Food and Agriculture Organization
of the United Nations

S P E C I A L R E P O R T

FAO CROP AND FOOD
SUPPLY ASSESSMENT MISSION TO THE SUDAN

15 March 2018

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FAO CROP AND FOOD SUPPLY ASSESSMENT MISSION TO THE SUDAN

15 March 2018

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 2018

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CONTENTS

Page

Acronyms and abbreviations 6

Mission Highlights 7

1. OVERVIEW 7

2. SOCIO-ECONOMIC CONTEXT 9

2.1 General 9
2.2 Population 9
2.3 Agriculture 10
2.3.1 Irrigated agriculture 11
2.3.2 Semi-mechanized rainfed agriculture 11
2.3.3 Traditional rainfed agriculture 12
2.3.4 Livestock 12

3. AGRICULTURAL PRODUCTION IN 2017/18 12

3.1 Main factors affecting cereal production in 2017/18 12
3.1.1 Rainfall 12
3.1.2 Agricultural finance and credit 14
3.1.3 Agricultural inputs 15
3.1.4 Crop pests and diseases 18
3.1.5 Area planted and harvested in 2017/18 19
3.1.6 Crop yields 21
3.2 Cereal production forecast 23
3.3 Other crops 26
3.3.1 Sesame 26
3.3.2 Groundnuts 26
3.3.3 Sunflowers 27
3.3.4 Pigeon peas 28
3.3.5 Sugar 28
3.3.6 Cotton 29
3.4 Livestock 29

4. CEREAL SUPPLY/DEMAND SITUATION 30

4.1 Crop and livestock markets 30
4.2 Cereal supply/demand balance (January-December 2018) 32

5. RECOMMENDATIONS 33

Acronyms and abbreviations

ABS	Agricultural Bank of Sudan
CBS	Central Bureau of Statistics
EBA	Everything But Arms
FAO	Food and Agriculture Organization of the United Nations
FEWS NET	Famine Early Warning Systems Network
FSTS	Food Security Technical Secretariat
GDP	Gross Domestic Product
HAC	Humanitarian Aid Commission
mm	Millimetres
MoAF	Ministry of Agriculture and Forestry
MoAR	Ministry of Animal Resources
NDVI	Normalized Difference Vegetation Index
NGOs	Non-Governmental Organizations
SDG	Sudanese Pound
SRC	Strategic Reserve Corporation
UNHCR	United Nations High Commissioner for Refugees
USAID	United States Agency for International Development
USD	United States Dollar
VCI	Vegetation Condition Index
WFP	World Food Programme

Mission Highlights

- The performance of the 2017 rainy summer season (June/October) was favourable in terms of rainfall amount and distribution across the country, with the exception of Kassala, Gedaref and North Darfur states.
- In most irrigated areas, with the exception of Tokar and Gash schemes, water availability was sufficient.
- In comparison with the previous year, the area planted to sorghum and millet decreased across the country by 20 percent and 8 percent, respectively.
- National cereal production in 2017/18 is estimated at 5.2 million tonnes, including 3.7 million tonnes of sorghum and 954 000 tonnes of millet. The estimate includes the wheat production to be harvested in early 2018, which is forecast at 463 000 tonnes. At this level, aggregate cereal production would be around 40 percent below the 2016/17 bumper harvest. Nonetheless, it is still 11 percent above the five-year average.
- The irrigated sector registered major gains in cereals and cash crops productivity, while the yields in the rainfed sector were below average due to low or unevenly-distributed rainfall in some key-producing states.
- Most agricultural inputs were generally available, though prices have increased considerably from the previous year.
- Crop pests and diseases were kept to a minimum with effective MoAF control measures. Fall Armyworm has been detected in Blue Nile, Gedaref, Sennar and Kassala states, where the situation is to be closely monitored and further investigated.
- The shortage of labour was reported in several areas, especially as a consequence of the increased area under the high labour-demanding cotton cultivation.
- As a consequence of high market prices of cotton and sesame, farmers increased the planted area of both crops in 2017 and their production is estimated at above-average levels.
- The favourable rains improved pasture and water availability across the country, with positive effects on livestock body conditions. However, the expansion in farmland and the reduced access to South Sudan due to insecurity are expected to cause overgrazing and increase the competition between farmers and livestock owners in some areas.
- Cereal import requirements, mostly wheat, are forecast at normal levels and are expected to be covered by commercial purchases.
- The prices of millet and sorghum surged in most markets in November 2017, reaching record or near-record levels. The steep increase was driven by a sharp depreciation of the local currency (the Sudanese Pound) in the parallel market.

1. OVERVIEW

Between 17 November and 15 December 2017, assisted by the Food and Agriculture Organization of the United Nations (FAO), the Ministry of Agriculture and Forestry (MoAF) carried out its annual Assessment Mission to determine crop production and the food supply situation throughout the 18 states of the Sudan. The Mission consisted of six core teams comprising members from the MoAF, the Food Security Technical Secretariat (FSTS) of the MoAF, the Ministry of Animal Resources (MoAR), the Humanitarian Aid Commission (HAC), the Strategic Reserve Corporation (SRC), FAO, FEWS NET, WFP and USAID. Prior to departure, the team members attended a preliminary Training Workshop in Khartoum to standardize the methodology to be used in the field and to prepare the teams for the field visits.

The team visits were designed to collect data and information from State ministries, irrigation schemes, enterprises and to audit such data and information through observational transects, field observations, farmer interviews and independent key informant interviews. The combined quantitative and qualitative information, from both primary and secondary sources, allowed the teams to assess the 2017/18 season's cereal (sorghum and millet) and other field crop production and to forecast wheat production to be harvested by March 2018. Returning from the field, the teams prepared summaries of data and information acquired during the visits for discussion and explanation in detailed debriefings before inclusion in the final Mission report. Data were compiled by State, crop and sub-sector (irrigated, rainfed mechanized and rainfed traditional) to give the overall area and production estimates. Using these data, a national cereal balance sheet is drawn up comparing the total cereal requirement for the

coming marketing year (January-December) with domestic cereal availability. The balance sheet gives an indication of whether the country is in surplus or deficit with regard to cereals and hence of its import requirements.

The six Mission teams received the full cooperation of the relevant State authorities. Discussions on the factors affecting crop and livestock conditions were held with the representatives from the relevant line agencies, local government offices, selected credit institutions, United Nations (UN) agencies and Non-Governmental Organizations (NGOs). Field visits were supported by local subject matter specialists from State ministries and irrigation schemes, who also provided the latest information on all aspects of the production within their domains, including the provision of follow-up data, where required. Where possible, the teams cross-checked the official data estimates received by conducting extensive field inspections, rapid case studies with sample farmers and interviews with herders and traders. This year, the civil insecurity was generally less of a constraint to field observation and farmer interviews.

At the national and sub-national level, the latest available information and data were collected concerning rainfall amount and distribution, vegetation cover, crop protection campaigns, cereal reserve stocks, prices of the main crops and livestock. Periodic food security reports were perused and the main socio-economic indicators were provided by the Central Bank of Sudan, the Agricultural Bank of Sudan, the Central Bureau of Statistics and the Strategic Reserve Corporation. Rainfall data was obtained from the Sudan Meteorological Authority and from other sources in the field. Satellite imagery was used to review the evolution of vegetation cover over the course of the year.

The overall performance of the 2017/18 summer cropping season has been above the five-year average, but below the record of 2016/17. The 2017 cumulative main season rainfall between June and August 2017 was average tending to above average over most parts of the Sudan, but had an erratic temporal distribution in some areas. Dry spells occurred during June, July and September in some high-producing regions such as Gedaref and Kassala states. Abundant rainfall in August helped to improve moisture conditions, but also caused severe flooding, water logging of crops and damage to infrastructures.

The incidence of crop pests and diseases was very low, with satisfactory aerial and ground control of the migratory pests such as locusts, grasshoppers and Quelea quelea birds. Fall Armyworm (*Spodoptera frugiperda*), most likely migrated from Ethiopia and Eritrea, has been detected in Sennar, Gedaref, Kassala and Blue Nile states causing some damage especially on maize. The situation needs to be further investigated in preparation of the next season in order to prevent future severe problems.

The major agricultural inputs, such as machinery, seeds and fertilizers, were generally available to farmers, although they were often considered to be quite expensive. The total area, financed by the Agricultural Bank of Sudan, increased by 7 percent compared to last year.

The production of sorghum and millet in 2017/18 is estimated at 3.7 million tonnes and 954 000 tonnes, respectively, below the levels of last year, but still above the five-year average. Wheat production, to be harvested by March 2018, is forecast at about 463 000 tonnes, over 15 percent more than the five-year average. The decrease in cereal production is associated with the decline in the area planted, following farmers' decision to switch to more profitable crops. As a result, production of cash crops (sesame, cotton, sunflowers) is expected to be higher than in the previous year.

Water and pasture availability have been generally good in the areas where seasonal rainfall has been adequate. On the other hand, some regions experienced below-average rainfall and long dry spells that resulted in pasture and water scarcity. Overall, good livestock body conditions have been observed across the country and no major disease outbreaks have been reported.

Using the population projections for mid-2018 by the Central Bureau of Statistics to estimate the food use during the marketing year January-December 2018, the cereal balance sheet provided in this report shows that the country's utilization needs would be covered by the 2017/18 sorghum and millet production, plus high carryover stocks from the previous year. The structural deficit between production and consumption for wheat and rice is expected to be covered by the normal levels of commercial imports.

The prices of locally-produced sorghum and millet in most Sudanese markets have been characterized by a steady upward trend during the last 24 months, essentially due to the high costs of production and transportation,

depreciation of the local currency and the decline in cereal production in the current year. The prices of sorghum and millet reached their records in November in most markets despite the ongoing harvest. In November 2017, prices of sorghum and millet were from 30 to 130 percent higher than their levels of one year before. The high market prices have affected the most vulnerable groups, including the urban poor, which do not have cereal production or additional income to afford food on higher prices.

2. SOCIO-ECONOMIC CONTEXT

2.1 General

Economic conditions in the Sudan remain challenging six years after the secession of South Sudan in 2011, taking with it three-quarters of the country's oil output, the main source of foreign currency and government income. The Government has performed a series of reforms to stabilize the economy, allowing for greater exchange rate flexibility and reducing energy subsidies. However, a difficult external environment, including the limited access to external financing, trade and financial sanctions has continued to constrain the economy. As a result, unsustainable fiscal deficits persist, inflation is high and economic growth remains below potential.

According to the estimates of the Ministry of Finance, the country's GDP in 2017 is forecast at about SDG 958 billion, to which the agricultural sector contributed about 31 percent, the industrial sector about 18 percent and the services sector about 51 percent. In real terms, the GDP grew by 4.4 percent in 2017 compared to the 4.7 percent in 2016.

