SPECIAL REPORT

2019 FAO CROP AND FOOD SUPPLY ASSESSMENT MISSION (CFSAM) TO THE SUDAN

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CONTENTS

ACRONYMS AND ABBREVIATIONS

ABS	Agricultural Bank of Sudan
CBS	Central Bureau of Statistics
CBOS	Central Bank of Sudan
CFSAM	Crop and Food Supply Assessment Mission
DAP	Diammonium Phospate
EBA	Everything But Arms
FAO	Food and Agriculture Organization of the United Nations
FSTS	Food Security Technical Secretariat
FEWS NET	Famine Early Warning Systems Network
GDP	Gross Domestic Product
GIEWS	Global Information and Early Warning System on Food and Agriculture
GMO	Genetically Modified Organism
HAC	Humanitarian Aid Commission
ha	hectares
ILO	International Labour Organization
IMF	International Monetary Fund
LTA	Long-Term Average
mm	millimetres
MoANR	Ministry of Agriculture and Natural Resources
MoARF	Ministry of Animal Resources and Fisheries
NGOs	Non-Governmental Organizations
OIE	World Organization for Animal Health
RVF	Rift Valley Fever
SDG	Sudanese Pound
SRC	Strategic Reserve Corporation
t	tonne
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
USAID	United States Agency for International Development
USD	United States Dollar
WFP	World Food Programme

HIGHLIGHTS

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➤ The national total production of sorghum and millet in 2019/20 is estimated at 5.1 million tonnes, 36 percent below the previous year's record output and 18 percent less than the past five-year average.

➤ Sorghum production is forecast at about 4 million tonnes, 26 percent lower than the level of the previous year and 19 percent less than the past five-year average. The national millet production is estimated at 1.1 million tonnes, 63 percent lower than the record production of 2018 and 16 percent less than the average of the past five years.

➤ The decline in production is mainly due to contracted cereal plantings as farmers shifted to more remunerative cash crops (sesame and groundnuts), compounded by lower yields resulting from unfavourable weather conditions and pest infestation.

➤ The 2019 rainy season was characterized by an irregular distribution of rains. After an early onset in May and long dry spells in July, torrential rains triggered floods in August. Unusual abundant precipitation was also recorded in September and October.

➤ Production of wheat, to be harvested in March 2020, is forecast at 727 000 tonnes, more than 30 percent above the previous five-year average, reflecting enlarged plantings.

➤ Production of sesame and groundnuts is estimated to have increased in 2019 to an above average level, on account of expanded plantings prompted by higher year-on-year market prices and strong demand for exports.

➤ Constraints on the availability of, and accessibility to, inputs were reported as a result of high and increasing inflation, which also led to soaring costs of production.

➤ The incidence of pests, diseases and weeds on national crop production was significantly higher than in the previous years.

➤ Abundant rains and improved security situations increased the availability of pastures and water for livestock. However, the expansion of the cropped area at the expense of pastures and animal routes resulted in growing conflicts between farmers and pastoralists in some parts of the country.

➤ Livestock health at the time of the Mission was good and no major disease outbreaks were observed.

➤ The annual vaccination campaign was affected by severe shortages of vaccines and medicines.

➤ High and increasing inflation rates have been recorded in 2019, reaching over 60 percent in November. Food/beverage and housing sectors contributed the most to the upward trend in the inflation rate by about 60 and 10 percent, respectively.

➤ Although the official exchange rate was pegged at SDG 45 per US Dollar since April 2019, USD 1 was traded for up to SDG 88 as of mid-December in the parallel market. The weakening of the Sudanese Pound consequently put upward pressure on prices, especially those of imported goods, including fuel and wheat.

➤ Prices of locally produced sorghum (*feterita*) and millet began to rise from late 2017 and continued the increasing trend in 2019. In December 2019, prices of staple grains were 65-130 percent higher, year on year.

OVERVIEW

Between 24 November and 14 December 2019, assisted by the Food and Agriculture Organization of the United Nations (FAO) and other partners, the Ministry of Agriculture and Natural Resources (MoANR) carried out its annual Assessment Mission to determine crop production and food supply situation throughout the 18 states of the country. The Mission consisted of six core teams comprising members from the MoANR, the Food Security Technical Secretariat (FSTS) of the MoANR, the Ministry of Animal Resources and Fisheries (MoARF), the Humanitarian Aid Commission (HAC), the Strategic Reserve Corporation (SRC), FAO, FEWS NET, WFP and USAID.

The teams' visits were designed to collect data and information from the State ministries and irrigation schemes and to audit it through transects, field observations and interviews with farmers and independent key informants. The combined quantitative and qualitative information, from both primary and secondary sources, allowed the teams to assess the 2019 cereal (sorghum and millet) and other field crop production and to forecast the wheat production to be harvested by March 2020. Upon returning from the field, all teams prepared summaries of the information gathered for internal discussion and final inclusion in the 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 was drawn up comparing the total cereal requirement for the coming marketing year (January December) with the domestic cereal availability.

The six Mission teams received full cooperation by the State authorities. Discussions on the factors affecting crop and livestock conditions were held with representatives from the local Government offices, United Nations (UN) agencies and Non-Governmental Organizations (NGOs). Field visits were supported by local specialists from State ministries and irrigation schemes, who also provided the latest information on all aspects of

production within their domains, including the provision of follow-up-data, where required. The teams cross-checked the official estimates by conducting extensive field inspections, rapid case studies with sample farmers and interviews with herders and traders. The security situation generally improved compared to previous years and was less of a constraint to field observation and farmer interviews.

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

The overall performance of the 2019/20 summer cropping season was below last year's record level and below the previous five-year average, reflecting the contracted area planted of cereals and lower yields. Although cumulative seasonal rainfall in 2019 was above average across the country and the rainy season was longer than usual, rains were irregularly distributed: long dry spells in July and heavy rainfall in August affected crops across the country, leading to high losses and to the need for repeated sowing. The unusual length of the rainy season caused also the spread of weeds and favoured a high incidence of crop pests and diseases.

Constraints to the availability of, and accessibility to, agricultural inputs, such as machinery, seeds and fertilizers, owing to higher prices and increasing inflation, were reported. Shortages and the delayed distribution of fuel reduced the application of herbicides, pesticides and fertilizers, and delayed harvesting operations, particularly in

semi-mechanized areas. Many farmers resorted to the parallel market to obtain fuel or opted for manual labour to complete agricultural operations. All these constraints increased production costs and lowered yields.

The production of sorghum and millet in 2019/20 is estimated at below-average levels of 4 and 1.1 million tonnes, respectively. The overall decline in cereal production is mainly due to a reduction in the area planted in favour of more remunerative crops (sesame and groundnuts), compounded by reduced yields. Some tribal clashes in Darfur also restricted access to agricultural land. Extreme weather events, such as dry spells and torrential rains, led to localized crop failure and reduction of the harvested area. The wheat crop, to be harvested in March 2020, is forecast at an above-average level of about 726 000 tonnes.

Abundant rains and the extended length of the rainy season have improved the availability of pastures and water for livestock. However, the expansion of the cropped area at the expense of grazing lands was reported to have blocked herding routes, leading to conflicts between pastoralists and farmers. Animals were generally in good condition and no major disease outbreaks were observed during the field visits. However, lack of the availability of vaccines was reported

by stakeholders to be a major issue in animal production. In response to an announcement of the World Organization for Animal Health (OIE) about documented cases of Rift Valley Fever (RVF) in the country, Saudi Arabia, in October, banned livestock imports from the Sudan. In January 2020, the RVF outbreak was declared over.

Using the population projection for mid-2020 by the Central Bureau of Statistics to estimate the food use in 2020, the cereal balance sheet shows that the 2019/20 production of locally produced sorghum and millet is expected to cover the country's utilization needs. In case of millet production, it allows a building up of stocks, equivalent to the food requirements for three months. With regards wheat and rice, the cereals that the country mostly depend on imports, the structural deficit between production and consumption is expected to be covered by the normal levels of commercial imports.

The prices of locally produced sorghum and millet in most markets have been characterized by an upsurge during the last 12 months, essentially due to the high costs of production and transportation, depreciation of the local currency and increasing inflation that started at the end of 2017. In December 2019, prices of sorghum and millet were from 65 to 130 percent higher than their levels of one year before.

