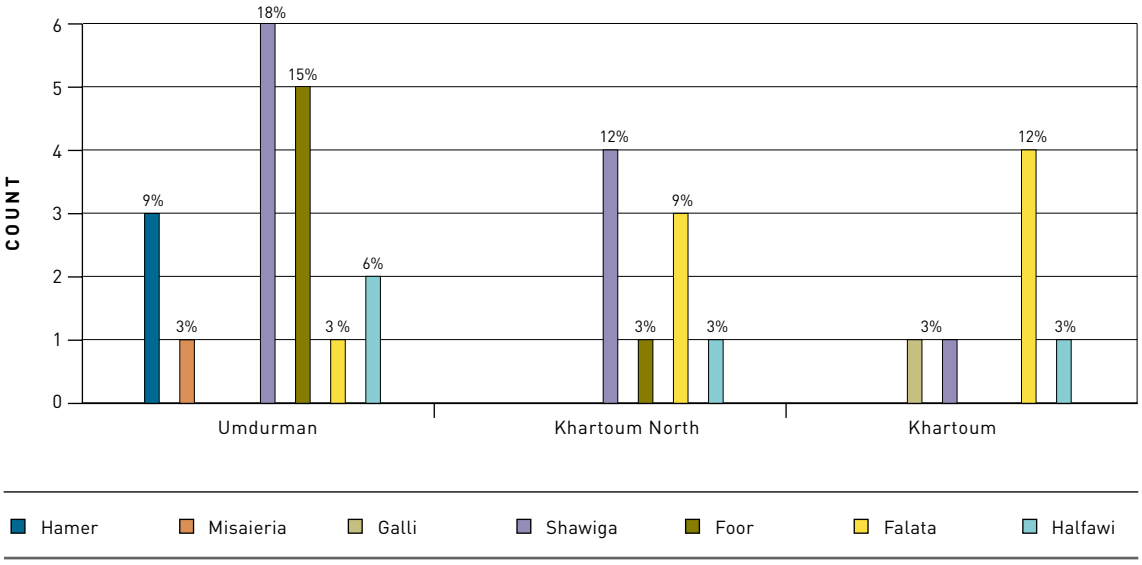
(Note: For simplicity of presentation, the percentages were rounded down by removing two decimal points. This reduced the total percentage to slightly less than 100 percent.)

Figure 11. **Ethnic groups of NWFP traders interviewed in the states**



With respect to NWFP processing activities (Figure 12), the interviewees came from seven different ethnic groups ranked in a descending order for the three localities collectively as follows; *Shawaaiga* (33 percent), *Falata* (24 percent), *Foor* (18 percent), *Halfaween* (12 percent), *Hamar* (9 percent), *Galli* (3 percent) and *Misaieria* (3 percent).

Figure 12. **Ethnic groups of NWFP processors interviewed in Khartoum State**



(Note: For simplicity of presentation, the percentages were rounded down by removing two decimal points. This increased the total percentage to slightly over 100 percent.)

3.1.5 Educational status

The interviews with three categories of NWFP actors reflected various results (Table 3). High percentages of primary education among the three categories were stated for collectors (66 percent), processors (32 percent), and a moderate percentage for traders (35 percent). A high percentage of NWFP traders reported having a secondary education (44 percent), while a relatively high percentage (27 percent) of processors reported having a university education compared to traders and collectors who obtained very low percentages (4 percent).

Table 3. **Educational status of NWFP actors in the study area**

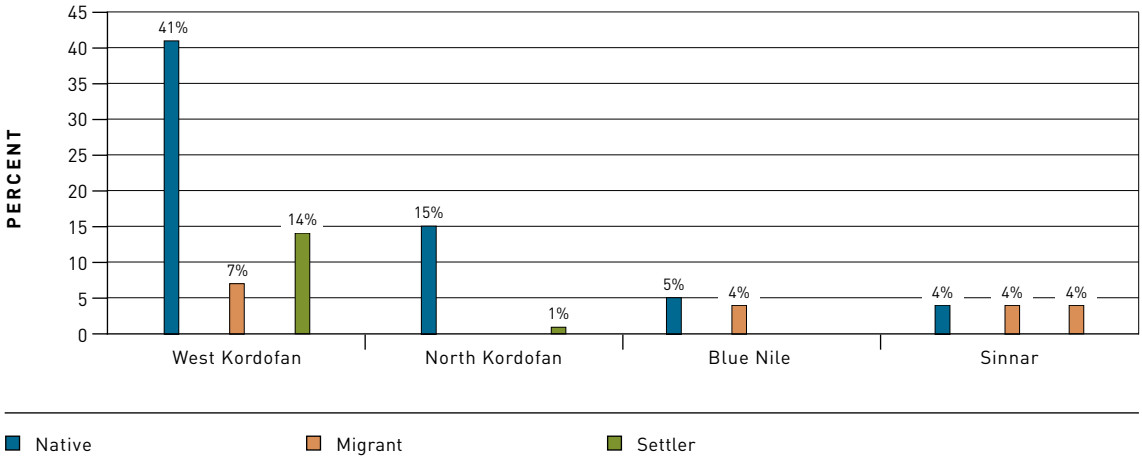
	Nil	Khalwa	Primary School	Intermediate School	Secondary School	University
Collectors	4%	12%	66%	8%	5%	4%
Traders	4%	3%	35%	12%	44%	4%
Processors	3%	18%	32%	0	21%	27%

3.1.6 Distribution according to origin

Regarding the sample distribution according to the origin of respondents in the states, Figure 13 shows that most of the NWFP collectors interviewed were native with higher percentages in North Kordofan, West Kordofan and Blue Nile. The second highest was recorded for settlers, while migrants scored the lowest. This result may be attributed to the fact that

the prevailing land use and land tenure systems give priority for collecting NWFPs to natives and then to settlers more than migrants who in most cases have been received as a guest in the peripheral boundaries of the village with less chance of accessing NWFPs.

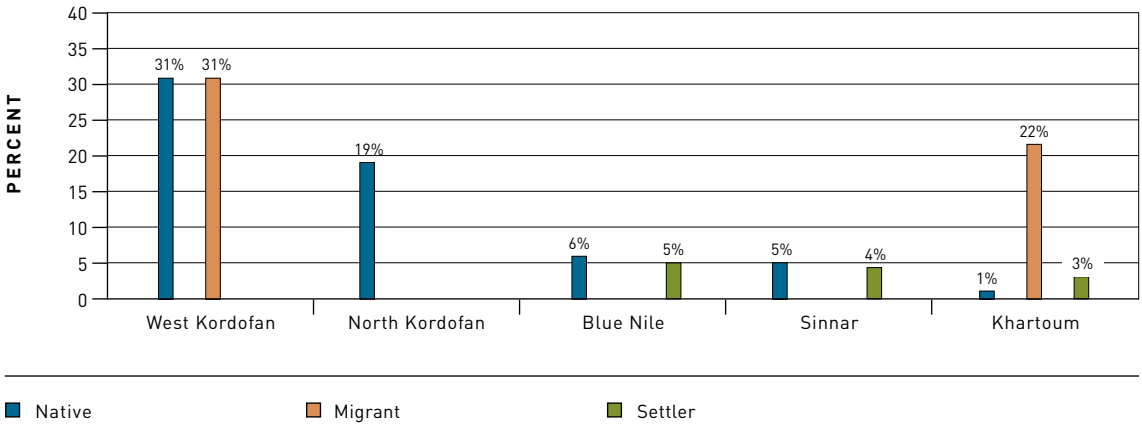
Figure 13. **Classification of interviewed NWFP collectors**



(Note: For simplicity of presentation, the percentages were rounded down by removing two decimal points. This reduced the total percentage to slightly less than 100 percent.)

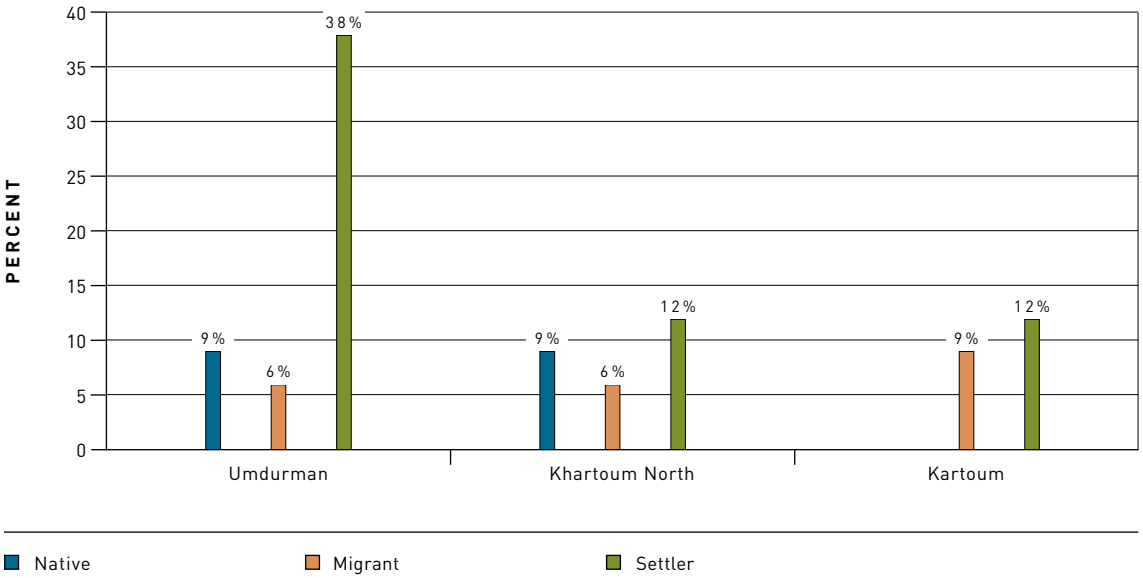
Screening the sample distribution based on the origin of the NWFP traders interviewed revealed that most were natives of West and North Kordofan, and both natives and migrants to Blue Nile and Sinnar (Figure 14). As regards Khartoum, most of the investigated NWFP traders were migrants from other states and they trade NWFPs by the roadside or around marginal markets in peripheral areas of the city of Khartoum.

Figure 14. **Classification of interviewed NWFP traders according to their origin**



The study findings articulated the distribution of interviewed processors according to their origin in Khartoum, Khartoum North and Umdurman cities. The findings showed that most of the interviewed processors are settlers and to a lesser degree migrants and natives (Figure 15). The settlers and natives are the owners of large factories of NWFPs and are mostly concentrated in the city of Omdurman, while the migrants practice primary processing and marketing of NWFPs by the roadside or in peripheral city markets.

Figure 15. **Classification of interviewed NWFP processors according to their origin in Khartoum**



3.1.7 Distribution of main occupation

Figure 16 explores different types of main occupations in the study area according to feedback from interviewed collectors. About three quarters (74 percent) of the respondents were agricultural producers, while other main occupations (middlemen, animal raisers, producers' agents, casual labourers, tribal leaders and students) represented about one quarter (26 percent) across all the states.

3.1.8 Distribution of minor occupation

Due to the seasonality of most activities in rural areas, the collectors studied have other minor occupations to improve their income and livelihoods. In this respect, Figure 17 shows a variety of minor occupations in the study area as reported by the interviewed collectors. About one third (30 percent) of those interviewed were producers versus a little more than two thirds (70 percent) recorded for other minor occupations (casual labourers, village traders, city merchants, middlemen, animal raisers, herders and producers' agents) across all the states.

Figure 16. **Main occupations of NWFP collectors interviewed in the selected states**

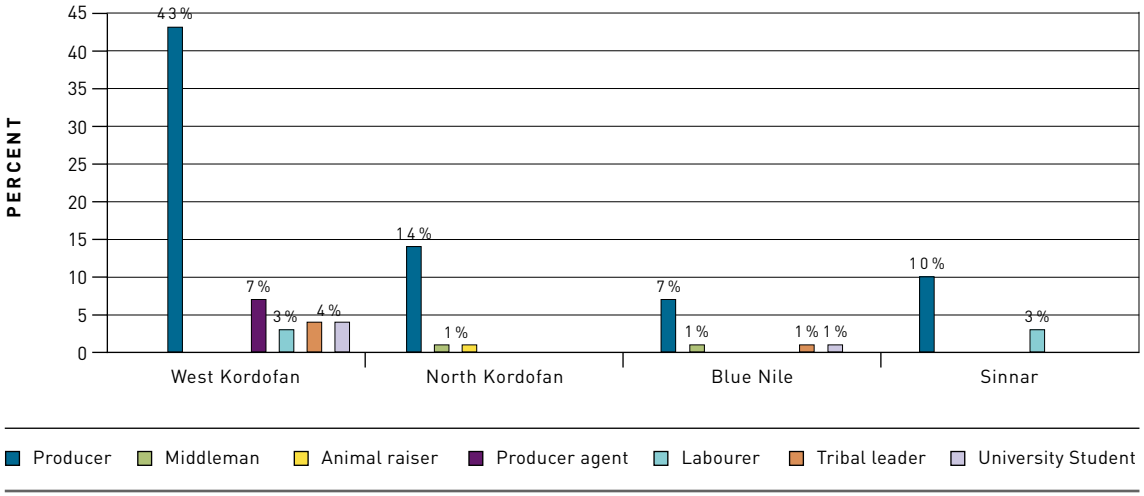
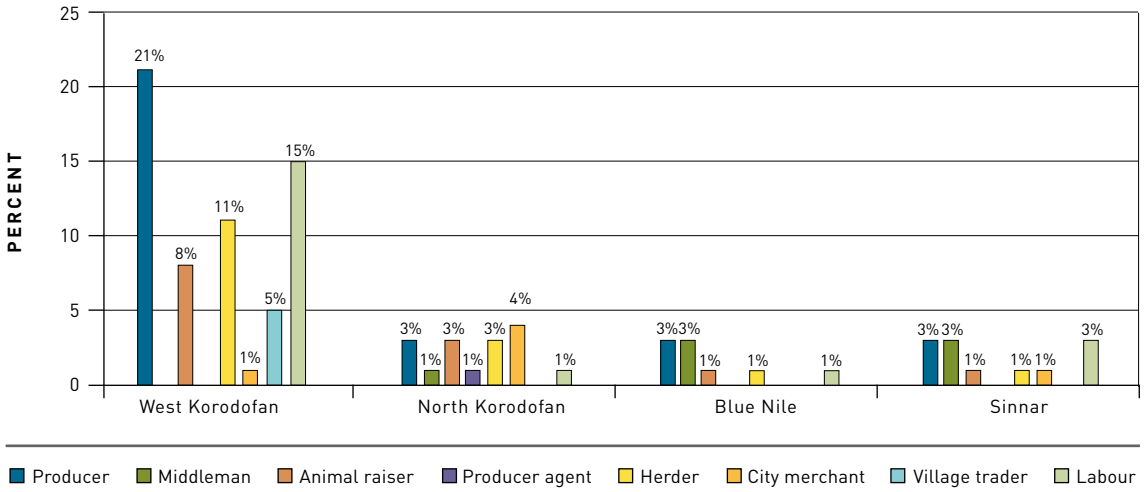


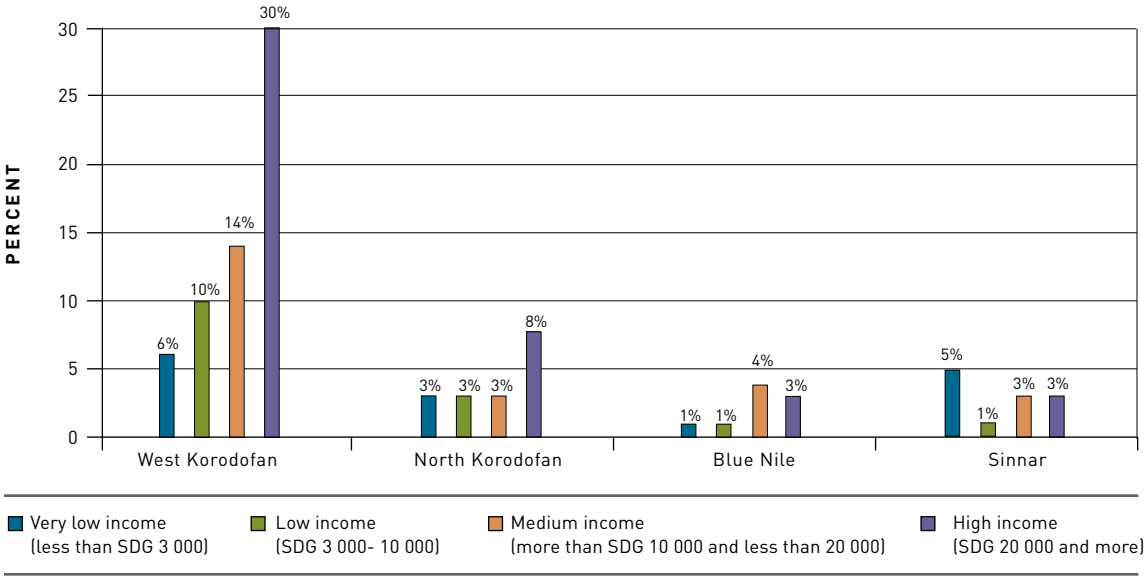
Figure 17. **Minor occupations of NWFP collectors interviewed in the selected states**



3.1.9 Distribution of gross income

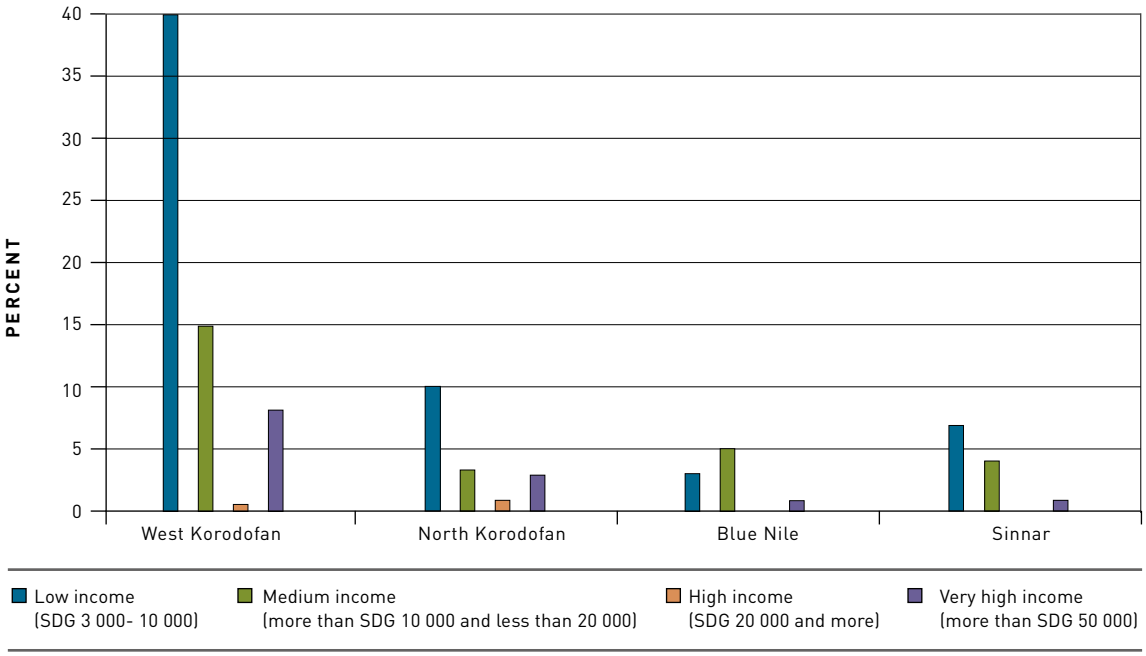
The gross income derived from the main occupations including NWFPs in the study area is shown in Figure 18. The highest annual gross income (SDG20 000 to SDG50 000) was earned by nearly half of the interviewed NWFP collectors in the states (44 percent). In this context, NWFP collectors from West Kordofan ranked higher (30 percent), followed by North Kordofan (8 percent), Blue Nile (3 percent) and Sinnar (3 percent). This result indicates the importance of NWFP collection in the western states of Sudan, where limited sources of income are available for local communities in rural areas.

Figure 18. **Distribution of gross income from main occupations in the selected states**



The results also indicated that the NWFP collectors are relying on other sources of income to support their livelihood. In this context, the annual gross income derived from minor occupations across the different states are indicated in Figure 19. The distribution demonstrated that the lowest annual gross income (less than SDG3 000) was earned by nearly half of the collectors interviewed (44 percent). This was found in West Kordofan (40 percent), North Kordofan (10 percent), Sinnar (7 percent) and Blue Nile (3 percent). In addition, other annual gross incomes were earned by fewer than 10 percent of the respondents in all the states.

Figure 19. **Distribution of gross income from minor occupations in the selected states**



3.1.10 Household involvement in NWFP collection

At the national level the reviewed literature (Mahmoud, 2004; Taha, 1999) indicated that about 5 million people were involved in NWFPs across the Gum Belt in Sudan. Before the South Sudan referendum was held in 2011, the estimated number was eight million people (GAB, 2015).

However, the current study shows (Table 4) different variables regarding the number of spouses, family size by gender, and household involvement in NWFP collection in the states. The table shows that the number of people per household ranges from 5 to 14, with an average of 7 members. Most (62 percent) of the NWFP collectors come from families with two to seven members, while fewer (38 percent) come from a family with 8 to 14 members. Nevertheless, the maximum number of men in the household ranges from two to nine with an average of 4.11, while the number of women ranges from three to six, with an average of 4.29. This large number of family members encourages substituting family labour for hired labour which in turn reduces the cost of labour in most of the NWFPs across the states.

The results (Table 4) also show that the maximum number of spouses was three wives and the minimum was 0 (unmarried), for an overall average of 1.1. Concerning household involvement in NWFP collection, the maximum number of females per household was five women and three girls versus three and two recorded for men and boys, respectively. These results confirmed that rural women play an important role in NWFP collection, and the significant participation of children alongside other family members in NWFP collection. In many rural communities there are few income-generating opportunities for women and so NWFP activities are one of the few cash-generating opportunities for women in marginalized rural communities. Nevertheless, increasing pressure on forests and biodiversity has increased the pressure on rural communities. The observations (Figure 20) registered by the PNC, during the field survey conducted at Talib village in West Kordofan, revealed that the majority of women are involved as individuals or as members of the Gum Arabic Producers Association (GAPA) in the gathering of NWFPs because the business empowers them economically, thus enabling them to continue to contribute to the upkeep of their households in particular and their social system in general.

Figure 20. **Active GAPAs (women & men) interviewed in Talib village, West Kordofan**

Table 4. **Number of spouses, family size and household involvement in NWFP collection by gender**

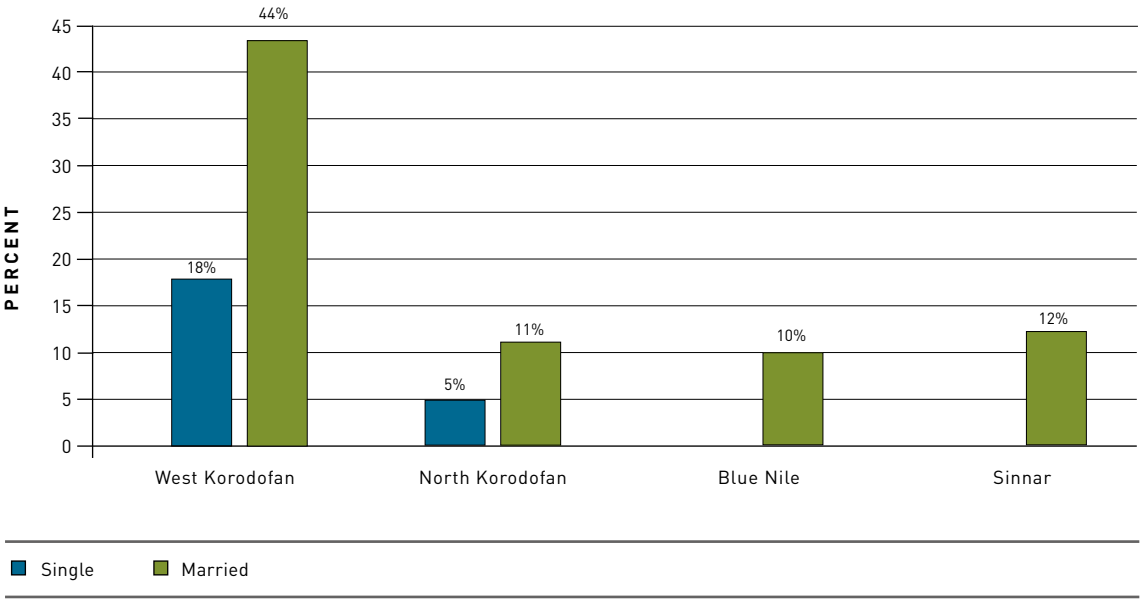
Variable	Minimum	Maximum	Mean	S. D
No. of spouses	0	3	1.10	0.598
Total number in households	5	14	7.00	1.890
Number of men in household	2	9	4.11	1.16
Number of women in household	3	6	4.29	1.160
Number of men involved in NWFP collection	0	3	1.71	1.007
Number of women involved in NWFP collection	0	5	1.51	1.857
Number of boys involved in NWFP collection	0	2	0.47	0.851
Number of girls involved in NWFP collection	0	3	0.21	0.763

(Note: Where the standard deviation is higher than the mean, the mean is not a good representative for measuring central tendency and so the minimum and maximum values were used here to interpret the results)

3.1.11 Marital status

The majority (77 percent) of the NWFP collectors studied are married while the minority (23 percent) are single (Figure 21). In contrast with North and West Kordofan, all the respondents in Sinnar and Blue Nile are married. The result highlights the status of family stability in most of the NWFP collection areas across the states.

Figure 21. **Distribution of marital status among interviewed NWFP collectors in the states**

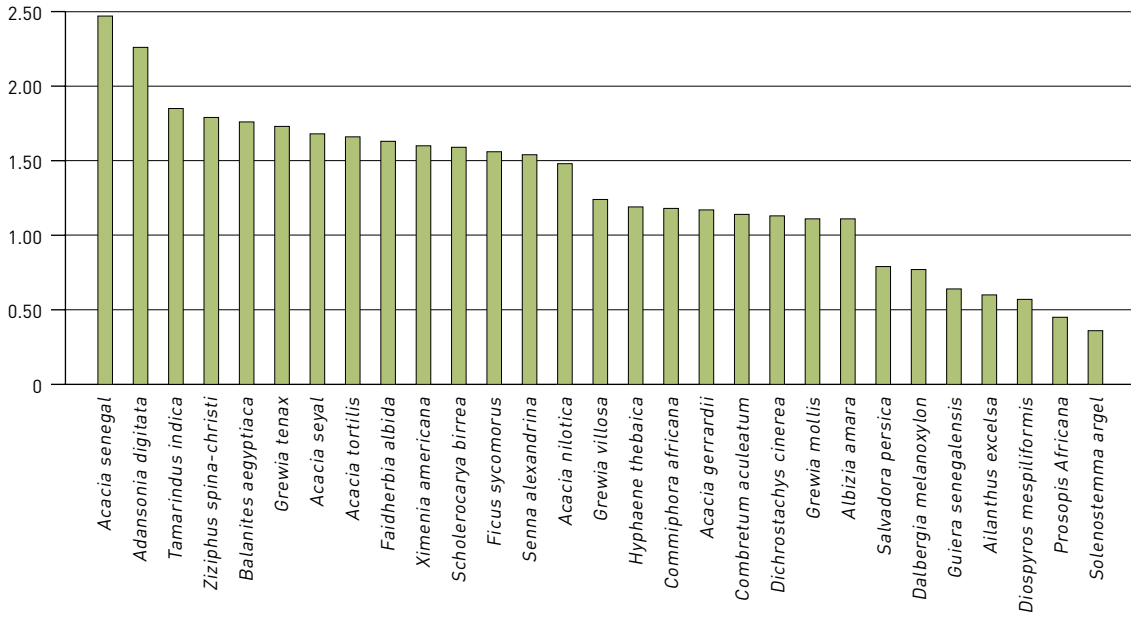


3.2 Importance and uses of NWFPs in the study area

A wide range of NWFPs is available in the study area. NWFPs are products of almost 84 indigenous tree species and include gums, fruits, fibres, fodder, flowers, medicinal herbs, and others. Despite the great variety of NWFPs, only a few are considered to be of commercial value. The important NWFPs including their scientific names, local names, type and important uses are attached to this study (Annex 6).

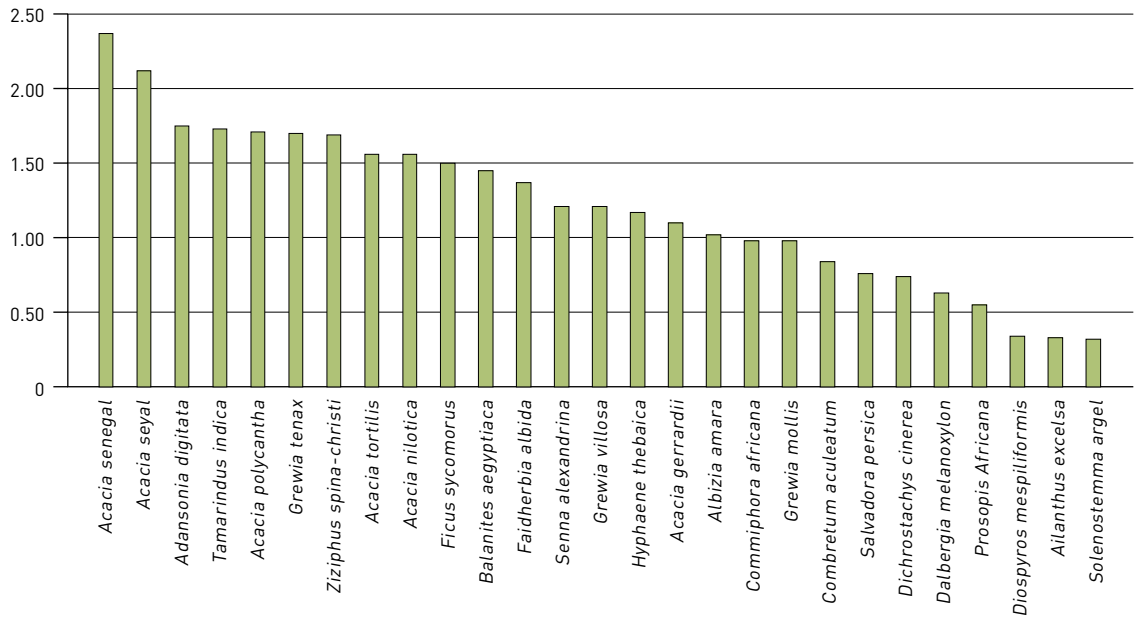
Based on key informant interviews, the most important NWFPs in North and West Kordofan, depending on the IVI (the value stated in brackets is calculated in detail in Annexes 7, 8 and 9 for North and West Kordofan, Sinnar and Blue Nile, and collectively) are the following ten species ranked in descending order (Figure 22): *Acacia senegal* (2.47), *Adansonia digitata* (2.26), *Tamarindus indica* (1.85), *Zizyphus spina-christi* (1.79), *Balanites aegyptiaca* (1.76), *Grewia tenax* (1.73), *Acacia seyal* (1.68), *Acacia tortilis* (1.66), *Faidherbia albida* (1.63) and *Ximenia americana* (1.60).

