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Acronyms & Abbreviations

(AAC) Africa Agriculture Company
(ABS) Agricultural Bank of Sudan
(CBoS) Central Bank of Sudan
(CPA) Comprehensive Peace Agreement
(GoS) Government of Sudan
(EU) European Union
(FAO) Food and Agriculture Organization
(INGO) International Non-Governmental Organization
(NCP) National Congress Party
(MFNE) Federal Ministry of Finance and National Economy
(NAIP) National Agricultural Investment Plan
(OFAC) Office of Foreign Asset Control
(SRC) Strategic Reserves Corporation
(SSMO) Sudanese Standards and Metrology Organization
(WFP) World Food Programme
(MAF) Ministry of Agriculture and Forestry
(SMEs) Small and Medium Enterprises

Executive Summary

Sorghum is a staple food grain consumed widely in Sudan. The Government of Sudan (GoS), like many other governments, pursues an interventionist policy in staple grain markets aimed at stabilizing food prices and improving food security. Yet, 4.6 million people in Sudan remain food insecure and local sorghum prices are marked by constant volatility (European Commission 2017). It is often argued that interventionist economic policy inevitably creates distortive market outcomes. This research looks at the degree to which actors within Sudan's sorghum value chain contribute to, and are impacted by, a distorted market environment. The analysis reveals distortions related to production, marketing, finance, exports and policy driven mainly by practices of a handful of powerful downstream and upstream actors. These distortions, directly and indirectly, impact the competitiveness of smallholder farmers.

The Government of Sudan (GoS) remains a tremendously influential actor in the sorghum value chain. Through state-institutions like the Agricultural Bank of Sudan (ABS), the Ministry of Finance and National Economy (MFNE) and the Strategic Reserve Corporation (SRC), the GoS finances the largest sorghum farming operations in the country and exerts control over pricing, trade and exports. These institutions derive their power from legislation, most notably the country's Strategic Food Reserves Policy, which also gives these institutions a framework for coordination and organizing. Other major non-state actors in the chain, although also influential, tend to lack coherent coordination within their individual groups including, large farmers, agribusinesses and large-scale grain mills. A relations of patronage link government institutions and ruling elites with some major players in the value chain. As a political resource, sorghum has helped maintain relative stability in Sudan and enabled the country to form strategic alliances internationally, namely with the Arabian Gulf region.

Analysis of revenue margins shows a skewed value distribution with actors in processing and retail accumulating the largest share of the end-market price, while actors involved in production activities receive the lower income shares. Hence, the researcher recommends 5 policy and programme responses to improve economic viability for production actors with focus on smallholder producers, highlighting the potential role for private sector responses:

- Pursue a conditional engagement approach with select agribusinesses and high-performance SMEs to capitalize on synergies and mutual interests between them and smallholder farmers while exercising diligence to reduce risks of supporting businesses in patronage networks.
- Lobby for improved land tenure rights for smallholder producers to prevent land dispossession and encroachments from domestic and foreign investors.
- Enhance productivity through contract farming where smallholder producers can enter partnerships with large farmers and agribusinesses who can provide sustained marketing outlets and facilitate knowledge and technology transfers.
- Develop and strengthen a local supply chain to offer farmers hermetic storage options which would decrease post-harvest losses and improve incomes and food security of smallholders.
- Support farmers' associations to stimulate local market systems and to empower farmers through collective marketing and resource mobilization.

Introduction:

Background

Value chain development is increasingly recognized as an effective tool in generating employment and promoting socio-economic development in contexts marked by economic fragility. A value chain refers to the interconnected processes and activities that jointly contribute to delivering a final product or service to the end customer. Central to the concept of value chains is the notion of value addition, which assumes that products or services are transformed and more value is added at every stage from inception to final delivery. Value chain development efforts typically aim at improving the functioning of value chains and enabling value chain actors to generate added value (Altuna 2014).

Sorghum is a cereal grain that has a variety of species with domestic and global appeal and demand. It is a main food staple in Sudan linked closely to food security in the country. Sorghum is used as food, base ingredient in syrup manufacturing, ground into flour, and used as animal feed. Internationally, sorghum is used in the production of ethanol and alcoholic beverages (Altuna 2014). There are several varieties of sorghum cultivated in Sudan. Varieties which are typically available in eastern Sudan include Tetron, Feterita, Dabar, Tabat, Mugud, Wad Akar, and Wad Bako.

Sudan is a large producer of sorghum although production in the country tends to be extensive rather than intensive. Between 2011 and 2015 Sudan produced an annual average of 3,465,000 metric tons of sorghum for domestic and international markets, with the FAO suggesting that the 2016 harvest was above average levels (FAO 2016). A significant part of sorghum cultivation takes place in the eastern region of the country, also known as Sudan's breadbasket, in the states of Kassala, El Gedarif, Sennar and Blue Nile. These states are also home to communities of refugees and migrants from neighboring countries such as South Sudan, Ethiopia and Eritrea.

A comprehensive value chain analysis was sought to help illuminate and guide an increasing focus on agriculture with the view to enhance livelihoods in communities and among refugees and migrants, and by improving economic viability for smallholder producers and Small and Medium Enterprises (SMEs) in the region.

Several studies have addressed the various constraints smallholder farmers face in Sudan. The focus of these analyses, however, has mostly been the production level of agricultural commodity chains and the role of upstream actors such as producers, field laborers and input providers. Thus, there is a paucity of analysis on downstream actors, networks and activities in agricultural value chains in Sudan. It is well-recognized that distortions at one level of the value chain are likely to impact viability at another level of the chain since actors and activities within a given value chain are interdependent. It is, therefore, important to shed further light on the role and activities of downstream networks and to identify any possible distortions they might be causing and which directly or indirectly impact economic viability for smallholder farmers.

Objectives of the study

This study examines the sorghum value chain in Sudan with focus on the states of Kassala, Gedarif and Sennar, as part of wider effort to improve economic viability for smallholder farmers and SMEs in eastern Sudan. The study focuses on the roles, functions, interests and incentives of downstream value chain actors and market players and thoroughly investigates the ways that these actors impact and influence upstream players including smallholder farmers. Furthermore, the study aims to uncover linkages between local and global actors within and across the value chain.

This report provides an in-depth analysis of the local, regional, national and international actors involved in Sudan's sorghum value chain. Using a political economy approach, it identifies possible distortions within the chain that hinder economic viability for smallholder producers and prevent them from moving beyond subsistence agriculture to market-oriented farming. Drawing on primary and secondary research, this report examines the power dynamics within this chain and the opportunities and risks associated with potential development responses.

Methodology

To achieve the research objectives, the consultant used a mixed methods research approach combining a traditional value chain analysis with a political economy approach, using both qualitative and quantitative data collection methods. Rather than approaching value chain analysis as a purely technical exercise, the consultant incorporates a political economy lens thereby acknowledging that value chains do not exist in vacuum and are rather shaped by, and themselves shape, a particular socio-economic context.

Primary data was collected through semi-structured field-based interviews and focus group discussions during visits to the states of Kassala, Gedarif and Khartoum. Research was carried out between March and May 2017. The study utilized interviews with representatives from relevant Sudanese government institutions, small¹ and large sorghum producers in eastern Sudan, traders, exporters, retailers, financial institutions, relevant international organizations and embassies. Secondary data was collected from relevant journals, media articles, study reports, government reports and grey literature.

The study identifies opportunities for upgrading the sorghum value chain and uses a Strength Weaknesses Opportunities and Constraints (SWOC) framework to assess the viability of recommendations made in the study. It is important to note the limitations involved in the

¹ It is important to note that land allocation varies between Sudan's eastern states and between the rain-fed and irrigated sectors with a tendency of farmers in Gedarif to own relatively larger plots of land compared with farmers in Kassala. Therefore, and for the purposes of this analysis, any farmer with 50 feddans¹ or less is considered a smallholder producer.

Feddan is a unit of agricultural land measurement used in Sudan. 1 feddan = 1.038 acre (AC).

research process due to time and access constraints in the field sites. While the report endeavored to capture the voices of a variety of stakeholders in the sorghum value chain, there are some notable absences, including local and international distributors. While insights from these actors would have been valuable, the consultant does not believe that their absence detracts from the overall value of the report.

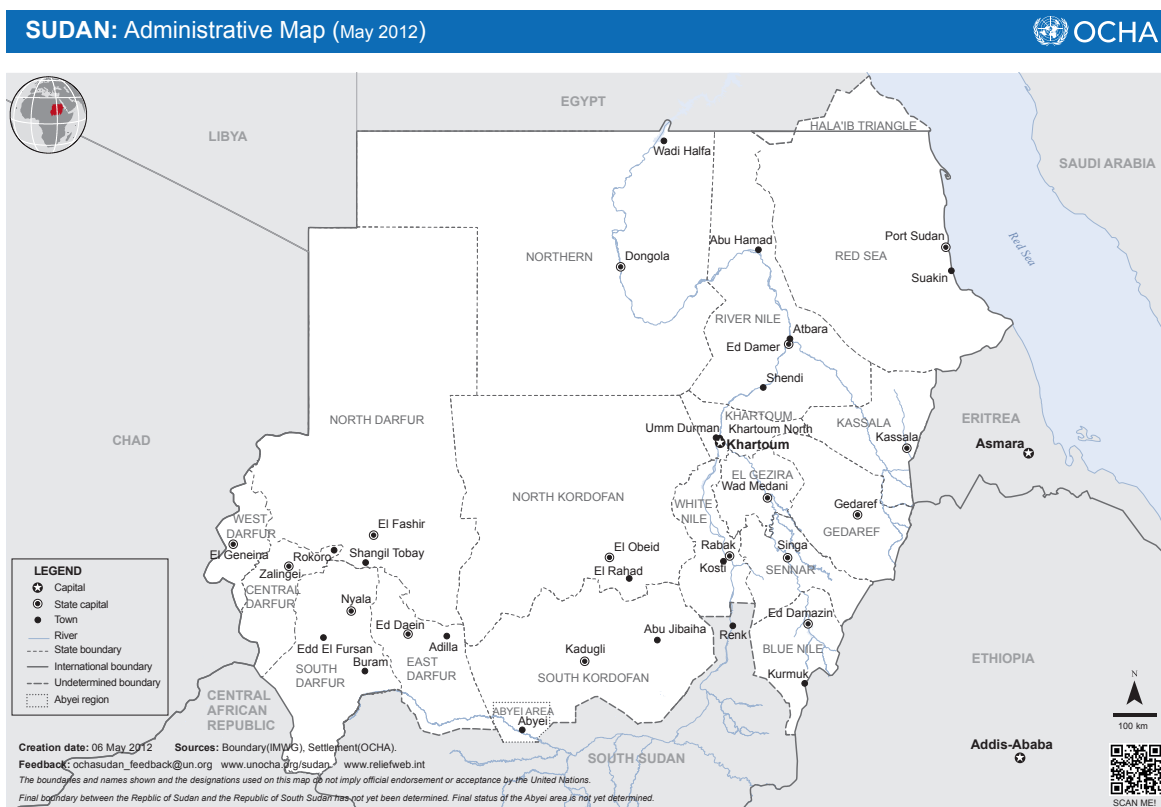


Figure 1: Sudan Administrative Map. Source UN OCHA

Chapter One

1. Sorghum In Context

1.1 The drive toward modernization in Sudanese agriculture (2000-2017)

The secession of South Sudan in 2011 and the consequent loss of more than 70% of the country's oil wealth has made the focus on agriculture in Sudan an economic imperative (IRIN 2012). Agriculture is currently seen as an important resource sector for overcoming economic distress. Aspirations of agro-led development in Sudan typically invoke the abundance of water resources and availability of arable land estimated at 200 million feddans, of which only an estimated 30 million feddans have been put to use. Sudan's arable land resources amount to about 45% of total arable land area in the entire Arab region, comprising North Africa and large parts of the Middle East (Almalah 2017). Despite availability of arable land and water resources, Sudan remains structurally deficit in staple food production posing constant risks to food security in the country. Agricultural development in Sudan therefore has implications for food security in Sudan and across the entire region.