SOCIO-ECONOMIC CONTEXT

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General

The country has been facing macro-economic challenges since the secession of South Sudan in 2011 that took three-quarters of the oil output, leaving it with half of fiscal revenues and one-third of export earnings. The country also suffers from a lack of foreign exchange reserves, mainly due to low foreign investment and limited access to international financing, as well as from fiscal deficits, deriving from weak revenue collection and heavy subsidies on fuel (as high as 8 percent of the GDP, according to the Minister for Finance and Economic Planning).

Economic conditions significantly worsened since late 2017, following the sharp devaluation of the currency, as the removal of the international economic sanctions on the country increased the demand for imports and, consequently, for US dollars. This prompted high inflationary pressures and particularly an increase in prices of imported goods, such as fuel and wheat, which triggered widespread protests from December 2018 to April 2019, when the President was ousted. Five months later, a new transitional Government was swore in for a period of 39 months, until the general elections planned to take place in late 2022. The new Government is facing challenges to stabilise the economy, including the high inflation rate, the depreciation of the Sudanese Pound and the widening of fiscal and external imbalances.

The CBS estimates the country's GDP in 2019 at about SDG 1 607 billion (at current prices). According to the estimates, the agricultural sector contributed about 20 percent to the GDP in 2019, and the contribution of the industrial and services sectors were 22 and 58 percent, respectively. In the agricultural sector, the contribution to the GDP is highest in livestock (about 60 percent), followed by agricultural crops (about 40 percent), while the importance of the forestry and fishing sectors is limited to a marginal level. The GDP has grown by 1.3 percent in 2019 compared to 2.8 percent in 2018. Similarly, the contribution of the agriculture sector to GDP growth rate has decreased from 4 percent in 2018 to 1.2 percent in 2019.

At the end of the third quarter of 2019, the trade balance recorded a deficit of about USD 3.7 billion, a 35 percent increase from last year's level. Compared to the same period in 2018, exports of crude oil declined by 32 percent, in value terms, due to lower year-on-year international prices. By

Table 1: The Sudan - Exports of crop products, 2018 and 2019

Crop/product	2018		2018[1/]		2019[1/]	
	Weight (tonnes)	Value ('000 USD)	Weight (tonnes)	Value ('000 USD)	Weight (tonnes)	Value ('000 USD)
Cotton (bales)	111 134	159 481	77 892	111 859	88 660	124 823
Gum Arabic	76 394	112 766	55 939	81 543	64 598	82 169
Sesame	704 568	576 155	396 239	370 692	390 826	495 509
Sugar	1 206	2 003	-	-	6 473	2 738
Groundnuts	80 768	59 846	59 620	43 532	230 438	155 198
Sorghum	141 152	27 149	118 979	23 159	153 246	32 649
Hibiscus flowers	12 568	15 461	9 626	11 993	6 713	7 934
Watermelon seeds	92 220	61 324	74 149	49 335	60 830	38 208

Source: CBOS.
[1/] 1 January-30 September.

contrast, imported quantity of petroleum products increased significantly, by more than 60 percent, following the sustained domestic demand for oil. With regard to agricultural commodities, exports in volume terms in the January-September period were 26 percent higher than the same period last year. Most notably, exports of groundnut quadrupled both in volume and value terms, with an increased demand from China (Mainland) and Indonesia. Exports of sorghum rose by 30 percent in volume terms compared to the first nine months of 2018, following the favourable harvest in 2018/19. With regard to sesame, exports in value terms were higher than a year earlier, mainly due to higher international prices. Exports of hibiscus flower and watermelon seeds contracted year on year, despite increased harvests in 2019, mainly due to strong domestic demand. While imported quantity of wheat products (grain and flour) in the three quarters of 2019 were similar to the same period in 2018, imports in value terms increased by 45 percent, due to the weaker local currency that

made imported goods more expensive. Imports of other food items, such as dairy products and vegetables, were similar to 2018, with a notable exception for imports of animal and vegetable oils that recorded a sharp increase.

After reaching a record high of 73 percent in December 2018, when the increase in prices of bread (from SDG 1 to SDG 3) prompted protests, the inflation rate dropped sharply in January 2019 in response to the Government's decision to revoke the price increase. Then, inflation increased throughout the year and was over 60 percent in November 2019 (Figure 1). According to the CBS, food and beverages as well as the housing sectors were the main drivers of the upward trend of inflation, by 61 and 11 percent, respectively, reflecting higher prices of inputs, mostly imported goods. High inflationary pressures have contributed to diminish the purchasing power of consumers and farmers, resulting in lower access to food and agricultural inputs.

Figure 1: The Sudan - Inflation rate (percent) and official exchange rate (SDG for USD 1)
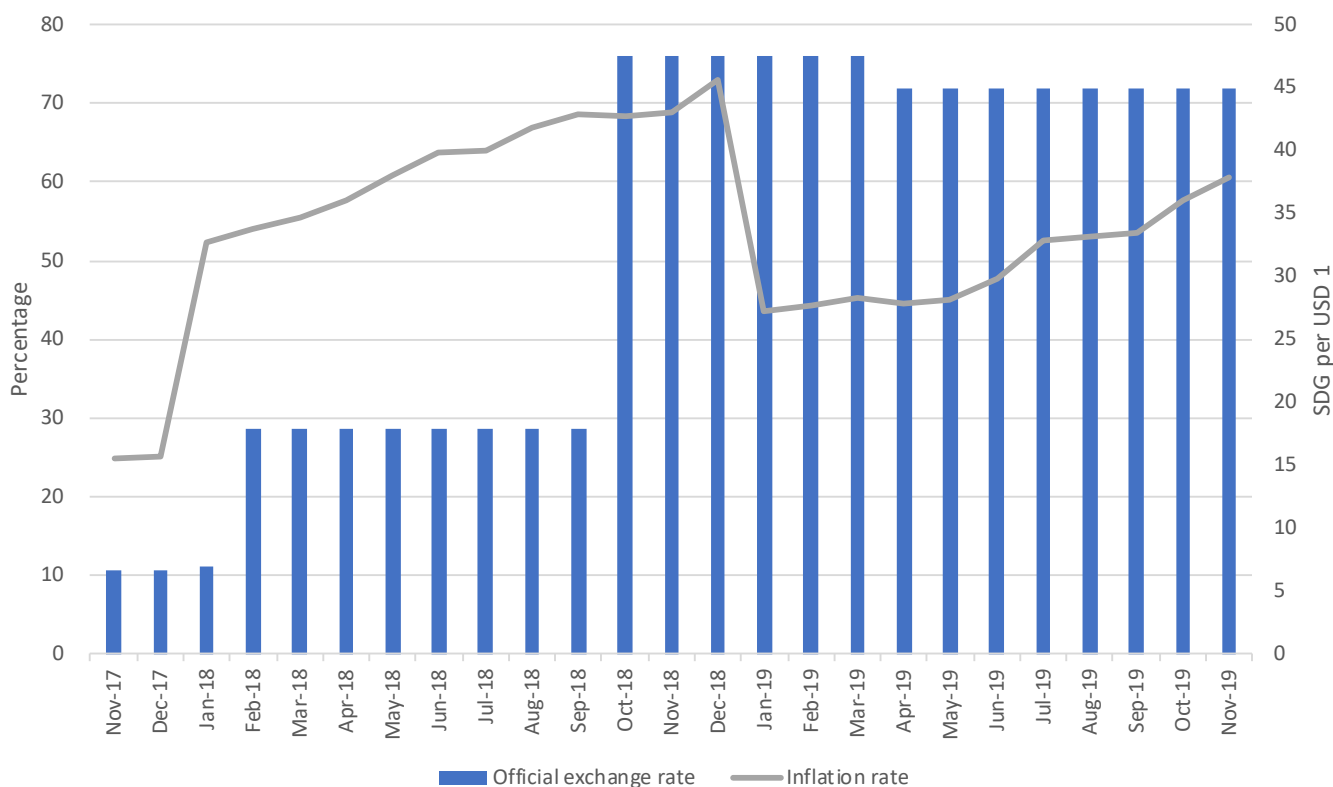
Source: Central Bureau of Statistics (for inflation rate) and Central Bank of Sudan (for exchange rate).

The upsurge of inflation was triggered by the sharp devaluation of the Sudanese Pound (SDG) from SDG 7 to SDG 18 per US Dollar in January 2018 (and to SDG 47.5 in October) to narrow the increasing gap with the parallel exchange rates. In the parallel market, the Sudanese Pound weakened following the lift of international sanctions on the country in October 2017, which increased the demand for US dollars. Although the official exchange rate was pegged at SDG 45 per US Dollar since April 2019, USD 1 was traded for up to SDG 88 as of mid December 2019 in the parallel market. The weakening of the Sudanese Pound also exerted upward pressures on prices, especially those of imported goods, including fuel, wheat and agricultural inputs. Furthermore, the political uncertainty in 2019 prevented the country from attracting foreign investments, taking advantage of the depreciation of the Sudanese Pound. The CBOS estimates that foreign investments during the three quarters of 2019 were about 13 percent lower than the same period in 2018, with a negative effect on economic growth.