Figure 22. **IVI according to NWFP key informants in North & West Kordofan states**



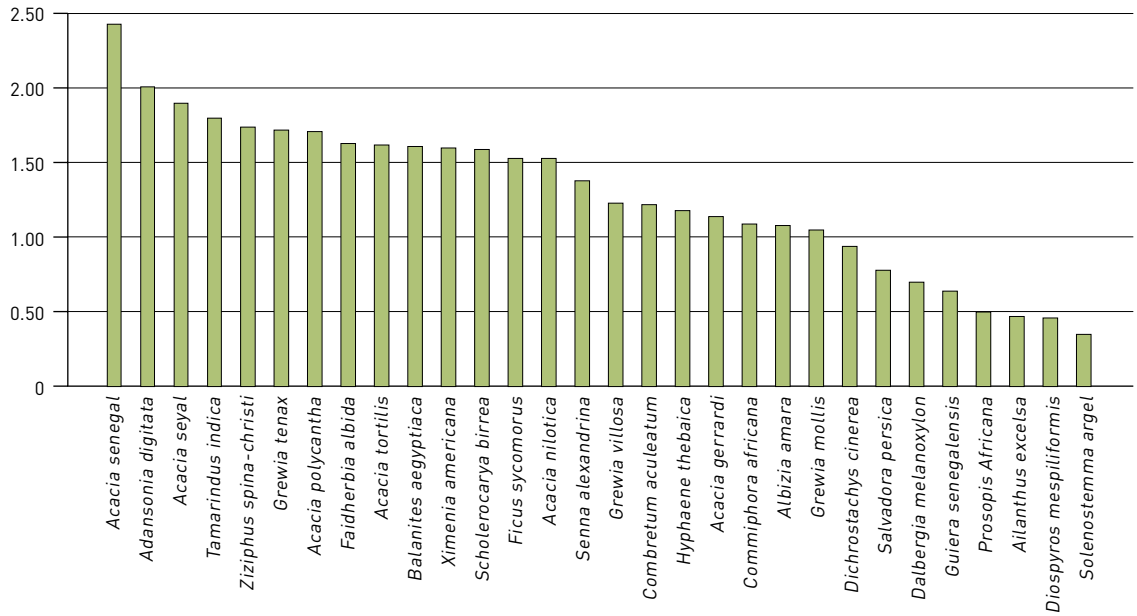
In the Blue Nile and Sinnar, many species, such as *Acacia senegal* (2.37), *Acacia seyal* (2.12), *Adansonia digitata* (1.75), *Tamarindus indica* (1.73), *Acacia polyacantha* (1.71), *Grewia tenax* (1.70), *Ziziphus spina-christi* (1.69), *Acacia tortilis* (1.56), *Acacia nilotica* (1.56), and *Ficus sycomorus* (1.50) ranked high for their fruits and/or seeds, as fodder, gum and/or resin, and bark and/or root and obtained the highest IVIs overall (Figure 23).

Figure 23. **IVI according to NWFP key informants in Blue Nile and Sinnar**



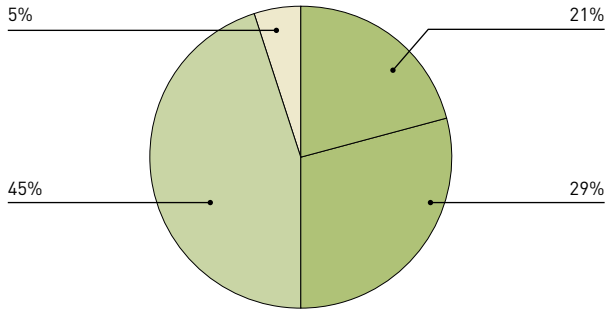
The IVIs obtained from North and West Kordofan and Blue Nile and Sinnar were combined and averaged to give the final IVIs for the whole study area (Figure 24). This could be generalised to denote the most important NWFPs in Sudan.

Figure 24. **IVI according to all NWFP key informants in the states**



The results obtained from the key informant interviews provided strong evidence of the significant contribution NWFPs make to local communities in the study area, including food, fodder, medicinal materials, and other uses. The statistical analysis (Figure 25) showed that the use of NWFPs as fodder ranked first (45 percent percent), followed by food (29 percent), medicinal materials (21 percent) and other uses (5 percent).

Figure 25. **The most important uses of NWFPs according to key informants in the study area**

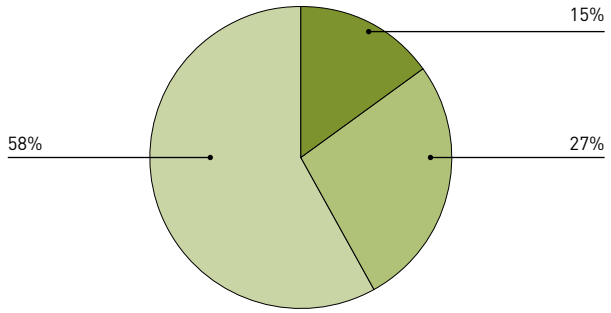


Medicinal materials Food Fodder Other NWFP uses

3.3 Distribution of gross income from collecting the three top NWFPs

The distribution of gross income from collecting the three top NWFPs in North and West Kordofan states revealed that the highest income was obtained from collecting gum arabic, followed by baobab and tamarind fruit, according to feedback from collectors (Figure 26).

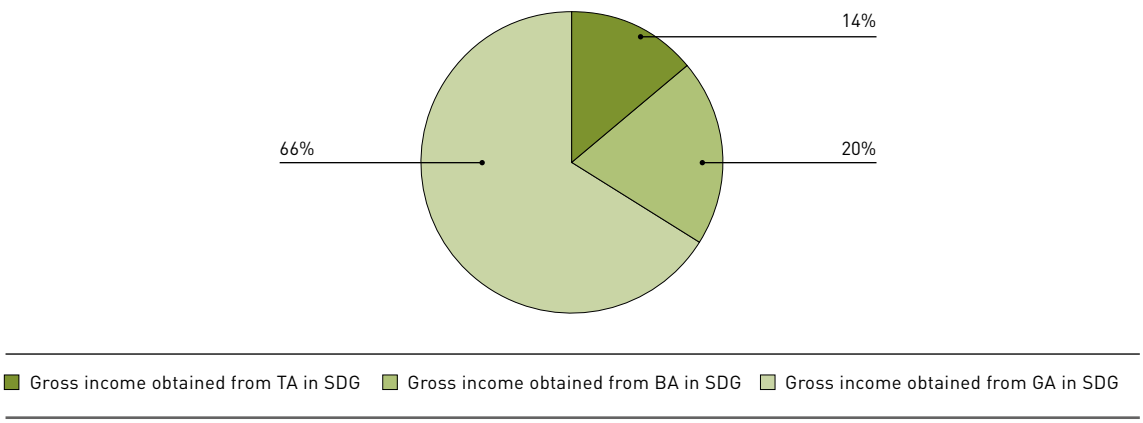
Figure 26. **Gross income from gum arabic, baobab and tamarind collection in North and West Kordofan**



Gross income obtained from TA in SDG Gross income obtained from BA in SDG Gross income obtained from GA in SDG

The same trend was seen in Blue Nile and Sinnar states where gum arabic ranked first, followed by baobab and tamarind fruits (Figure 27). Unlike the case of North and West Kordofan where the percentage of gum arabic contribution to gross income was computed using only *Acacia senegal*, both *Acacia senegal* and *Acacia seyal* contributed to the percentage in the case of Sinnar and Blue Nile.

Figure 27. **Gross income from gum arabic, baobab and tamarind collection in Blue Nile and Sinnar**



3.4 NWFP species collected across the states

The descriptive statistics highlight the different NWFP species gathered by collectors across the states (Table 5). Most (75 percent) of the respondents in North Kordofan gathered *Acacia sengal, Adansonia digitata, Ziziphus spina-christi, Acacia nilotica* and *Balanites aegyptiaca* at the same time compared to 25 percent who collected these products in Blue Nile. Gum arabic from *Acacia seyal* was collected exclusively (100 percent) in Sinnar. *Acacia senegal, Acacia seyal, Aansonia digitata and Tamarindus indica* were gathered together in West Kordofan (47 percent), Blue Nile (41 percent) and Sinnar (12 percent).

These results show that the collectors generally do not gather just one product but rather a range of species. Some species such as *Acacia senegal, Acacia seyal, Adansonia digitata* and *Tamarindus indica* were frequently reported as being collected along with other species across the different states. This correlates with the IVIs reported across the states.

Table 5. **Different NWFP species collected across the states**

Common NWFPs species	West Kordofan	North Kordofan	Blue Nile	Sinnar	Total
Acacia sengal + Adansonia digitata + Ziziphus spina-christi + Acacia nilotica + Balanites aegyptiaca	75%	25%	0	0	100%
Acacia seyal	0	0	0	100%	100%

FOLLOWS ON THE NEXT PAGE →

Common NWFPs species	West Kordofan	North Kordofan	Blue Nile	Sinnar	Total
Acacia sengal + Adansonia digitata +Ziziphus spina-christi + Acacia nilotica + Balanites aegyptiaca + Balanites aegyptiaca	64%	27%	0	9%	100%
Acacia sengal + Adansonia digitata +Ziziphus spina-christi + Acacia nilotica + Balanites aegyptiaca + Balanites aegyptiaca +Acacia nilotica	50%	33%	0	17%	100%
Acacia sengal + Adansonia digitata + Grewia tenax +Ziziphus spina-christi	100%	0	0	0	100%
Acacia sengal +Ziziphus spina-christi + Adansonia digitata	86%	14%	0	0	100%
Acacia senegal + Acacia seyal + Acacia polyacantha	0	0	0	100%	100%
Acacia seyal+ Adansonia digitata	60%	20%	0	20%	100%
Acacia senegal + Acacia seyal + Adansonia digitata +Tamarindus indica	47%	0	41%	12%	100%

3.5 NWFP species traded collectively across the states

The findings of the current study (Table 6) listed the species of NWFPs traded collectively across the states. All transactions made by NWFP traders included various products and never just one. This diversification of products might be intended to mitigate any risk and uncertainty that may arise in case of trading a single product.

Table 6. **NWFP species traded across the states**

Common NWFPs species	West Kordofan	North Kordofan	Khartoum	Blue Nile	Sinnar	Total
Acacia sengal + Tamarindus indica + Grewia tenax	100%	0	0	0	0	100%
Adansonia digitata + Ziziphus spina-christi + Cassia senna	100%	0	0	0	0	100%
Borasus aethiopia + Detarium microcarpum Ziziphus spina-christi + Balanites aegptiaca	0	0	100%	0	0	100%
Adansonia digitata + Hyphene thebiaca + Tamarindus indica + Ziyiphus spina-christi	22%	0	33%	28%	17%	100%
Acacia senegal + Adansonia digitata + Detarium microcarpum Ziziphus spina-christi + Balanites aegptiaca + Hyphene thebiaca+	24%	9%	57%	5%	5%	100%
Ziziphus spina-christi + Adansonia digitata + Tamarindus indica + Grewia tenax	89%	0	0	11%	0	100%
Acacia senegal + Adansonia digitata + Ziziphus spina-christi + Cassia senna	27%	50%	4%	8%	11%	100%

3.6 Distribution of the areas occupied by the main NWFP species

The distribution of frequencies regarding the areas occupied by the top three NWFP species (GA, BA and TA) across the study areas is displayed in Table 7. The findings show that over 50 percent of the forested areas was covered by GA (from *Acacia sengal*) and BA according to 36 and 10 respondents in West Kordofan, respectively. Moreover, 45 respondents mentioned that the TA areas cover 33 percent or less of the forested areas in West Kordofan. The same patterns of area distribution for the three main species were emphasized by fewer respondents across the states (Table 7).

Table 7. **Distribution of areas occupied by the gum arabic, baobab and tamarind trees**

State	GA			BA			TA		
	Frequency			Frequency			Frequency		
	>50%	33%	<33%	>50%	33%	<33%	>50%	33%	<33%
West Kordofan	36	9	0	10	21	14	0	20	25
North Kordofan	9	3	0	3	5	4	0	5	7
Blue Nile	7	0	0	0	3	4	0	3	4
Sinnar	9	0	0	0	3	6	0	6	3

3.7 Distribution of the areas where the main NWFP species are harvested

The distribution of frequencies regarding where the three main NWFP species are harvested (GA, BA and TA) across the study areas is shown in Table 8. The results reveal that over 50 percent of the GA area in West Kordofan was harvested, whereas only nine respondents in the same state expressed that the area of GA was completely (100 percent) harvested. In West Kordofan, 14 respondents mentioned that the areas of BA and TA were completely harvested (100 percent). The same patterns were expressed with fewer frequencies across other states.

Table 8. **Percentage of NWFP area harvested per species across the states**

State	GA				BA				TA			
	Frequency				Frequency				Frequency			
	100%	>50%	33%	<33%	100%	>50%	33%	<33%	100%	>50%	33%	<33%
West Kordofan	9	27	5	4	14	10	8	10	14	0	10	18
North Kordofan	2	7	2	1	3	3	3	3	3	0	3	6
Blue Nile	4	3	0	0	3	0	0	0	3	0	0	0
Sinnar	3	3	3	0	3	0	3	0	3	0	0	3

3.8 Rights to access and control NWFP land

The ongoing principle is that the lands belong to the government and are administered by the tribes living there under the communal system. In the past, the influence of the tribe and its subdivisions have come about either by natural agreement or boundaries, and this area is known as the tribal *mashiakha* land of the village. In most cases village leaders have the right to allocate land within their tribal lands and the tribal chiefs (*Sheikhs*) have established traditional rules to organize land tenure. The results of this study reveal that the tribal leaders, local community, landlords (owners) and both tribal leaders and the government authority - mainly the Forest National Corporation (FNC) - are involved, with varying degrees of authority, in controlling NWFP community lands as confirmed by 34, 4, 30 and 32 percent of collectors across the states, respectively (Figure 28). Regarding who has the right to harvest NWFPs across the states, the results reflect that both natives and land owners (whether or not they are native) have the right to collect NWFPs. In this context, most of the native inhabitants were observed to be very satisfied with the land use and land tenure regulations (Figure 29). Moreover, the study differentiated the different methods for obtaining the right to harvest NWFP lands across the study area, which include inheritance, benefit sharing, land use (*wad yad*) and purchasing the land (Figures 30 and 31).

Figure 28. **Entities eligible to control NWFPs on community land**

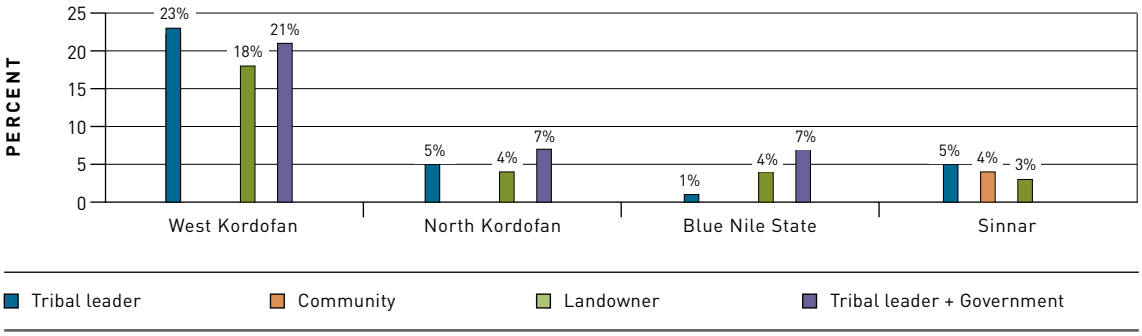


Figure 29. **People eligible to harvest NWFPs on community land in the states**

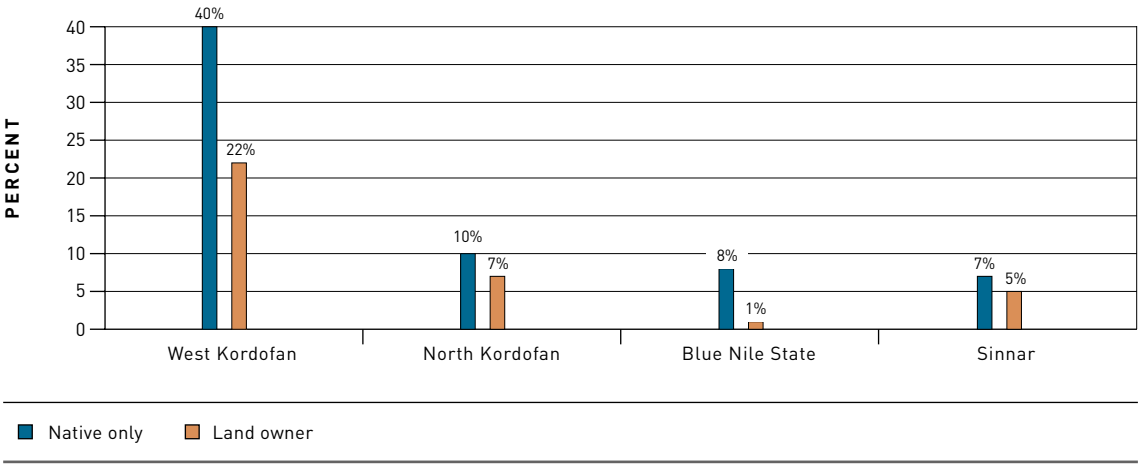


Figure 30. **Method of eligibility and the right to harvest NWFPs**

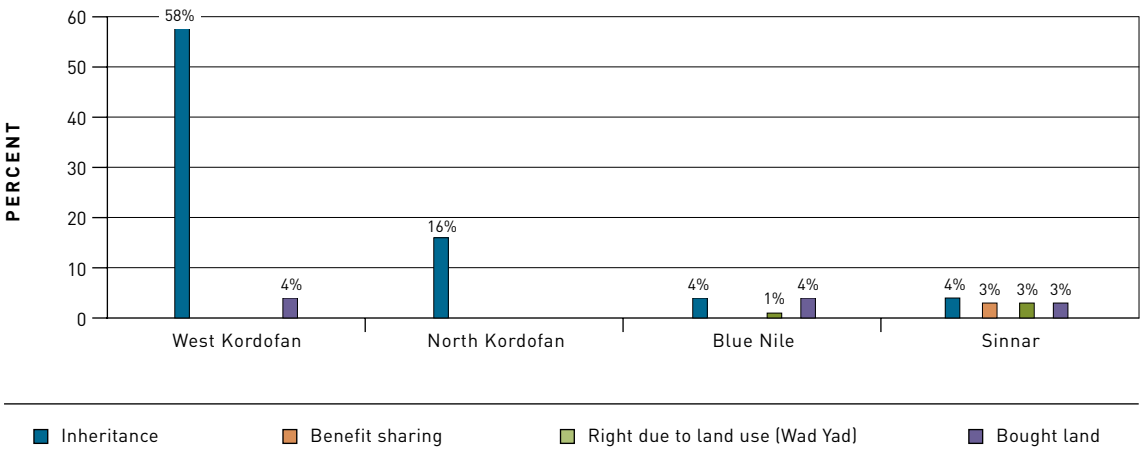
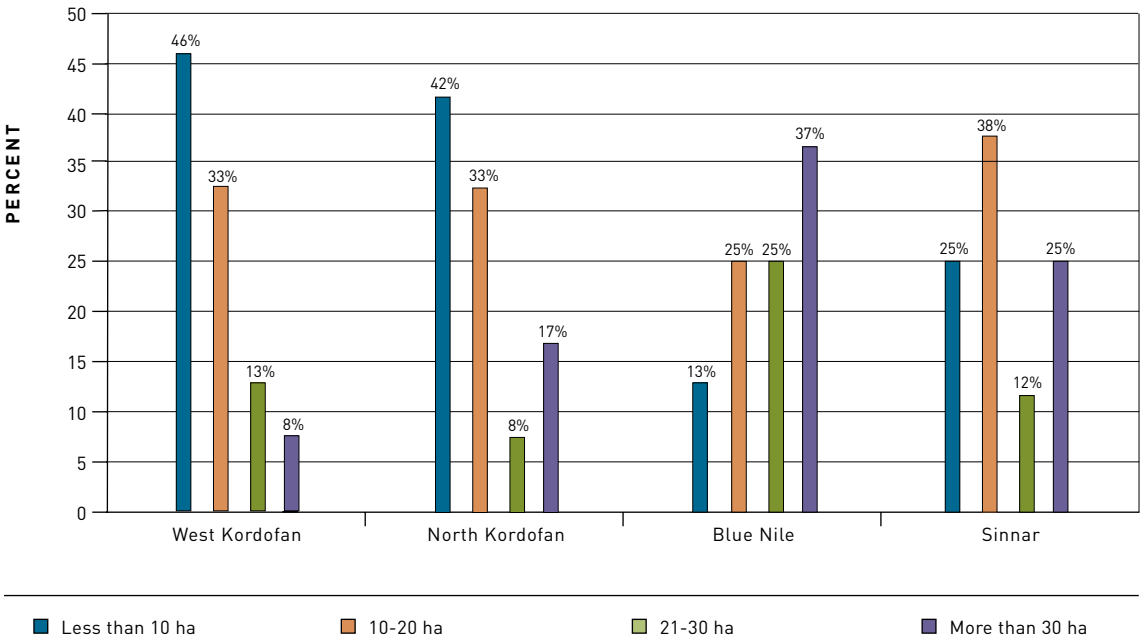


Figure 31. **Variation of harvested NWFP areas (in hectares) across the states**



3.9 Payment made for harvesting NWFP land

Payment made for harvesting NWFP land was highlighted (Figure 32). The collectors reported the following means of payment: royalty (78 percent), free (22 percent) and taxes (4 percent). As regards to the perception of the NWFP collectors towards land payments, most reported being satisfied with how much they paid across all states (Figure 33).

Figure 32. **Payments made for harvesting NWFP areas**

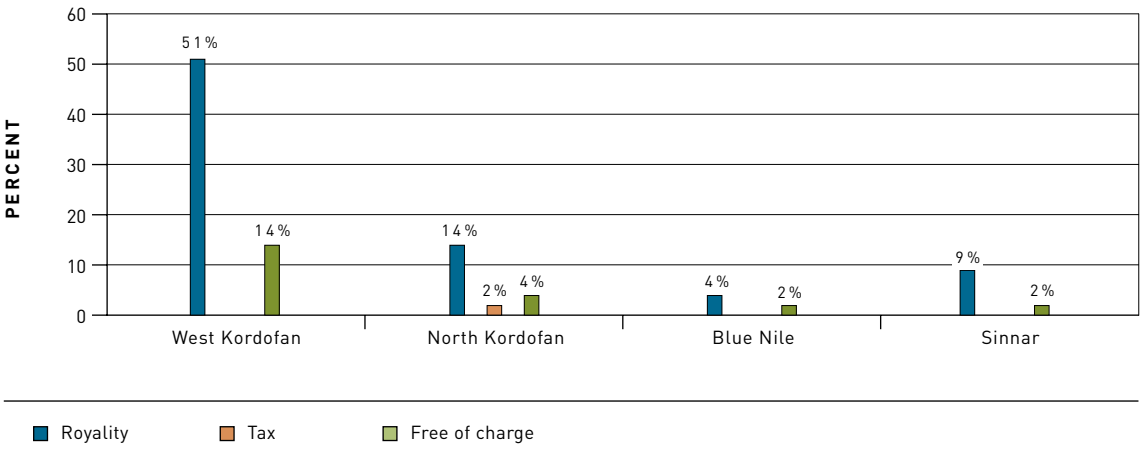
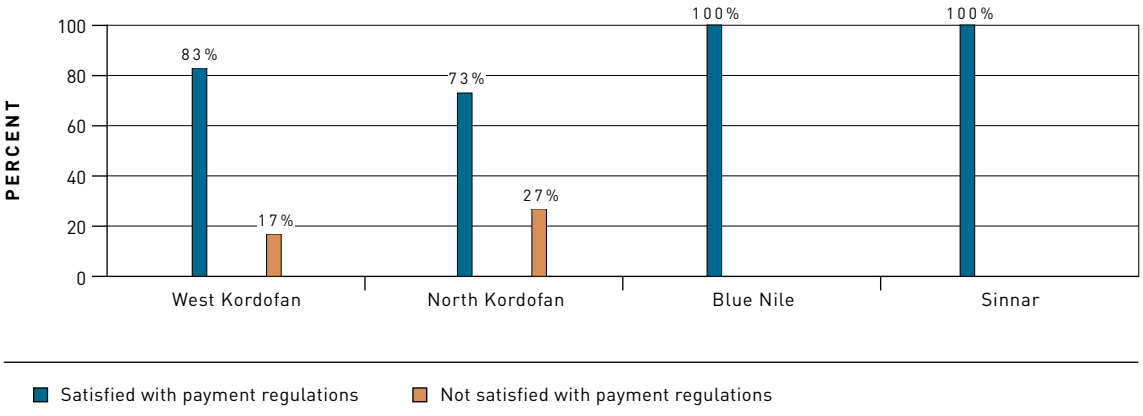


Figure 33. **NWFP collectors' perception of land payments**



3.10 Methods of NWFP species regeneration

Concerning the methods of establishing NWFPs, the results revealed that *Adansonia digitata* and *Tamarindus indica* regenerate naturally (100 percent) across the states. However, in the case of the gum arabic tree, the majority of the respondents pointed out the trees either grow naturally or are seeded (Table 9).

Table 9. **Methods of regeneration pertaining to the selected NWFP species**

State	*Acacia senegal*				*Adansonia digitata*		*Tamarindus indica*	
	Naturally	Seeding	Seedling	Coppicing	Naturally	Seeding	Naturally	Seeding
West Kordofan	69%	31%	0	0	100%	0	100%	0
North Kordofan	75%	25%	0	0	100%	0	100%	0
Blue Nile	29%	71%	0	0	100%	0	100%	0
Sinnar	56%	44%	0	0	100%	0	100%	0

3.11 Land use regulations for accessing NWFPs

Most respondents confirmed that there are no clear regulations other than some that organize access to and protection of land use across the states.

3.12 Membership, objectives and benefits of NWFP associations

The study shows that most of the NWFP collectors (79 percent) are not member of any NWFP association (Figure 34); a small number (21 percent) belong to associations, mainly gum arabic associations in the states. Although, the majority of NWFP collectors across the states do not belong to any association, they are aware of the objectives of the associations in terms of product purchase, price bargaining and credit facilities. The benefits provided by these associations, such as credit facilities, were mentioned by 100 and 87 percent in North and West Kordofan states, respectively (Table 10).

Figure 34. **Association membership in the states**

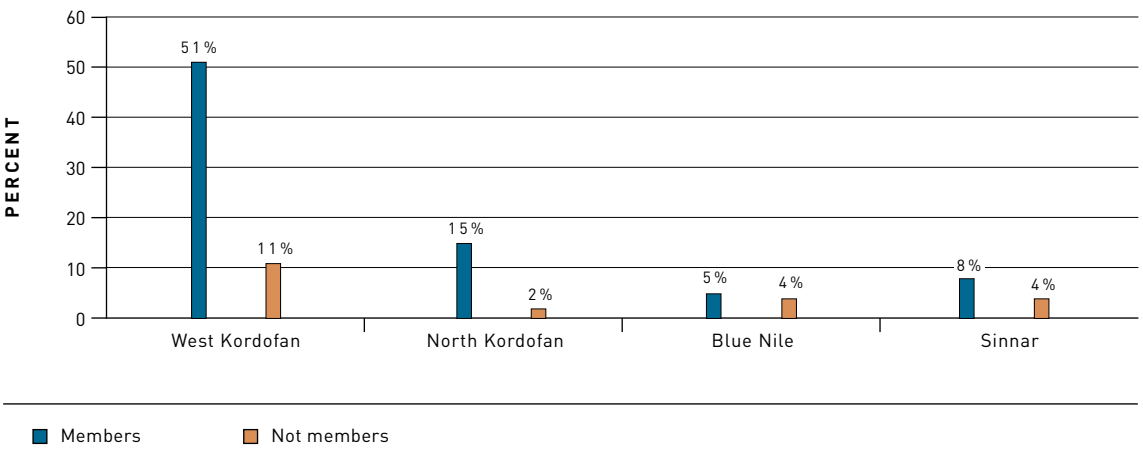


Table 10. **Objectives and benefits of the NWFP Associations**

State	Objectives		Benefits	
	Price bargaining	Purchase product + price bargaining + credit	Credit facility	No benefits
West Kordofan	38%	62%	87%	13%
North Kordofan	0	100%	100%	0
Blue Nile	67%	33%	35%	65%
Sinnar	33%	67%	65%	35%

3.13 Area of NWFP collection

Sustainable forest management implies that the local people should have the right to access the forest reserves besides other forested lands managed and controlled by the FNC and community for the purpose of protection and conservation. Therefore, and based on NWFP collectors' responses, the NWFPs are mainly collected from community land in all the states, and a few collectors gather some products from forest reserves and fallow lands (Table 11).

Table 11. **Area from which respondent collects NWFPs**

State	Area from which respondent collects NWFPs		
	Forest reserve	Fallow land	Community land
West Kordofan	13%	13%	74%
North Kordofan	17%	17%	66%
Blue Nile	43%	0	57%
Sinnar	33%	0	67%

Gum exudation depends on the climate and environmental conditions, particularly the temperature and the amount of rainfall within the season, which vary from one place to another across the Sudan Gum Belt. For instance, and according to the collectors' responses in both North and West Kordofan, there are two seasons for collecting gum arabic from the *Acacia senegal* tree. Early gum tapping is always between November and December while late tapping is done between December and early March depending on how long the rainy season lasts; it normally ends in October. In Blue Nile and Sinnar, the rainy season extends to late November which delays the time of tapping and consequently when the gum can be collected (Table 12).

Table 12. **Gum arabic collection period in the states**

State	Time of gum arabic collection		
	November to December	November to February	December to March
West Kordofan	47%	53%	0
North Kordofan	50%	50%	0
Blue Nile	14%	43%	43%
Sinnar	34%	33%	33%

Concerning collecting baobab fruit, the majority (over 50 percent) of the collectors across the states agreed that the appropriate time to collect baobab fruit is between November and December, with some variation in Sinnar (Table 13).

Table 13. **Baobab fruit collection period in the states**

State	Baobab fruit collection period			
	December	November to December	November to February	October to December
West Kordofan	0	62%	25	13%
North Kordofan	0	50%	33%	17%
Blue Nile	43%	57%	0	0
Sinnar	33%	34%	33%	0

Tamarind trees (*Tamarindus indica*) usually grow on well-drained sites along rivers and valleys as scanty vegetation. The fruit ripens depending on the availability of water and so during the rainy season the fruits are ready for collection during November and December, particularly in West and North Kordofan. While in Blue Nile and Sinnar, tamarind fruit is normally collected during December and continues up to March (Table 14).

Table 14. **Tamarind fruit collection period in the states**

State	Tamarind fruit collection period			
	November to December	November to February	December to March	December to January
West Kordofan	38%	15%	35%	12%
North Kordofan	40%	20%	30%	10%
Blue Nile	0	0	100%	0
Sinnar	0	0	100%	0

To sum up, gum arabic, baobab and tamarind fruit is always collected in the period extending from November to March, which varies slightly from product to product. This period does not

clash with the calendars for other cash and food crops across the different states, which start in April and end in October. Accordingly, the income generated from these NWFPs could be invested in food and cash crops throughout the states.

As the time of gum tapping varies from state to state, the quantities collected per month also vary. A large amount (over 31 *kantars*) of gum arabic was collected per month in Blue Nile as reported by two thirds of the respondents (70 percent). Other amounts collected of gum arabic, baobab and tamarind products across states can be seen in Tables 15, 16 and 17.

(1 *kantar* = 44.5 kg)

Table 15. **Quantity of gum arabic collected per month in the states**

State	Quantity of gum arabic collected per month				Total
	Less than 10 kantars	10-20 kantars	21-30 kantars	More than 31 kantars	
West Kordofan	49%	4%	16%	31%	100%
North Kordofan	58%	0	17%	25%	100%
Blue Nile	0	0	29%	71%	100%
Sinnar	33%	0	11%	56%	100%

Table 16. **Quantity of baobab fruit collected per month in the states**

State	Quantity of baobab fruit collected per month				Total
	Less than 5 kantars	5-10 kantars	11-15 kantars	More than 15 kantars	
West Kordofan	33%	38%	0	29	100%
North Kordofan	34%	33%	0	33%	100%
Blue Nile	100%	0	0	0	100%
Sinnar	17%	83%	0	0	100%

Table 17. **Quantity of tamarind fruit collected per month in the states**

State	Quantity of tamarind fruit collected per month				Total
	Less than 5 kantars	5-10 kantars	11-15 kantars	More than 15 kantars	
West Kordofan	64%	0	0	36%	100%
North Kordofan	56%	0	0	44%	100%
Blue Nile	100%	0	0	0	100%
Sinnar	100%	0	0	0	100%

The majority (49 percent) of respondents in West Kordofan harvest both tamarind and baobab fruit (Figure 35 A and B) using a normal stick (used also by herders who are sometimes very active in fruits collection) or a modified hooked stick (*kungara*). The study observed that an axe is often used by local communities for collecting NWFPs and for other proposes, and is part of the prevailing culture in North and West Kordofan (Figure 36). In Sinnar, the collectors also use both a stick and a hooked stick to harvest tamarind fruits.