At present, Sudan's agricultural sector is defined by dependency on favorable climatic factors, notably ample rainfall. The main crops produced are sorghum, millet, sesame, groundnut, cotton and varieties of vegetables and fruits. Food imports have increased as a result of acute price volatilities locally. While Sudanese agriculture has witnessed the entry of new agri-business players in recent years, much production is still at the subsistence level carried out by smallholder farmers.

The call to modernize Sudan's agricultural sector dates to the time of independence from British colonial rule, albeit interrupted by periods of general neglect, especially during the oil boom of the early 2000s. This call has been renewed in recent years as several initiatives and plans have been put forward by the Sudanese government, international partners and the private sector. The modernization of Sudan's agricultural sector centers around increasing agricultural investment, mechanization, irrigated farming, and facilitating knowledge and technology transfers. To realize these objectives, Sudan has turned to development and business partners in the East and West.

For example, in March 2017 and following the probationary lifting of U.S economic sanctions on Sudan imposed in the 1990s, the Sudanese Minister of Agriculture Mr. Ibrahim El Dikhery paid a visit to the United States and signed framework agreements with Reinke Irrigation and Thompson Pump and Irrigation Inc. (Toum 2017). The two companies are leaders in the irrigation field and solar-powered agricultural technologies. In addition, Mr. El Dikhery also met with U.S banks to discuss agricultural financing and international bank transfers, two areas that were largely crippled during almost two decades of U.S. sanctions. Despite the sanctions, Sudan has been an attractive market for U.S-manufactured tractors, pivot irrigation systems, and

combines which were imported under special OFAC² licenses (Bureau of Economic and Business Affairs 2016).

In 2013 Sudan also signed an agricultural cooperation agreement with China allowing Chinese businesses to invest directly in Sudan, engage directly with Sudanese partners, and fund agro processing and food production projects (Sudan Tribune 2013). In the same year, Sudan launched the Arab Food Security Initiative aiming to attract intra-regional agricultural investment. Sudan has reportedly attracted over \$28billion (USD) in investment, most of which comes from Gulf countries (Almalah 2017).

Sudan has also worked closely with the Food and Agriculture Organization (FAO) on the country's National Agricultural Investment Plan (NAIP), which outlines policy priorities and investment areas for the sector, including, but not limited, to institutional reforms and creating an enabling environment for producers, value chain development, industrialization and modernization of agricultural systems including information systems (Emery and Elnaiem 2016).

In this context, increasing focus on agro-development in Sudan seems to align well with the strategic goals and aspirations of Sudan. Furthermore, strategic support by international actors would be valuable and can help facilitate the success of agro-development initiatives and provide support for small-holder farmers.

[1.2 Peeking the political economy of agriculture in Sudan: Privatization, agribusiness and sorghum as a political resource](#)

The era of The National Congress Party (NCP)³ in Sudan has been marked by steady gravitation toward the privatization of national agricultural schemes and the promotion of private agribusiness. National agriculture schemes were established under previous governments to contribute toward economic development using agriculture as a strategic sector. Despite its appetite for *laissez-faire* economic restructuring, the government of Sudan still maintains considerable control over the financing, production and marketing of sorghum. The government, through its various institutions and state corporations, sets the prevailing price for the commodity and finances the largest production operations of sorghum in the country.

By 2005, of the 81 largest privatized enterprises in Sudan, 26% were agricultural schemes (Hamad and Salih 2014). The four largest national agricultural schemes, which once made up over 60% of the total irrigated area in the country, have all been exposed to privatization attempts. These schemes include Gezira, Rahad, Sinkat and New Halfa, which produce crops such as sorghum, sugar cane, groundnuts and cotton (Wallin 2014). The impact of these privatization programs on smallholder farmers and the sorghum value chain is discussed in more detail in section 3.4.

² U.S Office of Foreign Assets Control was responsible for issuing licenses and monitoring the compliance with US sanction laws imposed on Sudan.

³ The NCP is Sudan's governing party which has been in power for over 27 years.

The expansion of the privatization program in Sudan has involved the entry of new and old capital as well as the formation of alliances between capital and political actors. Collusion between business and political elites in Sudan is well-documented. The survival of the political class in Sudan in many ways hinges on access to material resources from business patrons (Waal 2015). To become a ruling party official in Sudan often means to exert economic control. Large agro-industrial companies are dominated by high-level officials of the ruling party.⁴ Interviewees also confirmed that members of the political and security elites often target promising business ventures with the demand to become shareholders.

These alliances have had a marked impact on the sorghum value chain. For instance, interviewees confirmed that the Mahgoub Sons Group, one of the largest players in the agricultural sector in Sudan and whose chairman Mr. Wagdi Mirghani received the Presidential Order for Exemplary Contribution in 2014, replenishes the treasury with hard currency in exchange for subsidized purchases locally and facilities to export sorghum⁵. It has also been reported that Sayga Flour Mills of the DAL Group has been granted a standing certificate to import sorghum for its sorghum retail packages. Sayga cited high costs of domestic sorghum as motivation for seeking the import certificate (Emery and Elnaiem 2016). It is noteworthy that sorghum is generally not imported into Sudan.

Families such as El Berier family, which has historically been active in the country's industrial sector, have more recently ventured into agriculture. Saud El Berier has established private sorghum silos in El Gedarif as part of his Thagib Group, and as Muawiya El Beriers ventures into wheat production (Awad 08).

It is often argued that the toppling of El Numairi regime in the mid 1980s through a popular uprising was prompted by rising food prices due to the drought that struck Sudan at the time. This event led subsequent governments in Sudan to pursue interventionist policies in the grains market heavily regulating the markets for sorghum, wheat and millet. The National Congress Party (NCP), which took power in 1989, implemented variations of interventionist policy in grain markets with a brief period of a free market reversal in the mid 1990s (Ahmed, Abdulsalam and Siddique 2012). Today, it appears that the NCP has learned from lessons of the past and would not risk the complete deregulation of the grains market, as severe shocks could translate into political instability. In fact, the regulation of grain prices in order to ensure food security is enshrined in the country's Strategic Food Reserves Policy, which will be discussed in greater detail in section 3.3.

In addition to its importance for food security and political stability, sorghum has also been used as a resource to gain political leverage and influence outside of Sudan. Sudan recently donated sorghum to South Sudan from its national reserves as the latter experienced severe food shortages leading to a declaration of famine in early 2017. The Sudanese humanitarian

⁴ Verhoeven, H. 2011, p. 697.

⁵ See link on note of presidential order award: <http://www.sudaress.com/akhirilahza/136415>

gesture played well into Sudan's political goals of normalizing and improving relations with the West, as well as addressing a trust deficit with South Sudan's government. Indeed, the United States, Norway and the United Kingdom issued a joint statement commending Sudan on the opening of a humanitarian corridor to South Sudan and specifically praised Sudan for donating its food reserves (U.S Department of State, Office of the Spokesperson 2017).

It is not only the government of Sudan represented in the NCP that has used sorghum as a political resource; some notable power brokers in eastern Sudan have also done the same. The Democratic Unionist Party (the origin) launched Al Mirghani Initiative for South Sudan (Ali 2017). Farmers in Gedarif state allied with the party donated around 3000 sorghum sacks to the initiative to be sent as part of food aid to South Sudan. Al Mirghani family who is leading the humanitarian initiative is one of the most influential houses in the country and whose member the late Ahmed Al Mirghani was the Head of State before Sudan's democratically elected government was ousted in the military coup that brought Al Bashir to power in 1989. Al Mirghani family and the DUP have a strong support base in eastern Sudan comprised of many large sorghum farmers whose allegiance to the DUP extends through the sectarian and political divides.

The power and influence of the DUP and its ability to translate its influence over sorghum farmers in Gedarif into effective political outcomes has, nonetheless, been contested by the State government represented by the Governor of the state. For instance, the governor of the Gedarif state prevented the transport of supplies collected under Al Mirghani Initiative for South Sudan citing the need for the Al Mirghani Initiative to be part of the GoS ongoing initiative to provide food aid to South Sudan.

Finally, eastern Sudan had been the theatre of a low-level insurgency that led armed groups from the region into confrontation with Khartoum amid grievances of economic and political marginalization. A peace deal brokered by Eritrea was signed in 2006. However, by 2013, only 12% of the \$600 million development funds promised under the peace deal were allocated to the region (Thomson Reuters 2013). With most population in eastern Sudan living in rural areas, investment in agricultural development in the region is essential in addressing grievances that are fundamentally economic in nature. Direct links between the sorghum value chain and conflict lines in eastern Sudan were not immediately identifiable; and such exercise would have been beyond the scope of this consultancy. Nevertheless, it is acknowledged that the sorghum value chain in eastern Sudan exists in a context of political and economic fragility characteristic of the entire country.

1.3 Sorghum production in ‘Sudan’s breadbasket’: Kassala, Gedarif and Sennar states

There are an estimated 1.35 million people who live in eastern Sudan and about 80% of them earn their living from subsistence farming (United Nations 2016). The eastern states of Gedarif, Kassala, and Sennar are often referred to as ‘Sudan’s breadbasket,’ underscoring their importance for food security. In addition to Blue Nile, White Nile and South Kordofan states, Kassala, Gedarif and Sennar are sorghum surplus producing states. The dominant systems of sorghum production in the eastern region are the traditional, mechanized and semi-mechanized rain-fed farming systems with a few irrigated schemes such as the New Halfa scheme.

There has been a notable increase in 2016 in the total area used for sorghum production in Sudan in general compared with 2015. Total area cultivated in 2015 was 15,990 814 feddans while in 2016 the total area reached 21,839,351 feddans which amounts to an increase of about 37%. The rain-fed sector accounted for most of the increases in cultivated areas amounting to 20,697,922 feddans in 2016 compared with 14,769,640 feddans in 2015. Eastern Sudan accounts for over 60% of the total area cultivated with sorghum in Sudan (Ministry of Agriculture and Forestry 2016).