In an effort to restore economic stability, the new Government agreed, with the World Bank and the International Monetary Fund (IMF), to implement an economic reform in October 2019. Although the details still need to be negotiated, the reform is expected to address the liberalization of the exchange rate, the revenue mobilization, the gradual phasing out of fuel subsidies and the enhancement of the business environment by adopting anti-corruption measures and improving governance, as identified by the IMF during the visit carried out in December 2019. The new Government already made an attempt to reduce fuel subsidies in the 2020 budget, but the manoeuvre was not successful as a coalition of opposition political groups disagreed with the proposal.

The Government's other measures to stabilise the economy include the following: Firstly, in January 2020, the Government plans to allow private traders to export gold, which was exclusively traded by the Central Bank. However, the new regulation stipulates that mining companies sell 30 percent of the gold production to the Central Bank (while exporting the rest 70 percent) and sell any foreign currency earned to the Bank at the official exchange rate, which is far lower than in the parallel market. Secondly, the Government extended the oil deal with South Sudan until March 2022, which will allow South Sudan to use Sudanese pipelines to reach the port of Port Sudan to export crude oil. In exchange, the Sudan will receive USD 24 or USD 26 per barrel of oil transported. Also, South Sudan will supply a refinery facility in the Sudan with 28 000 barrels of crude oil per day. Lastly, the Government is resorting to foreign aid and has already secured the commitment of USD 3 billion and 540 000 tonnes of wheat from Saudi Arabia and the United Arab Emirates in April 2019 and EUR 466 million from the European Union in October 2019.

Population

The last Population and Housing Census was carried out in 2008 and, since then, the CBS extrapolates the country's population size using specific growth rates at State level. The total population in mid-2020 is officially forecast at 44.4 million. The most populated states are Khartoum (19 percent of the total population), Gezira (12 percent) and South Darfur (9 percent). As of January 2020, the UNHCR estimated the number of refugees and asylum seekers residing in the country at 1.1 million, among which 811 000 are from South Sudan. Although the UNHCR estimates that 1.9 million Sudanese are still internally displaced, there has been a steady trend of returns over the past years as the armed confrontation in Darfur has subsided.

Agriculture

The economy of the Sudan is highly dependent on agriculture, which occupies an estimated 43 percent of its labour force (ILO estimates of 2019) and accounts for about 30 percent of its GDP (World Bank). Its crop portfolio is quite diversified, including cereals (such as sorghum, millet, wheat, rice and maize), oilseeds (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 in 2019 of about 119 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 country is the third major producer of sugarcane in Africa, after Egypt and South Africa, with a total planted area of about 82 000 hectares. The country is also a 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 (227 kg) per year. Cotton production has declined dramatically since then due to a significant reduction in planted area. However, in 2016 and 2017, high international prices and highly productive improved seeds provided a new impetus to the sector that is now facing a renewed growth.

Irrigated agriculture

The area under irrigation in the Sudan is estimated at about 1.68 million hectares (4 million feddans). 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. As yield expectations are more reliable, the irrigated sector is the principal user of imported agricultural inputs. Crop yields in the Federal Irrigated schemes remain low by world standards, largely due to the poor maintenance and silting up of canals, the shortage of efficient modern pumps and the adoption of traditional agricultural practices that do not allow to make the most efficient use of the constant water resource and exploit the full potential of more intensive farming.

Irrigation water is mainly obtained from the River Nile and its tributaries by means of gravity or pumps, or from spate flow from seasonal rivers at Gash and Tokar deltas. The principal crops of the irrigated sector include sugar cane, cotton, sorghum, groundnuts, wheat, vegetables, fruits and green fodders. According to the season, the sector also takes advantage of 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 production costs on privately-owned irrigated smallholdings 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.

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, Gadarif, 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, even above 50 000 hectares. Given the erratic nature of rainfall and, therefore, the possibility that yields could be very low, the system may be considered as opportunistic and operations are 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.

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 State, 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.

Livestock

Livestock is raised in almost all parts of the country and animals are owned primarily by nomadic tribes. In 2019, the livestock population was estimated at about 109 million heads, comprising about 31 million cattle, 40 million sheep, 32 million goats and 4.9 million camels (Table 2). Pastoralists in the Sudan efficiently use natural resources, moving herds around the country in response to weather conditions and availability of forage. The major problem faced by pastoralists is the loss of rangeland to mechanized farming. The traditional practice of farmers allowing herds to graze crop residues, with animals simultaneously fertilizing land, is declining as farmers prefer to sell their

Table 2: The Sudan - Estimates of livestock population, 2019

Livestock	Quantity ('000 heads)
Cattle	31 489
Sheep	40 896
Goats	32 032
Camels	4 895
Total	**109 312**

Source: MoARF.

residues for cash. Clashes between pastoralists and farmers are common, even in years of good rainfall, prompting the Government to set up committees in each State to resolve disputes.

Livestock accounts for about 60 percent of the Sudan's agricultural GDP. Exports of sheep, mainly to Saudi Arabia, are reported at about 2.8 million heads in the first nine months of 2019. In the same period, around 90 000 camels were exported mainly to Egypt. About 112 000 goats were exported in the same period of 2019 with a marked decline of about 60 000 heads in 2018. This is due to a ban on importing livestock from the Sudan by the Saudi Arabian Ministry of Environment, Water and Agriculture as a response to the announcement of the OIE about documented cases of RVF.

Compared with live animal exports, meat exports were relatively modest with a total value of about USD 36 million (Table 3). The country exports also considerable quantities of animal hides. In the first nine months of 2019, a total value of about USD 7 million of fresh hides were exported.

Table 3: The Sudan - Exports of live animals and hides and skins, 2018 and 2019

Livestock	January-September 2018		January-September 2019	
	Quantity (heads)	Value ('000 USD)	Quantity (heads)	Value ('000 USD)
Sheep	2 663 664	337 258	2 854 741	373 496
Goats	178 237	13 151	112 452	11 986
Cattle	61 563	38 360	65 169	53 483
Camels	141 902	156 707	90 173	119 439
Hides and skins	-	12 349	-	7 687
Meat (tonnes)	12 091	50 500	-	36 219

Source: CBOS.

AGRICULTURAL PRODUCTION IN 2019/20

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Main factors affecting cereal production in 2019/20

Rainfall

With rainfed agriculture accounting for about 90 percent of the area under cultivation in the Sudan, rainfall is the most important driver of national food crop production. Precipitation is crucial also in the irrigated sector as it supplements irrigation water and supports crop establishment and development.

In all the key cropping areas of the country, cumulative rainfall between June and November 2019 was between 50 and 100 percent above the Long-Term Average (LTA). Compared to 2018, rainfall volumes were similar or just slightly higher in the states of Kassala, Gezira, Gadarif and West Darfur, while they were about 20-30 percent higher in the states of Blue Nile, Sennar, North Kordofan, South Kordofan, and North and South Darfur.

The rainy season was characterized by exceptionally high cumulative amounts of rain, but with irregular distribution in space and time. The early onset of the rains in May, over all key producing areas, and adequate precipitation received in June, were followed by long dry spells in July and torrential rains in August. Unusual abundant precipitation was also recorded in September and October, with occasional showers until November.