Figure 35. **Tools used to collect baobab (A) and tamarind (B) fruit**

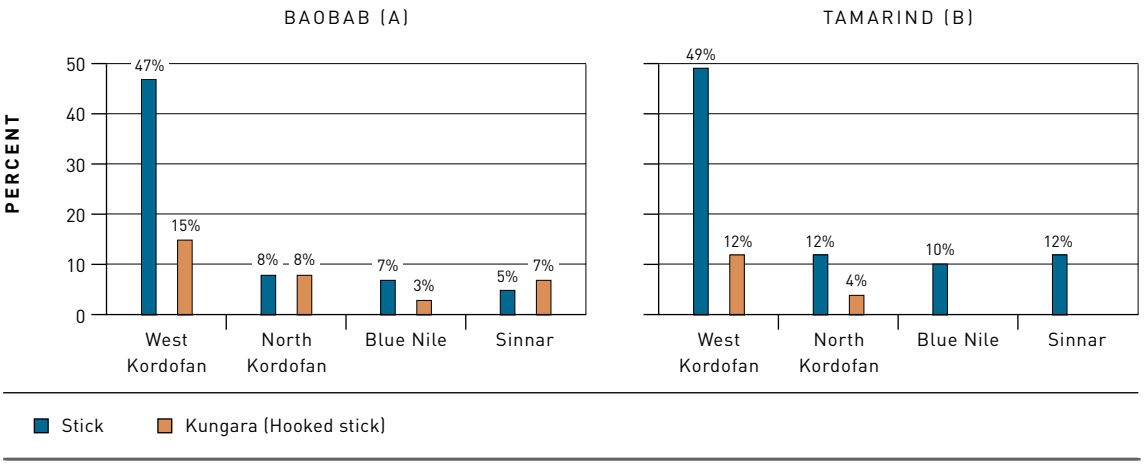


Figure 36. **Traditional tools used to collect NWFPs near *Eldowdia* village, West Kordofan**

Regarding the assembly area of NWFPs, the results revealed that 47 percent, 43 percent, 42 percent and 33 percent assembled these products at home in West Kordofan, Blue Nile, North Kordofan and Sinnar, respectively (Table 18).

Table 18. **Assembly area of NWFPs across the states**

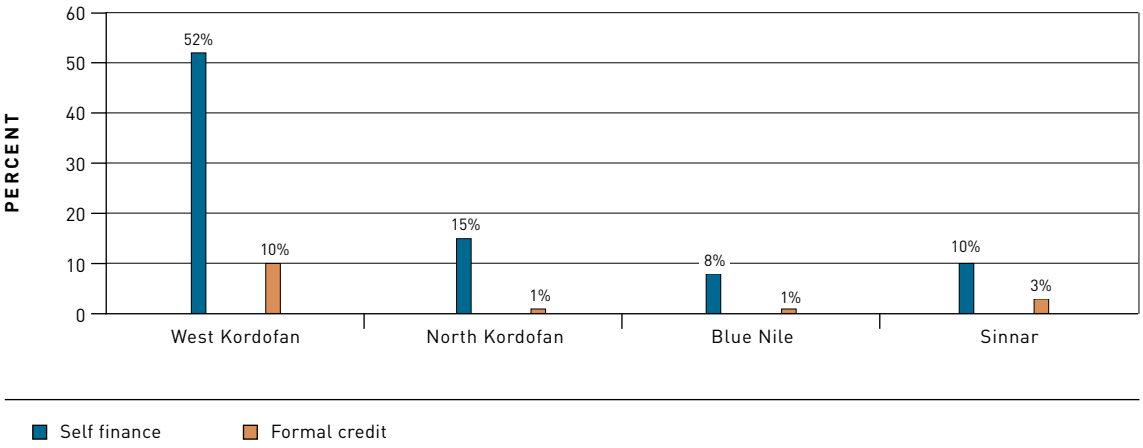
State	Assembly area of NWFPs			
	At home	Roadside	At the market	Total
West Kordofan	47%	9%	44%	100%
North Kordofan	42%	8%	50%	100%
Blue Nile	43%	0	47%	100%
Sinnar	33%	0	77%	100%

As far as the distances from NWFP assembling areas to the market place is concerned, the results show that this distance ranges from 0.5 km to 27 km, which will require a reliable

means of transport in most case. The fact that many market places are far from the point of collection is often the reason why there are large numbers of intermediaries between the collectors and the sellers in the markets.

Concerning sources of finance available to NWFP collectors, the findings reveal that most of the respondents (90 percent) were self-financed versus very few (10 percent) that were able to acquire formal credit (Figure 37).

Figure 37. **Sources of finance available to NWFP collectors across the states**



In most cases the NWFPs that are collected are delivered in a good and clean condition (Figure 38) and so are accepted by traders, as mentioned by more than 70 percent of collectors in the states. In some few cases the traders might reject (Table 19) the products due to reasons such as immaturity in the case of baobab fruit, or if they are rotten and dark in the case of gum arabic, if they are stored in plastic sacks and poor storage facilities (Figure 39).

Figure 38. **Clean NWFPs at the Abuzabad market**

Figure 39. **Rejected gum arabic at the Enuhud market**

Table 19. **Rejection of collected NWFPs across the states**

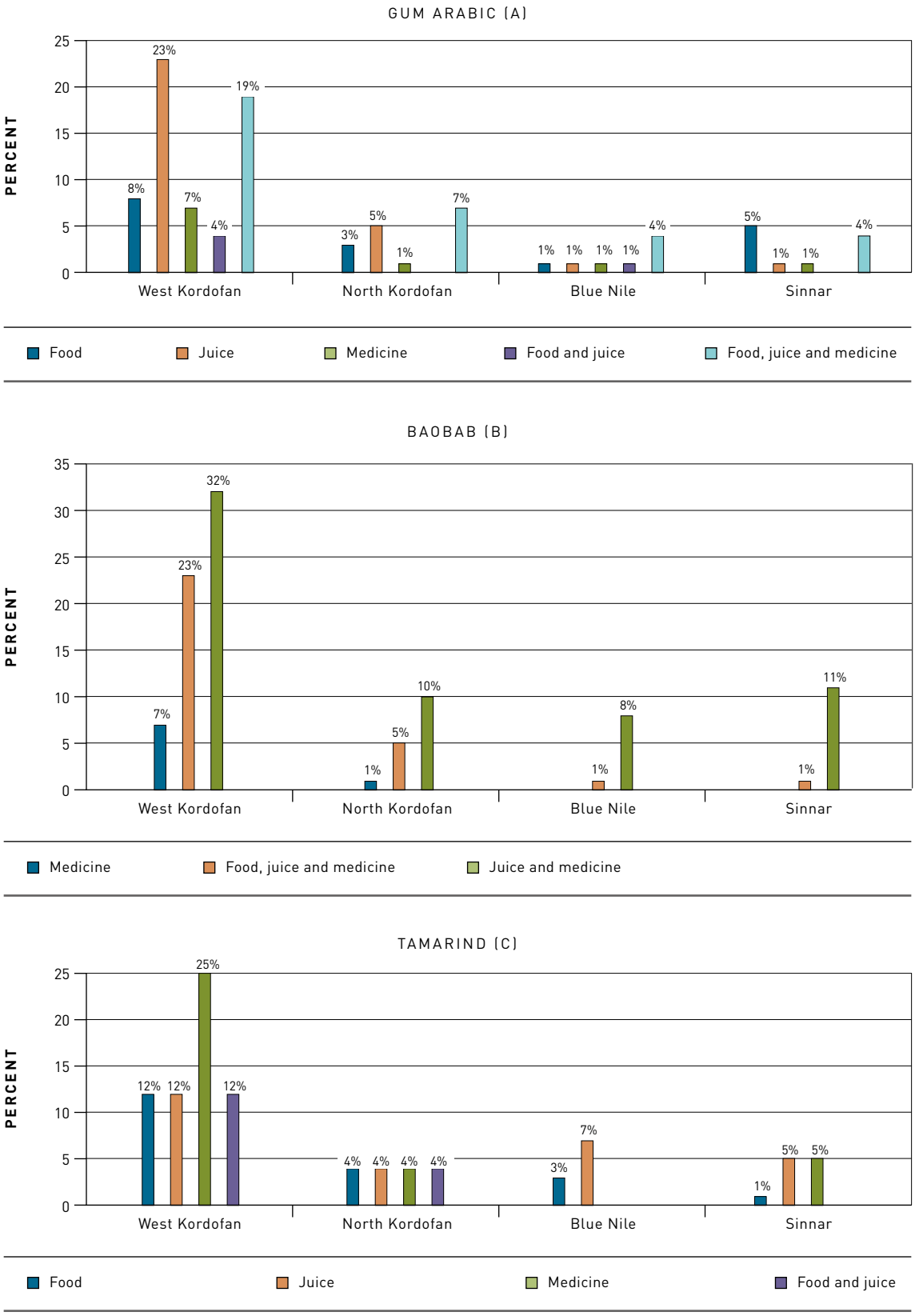
State	Collected NWFPs are sometimes rejected		
	Yes	No	Total
West Kordofan	29%	71%	100%
North Kordofan	33%	67%	100%
Blue Nile	0	100%	100%
Sinnar	0	100%	100%

NWFPs are always collected as a secondary source of income to be used should the crops fail; however, this income also contributes significantly to household income and is sometimes invested to finance the production of food and cash crops. Some products are collected for domestic use, such as for food, fodder and medicine, and other products are collected for both domestic consumption and commercial purposes. The results from the social survey in the states revealed that the maximum domestic consumption is 5 percent, 15 percent and 4 percent for gum arabic, baobab and tamarind, respectively, (Table 20, Figure 40).

Table 20. **Quantities of NWFPs used for domestic consumption**

Quantity	Minimum	Maximum	Mean	S. deviation
Quantity of gum arabic used for household consumption %	0.5	5.0	1.7	1.73
Quantity of BA used for household consumption %	2.0	15.0	7.7	4.11
Quantity of TA used for household consumption %	0.0	4.0	1.4	1.12

Figure 40. **Uses of gum arabic (A), baobab (B) and tamarind (C) products across the states**



There are many factors affecting the collection process of NWFPs across the states. These factors vary from one state to another depending on the type of NWFPs available. In Blue Nile and Sinnar over 55 percent of respondents agreed that the availability of NWFPs is the main factor, while the labour force coupled with availability of NWFPs in West and North Kordofan is considered a major determinant (around 50%). Other factors are also listed (Table 21).

Table 21. **Factors affecting the volume of NWFPs harvested across the states**

State	Factors affecting the volume of NWFPs harvested				
	Availability of NWFPs	Level of disease infestation	Labour availability + Availability of NWFPs	Harvesting technique + locust + camels	Total
West Kordofan	20%	11%	56%	13%	100%
North Kordofan	17%	8%	48%	17%	100%
Blue Nile	57%	0	29%	14%	100%
Sinnar	67%	0	22%	11%	100%

NWFP collection across the states encounters some constraints as stated below (Table 22):

- Harsh conditions because of the thorns on the trees and long distances.
- Conflicts due to land ownership, high fees and complex laws, and lack of capital.
- Pest and insects, overcutting, overgrazing, collection of immature fruit and outbreaks of fire.

Table 22. **Problems encountered by NWFP collectors across the states**

State	Problems facing NWFP collectors				
	Pests & insects	Harsh conditions (thorns on trees, long distances)	Land ownership, fees, laws and lack of capital	Overcutting, overgrazing + immature fruit and outbreaks of fire	Total
West Kordofan	18%	56%	13%	13%	100%
North Kordofan	8%	58%	17%	17%	100%
Blue Nile	57%	29%	0%	14%	100%
Sinnar	33%	22%	33%	12%	100%

Table 23 presents solutions to problems experienced by NWFP collectors across the states. These include improving infrastructure and services at the production sites, as noted by 43 percent of respondents in Blue Nile, while providing funding and formal credit were suggested by 38 percent of respondents in West Kordofan.

Table 23. **Solutions to problems facing NWFP collection across the states**

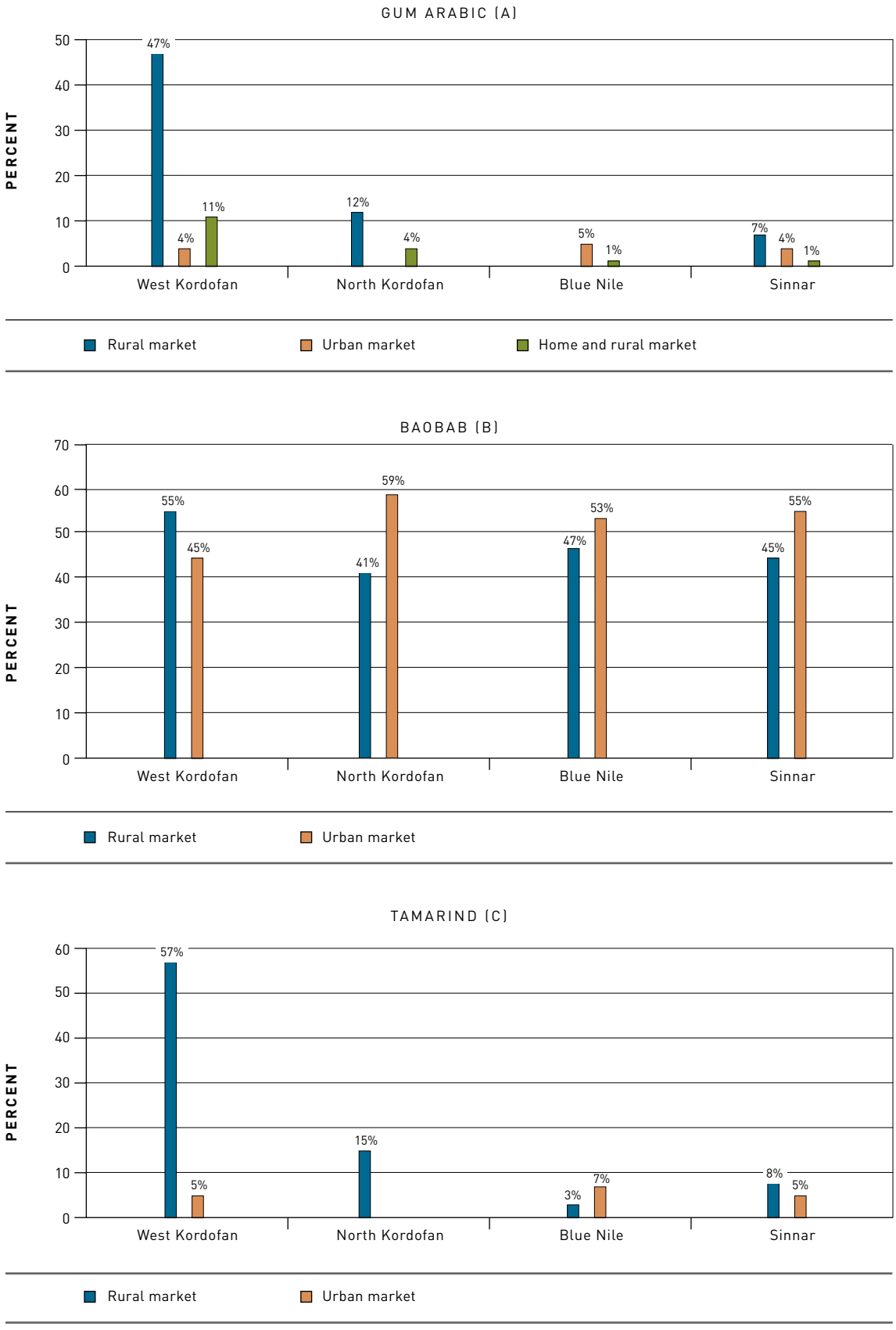
State	Solutions for problems facing NWFP collectors					
	Improve infrastructure and services at production sites	Awareness	Provide formal credit	Improve land tenure system	Manage grazing + harvest maturing fruits + pest control	Total
West Kordofan	7%	24%	38%	18%	13%	100%
North Kordofan	0	25%	33%	25%	17%	100%
Blue Nile	43%	0	14%	29%	14%	100%
Sinnar	22%	34%	11%	22%	11%	100%

In the context of the specific problems and difficulties encountered by gum arabic, baobab and tamarind fruit collectors in the study area, the feedback from the key informant interviews revealed some more difficulties added to those already stated by the collectors, as follows:

- Traditional tool used for GA tapping and collection. This problem is also encountered in BA collection;
- Environmental hazards;
- Difficulties associated with the marketing of these products;
- Lack of capital and limited informal credit (*shail* system);
- Poor infrastructure and services at collection sites, such as lack of drinking water;
- The felling of hashab trees and distance to collection areas are interrelated as the excessive cutting down of trees contributes to there being fewer products available and/or the products are only found far in the forest. This problem is valid only in the case of hashab trees and not baobab trees.

Regarding regulating NWFP collection by government or associations, the results show that the majority of the respondents interviewed were not aware of any such regulation. Gum arabic, baobab, and tamarind products are always sold on rural and urban markets although sometimes gum arabic and baobab products are sold from home (Figures 41A, B and C).

Figure 41. **Places where gum arabic (A), baobab (B) and tamarind (C) products are sold**



3.14 Results from interviews with traders

Some demographic and socioeconomic characteristics of NWFP traders in the study area include number of spouses, number of men and women in the household, and number of NWFP associations across the states. These are attached to this study (Annex 10). In Sudan, trading NWFPs has a long history, although it is always linked to the gum arabic trade, which was stated as being the most traded NWFP during the field surveys. The results show that most of the interviewed NWFP traders have accumulated experience and skills in business over the previous 0 to 6 years (Annex 11). According to respondents, NWFP traders are not attached to any associations in Sinnar, Blue Nile and Khartoum, whereas some active trade associations were observed and researched in North and West Kordofan (Annex 12). These associations were categorized according to feedback from traders as Gum Arabic Producers' Associations (GAPAs), farmers' associations, and trade unions that are related to businessmen's federations (Annex 13).

The objectives of NWFP associations across the states, as highlighted by the traders interviewed, include facilitating NWFP marketing transactions, and/or providing services and offering credit facilities to collectors. The benefits obtained by traders from belonging to the associations were limited to credit facilities and the provision of some infrastructure in the form of storage and transporting facilities (Annex 14). Trading NWFPs involves different actors in the marketing chain from village traders to city merchants via middlemen and producers' agents. Gum arabic and senna go to the main crop market, such as the Elobeid, Enuhud and Damazin crop markets, while baobab and tamarind always go to special markets, mostly on the outskirts of large cities. Most of the respondents stated that the prices of NWFPs are determined by buyers only and the product suppliers (producers' agents or village traders or city merchants) keep a low profile while prices are being negotiated. The traders listed different factors that affect the quality of NWFPs across the states. These include maturity of products, purity level, cleanness, storage and transportation conditions, and the source of the product itself (Annex 15). A list of gum arabic companies, city merchants and producers' agents at the Elobeid crop market can be found at the end of this study (Annex 16). Quantities and prices of gum arabic obtained from the Enuhud crop market (2003-2014) are displayed in Annex 17. Detailed records showing the different quantities and prices of NWFPs, including gum *Hashab*, gum *Talha*, Senna *maka*, and *Tarag-tarag* that were traded in the last 14 years (2000-2014) at the Elobeid crop market can be found in Annex 18. Annex 19 shows the gum arabic exports in Sudan obtained from the GAB for the last 20 years (1995-2015).

The NWFP traders' suggestions for boosting the NWFP industry in the country can be summarized as follows:

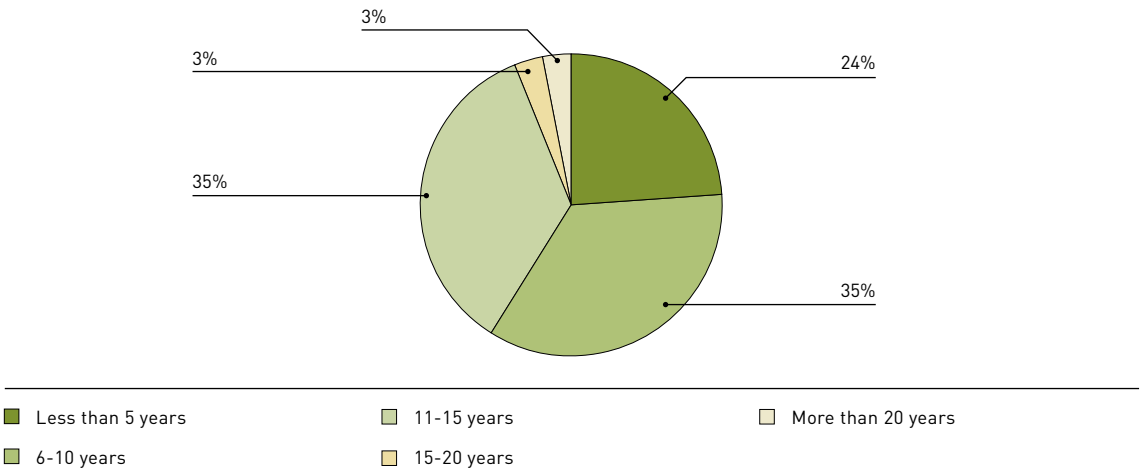
- Commercializing NWFPs by involving large-scale and massive collection enterprises;
- Expanding credit facilities to traders through microfinance and other funding programmes;
- Activating NWFPs trade association and union;
- Improving quality control services;

- Enhancing services;
- Offering better prices.
- Provision of good storage conditions.

3.16 Results from interviews with NWFP processors

The experience of the processers interviewed in Khartoum varies significantly. The majority (70 percent) have acquired experience ranging from 6-15 years in NWFP processing (Figure 42). In contrast very few respondents have experience exceeding 20 years. Although the gum arabic trade in Sudan has been in force since the 1950s, the real processing of this important commodity only started in the early 1990s; this commodity was exported raw for over 50 years. Apart from processing gum arabic, very few enterprises reported dealing with NWFP processing.

Figure 42. **Experience (years) in NWFP processing in Khartoum State**



With respect to the main occupations of the processors interviewed, the results indicate that 88 percent (all men) were owners of processing enterprises, nine percent were technical staff and only three percent were executive managers. The women are active workers or officers at these processing enterprises. The processing units use intermediate technology, where machines complement the labour force (Figure 43). It is worth mentioning that most of the baobab and tamarind processors are located in Omdurman, while the gum arabic processing warehouses are mostly located in Khartoum (*Soba* area).

Figure 44 describes the status of NWFP enterprise registration in Khartoum. 71 percent of the NWFP processing enterprises reported not being registered while only 29 percent of the enterprises were registered. These percentages indicate that the majority of the enterprises have no official permission to work. Based on their feedback, the interviewed processors confirmed their willingness to register their activities while blaming the authorities for excessive red tape and complex licensing requirements.

Figure 43. **Occupation of respondents at the NWFP enterprises in Khartoum**

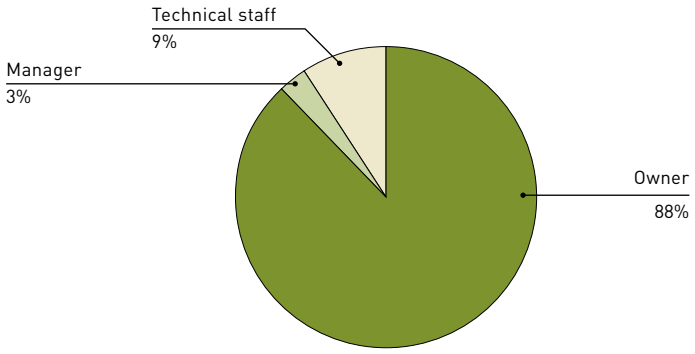
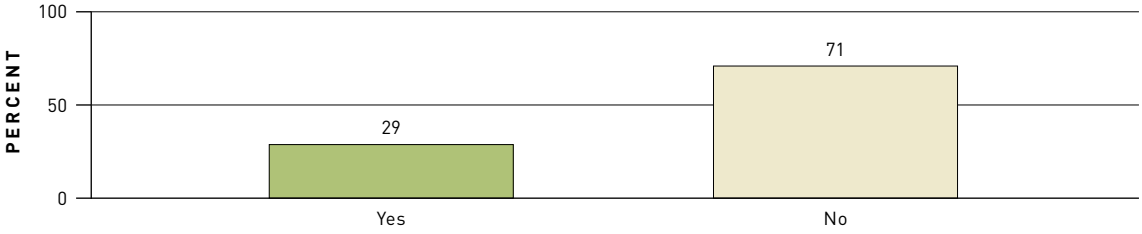


Figure 44. **Status of registration as regards to the NWFP processing enterprises in Khartoum State**



The study found that most (71) of the interviewed processors are not members of NWFP associations. The study shows that some gum arabic processors are members (29 percent), whereas few other NWFP processors are not (Figure 45).

Figure 45. **Membership of NWFP associations or trade unions in Khartoum**

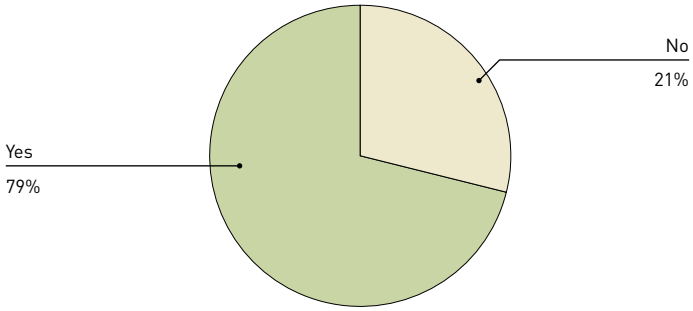
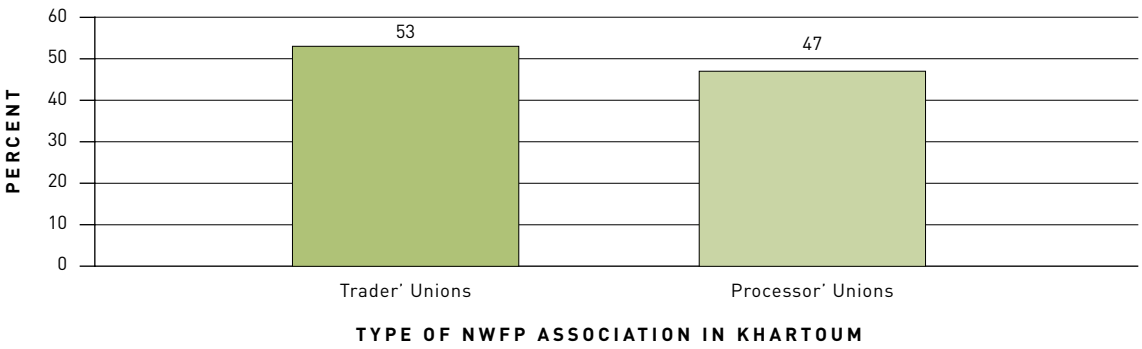


Figure 46 shows that the NWFP associations are either traders' unions (53 percent) belonging to businessmen's federations, or professional associations in the form of processors' unions (47 percent).

Figure 46. **Types of NWFP processor associations**



The respondents listed different categories regarding pre-processing (cleaning and grading) and processing activities that are always carried out on the NWFPs (Table 24). These include cleaning and grading for the three products studied (gum arabic, baobab and tamarind). Processing gum arabic takes the form of form of kibbling (70 percent) and powdering (30 percent), and for baobab fruit, granulating and powdering were mentioned by 29 and 71 percent, respectively. For tamarind both powdering (63 percent) and compressing (37 percent) were reported.

Table 24. **NWFP grading and processing activities**

Gum arabic		Baobab		Tamarind	
Kibbling	Powdering	Granulating	Powdering	Compressing	Powdering
70%	30%	29%	71%	37%	63%

Figure 47 shows the main factors that determine the quality of NWFP processing according to feedback from respondents in Khartoum. These include the cleaning of raw materials (71 percent), period of storage (15 percent), source of product (9 percent) and handling of the product during transportation (6 percent). The raw NWFPs must be cleaned because they are picked up from the ground or brought down from the trees using traditional sticks. In the case of gum arabic, producers are very keen in most cases to harvest their product directly from the tree.

Referred to the tools that are used in the processing of NWFPs, modern technologies the tools that are used to process NWFPs, modern technologies are not widely applied (Table 25). In the case of gum arabic, the percentages of traditional tools, intermediate technology, and modern technology used were 20, 30 and 50 percent, respectively. For baobab, the percentages of traditional tools, intermediate technology, and modern technology used were 45, 45 and 10 percent, respectively. The same trend is seen in the case of tamarind processing. The respondents reported using modern technology to process gum arabic.

Figure 47. **Factors determining the quality of NWFP processing**

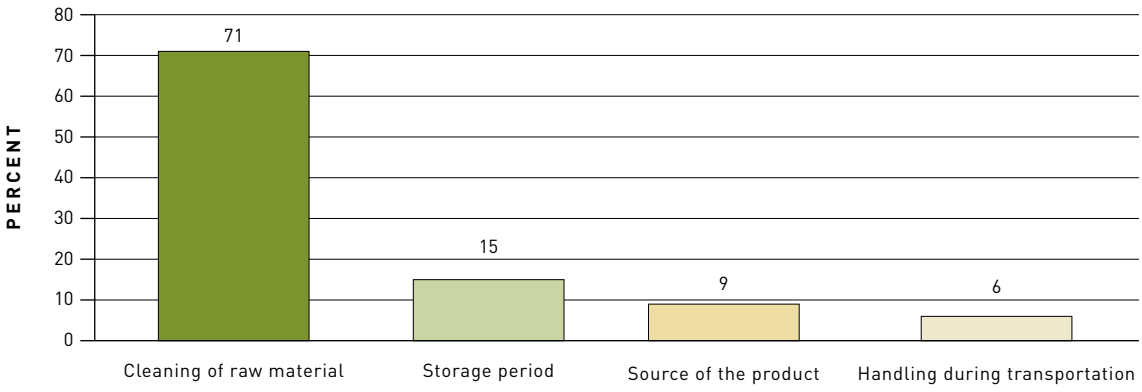
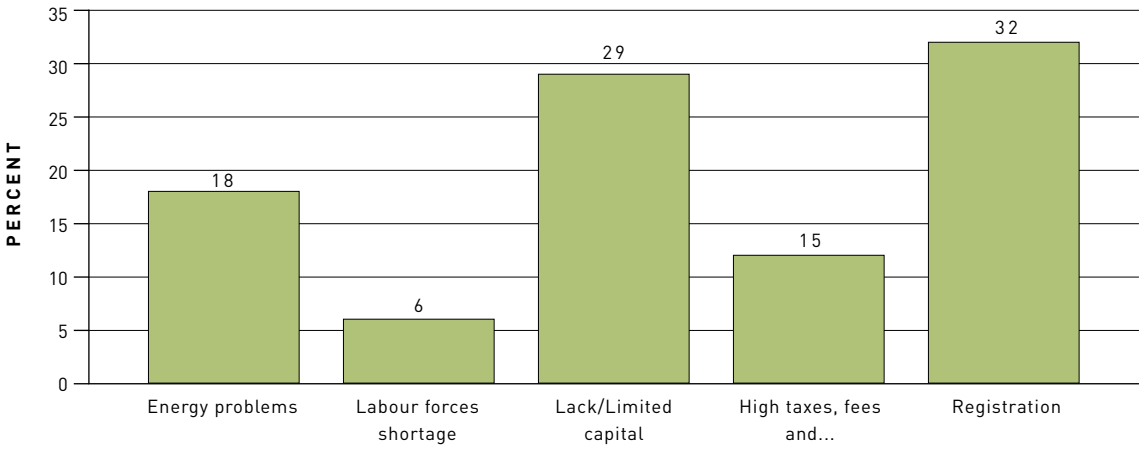


Table 25. **Description of tools for NWFP processing in Khartoum**

Gum arabic			Baobab			Tamarind		
Traditional tools	Intermediate technology	Modern technology	Traditional tools	Intermediate technology	Modern technology	Traditional tools	Intermediate technology	Modern technology
30%	50%	20%	45%	45%	10%	51%	35%	14%

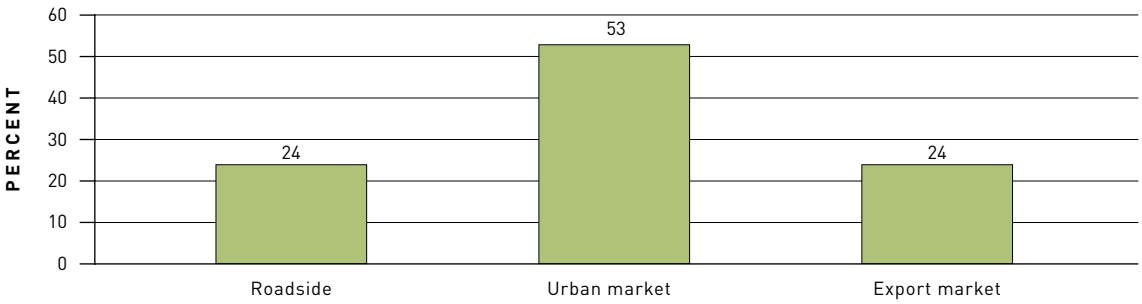
Figure 48 shows the main problems encountered when processing NWFPs. Over 60 percent of the respondents mentioned difficulties registering, inadequate working capital and the limits put on the maximum amount of bank credit. Although the shortage of skilled labour was highlighted by some respondents, energy limitation and high taxes were also considered to be major obstacles. The respondents proposed some solutions to these obstacles.