Table 1: Total area cultivated with sorghum per feddan in season 2016

Irrigated Sector			Rain-fed Sector	
Scheme Name	Sorghum area		State	Sorghum area
Gezira scheme	639,194		Gedarif	6,123,552
Rahad scheme	116,931		Sennar	3,957,939
New Halfa scheme	115, 116		Kassala	1,192,755
Suki scheme	48,425		Blue Nile	2,051,907
Other schemes in Gezira	5,563		Red Sea	22,057
Other schemes in Sennar	113,230		South Kordofan	2,376,701
Other schemes in White Nile	93,704		North Darfur	195,073
Other schemes in Gedarif	9,216		Khartoum	0

Source: (Ministry of Agriculture and Forestry 2016)

*blue shading indicates states in eastern Sudan

Sorghum yields depend heavily on climatic factors, rainfall in particular. Estimates of average annual sorghum production in Sudan range between 3.5 - 5.4 million ⁶MT. The year 2016 saw notably higher production figures estimated at 7,971,759 MT due to an above average rainy season compared with production yields of around 4,040,345 MT in 2015 in Sudan. Average

⁶ MT = Metric ton in U.S. measurement system

yields per feddan have also risen from 252 Kg/feddan in 2015 to 365 kg/feddan in 2016 (Ministry of Agriculture and Forestry 2016). The growing appetite for and uptake of mechanization and improved seeds coupled with abundant rainfall are responsible for the efficiency gains realized in 2016.

Table 2: Total yields of sorghum per metric ton (MT) in season 2016

Irrigated Sector			Rain-fed Sector	
Scheme Name	Sorghum (MT)		State	Sorghum (MT)
Gezira scheme	634,888		Gedarif	2,334,778
Rahad scheme	125,640		Sennar	1,206,004
New Halfa scheme	105,835		Kassala	482,995
Suki scheme	50,689		Blue Nile	884,030
Other schemes in Gezira	5,504		South Darfur	321,306
Other schemes in Sennar	110,168		South Kordofan	728,559
Other schemes in White Nile	77,077		North Darfur	17,873
Other schemes in Gedarif	8,875		White Nile	516,363

Source: (Ministry of Agriculture and Forestry 2016)

Chapter (2)

2. Value Chain Actors

This chapter identifies the main actors in the sorghum value chain in Sudan and categorizes them as vertical and horizontal actors that fulfill different functions in the value chain including production, trade, retail, policy, financing, distribution and so on. Furthermore, the chapter reveals the sources of market power and influence for actors within and across different groups in the value chain.

2.1 Vertical Supply Chain Actors

These actors are involved directly in generating monetary value through either production, trade, distribution, brokering or sales of sorghum or products containing sorghum.

Production

Input suppliers: provide agricultural inputs necessary for planting, cultivating and harvesting sorghum including machinery, fertilizers, pesticides, herbicides and seeds. Many input suppliers work through a distribution model with certified distributors and agents dealing directly with farmers (Abdulatif 2017). Large inputs suppliers include CTC Agrochemicals, a company under the Central Trading Company (CTC) Group, DAL Engineering Company part of the DAL Group and Arab Sudanese Seed Co. Medium-Size input suppliers include Al Doma and Al Nilain companies. In addition to providing the physical agricultural inputs, these actors may provide limited training to customers on applying and using inputs. Agricultural inputs are generally imported into Sudan with some seedlings grown locally.

Farmers: sorghum is cultivated by large, medium and small scale farmers. Larger farmers may run farms larger than 30,000 feddans and smallholder farmers may cultivate plots as small as 5 feddans. An overwhelming majority of farmers rely on rainfall and can either incorporate machinery or use traditional farming methods. Farmers may be organized under farmers' associations, which assist groups of farmers in accessing input supplies, credit, training and marketing channels. Many smallholder farmers hold land under customary tenure arrangements.

Agribusinesses: enterprises set up for agricultural production and trading. Agribusinesses do not necessarily produce sorghum exclusively and may produce other crops simultaneously including cotton and sunflower seeds. Some agribusinesses, such as the Africa Agricultural Company Co. of the Mahgoub Sons Group, have integrated business models. As often subsidiaries of larger conglomerates, agribusinesses may be linked to agriculture-related businesses within their business groups and thus may benefit from better access to agricultural inputs and marketing channels.

Hired Labour: may work for large farmers, smallholder farmers, or agribusinesses usually through seasonal contracts. Hired labour assist farmers with planting, cultivating and harvesting sorghum and undertake activities such as weeding and manual threshing. An overwhelming number of hired laborers in eastern Sudan are from neighboring countries such as South Sudan, Eritrea and Ethiopia and may be both refugees or migrants seeking seasonal work.

Trade and Distribution

Brokers: often offer the first marketing channel for smallholder producers. Brokers purchase sorghum from farmers at the farm gate, in a village, or in localized markets for reselling in the city. City and locality markets are typically located at considerable distances from production areas. Some larger farmers act as brokers aggregating their sorghum stocks from smallholder farmers to sell to traders in crops markets.

Agents: representatives of farmers (selling agents) or representatives of exporters and large mills (buying agents). They are in central crop markets and are generally compensated through commission. In addition to organizing transports for their respective clients, agents may also deal with the administrative steps associated with transactions such as paying taxes and market fees. Agents also provide daily market intelligence to prospective buyers and sellers.

Traders: purchase sorghum in central crop markets and resell in retail, wholesale and processing channels. Traders may also sell to exporters. Traders use their own capital to finance transactions or access loans through commercial banks. Many large farmers also act as traders of their own sorghum in crop markets. The largest crop market in the eastern region is in Gedarif city, the capital of Gedarif state. Gedarif is also home to the largest grain silo in the country.

Wholesalers: financial institutions in Sudan are considered trading actors since loan repayment to these institutions are often in-kind. Financial institutions are wholesale channels that receive crops, as in-kind loan repayment, and resell to retailers, processors and traders. **The Agricultural Bank of Sudan (ABS)** finances farmers to produce sorghum and collects repayment in wholegrain sorghum. The ABS considers itself the largest development bank in Sudan supporting famers and agriculture in general. The ABS also finances purchases of sorghum by the **Strategic Reserves Corporation (SRC)**, which operates as an autonomous corporation of the ABS. Both the ABS and the SRC are government institutions. The SRC operates the largest silos in Sudan, and by acting as market player that buys and sells sorghum, the SRC aims to stabilize prices of grains as a matter of food security policy enshrined in Sudanese legislation.

Processing and Retail

Processors: process sorghum for consumption by humans or for the production of animal feed. Large and small grain mills process sorghum into flour that is used as an ingredient in food preparation at household level or in food production in bakeries and restaurants that sell traditional bread known as 'Kissra'. Processing sorghum into animal feed is undertaken by feed

mills and aggregators including El Stagbil Feed Mill in Kassala which services both the dairy and poultry industries and over 10 feed aggregators in Gedarif (Emery and Elnaiem 2016). Large flour mills include Sayga Mills, a subsidiary of the DAL Group which produces a retail-focused mixed flour product known as Zadna, which includes 60% sorghum. Zadna is distributed across Sudan through a network of agents and distributors (Yousif 2017). In addition, there are small and medium sized traditional mills in cities, towns and local markets across eastern Sudan which also sell retail packages of both whole-grain sorghum and sorghum flour.

Distributors & Consumer Retailers: large mills such as Sayga contract their distribution of Zadna and bread flour containing sorghum to a network of distributors who can market to retail outlets. Distributors have the logistics infrastructure necessary to store and ship sorghum flour and often focus on specific sales territories. Distributors work closely with retailers and extend credit to them at request. Retailers include supermarkets, grocery shops, select restaurants that produce Kissra and bakeries.

Consumers

Home consumers, commercial poultry and dairy farms: sorghum is a staple crop in Sudan and especially in the eastern part of the country. However, consumption habits are changing with growing preference for wheat particularly around urban centers. This is clear through the increasing level of wheat and wheat flour imports in recent years (OEC 2017). Commercial and large poultry and dairy farms purchase processed feed containing sorghum from feed mills either directly or through proxy distributors which supply these farms with other inputs. Small poultry and dairy farms access sorghum through local market aggregators that also seem to advise them on appropriate feed mixes.

Exporters: Surplus sorghum is sold mostly in the Arabian Gulf region to be used as livestock and poultry feed. The ability to export is subject to availability of national stocks when there is an overall production surplus in the country. Exporters procure sorghum either directly or through agents, from large farmers, from traders or from the SRC. Notable exporters include the Mahgoub Sons Group, which has its own sorghum farming operations and also bolsters its own stocks by purchasing in the market including from the SRC.

International Distributors: located outside Sudan and in international free trade zones such as Dubai. International commodity brokers are included within this group who purchase sorghum from Sudan based on orders from their clients. International distributors deal directly with Sudanese exporters or through brokers.

2.2 Horizontal Support Environment Actors

These actors work with vertical actors to help generate a conducive production and commercial environment through regulation, business development services, lobbying, advisory, and training.

Ministry of Finance and National Economy (MFNE): Provides the liquidity needed for the SRC and the ABS to undertake their mandates of supporting farmers and ensuring food security. In collaboration with other ministries such as the Ministry of Agriculture and Forestry (MAF) and ABS, the MFNE determines the prevailing price of sorghum in the country through its pivot pricing tool⁷. The MFNE also plays a crucial role in determining whether exporting sorghum should be allowed during a given year.

Ministry of Agriculture and Forestry (MAF): mandated with agricultural planning, policy formulation and ensuring food security nationally. The Ministry of Agriculture conducts annual crop production surveys which are used to determine viability of permitting exports of sorghum. The ministry also facilitates the provision of extension services to sorghum farmers.

Sudanese Standards and Metrology Organization (SSMO): sets the quality and safety standards for local sorghum production, consumption and export in addition to a host of other products sold across different sectors. SSMO operates through specialized technical committees involving experts in different sectors.

Crop Insurance: insurance companies that insure loans issued to farmers by banks. Crops insurance for microfinance loan is compulsory. Notable crop insurers include Sheikan Insurance Company, Alsalma and Islamic insurance company.

General Administration of Crop Markets: under the MFNE, the administration operates crop markets in cities such as Gedarif and Sennar. The authority collects fees from participants in crop markets and may provide services such as warehousing and offices for agents and traders.

INGOs and Donors: International donors such as the EU, INGOs such as ZOA and UN organizations such as the WFP are involved in improving the sorghum value chain either through provision of funds or through facilitation and implementation of training and business development programs with overwhelming focus on smallholder producers. Actors, such as the FAO, work closely with Government of Sudan (GoS) in developing macro-agricultural policy and contribute to periodic food security risks assessments.