In 2016, the trade balance recorded a deficit of about USD 4.2 billion (around 5 percent of the country's GDP), slightly below the deficit of USD 5.2 billion (6 percent of the GDP) in 2015. The Sudan's average trade deficits can be attributed to the lack of manufacturing industry and commercial agriculture, which make the country dependent on imports of food, manufactured goods and machinery, while the country remains a net exporter of gold and livestock. The slight improvement of the trade balance in 2016 was essentially due to higher export prices of gold as well as an increase in exports of most agricultural commodities such as sesame, gum arabic, cotton, groundnuts and livestock.

During the first ten months of 2017, the value of the main agricultural exports has increased compared to the same period of 2016. The growth was essentially due to the increase in exports of groundnuts and cotton. In particular, exports of groundnuts increased from 17 000 tonnes to 70 000 tonnes and exports of cotton from 52 500 tonnes to 86 500 tonnes (Table 1). Similarly, exports of sesame increased from 324 000 tonnes in 2016 to 357 000 tonnes in 2017. In the first ten months of 2017, the value of meat and livestock exports increased by 11 percent compared to the corresponding period of 2016, mainly on account of higher meat exports.

During the first ten months of 2017, about 2 million tonnes of wheat were imported, around 7 percent below the level of the same period in 2016 and wheat imports were about 13 percent cheaper due to lower international prices. During the same period, imports of fertilizers declined in quantity (at about 186 000 tonnes) due to high international prices and the depreciation of the national currency, which made imported goods more expensive.

According to the Central Bureau of Statistics, in October 2017, the year-on-year inflation rate was estimated at 33 percent, reaching record levels of about 60 percent in the health sector and 51 percent in transportation. Among the food categories, prices of meat, oils and fat and fruits have increased the most in 2017. The increase of inflation was driven by the sharp depreciation of the SDG against the USD in the parallel market, from SDG 17 in January to SDG 28 in November for USD 1. The United States of America decided to lift the sanction temporarily in January 2017 and, in October 2017, suspended the trade embargo, unfreezing assets and removing the financial penalties permanently. Due to the increasing demand from importers and traders and the limited supplies of foreign currency in the country, the Sudanese Pound plunged against the US Dollar in the parallel market, marking an historic low value of SDG 28 in November. The Central Bank of Sudan has held the official exchange rate at an average of SDG 7 to the USD until the end of 2017. The Government lifted the official exchange rate from SDG 7 to SDG 18 in January 2018.

2.2 Population

The last Population and Housing Census was carried out in 2008. Since then, the Central Bureau of Statistics (CBS) extrapolates the country's population size on the basis of assumed growth rates at States' levels. By mid-

2018, the total population in the country is officially estimated at 42 million. The most populated states are Khartoum (19 percent of the total population), Gezira (12 percent) and South Darfur (9 percent). In addition, UNHCR estimated the total number of refugees and asylum-seekers at about 925 000 as of 31 December 2017.

2.3 Agriculture

The economy of the Sudan is highly dependent on agriculture, which occupies an estimated 80 percent of its labour force and accounts for about 32 percent of its GDP but could contribute significantly more with greater investment and better governance. According to the Ministry of Finance, crop production was responsible for 38 percent of the agricultural GDP in 2016 and livestock for 61 percent, with the remaining 1 percent being from fisheries and forestry.

Its crop portfolio is quite diversified, including cereals (such as sorghum, millet, wheat, rice and maize), oilseeds (mainly sesame, groundnuts and sunflowers), industrial crops (cotton and sugarcane), fodder crops (alfalfa, fodder sorghum and Rhodes grass), pulses (broad beans and pigeon peas) and horticultural crops (okra, onions, tomatoes, citrus, mango, etc.).

Moreover, land in the Sudan is suitable for animal husbandry, with an estimated total livestock population of 107 million heads of cattle, sheep, goats, camels and others.

Crop production in the Sudan is practiced under three main patterns:

1. Irrigated agriculture, which includes:

    - Large national irrigation schemes (Gezira, Suki, New Halfa and Rahad) using river flow from the Nile and its tributaries.
    - Large spate irrigation schemes (Gash and Tokar) using seasonal floods.
    - Small scale irrigation along the banks of the Nile and its tributaries.

2. Semi-mechanized rainfed agriculture.

3. Traditional rainfed agriculture.

Crop production in the rainfed sectors exhibits very wide annual fluctuations as a result of unreliable rainfall amounts and distribution which can result in late sowing, long dry spells, flooding from intense downpours, the necessity to re-sow and, not uncommonly, complete crop failure. The situation in the irrigated sector, however, is much more predictable. Nevertheless, viewed globally, yields are generally low in all sectors for various reasons as well as rainfall. These include, inter alia, a shortage of efficient, well-maintained farm machinery, a shortage of credit and working capital, the use of low yielding crop varieties with scarce availability of improved seeds, inadequate maintenance of irrigation canals, inefficient irrigation pumps and poor agricultural practices such as weed and pest control.

Regarding commercial crops, the Sudan is the third African major producer of sugarcane in Africa, after Egypt and South Africa, with a total planted area of around 82 000 hectares. The country has also become a very significant importer of sugar, especially from India and Thailand. Unlike India and Thailand and other major sugar producers such as Brazil, the Sudan is allowed, as part of the Everything But Arms (EBA) agreement, to export unlimited amounts of its own sugar production to the European Union without paying taxes. The EBA is a component of the European Union's Generalized Scheme of Preferences devised to assist the economies of the Least Developed Countries. The difference between the Sudan's annual domestic sugar requirement and the sum of its production and imports allows the country to export substantial amounts.

Until the 1980s, the Sudan was a major cotton producer, frequently exporting more than 1 million bales (217 kg) per year. Cotton production has declined dramatically since then as a consequence of a greatly reduced area and fewer than 100 000 bales exported annually over the last four years. However, in 2017, the production of cotton shows some signs of recovery. Table 1 shows the amounts and values of the Sudan's main crop exports for the first ten months of 2017 compared to same reference period in 2016.

Table 1: The Sudan - Exports of crop products, 2016 and 2017[1/]

Crop/product	2016		2017	
	Weight (tonnes)	Value ('000 USD)	Weight (tonnes)	Value ('000 USD)
Sesame seeds	323 699	267 602	356 940	267 374
Groundnuts	16 656	14 651	69 883	49 966
Cotton (lint)	52 595	62 352	86 580	109 592
Millet	1 885	333	2 748	574
Hibiscus sepals (karkadé)	13 706	14 512	7 333	8 180
Watermelon seeds	31 439	31 439	38 684	25 043

Source: Ministry of Finance and Economic Planning of the Sudan.
1/ 1 January-31 October.

The livestock sector, with an estimated 107 million heads, accounts for about 61 percent of the Sudan's agricultural GDP. Annual exports of live animals run to approximately 6 million heads, about 5 million of which are sheep. The principal importers from the Sudan are Saudi Arabia and Egypt.

2.3.1 Irrigated agriculture

The area under irrigation in the Sudan is estimated at about 1.68 million hectares (4 million feddans). Of this, large-scale mechanized federal schemes account for about 1.26 million hectares (3 million feddans), including the Gezira Scheme which, at approximately 1 million hectares (2.38 million feddans), is one of the largest irrigation schemes in the world. Because of its more reliable yield expectations, the irrigated sector is the principal user of the country's imported agricultural inputs. Nonetheless, crop yields in the federal irrigated schemes remain low by world standards, largely owing to the poor maintenance and silting up of canals, a shortage of efficient modern pumps and poor agricultural practices.

Irrigation is mainly from the River Nile and its tributaries by means of gravity or pumps, or from spate flow from the seasonal rivers at Gash and Tokar deltas. The principal crops of the irrigated sector include sugarcane, cotton, sorghum, groundnuts, wheat, vegetables, fruits and green fodders. According to the season, the sector takes advantage of the rains, especially during the establishment of summer crops. For example, rain is estimated to provide about 40 percent of the water requirements of crops on the Suki Irrigation Scheme. Rain is especially important for reducing the production costs on privately-owned irrigated small holdings along the banks of the Nile and its tributaries that depend on diesel-powered pumps.

In recent years, several large private enterprises have emerged, producing fodder crops such as alfalfa and Rhodes grass for export, mainly to the Gulf countries. These enterprises are usually highly mechanized, use efficient irrigation systems such as centre pivots and other forms of sprinkler irrigation and generally achieve high yields of good quality fodder.

2.3.2 Semi-mechanized rainfed agriculture

Semi-mechanized rainfed agriculture is so called because mechanization is usually limited to land preparation and seeding. Other field operations, including harvesting, are usually carried out manually, although combined harvesting is becoming less rare. Semi-mechanized rainfed agriculture is practiced in a broad belt of 6.7 million hectares and receives, on average, more than 500 mm of rainfall annually. It runs through Kassala, Gedaref, Blue Nile, Sennar, White Nile and South Kordofan states. This belt is effectively the granary of the country, with sorghum accounting for about 80 percent of the cultivated land and usually producing about 45 percent of the country's requirements. Other crops include sesame, sunflowers, millet and cotton.

Farms in the semi-mechanized sector are frequently very large with some covering 50 000 hectares or more. Given the unpredictable nature of the rainfall and, therefore, the possibility that yields will be very low or even that there may be a complete crop failure, the system may be described as opportunistic. Operations are, therefore, carried out as economically as possible. Standard crop varieties are sown using wide disc seeders with up to 30 discs and no fertilizer is applied. If the rains are favourable, yields of up to 1 tonne/hectare can be achieved, otherwise crops may be sold off as a standing crop to pastoralists for grazing.

2.3.3 Traditional rainfed agriculture

The traditional rainfed sector covers about 9 million hectares and occupies the largest number of farmers. The sector is made up of small family units farming from 2 to 50 hectares for both income and subsistence. On the larger units, there may be a modicum of mechanization in the form of land preparation, but most operations are carried out manually. The traditional sector predominates in the west of the country, in Darfur and in much of Kordofan states, where the main cereal crops are millet and sorghum. Input levels are low and yields are especially vulnerable to unfavourable rainfall. Other important crops in this sector include groundnuts, sesame, hibiscus (karkadé), watermelon and gum arabic.

2.3.4 Livestock

Production of Livestock in the Sudan is conducted primarily as migratory pastoralism. In 2016, the livestock population was estimated to comprise about 30 million cattle, 40 million sheep, 31 million goats and 4.8 million camels. Livestock ownership plays a major role in the rural economy of the Sudan and financial gain is not always its primary objective; numbers of livestock are often considered as being more important than weight gain. With large numbers of livestock converging on pasture which, in a year of poor rainfall, may be very limited, conflict between herders and settled farmers and amongst different groups of herders is not uncommon.

Table 2: The Sudan - Estimates of livestock population, 2016 ('000 heads)

Cattle	30 632
Sheep	40 612
Goats	31 481
Camels	4 830
Total	**107 555**

Source: Ministry of Animal Wealth, Pasture and Fisheries.