Figure 48. **Problems encountered by NWFP processors in Khartoum**



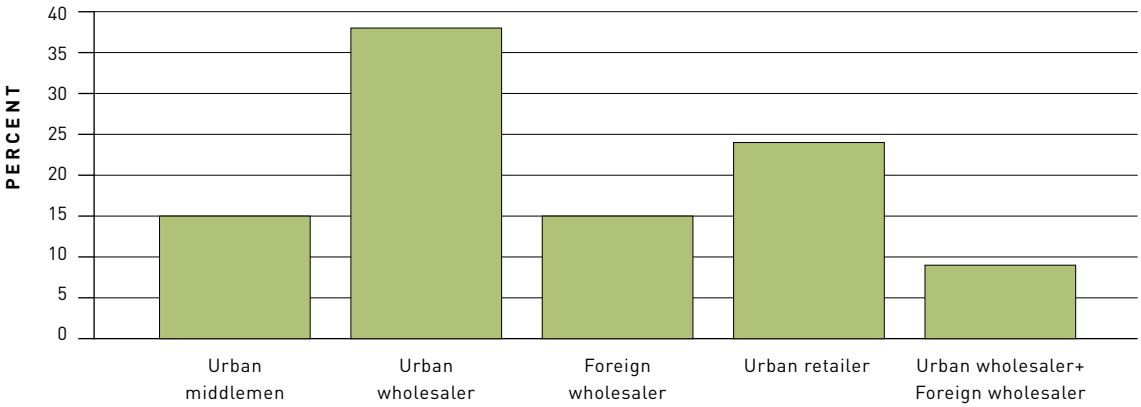
There are different places where processed NWFPs are marketed. These include urban markets (53 percent), followed by exports (24 percent) and at the side of the road (24) (Figure 49). Mainly primary processed NWFPs are sold at the side of the road.

Figure 49. **Places for marketing processed NWFPs in Khartoum**



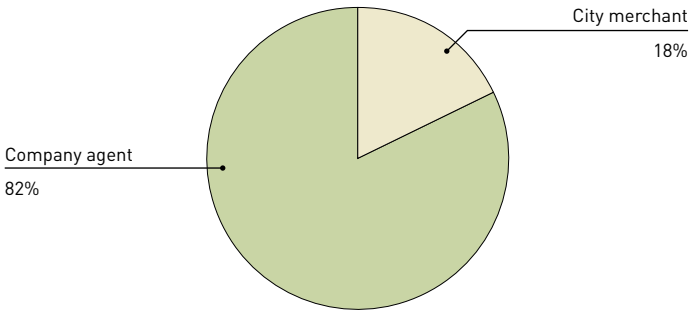
The main buyers (Figure 50) of processed NWFPs are always urban wholesalers (38 percent), followed by urban retailers (24 percent) and then foreign wholesalers (15 percent).

Figure 50. **Main buyers of processed NWFPs in Khartoum**



Regarding the active sellers of processed NWFPs in Khartoum, the majority of the respondents (Figure 51) mentioned company agents (80 percent) followed by city merchants (18 percent).

Figure 51. **Main sellers of processed NWFPs in Khartoum**



CHAPTER 4

Value chain analysis of the selected NWFPs

4.1 Gum arabic value chain

4.1.1 Cropping patterns

In North and West Kordofan, during the field surveys the National Consultant saw that *Hashab* trees grow along the roadside from Elobeid to Enuhud in the forest area as pure stands or mixed stands intercropped with other cash and food crops. Acacia trees are more commonly found in the forest. The farmers often cultivate multi-crop farming systems and allocate each piece of land to a specific crop on the basis of its relative profitability within the system. These comprise food (sorghum and millet) and cash (sesame, groundnuts, water melon seeds and hibiscus) crops beside gum arabic, baobab, tamarind and other forest products. They occupy large acreages in sandy '*qoz*' soil. Individual cultivated areas are comparatively small, following a bush-fallow rotation system where field crops are grown on the same plot for several years (4-6 years) until the soil fertility decreases. Then, the land is given over to bush, usually *Acacia Senegal* and the field crops are shifted to another piece of land. Thus, the total areas involved in the whole shifting cycle are large. Animals are usually part of this cycle, hence the farming system in North and West Kordofan is considered as a typical agrosilvopastoral system.

In Blue Nile and Sinnar, the forests are dominated by *Acacia seyal*, *Acacia Senegal*, *Zizyphus spina-christi, Balanites aegyptiaca* and *Acacia nubica*. Both *Acacia senegal* and *Acacia seyal* are managed for the production of gum arabic in a rotation of up to 20 years. *Acacia seyal* (*talha*) is considered a very important tree species for producing good quality fuel wood and charcoal. A rotation of 20 years is followed for the production of maximum wood volume. The climate in both states favours the production of cash crops and collection of NWFPs in the area.

4.1.2 Tapping

The trees are ready for tapping when they reach a height of 1 to 1.2 m and a diameter of 5 cm or more. The tapping process can also be started when the trees shed yellow leaves naturally and the bark changes to brown. Tapping is usually done in mid-October in Kordofan and mid-November in Sinnar and Damazin. However, sometimes tapping is delayed in both states to March if the rainy season is prolonged (green vegetation continues) or tree locusts defoliate the trees.

Most of the collectors in West and North Kordofan or even in Damazin and Sinnar use an axe for tapping while a few of them use the recommended sharp tool for tapping known locally as *sunki*. The *sunki* cuts the bark into 20-30 cm strips. The lateral branches of the tree are always tapped in a rotational manner (i.e. one year on next year off). Tapping is carried out on trees in coppices, raised from seedlings, and in natural stands, and at 3-4, 5 and 6-7 years, respectively.

4.1.3 Gum yield

The minimum production of gum arabic is less than 10 *kantar* (100 lb.) per month extended for two months, as stated by 49, 58 and 33 percent of respondents in West Kordofan, West Kordofan and Sinnar, respectively. The findings also showed that the average productivity across all states is about two pounds per tree. This amount of gum can be obtained from five collections on average per season. The average yield per tree and unit area varies from one tree to another and also from one season to the next.

4.1.4 Actors involved in the gum arabic value chain

Many actors are involved in the gum arabic chain as the commodity moves from production through the domestic market, wholesale and auction to the export market. These stakeholders are classified as follows:

- *Gum producers* or collectors can be broadly defined as the rightful owner of a gum orchard or plantation, or a shareholder in the cropping system of the gum product. Their main job is to establish, maintain and market gum, to acquire land, plant naturally regenerated gum trees, tend to, protect, tap and collect the gum arabic, and finally sell it as raw, green natural gum, ideally through official channels (auction markets) but often through 'middlemen'(Mahmoud, 2004).
- *Village merchants* exist at the village level and undertake small-scale transactions. They buy directly from the gum producers at village shops or mobile markets *(umduarwar)* on market days, and sell the amount they collect to merchants at the markets in nearby towns or to trucks visiting the assembly markets.
- *Gum Arabic Producers' Associations* (GAPAs) are established by the FNC, in line with the cooperative laws in Sudan, which were started during the period of the Sudanese Socialist Union party (1971) and amended in 2003. The GAPAs are mandated to provide tangible benefits for improving producers' access to services such as credit, training and extension, and community development projects like constructing water reservoirs, gum arabic stores, schools and mosques. This study looked at the role of GAPAs across the states and found some active GAPAs in North and West Kordofan.
- *Local city merchants* are present in centres, with some operating as producers or company agents who may be self-financed or supported by main dealers in major cities (Khartoum, Elobeid, Ennuhud, Damazin and Sinnar). They represent the top tier in the hierarchy of the marketing setup, and organize the cleaning, grading and transportation to auction or other markets.

- *Middlemen* (*Samasrah*) act as a link between producers and traders. They receive a commission, which varies according to the transaction value and is previously agreed to. They tend to collect the harvest from remote production sites and crop markets.
- *Producers' agents* are sometimes represented by middlemen, commission agents, purchasing agents and speculators. They seal the deal for a specific amount of money.
- *Company agents* work for large firms or companies. They broker deals and other processes in the auction market.
- *Gum processors* are established operating companies. They process crude gum into different categories according the international market demand.
- *Gum exporters* represent individuals or gum arabic companies. Recently, they have acquired the right to export crude or processed gum. According to the information obtained from the key informants, there are about 98 gum processors and exporters in Sudan, of which 10-15 are active and export around 75 percent of the gum arabic. They perform the following functions:
  - Sourcing: They rely on local agents to transport the gum to their facilities;
  - Processing: Mostly light processing, consisting of cleaning the gum received in the facilities, sorting, grinding, grading;
  - Exporting: Making lots of gum, after the cleaning, sorting and grading operations, and shipping it in containers. The exporters comply with the shipping programme previously agreed upon. Most of the exporters, but not all, are agents of international importers. This is a partnership that consists of sharing investments and completing delivery programmes.
- *Gum arabic importers* are very important because more than 90 percent of gum arabic is exported to the international market. Data from UN Comtrade (2014) indicated that Sudanese gum arabic is exported to more than 43 countries. The combined share of the top eight importing countries was about 90 percent of the average annual export value of Sudan in 2001-2013. The markets in the European Union, Japan and the USA are the largest importers of Sudanese gum arabic. In this context, France imported the largest share (40 percent) of the total export from Sudan, followed by the United Kingdom (11 percent), Germany (10 percent), USA (10 percent) and Japan (6 percent).
- Other supporting actors:
  - Central and state departments involved in the sector supervision (Departments in the ministries of environment, agriculture, finance, interior, etc.);
  - Gum Arabic Board (GAB) is a public body set up by a Presidential Decree in 2009 to perform several major activities related to improving gum production, processing, trade and sector development;

- Forests National Corporation (FNC) is one of the most important bodies that targets environment protection issues. In the meantime, it ensures direct management of the forest sector and supervises most of the gum arabic projects;
- SSMO is mandated to launch all aspects of the quality control and certification process in the country;
- Research institutions that belong to universities and the Agricultural Research Corporation (ARC). In Elobeid, there are two research institutions dealing directly with the gum arabic sector. These are the Institute of Gum Arabic and Desertification Studies (University of Kordofan) and Elobeid Agricultural Research Station (ARC).

4.1.5 Markets of gum arabic product

Gum arabic markets

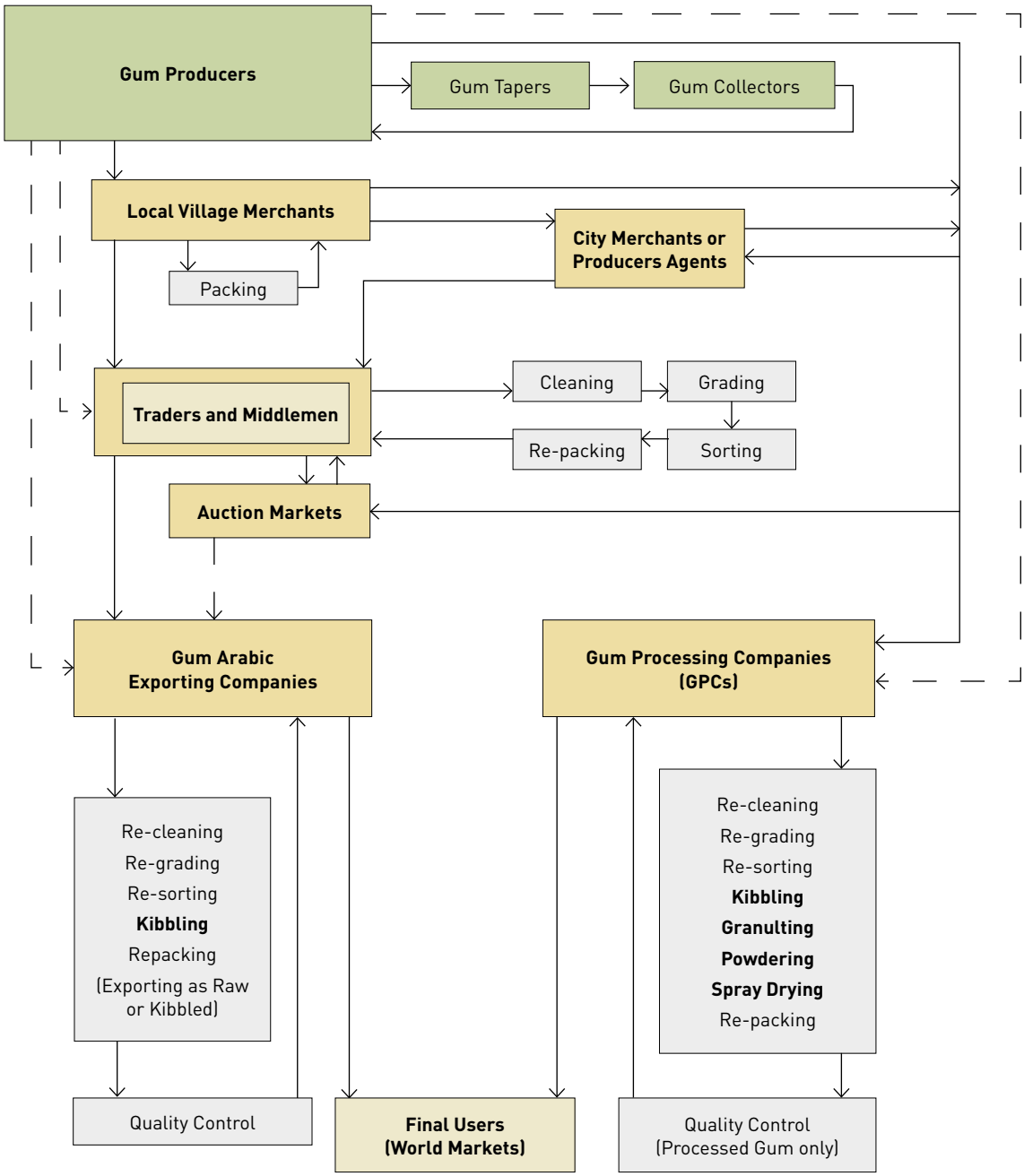
Gum arabic markets can be classified according to the economic hierarchy that governs these markets as follows:

- Domestic or traditional rural markets comprising producers and village merchants;
- Assembly markets (receive gum arabic from domestic markets) comprising village merchants, middlemen and city merchants;
- Wholesale markets (receive gum arabic from both domestic and assembly markets) located in urban areas;
- Central markets (where gum arabic is sold in/outside auction markets) located in main cities. Auction markets are organized by the local government as part of the gum marketing system. Gum is brought by producers' agents or merchants to special yards or sheds and sold at auction to buyers. In the auction markets both sellers and buyers come together under one roof. Gum is auctioned by a government clerk.

4.1.6. Gum arabic marketing channels

Gum arabic marketing channels refers to how gum arabic is transferred from producers to various destinations. Figure 52 illustrates the structure of marketing channels for gum arabic in Sudan. Gum arabic differs a little as regards marketing channels due to the number of marketing intermediaries at each location.

Figure 52. **Gum arabic chain in Sudan**



Source: Developed from the field study and market surveys, 2015

4.1.7 Gum arabic processing

After the merchants buy at auction, they have the gum cleaned and graded by hand by young female employees in the sheds. The grades used are: Hand-Picked and Selected (H.P.S), Cleaned and Sifted (CAS), Cleaned Natural Red (CNR), Siftings (S), and Dust (D). According to some key informants interviewed at the Businessmen's Federation in Khartoum (2015) more than 100 companies are now working in gum arabic processing, producing different forms such as kibbled, mechanical powdered, and spray dried gum (very few companies make this form).

Karama (2002) provided a model of gum arabic marketing, buffer stocking, processing and finance.

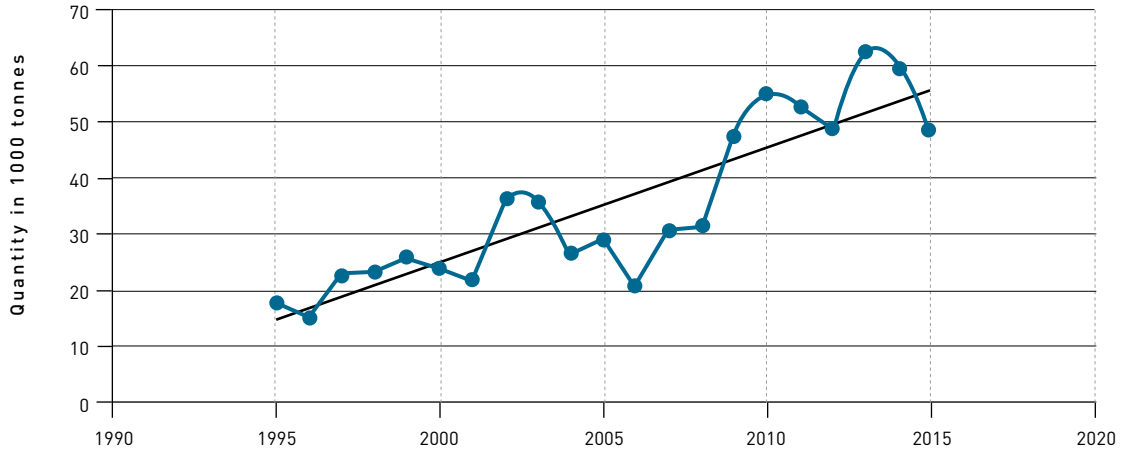
This model emphasized the importance of storage and buffer stocks in smoothing out fluctuations in production of gum arabic in Sudan. His study also explored the importance of processing in improving the value added of Sudanese gums. He argued that not only should kibbling be considered as processing but also any simple cleaning of gum using a machine. Thus, crude gum will be taken to mean hand-picked and selected gum only. This debate evolved because some groups in the past tried to protect the GAC monopoly of crude gum exports by expanding the concept of crude gum arabic to include hammered and kibbled gums. Other groups are not satisfied with the bargaining power of GAC dealing solely with crude gum exports. For these groups one way of limiting the GAC monopoly is by narrowing the definition of crude gum and relaxing and expanding the definition of processed gum as it is loosely used today.

4.1.8 International gum arabic markets

The gum arabic international market is always described as a very difficult market. At the production level it is simple, friendly and transparent; however, it becomes exactly the opposite at the processing and marketing stages. Because the number of players is limited at the processing stage, the gum arabic market is far from being a perfect market (Mahmoud, 2002; Mahmoud, 2004). In terms of accessibility and information regarding the end users this claim is even more evident. This has been the case at least since 1994 after buffer stock was created.

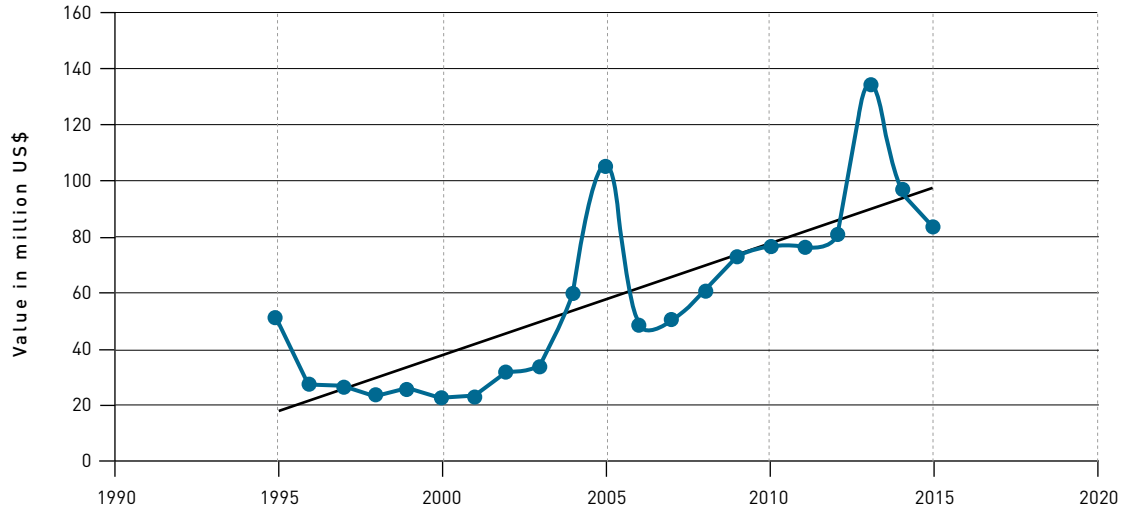
As regards exports, the gum arabic market is still dominated by Sudan in spite of many years of disruption caused by the civil war, frequent policy intervention and market failure. In the late 1980s, Sudan exported over 20 000 tonnes annually, mainly to Europe, but in 1992/93 official exports had fallen to about 6 000 tonnes. Several thousand tonnes of Sudanese gums were smuggled through other countries and in 1994 up to USD8 000 per tonne was paid for this material in Europe. By 1995, Sudanese supplies had increased to 18 480 tonnes with no smuggling, and fell again to 15 550 tons in 1996. In 1997 and 1998, official exports had risen to 22 420 tonnes and 63 012 tonnes, respectively. Recently in 2013, gum arabic exports rose sharply to 63 012 tonnes as the highest export volume registered for the previous 20 years and fell again to 59 978 tonnes and 48 700 tonnes in 2014 and the third quarter of 2015 (September 2015). The general movement for gum arabic exports for the last 20 years revealed an upward zigzag trend (Figure 53).

Figure 53. **Gum arabic export trends over the last 20 years (1995-2015)**



At the beginning of this century, proceeds from gum arabic exports rose from USD23.1 million in 2000 to USD24.3 million in 2001 - a rise of 5.2 percent - due to an increase in international prices, despite a drop in exported quantities. In the period 2002-2004, the annual average of gum arabic export earnings increased to USD42.6 million (totalling USD 127.9 million) before reaching its peak (USD107.6 million) in 2005. Again the annual export proceeds of the commodity for the period (2006-2012) remained high (USD67.7 million) compared to the moving average for the first period. The export earnings were very high (USD134.2 million) in 2013 due to the huge quantities exported worldwide. Earnings dropped slightly (USD97.99 million) in 2004 and once again (USD84.15 million) in the third quarter of 2015. The tendency of gum arabic export proceeds showed an upward unstable trend for the whole period as shown in Figure 54.

Figure 54. **Gum arabic export earnings over the last 20 years (1995-2015)**



The most important European importers of Sudanese gum are France, Germany and the United Kingdom. Combined they import over 70 percent of gum arabic to Europe. France and the United Kingdom are also the major re-exporters of Sudanese gum to the US. Commerce between American companies and the Sudanese public or private sector is generally prohibited by the November 1997 embargo imposed by executive order (Mahmoud, 2004). Concerned about the lack of alternative sources, major newspapers, pharmaceutical firms, and beverage giants such as Coca-Cola lobbied intensively to gain an exemption for gum arabic. However, the global gum arabic business continues to be strongly influenced by the Sudanese crop, which is the world's largest and most-prized for its quality and consistency. Several industry leaders have worked tirelessly and successfully to convince the United States Department of State and Treasury Department that the embargo unfairly punishes a significant number of United States companies that process and use gum arabic without having any effect on total Sudan gum arabic exports. Their arguments swayed the United States Congress and imports of gum arabic were exempted from the sanctions. The exemption was again renewed in the Tariff Suspension and Trade Act of 2000 (§1464, Pub L. No. 106-476), signed by President Clinton on 9 November 2000. In that act, Congress also authorized him to promote the development of alternative sources in countries other than Sudan (United States -Public-Law, 2000).

Sudan's experience since independence in the international gum arabic market is not without failures. Much has had to do with the Sudan marketing strategy as a dominant producer of this product. According to Karama (2002), GAC failed to increase or to preserve the gum arabic international market at around 70 thousand tonnes in the early 1960s, which has fallen to about one half of that level in recent years. Second, it failed also to avoid three acute shortages due to lack of buffer stock, in 1973/1974, 1984 and 1993. Third, Sudan is blamed for the thorny issue of gum arabic specifications. Finally, one of the destabilizing results of the GAC inappropriate pricing policies was the smuggling of gum experienced in the aftermath of the 1993 shortage and consequent huge production in the following seasons.

4.1.9 Measures and policy interventions

The following points list the main policies and government interventions that affect gum arabic production, local marketing, processing and exports in the country (Mahmoud *et al.*, 2014):

- 1920: Gum exported officially from the port of Suakin in Red Sea.
- 1922: Gum arabic auctioning (oligopoly of foreign companies) started in some potential gum arabic markets.
- 1932: Forest policies emphasized the importance of gum tree and gum trade as a core issue for developing the forest sector, particularly in rural areas.
- 1962: Producer floor price declared for the first time to support gum arabic producers.
- 1966: Concentration fund imposed by the Federal Ministry of Commerce to rehabilitate gum arabic production areas.

- 1969: Government-sponsored company (Gum Arabic Company - GAC) established, aided with monopoly power.
- 1976: Gum arabic producers' unions involved in GAC as real partners for the first time.
- 1990/91: GAC concession abolished and restored again at the end of 1991.
- 1992: Overall liberalization policies set in motion (gum arabic exempted).
- 1989-1994: Gum arabic substitutes prospered as a result of sharp increase in gum arabic worldwide.
- 1997: American embargo and economic sanctions on Sudan (gum arabic was excluded).
- 2000: Gradual change in GAC concession power.
- 2001: Gum arabic processing started.
- 2002: Debates and arguments for and against the liberalization of the gum trade. These debates ended up with the GAC concession being abolished for only three months prior to its rejection by the National Assembly in Sudan.
- 2003: Ministry of Investment endorsed about 12 gum arabic processing companies, considered as a turning point on GAC concession.
- 2005: Cabinet Decree (No. 118, 3 September) passed to abolish GAC concession on the gum arabic trade.
- 2006: Mansoor Khalid's famous report presented to the National Assembly on gum arabic trade.
- 2007: Elkindi National Committee Report on the gum arabic trade.
- 2008: The consequences of the global financial crisis on the gum arabic trade.
- 2009: Presidential Decree issued to liberalize gum trade.
- 2009: Gum Arabic Board (GAB) established.
- 2014: Debate on how to define gum arabic (Sudan provided some scientific arguments to restrict the definition of gum arabic to *Acacia senegal gum* only).
- 2015: Presidential Decree approved the Sudanese Standardization of gum arabic.
- 2015: Presidential Decree prohibiting tree felling in accordance with the REDD international initiative (implications for NWFPs).

The overall effect of these polices on gum arabic can be summarized according to some recent studies (Mahmoud *et al.*, 2014) as follows:

1. Historically the price mechanism of gum arabic at the auction market was dependent on the minimum floor price which was mainly determined by the Federal Ministry of Commerce, whereby the producers are theoretically protected because the floor price was considered to be the starting price for gum arabic bidding.

2. According to current price liberalization policies (Presidential Decree in 2009), the minimum floor price is no longer valid. This situation most likely leads to price dimness among gum arabic dealers prior to entering the auction hall.
3. Many traders prefer to sell their gum arabic commodity outside the auction markets due to many factors, including lower rates of taxes and fees imposed on crops, less bureaucracy resulting in higher profit margins obtained at these markets.

4.2 Baobab fruit value chain

The information available on baobab is not as well developed in Sudan as it is for gum arabic. Only basic scientific information and a few studies could be used for the following sections.

4.2.1 Historical background

The name baobab is probably derived from the Arabic words '*bu hibab*' which means 'fruits with many seeds' (Mshigenro and Paull, 2008). It was given its scientific name *Adansonia digitata* by Carl von Linné in 1753 in honour of the French scientist Michel Adanson who lived from 1727 to 1806 and was the first European botanist to see and describe the baobab tree in its native habitat (Orwa *et al.*, 2009), while the term '*digitata*' refers to the shape of the tree's leaves. In Sudan, the common Arabic vernacular name is '*tabaldi'*, or sometimes '*humeir*' and the fruit is known as '*gungolez*' (Vogt, 1995). The fact that there is a different name for the fruit indicates its specific importance to local people in Sudan.

In Sudan, it is well known that old trees very often have natural or artificial caves in their trunks where up to 10 000 litres of water can be stored for months or even years without spoiling if properly covered (Maydell, 1990). This may also be one reason why the baobab is also called the 'bottle tree' (Gruenwald and Galizia, 2005; NRC, 2006). Nachtigal (1971, cited by Wickens and Lowe, 2008) recorded several examples of Sudanese villages without wells where people relied entirely on water stored in hollow baobabs for their survival during the dry season. It appears that the presence of baobabs is an important consideration for when settlements are being established. The value of baobabs as water cisterns to both villagers and long-distance travellers is also illustrated by the large number of water-storing trees that were deliberately destroyed during the time of the 1881-1898 Mahdist war in Sudan (Wickens and Lowe, 2008). In Eastern Africa, hollow trunks have been used as shelters, stables and stores for centuries. Even the enormous trunk of the baobab itself provides shelter, especially in the almost treeless regions of North Kordofan. Herdsmen occasionally fix a mirror to and store sanitary items such as soap, towel and toothbrush in the wrinkled bark of a stand-alone baobab and use the shade of the trunk as a temporary washing place. Hollow trees are occasionally used as stables for livestock, which is also the case in West Africa (Guy, 1971). The bark of many large baobab trunks shows inscriptions and carvings from the past, making these trees living witnesses of history (Erb, 2004). However, damage by fire, livestock and human visitors as well as natural attrition seem to have reduced the number of historical engravings. Due to its visibility from a long distance and the distinctive shape of individual trees, baobab has been an important landmark for travellers in savannah areas

for centuries. Individual trees were even marked on early 1:250 000 maps of Sudan (Wickens 1982). Furthermore, in many cases boundaries were demarcated or sites of new villages were established with a baobab tree as the main reference point.

4.2.2 Natural distribution

In Sudan, baobabs are most frequently found in the southern part of the country They thrive on sandy and rocky soils from the short grass savannah (El Amin, 1990) to the deciduous savannah woodlands (Wickens and Lowe, 2008). They often occur as widely spaced individuals or small groups of individuals scattered over large areas. Baobabs are also common on mountain slopes such as the Jebel ed Dair in Central Sudan. Wiehle and Prinz *et al.* (2014) sampled baobabs up to an elevation of 1 013 m in the Nuba Mountains. In the eastern foothills of the Jebel Marra massif, baobabs are known to occur up to 1 250 m (Wickens 1982). Along *wadis* and in depressions, where water collects during the rainy season, baobabs are found even in the very dry northern parts of Dafur and Kordofan with a 100-200 mm annual rainfall. On heavy soils, such as the flat clay plains around Habila (600 mm annual rainfall) in the Nuba Mountains, baobabs are almost absent but often found as monumental individuals or in clumps on rocky outcrops that give this area a characteristic feature. According to El Amin (1990), baobabs form belts in Kordofan, Darfur, Blue Nile, Upper Nile (South Sudan) and Bahr El Ghazal (South Sudan).

One of the most likely dispersal vectors for baobab seeds are humans. Nomads and travellers commonly carry baobab fruit as a food supply. While eating the sweet pulp, they spit out the seeds, and thereby spread them along the wayside or in the shade of trees (Wickens and Lowe, 2008). It is also possible that fruit from riverine trees are water-dispersed, which explains the fact that baobabs are frequently found on the banks of the Nile (Sahni, 1968) and along *wadis* (El Amin, 1990) in Sudan.