⁷ Pivot pricing is a price control tool. It is further explained in section 3.3

2.3 Power Analysis of Vertical and Horizontal Actors in the Sorghum Value Chain

Sorghum production and trade in Sudan is shaped by the relational dynamics between local, regional, national and international actors, some of which possess a greater or lesser degree of leverage in shaping policy and trade decisions and outcomes.

Production Actors:

Large farmers derive their power from their ability to replenish the strategic food reserves of Sudan. They are important players in the Sorghum supply chain in Sudan, especially farmers in Gedarif. However, large farmers' power, as a group of actors in the value chain, tends to be diffuse as there is currently no formal and cohesive body that organizes and represents them collectively following the dissolution of the Farmers' Union.

Access to land, which is often passed down through lineage, gives large farmers an advantage that large agribusinesses do not necessarily have. Though endowed with investment capital, agribusinesses must lease or purchase land and this is often a sensitive and delicate issue for communities near fertile agricultural land (see section 3.4). Compared with agribusinesses and larger farmers, smallholder producers are devoid of effective power as production actors mainly due to the pervasive lack of formal title to land among small-scale farmers which increases land insecurity. Smallholder farmers typically have right to use of land guaranteed by customary law only.

Trade and distribution actors:

Having adequate social capital determines the broker's effectiveness and acts as a source of influence for brokers in the value chain. Brokers' knowledge of production areas and people in production areas facilitates trust between farmers and brokers. The degree of trust in this relationship is fluid and might be impacted by several factors including prices offered by brokers to farmers or perceptions that farmers form. For example, when farmers feel there are collusive alliances between a few brokers in a given production area, they typically refrain from dealing with these brokers (Focus Group Discussion 2017). Risk of exploitation of farmers by brokers emanate from farmers' lack of marketing knowledge including daily prices and from farmer's limited network of potential customers.

Agents derive their market power from their ability to provide market intelligence such as communicating daily prices and quantities available in market to prospective buyers and sellers. Thus, being physically present in the crop market is key for agents. Traders and wholesalers such as the ABS and SRC, on the other hand, derive their market power from having access to storage capacity and to liquidity. Storage capacity allows traders to buy sorghum at the beginning of the season when prices are low, store it and sell it when prices are higher. Traders prefer to use storage facilities near crop markets for easy access to daily sales. The SRC's price stability mandate enables it to offset, although not eradicate, forward buying⁸ practices typical

⁸ Forward buying entails purchasing large quantities of merchandise when prices are discounted and storing merchandise in anticipation of higher prices in the future.

of traders. While both the SRC and traders influence the supply of sorghum in the market at a given point, their incentives are at odds. Traders store grain to realize higher prices while the SRC stores grain to release into the market when prices become unaffordable. The SRC is established by presidential decree and its mandate of promoting food security through price stabilization is enshrined in Sudanese law, giving the corporation tremendous power in the value chain.

Processing and retail actors:

Sayga Mills is a key player in the flour market in Sudan, which, until recently, focused on milling wheat and supplying bakeries across Sudan with bread flour. Sayga is estimated to cover 70% of Sudan's consumption of wheat flour which is the main type of flour used to make bread in Sudan's urban centers (Sudan Tribune 2015). However, wheat flour sold to make bread is often mixed with sorghum flour up to an allowed maximum of 10% of total content, which highlights the link between sorghum and wheat as two strategic commodities (Abulsaid 2016).

Competitors of Sayga include Weta Mills owned by businessman Ibrahim Malik, Gena Mills, and Seen Flour Mills which is owned by Sudan's National Intelligence and Security Service (NISS)⁹. Seen Mills is the only mill reported to mill sorghum and produce a retail package only during the season of Ramadan (Abulsaid 2016). Sayga and Seen Flour Mills' possession of a large market share of processed sorghum flour and the existence of only a few modern processors suggests an oligopolistic structure in the processing stage in the value chain.

Sayga's venture into the sorghum retail market using a brand development approach is driven by the realization of a market opportunity (Yousif 2017). Sayga's Zadna sorghum flour brand targets household consumption which until recently depended on sorghum flour milled in independent small and medium sized flour mills. Offering a premium sorghum flour product at a competitive retail price of SDG 8-10 (approximately \$ 0.50 – 0.6 USD) per kilo makes it increasingly difficult for small and medium sized mills to compete. Sayga's ability to capitalize on economies of scale and utilize its established marketing apparatus gives it a clear advantage over other mills milling sorghum flour.

Sayga sent shock waves across the Sudanese economy when it halted its production in 2015 citing unfavorable hard currency exchange rates from the government. Flour shortages resulting in bread shortages saw Sudanese lining up for hours to purchase bread. Sayga relies on hard currency for its wheat imports, as Sudan imports around 2 million tons of wheat annually costing nearly a USD billion. In 2016, Sudan imported 1,952,179 MT at a cost of USD 736,334,000 (Central Bank of Sudan 2017). Halting production was used as a means to pressure the government to offer Sayga subsidized hard currency rates, which the government reportedly did. Thus, Sayga's power as a sorghum processing actor transcends market boundaries into the realm of political influence.

"The distributor wanted to take half of my business. I told him over my dead body"
a baker in Omdurman

⁹ See: <http://reliefweb.int/report/sudan/flour-and-cooking-gas-shortages-sudan-continue>

Some distributors of Sayga's bread flour, which contains sorghum, have reportedly drove bakers out of business in an attempt to control quotas assigned to them. Sayga allocates a designated distributor to each bakery and issues them specific quotas of flour. Some distributors have been known to withheld flour quotas, partially or totally, from bakers and resell the flour in the parallel market for higher prices. Some distributors have even ventured into the bakery business as owners and shareholders taking advantage of their access to favorable flour prices from large flour mills. A baker in Omduramn reportedly closing down his bakery after his distributor stopped delivering his quota of flour and proposed to partner with the baker (Abulsaid 2016). After refusing to partner with the distributor, the baker reached out to Sayga to complain and Sayga promised to launch an investigation. This incident illustrates the degree of power that distributors exercise over retailers.

Table 3: Power Box

Exporters

Exporters derive their power from their access to hard currency. Access to hard currency is a distinct advantage to businesses in Sudan considering U.S. economic sanctions and the secession of South Sudan, which used to replenish the national coffers with hard currency through international sales of oil. Hard currency shortages in Sudan took a toll on the Sudanese economy. A

grain exporter reported that his sole interest is getting access to foreign currency, which he uses to import more lucrative products (Eltahir 2017).

Production
• <u>Influential actors</u>: ABS, large-scale farmers, agribusinesses • <u>Power structures</u>: land tenure system, seasonal contracts with laborer, Salam loans
Trade and Distribution
• <u>Influential Actors</u>: SRC, MFNE, ABS • <u>Power structures</u>: pivot price, Strategic Food Reserve Policy
Processing and Retail
• <u>Influential actors</u>: processors (Sayga), retail distributors • <u>Power structures</u>: oligopoly in processing, retail distribution as model
Exports
• <u>Influential Actors</u>: integrated agribusinesses (Mahgoub Sons), government-affiliated exporters, GoS • <u>Power structures</u>: subsidized sales to select exporters,

Support environment actors:

The MFNE finances both the ABS and the SRC, and plays an important role in determining the pivot price and allowing exports. As a support environment actor, the MFNE is certainly an actor that wields tremendous influence in the sorghum value chain. It derives that influence from its position as the custodian of liquidity needed to finance the largest operations of sorghum production and trade undertaken by the ABS and the SRC.

International donors, UN and INGOs inject much-needed resources into the value chain in the form of project funding, capacity building and policy advice. WFP and FAO in particular play a major role in implementing food security strategies thereby also indirectly influencing political stability, as grain price shocks and food insecurity are drivers of turmoil.

Chapter (3)

3. Analysis of value chain distortions

This chapter identifies and analyzes distortions taking place in the value chain with focus on downstream actors. In other words, the chapter addresses the direct and indirect impacts that major players in the chain have on smallholder producers and on the structure of the chain in general. The chapter is structured to highlight distortions as related to function (i.e production, financing, marketing, etc.). It should be recognized though that functions in the value chain are inevitably linked.

3.1 Distortions in production

Labour:

Labour is arguably the most important production input. A focus group discussion with smallholder farmers in Kassala state revealed the need of many small-scale farmers for labour outside their immediate households. Small farmers often compete for labor with large farmers, and the latter group is typically more successful in attracting labor, as large farmers offer longer contracts guaranteeing longer periods of employment for laborers (Focus Group Discussion 2017). This issue is more pronounced during the harvesting season and less consequential for small farmers during planting and cultivation, as large farmers prefer to use mechanized ploughs which reduces their demand for labour. The lack of sufficient harvest labour often means that sorghum which could have been either marketed or consumed would go unharvested. It is also not unusual for small farmers who cultivate between 5-10 feddans to sometimes work as laborers on larger farms.

Contractual arrangements between laborers and large farmers reveal a clear asymmetry of power. There are typically two types of contractual arrangements between farmers and harvest laborers which mostly hail from Eritrea and Ethiopia. Laborers are paid on a piece-rate system, based on either the amount of sorghum they are able to harvest or by the planted area they can cover (Issa 2017). It is clearly in the interest of the large farmer to contract labour based on area harvested when productivity per feddan seems low and to peg payment to the amount of sorghum harvested when the productivity per feddan is high. Many farmers reportedly pressure laborers to accept payment arrangements that are geared toward lowering their immediate costs irrespective of the wishes of laborers. A large farmer reported paying 25/SDG per one harvested sack of sorghum (Issa 2017).

The supply of labour in the sorghum value chain in eastern Sudan varies greatly depending on the state in question. The year 2016 did not see as much pressure on labour supply as did previous years. The intensified conflict in South Sudan displaced many Southern Sudanese who now work in sorghum fields in Sennar states. Eritrean migrant labour is widely accessible in Kassala state. In this context, it is worthwhile for international development actors to work with

state governments on relaxing the process of absorbing temporary labour from Sudan's neighbors.

Many interviewees reported that Sudanese laborers are increasingly being replaced by Eritrean transitional migrants, refugees and temporary laborers. This is mainly due to the fact that Sudanese laborers are choosing to work in gold mining operations or join rebel groups where the rate of pay can be as high 500 SDG/day (Imam 2017). It is worth noting that laborers in the sorghum fields, whether Sudanese or Eritreans, think of their work as seasonal, temporary and transitional and not necessarily as a reliable or permanent form of employment. The difficult work conditions they are faced with and the low wages they receive feed directly into this perception. This calls into questions arguments which suggest that offering more opportunities as field laborers could be part of a viable resettlement strategy for migrants and refugees or a source of fulfilling work for Sudanese. In order to have labour settle near sorghum production areas, incentives must be created. Improving access to health care, education and social services in production areas is a necessary condition. Providing these essential services would likely encourage labor inflows in production areas and create a steady supply of labour leading to stabilized wages. One factor affecting the volatility of wages in the sorghum value chain is the fluctuation of labour supply.