Exports of sheep, mainly to Saudi Arabia, are reported at 137 000 heads in the first ten months of 2017. In the same period, about 272 000 goats and 233 000 camels were exported, the latter mainly to Egypt. By comparison, the export numbers for cattle were low at 89 000, but they had been increasing. Compared with live animal exports, meat exports in 2017 were relatively modest at 2 132 tonnes of mutton, 10 076 tonnes of beef and 962 tonnes of goat meat. In 2014, the production of chicken meat and fish landings were estimated at 91 000 and 60 000 tonnes, respectively.

Table 3: The Sudan - Meat exports, 1 January-31 October 2017 ('000 tonnes)

Beef	10 076
Mutton	2 132
Goat meat	962
Camel meat	762

Source: MoAF.

The Sudan exports considerable numbers of animal hides. In the first ten months of 2017, a total of 4 386 tonnes of fresh hides were exported with a value of about USD 4 million (Ministry of Finance).

3. AGRICULTURAL PRODUCTION IN 2017/18

3.1 Main factors affecting cereal production in 2017/18

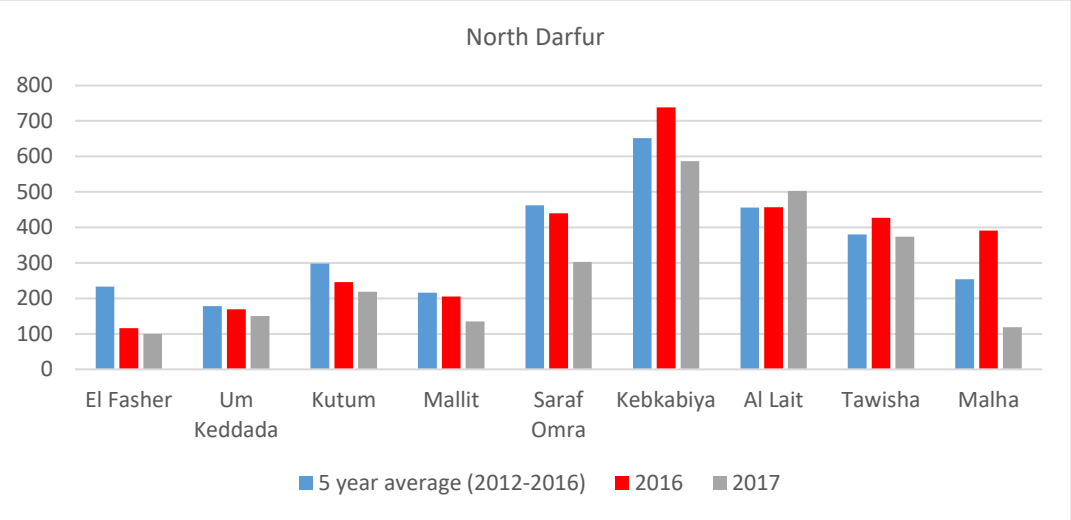
3.1.1 Rainfall

The 2017 cumulative main season rainfall between June and August was average tending to above average over most parts of the country, but had an erratic temporal distribution in some areas (Figure 1). Dry spells occurred during June and July in some high-producing regions, with significant rainfall in August helping to improve conditions, but also causing severe flooding, water logging of crops and damage to property.

In Kassala State, precipitations started early (in May) but long dry spells in June, July and August severely affected most of the rainfed areas. In Gedaref, the rainy season has been shorter than normal and about 62 percent of the weather stations recorded fewer cumulative rainfall compared to the previous season. In the northern areas of the State, the delay and irregularity of precipitations caused serious problems to crops and created poor conditions for natural pastures. Also in North Darfur, almost every rainfall monitoring station recorded lower total rains this year compared to previous seasons. A slow start of the rains and long dry spells during July forced many farmers to replant and reduced the growing season. Moreover, heavy floods of seasonal rivers uprooted fruit trees, caused erosion of fertile soils and damaged shallow wells.

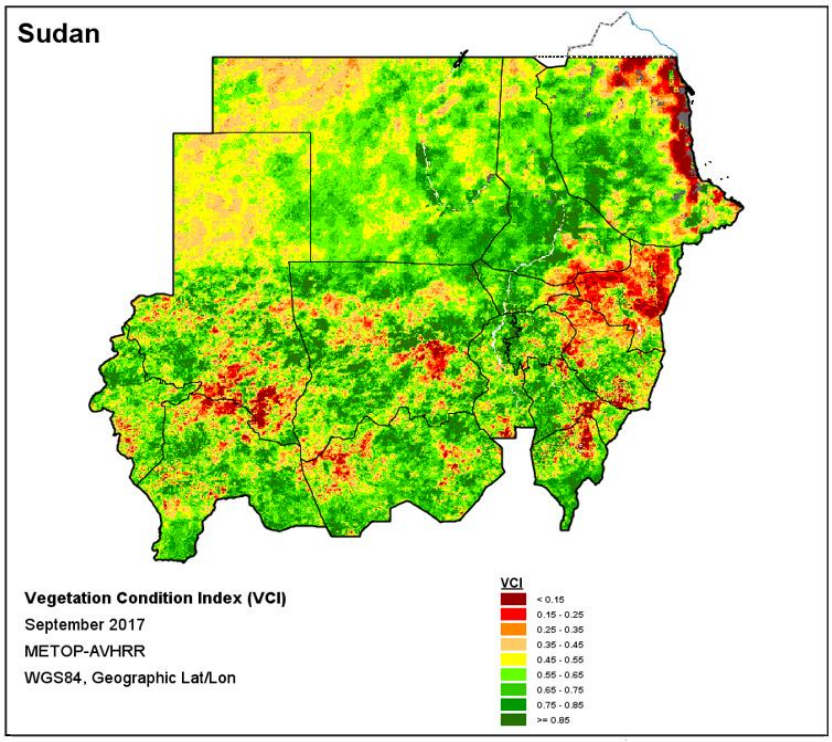
The Vegetation Condition Index (VCI)[1], suggests that the situation in September remained much poorer than normal in Kassala, northern Gedaref and parts of North Darfur states (Figure 2).

Figure 1: The Sudan - Total cumulative rainfall (mm) recorded in nine localities of North Darfur



[1] The VCI compares the current NDVI to the range of values observed in the same period in previous years. The VCI is expressed in percentage and gives an idea where the observed value is situated between the extreme values (minimum and maximum) in the previous years. Lower and higher values indicate bad and good vegetation state conditions, respectively.

Figure 2: The Sudan - VCI, September 2017



In Central, East Darfur and White Nile states, despite reduced amounts, the rainfall's temporal and spatial distribution has been better compared to the previous year. Some localized dry spells did not undermine agricultural production. In South and West Darfur states, excluding some limited areas that experienced dryness and required replanting, rains were very favourable for crops, pastures and drinking water. In North and West Kordofan states, rains started earlier than usual with average to above average total precipitations. Despite some dry spells in July and an early cessation of seasonal rains in September, the situation has been very good.

In South Kordofan and Sennar states, rainfall this year has been favourable for the crops in terms of quantity, distribution and duration. In Blue Nile State, weather conditions have been better than last year, but some floods as well as dry spells in the eastern parts of the State created problems in specific areas. In Gezira and Khartoum states, inadequate quantities and early stoppage of the rains have negatively affected rainfed crops.

In the irrigated schemes, the situation this year has been generally favourable. However, the Tokar and Gash schemes did not receive sufficient irrigation water and consequently the area planted was below the planned level. In Rahad Scheme, some maintenance work must be carried out and pumps need to be replaced. In Gezira Scheme, as irrigation water is adequately available, the lack of rains in July has been actually beneficial for farmers, allowing them to conduct agricultural operations without interruptions.

3.1.2 Agricultural finance and credit

The provision of short-term agricultural credit through the Agricultural Bank of Sudan (ABS) is a regular operation procedure in both the irrigated and the rainfed sectors, but most particularly in the entrepreneurial semi-mechanized rainfed sector. Loans for cereal production are usually accessed by entrepreneurs who have strong business connections with the ABS and other banks, while most farmers in the traditional sector are either unable to raise the collateral required to obtain a loan or are not prepared to take one. Farmers with poor repayment histories, those without sufficient collateral and loan defaulters from the previous year are excluded by the banks. However, micro credit is generally available for small traditional farmers through livelihood support programmes, particularly in Darfur Region. In other states, short-term seasonal loans to eligible farmers are made through the interest-free *salam* system. Under *salam*, bank charges are levied in kind, at a value fixed jointly at planting time by the Ministry of Finance, the SRC, the ABS and Farmers' Associations.

Table 4: The Sudan - Finance to agriculture by the ABS and number of beneficiaries, 2017

State/Scheme	Total (SDG millions)	Beneficiaries
Eastern	1 021	18 032
Sennar and Blue Nile	499	3 773
White Nile	154	963
North Kordofan	46	2 314
South Kordofan	96	2 393
Gezira	266	10 277
Darfur	22	268
Northern	27	143
River Nile	20	166
Khartoum	3	9
Main Branch	164	14
Red Sea	-	-
Total	**2 316**	**38 352**

Table 5: The Sudan - Area financed for summer cropping, 2016 and 2017

	Area ('000 hectares)	
	2016	**2017**
Semi-mechanized rainfed sector	1 970	2 478
Traditional rainfed sector	62	56
Irrigated sector	91	76
Cotton	n.a.	37
Horticulture	12	10
Other	508	172
Total	**2 642**	**2 829**

Source: Ministry of Finance.

3.1.3 Agricultural inputs

Seeds, fertilizers, herbicides, labour and agricultural machinery are the major inputs required by farmers and their costs have generally increased during the last year. The majority of the farmers use the seeds retained from their previous year's crop or purchased locally from the market. The purity of the seeds may sometimes be low and the productivity of the traditional varieties is decreasing every year.

Improved seeds are used mostly on the irrigation schemes where yields are more reliable, but also by some farmers in the semi-mechanized rainfed sector, while its adoption in the traditional rainfed sector remains negligible.

Moreover, hybrid sorghum seeds are not always available and its costs are high. In River Nile, East Darfur and South Darfur states, some farmers interviewed by the Mission teams lamented delays in seeds availability that eventually forced them to use the retained ones. In Kassala State, many farmers ran out of seeds as they had to replant several times because of the protracted June-July dry spell.

In New Halfa Scheme, a shortage of wheat seeds has been reported as only 25 percent of the total amount required was available at the time of the Mission.

The cost of fertilizers has generally increased. In Suki Scheme, urea now sells for SDG 360 per 50 kg bag, a 40 percent increase from SDG 255 of last year and Diammonium phosphate, which is used mostly on wheat and cotton, sells for SDG 485 per bag (compared to SDG 320 per bag last year). Empty sacks for sorghum cost about SDG 30-35, the same price as last year, while sacks for cotton doubled their price and cost now SDG 89.