4.2.3 Utilization and yield

Several studies have highlighted the baobab as one of the most important indigenous fruit trees (IFTs), with considerable ethnobotanical significance, in Sudan (e.g. Bella *et al.*, 2002; Gebauer *et al.*, 2002a,b; El Tahir, 2004; El Tahir and Gebauer, 2004; Gebauer and Osman, 2004; Adam *et al.*, 2012, 2013).

The most important benefit of baobab is derived from the fruit, different parts of which are used in various ways. The fruit, which is generally well-attached to the branches, is picked by hand or using a long rod with a hook. It is then smashed on a stone or cut open using a machete. The capsules contain cream-coloured farinaceous pulp, which is rich in vitamin C, calcium, magnesium and potassium (Stadlmayr *et al.*, 2013). Due to its naturally low water content, the fruit can easily be stored for months under dry conditions (FAO, 1988). The pulp is eaten raw, dissolved in water or milk, or added to porridge (Maundu *et al.*, 1999).

In Sudan, the seeds are pounded into a coarse meal, fermented and added to the traditional dish '*kurundu*' (Dirar, 1993). In drought-prone areas, baobab pulp and seeds still act as an important supplementary food during times of famine, as reported by Robinson (2004, 2005)

from South Sudan. The woody fruit shells are used in different ways, such as for dishes, vessels, etc. and for making curio items and souvenirs such as mouse traps, jewel cases, lamp shades and musical instruments. Baobab leaves are rarely used in Eastern Africa. In many parts of Western Sudan in contrast, young tender leaves are mixed with peanuts and used as salad (Bella *et al.*, 2002).

In general, baobab leaves are of limited importance as food in Eastern Africa, especially compared to West Africa where they are part of daily dishes and sold fresh or dried in large amounts on rural and urban markets (Sidibé *et al.*, 1998; Gebauer *et al.*, 2014). However, where a lack of water limits the production of vegetables, baobab trees are also heavily pruned for fresh green leaves in Sudan. To our knowledge, no scientific data on leaf yields are available for Eastern Africa. However, in Mali, Dhillion and Gustad (2004) estimated that more than 130 kg of fresh leaves per tree and year are harvested. The stringy inner bark of the baobab trunk yields a strong durable fibre. In Sudan, the bark is stripped off the lower trunk of the trees and used to make string and cordage, which is then used to cover furniture, such as the traditional rope stool '*bambar*' or the traditional rope bed '*angareb*'. The trees are not seriously damaged and even after repeated use the bark regenerates and can be stripped again some years later.

According to Sahni (1968), the wood is little used other than for floats for fishing nets as a substitute for cork. Trials at the Forest Research Institute in Soba, Sudan have shown that if the wood is left in water for about two months it will disintegrate, producing a long fibrous substance that could be used as a packing material. As it has a high water content, the wood is chewed by humans and animals in case of extreme water scarcity (Simitu and Oginosako, 2005). However, the low value of baobab wood for humans has saved many trees from being cut down for construction, firewood and charcoal in Sudan and Kenya.

For example in Sudan, dysentery and diarrhoea are treated with a maceration or decoction of baobab fruit pulp (El Ghazali *et al.*, 1997; El-Kamali and El-Khalifa, 1999). If this remedy shows no effects, a dough made from baobab bark or roasted seeds are fed to patients several times a day (Wickens and Lowe, 2008). Baobab is also used as an ethno-veterinary medicinal plant in both countries.

In Sudan, the bark colour was observed to be predominantly grey-green, grey-yellow and silver-grey. In the Western African Sahel, folk classification recognizes three morphotypes: black, red and grey bark baobabs (NRC, 2006). Farmers there often assert that the colour of the bark is linked to the quality of the fruit and leaves (Parkouda *et al.*, 2012).

4.2.4 Cultivation and conservation

Baobabs are an integral part of human settlements. In Elobeid town they grow in urban gardens (Gebauer, 2005), are signs of market places and planted to line avenues. Wiehle *et al.* (2014) studied 61 home gardens in four villages of the Nuba Mountains and found *A. digitata* in 46 percent of the gardens with a total of 74 individuals. Gardeners collect baobab fruit in the wild and seeds are extracted from the nearby woodlands in the Nuba Mountains,

transferred to homesteads, scattered in the gardens and often spontaneously germinate. In the village of Sama, in South Kordofan, Goenster *et al.* (2011) found baobab trees in home gardens, where they were not actively planted, but had been retained during land clearance for crop planting. Beentje (1989, 1994) also reported that baobab trees are often left standing in cultivated areas in Kenya.

Wilson (1988) recorded a lack of regeneration in baobab populations in Darfur and Kordofan. However, Gebauer and Luedeling (2013) were able to identify a viable population pattern with high recruitment rates of a natural baobab stand in North Kordofan, Sudan. Venter and Witkowski (2010, 2013) argued that recruitment of the baobab is an episodic event of long-lived trees, and therefore relatively low numbers of juveniles, compared to other species, are normal for baobabs. 'Sheets of seedlings' with a number of same-age individual baobabs under the canopy of a mature baobab were observed by Gebauer near Damazin in Eastern Sudan. While natural regeneration in most African countries is lacking, Sudan seems to offer unique possibilities for studying population dynamics of baobabs at the northernmost limit of the East African distributional range.

4.2.5 Marketing of baobab fruit

Local people in the study area have limited channels for disposing of the excess of the small collected quantities of baobab fruit that will not be used for household consumption. The feedback from the investigated NWFP collectors showed that all the respondents in the states sold excess produce at the rural markets and then village traders take it to urban centres where it is stored and husked before being sold to city merchants. The prices are always fixed by the buyers.

4.2.6 Baobab fruit markets

Baobab fruit markets can be classified as follows:

1. Domestic or traditional rural markets comprising baobab collectors and village traders.
2. Assembly markets (receive baobab fruit from domestic markets) comprising village traders, middlemen and city merchants.
3. Main markets receive baobab fruit from both domestic and assembly markets. These markets are located in large cities and sometimes in markets on the outskirts of cities. Some of the potential markets that were investigated by the current study are Ibn Maso'od (formerly called *Sooq Abogahal*) in Elobeid (Figure 55), *Umdafaso* in Enuhud, *Elmalja* in Damazin and *Sha'abi* in Omdurman.

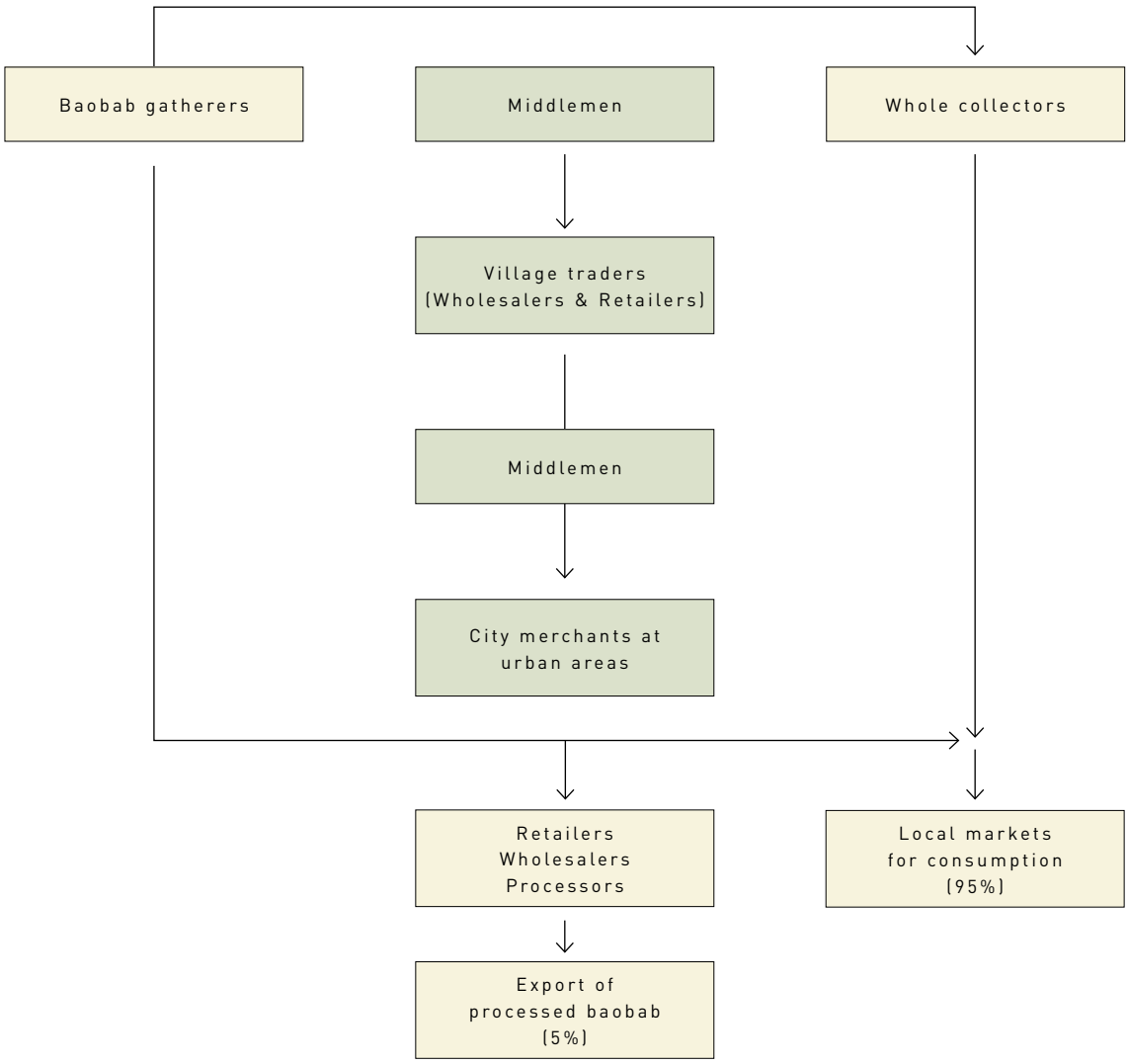
Figure 55. ***Ibn Maso'od* NWFP market (Elobeid) after being rebuilt in 2015**

4.2.7 Actors involved in the baobab value chain

Many actors (Figure 56) are involved in the baobab chain as the commodity moves from collection through the domestic market, wholesale and central markets. These actors are classified as follows:

- *Baobab collectors*: These actors are the most important in the chain. Most rural people are involved in collecting baobab fruit (men, women, children and some of the older people). They tend to collect the product and sell it raw or shelled to village traders or city merchants, often through 'middlemen'.
- *Village merchants:* They exist at the village level and buy baobab fruit directly from collectors at village or mobile markets *(Umduarwar)* on market days, and sell what they collect to merchants at nearby town markets or to trucks visiting the assembly markets.
- *Local city merchants* are present in centres, with some working as producers' agents or middlemen who may be self-financed or supported by big traders. They represent the top tier in the hierarchy of the marketing setup, and organize the husking of baobab fruit and transportation to main markets or baobab processors in Omdurman (Khartoum).
- *Middlemen* (*Samasrah*) act as a link between collectors and traders. They tend to collect the harvested fruit from remote production sites and take it to the main markets.
- *Baobab processors* are either individuals performing primary processing activities manually (women in most cases) or medium-scale processing units (warehouses). These units are semi-mechanized. Most of these units, which are concentrated in Khartoum (in Omdurman around *Sooq Sha'abi*) are owned by big names in the business. These companies process the shelled pulp of baobab fruit into different sweet categories (e.g. powdered, granulated forms) according to the local and international market demand. One of the largest processing units, which was visited by the study team, is *Elnsar* Company, in Khartoum North.

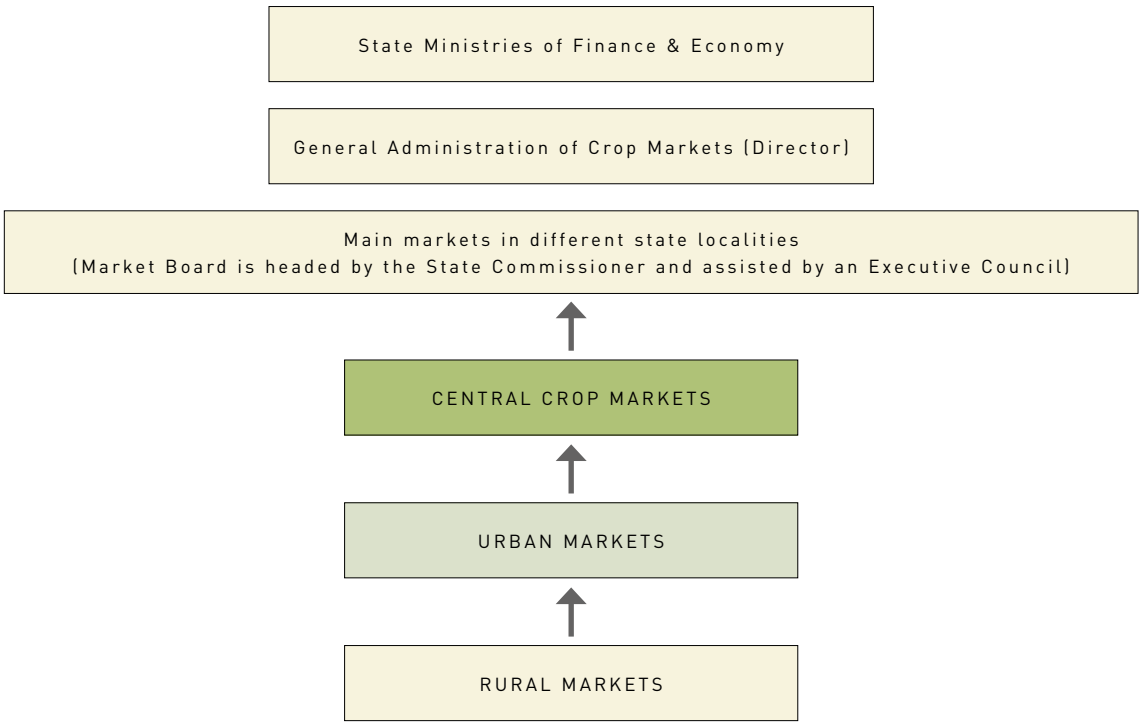
Figure 56. **Actors involved in the baobab value chain**



4.3 Institutional setup of crop markets in the states

The Ministries of Finance and Economy, set regulations in the investigated states to manage the crop markets whereas state ministries manage crop market technically through General Administration of the crop markets, and the market assets and manpower structure are directed by state localities through delegated market boards. The pyramid hierarchy of crop markets in the states may differ slightly although in most cases they have the same structure (Figure 57).

Figure 57. **Administrative setup of crop markets in North and West Kordofan**



4.3.1 Elobeid crop market

Based on interviews with the Elobeid crop market authorities, the market was established in 1905. In 1912, the market moved to its current location as a central crop market. The auction hall was established in 1930. Until 1942, the market was under the administration of the Kordofan District headquarters; afterwards administration was taken over by the executive officers in Elobeid.

1. Infrastructure and services

Elobeid crop market is situated in the centre of the city near the railways station and covers an area of 18 324 m^2. It consists of different specialized sections; an information office, auction hall (Figure 58), market yard, executive authority office, one electronic balance (maximum load 70 tonnes ± 20 kg) and 35 conventional balances (maximum load 250 kg ± 0.5 kg), and a nursery. Other offices are allotted for representatives of alms (*zakat*), taxes and duties, the Sudanese Corporation for Standards and Quality Control, merchants, producers' agents and company agents. Basic water and electricity services are available in addition to security guards to protect crops and assets inside the market. Market activities run every day except public holidays. There are no storage facilities in the market. Approximately 120 people administer the market, in addition to staff in charge of taxes, quality control, FNC and alms.

Figure 58. **Elobeid crop market**

2. Crops supplied to the market

The cash crops supplied to the market for auctioning are gum arabic (in most cases from *Acacia senegal*, and some from *Acacia seyal*), senna, sesame, groundnuts, roselle and watermelon seeds. All these crops are displayed on unroofed cement beds in the market yard. The commodities are usually cleaned by hand in designated areas by skilled women paid by merchants. Each crop is packed in jute or plastic sacks, depending on the nature of each crop. Throughout the process (crop entry, exhibition, auctioning, repacking, transportation and storage), the market authorities do not provide any sort of services such as transportation, storage, and safekeeping of the crops for more than 24 hours.

3. Tributary markets

The inquiries revealed that the following tributary markets provide Elobeid crop market with gum arabic:

1. Ennuhud (gum *hashab*) central market.
2. Ghibaish (gum *hashab*) urban market.
3. *Eyal Bakheet* (gum hashab) rural crop markets.
4. Mobile rural markets (*Umdawarwar*)
5. East Darfur (gum *hashab*).
6. South Kordofan (different gums e.g. *talha*, *tartar* and *Kakmut*).

Most of the urban markets (Ghibeish and Errahad) are located near potential gum arabic supply areas. These markets are positioned, in terms of marketing dynamics, in between the central and rural markets. On the other hand, the rural markets (e.g. Eyal Bakheet and Umgafala) are characterized by being weekly and located close to production sites where producers frequent and gum arabic is traditionally displayed. The commodity is transported to the rural markets

by animals and on foot. Thus, transportation costs are minimal. In contrast, gum arabic is taken from the market by special pickups called "*Umcheleli*". Rural markets are considered as places for social and cultural interaction in local communities. For instance, Umgafala rural market is located in Bara and administered by a local committee from Umgafala village in common with the administrative officer and executive body of cashiers, market foremen and guards. The market area is very small and unfenced without any administrative buildings. Gum arabic is displayed haphazardly under temporary shade made from crop sticks and dried hay. Nevertheless, Umgafala market is considered to be an important gum arabic market due to the huge amounts (about 400 *kantar*) of gum received daily at the market. Contrary to this advantage, the market is inaccessible to most merchants and companies. This phenomenon from an economic point of view is known as market discrimination.

4. Role of gum Arabic actors in Elobeid crops market

The actors who deal with gum Arabic commodity in the market include merchants, producers' agents, companies' agents and executive authority related to market daily work. The existing actors were listed at the tail of this study according to the market documents for the year 2015 (Annex 16):

- The first list comprises 38 producers' agents representing 38 producers from both North and West Kordofan.
- The second list encompasses 40 traders.
- The third list consists of 15 active gum arabic companies and their representatives.

All these actors paid the eligibility fees in January 2015 to enter the auction market. Gum arabic producers are not physically present at the auction market for the reasons below:

- They do not satisfy the requirements for entering the market;
- They are scattered over widespread areas far from the auction market;
- Lack of institutional marketing bodies among gum arabic producers' associations and unions. The role of these associations is, to a great extent, restricted to gum arabic production only;
- A considerable amount of gum producers are not aware of the auction markets;
- Some producers need immediate cash or daily supplies, and so prefer to sell their produce to merchants or middlemen at low prices;
- The quantity (lot size) required by auction markets for one transaction is beyond the capacity of the small producers;
- Gum producers are not comfortable with the complexity of the auction markets;
- Most are classified as risk averse (sometimes risk indifferent);
- Lack of entrepreneurial spirit.

5. Auction process

Auctioning gum arabic is a process of buying and selling the commodity by offering it up for bid, taking bids, and then selling the item to the highest bidder. The bidding is done inside the auction hall for gum arabic received at the market. The process starts every day at 12.30 p.m. except in the rainy season when it starts at 11.00 a.m. The duration (1-2 hours) of the process depends on how much (volume) is to be auctioned. Each commodity should first be registered by the market authority. Then, commodities receive serial numbers prior to entering the auction hall. All commodities for auction are displayed on the nearby cement beds in the market yard (Figure 57). After that, all parties are allowed to examine the commodity prior to the commencement of the auctioning process. Then, the auction process is steered by a clerk using a bell to control the process. The auctioning begins with gum arabic followed by other cash crops. The starting price of the commodity in the auction process is triggered by the buyers. The procedure continues until the buyers' preferred price is attained. Subsequently, the seller has the right to reject the price offered. At this stage, he can leave his commodity inside the market premises for 72 hours after which he should take his goods back to his own or a rented store.

6. Market forces and pricing mechanisms

Based on key informant interviews conducted with some producers' agents, city traders and company agents at the Elobeid crop market, the following information was revealed as regards market forces and pricing mechanisms for gum arabic:

- Historically and up to 2008, the price mechanism of gum arabic at auction depended on the minimum floor price, which was mainly determined by the Federal Ministry of Commerce, which afforded the producers some degree of protection as the floor price was considered to be the starting price for bidding;
- According to the current trade liberalization policies imposed on gum arabic by Presidential Decree in 2009, the minimum floor price is no longer valid. This situation most likely leads to price distortion among gum arabic market actors prior to entering the auction hall;
- Many traders prefer to sell their gum arabic outside the auction markets due to many factors including lower rates of taxes and fees imposed on crops, less bureaucracy and red tape resulting in higher profit margins;
- Seasonality in gum arabic has an effect on quantities and prices;
- The traders interviewed at the Elobeid crop market stated that the prices of gum arabic at the auction market are, more often than not, determined by buyers and that the competition between buyers sometimes generates favourable prices for the sellers, who usually keep a low profile during the bidding process. Accordingly, the market could be described as 'somewhat between' a competitive and/or oligopoly market.

7. Taxes and fees

Service fees at the auction market are imposed by the state authority to compensate for the taxes and fees on agricultural products abolished by the federal government. In addition to

federal taxes and fees, there are other taxes at the level of the state and towns which means that taxes are paid twice on the same crop. Moreover, there are variable additional fees that are levied on crops, including on gum arabic. As mandated by the market authorities, the fees currently imposed constitute 5 percent of the commodity price, but the debate is still ongoing on other taxes and fees levied on the commodity on a regular basis at the states' borders. The taxes on gum arabic and other NWFPs were recently renewed in 2015.

8. Quantities and prices of gum arabic

The secondary data acquired from the Elobeid crop market revealed that the highest volume of gum arabic (663 577 *kantars* equivalent to 29 500 tonnes*)* was received at the Elobeid crop market during the mid-1960s. Since then, quantities have steadily dropped. This decline in quantities levelled out from the late 1970s until the mid-1990s when they started to increase again. This increment in quantities might be attributed to the prevalence of floor price as a good incentive for gum production and trade. The lowest quantities (23 730 *kantars* equivalent 1 055 tonnes) of the commodity were supplied to the market in 2001. Interestingly, the quantities jumped up (340 087 *kantars* equivalent to 15 115 tonnes) in 2006 and dropped slightly in 2007 (259 398 *kantars* equivalent to 11 529 tonnes). In the following year (2008), the quantities showed a slight increase (more than 300 000 *kantars* equivalent to 13 333 tonnes) before a sharp drop in 2009 (207 250 *kantar*s equivalent to 9 211 tonnes). After the liberalization of the gum arabic trade the quantities of gum arabic received at the market fell steadily (25 105 *kantar* equivalent to 1 116 tonnes) in 2010 and again the following year 2011 (23 563 *kantar* equivalent to 1 048 tonnes). Recently, the quantities of gum arabic supplied to the Elobeid crop market have dropped sharply (1 257 tonnes) in 2012, and increased again (6 594 tonnes of Hashab gum, versus 8 086 tonnes for *Talha* gum) in 2013, before a slight increase (7 383 tonnes of Hashab gum versus 6 156.73 tonnes for Talha gum) in 2014 (Annex 20).

Strengths of the market:

- Rich indigenous knowledge on gum arabic production and trade
- Large-scale crop market (huge gum arabic lots)
- Presence of auction
- Well-structured crop market
- Well-administered setups
- Sufficient skilled labour force
- Suitable cement beds for displaying gum arabic
- Presence of a quality control unit
- Availability of transportation means
- Acceptable gum arabic packing (use of jute sacks)
- Reasonable information unit (trade point)
- Availability of market records since 1954

FOLLOWS ON THE NEXT PAGE →

Weaknesses:

- Limited market area, hence new market will be rebuilt in the northern part of the city.
- No dealing with some active NWFPs (baobab, tamarind, etc.)
- Fluctuations in supplied quantities of gum arabic
- Lack of storage facilities
- Lack of financial institutions (commercial banks)
- Traditional means of gum arabic grading
- Lack of export preparation unit
- Relatively high taxes, fees and local duties due to the recently introduced fees for rehabilitation state infrastructures
- Domestic price fluctuations

9. Gum arabic grading and standards

Gum arabic is normally brought to the markets (auction or others) by village merchants and producers' agents (middlemen and traders) directly after the picking process, in jute sacks, as raw gum. Only a few producers dry the picked gum in the sun for a short period. There is no proper grading or standardization for produce in the markets. Historically, some grading and standardization were practiced by the GAC agents. After the merchants buy at auction, they have the gum cleaned and graded by hand in their sheds by young female employees. The grades used are: Hand-Picked and Selected (H.P.S), Cleaned and Sifted (CAS), Cleaned Natural Red (CNR), Siftings (S), and Dust (D). These grades are then delivered to exporters at prices that vary for each grade to allow the buyer, cleaner and grader a margin of profit after the costs of transportation have been covered. However, most of the mentioned grades are considered as crude gum at the auction market. The gum processing companies deal with clean well-dried gum so as to facilitate the crushing process.

10. Impurities in gum arabic

Generally, impurities are substances inside a confined amount of liquid, gas, or solid, which differ from the chemical composition of the material or compound. In gum arabic nodules, impurities are usually either organic material like bark and leaf residues, or inorganic material like grit or small stones. These impurities may appear during the processes of tapping and picking as well as during primary processing and the conventional storage processes by the producers.

Impurities have a negative effect not only on the quality of Hand-Picked and Selected gum (H.P.S) and processed gum (kibbled and powered) but also on mechanical processes in the factory. The level of gum arabic impurities is generally estimated in relative terms. The quality control units at the Elobeid crop market estimated impurities in gum arabic at less than 3 percent last season (2014).

Weaknesses

- Limited market area
- Unpaved roads
- Difficult entry-exit
- Limited labour force at the market
- Fluctuations in supplied quantities
- Poor storage facilities
- Preliminary processing (cleaning and grading) is done outside the crop market
- Unseen role of the quality control unit
- Lack of entrepreneurial spirit amongst gum arabic producers and traders (low level)
- Companies do not show up directly at the auction market
- Traditional means of gum arabic grading
- Unacceptable gum arabic packing (e.g plastic materials)
- Lack of export preparation unit
- Relatively high taxes, fees and local duties
- Domestic price fluctuations
- Limited domestic consumption (<5%)
- Lack of processing companies

Strengths

- Very rich indigenous knowledge on gum arabic production and trade
- Medium to large-scale crop market (considerable volumes of gum arabic)
- Near to gum arabic production areas
- Presence of auction
- Accessibility all year round
- Good administrative setup
- Presence of cement beds for displaying the gum arabic
- Availability of transportation means
- Presence of information unit
- Availability of market records since 1994
- Low rate of gum arabic impurities (2-3%)
- Large number of stakeholders

4.3.2 Enuhud crop market

According to the historical background described by the market authorities, Enuhud crop market was established in 1988. At that time, it came under the authority of the district inspector and then was promoted as a central market in West Kordofan.

The market is located in the western part of the city centre. The market institutional setup follows that of the Elobeid crop market. It encompasses a new auction hall that was built in 2015 to replace the old one, which was not big enough for the large numbers of market dealers. The market also comprises executive offices, one electronic balance (max. load 70 tonnes ± 20 kg) and several conventional balances, one mechanical seed sieve, an information unit and foreign trade office. Most of the crops supplied to Enuhud arrive first at the nearby market called *Dabai Soog*. The market provides water, electricity and administrative services. Crops are stored inside the market where they are protected from vandalism and harsh climatic conditions. Moreover the road between the Enuhud crop market and the Dabai retail market is unpaved.

Quantities and prices of gum arabic from Enuhud crop market (2003-2015) were desplayed in Annex 17.

The price of the commodity to be auctioned is negotiated outside the market itself and is determined by the buyers. Therefore, the findings for the Elobeid crop market are valid for this market, i.e. the Enuhud crop market could be described in between a competitive and oligopoly market. One of the most debatable problems observed by the National Consultant is that the alms (*zakat*) imposed on gum arabic is paid by the merchants, although most of them confirmed that it should be a crop alms (*Zakat Zroa*) rather than a trade one (*Zakat Uro'od Tigara*), and hence should be paid by farmers.

4.3.3 Sinja and Sinnar crop markets

1. Background and structural setup

According to feedback from the interviewed stakeholders, the gum arabic trade commenced in 1962, when the Ministry of Commerce announced the gum arabic floor price. At that time, the crop market was in the form of rural markets around Sinja and Sinnar towns. In 1969, the gum arabic trade was practiced by GAC agents who transported the commodity by train to the company stores. The so-called market is run by a small unit located inside the State Ministry of Finance for the purpose of collecting fees and taxes from gum arabic and other cash crops. Little data on quantities and prices of gum arabic commodity are available at the government revenue office, which is divided between Sinnar and Sinja towns. Currently, there is neither a specialized auction market for gum arabic nor a specific market for other crops. The crop market which was run at the common market lacks infrastructure and services (e.g. cement beds, quality control unit, proper storage facilities, offices, etc.). Most recently, a site has been allotted to be used as a crop market.

2. Actors at the crop market

The feedback from the survey of the Sinja and Sinnar crop markets came from the actors and relevant entities, namely: FNC authorities, State Minister of Agriculture, and the marketing administration unit. Those who were interviewed on the market premises include traders, village merchants and middlemen. NWFP processors were not found in the market and so they could not be interviewed. In fact, the actual number of active stakeholders at the market seems difficult to estimate. This is always hampered by the lack

of annual marketing records and the fact that the market is unorganized and spread out. Nevertheless, the National Consultant observed a small number of active actors as regards gum arabic marketing. The gum arabic dealers at the market include domestic merchants (local traders), middlemen, company agents and powerful producers' associations scattered throughout the state. As opposed to in North Kordofan, gum arabic producers can be found in local markets. Middlemen and traders make collusive arrangements allowing them to underestimate the producers' prices, mainly because of the lack of a real auction market and market mechanisms to protect producers.

No means of quality control for gum arabic was found in the local market. A new market has recently been established and could play an important role in regulating the gum arabic trade in the future. The market survey also pointed out that the gum arabic companies do not appear directly at the local market. The reasons for this were addressed, as in the case of the Elobeid crop market. Most of the interviewed gum arabic actors recalled the 'golden age' of the flourishing gum arabic trade - the big names in the gum arabic trade, large-scale transactions that were made by GAC agents, an absence of market distortions and efficient gum arabic price policies. The consultancy team observed that, unlike in North Kordofan, market information on cash crops, including gum Arabic, is paid little attention by the market authorities; their attention is mainly concentrated on market revenues rather than providing services.

3. Gum arabic quantities and prices

Unlike the other markets studied, no time series data on gum arabic quantities supplied to the market in the previous period have been registered. Despite this, the quantities received at the market nowadays are far less compared with the amounts in previous years, primarily due to price fluctuations and market distortion. In this context, the feedback from the market dealers estimated the quantity of gum arabic supplied to the common markets at about five tonnes daily (This quantity varies throughout the season.) The recorded average price of gum arabic at the common market was SDG720 per *kantar*. The prices were determined solely by the buyers. Nevertheless, small quantities of gum arabic were reported to be in the hands of gum arabic traders at the Sinja and Sinnar markets. As the storage facilities are sub-standard, the quality of gum arabic being traded at these markets is probably poor.

4.3.4 Damazin crop market- Blue Nile

The state depends mainly on agriculture where 2.5 million *feddans* are apt for cultivation. The state is endowed with huge natural resources in terms of agricultural, livestock and forest potential, which are attractive to investors. It comprises six towns: Damazin, Rosaries, Bao, Giesan, Kurmok and Tadamon.

1. Market establishment and administration

The crop market in Blue Nile started up in the 1950s to trade sesame and groundnuts from Ressares, Bados, Wadelmahi, Saolial, Esirio, Bigaoi, Afid and Ugli. Later, the government of the Middle State formed an expert committee on government revenues (taxes, fees and local

duties). The crop market administration in the Middle State was founded in 1992, according to a recommendation made by the expert committee in Bao village. In 1994, the newly-formed Blue Nile State issued a decree to form a new crop market administration structure.