Service inputs:

Small and large farmers face numerous challenges related to securing agricultural inputs, such as tractors, seeds, insecticides, pesticides, and ploughs. In many cases, large farmers work as service providers for small farmers who cultivate adjacent land creating a relation of dependency in some instances (Emery and Elnaiem 2016). For example, large-scale farmers may rent their equipment to smallholder farmers for ploughing. Thus, inaccessibility of service inputs by large farmers also impact small farmers. These arrangement are also frequently informal and temporary, as they often take the form of verbal contracts that are not legally enforceable. This approach leaves small farmers vulnerable. Emery and Elnaiem (2016) report that some large farmers removed their equipment from fields of small farmers in the middle of ploughing, as they needed the equipment for their own farms. Such practices impact the ability of small farmers to timely cultivate their crops.

The difficulty in accessing agricultural service inputs is multilayered, having to do on the one hand with the sanctions that were imposed on Sudan, which made importing agricultural inputs difficult and costly, and on the other with current government tariffs that can reach up to 10% (Emery and Elnaiem 2016). Timely and affordable access to agricultural inputs at the field level also has an element of nepotism, as business connections and next of kin relations have been reported to facilitate speedy access to these services offered by inputs suppliers.

Access to agricultural inputs including machinery by large and smallholder farmers is often hindered by the practices of input suppliers which decrease financial institutions' confidence in clients. For example, Fanar Company, a supplier of agricultural inputs, had been mired in allegations of importing defected agricultural machinery which had a negative impact on

farmers who purchased the machinery from the company. The ABS, which apparently financed the company, launched an investigation into the matter (Sudan Tribune 2015).

Acknowledging the importance of access to agricultural inputs as it relates to availability, affordability and timeliness, both Sudanese actors and international partners have sought to address the issue through strategic initiatives. The MAF adopted an integrated solutions model and program that link provision of physical agricultural inputs with provision of extension services for small-scale sorghum producers in Sudan (Eltayeb 2017). International and local NGOs such as ZOA and Zainab are also implementing projects in eastern Sudan with components that seek to offer pre-and post-harvest input packages to small farmers. The two NGOs have partnered with the private sector and their experience (described below) is worth noting.

The NGOs contracted the provision of agricultural input support packages to an Australian company named Globe. Officers from the two organizations cited the lack of capacity of local service providers, as the reason for engaging an Australian company (Mohamed and Omer 2017). It became clear, however, during project implementation that Globe did not have enough machines and equipment and was also unable to deliver services to small farmers in a timely manner. Officers from the two organizations also mentioned that farmers didn't make their land immediately available for service provision as agreed upon. This experience represents a missed opportunity for the Sudanese private sector to engage in partnerships with local and INGOs that could potentially stimulate local private sector development. During the Annual Fair for Agricultural Technology 2017 in Gedarif, representatives of CTC and DAL Group, two leading service providers and input suppliers in Sudan, expressed willingness and readiness to engage in partnerships with the INGO sector. Local service and inputs providers are more tuned to the intricacies of farming culture in Sudan and can be a valuable knowledge resource.

3.2 Distortions in finance

Adequate and accessible financing are recognized as crucial conditions for achieving sustainable agricultural development. The bulk of finance for sorghum production and marketing in eastern Sudan is directed toward the irrigated and mechanized rain-fed sectors (FEWSN 2015). Some banks such as the Bank of Khartoum only extend credit to farmers in the irrigated sector¹⁰. Most smallholder farmers are typically found outside of irrigated and mechanized sectors. The ABS and a handful of commercial financial institutions including specialized banks such as the Farmer's Bank are the leading financers of agriculture in Sudan. Yet, access to finance through the ABS and commercial banks is largely out of reach for smallholder farmers.

The Central Bank of Sudan (CBoS) requires commercial banks to allocate at least 12% of all bank lending to microfinance loans which, would ideally offer small farmers the opportunity to access finance. This CBoS rule, however, is not effectively enforced and many banks do not

¹⁰ Link to micro finance loan issuance condition by Bank of Khartoum:
<http://bankofkhartoum.com/arabic/sme-banking/>

reach the 12% minimum threshold (H. A. Hamad 2017). Many banks assert that micro financing is costly and collecting loans from small farmers is rather a very difficult exercise. Microfinance lending ceilings are currently at SDG 30,000 with ongoing efforts to reach SDG 50,000. In the absence of effective monitoring and enforcement mechanisms by the CBoS for its microfinance quota, it is likely that commercial bank's apprehension towards extending microfinance to small farmers will continue.

The difficulty of accessing finance by smallholder farmers goes beyond the reluctance of banks to extend credit to them. There is a structural element to this difficulty which has to do with lending requirements and criteria set by the CBoS and enforced by other banks, as a matter of compliance with policy (see table 3). The criteria and requirements for microfinance are not realizable for many smallholder farmers and many of them view these requirements as unrealistic (Discussion 2017). For example, the requirement to produce a feasibility study that meets the bank's standards is impractical for many smallholder farmers who have modest levels of education and cannot afford paying a professional to undertake the study. Considering these constraints, supporting traditional rural microfinance models championed by local and INGOs is important.

In many cases the fates of smallholder and large-scale farmers are intertwined and often the success of the large farmer opens opportunities for the smallholder farmer. Large farmers often bolster their sorghum stocks by purchasing from small farmers providing a de facto marketing outlet for small farmers. Thus, accessibility of finance to large farmers could also be helpful to small farmers when there is a window of commercial exchange between them. However, larger farmers, too, have had their fair share of difficulties with commercial financing. Farmers experience extensive delays in receiving finance, which sometimes is not available until July by which time the rainy season has already commenced. It is crucial for large farmers in the rain-fed sector to access finance well before the beginning of the rainy season in order to purchase required inputs and prepare their plots of land. Large farmers also report that interest rates for equipment financing can exceed 4% with a sizable down payment of 10% coupled with short repayment cycles making it difficult to repay loans. Many farmers in Gedarif have been jailed, as a result of defaulting on their loans (Issa 2017). Increasing the durations of repayment periods for farmers would be a welcome step in improving the conditions under which they access finance.

Some ABS practices have been decried by researchers, such as the bank's preference to finance white sorghum variety only which is considered more marketable (Emery and Elnaiem 2016). This preference discourages farmers from growing Tabat sorghum variety which could offer a lucrative opportunity for the local packaged consumer market in the Gash area in Kassala. This bias toward white sorghum is rather a symptom of the larger challenge of synchronizing agricultural finance allocations and policies with the individual needs and market demands in each geographical region in the country.

Table 4: Criteria and required documents for financing individuals and groups (Microfinance)

Individual		Groups and Associations
Proof of identity (National ID card, License etc)		Proof of identity for 3 officers
Certificate of residency		Certificate of registration
Commercial or professional license		Documents of collateral
Feasibility study		Pro forma invoice in case of financing equipment
Certificate from agricultural authorities confirming ownership of project, land and the cultivated area and absence of disputes in the case of traditional farming		Certificate from agricultural authorities confirming ownership of project, land and the cultivated area and absence of disputes in the case of traditional farming
Clients declaration		

Source: Farmer's Commercial Bank (2017)

Since the bulk of financing goes toward purchasing inputs and services including machinery, seeds, pesticides and fertilizers, it is only sensible to consider a more involved role for service and input providers in securing finance for farmers. The dominant approach currently is that service providers are paid upfront for their services and products by the financing bank and farmers are liable directly to the bank. Nevertheless, it has been reported that large service providers like CTC sometimes extend direct credit to large farmers whom they know are very likely to repay promptly and successfully. As extending credit is always a question of risk management, it is not realistic to expect service providers to offer direct credit to small and medium farmers. However, with the right incentive structure in place, one which would reduce service providers' risk, it could be possible to persuade them to offer direct credit to small farmers. Furthermore, service providers' proximity to farmers and their technical knowledge in agriculture can be useful in loan risk reduction strategies. The current approach does not take advantage of this possibility. So long as service providers are paid in advance by the bank, they will always have an incentive to sell to farmers regardless of the feasibility of farmers' farming operations. The onus of assessing feasibility and thereby risk currently falls primarily on the bank.

Envisioning viable finance options for small-scale farmers outside the traditional microfinance frameworks championed by local and INGOs and by specialized microfinance institutions seems rather challenging. It is, therefore, intriguing to note that during the Group Discussion in Kassala, a group of smallholder farmers reminisced an old financing model that they claim worked for smallholder farmers within the New Halfa scheme. Smallholder farmers in New Halfa used to access finance through a common account held at the Ministry of Finance and administered by the management of the scheme. Farmers attribute the viability of this model to the fact that the management of the scheme knew the farmers and their challenges and did not apply a rigid lending criteria as do commercial banks now.

3.3 Distortions in marketing

Pricing:

Setting the right price is an important element of the marketability of goods and services. The government of Sudan through a deliberative process involving the MoA, MFNE, Ministry of Trade and Commerce and the ABS sets the prevailing price of sorghum in the country which is commonly referred to as the 'Tarkeez price' or pivot price. The pivot price is important because it becomes a reference for finance and trade. For example, in-kind repayments of credit extended to farmers through what is known as "Salam" loans are pegged to the pivot price set by the government institutions mentioned above. Salam loans are credits extended to farmers typically before harvest and collected by the banks in the form of crops at the end of the season. In-kind repayments are pegged to the pivot price. A significant share of sorghum production in Sudan is financed through Salam loans underscoring the importance of the pivot price which is currently set at SDG 250/sack. It is important to note that sorghum in Sudan may be sold above or below this price. The idea is that prices in the market should gravitate toward the pivot price. If prices in the market significantly increase above the pivot price, it is a sign that sorghum (food) prices are becoming unaffordable which impacts food security. On the other hand, when prices in the market drop significantly below the pivot price, farmers lose the incentive to cultivate which also impact food security. Thus, the pivot pricing tool is an important pillar of Sudan's Strategic Food Reserves Policy aimed at stabilizing staple food prices with the view to ensure food security.

As a general reference for trade, prices paid to smallholder farmers by traders and brokers for their sorghum could be measured against the pivot price which further highlights the relevance of the pivot price to smallholder farmers. The pivot price is also highly relevant to large scale farmers who access Salam loans. As mentioned earlier, many large-scale farmers provide marketing outlets for small scale farmers by purchasing their crops. This is another way the pivot price indirectly impacts the marketability of smallholder producers, as large farmers are likely to bolster stocks from smallholder farmers when the pivot price is feasible.

The viability of SDG 250 as a pivot price for sorghum has, however, been contested by farmers and the issue has led them into direct confrontation with other actors. In March 2017, for example, a group of farmers from Gedarif produced a cost study and submitted it to the Presidency of the Republic and to Parliament to protest what they believed was an unfeasible pivot price. In the cost study, farmers argued that the real cost of producing a sack of sorghum is SDG 325, and that the SDG 250 pivot price means that they produce at a loss. The farmers also decried the lack of official representation for them when it came to setting the pivot price and added that the price of SDG 250 had been set five years ago and doesn't reflect increases in the prices of agricultural inputs and general inflation (K. M. Issa 2017). A farmer in Gedarif expressed frustration at the recent dissolution of the Farmer's Union which he believed would have gave farmers a louder voice and improved their prospects in negotiating for a price increase.