The cost of farm labour has risen in most parts of the country over the last year. In Gedaref State, the increased area under the high labour-demanding cotton cultivation, resulted in workforce shortage and higher wages. In Northern and River Nile states, the traditional gold mining sector employs most of the local workers.

In Suki Scheme, the average cost for weeding is SDG 40-50 per person for four working hours and about SDG 500 per feddan. Cutting and collection of sorghum heads and cutting of stacks is about SDG 1 200-1 500 per feddan, while threshing costs SDG 15 per bag. In Gedaref State, the average cost for sorghum harvesting is SDG 50 per sack plus food for the workers.

In Khartoum, labour was available and the cost was stable this year, like in Kassala State where the poor harvest increased workers availability. Also in White Nile, the presence of refugees from South Sudan has assured labour availability at stable costs (but increased demand on sorghum).

An increased cost of production has been reported particularly in White Nile and South Kordofan states. In West Kordofan State, Mission-interviewed farmers claimed a 30 percent rise compared to last year mainly because of higher costs of inputs and labour.

With about a 65 percent increase in irrigation water costs and scheme management fees compared to last year, the cost of production of cotton in Rahad and New Halfa stands this year at around SDG 5 400 per feddan with a gross return of about SDG 12 000.

Low yields and poor pasture conditions in rainfed areas, caused by unfavourable precipitations, have led some farmers to sell their standing crops for grazing animals. In Kassala State, the return from groundnut crops residues this season was around SDG 1 000 per feddan.

In Red Sea, Gedaref, Kassala and South Darfur states, the Mission teams reported the lack and malfunctioning of agricultural machinery for various agricultural practices.

This year, MoAF provided a total of about 4 900 tonnes of seeds (Table 6) and allocated a number of farm machinery to the different states (Table 7). Various NGOs, including FAO (Table 8), also distributed agricultural inputs.

Table 6: The Sudan - Quantities of seeds distributed by MoAF, 2017 (tonnes)

State/Scheme	Sorghum	Millet	Sesame	Groundnuts	Sunflowers	Beans	Cotton	Total
N. Darfur	255	20	15	34				**324**
S. Darfur	240	13	15	35				**303**
C. Darfur	235	30	8	31				**304**
E. Darfur	240	30	8	23				**301**
W. Darfur	213	40	8	43				**304**
N. Kordofan	242	11	23	50		5		**331**
S. Kordofan	277	15	23	27	2			**343**
W. Kordofan	263	31	15	58				**367**
White Nile	261	7	10	20	1			**298**
Blue Nile	317		10		2	5		**333**
Sennar	253	1	10		2	5	40	**310**
Gezira	285	5	3		1			**294**
Gedaref	191		20	15	2	5	40	**273**
Kassala	247		13		1			**261**
Red Sea	186							**186**
River Nile	125							**125**
Khartoum	63							**63**
Abyei	61	5	4	14				**84**
Integr Sol Prog	62			25	18			**105**
Total	**4 013**	**207**	**185**	**375**	**26**	**20**	**80**	**4 906**

Source: MoAF.

Table 7: The Sudan - Farm machinery distributed by MoAF, 2017/18

State/Scheme	Quantity
Northern states, River Nile	34
Kordofan	123
Gezira, Sennar, Blue Nile, White Nile	100
Gedaref, Kassala, Red Sea	64
Khartoum	38
C. Darfur, W. Darfur	67
N. Darfur, S. Darfur, E. Darfur	129
Total	**555**

Source: MoAF.

Table 8: The Sudan - Agricultural inputs and livestock provided by FAO, 2017

Item	Unit	Quantity
Crop seeds	tonnes	593
Vegetable seeds	kg	7 955
Seedlings	each	14 500
Hand tools	each	62 727
Livestock concentrates and licks	tonnes	1 964
Vaccines	dose	3 195 111
Live animals	head	6 565

Source: FAO, Khartoum.

3.1.4 Crop pests and diseases

In the 2017/18 cropping season, crop health has been generally good, with no significant damage over the vast majority of the areas of the country. This is mainly due to the efforts of the Central Crop Protection Administration and the strong connection with the State ministries of Agriculture. All controlling measures and products were available in due time and actions have been taken at early stages. However, in some states, local authorities were concerned about indiscriminate uses of chemical pesticides. Table 9 shows the areas affected by pests and the level of control achieved.

Successful treatments have been used during the summer to control the Desert Locusts at breeding stage and the Sorghum Midge (*Contarinia sorghicola*) during the hibernation period to prevent migrations and major problems to crops. At the same time, birds' attacks have been continuously monitored and successfully contained thanks to aerial spraying all over the country. Some damage to crops was caused by grasshoppers in Kassala State at the beginning of the summer season and by thrips in Rahad Scheme where 50 percent of the cotton area was affected.

Fall Armyworm (*Spodoptera frugiperda*), probably migrating from Ethiopia and Eritrea, has been detected in Sennar, Gedaref and Kassala states causing moderate damage, especially in Blue Nile State where it completely destroyed about 500 hectares of maize and affected 100 000 hectares of sorghum, about 4 percent of the total area. The attack did not have serious consequences on sorghum and this possible resistance could represent a case study to improve the knowledge on its biology. The situation needs to be further investigated and closely monitored in preparation of the next season to prevent future severe damages.

Table 9: The Sudan - Crop pests and control during summer cropping season (until end-October 2017)

Pest	Area surveyed (hectares)	Area affected (hectares)	Area treated (hectares)	Control (percent)
Weaver Birds (Quelea quelea)	123 420	53 500	53 500	97
Other Birds	286 334	264 334	22 334	-
Rats	857 420	726 929	676 754	95
Desert Locusts	325 305	26 700	175	100
Tree Locusts	154 480	43 850	35 801	85
Grasshoppers	354 821	140 323	95 318	85
Sorghum Bugs	615 292	276 870	278 160	97
Fruit Flies	-	-	8 922	-
Watermelon Bugs	53 310	8 765	3 163	-
Migrating African Locusts	8 985	2 683	1 600	75
Other Locusts	46 872	5 073	3 812	-
Sesame Bugs	-	-	3 483	-

Source: MoAF.

Weeds are a perennial problem for the crops in the Sudan, complicated by the fact that very little herbicide is used. Weeding is practiced manually in the traditional smallholder farming sector, while herbicides and inter-row cultivations (tractor mounted) are used to some extent in the semi-mechanized and irrigated sectors. The increased invasion by Striga and Sudangrass has been reported in much of the semi-mechanized rainfed sector. Striga caused some noticeable damage to millet cultivation in West Kordofan triggering production drops.

3.1.5 Area planted and harvested in 2017/18

This year, a decrease of 20 percent over last year in the area planted to sorghum, from 11.4 to 9.1 million hectares, has been recorded. The decrease has been mostly in the traditional rainfed sector where a 28 percent reduction has been registered, while in the mechanized rainfed and the irrigated sectors, a 15 and 26 percent decline, respectively, has been observed.

The reasons for this decrease are different. In Blue Nile, Gezira Scheme, Rahad, New Halfa, Sennar and Northern states, the expectation that sorghum prices would decline after the production record of last year encouraged many farmers to opt for other crops with more attractive prices, mainly sesame and cotton, but also millet and vegetables.

In River Nile, Khartoum, Gedaref, Gezira and South Darfur states, the reduced area planted has been a consequence of a delayed start of seasonal rainfall. In White Nile State, farmers opted for shorter cycle crops such as watermelon and karkadé, while in Kassala and North Kordofan states, they replanted several times with no success. In Gash and Tokar schemes, seasonal river floods were late and low limiting the use of spate irrigation, with a consequent decline in total cultivated area.

By contrast, the area planted with sorghum increased in Sennar, West Kordofan and Red Sea states due to favourable rainfall, while in South Kordofan and West Darfur states, a local improvement in civil security was also a key factor.

The total area harvested in 2017 is 6.3 million hectares, 33 percent less than last year (9.4 million), but still 6 percent above the 2011-2016 five-year average (Table 10). It is about 69 percent of the total area planted, while last year it was 82 percent. This is due mostly to the poor rains in the semi-mechanized rainfed sector, where 34 percent was not harvested.

Table 10: The Sudan - Cereal area harvested by State/Scheme and sector ('000 hectares)

State/Scheme	Sorghum					Millet					Wheat				
	5-yr av. 2011/12-2015/16	2016/17	2017/18	2017/18 as % 2016/17	2017/18 as % 5-yr average	5-yr av. 2011/12-2015/16	2016/17	2017/18	2017/18 as % 2016/17	2017/18 as % 5-yr average	5-yr av. 2011/12-2015/16	2016/17	2017/18	2017/18 as % 2016/17	2017/18 as % 5-yr average
Irrigated															
Northern	2	2	1	75	63						36	31	42	135	117
River Nile	16	6	4	64	24						17	15	15	100	88
Khartoum											1	1			
Gezira	178	152	117	77	66						92	168	82	49	89
Suki	13	13	11	87	87										
Sennar	27	26	19	74	70										
White Nile	47	41	43	105	91						18	13	15	115	83
Blue Nile											44				
Rahad	35	36	22	61	62							1			
New Halfa	32	34	23	67	72						14	21	16	76	114
Gash	27	29	15	51	56										
Kassala		3	1	38											
Tokar	9	10	2	17	19	6	6	3	50	50					
N. Kordofan	2	3	2	63	105										
Total	**388**	**355**	**260**	**73**	**67**	**6**	**6**	**3**	**50**	**50**	**222**	**250**	**170**	**68**	**77**
Semi-Mechanized															
Sennar	619	743	744	100	120	76	113	149	131	196					
White Nile	318	622	421	68	132	27	54	16	30	61					
Blue Nile	308	547	291	53	95	24	42	46	110	191					
Gedaref	1 624	2 605	1 376	53	85	77	88	97	111	127					
Kassala	254	605	126	21	50										
N. Kordofan	9	23	17	74	187										
W. Kordofan	4	98	142	145	3549										
S. Kordofan	321	419	578	138	180	10	8	7							
Total	**3 457**	**5 662**	**3 695**	**65**	**107**	**214**	**305**	**315**							
Traditional Rainfed															
River Nile	27	24	19	79	70										
Khartoum	42	55	4	7	10										
Gezira	214	381	98	26	46	3	3	4	133	133					
Sennar	134	211				14									
White Nile	122	165	189	115	155	17	25	17	68	100					
Blue Nile	45	84				9									
Kassala	61	134	17	13	28		4	16	400						
Red Sea	12	3	9	357	75	5	18	8	44	160					
N. Kordofan	193	389	263	68	136	427	610	527	86	123					
W. Kordofan	226	81	116	143	51	352	480	469	98	133					
S. Kordofan	247	126	194	153	79	57	34	26	76	46					
N. Darfur	82	74	84	114	102	283	202	147	73	52					
W. Darfur	168	256	143	56	85	225	459	308	67	137	4	2	1	50	25
S. Darfur	329	612	429	70	130	420	389	378	97	90	4	2	2	100	50
Central Darfur	102	142	108	76	106	109	321	231	72	212					
E. Darfur	114	670	670	100	588	123	168	171	102	139					
Total	**2 118**	**3 407**	**2 343**	**69**	**111**	**2 044**	**2 713**	**2 302**	**85**	**113**	**8**	**4**	**3**	**75**	**38**
Grand total	**5 963**	**9 424**	**6 298**	**67**	**106**	**2 264**	**3 024**	**2 620**	**87**	**116**	**230**	**254**	**173**	**68**	**75**

The area planted to millet in 2017 is 3.8 million hectares, 8 percent less than the 4.1 million hectares of last year. In Tokar, the only irrigation scheme to grow millet, a reduction in area of 23 percent was registered and the whole traditional rainfed sector, where millet is normally grown, scored a 10 percent decline. In the mechanized rainfed sector, the area planted to millet was 17 percent higher (Sennar, Gedaref, Blue Nile) as a consequence of the higher prices expected and the better tolerance of millet to drought.