Figure 2: The Sudan - Cumulative rainfall comparison in selected states
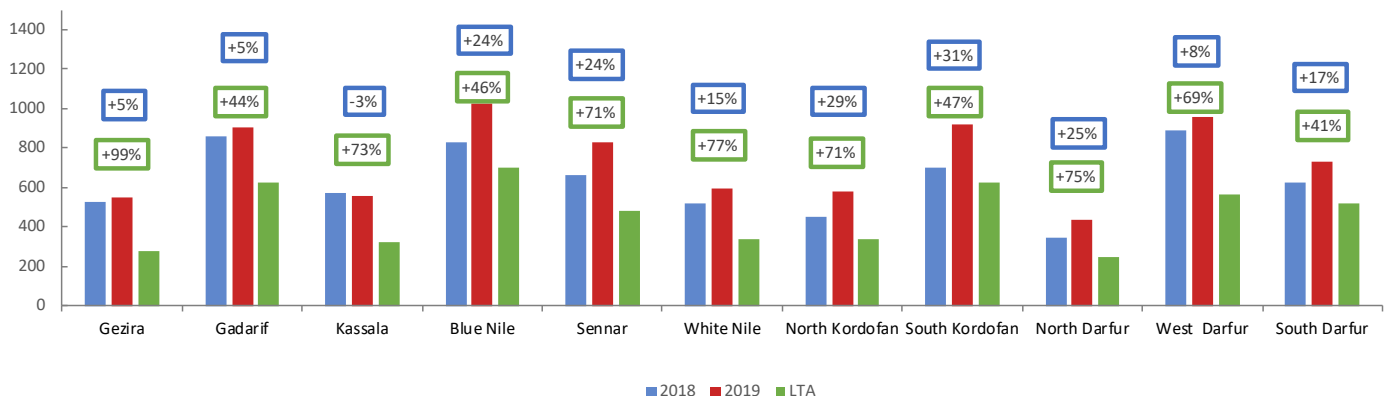
Source: FAO/GIEWS.

The early onset of the rains in May (Figure 3: left) improved overall soil moisture, bringing water content to suitable levels for land preparation. Adequate rains in June fostered some early sowing of sesame, groundnuts and millet in the Great Darfur Region. In early July, under overall favourable weather conditions, typical planting operations began to take place across most of the country. However, with the exceptions of Blue Nile, Sennar and East Darfur states, where rains continued at average levels, in most cropping areas of the country precipitation ceased in July (Figure 3: centre). In North, West and South Darfur, during most of July a prolonged dry spell negatively impacted the establishment of millet, the local main food crop, and sesame and groundnuts were replanted in substitution.

Figure 3: The Sudan - Precipitation anomaly: Relative difference to LTA dekads
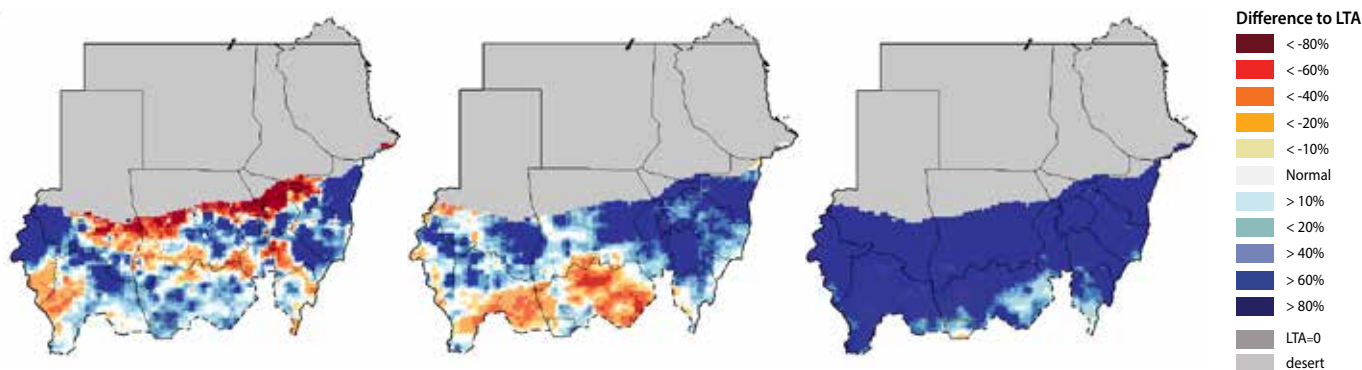
Source: FAO/GIEWS. Conforms to UN World map, February 2019.

Millet and sesame crops were severely affected by dry weather conditions also in White Nile and West Kordofan states and in eastern parts of South Kordofan State, where the dry spell lasted up to three weeks. In the region of Barah of North Kordofan State, no rains were received for four weeks. Several smallholder farmers were not able to financially sustain the extra costs of seeds and labour needed to replant crops. The dry spell also affected some rainfed areas in key cereal producing states of Kassala, Gezira and Gadarif (Figure 4). In the northern part of Gadarif State, planting activities had to be interrupted and postponed.

Figure 4: The Sudan - Vegetation Health Index, July 2019
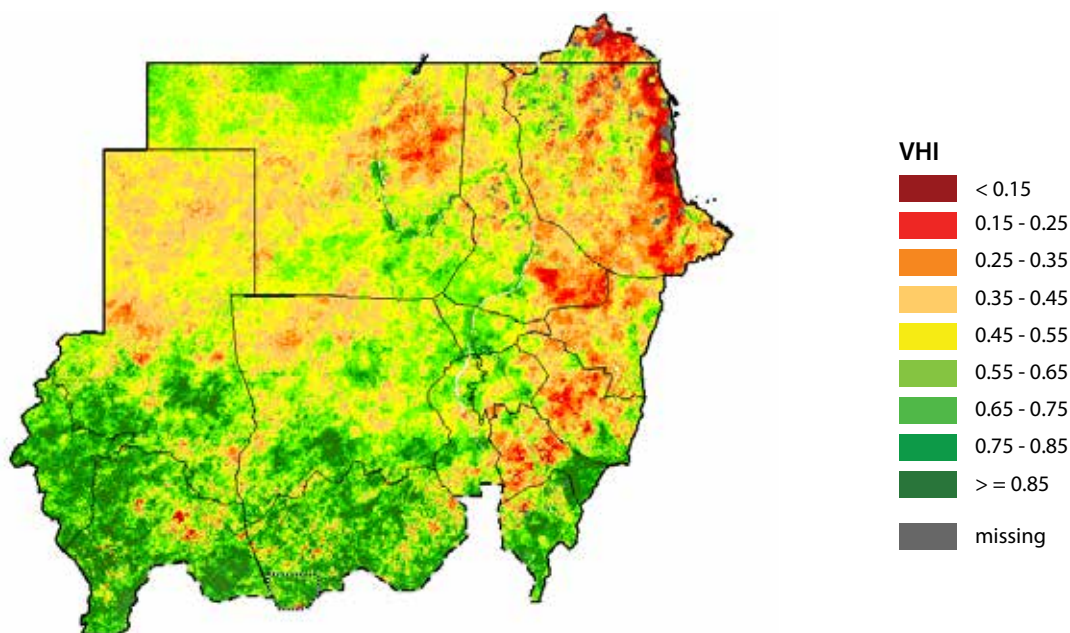
Source: FAO/GIEWS. Conforms to UN World map, February 2019.

Following dry weather conditions, agricultural activities were affected also by exceptionally heavy rains in August. In Gadarif and Gezira states, planting was further delayed due to floods and waterlogging. Some of the early sown sorghum and sesame crops had to be replanted or replaced by short cycle crops such as watermelon. Crops in White Nile State were particularly affected by flooding, with about 300 000 hectares reported to be damaged in the traditional rainfed sector. About 60 000 hectares of sesame and 30 000 hectares of sorghum were replanted in Sennar and Kassala states, respectively. In the New Halfa Scheme, nearly 60 000 hectares of sorghum, groundnuts and cotton, 15 percent of the total area planted, were severely damaged. Farming operations were disrupted and crops damaged in Blue Nile, South Kordofan and West Kordofan states. Heavy rains in August also hit the Darfur Region, affecting crops, causing damage to key infrastructure, destroying farms and killing animals.

After the extreme variability of July and August, rainfall was consistently above average for the remainder of the season, registering record cumulative levels during both September and October, when normally rains taper off and subside (Figure 3: right). The late-season heavy rains had a beneficial impact on late planted crops, but it also favoured the spread of diseases, weeds and pests. Owing to farmers' limited control capacity, the negative impact on yields was severe in several cases, particularly for sorghum crops that were replanted at the end of August. The unusual October rains (Figure 5) were received when most crops were at milling stage, when grains begin forming and filling and are more prone to pest attacks. The excess moisture favoured the spread of Sorghum midge, which led to total crop failure in several fields. In addition, the excessive late season rains delayed harvesting operations and reduced the quality of sorghum, by darkening the colour of the grains, and groundnuts, by favouring the growth of mould.