The issue of the pivot price was brought up before Parliament in mid-March 2017 in a heated session of the agriculture and economics parliamentary committees, where representatives of

farmers raised their grievances before members of the committees and in presence of representatives from the CBoS, MFNE, the Minister of Agriculture and the General Manager of the ABS (Elsid 2017). Despite threatening to halt production of sorghum in the coming seasons, farmers received a resounding rejection by the Minister of Agriculture for their wish to adjust the pivot price (Al Sudani 2017).

The government's interest in maintaining the current price is likely due to concerns around food inflation and therefore maintaining political stability. The surplus of sorghum supply this year means that there is less urgency to respond to farmers' pressure and threats to stop production next season. The MFNE which finances sorghum production through the ABS has little interest in raising the sorghum bill amid growing budgetary deficits in recent years. Raising pivot prices would also introduce an administrative burden on the ABS which would have to adjust its accounts to reflect the new prices. Exporters have long complained of their inability to compete internationally due to high prices inside Sudan. Hence, at the moment, it seems only farmers have an incentive to raise the pivot price and with the disbanding of the Farmers Union that gave them collective negotiation power, the prospects of higher prices for farmers look dim.

*“Cultivating
sorghum is all we
know”
a farmer in Gedarif*

Practices of the SRC also generate price distortions in the sorghum value chain. In an ideal scenario, the SRC would purchase sorghum from farmers when there is a surplus in the market preventing prices from dropping significantly and shielding farmers from losses. However, the SRC enters the market late and well into the season (Ahmed, Abdulsalam and Siddique 2012). Farmers reported selling sorghum at losses immediately after the harvest either because loan repayment was due or because they did not have storage to keep the sorghum until prices improve (Imam 2017). Farmers sell sorghum to traders and brokers at low prices immediately at harvest and traders and brokers then store the sorghum until the SRC starts purchasing. Brokers and traders then resell sorghum to SRC through proxy farmers since the SRC's policy is to buy from farmers first. The SRC typically buys at the pivot price which is very often higher than the price in the Gedarif market. The SRC also generally purchase sorghum from farmers that have been financed by its patron, namely the ABS. Therefore, by entering the market late and showing preference toward farmers that were financed by the ABS, the SRC undermines its own price stabilization mandate.

During fieldwork the consultant asked a farmer in Gedarif why he keeps cultivating sorghum every year when prices are not feasible and when the pivot price is often lower than the cost of production. The farmer immediately responded by saying: “cultivating sorghum is all we know” (O. M. Issa 2017). The farmer's firm response indicates an attachment to sorghum cultivation that might be explained by the relative ease of finding buyers compared with other crops. Chances of finding a broker or trader that deals in sorghum are far greater compared with other crops.

Humanitarian actors have often contributed to the volatility of the sorghum market albeit unintentionally. The agricultural season of 2013 – 2014 was characterized by severe production

shortfalls. WFP's cash and voucher programs at the time aggravated local marketing systems by creating high effective demand which resulted in increased and volatile prices (FEWSN 2015). Cash and voucher programs can have positive impacts on local marketing systems. However, cash and voucher programs need to be designed well and in synch with the local marketing context for their positive spillover effects to be realized.

Workers' food programs in some states in Sudan, through which state employees can purchase grains from the SRC or from financial institutions at reduced rates, also contribute to price volatility. Employees reportedly resell sorghum purchased at a discount in grain markets such as in Gedarif and flood the market with more supply of grains and consequently depress prices below their optimal level (allAfrica 2017).

Storage:

As mentioned earlier, many farmers sell their sorghum at loss or at extremely low prices because they lack adequate storage capacity. Therefore, having adequate storage could mean the difference between making a profit or a loss. Storage is a challenge for actors both in the downstream and upstream levels of the value chain.

Smallholder farmers are largely excluded from the commercial storage market and from public silos run by the SRC. Small-scale farmers may rely on underground traditional storages known as 'mutameers'. Mutameers are conventional storage methods in Sudan and used widely in the country though they also involve several risks including sanitary risks and risks of exposure to insects, which could multiply post-harvest losses. Exporters and large farmers wishing to resell to the SRC must comply with food safety standards set by the SSMO. They are unlikely to favor sorghum stored in mutameers of smallholder farmers.



Figure 2: sacks of sorghum stored outside Gedarif silo

The minimum quantity accepted by Gedarif Silo for commercial clients is 150 tons (GabartAllah 2017). The Gedarif Silo, under the SRC, is one of the largest grain silos in

the country with a capacity of 100,000 tons built in the 1960s by the Soviet Union. Officials in the Gedarif Silo indicated that inadequate capacity has been a challenge leading them to reject clients or store grains in open areas in the vicinity (see figure 2). For commercial silos such as the one owned by Thagib Group in the outskirts of Gedarif, the minimum quantity accepted is 2000 sacks which is almost 200 tons. Cost is SDG 300 /ton for Thagib's silo including loading, offloading, sieving and packaging of sorghum while in the Gedarif Silo the cost is around SDG 200/ton annually (Awad 2017). The high minimum quantity admission requirements and fees are beyond the affordability of an average smallholder farmer thus effectively excluding this group from a storage option most conducive to

improved marketability, since silos maintain the high quality of produce and offer fumigations services.

Thagib Group's silo, located on the outskirts of Gedarif, is a private sector response to shortages in storage capacity in eastern Sudan. The group, under the brand name Silo Bags International¹¹, claims to have introduced a storage solution that offers options for in and off-farm storage selling storage space in large durable insulated bags made from UV protected layered film. The idea is for customers to store inside the facility run by the group. Thagib admits that demand has not been as high as they had hoped pointing out that they started their businesses only 2 years ago. It is true that innovation takes time to be adopted but the choice of location of the business may also have to do with the level of demand. Located about 10 kilometers outside of Gedarif city, Thagib's silo is far from sorghum farms and also far from the Gedarif crop market used by traders who prefer storage near the market which makes daily sales easier.

Actors outside of the private sector have also acknowledged the need for storage solutions for smallholder farmers. The World Food Program (WFP) is piloting a project aimed at reducing post-harvest losses in the Hamashkoraib area north of Kassala state (Nelson, Conlan and Tefera 2017). The WFP is supplying farmers with silos based on a cost-sharing arrangement. The portable silos are imported by a Sudanese firm, according to WFP. WFP's approach is a step forward in encouraging partnerships with the local private sector and hopefully paving the way for alignment between procurement and program. It is hoped that WFP can help stimulate local entrepreneurial incentive to manufacture the silos inside of Sudan (See section 4.2)b).

WFP officers in Khartoum also acknowledge the need to purchase more sorghum locally in Sudan for their food distribution programs (Nelson, Conlan and Tefera 2017). Currently, WFP procures significant amounts of sorghum from the United States for local distribution in Sudan. The international agency might be constrained by the requirements of its donors demanding international procurement. Buying more sorghum locally could open more marketing channels for Sudanese farmers, although this needs to be in synch with local marketing systems as emphasized earlier.

3.4 Distortions caused by macro-economic policy and tenure system

Privatization:

The motivations behind Sudan's privatization program are complex. Efficiency gains and public finance imperatives are usually cited as rationales for promoting privatization. Furthermore, public reform packages prescribed by the World Bank (WB) and the International Monetary Fund (IMF) gave Sudan little choice in charting its own solutions for the economy. Assessments of Sudan's privatization program reveal that the country overlooked the prerequisites of successful privatization including establishing conducive regulatory and competitive

¹¹ For more information see: <http://www.silobagsinternational.com/home/mail.php>

frameworks and the weaving of social safety net (Elbeely 2015). The impacts of the privatization process has been felt most acutely by smallholder producers.

Privatization in Sudan often meant that irrigated land and government extension services shifted from smallholder farmers to private agribusinesses in privatized agricultural schemes that housed smallholder producers. A case in point is that of smallholder sorghum farmers in Khashm El Ghirbah locality in Kassala state, part of the New Halfa scheme, which was allocated to a private company backed by Emirati investors known as Arab Investment Company Inc. (Focus Group Discussion 2017). Smallholder producers in the area complained that agribusinesses with their considerable resources always seek deals in which they try to dictate terms that favor them but are not necessarily fair for the farmers. They added that agribusiness is after agricultural land that is close to transportation routes and that has good access to irrigation and extension services. This has intensified competition with small-scale farmers over scarce access to agricultural services and resources. In the absence of a Farmers Union and undeveloped farmers' associations in the area, smallholder farmers are increasingly vulnerable to unfair competition at best and to dispossession from their land at worst.

Large agribusinesses in Sudan are intensifying their lobbying for more private sector involvement in agriculture. The S24 Sudania TV channel, owned by Mr. Wagdi Mirghani, chairman of the Mahgoub Sons Group, has been used as a platform to showcase successful experiences of big agribusinesses and advocate for government's assistance in establishing a more enabling regulatory frameworks and making more investment capital available (Toum 2017). This moment of accelerated momentum for large agribusiness in Sudan demands that international actors make tactical shifts to their approaches. Smallholder producers and SMEs are, rightly so, the targets of many programs and policies championed by international players in Sudan. Nonetheless, an approach of near disengagement from large agribusinesses who actively attempt to co-opt political elites risks intensifying of power alliances that exclude smallholder producers from the benefits of agriculture. An approach of conditional engagement and conditional transfer of resources to large agribusiness gives international actors leverage that can be used to assist smallholder farmers in a context where they have little power (see section 4.2)

An approach of near disengagement by international actors from large agribusinesses that actively attempt to co-opt political elites risks intensifying power alliances that exclude smallholder farmers from the benefits of agriculture.

Land Tenure System:

Under formal law, all unregistered land belongs to the government of Sudan. Unregistered land makes up around 90% of all land in Sudan (USAID's E3/Land Office 2013). Formal law does not recognize customary land systems although customary land laws are applied in many communities in Sudan especially in rural areas. Reforms of the land tenure system was one of the major stipulations of the Comprehensive Peace Agreement (CPA) of 2005.

The absence of a socially legitimate and functioning system to enforce formal and customary land rights has increased tenure insecurity in the face of pressure to develop agribusiness in Sudan (USAID's E3/Land office 2013). Under formal law, the Government of Sudan can issue long-term leases to unregistered land without consultations with local communities. As a result, smallholders have been evicted from land and denied access to natural resources in favor of private investors, land speculators, military personnel and elites. Smallholder farmers in Khashm El Ghirbah complained of dispossession from their land in the New Halfa scheme as the land was reallocated to the Arab Investment Company (Group Discussion 2017). These farmers' lacked official title deeds which made it easier to displace them. In focus group discussions, they explained that it is common for smallholder farmers to not have formal title to their land. The consultant visited the site within the New Halfa scheme that farmers claimed was allocated to the private company but no one was available to verify farmers' reports.