At the national level, the proportion of harvested area to planted area is 69 percent (4 percent below last year). The area harvested in 2017 (Table 10) is 2.6 million hectares, 13 percent less than last year but 16 percent higher than the 2011-2016 five-year average.

Although planting of the 2017/18 wheat crop had just started at the time of the Mission, the total planted area was anticipated at about 173 000 hectares, compared to 254 000 hectares last year and an average of 230 000 hectares over the last five years. The significant decline is mainly due to the fact that farmers in Gezira Scheme are switching to more profitable winter crops like chickpeas and pigeon peas.

3.1.6 Crop yields

The average sorghum yield is estimated at 0.59 tonnes per hectare, 13 percent less than the yield obtained in 2016, but similar to the last five-year average. The greatest decrease was observed in the semi-mechanized rainfed sector where the average yield of 0.54 tonnes/hectare was 21 percent below that of 2016 but 8 percent above the average of the last five years. However, the irrigated sector is reported at 2.3 tonnes/hectare, almost 20 percent more than last year (Table 11).

Table 11: The Sudan - Cereal yields by State/Scheme and sector (tonnes/hectares)

	Sorghum					Millet					Wheat				
State/Scheme	**5-yr av. 2011/12-2015/16**	**2016/17**	**2017/18**	**2017/18 as % 2016/17**	**2017/18 as % 5-yr average**	**5-yr av. 2011/12-2015/16**	**2016/17**	**2017/18**	**2017/18 as % 2016/17**	**2017/18 as % 5-yr average**	**5-yr av. 2011/12-2015/16**	**2016/17**	**2017/18**	**2017/18 as % 2016/17**	**2017/18 as % 5-yr average**
Irrigated															
Northern	2.50	1.79	1.59	89	63						2.14	2.84	3.43	121	160
River Nile	2.19	1.87	1.85	99	85						2.00	2.67	2.33	87	117
Khartoum															
Gezira	1.85	1.91	2.62	137	142						1.96	2.14	2.61	122	133
Suki	1.92	2.61	2.38	91	124										
Sennar	1.74	1.68	1.80	107	103							1.33			
White Nile	2.11	1.99	1.89	95	90						1.72		1.87		108
Blue Nile															
Rahad	2.03	2.02	2.24	111	111							2.00			
New Halfa	2.06	2.35	2.47	105	120						1.93	1.81	2.38	131	123
Gash	2.15	1.94	1.79	92	83										
Kassala		1.79	1.59	89											
Tokar	1.22	1.69	1.19	71	97	1.00	1.17	1.00	86	100					
N. Kordofan	0.50	0.30	0.48	160	95										
Total	**1.93**	**1.96**	**2.29**	117	**119**	**1.00**	**1.17**	**1.00**	**86**	**100**	**1.77**	**2.11**	**2.70**	**128**	**152**
Semi-Mechanized															
Sennar	0.55	0.71	0.75	105	135										
White Nile	0.40	0.56	0.51	92	130										
Blue Nile	0.53	0.76	0.54	71	103										
Gedaref	0.52	0.77	0.49	64	95										
Kassala	0.54	0.54	0.30	56	56										
N Kordofan	0.33	0.57	0.48	83	143										
W. Kordofan	0.50	0.25	0.28	115	56										
S. Kordofan	0.37	0.52	0.52	102	143										
Total	**0.50**	**0.68**	**0.54**	79	**108**										
Traditional Rainfed															
River Nile	1.00	0.96	0.53	55	53										
Khartoum	0.48	0.22	1.25	569	263										
Gezira	0.41	0.60	0.30	50	72										
Sennar	0.47	0.66													
White Nile	0.45	0.39	0.22	56	48		0.24	0.41	172						
Blue Nile	0.49	0.66													
Kassala	0.51	0.60	0.47	79	93		2.00	0.13	6						
Red Sea	0.42	1.19	0.44	37	107		0.06	0.38	675						
N. Kordofan	0.28	0.30	0.25	84	90										
W. Kordofan	0.34	0.53	0.43	81	128		0.33	0.28	84						
S. Kordofan	0.56	0.67	0.68	101	122		0.26	0.27	102						
N. Darfur	0.37	0.72	0.19	26	52		1.38	0.31	22						
W. Darfur	0.77	0.95	1.29	136	168	0.75	0.58	0.76	131	101	1.25	1.50	2.00	133	160
S. Darfur	0.44	0.71	0.75	105	171	0.31	0.79	0.19	24	59	1.25	1.00	1.00	100	80
Central Darfur	0.94	0.91	1.19	130	126										
E. Darfur	0.33	0.24	0.24	99	71	0.28	0.14	0.13	94	49					
Total	**0.48**	**0.55**	**0.49**	**90**	**103**	**0.33**	**0.49**	**0.35**	**72**	**106**	**1.25**	**1.25**	**1.33**	**107**	**107**
Grand total	**0.59**	**0.68**	**0.59**	**87**	**101**	**0.34**	**0.48**	**0.36**	**76**	**107**	**1.76**	**2.22**	**2.68**	**121**	**152**

The average millet yield is estimated at 0.36 tonnes/hectare, 24 percent below that of 2016/17, but 7 percent above the average of the last five years. The greatest decrease in the traditional rainfed sector was registered in Kassala State, with declines also in North and South Darfur states. Above-average yields have been reported in West Darfur State. In Tokar Scheme, the only Scheme producing millet under irrigation, the average yield is estimated at 1 tonne/hectare, 14 percent lower than last year.

The wheat crops, apart from the small rainfed area on the Jebel Marra in South and Central Darfur states, are grown under irrigation and there is usually very little fluctuation in annual average yields.

3.2 Cereal production forecast

Following the decreases in harvested area and yield, the production of sorghum and millet in 2017 is expected to be below the record levels of last year. Sorghum production is estimated at 3.743 million tonnes, almost 40 percent below the level of the previous year, but still 7 percent higher than the five-year average. Millet production is estimated at about 954 000 tonnes, 35 percent below the record production of last year, but exceeding the 20 percent average of the last five years (Table 12).

Table 12: The Sudan - Cereal production by State/Scheme and sector ('000 tonnes)

State/Scheme	Sorghum					Millet					Wheat				
	5-yr av. 2011/12-2015/16	2016/17	2017/18	2017/18 as % 2016/17	2017/18 as % 5-yr average	5-yr av. 2011/12-2015/16	2016/17	2017/18	2017/18 as % 2016/17	2017/18 as % 5-yr average	5-yr av. 2011/12-2015/16	2016/17	2017/18	2017/18 as % 2016/17	2017/18 as % 5-yr average
Irrigated															
Northern	5	3	2	67	40						77	88	144	164	187
River Nile	35	11	7	64	20						34	40	35	88	103
Khartoum											1	2			
Gezira	329	290	306	106	93						180	360	214	59	119
Suki	25	34	27	79	108										
Sennar	47	43	34	79	72							4			
White Nile	99	81	81	100	82						31	24	28		90
Blue Nile											44				
Rahad	71	72	49	68	69							2			
New Halfa	66	81	57	70	86						27	38	38	100	141
Gash	58	57	27	47	47										
Kassala		6	2	33											
Tokar	11	17	2	12	18	6	7	3	43	50					
N. Kordofan	1	1	1	100	100										
Total	**747**	**696**	**595**	**85**	**80**	**6**	**7**	**3**	**43**	**50**	**394**	**558**	**459**	**82**	**116**
Semi-Mechanized															
Sennar	343	531	558	105	163	31	55	80	145	258					
White Nile	126	347	216	62	171	10	19	8	42	80					
Blue Nile	162	415	157	38	97	10	12	21	175	210					
Gedaref	840	2 005	675	34	80	28	33	27	82	96					
Kassala	137	324	38	12	28										
N. Kordofan	3	13	8	62	267										
W. Kordofan	2	24	40	167	2000										
S. Kordofan	118	216	303	140	257	4	3	2	67	50					
Total	**1 731**	**3 875**	**1 995**	**51**	**115**	**83**	**122**	**138**	**113**	**166**					
Traditional Rainfed															
River Nile	27	23	10	43	37										
Khartoum	20	12	5	42	25										
Gezira	88	227	29	13	33	0	1	1	100						
Sennar	63	139				6									
White Nile	55	64	41	64	75	7	6	7	117	100					
Blue Nile	22	56				4									
Kassala	31	80	8	10	26	0	8	2	25						
Red Sea	5	3	4	133	80	2	1	3	300	150					
N. Kordofan	54	116	66	57	122	62	160	122	76	197					
W. Kordofan	76	43	50	116	66	93	160	131	82	141					
S. Kordofan	138	85	132	155	96	23	9	7	78	30					
N. Darfur	30	53	16	30	53	66	278	45	16	68					
W. Darfur	129	243	184	76	143	169	267	234	88	138	5	3	2	67	40
S. Darfur	144	437	322	74	224	131	306	70	23	53	5	2	2	100	40
Central Darfur	96	130	128	98	133	83	108	168	156	202					
E. Darfur	38	159	158	99	416	34	24	23	96	68					
Total	**1 016**	**1 870**	**1 153**	**62**	**113**	**680**	**1 328**	**813**	**61**	**120**	**10**	**5**	**4**	**80**	**40**
Grand total	**3 494**	**6 441**	**3 743**	**58**	**107**	**769**	**1 457**	**954**	**65**	**124**	**404**	**563**	**463**	**82**	**115**

Table 13: The Sudan - Cereal production by sector ('000 tonnes)

	Sorghum			Millet			Wheat		
	5-yr av[1]	2016/17	2017/18 (forecast)	5-yr av[1]	2016/17	2017/18 (forecast)	5-yr av[1]	2016/17	2017/18 (forecast)
Irrigated	747	696	595	6	7	3	394	558	459
Semi-Mechanized Rainfed	1 731	3 875	1 995	83	122	138			
Traditional Rainfed	1 016	1 870	1 153	680	1328	813	10	5	4
Total	**3 494**	**6 441**	**3 743**	**769**	**1457**	**954**	**404**	**563**	**463**

1/ 2011/12-2015/16 average.