Figure 5: The Sudan - Rain distribution in Sennar State
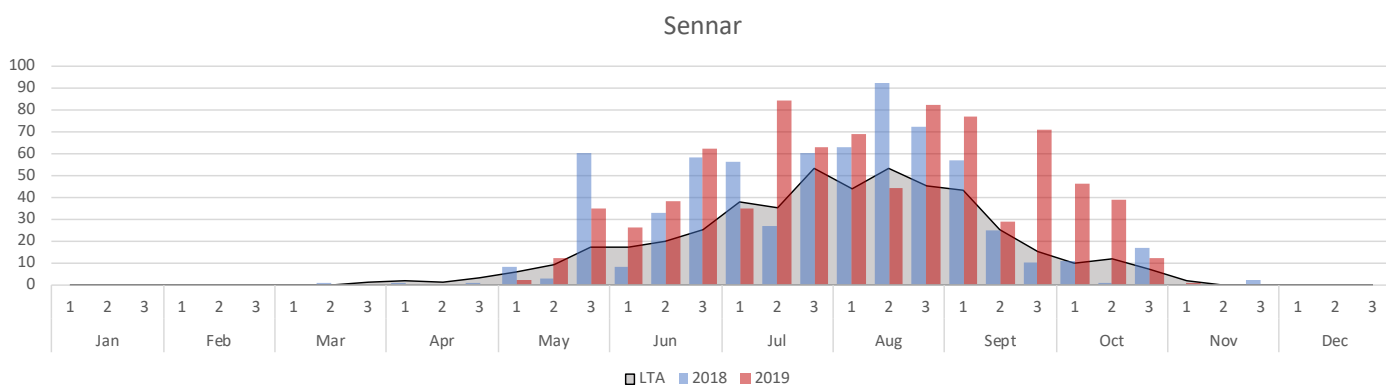
Source: FAO/GIEWS.

Despite the impact of erratic rains, the performance of the irrigated sector in 2019 was better than in 2018. Normally, rainfall assists in the establishment of crops, which reduces the burden on the irrigation system in July and August, while in September and October the required amount of water is supplied by a number of scheduled irrigations. While the effects of the prolonged dry spell in July were mitigated by irrigation, the flooding in August led to widespread

waterlogging due to the lack of efficient drainage systems. Finally, the heavy rains of September and October contributed to reduce to a minimum level the use of irrigation.

In the Gezira and Suki schemes, where silting of canals has significantly reduced the efficiency of irrigation systems, rains played a crucial role in providing sufficient water for crops. Shortages of

water were reported especially at the beginning of the season and at the final end of the canals. For winter crops, which are entirely dependent on irrigation, major complications are expected if de-silting of canals is not carried out.

In the Gash Scheme, which uses river floodwaters, flooding began early in the season and was characterized by a stable and persistent water flow. The total amount of water received in 2019 was 1 750 million cubic metres, an increase of 35 percent compared to the previous season and 169 percent compared to the LTA. However, due to fuel shortages at the beginning of the season and to the lack of financial resources, only 30 percent of the canals were properly cleaned, reducing the total area potentially irrigable with available water. In the Tokar Scheme, the amount of floodwater was good, but inadequate maintenance and inefficient flood control measures resulted in the leakage of water away from the target area. In addition, invasive

mesquite trees were reported to be obstructing several canals in both Gash and Tokar schemes.

In New Halfa and Rahad schemes, on the other hand, regular maintenance of canals ensured efficient irrigation in 2019. In Rahad Scheme, two old pumps were replaced and five pumps were repaired. Nevertheless, the drainage system has yet to be completely rehabilitated and water logging in August could not be avoided. After the heavy rains in irrigated areas of White Nile State, some pumps were reported to be entirely under water and large fields of cereals and horticultural crops were severely affected.

While the irregular but abundant seasonal rains hindered agricultural operations in several areas and resulted in severe drought and flood-induced crop losses, they were largely beneficial for pastures and for the replenishments of water points for livestock (Figure 6).

Figure 6: The Sudan - Agricultural Stress Index Grassland, September 2019
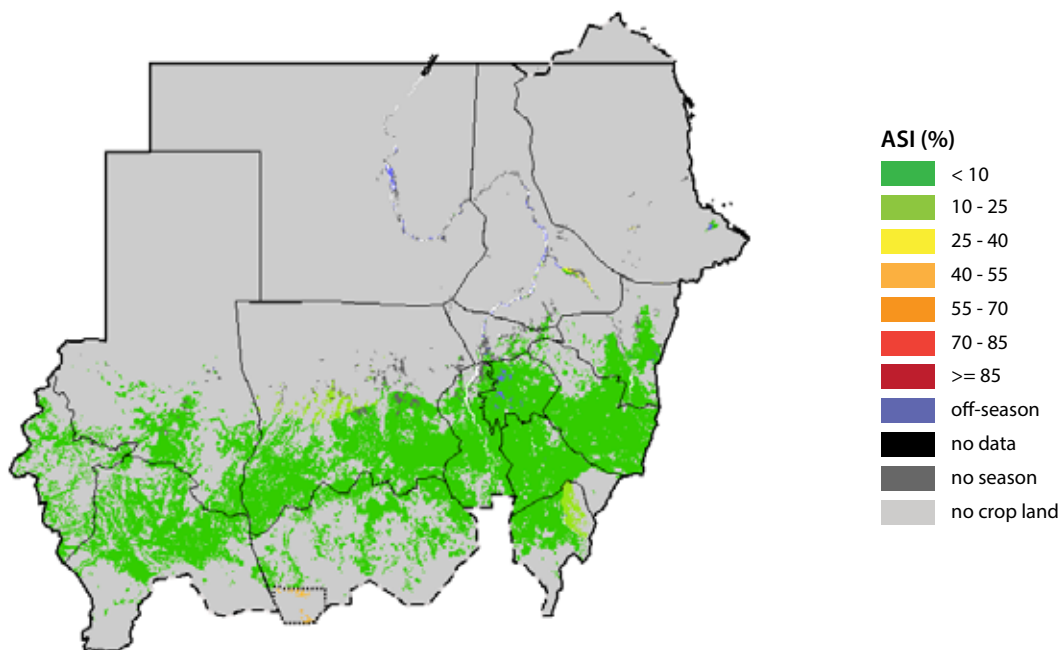
Source: FAO/GIEWS. Conforms to UN World map, February 2019.

Agricultural finance and credit

The provision of short-term agricultural credit through the ABS is a regular procedure in both the irrigated and the rainfed sectors, but more 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. On the other hand, most farmers in the traditional sector are either not sufficiently informed about the procedures to borrow or unable to raise the collateral required to obtaining a loan. Farmers with poor repayment records, with insufficient collateral and loan defaulters from the previous year are excluded by the banks. In addition, most commercial banks prefer to finance harvest operations, especially for sesame, while few banks offer finance for land preparation and planting operations, thus constraining increases in plantings. Micro credit is generally available for small scale traditional farmers through livelihood support programmes managed mainly by NGOs, particularly in Darfur Region.

During the fieldwork, some farmers reported that plots in the Rahad Scheme that were considered too far from the main canals were not financed by the ABS due to the higher risk of water shortages. While some farmers producing cotton in the Suki and Gezira schemes received all needed agricultural inputs through private companies, with a pre set selling price for the final production, some companies failed to reach the final agreement with farmers in the Rahad scheme and credit was not granted.

Short-term seasonal loans to eligible farmers are made through the interest-free *salam* system by the ABS. Under the *salam* system, bank charges are levied in kind, at a value fixed jointly at planting time by the Ministry of Finance, the SRC, the ABS and the farmers' associations. In 2019, the *salam* programme was still not available in West, Central and North Darfur states, where small scale farmers do not meet the ABS minimum required standards and risk is considered to be too high. On the other hand, the *salam* system was available for the first time in South and East Darfur states with a total amount paid of about SDG 8 million. In East Darfur State, only groundnut production was reported to be financed, while in South Darfur State, sorghum, sesame and millet producers were able to access the programme.

The 2019 *salam* prices for the different crops across the country were generally higher than those of a year earlier, reflecting high inflation (Table 4).

However, the 2019 *salam* price was considered too low by farmers due to increasing production costs owing to the soaring inflation and to higher market prices at harvest time. Also, the price paid for sorghum at auction in December was SDG 1 800/90 kg in Gadarif and SDG 2 000/90 kg in Kassala, equivalent to twice the *salam*. The sesame price in Kassala was SDG 4 300/45 kg, more than double the *salam* price.

Table 4: The Sudan – *Salam* prices for different crops in 2018 and 2019 (SDG)

Crop	2018	2019
Red sesame (45 kg)	750	1 750
White sesame (45 kg)	800	2 000
Millet (90 kg)	700	1 200
Millet (90 kg)	300	600
Sorghum (90 kg)	500	1 000
Wheat (90 kg)	1 850	2 500

Source: CFSAM.