2. Objectives of the crop market general administration

- Offer agricultural services to farmers;
- Enhance the promotion and marketing of agricultural crops through an auction process at the main market and tributary markets;
- Assist producers to obtain the best prices;
- Abolish the distortive role of middleman and brokers;
- Ensure the high quality of crops and trade efficiency;
- Strengthen the trade relationships between farmers and traders;
- Provide information and statistics on agricultural crops, forest and horticultural products.

3. Infrastructure and services

The market is situated on the outskirts of the city. It consists of different specialized sections; a new auction hall constructed in 2015 (Figure 59A), an efficient Indian unit for grading and sorting agricultural crops (Figure 59B), executive authority offices, electronic and conventional balances, and other offices allotted for taxes and duties representatives, in addition to security elements to protect crops and assets inside the market. Marketing activities are held every day except public holidays.

Figure 59. **Damazin crop market - (A) Market Hall & (B) Indian unit for grading crops**

Deficiencies encountered in the NWFP sector:

Most of the NWFPs (with the exception of gum arabic) in Sudan have remained underdeveloped (This is true despite the developmental projects interventions, listed in Annex 26) in comparison to their huge potentialities mainly because of some serious deficiencies that have existed for some time, such as:

- Deficiency at policy level: There is no obvious national policy on developing the NWFP sector.
- Deficiency at production level:
  - NWFP collection, in most cases, is concentrated in remote areas in the country, which are affected by unfavourable environmental conditions (erratic rainfall, tree locusts, etc.).
  - Conservation and regeneration of NWFP species does not receive adequate attention from concerned authorities and stakeholders.
  - Collectors are scattered over widespread areas that lack basic infrastructure and services.
  - Under production due to incompetent harvesting practices.
- Deficiency at institutional level:
  - Lack of central organization to coordinate the fragmented developmental efforts of the NWFP sector. This is true despite the huge amount of money invested by some development projects implemented since the last century. These projects are listed in Annex 29.
  - Lack of effective NWFP associations, except in the case of gum arabic which were observed to be active in some few states.
- Deficiency at market level:
  - The NWFP markets are mostly unorganized in nature; most of the NWFPs are not marketed at the central crop markets.
  - Uncertainty and seasonality of market demand for most of the NTFPs.
  - Inadequate value addition that could be gained through grading and processing activities for most of the NWFPs at main rural and urban markets in the country.

4.4 Margin distributions through value chains of gum arabic and baobab products

The marginal analysis provides a simple method for comparing the performance of income generated and costs encountered across the investigated gum arabic product and baobab fruit throughout the value chain as these products move from farm gate to rural markets and from rural markets to urban and central markets for export markets. In case of gum arabic the product is mostly (90 percent) exported as raw, kibbled or mechanical powdered gum. Unlike gum arabic, most of the baobab fruit (raw or processed) is destined for local consumption, whereas only a small portion of processed fruit finds its way to international markets. The calculations of margin percentages across the different categories of gum arabic and baobab products are expressed as follows:

4.4.1 Gum arabic

The structure of the gum arabic sector involves many internal and external actors across the chain. It means that between both extremities of the chain, i.e. the many producers and the many end users (food, pharmaceutical, cosmetics and miscellaneous industries), there is a lower number of operators. These intermediaries are necessary to organize the different stages of moving the gum and to acquire value added throughout the different stages.

The results of empirical calculations as regards cost and revenue items as well as their percentages to producers and FOB prices were conducted for the value chain of the four types of gum arabic classified as 'Clean' graded gum, 'H.P.S' graded gum, 'Kibbled' processed gum and 'Mechanical Powdered' processed gum (Annexes 20, 21, 22 and 23). The producer price was SDG580/*kantar* on average obtained from key informant respondents across all states (2015). The FOB price was also calculated including all costs until the lot is loaded onto the ship with the freight paid by the importer. Between partners, payments for the cargo are usually made against documents. The letter of credit is a more costly but a safer means of payment between a supplier and a customer, and is the starting point for transactions. Regarding the empirical records obtained, on average the following results and discussion should be mentioned:

- The percentage of the FOB price received by small-scale gum producers is currently 41.18 percent, 36.67 percent, 38.24 percent and 38.80 percent according to the above calculation for Clean, H.P.S., Kibbled and Mechanical Powdered gums, respectively. These results emphasized that the producer price ratio corresponding FOB price have improved significantly for all graded and processed gum compared to past records: four percent in 2001-03 (Mahmoud, 2004), 18 percent in 2008 (Mahmoud *et al.*, 2014), 36 percent in 2010 as per the Revitalizing the Sudan Gum Arabic Production and Marketing records (cited in World Bank, 2014).

- The overall margin assessment of the four categories of gum revealed (Figures 60, 61, 62 and 63) that H.P.S. graded gum ranked first (21.25 percent), followed by kibbled gum (17.49 percent), mechanical powdered gum (17.27 percent) and clean graded gum (14.59 percent). The result seems logical because of the high preference for H.P.S. on the international markets due to international technology brokers that always prefer to process commodities outside the country.

- The high value of moisture loss is equivalent to 15 and 36 percent of the FOB and producer prices, respectively. This cost is always encountered at the producer level, as the gum is brought to market in plastic sacks as a fresh product (wet) and is subjected to the drying process (on cement beds in the market yards or processing warehouses), which reduces the weight significantly.

- Fees retained by intermediaries, exporters' agents and the auction market together amount to 10 and 4 percent of the producer's and FOB price, respectively. Part of the value added represented by the concentration stages from the villages to the auction market could be made up by GAPAs at a lower cost. The GAPAs are organized to derive profit from economies of scale, avoiding too many handling and transport phases.

- Cleaning and processing together correspond to 7 percent compared to the FOB price and 21 percent compared to the producer price.
- Taxation and alms was equivalent to 6 and 15 percent compared to the producer price and FOB price, respectively. The taxation system is debatable. Taxes vary according to the markets, which leads to distortions. The report on Gum Arabic Auction Markets notices the different situations in three locations: Ennuhud / North Kordofan, Damazin / Blue Nile and Abu-gebaiha / South Kordofan, which differ significantly. The *zakat* is fixed at 10 percent which is called *Zakat zro'a* and according to Islam should be paid by producers and traders.
- FNC fees, which amounted to five percent, have now been reduced to an average of 0.5 percent. They are collected from the producers, but the traders usually pay them on their behalf.
- Relatively low transport costs (0.8 percent) at the upstream level have already been described; this is the result of dependence on cheap service providers. The cost is low because the product is transported via a big truck with two containers equivalent to 40 tonnes in weight.
- The chain seems to be market-driven, but is still below aspiration, mainly because the communication between downstream and upstream actors are not fully functioning. The situation is starting to change compared to the past, where the FOB prices or the export party prices rarely trickled down to the producer level.

Figure 60. **Margin distributions through value chains of clean graded gum arabic**

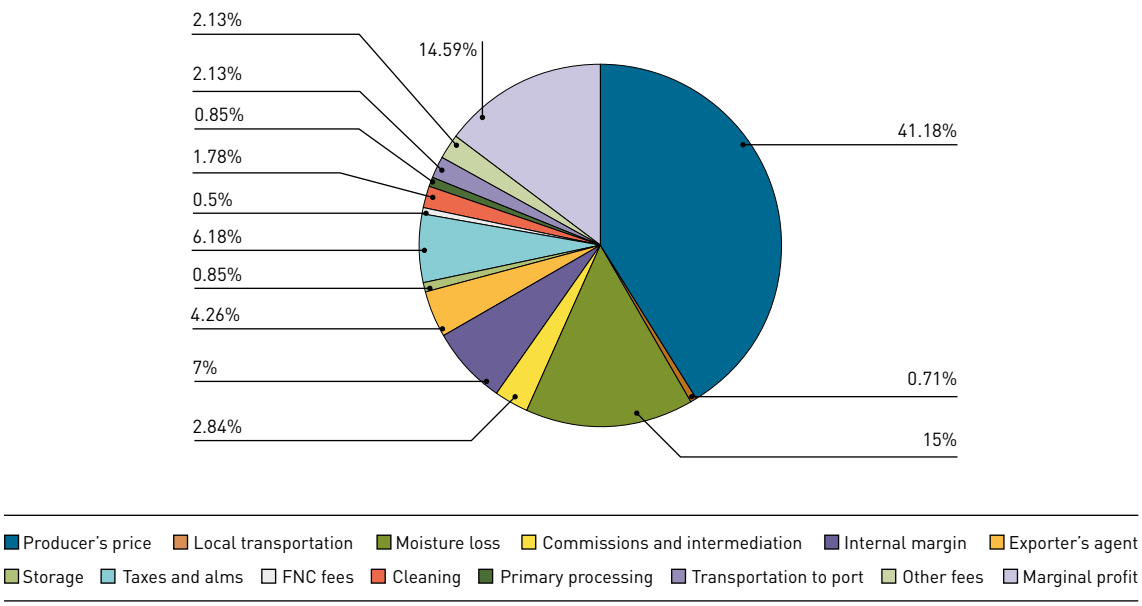
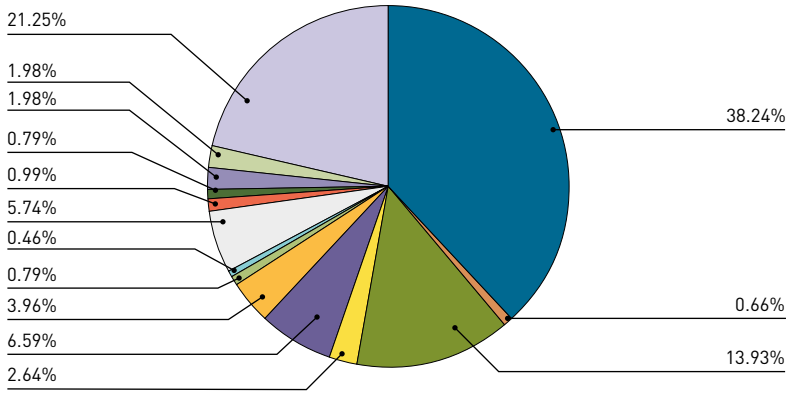
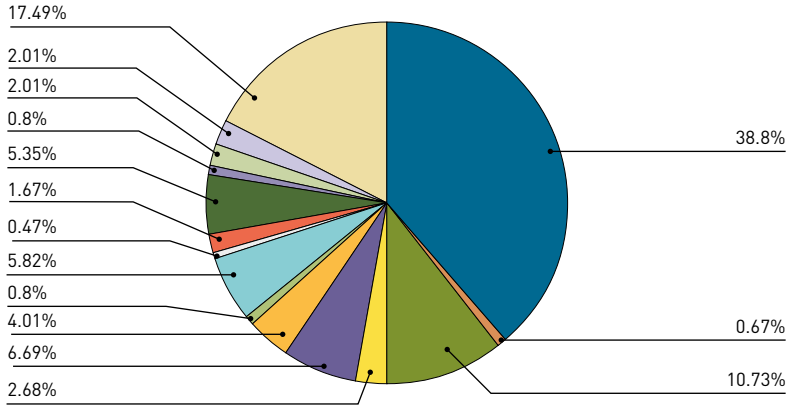


Figure 61. **Margin distributions across value chains of H.P.S. grade gum arabic**



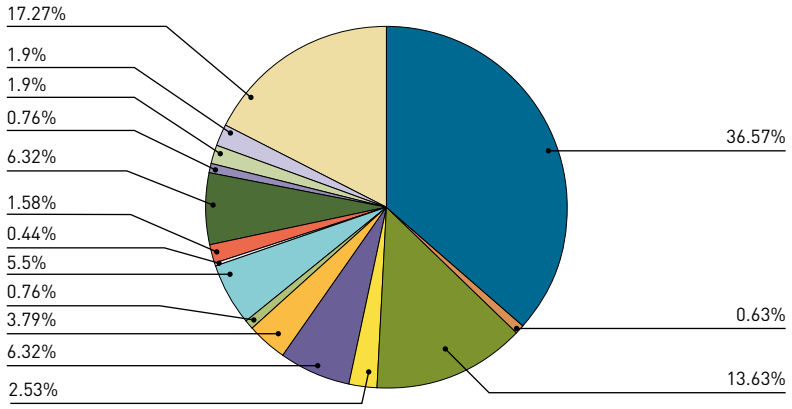
Producer's price | Local transportation | Moisture loss | Commissions and intermediation | Internal margin | Exporter's agent | Storage | Taxes and alms | FNC fees | Cleaning | Transportation to port | Other fees | Bank commissions for credit + insurance | Marginal profit

Figure 62. **Margin distributions across value chains of kibbled gum arabic**



Producer's price | Local transportation | Moisture loss | Commissions and intermediation | Internal margin | Exporter's agent | Storage | Taxes and alms | FNC fees | Cleaning | Transportation to port | Other fees | Insurance | Bank commissions for credit | Marginal profit

Figure 63. **Margin distributions across value chains of gum**



Producer's price | Local transportation | Moisture loss | Commissions and intermediation | Internal margin | Exporter's agent | Storage | Taxes and alms | FNC fees | Cleaning | Processing | Transportation to port | Insurance | Bank commissions for credit | Marginal profit

4.4.2 Baobab fruit

The baobab fruit market is mostly unorganized in nature and uncertainty in market demand makes it difficult to know the quantities and prices of the commodity over a long period in the past due to the gaps in the records. A lack of real value addition (like cleaning and grading) at the primary level causes the primary supplier to lose a substantial part of the possible income, whereas processing at the higher market level seems very profitable to the actors concerned. Despite this, the current study was able to acquire some essential information in this context. The average price of baobab fruit (raw and shelled) received by collectors across the states is equivalent to SDG750/sack (new product in 2015). The study also obtained the average market price (SDG1200/ sack) at the main urban markets across the states, in addition to the average price of the processed product (SDG1800/sack) announced by key-processors in Khartoum. Concerning the empirical calculations, the following results were found:

- The percentage of the price received by small-scale baobab collectors represents 62.50 and 41.66 percent compared to the price of the raw and processed product, respectively. The margin seems to discourage collectors because the values added acquired by traders; processors and externalities (in both cases) were very high within product chain. This could offer good opportunities for large-scale enterprises to invest more in the baobab processing business.
- The assessment of the margin obtained for the two categories of baobab fruit indicated (Annexes 24 and 25) that the processed product (refined, powered and properly packed) acquired a high commercial margin (32.26 percent) as compared to the raw product (17.98 percent). The result seems reasonable because the processed product is in high demand in urban centres and, to some extent, on the export market (particularly in the Arab world) rather than the raw product, which is in high demand during the month of Ramadan only. It is worth mentioning that a considerable amount of baobab fruit is imported annually from Nigeria and Niger, although most of the interviewed key traders emphasized its low quality.
- Market commissions and intermediation costs levied by brokers and producers' agents together ranged 3 percent -4 percent) for both the raw and processed product. This cost could be reduced by involving producers associations to substitute the intermediaries in local market and/or production areas.
- Processing was equivalent to 8 percent compared to the market price of processed baobab fruit. The cost does not affect favourable value added generated from processing.
- Taxation was equivalent to less than 1 percent compared to the market price of the raw or processed product.
- The relatively low transportation cost (0.8 percent) upstream does not affect the value addition obtained by actors within the system.

CHAPTER 5

Study Recommendations

5.1 General recommendations

Based on the listed deficiencies and gaps encountered in NWFPs sector, the following sets of recommendations were formulated by the current study coupled with the responsible entities, which are supposed to take lead for these actions. These recommendations were categorized as follows:

Recommended actions	Responsible entity(ies)
Look at NWFP production in Sudan. This could be done at different levels. For instance, the FNC is giving priority to gum arabic, whereas developing the remaining NWFPs is being paid less attention. It is recommended that the FNC make more effort to institutionalize such NWFPs in its programmes and future strategies.	FNC, GAB, Ministries of Agriculture, Environment, State governments, Farmers' Associations and NGOs
Survey production and consumption of different types of NWFPs in order to link their supply and demand to the forest stock and forest growth on the National Forest Inventory (NFI).	FNC, Ministries of Agriculture, Environment, SCBS), GAB.
Develop a resource base of forest species bearing important NWFPs like Acacia senegal, Acacia seyal, Adansonia degitata, Tamarindus indica, Balanites aegyptiaca and Ziziphus spina-christi. Also include endangered species such as Borassus aethiopum and Hyphaene thebaica to receive special consideration for management for sustainable production and uses.	FNC, Farmers' Associations, NGOs, GAB and State governments.
Policy alternatives- manipulated at the federal, state and local levels to support and encourage NWFP collectors to become actively involved in managing NWFP sources and other natural resources.	FNC, GAB, Ministries of Agriculture and the Environment, State governments, Farmers' Associations, chambers of commerce at Businessmen's Federations, crop market administrative bodies.
Conflict-resolution— resolving conflicts in land tenure and land use systems via setting up obvious regulations on the basis of win-win arrangements agreed upon between tribal leaders, landlords, peasants and NWFP collectors, pastoralists, local communities and government authorities.	Ministries of Housing, Urban Planning, Agriculture, Environment, State governments, FNC, GAB, Farmers' Associations and NGOs, tribal leaders, local communities
Raise awareness via providing information on opportunities, ecology, risks, and funding programmes.	Ministries of Finance, Agriculture, Environment, State governments, FNC, GAB, Banks, Farmers' Associations, chambers of commerce at Businessmen's Federations, crop market administrative bodies.

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Recommended actions	Responsible entity(ies)
Endorse processing activities across all NWFP areas to acquire more value added in and to improve income for all actors via exchange visits and learning by actors from different states.	Ministries of Agriculture, Industry, Environment, State governments, Farmers' Associations, chambers of commerce at Businessmen's Federations, crop market administrative bodies.
Adequate marketing facilities and pricing policy, which encourage NWFP collectors to produce and market their products efficiently. This could be introduced by implementing new approaches, such as a sustainable value chain, a one village one product campaign, certification and application of fair trade mechanisms.	FNC, GAB, Ministries of Agriculture, Environment, State governments, Farmers' Associations, chambers of commerce at Businessmen's Federations, crop market administrative bodies.
Facilitation- coordinating partners and research. Increase coordination within government and between government, public, and private stakeholders. NWFP development needs to occur in an atmosphere that is conducive to innovation and free of unnecessary administrative controls. Entrepreneurs will benefit from access to ecological information, education programmes, start-up funding or tax incentives, market assistance, and research support. Government agencies can help to foster this climate.	FNC, GAB, Ministries of Agriculture, Environment, State governments, Farmers' Associations, chambers of commerce at Businessmen's Federations.
Change the common perception of crop markets from being markets for levying revenues to markets for providing real services. This could be attained through revising the regulations and laws, and distributing the tax burden among the different stakeholders on the basis of the relative profit margin obtained by each one.	FNC, GAB, Ministries of Agriculture, Environment, Finance, Trade, State governments, Farmers' Associations, chambers of commerce at Businessmen's Federations, NWFP private companies, crop market administrative bodies.
Improve infrastructure at urban and central markets. Activate quality control and standard units at these markets.	Ministries of Finance, Trade, Agriculture, Environment, State governments and town commissioners, Farmers' Associations, chambers of commerce at Businessmen's Federations, SSMO, and crop market administrative bodies.
Markets should be pushed towards more realistic and competitive transactions; NWFP prices should be determined in the light of market forces (supply and demand). The NWFP value chains are always seem to be buyer-driven led by big traders and processing companies at the downstream end of the value chains. This could be done by improving the bargaining power of NWFP collectors by encouraging NWFP associations to play an active role in price setting. Through this mechanism the role of middlemen and externalities in price setting could be minimized.	Policy makers at Ministries of Trade, Agriculture, Finance, Environment, State governments, Farmers' Associations, chambers of commerce at Businessmen's Federations, NWFP processors, Private companies, crop market administrative bodies.
Provide marketing information systems via establishment of well-equipped trade points at the main markets, besides establishing powerful networking connections for main NWFP markets.	Ministries of Foreign Trade, Agriculture, Environment, State governments, FNC, GAB, Farmers' Associations, chambers of commerce at Businessmen's Federations, SSMO, crop market administrative bodies, NWFP private companies
Emphasize adding value to NWFP products. Income levels for NWFP collectors are typically low and the demand for the products can fluctuate wildly. By concentrating on value-added products, which command a higher price, NWFP actors may be able to earn more from less plant biomass. This could also encourage large-scale collection of NWFPs in the country.	Ministries of Foreign Trade, Agriculture, Environment, State governments, FNC, GAB, Farmers' Associations, NWFP processors, private companies, chambers of commerce at Businessmen's Federations, SSMO and crop market administrative bodies.

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Recommended actions	Responsible entity(ies)
Emphasize developing rural and community-based NWFP opportunities.	Ministries of Agriculture, Environment, State governments FNC, GAB, Farmers' Associations, NWFP processors, private companies, chambers of commerce at Businessmen's Federations, SSMO and crop market administrative bodies.
Develop reliable modern methods for collecting NWFPs. For example, convince intermediate technology developers to design and manufacture suitable tools for gum arabic tapping and collection, which are always hampered by traditional tapping tools like the axe (destroys the tree).	Ministries of Technology, Higher Education, Agriculture, Environment, Agricultural Research Cooperation, research institutions and universities, FNC, GAB.
Certify some important NWFPs to offer a way of improving market access, to capture a greater share of benefits at the local and community level, and to promote wider conservation objectives.	Ministries of Foreign Trade, Technology, Agriculture, Environment, FNC, GAB, NWFPs private companies and processors, third-party institutions at the international level.

5.2 Specific recommendations concerned with initiation of NWFPs microenterprises

Specific recommendations on starting up NWFP microenterprises:

- Start up NWFP microenterprises based on activation, mobilization, market-orientation, and expansion of existing GAPAs (exclusively dealing with gum arabic) to include other NWFP stakeholders through the following mechanisms:
- Establish smart partnerships between proposed NWFP associations and the private sector on the basis of benefit sharing or power sharing. The idea could be implemented under the recent *Five-Year Economic Stability Programme* in Sudan.
- Capacity building programmes on NWFP pre and post-harvest cultural practices, recommended scientifically for maximizing quality of product and minimizing total losses (storage conditions, packing, loading and offloading, group transportation, displaying commodity at markets, marketing advertisement and promotion).
- Special training in some marketing activities that maximize value addition through NWFP grading and processing.
- Facilitate NWFP microenterprise access to credit by providing collateral for institutional finance with more emphasis on microfinance mechanisms.
- Provide adequate marketing facilities and pricing policy to encourage NWFP microenterprises to produce and market their products efficiently.

5.3 Recommendations for the NWFP markets studied

5.3.1 Elobeid crop market

- Some of the potential NWFPs (e.g. baobab, tamarind) should find their way to main auction markets;
- Construct proper storage facilities;
- Establish NWFP export preparation unit;
- Reactivate quality control unit;
- Develop an informative marketing information system;
- Adopt new techniques for cleaning, grading and packing NWFPs:
- Capacity building programmes for NWFP stakeholders, government auction clerks and the market administrative bodies;
- Introduce advertising and mass media services;
- Implement NWFP insurance services.

5.3.2 Enuhud crop market

- Rehabilitate market infrastructure;
- Renovate storage facilities to comply with standards and specifications;
- Incorporate the retailers' market (*dabai*) in the premises of the crop market;
- Establish NWFP export preparation point;
- Exhibit crops on the cement beds near the auction hall;
- Establish financial institutions (bank, cash exchange and ATM services);
- Reactivate quality control unit;
- Develop a well-equipped marketing information system;
- Adopt new techniques for cleaning, grading and packing NWFPs;
- Capacity building programmes for market stakeholders, government auction clerks and the market administrative bodies;
- Introduce advertisement and mass media services;
- Implement NWFP insurance services.

5.3.3 Sinja and Sinnar crop markets

- Construct a well-equipped auction market for gum arabic and other NWFPs;
- Train government clerks and market administration in state of the art auctioning processes;

- Exhibit crops on the cement beds in the market yard to enable fair inspection by all market dealers;
- Activate a quality control unit to play a crucial role in commodity standards;
- Train and equip personnel in the information and trade units;
- Expand the credit ceiling for NWFP and other crop dealers to facilitate large-scale transactions.

5.3.4 Damazin crop market

- Rehabilitate the existing crop market;
- Reactivate the market transactions to include the important NWFPs in the area;
- Establish well-equipped auction markets;
- Training programmes for market stakeholders and market administrative units;
- Activate a quality control unit to play a crucial role in commodity standards:
- Train and equip personnel in the information and trade units.

5.4 Specific recommendations on gum arabic and baobab products:

- Inventory of the production potential of both gum arabic (*Acacia senegal* and *Acacia seyal*) and baobab trees;
- Capacity building for the gum arabic (GAPAs) and baobab collectors to improve their commercial skills;
- Gum producers and baobab collectors should be encouraged to implement all recommended pre and post-harvest cultural practices for maximizing product quality and minimizing total losses;
- During and after handpicking from the tree, the dried gum and baobab fruit should be directly collected and stored in suitable containers, such as jute sacks, woven plastic bags, or baskets;
- Baobab fruits should be collected when full ripe to avoid immaturity losses;
- Gum arabic must not be stored on and/or collected from the ground in order to avoid further contamination with any foreign matter such as earth, stones, soil, glass, animal remains or parts of plants;
- For the collection and transportation of gums and baobab, only unused / virgin sacks, bags or baskets must be used;
- Collected products (gum and shelled baobab) temporarily stored before further transportation should be kept in suitable places, preferably buildings, and should be protected from all types of pests (rodents, insects) and any kind of animals including birds;

- The time between interim storage after collection / harvesting and road transportation to further or final warehouse storing, or to processing facilities (for granulation, pulverization), should be kept as short as reasonably practicable;
- For road transportation, only appropriate vehicles /covered trucks should be used, which are clean and in good condition;
- The gum arabic and baobab products must be kept separate from other goods in the same vehicle;
- Warehouse buildings /storing facilities for both gum arabic and baobab products must be properly designed for this use. They should be inaccessible to any kind of animals and adequately protected from birds, rodents and insects;
- Appropriate pest-control measures, such as traps, electrical insect-control devices, as well as measures for identifying an infestation are recommended;
- Processing facilities for pulverizing or granulating gums and baobab must comply with basic food hygiene standards;
- Buildings and production facilities should be inaccessible to any kind of animals and should be constructed in such a way that they are adequately protected against birds, rodents and insects;
- Machinery and equipment must be easily accessible and regularly maintained and dry-cleaned;
- The management information system must be considered as a real asset. Experience requires duly recorded data related to the activity in gum arabic and baobab fruit, as well as other potential NWFPs, especially on volumes and prices.

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ANNEX 1

A checklist for developing the study investigations

- Types of NWFPs (Identification, taxonomic classification and nomenclature) Geographical distribution and coverage of NWFPs: ecological zones, morphological diversity, genetic characterization, classes, habitat, climatic conditions, existence in pure stand or mixed, population stability/vitality, germination, ecophysiology, pests and diseases and natural regeneration.
- Uses and nature of consumption (Energy as charcoal, sawdust, wood) food and fodder (human and animal), nutritional, medicinal and aromatic, cosmetics, cultural, environmental values.
- Most potential NWFPs in Sudan: Why? Where? What potential? Who? To whom? Which comparative advantages and competitiveness?
- Forest dependent people (Producers, collectors, village traders, middlemen, local associations, cooperatives, tribal leaders, etc). Gender involvement.
- Other actors (City merchants, producers' agents, middlemen, companies, processors, retailers, wholesalers, exporters, fees/tax custom authorities, quality control authorities, market operators, FNC).
- NWFPs-based micro enterprises (definition, existence, formation, hierarchy, role, organization, readiness, willingness to development, awareness, indigenous knowledge, effectiveness)
- Role and involvement in the management of the NWFPs resources.
- Resource base (availability, accessibility, vulnerability, stability and sustainability)
- Role of local community, government, private sector, NGOs, etc.
- Practices (who, how, when?)
- Utilization (how, how much? why?)
- Conservation (by whom, how? to what extent?)
- Core values, laws, legislations, norms, believe, etc.
- History of country's involvement in the 3 top NWFPs
- Main production areas in the country.

- Seasonality of production and trade,
- Ownership (private, communal or public),
- Land use systems
- Methods of production, harvesting, collection, actors and their role.
- NWFPs value chain &Value addition.
- Market infrastructure (Transportation, storage) & Services
- Regulations administrative setups.
- Market forces (supply and demand). Marketing channels. Pricing mechanisms.
- Quality and standards.
- Processing (drying, cleaning, grading, kibbling, granulating, and powdering, etc.).
- Physical losses and mixing
- Value chain (production, intermediation, wholesaling, processing, retailing, export, consumption).
- Polices. Taxes, fees, commissions, custom duties, quotas, and subsides.
- Eligibility to enter market.
- Finance and credit system.
- Market information systems. Market pillars: Product, Price , Place, Promotion
- Factors affecting market transactions (labor regulation, unemployment, rural urban migration).
- Market distortion.
- List of projects concerned NWFPs in Sudan
- Extension. Research.

ANNEX 2

Questionnaire structure

A. Key informant interview

Interview No. ..... Interviewed by .....

State..... Locality ..... Village/Town/Location .....

Name of Key informant..... Date of Interview .....

Socio-demographic Information

1. Age of Key informant ..... Gender .....

   M/F ..... Ethnic group .....

2. Educational status .....

3. Occupation .....

4. Experience in your occupation..... (Years) .....

5. Indicate common NWFP species that found in the region and tick in the different part of the tree that are used according to your knowledge

Species common name	NWFP derived from the species					
	bark	fruits	Seeds	gum &resins	forage	Total score

6. What is the approximate area or size of your community land you collect NWFPs from? .....

7. What proportion of the community land is covered by NWFPs?

NWFP	100%	>50%	33%	<33%	Others
NWFPi					
NWFPii					
NWFPiii					

8. Who controls or owns the NWFPs land you exploit or work on?
   Tribal leader ( ) Community ( ) Family ( ) Landowner ( ) Government ( ) No one ( )

9. Who has the right to harvest NWFPs?
   Natives only ( ) Any one at all ( ) If not specify, ...

10. What is the nature of NWFPs market in the region (competitive, monopoly, oligopoly, other)
    .....

11. Infrastructures and services at the market

.....

12. Existence of active actors at the NWFPs market

.....

13. Eligibility to enter the market (requirements and Licenses)

.....

14. Peripheral markets supplying the target market (rural and urban markets)

.....

15. Auction market operations (if available)

.....

16. Discrimination or barriers to the access the market (if any)

.....

17. Types of NWFPs processing and treatments at the market

.....

18. Means of NWFPs packing, weighing, loading, offloading and transportation

.....

19. Display of NWFPs commodity at the markets

.....

20. Physical impurities of the NWFPs different grades

.....

21. Value added generated from NWFPs processing

.....

22. Sources of credit available to NWFPs actors

.....

23. Quality control measures

.....

24. Fees, taxes and custom duties imposed on NWFPs commodity

.....

25. Availability and reliability of marketing information at the market

.....

26. Advertisement and promotion of the NWFPs commodity at the market

.....

27. Security services at the market

.....

28. Policies affecting NWFPs auction markets (state, national & international levels)

.....

29. Future vision of developing NWFPs marketing and processing

.....

B. Questionnaire for NWFP Collectors

Questionnaire No.: ..... Interviewed by.....

State.....Locality ..... Village/Town/Location .....

Name of Respondent ..... Date of Interview: ..... /11/2015

Socio-demographic Information

1. Age of respondent..... Gender .....

   M/F.....Ethnic group.....

Educational status:

   Nil ( ) Khalwa ( ) Primary S. ( ) Intermediate S. ( ) Secondary S. ( )
   Polytechnic/Training college ( ) University ( ) Others.....

2. Origin:..... Native ( ) Migrant ( ) Settler ( )

3. Major occupation ..... Gross income (SDG).....

4. Minor occupation ..... Gross income (SDG).....

5. Marital status: Single ( ) Married ( ) No. of spouses .....

6. Householdsize..... Male.....Female .....

7. Number & gender of household members involved in NWFPs collection .....
   Men.....Women ..... Children: boys.....girls.....

8. What are the most common species of NWFPs collected? List the first five in the order of importance to you (i).....(ii).....(ii).....(iv).....(v).....