Table 14: The Sudan - Sorghum production by sector

	5-yr av[1]			2016/17			2017/18		
	Area (000 ha)	Prod (000 t)	Yield (t/ha)	Area (000 ha)	Prod (000 t)	Yield (t/ha)	Area (000 ha)	Prod (000 t)	Yield (t/ha)
Irrigated	388	747	1.93	355	696	1.96	260	595	2.29
Semi-Mechanized Rainfed	3 457	1 731	0.50	5 662	3 875	0.68	3 695	1 995	0.54
Traditional Rainfed	2 118	1 016	0.48	3 407	1 870	0.55	2 343	1 153	0.49
Total	**5 964**	**3 496**	**0.59**	**9 424**	**6 441**	**0.68**	**6 298**	**3 743**	**0.59**

1/ 2011/12-2015/16 average.

Table 15: The Sudan - Millet production by sector

	5-yr av[1]			2016/17			2017/18		
	Area (000 ha)	Prod (000 t)	Yield (t/ha)	Area (000 ha)	Prod (000 t)	Yield (t/ha)	Area (000 ha)	Prod (000 t)	Yield (t/ha)
Irrigated	6	6	1.00	6	7	1.17	3	3	1.00
Semi-Mechanized Rainfed	214	83		305	122		315	138	
Traditional Rainfed	2 044	680	0.35	2 713	1 328	0.49	2 302	813	0.35
Total	**2 264**	**769**	**0.36**	**3 024**	**1 457**	**0.48**	**2 620**	**954**	**0.36**

1/ 2011/12-2015/16 average.

Table 16: The Sudan - Wheat production by sector

	5-yr av[1]			2016/17			2017/18 (forecast)		
	Area (000 ha)	Prod (000 t)	Yield (t/ha)	Area (000 ha)	Prod (000 t)	Yield (t/ha)	Area (000 ha)	Prod (000 t)	Yield (t/ha)
Irrigated	222	394	1.77	250	558	2.11	170	459	2.70
Semi-Mechanized Rainfed									
Traditional Rainfed	8	10	1.25	4	5	1.25	3	4	1.33
Total	**230**	**404**	**1.76**	**254**	**563**	**2.22**	**173**	**463**	**2.68**

1/ 2011/12-2015/16 average.

3.3 Other crops

3.3.1 Sesame

Production of sesame is estimated at 861 000 tonnes, 64 percent higher than last year. This is mainly due to a 26 percent increase in harvestable area with an average yield of 0.32 tonnes/hectare, 31 percent higher than last year (Table 17).

Table 17: The Sudan - Sesame production, 2016/17 and 2017/18

State/Scheme	2016/17				2017/18			
	Planted ('000 ha)	Harvested ('000 ha)	Production ('000 t)	Yields (t/ha)	Planted ('000 ha)	Harvested ('000 ha)	Production ('000 t)	Yields (t/ha)
Mechanized Rainfed								
Sennar	317	277	89	0.32	484	462	248	0.54
White Nile	128	106	33	0.31	231	179	58	0.32
Blue Nile								
Gedaref	258	216	77	0.36	381	316	94	0.30
Kassala	84	50	16	0.32	13	11	2	0.19
N. Kordofan								
S. Kordofan	130	91	21	0.23	251	219	70	0.32
Total	**917**	**741**	**236**	**0.32**	**1 359**	**1 187**	**472**	**0.40**
Traditional Rainfed								
Gezira	8	4	1	0.24	11	5	1	0.18
Sennar								
White Nile	104	87	21	0.24	112	88	22	0.25
Blue Nile	127	99	34	0.34	252	230	115	0.50
Kassala								
N. Kordofan	992	694	104	0.15	933	658	91	0.14
W. Kordofan	137	105	13	0.12	150	106	16	0.15
S. Kordofan	118	82	19	0.23	118	135	45	0.33
N. Darfur	63	32	8	0.25	63	36	4	0.11
W. Darfur	144	81	35	0.43	99	81	23	0.28
S. Darfur	105	122	26	0.21	91	88	28	0.32
Central Darfur	21	69	25	0.36	21	49	41	0.84
E. Darfur	71	19	3	0.16	51	19	3	0.16
Total	**1 890**	**1 394**	**289**	**0.21**	**1 902**	**1 495**	**389**	**0.26**
Grand Total	**2 808**	**2 135**	**525**	**0.25**	**3 261**	**2 681**	**861**	**0.32**

3.3.2 Groundnuts

The production of groundnuts in the traditional rainfed sector was 15 percent below the level of 2017, with decreases in the area harvested (5 percent) and yield (11 percent). By contrast, production increased by 8 percent in the irrigated sector as a result of a 3 percent increase in area planted and a slightly higher yield.

Overall groundnut production is estimated at 1.60 million tonnes (Table 18), 15 percent below the 2016 output which received favourable rainfall. The average yield this year was 0.72 tonnes/hectare, slightly lower than that of last year (0.79 tonnes/hectare).

Table 18: The Sudan - Groundnut production, 2016/17 and 2017/18

State/Scheme	2016/17				2017/18			
	Planted ('000 ha)	Area ('000 ha)	Production ('000 t)	Yields (t/ha)	Planted ('000 ha)	Area ('000 ha)	Production ('000 t)	Yields (t/ha)
Irrigated								
Gezira	79	71	137	1.92	83	78	156	2.00
Sennar	1	1	1	1.19				
Rahad	13	13	31	2.46	16	14	37	2.67
New Halfa	24	23	73	3.16	22	21	69	3.22
Total	**117**	**108**	**242**	**2.24**	**121**	**113**	**262**	**2.31**
Rainfed								
Gezira								
White Nile	32	31	25	0.80	34	25	9	0.36
Blue Nile					3	3	1	0.33
Gedaref	12	11	5	0.48	11	10	5	0.50
N. Kordofan	77	61	22	0.36	72	61	21	0.34
S. Kordofan	78	47	29	0.62	57	51	38	0.74
W. Kordofan	689	448	288	0.64	799	621	359	0.58
N. Darfur	231	126	46	0.37	231	210	68	0.32
S. Darfur	756	643	482	0.75	496	440	330	0.75
W. Darfur	290	263	305	1.16	145	125	141	1.13
Darfur Central	113	110	98	0.89	93	88	84	0.95
Darfur Eastern	541	468	284	0.61	520	468	286	0.61
Total	**2 819**	**2 207**	**1 584**	**0.72**	**2 460**	**2 103**	**1 342**	**0.64**
Grand Total	**2 935**	**2 315**	**1 826**	**0.79**	**2 580**	**2 216**	**1 604**	**0.72**

3.3.3 Sunflowers

Sunflowers are grown both under irrigated and rainfed conditions in the semi-mechanized rainfed sector. There was an increase in the irrigated area this year and the average yield is estimated at 1.41 tonnes/hectare, slightly below last year's level (Table 19). In the semi-mechanized rainfed sector there was a significant increase in the area harvested from 122 000 hectares in 2016 to 202 000 hectares this year. Yield in this sector was also up from 0.71 tonnes/hectare to 0.76 tonnes/hectare. In the irrigated and the semi-mechanized sectors there was an increase in production from 87 000 to 153 000 tonnes.

Table 19: The Sudan - Sunflower production, 2016/17 and 2017/18

State/Scheme	2016/17				2017/18			
	Planted ('000 ha)	Area ('000 ha)	Production ('000 t)	Yields (t/ha)	Planted ('000 ha)	Area ('000 ha)	Production ('000 t)	Yields (t/ha)
Irrigated								
Suki					2	2	2	1.19
Rahad	2	1	2	1.59	4	3	5	1.49
New Halfa					4	4	6	1.43
Total	**2**	**1**	**2**	**1.59**	**10**	**9**	**13**	**1.41**
Rainfed								
Blue Nile	84	71	36	0.51	147	120	71	0.59
Sennar	10	8	5	0.60	25	23	22	0.97
Gedaref	46	41	44	1.07	55	50	47	0.95
Kordofan	1	1	(...)					
Total	**141**	**121**	**85**	**0.70**	**227**	**192**	**140**	**0.73**
Grand Total	**143**	**122**	**87**	**0.71**	**237**	**202**	**153**	**0.76**

3.3.4 Pigeon peas

Pigeon peas used to be planted primarily as a border crop which provided a convenient food security safety net (because of its drought tolerance) and an efficient protection from wind for the main crop (especially for cotton). The recent increase in cultivation as a sole crop under irrigation, has been prompted by growing international demand for the grain, especially from India where it is used to prepare dal.

Last year's record production of 165 000 tonnes (with a total area planted of 378 000 hectares) depressed market prices and farmers in 2017 decided to shift to other crops, mainly chickpeas with a consequent 40 percent decrease in the area planted and a total output of only about 88 000 tonnes (Table 20). However, the demand and prices of pigeon peas have been high in 2017 and the crop continues to be a good opportunity for export, given the poor production obtained in 2017 in Myanmar, the main provider to India.

Table 20: The Sudan – Pigeon peas area planted, harvested and production

State/Scheme	2016/17				2017/18			
	Planted ('000 ha)	Harvested ('000 ha)	Production ('000 t)	Yields (t/ha)	Planted ('000 ha)	Harvested ('000 ha)	Production ('000 t)	Yields (t/ha)
Gezira	41	38	54	1.43	21	20	29	1.44
Rahad	10	9	6	0.68	6	4	4	0.95
New Halfa	16	15	13	0.88	11	11	15	1.43
Sennar & Suki	4.2	3.8	5	1.32				
Blue Nile	2.1	1.7	1	0.60				
N. Kordofan	54	41	15	0.37	61	47	18	0.38
S. Kordofan	39	23	7	0.30	36	25	8	0.32
W. Kordofan	73	52	11	0.21	53	53	14	0.27
C. Darfur	43	42	31	0.75				
E. Darfur	76	63	17	0.27				
W. Darfur	21	21	5	0.24				
Total	**378**	**308**	**165**	**0.54**	**188**	**159**	**88**	**0.55**

3.3.5 Sugar

Sugar is produced by the Kenana Sugar Company, the White Nile Sugar Company and the Sudanese Sugar Company, which has four estates and factories in Guneid, New Halfa, Sennar and Asalaya. According to preliminary estimates, there have been increases in both area harvested and production for the three companies compared to last year (Table 21). The overall refined sugar production is 7 percent higher than last year.