Tenure insecurity seems to be an issue impacting smallholder farmers in Sennar state as well. It was relayed by a farmer from Sennar who was interviewed in Kahrtoom that Wali (governor) of Sennar threatened to put up some agricultural land utilized by small farmers for Saudi investment. Farmers responded by launching a successful campaign on social media with the objective of discouraging Saudi investors from investing in Sennar (Eid 2017).

Under law, the government can issue leases to unregistered land which has encouraged many large farmers, traders and agribusinesses to seek long-term leases and keep agricultural land, without necessarily cultivating it in anticipation of future profitable offers of investments or partnerships¹². This practice has effectively turned some farmers into land speculators. The leasing model and the cheapness (sometimes as low as SDG 6 per feddan) and relative ease to acquire new leases has also encouraged large farmers to abandon land that they have depleted and seek new fertile land (Eid 2017). This is a risk for smallholder producers as the quest for fertile land could lead to encroachments onto smallholder's land.

[3.5 Linking the value chain to global markets and influence: the challenge of exporting sorghum](#)

The underlying assumption of this section is that a thriving export market could open marketing opportunities for smallholder producers through, for example, contract farming with larger agribusinesses and traders who are better positioned to reach exporters and international markets. Hence, distortions related to the export function in the value chain indirectly impact smallholder producers by limiting available marketing channels and overall demand for sorghum.

Export figures vary and range from 0 – 240,000 MT in 2013 (Emery and Elnaiem 2016). In 2015 Sudan exported 107,341 MT for a value of USD 28,169 million and exports went up slightly in 2016 reaching 108, 191 MT for a total value of USD 28,180 million (Central Bank of Sudan

¹² The government through the Ministry of Investment is reportedly taking steps to curb the practice of leasing investment land without utilizing it

2017). Sorghum produced in Sudan has limited international marketing opportunities due to the relatively high cost of production in Sudan and due to the imposition of export controls by the bank of Sudan and MFNE in the form of authorizing exports based on national stocks availability.

Most of Sudan's sorghum exports go to the Arabian Gulf region and Turkey (Eltahir 2017). Primary destinations in the Gulf include Saudi Arabia, Qatar, Emirates and Kuwait and most exports to these countries are sourced from Gedarif. Sudanese sorghum exported to these countries is mainly used in animal feed and fodder. Sudan prioritizes imports to these countries as a matter of geopolitical strategy underpinned by a strategic alliance aimed at ensuring food security in Sudan and the Gulf. As water resources become ever depleted in the Gulf region, Gulf countries are increasingly looking to Sudan to secure feed for their livestock industries instead of growing animal feed at home. Sudan's Alfalfa exports to the Gulf, for example, continue to increase every year (Toum 2017). Estimates put Saudi agricultural investments in Sudan at 11 billion dollars (Toum 2017).

Sudan welcomes the hard currency it receives from the Gulf and uses it to finance its wheat imports which continue to rise every year despite Sudan's efforts to grow more wheat. This exchange highlights another linkage between wheat and sorghum as strategic commodities and as the primary commodities in Sudan's food security policy. As a result of this strategic alliance between Gulf countries and Sudan, the Gulf tries to always ensure that the stocks of the SRC are full during production shortages (FEWSN 2015).

Uncertainty regarding exports during every agricultural season serves as a de facto export control and dissuades producers from producing for export markets. Export controls are tools used to enforce the Strategic Food Reserves Policy and to stabilize prices through manageable international demand. Nonetheless, SRC offers subsidized sales to select exporters which creates unfair competition among exporters. An exporter noted that getting access to subsidized SRC sales requires 'political connections' and that several exporting companies are allied with the ruling party. Discounted sales from the SRC can be as low as SDG 190/sack compared with SDG 230 – 250 in the market (K. M. Issa 2017). Procuring from the SRC for export is an advantage also because it makes it easier to comply with SSMO standards.

Players like the Mahgoub Sons Group reportedly pay the SRC in foreign currency for sorghum that the company exports. Replenishing the national coffers with hard currency automatically grants the Mahgoub Sons Group a remarkably powerful position in the value chain. It is noteworthy that the chairman of the group is also the President of the Export Chamber of Sudan. Foreign currency received from the group is said to be used to subsidize medicine and finance its imports. While ensuring adequate supply of medicine is a necessity, it should also be recognized that the export of key grain stocks to finance non-food related activities poses a risk to overall food security.

Mid-size exporters decry CBoS export related policies and describe them as unpredictable and unstable. The requirement to convert hard currency into Sudanese pounds using an exchange

rate that is generally under the rate in the parallel market is a disincentive to export. Mid-size exporters also complain that the assignment of export taxes is rather arbitrary making it difficult for them to predict and manage costs (Eltahir 2017)

Numerical estimates of informal cross-border trading were not immediately available. A significant amount of sorghum, however, is reported to be smuggled across the borders with Ethiopia and Eritrea (FEWSN 2015). Key cross-border informal trade points include Laffa and Hamadiyat in Kassala and Galabat and Kurmuk in Gedarif. These areas are also important wholesale markets and transit points into neighboring Ethiopia and Eritrea. Trade flows to Ethiopia, nonetheless, are limited and restricted to small scale flows between communities on both sides of the border.

Chapter (4)

4. Recommendations and considerations for value chain development

This chapter provides recommendations for value chain upgrading aimed at improving economic viability for smallholder farmers through policy and program-oriented responses. With a focus on long-term sustainability, the chapter envisions an important role for the private sector in introducing market-led solutions to address distortions identified in the value chain. Moreover, this chapter also highlights places in the chain where development and humanitarian organizations could respond effectively. Some recommendations are generalizable beyond the sorghum value chain and generally contribute toward strengthening the position of smallholder farmers in agricultural commodity chains in Sudan.

4.1 Recommendations for Policy Formulation and Diplomacy

a) Pursue a policy of conditional engagement with large agricultural firms and SMEs:

international development assistance targeting agriculture should enable large agribusinesses and thriving SMEs to become conduits for transferring benefits to smallholder farmers. Such approach can generate favorable development outcomes for both private sector companies in agriculture and smallholder farmers. Transfer of financial and technical resources from international actors to large agricultural firms and SMEs, should be conditional upon the commitment of the latter to forging sustained partnerships with smallholder farmers based on clearly identifiable synergies and mutual interests. The idea is to capitalize on the resource base and entrenched market position of large agribusinesses and SMEs with strong market performance and to dissuade them from adopting practices that are detrimental to small-scale producers. The goal here is also for international actors to use their position, as programme funders and implementers, as a leverage necessary in containing distortive practices by larger agribusinesses.

Specific conditions for engagement with agribusinesses by international actors need to be developed and negotiated and must be informed by the dynamics pertinent to each agricultural commodity market. As a general guiding principle, however; international actors should engage large agribusinesses that have the willingness, ability and commitment to repatriating benefits to the smaller players. The creation of and transfer of development benefits at all levels should be enshrined in strong legally enforceable contracts between respective actors.

In addition to being an efficient approach that creates cooperation among different players in the value chain, engaging agribusinesses for the benefits of smallholder farmers also has strategic benefit. One risks contempt, co-option and potential sabotage when one completely excludes the larger players and try to empower others at the expense of their market share.

It is also important that international actors refrain from engaging businesses that are in patronage networks. To mitigate such risks, mapping agribusinesses in Sudan and profiling companies in the agricultural sector should be a good starting point. Mapping the private sector in agriculture is also instrumental to creating an incentive framework and identifying businesses that are in a good position to engage with smallholder farmers. Ideally, the incentive framework would combine regulatory and financial incentives. Regulatory incentives demand engaging relevant Sudanese authorities and international agencies with specialized technical expertise.

b) Lobby for improved land tenure for smallholder producers: improving property rights for smallholder sorghum farmers promises multiple benefits, including protection against land dispossession. It also offers a better negotiating position in dealing with large scale farmers, and can potentially allow access to credit and liquidity as land can be used as transferable collateral if owned outright. Furthermore, strong property rights in general helps increase investor confidence. Efforts to strengthen Sudan's land tenure system in order to ensure favorable outcomes for smallholder farmers should focus on legal frameworks and their application with a view toward formal recognition of customary land rights. Historical land contestation and ensuing violent conflicts in Sudan make discussion of land-tenure a delicate matter, particularly for international actors. Thus, the issue of improving tenure security and land rights for smallholder farmers must be framed as an imperative for rural agricultural development rather than a conflict-mitigation strategy. For example, international actors could stress to the Sudanese government the importance of clear and secure land tenure rights when mobilizing investments for development of irrigation systems in the country. Investors need to be reassured that their investments in irrigation systems are not subject to risks of property rights disputes in areas and location where projects would be set up. Drawing attention to the link between better tenure rights and improved irrigation systems has the dual benefit of lobbying for two development goals simultaneously. Support for the development of Sudan's irrigation systems is necessary in order to take advantage of the vast water resources in the country.

Land reform policy initiatives were previously planned in Blue Nile state and aimed at establishing local and state land reform commissions. These attempts, perhaps, signal a willingness on the part of the government to consider land reform policies. If the current political climate does not allow international actors to propose or engage in system-wide land reform initiatives, collecting and documenting information on customary rights systems may be a less controversial approach. Strong land rights for smallholder producers help cement benefits of agro development as land is currently the main resource for farmers.

4.2 Recommendations for Programme Development

a) Enhance productivity per feddan through contract farming: Enhancing yields per feddan through technology transfers and sustainable agronomy practices can benefit small-scale farmers if twinned with better access to markets. In fact, increasing yields and improving efficiency may be counterproductive if there are not marketing outlets available for smallholder farmers—this risks depressing prices further for smallholder farmers due to saturation in supply. Thus, programs aimed at improving efficiency through mechanization and improved inputs must have, as an integral pillar of these programs, a clear and realistic approach to marketing the augmented production. Assuming that improved production efficiency and quality will guarantee buyers is rather a risky approach.

Contract farming¹³ offers opportunities for enhanced productivity and guarantees marketing channels for smallholder producers. Use of contract farming as means of transferring benefits of resources and opening marketing channels for smallholder producers is expanding in much of Africa. In Sudan, large farmers and agribusinesses should be persuaded to enter into partnerships with smaller farmers that provide the latter with market outlets. For large-scale farmers, the contract farming model gives them access to fertile land and a supply of labour, which leaves them time to focus on marketing and processing activities. In return smallholder farmers gain access to sustained marketing channels. Large farmers and agribusinesses are also better positioned than smaller farmers to acquire inputs that can enhance productivity such as machinery, improved seeds and agricultural extension knowledge. The analysis (section 3.2) revealed that financial institutions are less likely to finance smallholder farmers to acquire much-needed machinery.