The total sum of agricultural finance provided to the agricultural sector in the 14 states visited at the time of the Mission was SDG 6 470 million, more than double the amount in 2018, 24 percent in kind and 76 percent in cash. Beneficiaries were about 44 000, about 20 percent more than in 2018 (Table 5). The area financed was approximately 2.7 million hectares, almost 90 percent was in the semi-mechanized rainfed sector, 6 percent in the irrigated sector and 2 percent in the traditional rainfed sector (Table 6). Although the total amount provided by the ABS was higher than in 2018, the area financed did not change, owing mainly to the increased cost

Table 5: The Sudan - Finance to agriculture by the ABS and number of beneficiaries for summer crops, 2017, 2018 and 2019

State	2017		2018		2019	
	Finance (million SDG)	Beneficiaries	Finance (million SDG)	Beneficiaries	Finance (million SDG)	Beneficiaries
Eastern regions	1 021	18 032	1 681	6 668	2 419	8 975
Sennar and Blue Nile	499	3 773	645	3 756	1 888	3 486
White Nile	154	963	173	950	325	964
North Kordofan	46	2 314	41	11 447	181	9 146
South Kordofan	96	2 393	66	1 214	234	1 574
Gezira	266	10 277	367	12 322	1 146	18 692
Darfur	22	268	2	405	118	996
River Nile	20	166	4	n.a.	27	96
Khartoum	3	9	0.4	n.a.	6	16
Main Branch	164	14	162	25	126	9
Total	**2 316**	**38 352**	**3 143**	**36 787**	**6 470**	**43 954**

Source: ABS.

Table 6: The Sudan - Area financed for summer cropping by sector, 2017, 2018 and 2019

State	Areas financed ('000 hectares)			Areas financed in 2019 (%)
	2017	2018	2019	
Gezira	2 478	2 524	2 392	88.8
Darfur	56	55	95	3.5
River Nile	76	229	152	5.6
Khartoum	10	26	13	0.5
Main Branch	172	71	53	2.0
Total	**2 829**	**2 753**	**2 693**	**100.0**

Source: ABS.

of inputs and agricultural operations. According to data collected at the beginning of the summer season, sorghum farmers received 75 percent of the total finance, while cotton and sunflower accounted for 10 and 11 percent, respectively (Table 7). An additional SDG 700 million were provided to the Ministry of Irrigation for irrigation system rehabilitation activities.

Regarding the winter cropping season, the total finance provided up to December 2019 was SDG 2 190 million, of which 96 percent was granted to the irrigated sector.

Table 7: The Sudan – Amount of finance provided by the ABS by crop (August 2019)

Crop	Total finance (million SDG)	Crop financed (%)
Sorghum	3 160	75.4
Cotton	424	10.1
Sesame	21	0.5
Sunflowers	460	11.0
Groundnuts	57	1.4
Fodder	0.15	0
Horticulture	65	1.6
Sugar cane	0.77	0
Legumes	0.48	0
Total	**4 189**	**100**

Source: CFSAM.

Agricultural inputs

Fuel, seeds, fertilizers, herbicides, labour and agricultural machinery are the main inputs to crop production. The Mission's findings indicate that, owing to an overall upsurge of prices, the application of most agricultural inputs was generally lower compared to the previous year. By contrast, contracted cotton growers were provided with all necessary inputs.

Despite the Government's efforts to meet the needs of the agricultural sector, fuel shortages and delays in fuel deliveries were reported in several areas of the country. A mid-season assessment, carried out by the MoARN, showed that the amount of fuel supplied in 2019 for land preparation, planting and weeding was 36 percent of the total requirements, while it was 52 percent in 2018 (Table 8). To mitigate the impact of fuel shortages, farmers were forced to purchase it on the parallel market, paying three to four times the official price or to purchase

it from Port Sudan or Khartoum, bearing the high transportation costs.

Fuel shortages at the beginning of the season were reported at the Gash Irrigation Scheme, where, as a consequence, machines could clean only 30 percent of the canals, and at the Rahad, New Halfa and Sennar schemes, where, however, availability improved over the rest of the season. In Kassala, several re-plantings following crop failures further increased the need for fuel, limiting the fuel availability for planting operations of onion and other vegetables.

In White Nile, and in North, West and South Kordofan states, the lack of fuel provided by the Government was particularly severe at harvest time. In addition, tanks for storing large quantities of fuel were unavailable in many localities limiting to a minimum the local autonomy and forcing to continuous supply. Most of the farmers had to resort

Table 8: The Sudan - Fuel required/received for land preparation, planting and weeding, mid-September 2019 ('000 m³) [1]

State	Required			Received	Percent
	Land preparation and sowing	Weeding	Total		
North Darfur	3.9	1.3	5.2	1.8	35
South Darfur	10.0	3.4	13.4	4.0	30
Centre Darfur	2.3	0.8	3.1	0.4	14
East Darfur	8.2	2.8	11	0.8	7
West Darfur	2.8	0.9	3.7	0.4	10
North Kordofan	7.1	2.4	9.4	3.4	36
South Kordofan	22.5	7.5	30.0	9.2	31
West Kordofan	8.3	2.8	11.1	2.9	26
West Nile	10.2	3.4	13.6	9.9	73
Blue Nile	14.2	4.8	19.0	9.1	48
Sennar	17.3	5.8	23.2	10.1	43
Gezira	6.4	2.2	8.6	3.2	38
Gadarif	34.7	11.6	46.3	15.2	33
Kassala	12.7	4.2	16.9	6.8	40
Total	**160.5**	**53.8**	**214.3**	**77.3**	**36**

Source: State ministries of Agriculture.

[1] Irrigated schemes have different arrangements and are not included.

to the black market, where prices increased up to 40 percent between the preparation and cultivation starting in July and the November harvest.

No particular shortages were reported in Greater Darfur, where traditional agricultural practices prevail and fuel requirements are lower, in the states of Red Sea and Gezira and in Tokar Scheme.

The majority of farmers use seeds retained from the previous year or purchased from the local markets. Seed purity is often low and the productivity of the traditional varieties is decreasing year by year.

Improved seeds are used mostly in irrigation schemes and by some farmers in the semi-mechanized rainfed sector, while their adoption in the traditional rainfed sector remains negligible.

Prices of seeds at the beginning of the season were at very high levels. In Kassala State, the price of sorghum seeds in July was SDG 20/kg for traditional varieties and SDG 80/kg for improved varieties, about 43 percent higher than in 2018 for both. In Blue Nile State, the increase was of 140 percent, with improved seed costing in July of about SDG 48/kg (Table 9).

Table 9: The Sudan - Prices of sorghum seeds in various locations (SDG/kg)

State	Price		
	2019	2018	Percent change
Kassala	20-80	14-56	43
Gash	18	17	5
New Halfa	54	25	116
Tokar	60	45	25
Blue Nile	48	20	140
North Kordofan	24	8	200
South Kordofan	28	28	36
West Kordofan	30	23	30
White Nile	50	30	67

Source: CFSAM (field visits).

Millet seeds were traded at about SDG 40-60/kg, almost twice the levels of July 2018, while groundnut seeds (Sodari and Gibaish varieties) were sold at SDG 57/kg, twice their year-earlier levels. Prices of sesame seeds, cotton and vegetables were also higher than a year earlier. For example, sesame seeds were traded in July at SDG 100-150/kg, 50 percent more than 12 months earlier. Watermelon seeds were sold at SDG 75/kg, 60 percent more than the previous year. The price of wheat seeds was SDG 45/kg, more than double the price paid in 2018.

In 2019, the total quantity of seeds delivered by MoANR to the agricultural State ministries in 14 states amounted to 1 941 tonnes of which 1 544 tonnes were sorghum (Arfa Gadamak, Wad Ahmed, Tabat

and Butana varieties) and 195 tonnes were millet (Table 10). Compared to 2018, the delivered quantities declined by 56 percent. The shortage of seeds was severe where farmers had to replant multiple times. In the Darfur State, most seeds were provided by the international organizations and NGOs. In some parts of East Darfur State, seeds were delivered late, after feasible planting dates, and are expected to be stored and used in the 2020 cropping season.

In 2019, FAO distributed crop and vegetable seeds, agricultural tools and other inputs to smallholder farmers (Table 11). The total quantity of crop seeds distributed amounted to 2 077 tonnes. In addition, 89 602 kg of vegetable seeds and 128 808 hand tools were distributed.