Table 21: The Sudan - Sugar production, 2015/16, 2016/17 and 2017/18

Company	Year	Area harvested ('000 ha)	Sugarcane production ('000 t)	Sugar production ('000 t)	Sugar yields (t/ha)
Sudanese Sugar Co.	2015/16	34.1	2 314	228	6.69
	2016/17	33.5	2 439	233	6.96
	2017/18	34.3	2 569	251	7.32
Kenana Sugar Co.	2015/16	35.3	2 911	299	8.47
	2016/17	35.4	3 009	301	8.50
	2017/18	34.5	3 500	350	10.14
White Nile Sugar Co.	2015/16	13.3	455	47	3.52
	2016/17	13.3	412	42	3.19
	2017/18	13.4	413	43	3.17
Total	2015/16	82.7	5 680	574	6.94
	2016/17	82.2	5 860	576	7.01
	2017/18	82.2	6 482	644	7.83

Source: Sugar producing companies.

3.3.6 Cotton

Harvested area of cotton has more than doubled compared with that of last year and average yields are about 12 percent higher. The observed production is three times higher than last year.

The expansion in area is largely due to the expected high market price of cotton and to the presence of private producing companies with better financial possibilities. Cotton cultivation is highly labour-demanding and shortages of workers have been reported in key-producing areas.

Higher average yields have been obtained in New Halfa (4.0 tonnes/hectare) and in Gezira Scheme (3.9 tonnes/hectare), where 50 percent of the cultivated varieties are genetically modified. Generally, pest control has been effective but thrips attacked about 50 percent of the area cultivated in Rahad causing a drop in productivity.

Table 22: The Sudan - Cotton production, 2016/17 and 2017/18

State/Scheme	2016/17				2017/18			
	Planted ('000 ha)	Area ('000 ha)	Production ('000 t)	Yields (t/ha)	Planted ('000 ha)	Area ('000 ha)	Production ('000 t)	Yields (t/ha)
Irrigated								
Gezira	13	13	47	3.7	49	45	176	3.9
Suki	9	8	20	2.5	11	10	34	3.4
Sennar	10	9	23	2.5	17	16	44	2.8
White Nile					7	5	3	0.5
Blue Nile	3	2	6	2.9				
Rahad	14	13	26	2.0	29	28	93	3.4
New Halfa	10	10	26	2.7	13	13	51	4.0
Tokar	1	1	2	1.6	1	1	1	0.8
N. Kordofan					3	3	1	0.3
Total	**60**	**56**	**150**		**129**	**121**	**403**	
Traditional Rainfed								
Sennar					3	3	2	0.8
Blue Nile					13	11	22	2.1
Gedaref	11	10	20	2.0	41	40	81	2.0
S. Kordofan	1	0	(...)					
Total	**12**	**11**	**20**	**1.9**	**57**	**53**	**105**	**2.0**
Grand Total	**72**	**66**	**170**	**2.6**	**186**	**174**	**508**	**2.9**

3.4 Livestock

Water and pasture availability has been favourable in 2017 in the areas where seasonal rainfall has been adequate. By contrast, because of poor precipitations and long dry spells in Kassala, Gedaref, Khartoum states and in the northern parts of South Darfur, East Darfur and North Kordofan states, water points and pastures were in poor conditions at the time of the Mission. Before the start of the next seasonal rainfall in June, livestock movements in search of feeding to other areas are likely to lead to overgrazing, conflicts between farmers and pastoralists and increased risks of disease transmissions due to the high concentration of animals in small areas of pasture. Moreover, the limited access to the rich pastures of South Sudan, due to the closure of the border, will necessarily increase pressure on the already over exploited lands. Livestock from nearby regions are likely to move to Gezira and Sennar states, while herders from Chad are expected to cross the border in North and West Darfur. In 2017, movements of livestock have been much less restricted by civil unrest if compared to recent past years, with the only exception of White Nile, South Kordofan and North Kordofan states, where farmland expansion has generated limitations to animals' movement.

Crop residues are available, but they are not free of charge as for many farmers they represent a good source of income, especially in times of poor production.

Livestock condition at the time of the Mission was good and no major disease outbreaks have been reported; the vaccination campaign, albeit with some localized delays and shortages of vaccines (Blue Nile, Gedaref, Rahad, Kassala and Northern states) has been carried out as usual.

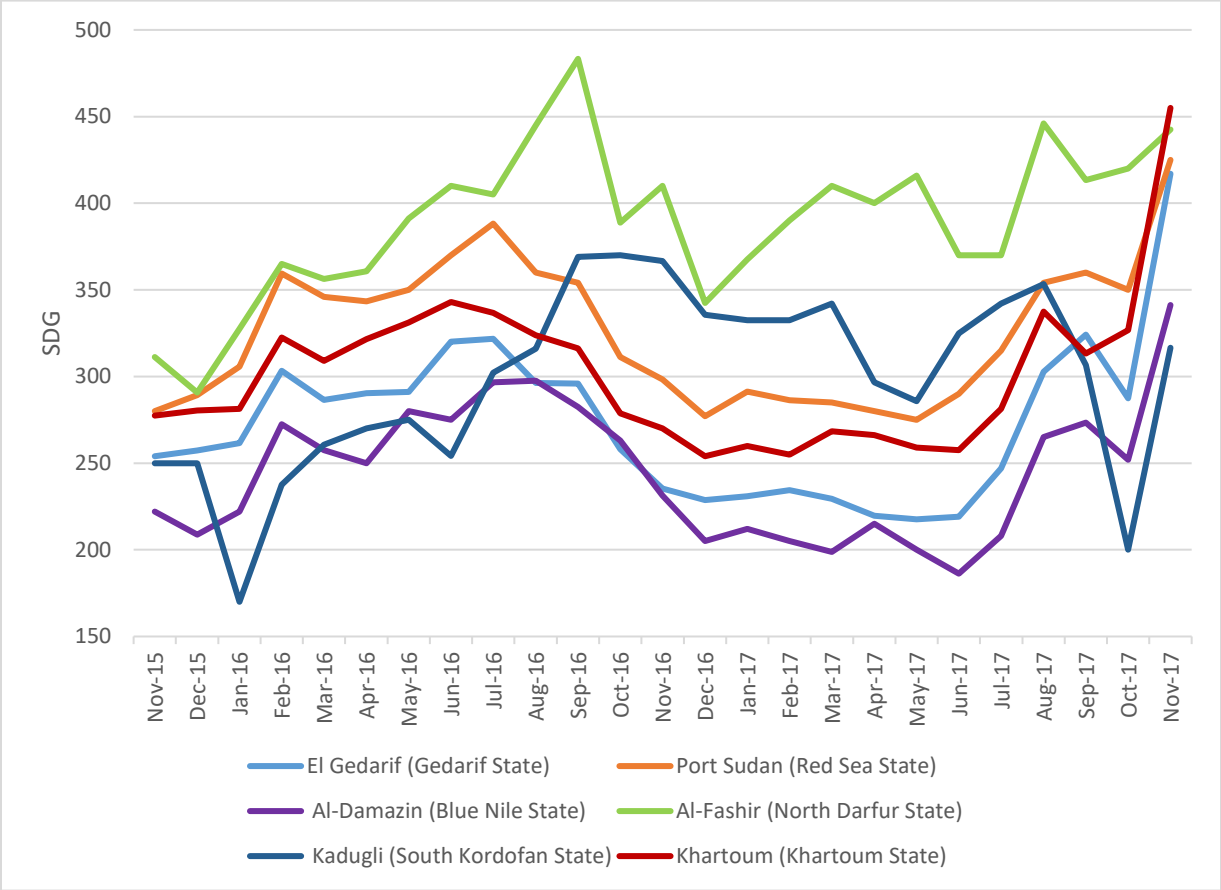
4 CEREAL SUPPLY/DEMAND SITUATION

4.1 Crop and livestock markets

Prices of locally-produced sorghum and millet normally show seasonal declines in October/November with the start of the main harvest and remain generally stable through March, before rising in August/September. However, in 2017, after some decline in October, prices of cereals surged again in November, reaching historical highs. The steep increases were driven by several factors. The sharp depreciation of the local currency in the parallel market caused a significant growth in the general inflation rates and, as a result, in the prices of imported agricultural inputs. Prices of cereals also received support from the expected reduction in production in 2017, following a decline in area planted as farmers switched to cash crops that are more profitable. In addition, prices of sorghum, which is used to feed animals in lack of grazing pastures, were affected by the increased demand for feed from the livestock sector in the areas where poor rainfall negatively affected pasture lands.

As illustrated in Figure 3, nominal wholesale prices of sorghum reached record high levels in most markets in November 2017, ranging from SDG 317 to SDG 470 per 90 kg sack. In South Kordofan and Gedaref states, prices of sorghum increased by 58 and 45 percent, respectively, driven by localized production deficits and limited carryover stocks from the previous season. In North Darfur State, prices increased by 5 percent in November, but were still 10 percent below their record levels in September 2016, partially due to the improved security situation following the ongoing weapon collection campaign.

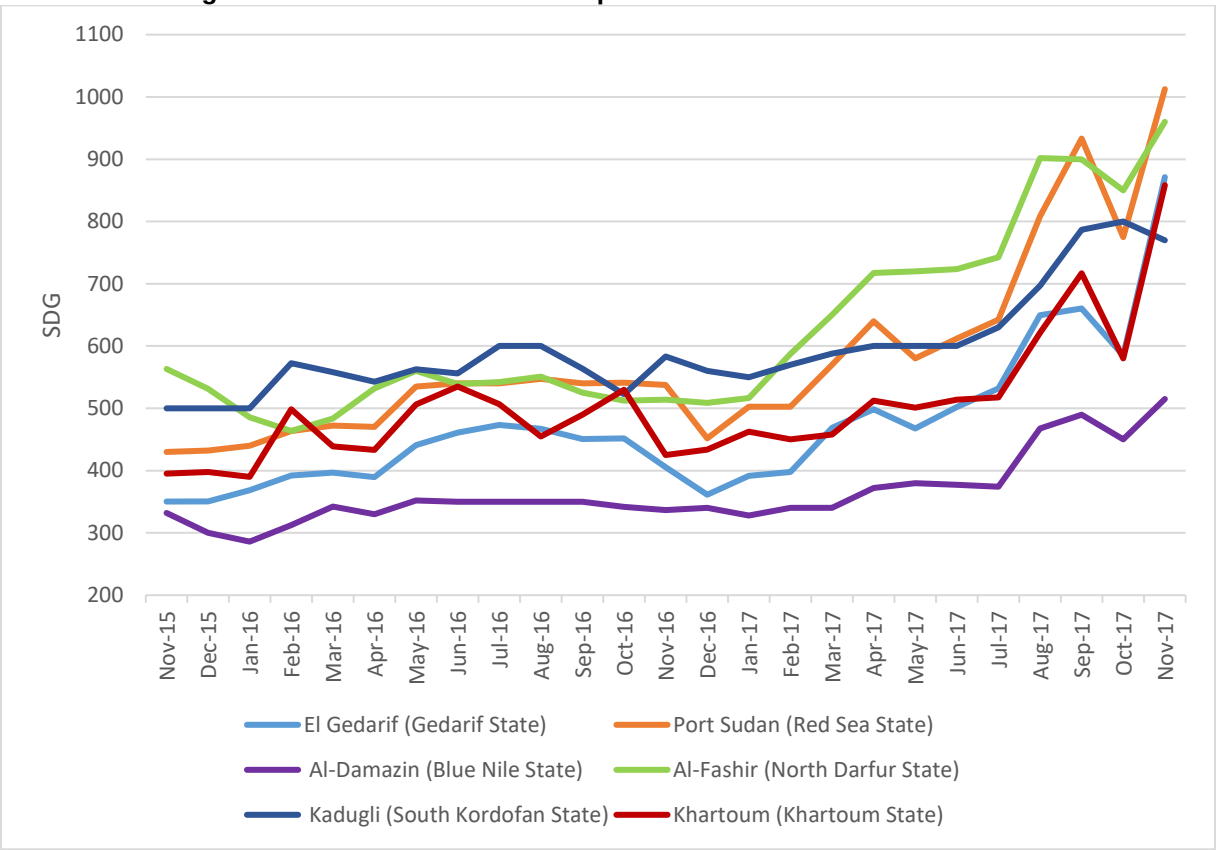
Figure 3: The Sudan - Wholesale prices of sorghum (feterita) in selected markets



Source: Food and Agriculture Real Time Messaging and Reporting System.