Evidence suggests that mechanization has resulted in much higher sorghum yields. The Mahgoub Sons Group, for example, has achieved a productivity ratio of 15 sacks/feddan for sorghum, which is almost five-times higher than the national average, primarily through introducing mechanization, improved seeds and extension services to their farming operations. The chairman of the Group also pioneered a successful experience in cotton contract farming with smallholders in Khor Abu Habil. The Group offered farmers inputs, finance, and extension services and an adjustable predetermined price for the produce.

Mr. Muawiya El Berier, an agribusiness leader expressed willingness to explore with contract farming models (Toum 2017). This positive gesture signals willingness on part of some agribusinesses to engage with smallholder farmers. Smallholder farmers in Khashm el Girba in Kassala state also indicated their willingness to work with agribusinesses and large farmers while emphasizing that such partnerships need to be fair (Focus Group Discussion 2017). Indeed, considering the power differential between smallholder farmers and agribusinesses needs to be the foundation for fair contracts between these actors.

¹³ Contract farming is agricultural production carried out according to an agreement between farmers and a buying entity, which places conditions on the production and marketing of the commodity.

Table 5: SWOC Enhance productivity per feddan through contract farming

<u>STRENGTHS</u> - Established network of importers that could provide machinery and general agricultural inputs needed for enhanced productivity. - Commercial banks already finance agribusinesses and large farmers to buy machinery and improved inputs (seeds, pesticides, etc.).	<u>WEAKNESSES</u> - Contract farming can become costly if smallholder farmers are not located nearby operations of larger farmers and agribusinesses. - No regulatory incentive for agribusinesses to work with small-scale producers or vice versa. - It is not clear how many agribusinesses and larger farmers have successfully adopted new technologies and achieved higher productivity in eastern Sudan.
<u>OPPORTUNITIES</u> - Some farmers and agribusinesses are willing to engage in contract farming. - Prevent large agricultural businesses from dispossessing smallholder farmers.	<u>CONSTRAINTS</u> - Creating incentive for actors through government policy and development programming to undertake contract farming is a lengthy process. - Repayment periods of loans used to finance purchase of equipment are relatively short, which means potentially high initial costs for large farmers and agribusiness.

b) Strengthen smallholders' storage capacity through development of hermetic storage

supply chain: Evidence increasingly shows that improved storage capacity has positive impacts on smallholder farmers' livelihoods, income and food security (Brenann 2017). Our research shows that smallholder farmers in Kassala are compelled to sell sorghum immediately after harvest for extremely low prices due to their lack of post-harvest storage capacity. Our findings also show that medium and often large-scale farmers face the same challenge, although to a lesser degree. Hence, adequate storage is an important component of successful marketing, helping smallholder farmers realize optimal prices and reduce post-harvest crop losses. Providing farmers with adequate storage capacity also tilts market dynamics in their favor as they are not compelled to accept the first offer they receive from brokers and traders. Acknowledging the importance of post-harvest storage capacity, WFP Sudan has started piloting a project to provide farmers in Eastern Sudan with portable small-scale silos. This is a welcomed step that could provide opportunities for the development of storage supply chains.

Figure 3: MIT researchers inspect portable grain silos



In order to improve the overall market potential of small farmers, it is essential that a supply chain for hermetic storage technologies, which have shown strong promise in Uganda¹⁴, be built and strengthened. Hermetic storage containers provide a barrier between the grain and the outside atmosphere, which controls grain moisture content and insect activity without the use of pesticides. A local entrepreneurial incentive should be created through a private sector development program to stimulate market entry by potential suppliers. While importing hermetic storage technologies may be required initially, building a local supply chain would provide multiple income-generation spillovers inside Sudan.

The provision of hermetic storage options to farmers in eastern Sudan should be informed by a feasibility study that identifies the profit margins that are likely to attract local investors. So – called ‘willingness to pay’ studies that determine optimal costs for farmers are also key. Actors like WFP Sudan can play a key role in these studies as they have an established logistics apparatus inside Sudan which can be both a gateway to crucial market information and product distribution in the early phases of hermetic storage adoption by farmers. Ultimately, transporting these storage options to farmers and from farmers to markets would require a distribution network independent of non-profit actors to improve probability of successful scale-up in the long-term.

Table 6: SWOC Strengthen storage capacity through local supply chain development

<u>STRENGTHS</u> • A local supplier of portable silos in Sudan has already been identified by WFP. • Investment financing structure exists through local banks that can be utilized by prospective suppliers.	<u>WEAKNESSES</u> • Industrial manufacturing capacity is generally poor in the country which means scaling-up solutions may require large investment capital.
<u>OPPORTUNITIES</u> • INGOs and UN agencies have established logistics apparatus that can help facilitate distribution and transportation of storage options during early adoption phase. • Farmers demonstrated willingness to pay for agricultural inputs (both ZOA and WFP work with smallholder under cost-sharing plans).	<u>CONSTRAINTS</u> • Potential skills-gap to manufacture portable storage options in eastern Sudan may increase reliance on Khartoum for skilled labor • Transporting stored yields to market may require development of a separate business model

¹⁴ A recent evaluation study undertaken by WFP and Massachusetts Institute of Technology demonstrated a strong promise for adopting and scaling-up of hermetic storage technologies by smallholder farmers in Uganda.

c) Develop farmers' associations to stimulate local market-systems:

Farmers' associations can improve smallholder farmers' access to finance and markets tremendously and can generate multiple economic and social benefits for members.

Associations are commercially effective because they can make decisions quicker, have lower admin costs and tend to be composed of members who are familiar with each other, in addition to leveraging economies of scale, of course. These advantages translate into the efficiency gains that a commercial enterprise needs and which gives it competitive advantage in the market. Competitive advantage also means competitive pricing. Efficient and well-organized associations can greatly enhance their members' bargaining power and help them secure better prices. Yet, it is not that smallholder farmers only need to increase the price they charge to have better outcomes, they could also improve their margins and position through a reduction of their costs, which should be the aim in a regulated value chain like the sorghum value chain where prices can only increase so much.

Smallholder farmers in Kassala indicated a strong desire to organize as collectives and associations. They also pointed out that the idea of working collectively is new to them, and argued that this tends to be the case in many places in the country (Focus Group Discussion 2017). Organizing farmers based on geographical locations, as opposed to size, would be an appropriate choice. When organized according to geographical location, it would be easier to get smallholder farmers to benefit from opportunities that large ones may provide, assuming of course, that each geographical location chosen has a mixture of both small and large farmers. Both larger and small farmers would also be able to benefit from any advantage that their geography may offer such as faster access to main roads, better soil, rainfall and so on. Segregating farmers based on size may run the risk of creating unfair competition between large and small farmers when the goal should be to get the two groups to cooperate.

Farmers associations in eastern Sudan should be promoted as means of stimulating the private sector and should not be viewed as replacing or deterring expanding agricultural SMEs. In the context of eastern Sudan, organizing through collective associations could facilitate the uptake of contract farming, as working with a collective increases efficiency gains and reduces costs for agribusinesses. There also exist tested association development methodologies that can contribute toward competitive and vibrant market systems in rural contexts. An example of such methodologies is ACIDI-VOCA's Sell More for More Approach.

There seems to be common challenges for nascent farmer associations in eastern Sudan which were echoed by the small-scale farmers interviewed, as well as by program implementers from ZOA and Zainab. These challenges include persistent administrative and management capacity gaps, as well as challenges related to legal registration and opening bank accounts. These common challenges create a tendency to develop one-size-fits-all approaches within association capacity-building programs. This risks ignoring the challenges and opportunities that might be specific to each geographical location. Association development approaches and activities should be tailored to take advantage of the strengths and circumstances of individual communities and locations.

Table 7: Develop farmers' associations to stimulate local market systems

<u>STRENGTHS</u> • The Agricultural Associations Act sets parameters for development of associations. • Financial institutions have developed rules and frameworks for working with associations. • Several association development programs are implemented by INGOs and local NGOs.	<u>WEAKNESSES</u> • Concept of associations is relatively new in eastern Sudan and often met by suspicion.
<u>OPPORTUNITIES</u> • A wealth of knowledge and evidence on cooperatives, associations and collectives in Africa in contexts similar to Sudan is available. • Strong desire expressed by smallholder farmers to work collectively in eastern Sudan.	<u>CONSTRAINTS</u> • While necessary, community sensitization is lengthy and delays the realization of benefits by association members.

Annexes

Annex 1: Revenue shares of different actors in the sorghum value chain

1. Value distribution is expressed as a percentage of the end-user (retail) price and indicates an estimate of value added at each stage. For example, 85.60% of the value is added at the processing stage while only 32.40% of the value is added at the production stage. According to the table, processing actors add the most value, 85.60% for large mills and 87.40% for distributors and agents of these mills. Essentially, processing mills collect almost all of the revenue from their agents and distributors minus 2-3% commission which represents the margin of agents and distributors.

Estimate Revenue Shares			
Sorghum <i>feterita</i> Variety			
Value Chain Actor	USD Revenue/MT	SDG Revenue/MT	Value distribution
Small Farmer - Village Sales	\$104	SDG 1,665	20.80%
Large Farmer - Crop market sales	\$162	SDG 2,598	32.40%
Traders - Crop market	\$166	SDG 2,664	33.10%
Wholesalers (ABS + SRC)	\$173	SDG 2,775	34.60%
Larger Mills (Sayga)	\$428	SDG 6,850	85.60%
Retail Distributors @ 2.15 % commission.	\$437	SDG 7,000	87.40%
Retailers (large supermarkets)	\$500	SDG 8,000	100.00%
Exporters	\$230 - 260	SDG 3,680 - 4,160	52.00%
International Distributors	\$138 - 400	SDG 2,208 - 6,400	80.00%

2. Retailers show a value addition of 100% because their revenue is used as the base price to calculate percentages of value distribution. This is not to be interpreted as showing retailers to hold the lion share of value. Retailers' mark-up¹⁵, however, is approximately 14-15% calculated from the distributor's price under the assumption that all retailers are supplied by distributors.

3. Value addition and distribution do not necessarily correlate with the degree of power an actor enjoys. This is not surprising in a regulated market. For example, wholesalers add only 34.60% of the total commercial value, yet wholesalers enjoy much power and a strong position in the chain since they are key players in sector's finance and regulation. Thus, these actors do not derive their power/influence from commercial activities as much as they do from their ability to regulate and finance the sector.

¹⁵ *Notes on Annex 1

- Exchange rate used is the parallel market rate of SDG 16/ 1 USD
- 1 metric ton (MT) = 11.1 Sudanese sacks. 1 sack = 90kg
- Any actor that sells to the SRC or ABS receives as revenue SDG 250/sack. ABS resells for same margin.
- Revenue shares do not account for various costs borne by actors and only reflect monetary value they receive in sales transactions.
- Prices were collected in March through April 2017 in Gedarif and elsewhere and from different supply chain actors considering that price fluctuations are hallmark of commodity markets.

Annex 2: Sorghum value chain actor map