9. Gross income from the top NWFPs in the table below

NWFP	Per trip/week/month/annum in SDG
NWFPi	
NWFPii	
NWFPiii	

10. Other sources of income (Please state) .....
    Specify amount (SDG) .....

11. What is the approximate area or size of your community land you collect NWFPs from?
    .....

12. What proportion of the community land is covered by NWFPs?

NWFP	100%	>50%	33%	<33%	Others
NWFPi					
NWFPii					
NWFPiii					

13. What proportion of the community land covered by NWFPs is harvested every year?

NWFP	100%	>50%	33%	<33%	Others
NWFPi					
NWFPii					
NWFPiii					

14. Who controls or owns the NWFPs land you exploit or work on?
Tribal leader ( ) Community ( ) Family ( ) Landowner ( ) Government ( ) No one ( )

15. Who has the right to harvest NWFPs?
Natives only ( ) Any one at all ( ) If not specify,.....

16. How do you obtain the right or access to harvest the NWFPs?
Inheritance ( ) Shared ( ) Wad Yad ( ) Gift ( ) Others .....

17. Do you own any NWFPs area? Yes ( ) No ( )

(i) If yes, state the size of area owned .....

NWFP	Area (in Mukhamas)	No. of trees (per Mukhamas)
NWFPi		
NWFPii		
NWFPiii		
Total		

(ii) If no, how do you pay for the area harvested?
Royalty ( ) Commission ( ) Tax ( ) Rent ( ) Share of NWFPs ( ) Nothing ( )

(iii) How much do you pay per year? (SDG.....

(iv) Whom do you make the payment to?.....

(v) What is your opinion of the level of payment?
Very satisfying ( ) Satisfying ( ) Neutral ( ) Not satisfying ( ) Not satisfying at all ( )

(vi) If nothing is paid give reasons.....

18. How is the NWFP stock locally regenerated?

NWFP	Naturally	Seeding	Seedlings	Coppicing	Others
NWFPi					
NWFPii					
NWFPiii					

19. What local regulations and practices are there for managing the available NWFPs stock?
.....

20. Do you belong to any NWFPs association? Yes ( ) No ( )

(i) If yes, what type of NWFPs association? Producers ( ) Village Committee ( )
Processors ( ) Others.....

(ii) What is the main objective of this association? .....

(iii) Number of people belonging to the association?.....

(iv) Since when established?.....

(v) How long have you been a member?.....

(vi) Benefits gained or expected from the association?

Tapping/collection/harvesting tools ( ) Credit ( ) Trainings ( )

Infrastructures (water, storages, transport) ( ) 6. Other (specify) .....

21. Where do you or other members of the community normally collect NWFPs from?
Forest reserve ( ) Fallow farm land ( ) Community land ( ) Others.....

22. What time of the year do you normally collect NWFPs?

NWFP	Dry season	Rainy season	All year round	Please specify the months
NWFPi				
NWFPii				
NWFPiii				

23. What quantity of NWFPs do you collect ?

NWFP	Per trip	Week	Month
NWFPi			
NWFPii			
NWFPiii			

24. List tools and other inputs required for NWFPs harvesting

NWFP	Tools
NWFPi	
NWFPii	
NWFPiii	

25. Please describe the NWFPs harvesting process.

NWFP	No. of collection	Interval
NWFPi		
NWFPii		
NWFPiii		

26. How do you transport the harvested NWFPs?
Vehicle ( ) Animal ( ) Head ( ) Others .....

27. How far from your village is the NWFPs found? .....
m ..... km.....

28. Where do you normally assemble the harvested NWFPs?
.....

29. How far from the point of assembly is the NWFPs found

.....

30. How much do you spend per person in collecting NWFPs per trip? (time)

.....

31. What is the average number of people in a collection team?

.....

32. Where do you obtain finance for NWFPs collection?

.....

33. Do you sometimes reject NWFPs collected? Yes ( ) No ( )

(i).If yes, how much is rejected per trip?..... .....

(i).Give reasons for the rejection..... .....

34. Do you sometimes use some of the NWFPs collected for household purposes? Yes ( ) No ( )

If yes, how much is used..... Please state purpose(s).....

NWFP	How is used	Purposes			
NWFPi					
NWFPii					
NWFPiii					

35. What factors affect the volume of NWFPs harvested?
Availability ( ) Harvesting technique ( ) Accessibility ( ) Season/time of year ( )
Level of disease infestation ( ) Labour availability ( )
Others.....

36. What problems do you face with NWFPs collection &How do you solve or think these problems can be solved?

.....

37. List or state regulations or controls on NWFP collection by government dept. or association, etc.

.....
.....
.....
.....

Costs & Revenues

38. Indicate the costs in NWFP collection (per trip) in (SDG)

Activity/Item	NWFPi		NWFPii		NWFPiii	
Labour	No. per trip	Rate	No. per trip	rate	No. per trip	Rate
No. of days per trip/trips per month						
Rate per day (food & transport)						

Activity/Item	NWFPi	NWFPii	NWFPiii
Rent/Fee/Royalty/Commission/Access tax			
Transportation (assembling point to market)			
Food ,,			
Tools			
Marketing (expenses incurred in selling)			
Other inputs			
Other expenses			

39. Revenue from NWFP collection (per trip)

Average quantity of NWFP collected per trip			Av. No. of trips per day/ week/month/year			Selling price per unit (SDG)			Total revenue (SDG)		
NWFP i	NWFP ii	NWFP iii	NWFP i	NWFP ii	NWFP iii	NWFP i	NWFP ii	NWFP iii	NWFP i	NWFP ii	NWFP iii

40. Other Household Incomes (per month/year)

Income source	Amount (SDG)
Farm production	
Trading	
Government work	
Labourer	
Remittances	
Others	

Marketing of raw NWFP

41. Where do you sell the NWFP harvested? *Please name town/village .....

NWFP	Home	Rural market	Urban market	Central market	Others
NWFPi					
NWFPii					
NWFPiii					

42. Who buys the NWFP harvested?

NWFP	Producer Agent	Village trader	Middleman	Association	City Merchant	Processor	Company	Others
NWFPi								
NWFPii								
NWFPiii								

43. What are the mechanisms which setup the market price for your product ?
Market supply/demand ( ) Self ( ) Buyer ( ) Middleman ( ) Other, specify.....

44. Are you satisfied with the income you earn from NWFP collection?

NWFP	Yes	No	Reasons
NWFPi			
NWFPii			
NWFPiii			

45. Do you clean and grade the raw NWFP before sale?

NWFP	Yes	No	Reasons
NWFPi			
NWFPii			
NWFPiii			

Processing

46. Do you carry out any processing activities on the raw NWFP? Yes ( ) No ( )

47. If yes, (i) specify type of activities
.....

Please describe the post harvest activities you perform for your NWFP?

Species/Process	Cleaning	Drying	Sorting	Grading	Packing tool	Other
NWFPi						
NWFPii						
NWFPiii						

(ii) List tools and other inputs required for processing and their uses and costs

NTWP	Tools / Inputs			Use			Total Cost/ (SDG)
NWFPi							
NWFPii							
NWFPiii							

48. Please state quantity processed (per trip/day/week)

NTWP	Quantity per trip/day/week
NWFPi	
NWFPii	
NWFPiii	

49. What is the form of your end processed product(s)?

NTWP	Form of your processed NWFP
NWFPi	
NWFPii	
NWFPiii	

50. How much do you earn from the processed NWFP?

NWFP	Quantity processed per trip/day/week/ month	Quantity sold per trip/day/week/ month	Price/Amount (SDG)	Total revenue (SDG)
NWFPi				
NWFPii				
NWFPiii				

51. Who buys the processed NWFP?

NWFP	Middleman	Wholesaler	Processor	Retailer	End user	Others
NWFPi						
NWFPii						
NWFPiii						

52. What should be done to enhance the NWFP industry in the country?

C. Questionnaire for NWFP Traders

Questionnaire No.: ..... Interviewed by.....

State.....Locality .....Village/Town/Location.....

Name of Respondent .....Date of Interview: .....

Socio-demographic Information

1. Age of respondent.....Gender .....

   M/F.....Ethnic group.....

2. Educational status:
   Nil ( ) Primary ( ) Intermediate S. ( ) Secondary S. ( )
   Polytechnic/Training college ( ) University ( ) Others .....

3. Origin: Native ( ) Migrant ( ) Settler ( )

4. Major occupation .....Gross income (SDG).....

5. Minor occupation .....Gross income (SDG).....

6. Marital status: Single ( ) Married ( ) No. of spouses .....

7. Household size.....Male.....Female .....

8. How long have you been in the trade?..... (Years)

9. Are you a member of any NWFP association or/and trade union? Yes ( ) No ( )

10. If yes, name the association or/and trade union
.....

11. What is the objective of this association or/and trade union?
.....

12. How many people belong to the association or trade union?
.....

13. When was it established?
.....

14. How long have you been a member?
.....

15. What benefits have you derived or are you expecting from the association or/and trade union?

    Purchasing agent ( ) Bargaining power ( ) Credit provider ( ) Subsidy provider ( )

    Infrastructure, storage, transportation, etc ( ) Training and extension services ( )

    Market information ( ) Others .....

16. To which market actors category do you belong to?

    Village trader ( ) Middleman ( ) City merchant ( ) Producer agent ( ) Company agent ( )

17. Which form of NWFP trade do you deal with?

    Unprocessed/Raw NWFP: .....Wholesaler ( ) Retailer ( ) Others .....

    Processed NWFP: .....Wholesaler ( ) Retailer ( ) Others .....

    Finished NWFP products: .....Wholesaler ( ) Retailer ( ) Others .....

18. What are the most common species of NWFPs do you trade in?

    (i).....(ii).....(ii).....(iv).....(v).....

19. What factors determine good quality NWFP species?.....

20. In which place (s) do you market your commodity? Roadside ( ) Home ( ) Rural market ( )

    Urban market ( ) Central market ( ) Export market ( ) Others .....

    Please name / location of market(s .....

21. Who buy(s) your goods?

    Village trader ( ) Middleman ( ) City merchant ( ) Producer agent ( )

    Company agent ( ) Processor ( )

22. Who setup (s) the price of your commodity ?

    Market supply/demand ( ) Buyer ( ) Yourself ( )

    Middleman ( ) Seasonality ( ) Other.....

23. Please specify quantities and price per unit of the main NWFPs, which are traded on local or/and export markets

Product	Local Market		Foreign/Export Market	
	Quantity traded per day/week/month	Price per unit (SDG)	Quantity traded per day week/month	Price per unit (SDG)
NWFP i				
NWFP ii				
NWFP iii				

24. Please categorize main clients & average quantities of top NWFPi purchased?

Client	Location/ destination	Quantity purchased per day/ wk/mth	Unit price	Marketing costs	Marketing Arrangements
Processor/ manufacturer					
Wholesaler					
Retailer					
End-user					

25. Please categorize main clients & average quantities of top NWFPii purchased?

Client	Location/ destination	Quantity purchased per day/ wk/mth	Unit price	Marketing costs	Marketing Arrangements
Processor/ manufacturer					
Wholesaler					
Retailer					
End-user					

26. Please categorize main clients & average quantities of top NWFPiii purchased?

Client	Location/ destination	Quantity purchased per day/ wk/mth	Unit price	Marketing costs	Marketing Arrangements
Processor/ manufacturer					
Wholesaler					
Retailer					
End-user					

**Client = the person who purchases the raw NWFP or processed NWFP or finished product from the trader

**Market arrangement = whether goods (i) Supplied on contract (ii) Anytime available (iii) Transported to client (iv) Client purchases at source or market (v) Payment made in advance (vi) Payment made at time of purchase (vii) Payment made later Others.....

27. What problems do you encounter in NWFP trading and how do you solve or think these problems could be solved? .....

28. What rules and regulations affect the trade?

Government (e g. Forestry Dept, Metropolitan assembly, Export Promotion council etc .....

Non-governmental (e.g. Association, trade unions, etc.....

Costs& Revenues

29. Indicate trading costs of the NWFPs

Item	Amount (SDG)			Total costs (SDG)		
	NWFPi	NWFPii	NWFPiii	NWFPi	NWFPii	NWFPiii
Goods purchased (per day/week/ month)						
Transportation of goods						
Government taxes/ levies/market tolls						
Store/stallrent						
Association dues						
Susu (daily/weekly/ monthly savings)						
Others						

30. Specify revenue you obtained from trading of NWFPs

	Quantities per NWFP per day/wk/month	Price (SDG)	Total revenue (SDG)
NWFPi			
NWFPii			
NWFPiii			

31. Indicate other Incomes (per month/year)

Item	Total income (SDG)
Farm production	
Trade in other goods**	
Government work	
Labourer	
Remittances	
Others	

**State other goods traded.....

32. What should be done to enhance the NWFP industry in the country?

.....

.....

D. Questionnaire for NWFP Processors

Questionnaire No.: ..... Interviewed by.....

State.....Locality ..... Village/Town .....

Name of Respondent ..... Date of Interview: ..... /.../2015

Socio-demographic Information

1. Age of respondent..... Gender .....

   M/F.....Ethnic group.....

2. Educational status:
   Nil ( ) Primary S. ( ) Intermediate S. ( ) Secondary S. ( )
   Polytechnic/Training college ( ) University ( ) Others .....

3. Origin: Native ( ) Migrant ( ) Settler ( )

4. Major occupation ..... Gross income.....

5. Minor occupation ..... Gross income.....

6. Marital status: Single ( ) Married ( ) No. of spouses .....

7. Householdsize..... Male.....Female .....

8. How did you enter the NWFP processing business?.....

9. How long have you been in the enterprise?.....

10. Position in the enterprise: Owner ( ) Manager ( ) echnical Staff ( ) Skilled labour ( )

    Overseer/supervisor ( ) Others .....

11. Is the enterprise registered?.....With which organization or trade unit?.....

12. Number & gender of other actors members involved in the enterprise:.....

    Men.....Women..... Children: male.....female.....

13. Type of activities engaged in by household members

14. Are you a member of any NWFP association or trade union? Yes ( ) No ( )

15. If yes, which type? Producers ( ) Processors ( ) Traders ( ) Others.....

16. What is the objective of this association?.....

17. How many people belong to the association or union?.....

18. When was it established?.....

19. How long have you been a member?.....

20. What benefits have you derived or are you expecting from the association?.....

21. Which of the following types/stages of the top 3 NWFPs processing do you do?

NWFPi: Primary processing ( ) Secondary processing ( ) Both of them ( )

NWFPii: Primary processing ( ) Secondary processing ( ) Both of them ( )

NWFPiii: Primary processing ( ) Secondary processing ( ) Both of them ( )

22. Where do you get them from?

Producer ( ) Middleman ( ) Village trader ( ) City merchant ( ) Others

23. What factors determine good quality NWFP species?

.....

24. What NWFP products do you produce, species used and respective volume of production

NWFP	NWFP species used	Source of NWFP species used	Quantity produced per day/week/ month	Unit price (SDG)	Total revenue (SDG) per day/ week /month
NWFPi					
NWFPii					
NWFPiii					

25. List tools used in processing and uses

NWFP	Tool	Uses	Unit cost (SDG)	Total cost (SDG)
NWFPi				
NWFPii				
NWFPiii				

26. Describe how you process the NWFP

27. What problems have you encountered in NWFP procurement and processing & how do you solve or think these problems could be solved?

Problem	Solution

Marketing of processed NWFP

28. Do you grade processed NWFP before sale?

	Yes	No
NWFP		
NWFPi		
NWFPii		
NWFPiii		

29. If yes what prices are paid for the various grades?

NWFP	Grade	Unit Price (SDG)	Total revenue (SDG)
NWFPi			
NWFPii			
NWFPiii			

30. Where do you sell your products? Roadside ( ) Rural market ( ) Urban market ( ) Central market ( ) Foreign/export market ( ) Others.....

31. Who buys your products? Middlemen ( ) Wholesalers ( ) Retailers ( ) Local end users ( ) Others.....

32. Where do your clients come from and what quantity of products do they purchase? (tick as appropriate)

Client	Resident status	Type of product purchased	Quantity purchased per day/wk/month	Destination
Middleman	Rural dweller			
	Urban dweller			
	Foreigner			
Wholesaler	Rural dweller			
	Urban dweller			
	Foreigner			
Retailers	Rural dweller			
	Urban dweller			
	Foreigner			
End users	Rural dweller			
	Urban dweller			
	Foreigner			

33. Who sets the price for your products? Self ( ) Buyer ( ) Middleman ( ) Supply/Demand ( ) Union/association ( ) Others

34. What is considered in price setting?

Quantity of material used ( ) Quality of material ( ) Size ( ) Seasons/Occasions ( ) Type of product ( ) Market demand ( ) Cost of raw materials ( ) Others.....

35. What problems do you encounter in marketing NWFP products & how do you solve or think these problems could be solved?

Employment

36. Employment status (Please specify below)

Status	Weeks available/month	Months available	Wage paid
Full-time			
Part-time			
Sub-contract			

37. Investment capital

Amount of capital	Name of source	Profit margin	Repayment period

Costs & Revenues of the 3 selected NWFPs

38. Costs in NWFPi processing

Item	Quantity purchased per week/month	Unit price (SDG)	Total Amount (SDG)
Raw materials			
Labour			
Equipment			
Taxes			
Miscellaneous			
Others			

39. Costs in NWFPii processing

Item	Quantity purchased per week/month	Unit price (SDG)	Total Amount (SDG)
Raw materials			
Labour			
Equipment			
Taxes			
Miscellaneous			

40. Costs in NWFPiii processing

Item	Quantity purchased per week/month	Unit price (SDG)	Total Amount (SDG)
Raw materials			
Labour			
Equipment			
Taxes			
Miscellaneous			

41. Revenues from NWFP processing

Product (s)	Amount earned (per day/week/month)	Total amount (SDG)
NWFPi		
NWFPii		
NWFPiii		
Total		

42. Other revenue sources

Source	Amount earned per day/week/month(SDG)
Farm produce	
Other trades/petty trading	
Government work	
Labourer	
Remittances	
Others	

43. What should be done to enhance the NWFP industry in the country?

.....

ANNEX 3

Timeline shows scheduled preparations and implementation of field surveys

November/December 2015								
06-08 Nov.	12-13 Nov.	15 Nov.	17-18-19 Nov.	21 Nov.	22 Nov.	29 Nov. - 2 Dec.	3 Dec.	4-6 Dec.
TOR revision & Preparing structure of study	Developing checklist, structured questionnaire, pretesting, amendments (some nearby villages in NK)	Elobeid & (including secondary data collection)			Errahad			
			Khewi, Eldowdia, Talib & Ennhud (including secondary data collection)	Abuzabad & Rehawa				
						Damazian & Rosiers		
							Sinja & Sinnar	
								Khartoum, Khartoum North, Umdurman

Key (State):

NK= North Kordofan

WK= West Kordofan

BN= Blue Nile

SI= Sinnar State

ANNEX 4

Sample distribution among different NWFPs actors across targeted states

State	Sample distribution					
	Collector		Trader		Processor	
	Frequency	%	Frequency	%	Frequency	%
West Kordofan State	45	62	27	35	0	0
North Kordofan State	12	16	15	19	0	0
Khartoum State	0	0	20	25	34	100
Blue Nile State	7	9.6	9	11	0	0
Sinnar state	9	12.3	7	9.0	0	0
Total	73	100.0	78	100.0	34	100.0

ANNEX 5

Sample distribution among different NWFPs actors across targeted localities

Locality	Sample distribution					
	Collector		Trader		Processor	
	Frequency	%	Frequency	%	Frequency	%
Elkhewei	18	24.7	8	10.3	0	0
Enuhud	14	19.2	10	12.8	0	0
Abuzabad	13	17.8	9	11.5	0	0
Sheikan	12	16.4	10	12.8	0	0
Errahad	0	0	5	6.4	0	0
Damazin	3	4.1	6	7.7	0	0
Rosiers	4	5.5	3	3.8	0	0
Sinnar	5	6.8	5	6.4	0	0
Sinja	4	5.5	2	2.6	0	0
Omdurman	0	0	15	19.2	18	52.9
Khartoum North	0	0	5	6.4	9	26.5
Khartoum	0	0	0	0	7	20.6
Total	73	100.0	78	100.0	34	100.0

ANNEX 6

Scientific names, local names, type and important uses of some NWFPs in Sudan

Scientific Name	Local Name	Type	Important Uses
Ailanthus excelsa	Ailanthus	Tr	Ornamental, shade, fodder, shelterbelt
Acacia etbaica	Arad	Sh	Forage, fuelwood
Tamarindus indica	Aradeib	Tr	Food, amenity, wood, forage, medicine, dye, tannins
Albizia amara syn. A. Sericocephela	Arad (a)	Tr	Wood, medicine, tannin, fodder, seeds, poison
Salvadora persica	Arak	Sh/Tr	Forage, medicine, toothbrushes, fruit, sand dunes stabilisation
Grewia mollis	Basham	Sh	Food, wood, medicine, forage
Hibiscus micranthus	Ghubeish	Us	-
Albizia anthelminthica	Girfat ad dud, Sud	H	Fuelwood, timber, fodder, bark, de-worming
Guiera senegalensis	Gobaish	Sh	Forage, medicine, fuel
Grewia villosa	Gregdan	Sh	Food, forage, medicine
Grewia tenax	Guddiem	Sh	Food, forage, medicine
Diospyros mespiliformis	Gughan	Tr	Wood, fruit
Combretum glutinosum	Habeit, Habil el mur	Tr	Wood, medicine
Faidherbia albida	Haraz	Tr	Agroforestry, medicine, fruit, timber, forage
Solenostemma argel	Hargal	Sh	Medicinal properties
Lonchocarpus laxiflorus	Har har	Tr	Wood, fuel, dye, medicine
Acacia senegal	Hashab	Tr	Gum, agroforestry, honey, fodder, medicine
Balanites aegyptiaca	Heglig	Tr	Wood, fruit, pesticide, hedging, fodder, medicine
Ximenia americana	Humeid abiad	Tr	Fuel, timber, fruit, hedging
Adansonia digitata	Humier	Tr	Food, fruit, water, medicine, leaves
Dichrostachys cinerea	Hurgan	Tr	Wood (small articles), fuel, medicine, honey
Diosyprus mespiliformis	Jokhan	Tr	Wood, fruit, medicine, gum
Dichrostachys cinerea	Kaddad	Tr	Wood, fuel, medicine, honey
Acacia polyacantha	Kakamout	Tr	Wood, fuel, medicine
Strychnos innocua	Kamma doda	Sh/Tr	-

FOLLOWS ON THE NEXT PAGE →

Scientific Name	Local Name	Type	Important Uses
Boscia salicifolia	Karanevari	Tr	Fuel, food, forage
Chamaecrista absus	Kawal	Us	Edible silage
Senna tora	Kawal	Us	Edible silage
Tephrosia bracteolata	Kawasa	pH	Very palatable
Dalbergia melanoxylon	Kelto	Sh/Tr	Timber, medicine, carving, forage
Bauhinia rufescens	Kharoub	Sh	Forage (pods), amenity, wood, tannins,hedging
Piliostigma reticulatum	Kharoub	Tr	Food, medicine, fuel
Piliostigma thonningii	Kharoub	Tr	Food, medicine, fuel, dye, gum
Stereospermum kunthianum	Khashkhash abiad, Samr	Tr	Fuel, medicine
Lonchocarpus laxiflorus	Khashkhash azrak	Tr	Wood, fuel, dye, medicine
Grewia flavescens	Khelisan	Cl/Sh	Timber, fruit, medicine, forage
Bauhinia rufescens	Kulkul	Sh	Forage (pods0, amneity, wood, tannins, hedging
Boscia senegalensis	Kursan	Sh	Food, fuelwood, hedging (poor), medicne
Acacia oerfota	Laot	Sh	Forage (last resort), medicine
Albizia lebbeck	Lebbek	Tr	Wood, amenity, gum, soap, agroforestry
Leucaena leucocephala	Leucaena	Tr	Forage, agroforestry, wood, fuel, medicine, edible leaves
Khaya senegalensis	Mahogoni	Tr	Timber, medicine, fuel, amenity, honey
Ximenia americana	Medika	Sh	Wood, food, medicine
Prosopis glandulosa syn. P. chilensis	Mesquite	Tr	Fuel, wood, fodder, shelterbelt, hedging, pods
Prosopis juliflora	Mesquite	Tr	Fuel, wood, medicine, fodder, shelterbelt, hedging
Dobera glabra	Mikah	Tr	Fruit, fodder, shade, amenity, carving
Boscia senegalensis	Mukheit	Sh	Food, fuel and hedging (poor), medicine
Ziziphus spina-christi	Nabak	Sh	Food, wood, forage, hedging, medicine, fuel
Ziziphus mucronata	Nabak el gamal	Tr/Sh	Fruit, browse
Ziziphus mucronata	Nabak el fil	Tr/Sh	Fruit, browse
Ailanthus excels	Neem hindi	Tr	Ornamental, shade, fodder, shelterbelt
Acacia ehrenbergiana	Sallam	Sh	Forage
Acacia tortilis	Samar	Tr	Fuel, forage (pods), timber, hedging, gum
Stereospermum kunthianum	Samr	Tr	Fuel, medicine
Adenium obesum	Sedger el sim	Sh/Su	Amenity, poison
Boscia angustifolia	Seheh	Sh	Wood, medicine, forage, fruit
Senna alexandrina	Sena maka	Us	Medicine (laxative), pods valuable
Senna italica	Sena sena	Us	Medicine, pods valuable
Boscia angustifolia	Sereh	Sh	Wood, medicine, forage, fruit

FOLLOWS ON THE NEXT PAGE →

Scientific Name	Local Name	Type	Important Uses
Parkinsonia aculeata	Sesaban	Tr	Amenity, windbreak, fuel, medicine, fodder, pods
Sesbania sesban	Sesaban	Tr/Sh	Fuel, timber, agroforestry, fodder, shelterbelt
Acacia tortilis	Seyal	Tr	Fuel, forage (pods), timber, hedging, gum
Acacia laeta	Subahi	Sh	Fuel, gum, hedging, forage, timber
Erythrina abyssinica syn. E. tomentosa	Shush	Tr	Red hot poker tree, ornamental
Ziziphus spina-christi	Sidr	Sh	Food, wood, forage, hedging, medicine, fuel
Acacia nilotica	Sunut	Tr	Wood, tannin, forage, dye, medicine, gum, honey
Cadaba farinosa	Sureih	Sh	Forage, medicine
Maerua crassifolia	Surha	Tr	Wood, forage, food
Chamaecrista nigricans syn. Cassia nigricans	Surib	H	Substitute coffee
Adansonia digitata	Tabaldi	Tr	Food, fruit, water, medicine, leaves
Acacia seyal	Taleh	Tr	Forage, timber, hedging, tannin, medicine, gum, smoke
Tamarix aphylla	Tarfa	Tr	Wood, fuel, amenity, shade, medicine, shelterbelt
Tamarix mannifera	Tarfa	Sh	Wood, fuel, amenity, shade, medicine, shelterbelt
Tamarix nilotica	Tarfa	Sh	Wood, fuel, amenity, shade, medicine, shelterbelt
Sterculia setigera	Tartar	Tr	Gum, timber, medicine
Sterculia setigera	Telieh	Tr	Gum, timber, medicine
Pongamia pinnata	Um al shuur	Tr	From India, shade, ornamental
Crateva adansonii	Um bekesha	Tr	Fuel, timber, fruit, ?
Combretum hartmannianum	Um hebeilon	Tr	Wood, fuel

Plant Type

Tr: Tree: generally 1 to 2 main stems, and over 3 m in height; **Sh:** Shrub: generally 2 or more stems and under 3 m in height; **Us:** Under-shrub: generally under 1 m, woody and shrub like; **H:** Herb; **PH:** Perennial Herb: low-growing generally less than 25 cm; **aH:** Annual Herb; **G:** Grass; **pG:** Perennial Grass; **aG:** Annual Grass; **Su:** Succulent; **Cl:** Climber.