Wholesale prices of millet, mainly grown and consumed in western regions, followed a similar increasing trend during 2017. With the start of harvesting of early maturing crops, prices declined in October. However, they increased again in November and reached record levels in most markets as a result of the sharp decline in 2017 production and the overall food price inflation.

Figure 4: The Sudan - Wholesale prices of millet in selected markets



Source: Food and Agriculture Real Time Messaging and Reporting System.

Prices of wheat grain, mostly consumed in the urban areas, continued to rise during 2017, supported by the overall currency depreciation and associated price inflation together with increased production costs. In November 2017, wheat grain was traded at about SDG 630 per 90 kg sack in Khartoum, about 60 percent above the level of a year earlier.

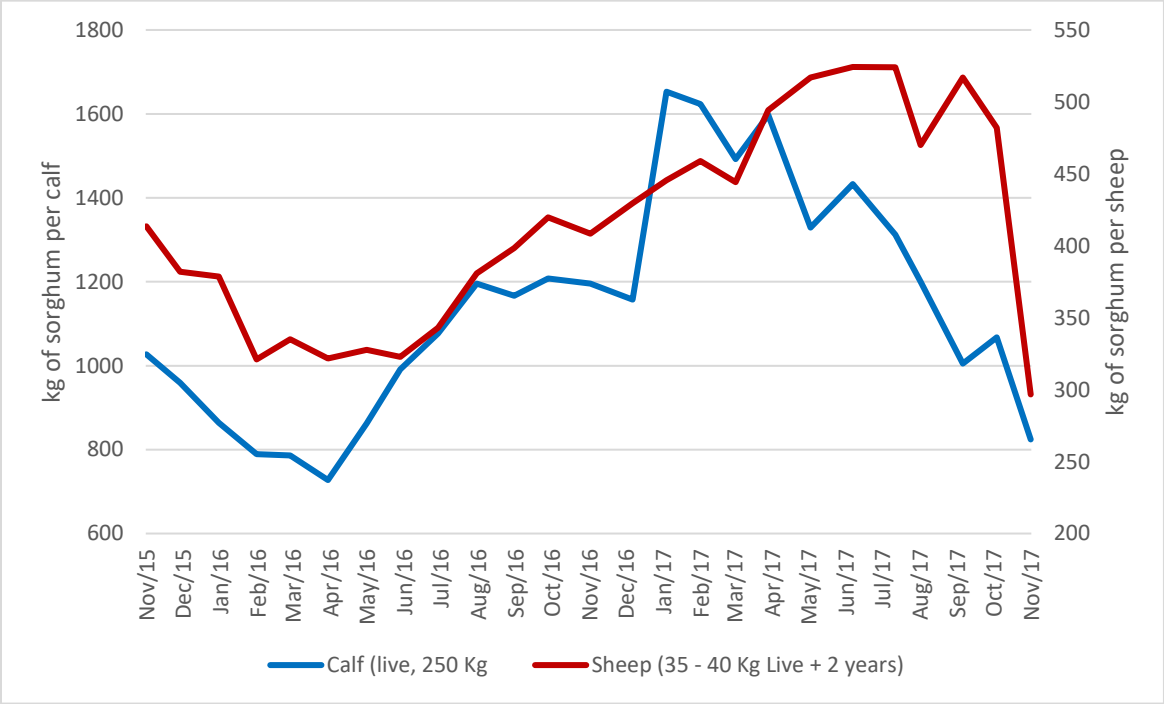
Generally, prices of cereals in the markets across the Sudan follow similar trends and markets are spatially integrated. However, as shown in Figures 3 and 4, the price differences for sorghum and millet exist among most markets, due to the variation between states in cereal production, transportation costs and market entry fees. The fees increase the transportation costs and final market prices, supporting the price gaps among the various locations.

In El Gedaref market, in the main sesame-producing areas, wholesale prices of sesame increased from SDG 490 per kantar in November 2016 to SDG 1 160 per kantar in November 2017, despite a 60 percent year-on-year increase in local production. The high price levels were underpinned by sustained export demand due to high international prices. The high local prices are likely to push farmers to plant more sesame in 2018, reducing plantings of cereals.

Prices of livestock followed an increasing trend over 2017 and, in November, they were higher than their values a year earlier. In November 2017, sheep and calves were traded in the Omdurman wholesale livestock market (Khartoum State) at SDG 1 500 and SDG 4 167 per head, respectively. Prices increased by 22 and 16 percent, respectively, over the year as a result of high inflation rates and transportation costs, coupled with sustained export demand. Moreover, livestock body conditions were reported to be better than last year, which in turn supported prices. As the prices of cereals surged in November, the terms of trade for pastoralists sharply deteriorated. In

September 2017, a calf or a sheep was equivalent to about 1 000 kg or 500 kg. Following the significant increase in the prices of cereals in November 2017, the terms of trade for pastoralists decreased by 30 percent to 800 kg for calves and 300 kg for sheep (Figure 5).

Figure 5: The Sudan – Terms of trade in Omdurman market (Khartoum State)



Source: Food and Agriculture Real Time Messaging and Reporting System.

4.2 Cereal supply/demand balance (January-December 2018)

The national cereal supply/demand balance for marketing year January-December 2018 is summarized in Table 23, with a breakdown by sorghum, millet, maize, wheat and rice. The balance is based on the Mission's production estimates (including the forecast for the winter wheat crop to be harvested by early 2018) and the latest information on consumption, feed use, trade and stocks availability. The following assumptions were used:

- Total cereal production is estimated at 5.2 million tonnes, including a forecast of 463 000 tonnes of wheat.
- Opening stocks of cereals for marketing year 2017/18 are estimated at the very high level of 940 000 tonnes. These include 406 000 tonnes of sorghum and 30 000 tonnes of wheat stocks held by the Strategic Reserve Corporation. The amounts of grain stored by private and community in underground stores in the central and eastern clay plains is expected at an above average level, given last year's record harvest.
- Feed use is forecast at 423 000 tonnes. In the absence of any survey data, based on discussions with farmers and extension officers, it is estimated that about 10 percent of sorghum and 5 percent of the millet produced is going to be used as feed for livestock and poultry.
- Seed requirements for 2018 plantings are estimated at about 106 000 tonnes on the basis of the recommended seed rate in the Sudan and a forecast planted area of about 13 million hectares of cereals. The following seed rates have been used: 7.5 kg/hectare for sorghum, 4 kg/hectare for millet, 20 kg/hectare for maize, 120 kg/hectare for wheat and 75 kg/hectare for rice.
- Post-harvest losses and other uses are estimated at 784 000 tonnes, with rates ranging from 15 percent for sorghum, millet and wheat to 20 percent for maize.
- Food use is estimated at 6.5 million tonnes, using the population figure of 42.9 million, which includes the CBS projected 2018 mid-year population of 41.9 million persons and 0.9 million refugees (see section 2.2). Per capita average consumption is set at 152 kg of cereals per year, which includes 75 kg of sorghum, 58 kg of wheat, 16 kg of millet, 2 kg of rice and 1 kg of maize.
- Closing stocks of wheat are expected to be normal at around 300 000 tonnes. Closing stocks of sorghum and millet are estimated at about 420 000 tonnes, reflecting the surplus of production in 2017.

Table 23: The Sudan - National cereal supply/demand balance, January-December 2018 ('000 tonnes)

	Sorghum	Millet	Maize	Wheat	Rice	Total
Availability	**4 584**	**954**	**16.72**	**763**	**32**	**6 340**
- Opening stocks	650	0	0	290	0	940
- Production	3 743	954	17	463	32	5 209
- Food aid (WFP)	191					191
Total utilization	**4 584**	**949**	**47**	**2 879**	**91**	**8 555**
- Food	3 218	687	43	2 489	86	6 522
- Feed	374	48	1	0	0	423
- Seed	68.4	15.2	0.3	21.1	0.6	106
- Post-harvest losses	561	143	3	69	5	782
- Closing stocks	362	61	0	300	0	723
Estimated import requirements	**0**	**0**	**30**	**2 126**	**59**	**2 216**
Anticipated commercial imports			**30**	**2 126**	**59**	**2 216**
Estimated gap	**0**	**0**	**0**	**0**	**0**	**0**

Table 23 shows that opening stocks of sorghum at the beginning of the marketing year were high, following a record production in the previous year. The structural deficits between production and consumption for wheat, maize and rice are expected to be covered by the normal levels of commercial imports.

5. RECOMMENDATIONS

The following recommendations are made in order to strengthen domestic production, food security and the functioning of the markets:

- In times of high prices, strategic reserves could be used to maintain the levels of consumption of the vulnerable population.
- Government support to farm mechanization should be increased, with a focus on tractor and machinery maintenance.
- Rainfed farmers need support for a better access to production inputs and water harvesting techniques.
- Irrigation schemes need both routine and special maintenance work to restore satisfactory efficiency.
- Fall Armyworm preventive control is important to impede future damages to crops. The possible resistance observed on sorghum in Blue Nile State could be a case study to improve the knowledge of its biology.
- Agriculture extension services should be reinforced to promote the adoption of new technology to farmers.
- Financial institutions should provide some kind of credit lines to smallholders using alternative collaterals, such as part of forward contracting, to allow investments in agricultural assets and farm machinery.
- The availability of certified seeds should be increased, with timely delivery to farmers.
- Gum arabic production should be encouraged, with a focus on the areas with high refugees' returns, to provide alternative sustainable livelihoods for rural people. Maintaining food security as a key objective, activities should support women's organizations and promote gender equality.
- A new livestock production and population census should be conducted to provide a more realistic and updated picture of this important sector in the economy of the Sudan.
- New water points and free corridors for livestock movement should be made available to avoid conflicts between farmers and herders.

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