Table 10: The Sudan - Quantities of seeds distributed by MoANR in 2019 ('000 tonnes)

State	Sorghum	Millet	Sesame	Groundnuts	Cotton	Sunflowers	Cowpeas	Total
North Darfur	110	30	8	-	-	-	0.5	**148.5**
South Darfur	130	15	8	-	-	-	0.5	**153.5**
Centre Darfur	110	20	8	-	-	-	0.5	**138.5**
East Darfur	110	20	8	-	-	-	0.5	**138.5**
West Darfur	110	20	8	-	-	-	0.5	**138.5**
North Kordofan	117	20	8	10	-	-	0.5	**155.5**
South Kordofan	130	10	5	-	10	2.0	0.5	**157.5**
West Kordofan	115	20	8	10	-	-	0.5	**153.5**
West Nile	117	10	7	-	-	0.5	0.5	**140.0**
Blue Nile	115	10	7	-	-	4.5	0.5	**157.0**
Sennar	100	10	7	-	10	3.0	0.5	**130.5**
Gezira	90	5	3	-	-	2.0	-	**100.0**
Gadarif	100	5	5	-	20	4.0	-	**134.0**
Kassala	90	0	5	-	-	-	0.5	**95.5**
Total	**1 544**	**195**	**95**	**20**	**65**	**16.0**	**6.0**	**1 941.0**

Source: MoANR.

Table 11: The Sudan - Agricultural inputs provided by FAO, 2019

Item	Unit	Quantity
Crop seeds	tonne	2 077
Vegetable seeds	kg	89 602
Fodder seeds	kg	2 500
Hand tools	piece	128 808
Donkey carts	piece	6 950
Livestock concentrates and licks	tonne	182
Animal Feeds	tonne	278
Vaccines	dose	6 490 000
Live animals	head	7 556

Source: FAO-Sudan.

No particular problems were reported regarding the availability of agricultural machinery in the eastern regions, although fuel shortages sometimes limited their use and increases in the price of fuel and spare parts led to the sharp increases in the cost of agricultural operations. In South and North Kordofan states, on the other hand, the unavailability of machinery was a major issue and resulted in delayed agricultural operations.

Fertilizers and herbicides were generally available across the country, but at high prices, reflecting the increasing inflation. Diammonium Phospate (DAP) was traded in early August at SDG 1 550 and SDG 1 800 per 50 kg in Rahad and Gezira schemes, respectively, almost double the price of one year earlier. The price of DAP in November reached SDG 1 500 in Gadarif and 1 700 in Sennar. The price of urea in Rahad, Khartoum and River Nile was SDG 1 550 per 50 kg sack, compared to SDG 700 in 2018. Similarly, prices of common pesticides and herbicides were on average between 55 and 70 percent higher than in 2018. In Gadarif, the price of herbicides was reported to have more than doubled over the previous 12 months.

Similarly, agricultural labour was costlier, year on year, for planting operations and daily agricultural practices. The expansion in total area planted, shortages of fuel and the reduced availability of other inputs increased the demand for manual operations. In Darfur State, the improved security situation allowed displaced people to return to their farms, increasing the demand for daily labourers and exerting upward pressure on wages. Labourers were also requesting higher wages to protect their purchasing power following the high inflation. Workers in East Darfur and Gadarif states were paid between SDG 450 and SDG 500 compared to SDG 250 to SDG 300 in the previous season. The presence of South Sudanese refugees in White Nile, West Kordofan, North Kordofan and Blue Nile states ensured an ample supply of labour at stable prices, although workers preferred to be employed in large farms where they could be hired for more days.

At the time of the Mission, farm labour was generally available for harvesting operations, but at twice or even three times the cost of last year in Gezira,

Sennar, Kassala and Blue Nile states. Shortages were reported in River Nile, Northern State, South Darfur and Red Sea states where the work force is traditionally absorbed by the gold mining sector.

Crop pests and diseases

In the 2019 summer cropping season, the incidence of pests, diseases and weeds was significantly higher than in previous years. The sequence of extreme weather events weakened crops, while the overall more humid environment, due to the long rainy season, favoured the proliferation of weeds and pests at the final stages of crop growth, during grain development and filling.

Rat infestations were reported at significant levels in Kassala, Blue Nile, West Kordofan, South Kordofan, White Nile and Darfur states. The early onset of summer rains in May improved soil moisture and vegetation growth, stimulating rodent reproduction. During the prolonged dry spell of July, enlarged populations caused serious damage to crops during planting and establishment by feeding on newly sprouted plants or digging up the seeds. Farmers in the key producing states of Gezira, Sennar and Gadarif were forced to replant multiple times, sometimes beyond the optimum planting date. Poisonous baits were disseminated, but they were only partially effective in limiting the damage. The impact of rats at planting stage was particularly severe in the irrigation schemes of Rahad, New Halfa and Tokar, where farmers were also forced to replant. The crops affected were mainly sorghum, millet, sesame and groundnuts.

Despite continuous monitoring and control measures put in place by the Sudan's Plant Protection Division, numerous attacks by birds were reported in most important crop production areas. The most severe damage was caused by the migrating red billed quelea bird (*Quelea quelea*) as their large populations and rapid reproduction make control extremely difficult. Storms migrating from South Sudan were reported to have fed on grain crops in Gadarif, Kassala, Blue Nile, Gezira, West Kordofan, South Kordofan, South Darfur, River Nile and Khartoum states. Damage was particularly severe in Sennar State, where nearly 20 percent of the sorghum crop in the traditional rainfed sector suffered heavy losses.

Late replanting due to adverse weather conditions and pest outbreaks (rats, birds and locusts) exposed the sorghum crops to attacks by the Sorghum Midge (*Contarinia sorghicola*), an insect which is a major pest of sorghum. High populations on non-resistant varieties can completely destroy the crop. Favoured by the atypically wet environment of October, the pest easily proliferated on plants at milling stage, affecting crops in Rahad, Sennar and Kassala states and especially in Gadarif State, where attacks caused crop failure in localized areas.

Similarly, sesame crops were affected in Gadarif and Sennar states by the Sesame Gall Midge (*Asphondylia sesame*), whose larvae infest the fruit capsule and feed on the seeds, leading to a sharp reduction in yields. As the midge attacks were unexpected and unknown to many farmers, no prevention strategy was in place and production losses were significant.

Although preventive treatments were conducted to control locusts and grasshoppers at breeding stage, widespread crop losses were reported at the beginning of the season. In Gadarif, White Nile, Kassala, South Kordofan and Khartoum states, swarms of desert locusts (*Schiostocerca gregaria*) negatively affected agricultural production. In addition, Brown Locust (*Anacridium spp*) attacked about 18 000 hectares of farmland in the southern part of Gadarif and 3 000 hectares in Blue Nile, damaging sorghum and sesame crops. Attacks were reported also in Tokar Scheme and in the states of Gezira, Centre Darfur and White Nile. Infestations of grasshoppers (*Aiolopus spp*) were reported in Gadarif, Blue Nile, Gezira, White Nile, River Nile, West and South Kordofan and in Central and East Darfur. Prompt control measures limited the damage to crops.

The Fall Armyworm (*Spodoptera frugiperda*) was detected in Blue Nile State, causing only limited damage to sorghum. Attacks by the Watermelon Bug (*Aspongopus viduatus*) were detected on plantations in North Darfur and in North and West Kordofan, where losses were significant, reaching up to 60 percent of the total expected output. Jassids (*Amrasca devastans*), thrips, aphids and white flies caused little damage to cotton in Gezira, Suki and Rahad schemes.

The abundant and long rainy season favoured growth of weeds, given also the reduced use of herbicides and farmers' limited knowledge of good agricultural practices. Increased infestations of Striga and Sudan grass were reported in many semi-mechanized rainfed cropping areas and yield losses on sorghum, millet and cotton were observed in South Darfur, East Darfur, South Kordofan, Kassala and Gadarif states.

The uncontrolled growth of Mesquite trees (*Prosopis chilensis* and *Prosopis juliflora*) in Red Sea State and specifically in the Gash and Tokar deltas was reported to have affected agricultural production by significantly reducing the area of agricultural land and disrupting irrigation channels.

Area planted and harvested in 2019/20

The area planted with sorghum in 2019/20 is estimated at 9 million hectares, about 13 percent less than in the previous year. The overall decrease was due mainly by a reduction of 21 percent in the traditional rainfed sector and of 7 percent in the mechanized rainfed sector. At the same time, the area planted with millet was estimated at a near-average level of 4 million hectares, 16 percent less compared to 2018, when millet plantings were record highs due to good weather conditions and to the improved security situation. The reduction in millet plantings was confined mainly to North and West Kordofan and North and West Darfur, where, in particular, tribal clashes restricted access to agricultural land. Sorghum plantings, instead, declined nationwide.