ANNEX 7

IVI, local and scientific names of NWFP in North & West Kordofan States

Local name	Scientific name (Species)	NWFP				Total score	Rank
		Bark & root	Fruits & seeds	Gum & Resin	Forage		
Hashab	*Acacia senegal*	0.55	0.32	0.89	0.71	2.47	1
Tabaldi	*Adansonia digitata*	0.79	0.88	0	0.59	2.26	2
Aradaib	*Tamarindus indica*	0.51	0.82	0	0.52	1.85	3
Nabag	*Ziziphus spina-christi*	0.69	0.77	0	0.33	1.79	4
Hegleig	*Balanites aegyptiaca*	0.48	0.76	0	0.52	1.76	5
Godiam	*Grewia tenax*	0.33	0.81	0	0.59	1.73	6
Talha	*Acacia seyal*	0.45	0.1	0.6	0.53	1.68	7
Seyal	*Acacia tortilis*	0.28	0.8	0	0.58	1.66	8
Haraz	*Faidherbia albida*	0.34	0.23	0.29	0.77	1.63	9
Humeid abiad	*Ximenia americana*	0.29	0.66	0	0.65	1.60	10
Humaid	*Scholerocarya birrea*	0.41	0.59	0	0.59	1.59	11
Jumaiz	*Ficus sycomorus*	0.33	0.66	0	0.57	1.56	12
Sanamaka	*Senna alexandrina*	0	0.79	0	0.75	1.54	13
Snut	*Acacia nilotica*	0.43	0.33	0.14	0.58	1.48	14
Gregdan	*Grewia villosa*	0	0.69	0	0.55	1.24	15
Doam	*Hyphaene thebaica*	0	0.77	0	0.42	1.19	16
Gafal	*Commiphora africana*	0.21	0.44	0	0.53	1.18	17
Sulgum	*Acacia gerrardii*	0.25	0.33	0	0.59	1.17	18
Habeel	*Combretum aculeatum*	0.29	0.33	0	0.52	1.14	19
Kadad	*Dichrostachys cinerea*	0.22	0.42	0	0.49	1.13	20
Basham	*Grewia mollis*	0.31	0.19	0	0.61	1.11	21
Arad	*Albizia amara*	0.45	0.38	0	0.28	1.11	21
Arak	*Salvadora persica*	0.42	0	0	0.37	0.79	23
Abanous	*Dalbergia melanoxylon*	0.22	0	0	0.55	0.77	24
Gobaish	*Guiera senegalensis*	0	0.11	0	0.53	0.64	25
Kibreet	*Ailanthus excelsa*	0	0.11	0	0.49	0.6	26
Gughan	*Diospyros mespiliformis*	0	0.45	0	0.12	0.57	27
Abusroog	*Prosopis Africana*	0	0	0	0.45	0.45	28
Hargal	*Solenostemma argel*	0.18	0	0	0.18	0.36	29

ANNEX 8

IVI, local and scientific names of NWFP in Blue Nile and Sinnar States

Local name	Scientific name (Species)	NWFP				Total score	Rank
		Bark & root	Fruits & seeds	Gum & Resin	Forage		
Hashab	*Acacia senegal*	0.43	0.49	0.79	0.66	2.37	1
Talha	*Acacia seyal*	0.43	0.44	0.62	0.63	2.12	2
Tabaldi	*Adansonia digitata*	0.39	0.79	0	0.57	1.75	3
Aradaib	*Tamarindus indica*	0.51	0.77	0	0.45	1.73	4
Kakamout	*Acacia polyacantha*	0.4	0.25	0.59	0.47	1.71	5
Godiam	*Grewia tenax*	0.29	0.71	0	0.7	1.7	6
Nabag	*Ziziphus spina-christi*	0.59	0.67	0	0.43	1.69	7
Seyal	*Acacia tortilis*	0.33	0.79	0	0.44	1.56	8
Snut	*Acacia nilotica*	0.33	0.44	0.21	0.58	1.56	8
Jumaiz	*Ficus sycomorus*	0.23	0.66	0	0.61	1.5	10
Hegleig	*Balanites aegyptiaca*	0.45	0.66	0	0.34	1.45	11
Haraz	*Faidherbia albida*	0.44	0.13	0.29	0.51	1.37	12
Sanamaka	*Senna alexandrina*	0	0.41	0	0.8	1.21	13
Gregdan	*Grewia villosa*	0	0.66	0	0.55	1.21	13
Doam	*Hyphaene thebaica*	0	0.77	0	0.4	1.17	15
Sulgum	*Acacia gerrardii*	0.15	0.34	0	0.61	1.1	16
Arad	*Albizia amara*	0.32	0.39	0	0.31	1.02	17
Gafal	*Commiphora africana*	0.25	0.39	0	0.34	0.98	18
Basham	*Grewia mollis*	0.21	0.22	0	0.55	0.98	18
Habeel	*Combretum aculeatum*	0.12	0.14	0	0.58	0.84	20
Arak	*Salvadora persica*	0.51	0	0	0.25	0.76	21
Kaddad	*Dichrostachys cinerea*	0.11	0.32	0	0.31	0.74	22
Abanous	*Dalbergia melanoxylon*	0.12	0	0	0.51	0.63	23
Abusroog	*Prosopis Africana*	0	0	0	0.55	0.55	24
Gughan	*Diospyros mespiliformis*	0	0.23	0	0.11	0.34	25
Kibreet	*Ailanthus excelsa*	0	0.11	0	0.22	0.33	26
Hargal	*Solenostemma argel*	0.11	0	0	0.21	0.32	27

ANNEX 9

IVI, local and scientific names of NWFP in study area (4 states)

Local name	Scientific name (Species)	NWFP				Total score	Rank
		Bark & root	Fruits & seeds	Gum & Resin	Forage		
Hashab	*Acacia senegal*	0.49	0.41	0.84	0.69	2.43	1
Tabaldi	*Adansonia digitata*	0.59	0.84	0	0.58	2.01	2
Talha	*Acacia seyal*	0.44	0.27	0.61	0.58	1.9	3
Aradaib	*Tamarindus indica*	0.51	0.8	0	0.49	1.8	4
Nabag	*Ziziphus spina-christi*	0.64	0.72	0	0.38	1.74	5
Godiam	*Grewia tenax*	0.31	0.76	0	0.65	1.72	6
Kakamout	*Acacia polyacantha*	0.4	0.25	0.59	0.47	1.71	7
Haraz	*Faidherbia albida*	0.34	0.23	0.29	0.77	1.63	8
Seyal	*Acacia tortilis*	0.31	0.8	0	0.51	1.62	9
Hegleig	*Balanites aegyptiaca*	0.47	0.71	0	0.43	1.61	10
Humeid abiad	*Ximenia americana*	0.29	0.66	0	0.65	1.6	11
Humaid	*Scholerocarya birrea*	0.41	0.59	0	0.59	1.59	12
Jumaiz	*Ficus sycomorus*	0.28	0.66	0	0.59	1.53	13
Snut	*Acacia nilotica*	0.38	0.39	0.18	0.58	1.53	13
Sanamaka	*Senna alexandrina*	0	0.6	0	0.78	1.38	15
Gregdan	*Grewia villosa*	0	0.68	0	0.55	1.23	16
Habeel	*Combretum aculeatum*	0.21	0.24	0.22	0.55	1.22	17
Doam	*Hyphaene thebaica*	0	0.77	0	0.41	1.18	18
Sulgum	*Acacia gerrardii*	0.2	0.34	0	0.6	1.14	19
Gafal	*Commiphora africana*	0.23	0.42	0	0.44	1.09	20
Arad	*Albizia amara*	0.39	0.39	0	0.3	1.08	21
Basham	*Grewia mollis*	0.26	0.21	0	0.58	1.05	22
Kadad	*Dichrostachys cinerea*	0.17	0.37	0	0.4	0.94	23
Arak	*Salvadora persica*	0.47	0	0	0.31	0.78	24
Abanous	*Dalbergia melanoxylon*	0.17	0	0	0.53	0.7	25
Gobaish	*Guiera senegalensis*	0	0.11	0	0.53	0.64	26
Abusroog	*Prosopis Africana*	0	0	0	0.5	0.5	27
Kibreet	*Ailanthus excelsa*	0	0.11	0	0.36	0.47	28
Gughan	*Diospyros mespiliformis*	0	0.34	0	0.12	0.46	29
Hargal	*Solenostemma argel*	0.15	0	0	0.2	0.35	30

ANNEX 10

Demographic characteristics of traders of NWPPs in the study area

Variable	Minimum	Maximum	Mean
No. of spouses	0	2	1.47
Number of household male	1	8	2.72
Number of household female	0	7	2.67
No. of people belong to association	180	200	190

ANNEX 11

Experience in years acquired by NWFPs traders across targeted states

State	Less than 5 years	6 - 10 years	11 - 15 years	15 - 20 years	More than 20 years	Total
West Kordofan	4%	33%	22%	22%	19%	100%
North Kordofan	13%	40%	0	30%	17%	100%
Khartoum	35%	30%	20%	5%	10%	100%
Blue Nile	11%	33%	11%	33%	11%	100%
Sinnar	14%	43%	14%	14%	14%	100%

ANNEX 12

Traders membership in NWFPs associations

State	Member	Not member
West Kordofan	22%	78%
North Kordofan	87%	13%
Khartoum	0	0
Blue Nile	0	0
Sinnar	0	0

ANNEX 13

Types of NWFPs associations with regard to traders across the targeted states

State	Producers	Traders union	Farmers union	Total
West Kordofan	50%	33%	17%	100%
North Kordofan	87%	13%	100%	100%
Khartoum	0	0	0	0
Blue Nile	0	0	0	0
Sinnar	0	0	0	0

ANNEX 14

Objectives and benefits of NWFPs associations

State	Association objectives			Association benefits	
	Help market transactions	Facilitate Infrastructures	Credit facilities	Credit facilities	Infrastructure+ storage + transportation facilities
West Kordofan	83%	0	17%	60%	40%
Khartoum	0	0	0	0	0
North Kordofan	0	100%	0	71%	29%
Blue Nile	0	0	0	0	0
Sinnar	0	0	0	0	0

ANNEX 15

Factors determine good quality of NWFPs

State	Factors determine good quality of the NWFPs				
	Cleaning	Maturity of the product	Storage period and transportation means	Source of the product	Total
West Kordofan	63%	26%	11%	0	100%
North Kordofan	100%	0	0	0	100%
Khartoum	88%	0	6%	6%	100%
Blue Nile	100%	0	0	0	100%
Sinnar	100%	0	0	0	100%

ANNEX 16

List of companies, city merchants, producers' agents in Elobeid Crops Market

بسم الله الرحمن الرحيم

إدارة سوق محصولات الأبيض

مكتب المدير التنفيذى

التاريخ: ٢٥ /١/٢٠١٥م

النمرة: ٦٤/١/٥ – ٦٤/أ/١٠

الإخوة الكرام :-

- نائب المدير التنفيذى
- مراقب السوق
- رئيس القسم الداخلى
- رئيس القسم الخارجى

السلام عليكم ورحمة الله

الموضوع – إعتماد الشركات والتجار و وكلاء المنتجين للموسم ٢٠١٤ – ٢٠١٥ م

إشارة للطلبات المقدمة من الشركات والتجار لإعتمادهم مشترين من بورصة سوق محصولات الأبيض ووكلاء المنتجين لمزاولة عملهم خلال الموسم ٢٠١٤ – ٢٠١٥ م أدناه كشف يوضح أسماء الشركات والتجار و وكلاء المنتجين الذين تم إعتمادهم حتى اليوم ٢٠١٥/١/٢٢م هم :-

اولاً : الشركات :-

الرقم	إسم الشركة	الوكيل المعتمد
١	شركة أغم للإستيراد و التصدير	عبد الباقي عبد الله هلال
٢	شركة ملاذ أنس	خالد مصطفى حداد
٣	شركة الجزيرة هايلاميكس	إبراهيم حميدة ادم
٤	شركة كاند لابرا	عبد الله يعقوب ادم
٥	شركة الإتجاهات المتعدده	عبد الله يعقوب ادم
٦	شركة كنترا للأعمال المتعدده	عبد الله يعقوب ادم
٧	شركة العنان	حامد محمد علي كوكو
٨	شركة لافيا	عبد العزيز ناصر أحمد
٩	شركة أم القري	يحي أحمد الأمين
١٠	شركة مساعي	يحي أحمد الأمين
١١	شركة روستا	محمد يوسف الصافي
١٢	شركة إيلي	صلاح الحسين
١٣	شركة الريفابي	يعقوب المدني
١٤	شركة نوبك	يوسف محمد احمد حبيبي
١٥	شركة ابو وائل	محمد اسماعيل
١٦	شركة النصر	الصادق احمد دفع الله

الرقم	إسم التاجر	الوكيل المعتمد
١	محمد عمر الضوي	النو حماد النو
٢	خالد مصطفي حداد	محمد احمد الدومة
٣	الطيب محمد جابر	الطيب محمد جابر
٤	أعمال مجذوب	عبد العزيز ناصر احمد
٥	أحمد موسي قرشي	وضاح أحمد موسي
٦	يوسف محمد أحمد حبيبي	عبد العزيز أحمد عوض
٧	محمد الحاج أحمد	أمير محمد صالح
٨	موسي محمد سعد الإمام	السماني موسي محمد سعد
٩	عبد الله التوم الخليفة	صبري أحمد ماكن
١٠	خالد الحاج محمد	يوسف محمد أحمد حبيبي
١١	عثمان سالم محمد سالم	محمد بشير مصطفي
١٢	فتح الرحمن مصطفي ناصر	عبد العزيز ناصر احمد
١٣	حامد النور احمد	يوسف أحمد يوسف
١٤	عبد الرحيم أحمد موسي	مبارك جمعة مرحوم
١٥	بدر الدين حبيبي	عبد الله يوسف
١٦	فرضي حمدتو	عبد الله
١٧	أعمال يوكاف	فرضي حمدتو عبدالله
١٨	خالد عابدين الدرديري	عبد العزيز ناصر احمد
١٩	محمد آدم الأنصاري	صلاح آدم الأنصارى
٢٠	عمر محمد عبد الله	الضو أحمد فضيل
٢١	موسي رحمة الله الماحى احمد	الهادي أحمد فضيل
٢٢	الهادي أحمد فضيل	حامد العاقب
٢٣	عثمان زكريا عبدالمولى	عماد حموده زكريا
٢٤	أحمد محمد ضوينا	أحمد محمد ضوينا
٢٥	عبد الحليم شريف احمد	عبد الحليم الشريف احمد
٢٦	الصادق احمد الأمين	الصادق أحمد الأمين
٢٧	هيثم إبراهيم محمد	هيثم إبراهيم محمد
٢٨	أحمد آدم أحمد جادين	أحمد آدم أحمد جادين
٢٩	مجمع محجوب الأمين	عثمان الشريف محمود
٣٠	عثمان الشريف محمود	عثمان الشريف محمود
٣١	صديق محمد ساهل	صديق محمد ساهل

١٤	الزبير جبريل الزبير	الزبير جبريل الزبير
١٥	محمد عبد الوهاب محمد	جمال محمد عبد الوهاب
١٦	الفحل حامد علي	محمد علي أبو سارة
١٧	أحمد عمر أحمد عجبنا	آدم عمر أحمد
١٨	عبد القادر البشير محمد	أحمد موسي أبو
١٩	إبراهيم حميدة آدم	إبراهيم حميدة آدم
٢٠	حسن أحمد محمد	محمد حسن احمد
٢١	محمد أحمد عبد الرحيم كباشي	بشير محمد أحمد
٢٢	موسي بدوي ادم	موسي بدوي ادم
٢٣	عبد الله عمر هنو	عبد الله عمر هنو
٢٤	إبراهيم عبد اللطيف احمد عريس	جمعة محمد حامد
٢٥	أحمد فضل الله بلوح	حمد أبو جيش موسى
٢٦	إبراهيم الزاكي حمدان	عبد العزيز حمدنا الله حمدان
٢٧	عبد الرازق عبد الله	إبراهيم عبد الله ابراهيم
٢٨	عبد الوهاب محمد عبد الله	جابر محمد احمد
٢٩	محمد عبد الله عبدالرحمن	محمد أبكر
٣٠	أحمد عبدالله احمد بين	آدم معلا محمد
٣١	محمد راخي النيل حسين	ناجي محمد راخي
٣٢	خليل المرضي العالم	خليل المرضي العالم
٣٣	عثمان حسن محمد عثمان	محمد الهادي عثمان حسن
٣٤	الشاذلي إسماعيل سبيل	الشاذلي إسماعيل سبيل
٣٥	عبد الرحمن مركز محمد على	علي مركز
٣٦	صلاح جلال عبدالله	صلاح جلال عبدالله
٣٧	محمد يوسف ابوشراء	محمد يوسف ابوشراء
٣٨	ابراهيم حسين	ابراهيم حسين

للتكرم بالعلم .

ولكم الشكر

سعد الشريف إبراهيم

المدير التنفيذي لسوق محصولات الأبيض

ANNEX 17

Quantities and prices of gum Arabic obtained from Enuhud Crops Markret (2003-2014)

بسم الله الرحمن الرحيم
ولاية غرب كردفـــان
محلية النهود
سوق محصولات النهود

التاريخ: /١٨/ ٣/ ٢٠١٥م النمرة س م ن/ ١ / أ / ١

الموضوع / معلومات بغرض الدراسة عن الصمغ العربى :
ادناه كميات وارد بورصة سوق محصولات النهودمن الصمغ العربي وحجم السيولة المتداولة في تسويق الصمغ بالبورصة :

العام	كمية الوارد بالقنطار	حجم السيولة المتداولة	متوسط الاسعار
٢٠٠٣م	١٦٢٠٣٠	٤٣٧٤٨١٠٠٠ دينار	٢٧٠٠ دينار
٢٠٠٤م	١٧٠٨٧٨	٢٠٥٠٥٣٦٠٠ دينار	١٢٠٠ :
٢٠٠٥م	٢١٣٣٢٤	٤٦٩٣١٢٨٠٠ دينار	٢٢٠٠ :
٢٠٠٦م	٢٣٧٤٠٨	١٦٨٥٥٩٦٨ جنيه	٧١ جنيه
٢٠٠٧م	٢٧٨٣٢٩	١٩٧٦١٣٥٩ جنيه	٧١ :
٢٠٠٨م	٢٨١٠٠٠	١٧٤٢٢٠٠٠ جنيه	٦٢ :
٢٠٠٩م	١١٨٤٢٧	٠٠٩٧١١٠١٤ جنيه	٨٢ :
٢٠١٠م	١٥٥٦٤٠	٠٤٣٥٧٩٢٠٠ جنيه	٢٨٠ :
٢٠١١م	٤١٦٥٤٢	١٤٥٧٨٩٧٠٠ جنيه	٣٥٠ :
٢٠١٢م	٦٤٦٣٩٢	٢٩٧٣٤٠٣٢٠ جنيه	٤٦٠ :
٢٠١٣م	٣٢٤٩٢٠	١٩٨٢٠١٢٠٠ جنيه	٦١٠ :
٢٠١٤م	١٩٥٠٢١	١٥٦٠١٦٨٠٠ جنيه	٨٠٠ :

وبالله التوفيق .....
ابراهيم يوسف عيسي
مدير سوق محصولات النهود

ANNEX 18

Records of NWFPs traded at Elobeid Crops Market (2000-2014)

(Original documents in Arabic language)

Crop	Quantity in Kantar 2000			Price in Dinar 2000		
	Auction	Stores	Total Supply	High	Low	Medium
Senna	11 329	1 625	12 954	4 300	1 728	3 014
Hashab gum	7 649	16 081	23 730	3 461	2 000	2 730
Talha gum	000	1 855	1 855	000	000	000
Trag trag	000	2 300	2 300	000	000	000

Crop	Quantity in Kantar (2002)			Price in Dinar (2002)		
	Auction	Stores	Total Supply	High	Low	Medium
Senna	3 088	4 435	007 523	4 500	3 000	3 750
Hashab gum	27 708	131 897	159 605	4 480	3 000	3 740
Talha gum	000	22 253	22 253	000	000	000
Trag trag	000	000	000	000	000	000

Crop	Quantity in Kantar (2003)			Price in Dinar (2003)		
	Auction	Stores	Total Supply	High	Low	Medium
Senna	4 098	7 332	11 430	8 000	3 500	5 750
Hashab gum	23 004	110 070	133 074	11 515	3 500	7 508
Talha gum	000	34 113	34 113	000	000	000

Crop	Quantity in Kantar (2002)			Price in Dinar (2002)		
	Auction	Stores	Total Supply	High	Low	Medium
Senna	05193	18932	24116	7305	4200	7553
Hashab gum	06766	177927	184693	40615	7000	23808
Talha gum	0063	76247	076310	7500	5000	6250
Trag trag	000	000	000	000	000	000

Crop	Quantity in Kantar (2002)			Price in Dinar (2002)		
	Auction	Stores	Total Supply	High	Low	Medium
Senna	2 258	1 398	03 656	7 130	3 000	5 065
Hashab gum	4 579	268 060	272 639	40 375	15 000	27 687
Talha gum	000	123 352	123 352	4 300	43 000	4 300
Trag trag	000	000	000	000	000	000

Crop	Quantity in Kantar (2002)			Price in Dinar (2002)		
	Auction	Stores	Total Supply	High	Low	Medium
Senna	292	1 541	1 833	000	000	000
Hashab gum	2 885	337 202	340 087	000	000	000
Talha gum	000	81 404	81 404	000	000	000
Trag trag	0000	000	000	000	000	000

Crop	Quantity in Kantar (2002)			Price in Dinar (2002)		
	Auction	Stores	Total Supply	High	Low	Medium
Senna	624	3 251	3 875	4 000	3 850	3 925
Hashab gum	1 840	257 558	259 398	10 505	7 800	9 153
Talha gum	000	34 583	34 583	000	000	000
Trag trag	000	000	000	000	000	000

Crop	Quantity in Kantar (2002)			Price in Dinar (2002)		
	Auction	Stores	Total Supply	High	Low	Medium
Senna	4 641	164	4 805	63	34	4 850
Hashab gum	17 824	147 161	164 985	140	78	109
Talha gum	000	117 854	117 854	000	000	000
Trag trag	000	000	000	000	000	000

Crop	Quantity in Kantar (2002)			Price in Dinar (2002)		
	Auction	Stores	Total Supply	High	Low	Medium
Senna	1 352	841	2 193	38	30	34
Hashab gum	23 992	173 319	197 311	90	68	79
Talha gum	000	207 250	207 250	000	000	000
Trag trag	000	000	000	000	000	000

Crop	Price in Pound (2010)	Price in Pound (2010)	
	Average	High	Low
Senna	405	47	46
Talha gum	25.104	189	82

Crop	Maximum price in SDG per Kg (2012)		Minimum price in SDG per Kg (2012)	Quantity in Kg (2012)
	SDG	SDG	Ton	Kg
Senna	1	3	21	524
Hashab gum	10	11	1 257	976

Crop	Quantities inside market (2013)	Stored quantities (2013)	Total (2013)	Price in SDG per Kg (2013)		
	Ton	Ton	Ton	High SDG	Low SDG	Medium SDG
Senna	624	3 251	3 875	4 000	3 850	3 925
Hashab gum	1 840	257 558	259 398	10 505	7 800	9 153
Talha gum	000	34 583	34 583	000	000	000
Trag trag	000	000	000	000	000	000

Crop	Quantities inside market (2013)	Stored quantities (2013)	Total (2013)	Price in SDG per Kg (2013)		
	Ton	Ton	Ton	High	Low	Medium
				SDG	SDG	SDG
Senna	128.11	232.57	339.70	5	3	128.11
Hashab gum	2 057.37	5 326.17	7383.54	18	15	2 057.37
Talha gum	-	6 156.73	6156.77	-	-	-

ANNEX 19

Gum Arabic export in Sudan obtained from GAB (1995-2015)

جدول صادرات الصمغ العربي من السودان

1995-2015

Gum Arabic Export in Sudan for the period 1995-2015

(Quantity in 1000 Metric Ton and Value in US$ 100 000)

السنة	طن 1000X	القيمة بملايين الدولارات
1995	18.48	51.40
1996	15.55	29.50
1997	22.42	27.00
1998	23.62	23.70
1999	25.67	26.40
2000	24.20	23.10
2001	22.42	24.30
2002	36.19	31.90
2003	36.16	35.40
2004	27.27	60.60
2005	29.21	107.60
2006	20.62	50.20
2007	30.88	51.90
2008	32.22	60.90
2009	47.85	73.20
2010	55.35	77.9 0
2011	52.928	77.80
2012	49.318	82.20
2013	63.012	134.20
2014	59.978	97.99
2015	48.70 حتى سبتمبر	84.15 حتى سبتمبر

د. الصادق جابر عاجب

رئيس قسم الأسواق

ANNEX 20

Percentage of commercial margins distribution pertinent to Clean gum grade

Price components Costs	(SDG/ kantar)	(SDG/ ton)	US$/ton	Percentage to commercial FOB Price
The producer price of gum Arabic was the average price obtained from all investigated states in November 2015.	580			
% of Producers price from FOB of clean gum	580	13 050	1 338.46	41.18%
Local transportation from farm gate to rural market	10	225.00	23.08	0.71%
Moisture losses	211.25	4 753.20	487.51	15%
Commissions and intermediation	40	900	92.31	2.84%
Internal margin until town market	100	2 250	230.77	7%
Exporter' s agent + auction market	60	1 350	138.46	4.26%
Storage at central markets	12	270	27.69	0.85%
Taxes (5%) + (10% zakat Zro'a) from farm get price	87	1 957.50	200.77	6.18%
FNC fees updated for 2015	7	157.50	16.15	0.50%
Cleaning of clean gum grade	25	562.50	57.69	1.78%
Transport (including loading and off-loading)	12	270	27.69	0.85%
Clearance at port	30	675	69.23	2.13%
Financing, bank commission, insurance	30	675	69.23	2.13%
Margin obtained for clean gum grade				14.59%

ANNEX 21

Percentage of commercial margins distribution pertinent to H.P.S grade gum

Price components Costs	(SDG/ kantar)	(SDG/ton)	US$/ton	Percentage to FOB Price
The producer price of gum Arabic was the average price obtained from all investigated states in November 2015.	580			
% of Producers price from FOB of handpick select	580	13 050	1 338.46	38.24%
Local transportation from farm gate to rural market	10	225.00	23.08	0.66%
Moisture losses	211.25	4 753.20	487.51	13.93%
Commissions and intermediation	40	900	92.31	2.64%
Internal margin until town market	100	2 250	230.77	6.59%
Exporter' s agent + auction market	60	1 350	138.46	3.96%
Storage at central markets	12	270	27.69	0.79%
Taxes (5%) + (10% zakat Zro'a) from farm get price	87	1 957.50	200.77	5.74%
FNC fees updated for 2015	7	157.50	16.15	0.46%
Cleaning of H.P.S gum grade	15	337.50	34.62	0.99%
Transport (including loading and off loading)	12	270	27.69	0.79%
Clearance at port	30	675	69.23	1.98%
Financing, bank commission, insurance	30	675	69.23	1.98%
Margin obtained for H.P.S gum grade				21.25%

ANNEX 22

Percentage of commercial margins distribution pertinent to Kibbled gum

Price components Costs	(SDG/ kantar)	(SDG/ton)	US$/ton	Percentage to FOB Price
The producer price of gum Arabic was the average price obtained from all investigated states in November 2015.	580			
% of Producers price from FOB of Kibbled gum	580	13 050	1 338.46	38.80%
Local transportation from farm gate to rural market	10	225.00	23.08	0.67%
Moisture losses	211.25	4 753.20	487.51	10.73%
Commissions and intermediation	40	900	92.31	2.68%
Internal margin until town market	100	2250	230.77	6.69%
Exporter' s agent + auction market	60	1350	138.46	4.01%
Storage at central markets	12	270	27.69	0.80%
Taxes (5%) + (10% zakat Zro'a) from farm get price	87	1 957.50	200.77	5.82%
FNC fees updated for 2015	7	157.50	16.15	0.47%
Cleaning of kibbled gum (processed)	25	562.50	57.69	1.67%
Processing of kibbled gum (including losses)	80	1 800	184.62	5.35%
Transport (including loading and off loading)	12	270	27.69	0.80%
Clearance at port	30	675	69.23	2.01%
Financing, bank commission, insurance	30	675	69.23	2.01%
Margin obtained for kibbled gum (processed)				17.49%

ANNEX 23

Percentage of commercial margins distribution pertinent to mechanical powder gum

Price components Costs	(SDG/ kantar)	(SDG/ton)	US$/ton	Percentage to FOB Price
The producer price of gum Arabic was the average price obtained from all investigated states in November 2015.	580			
% of Producers price from FOB of mechanical powder gum	580	13 050	1 338.46	36.67%
Local transportation from farm gate to rural market	10	225.00	23.08	0.63%
Moisture losses	211.25	4 753.20	487.51	13.63%
Commissions and intermediation	40	900	92.31	2.53%
Internal margin until town market	100	2250	230.77	6.32%
Exporter' s agent + auction market	60	1350	138.46	3.79%
Storage at central markets	12	270	27.69	0.76%
Taxes (5%) + (10% zakat Zro'a) from farm get price	87	1 957.50	200.77	5.50%
FNC fees updated for 2015	7	157.50	16.15	0.44%
Cleaning of mechanical powdered gum (processed)	25	562.50	57.69	1.58%
Processing of mechanical powdering gum (including losses)	100	2 250	230.77	6.32%
Transport (including loading and off loading)	12	270	27.69	0.76%
Clearance at port	30	675	69.23	1.90%
Financing, bank commission, insurance	30	675	69.23	1.90%
Margin obtained for mechanical powdered (processed)				17.27%

ANNEX 24

Percentage of commercial margins distribution pertinent to raw baobab fruits

Price components Costs	(SDG/ sack)	Percentage to central market Price
The collector price of Baobab was the average price obtained from all investigated states in November 2015.	750	
% of collectors price from the central market price (1200).	750	62.5%
Local transportation from farm gate to rural market	10	0.83%
Immaturity losses	5	0.42%
Commissions and intermediation	50	4.17%
Internal margin until town market	45	3.75%
Producer agent + city merchant	50	4.17%
Storage at central markets	10	0.83%
Taxes	5	0.42%
FNC fee	10	0.83%
Husking of capsule	10	0.83%
Transport (including loading and off loading)	10	0.83%
Market fee (locality)	5	0.42%
Financing, bank commission, insurance	15	1.25%
Processing (powdering + granulating + packing)	0.0	0.00%
Distribution and promotion costs	10	0.83%
Margin obtained for raw baobab (shelled grade)		17.98%

ANNEX 25

Percentage of commercial margins distribution pertinent to husked baobab fruits

Price components Costs	(SDG/ sack)	Percentage to processed Price
The collector price of Baobab was the average price obtained from all investigated states in November 2015.	750	
% of collectors price of processed baobab (SDG1800)	750	41.66%
Local transportation from farm gate to rural market	10	0.55%
Immaturity losses	5	0.28%
Commissions and intermediation	50	2.78%
Internal margin until town market	45	2.5%
Producer agent + city merchant	50	2.78%
Storage at central markets	10	0.55%
Taxes	90	5%
FNC fee	10	0.55%
Husking of capsule	10	0.55%
Transport (including loading and off loading)	10	0.55%
Market fee (locality)	5	0.28%
Financing, bank commission, insurance	15	0.83%
Processing (powdering + granulating + packing)	150	8.33%
Distribution and promotion costs	10	0.55%
Margin obtained for processed baobab		32.26%

ANNEX 26

List and some details of the implemented forests projects in Sudan that have considered directly or indirectly the development NWFPs sector

Title of Project	Objectives/ expected results	Donor & partners	Duration	Project sites	Main beneficiaries	Key NWFPs promoted/ Identified
Forestry Rehabilitation and Social Forestry	Management and protection of model natural forests. Forestry extension and community development.	Irish Aid	1992-96	Gezira Sinnar	Local communities, FNC	Producers, collectors, cooperatives
Forestry Development in Sudan	The project included many activities such as extension programmes at White Nile; agroforestry models have been established in the form of Acacia senegal plantations, farm nurseries and village woodlots.	Netherlands	1979-91	Kassala Gedarif Gezira Sinnar Blue Nile	Local communities, farmers, animal raisers, FNC, researchers	Producers, collectors, traders, cooperatives
CARE assisted Eastern Refugee Reforestation Project	The project adopted a diverse programme of agroforestry and extension for small farmers.	CARE International	1983-89	Kassala Gedarif	Refugees, farmers, animal raisers, FNC, M. of Agriculture,	Refugees, farmers, collectors, traders
Women Rural Development Project	Promotion of social development. Women empowerment.	UNFPA	1994-2000	Sinnar	Rural women communities	Rural women communities
Forests Assessment	Forest inventory. Forest utilization. Capacity building.	CIDA	1981-1986	Blue Nile	Local communities, FNC staff	Producers, collectors, traders, cooperatives

FOLLOWS ON THE NEXT PAGE →

Title of Project	Objectives/ expected results	Donor & partners	Duration	Project sites	Main beneficiaries	Key NWFPs promoted/ Identified
Community Forestry Project CONCERN	Promotion of community forestry. Soil conservation	Irish Aid	1988-1991	Sinnar	Local communities, women sector, farmers, animal raisers, FNC, researchers	Local producers and collectors, community organizations & GAPAs
Labour Intensive Project	Shelterbelts planting. Sand dune fixation. Village woodlots.	Irish Aid	1988-1991	White Nile	Local communities, women sector, farmers, animal raisers, FNC, researchers	Local producers and collectors, community organizations & GAPAs
Gutaina Shelterbelt Project	Shelterbelts planting. Sand dune fixation.	ILO	1988-1992	White Nile	Local communities, farmers, animal raisers & FNC	Local producers and collectors, community organizations, settlers around forests and in vulnerable areas to desertification
Programme of Rehabilitation of refugees hosting areas in eastern Sudan	Shelterbelts planting. Soil conservation. Extension and awareness	SOS Sahel International	1993-1995	White Nile	Local communities, farmers, animal raisers & extensions providers, FNC	Local producers and collectors, community organizations, settlers around forests and in vulnerable areas to desertification
Shelterbelts Project, Dongola, Northern Region	Environmental rehabilitation activities including reforestation landscape restoration, awareness raising with full community participation	(UNHCR) in collaboration with (COR). ENSO	1985	Eastern Sudan	Refuges local communities, farmers, animal raisers & extensions service providers , FNC	Refuges, local communities, settlers around refugees camps
Management of Jebel Marra Forests	Establishment of a central nursery, school nurseries, shelterbelts planting in farm lands (concentration on some tree species that produce NWFPs) and extension programmes.	UNDP	1988-1990	Northern State	Local communities, schools, farmers & FNC	Community organizations, producers, students

FOLLOWS ON THE NEXT PAGE →

Title of Project	Objectives/ expected results	Donor & partners	Duration	Project sites	Main beneficiaries	Key NWFPs promoted/ Identified
Restocking of the Gum Belt for Desertification Control	Management and utilisation of Jebel Marra forests. Strengthening and sustainable yield of forests	Government of Germany GTZ	July 1989	Darfur State	Foresters, local communities	FNC members, local producers and NWFPs collectors.
Restocking of the Gum Belt for Desertification Control, Donor	Establishing decentralized nurseries. Farmers were trained on improved techniques for planting and maintenance of Acacia senegal (gum trees) plantations.	UNSO/UNDP	1989-1994	Darfur	Gum Arabic stakeholders, local communities, FNC, etc.	Gum Arabic producers, GAPAs, FNC members and local communities
Support Project for Food Security, Poverty Alleviation and Land Degradation Control in African Countries producing Gums and Resins (Acacia Operation)	Restocking of Gum Gardens. Development of an extension service. Establishment of village nurseries	UNSO/UNDP	phase I (1981 -85), phase II (1986-90), phase III (1991 -96)	Northern Kordofan	Gum Arabic stakeholders, animal herders, farmers FNC, etc.	Gum Arabic producers, GAPAs, farmers, FNC members and local communities
Revitalizing the Sudan Gum Arabic Production and Marketing	The project aims at improvement and increase sustainability of agri-cultural and pastoral systems, and diversifying and increasing sources of household income, and thereby contributing to the food security of people involved	Italian Government	2003-2005	North Kordofan and Sinnar States	Local communities, foresters, farmers,	NWFPs collectors, crops producers, animal raisers, local communities
	To increase the production and income of small scale gum producers in selected areas of the gum belt through improved performance of the production and marketing systems.	Multi-donor Trust Fund g and IFAD	Faced out 2015	Eight Localities in Blue Nile, Sinnar, White Nile, North and South Kordofan states.	Gum Arabic stakeholders, local communities, FNC, etc.	Gum Arabic producers, local traders, GAPAs, FNC members and local communities

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CONSULTANCY REPORT

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