The main reason for the overall decline in the area planted with both cereals was a change in cropping patterns toward the remunerative crops such as sesame and groundnuts.

The total area harvested of both sorghum and millet was below their levels a year earlier. In addition, the ratio of area harvested to area planted declined year on year nationwide, falling from 77 to 70 percent for sorghum and from 77 to 74 percent for millet. The decline was due to the severe damage caused by dryness, pests and waterlogging to sorghum in Gadarif, Blue Nile, Kassala, Sennar, White Nile and South Kordofan states and to millet in the Darfur

and Kordofan states. In the most affected areas, farmers were forced to replant multiple times, to shift to shorter cycle crops or, in some cases, to sell residues of failed crops to pastoralists.

The total harvested area of sorghum was estimated at 6.3 million hectares, 21 percent less than in the previous year and 17 percent less than the five-year average. The total harvested area for millet was estimated at 3 million hectares, 20 percent less than in 2018, but 5 percent more than the five-year average.

Sowing of the 2019/20 wheat crop began at the time of the Mission, with the total planted area expected to be about 318 000 hectares, compared to 301 000 hectares in the previous year and 242 000 hectares of the five-year average. The expected expansion follows a decision by the Government to promote wheat production by increasing the minimum price for farmers. The increase is expected to take place mainly in the irrigated sector. However, delays in cleaning of canals and maintenance operations are likely to constrain agricultural activities and reduce the output of wheat.

Table 12: The Sudan - Cereal area harvested by State/Scheme and sector ('000 hectares)

State/Scheme and sector	Sorghum					Millet					Wheat				
	5-yr average 2014/15-2018/19	2018/19	2019/20	2019/20 as % 2018/19	2019/20 as % 5-yr average	5-yr average 2014/15-2018/19	2018/19	2019/20	2019/20 as % 2018/19	2019/20 as % 5-yr average	5-yr average 2014/15-2018/19	2018/19	2019/20	2019/20 as % 2018/19	2019/20 as % 5-yr average
Irrigated															
Northern	1.4	0.8	0.8	100	59	-	-	-	-	-	40	46	55	120	137
River Nile	10.0	8	12	161	127	-	-	-	-	-	17	20	24	121	147
Khartoum	0.3	2	2	100	500	-	-	-	-	-	1	1		0	0
Gezira Scheme	149	120	119	99	80	-	-	-	-	-	133	151	159	105	119
Suki	12	9	12	127	95	-	-	-	-	-	-	-	-	-	-
Sennar	25	22	26	119	106	-	-	-	-	-	1	0	-	-	-
White Nile	44	43	27	64	63	-	-	-	-	-	15	31	33	108	220
Rahad	31	23	23	100	76	-	-	-	-	-	0	-	1		298
New Halfa	28	21	21	104	76	-	-	-	-	-	23	35	28	79	121
Gash	26	29	25	86	96	-	-	-	-	-	-	-	-	-	-
Kassala	1	1	14	1 100	1 179	-	-	-	-	-	-	-	-	-	-
Tokar	9	11	8	80	94	8	4	4	100	50	-	-	-	-	-
North Kordofan	2	4	8	200	370	-	-	-	-	-	-	-	-	-	-
Total	339	293	299	102	88	8	4	4	100	50	230	284	301	106	131
Semi-mechanized															
Sennar	690	499	563	113	82	72	-	-	-	-	-	-	-	-	-
White Nile	393	305	212	70	54	31	16	17	105	55	-	-	-	-	-
Blue Nile	422	480	403	84	95	27	-	-	-	-	-	-	-	-	-
Gadarif	1 939	1 806	1 105	61	57	89	101	131	129	147	-	-	-	-	-
Kassala	350	490	265	54	76	-	-	-	-	-	-	-	-	-	-
North Kordofan	12	16	0	0	0	-	-	-	-	-	-	-	-	-	-
West Kordofan	178	646	311	48	175	-	-	-	-	-	-	-	-	-	-
South Kordofan	572	346	504	146	88	13	15	8	54	63	-	-	-	-	-
Total	4 556	4 587	3 363	73	74	231	132	156	118	67	-	-	-	-	-
Traditional rainfed															
River Nile	40	50	82	163	203	-	-	-	-	-	-	-	-	-	-
Khartoum	33	21	18	86	55	-	-	-	-	-	-	-	-	-	-
Gezira	273	382	322	84	118	8	27	19	70	250	-	-	-	-	-
Sennar	231	220	-	0	0	22	75	94	126	427	-	-	-	-	-
White Nile	139	189	180	95	129	16	17	11	65	67	-	-	-	-	-
Blue Nile	69	88	-	0	0	13	48	56	116	440	-	-	-	-	-
Kassala	76	224	114	51	150	7	6	-	-	0	-	-	-	-	-
Red Sea	9	24	8	36	89	6	3	2	63	33	-	-	-	-	-
North Kordofan	261	289	281	98	108	43	42	35	84	82	-	-	-	-	-
West Kordofan	159	105	47	45	30	585	570	352	62	60	-	-	-	-	-
South Kordofan	172	158	170	107	98	428	341	218	64	51	-	-	-	-	-
North Darfur	116	235	214	91	185	175	276	196	71	112	-	-	-	-	-
West Darfur	185	260	171	66	93	408	563	654	116	160	2	2	2	100	119
South Darfur	426	483	507	105	119	434	794	651	82	150	2	1	1	100	52
Centre Darfur	135	185	205	111	153	299	561	270	48	90	-	-	-	-	-
East Darfur	370	252	343	136	93	177	294	299	102	169	-	-	-	-	-
Total	2 693	3 166	2 662	84	99	2 621	3 616	2 856	79	109	4	3	3	100	83
Grand total	7 588	8 046	6 325	79	83	2 860	3 753	3 016	80	105	234	287	304	106	130

Source: CFSAM.

Crop yields

The average sorghum yield in 2019 is estimated at 0.63 tonnes per hectare, slightly below the average level and 6 percent below the yield obtained in 2018. The greatest decrease was observed in the semi-mechanized sector, where the average yield of 0.41 tonnes per hectare was about 24 percent lower than that of 2018 and 29 percent below the five-year average. This decrease is due to the impact of dry weather, pests, weeds and floods on yields. In Gadarif State, yields achieved were reduced by 45 percent compared to previous year and the five-year average as a consequence of adverse weather conditions and of severe attacks by the sorghum midge. In the irrigated sector, an average yield of 2.16 tonnes per hectare was achieved, about 2 percent more than the previous year.

The average millet yield is estimated at 0.38 tonnes per hectare, almost half the level of the previous year and 21 percent less than the five-year average. The decrease was mainly registered in the traditional rainfed sector due to the bad distribution of seasonal rains and the attacks of birds, rats and locusts at the beginning of the season.

The wheat crops, apart from a small rainfed area on the Jebel Marra in South and Centre Darfur states, are grown under irrigation and, therefore, the average yields have been obtained across the years. However, malfunctioning of the irrigation systems remain as a risk to reduce potential yields.

Table 13: The Sudan - Crops yields by State/Scheme and sector (tonnes/hectare)

State/Scheme and sector	Sorghum 5-yr average 2014/15-2018/19	Sorghum 2018/19	Sorghum 2019/20	Sorghum 2019/20 as % 2018/19	Sorghum 2019/20 as % 5-yr average	Millet 5-yr average 2014/15-2018/19	Millet 2018/19	Millet 2019/20	Millet 2019/20 as % 2018/19	Millet 2019/20 as % 5-yr average	Wheat 5-yr average 2014/15-2018/19	Wheat 2018/19	Wheat 2019/20	Wheat 2019/20 as % 2018/19	Wheat 2019/20 as % 5-yr average
Irrigated															
Northern	2.24	2.38	1.19	50	53	-	-	-	-	-	2.79	2.86	3.10	108	111
River Nile	2.21	2.12	2.38	113	108	-	-	-	-	-	2.28	2.38	2.62	110	115
Khartoum	1.19	1.19	1.43	120	120	-	-	-	-	-	-	-	-	-	-
Gezira Scheme	2.12	2.38	2.57	108	121	-	-	-	-	-	2.32	2.38	2.14	90	92
Suki	2.28	2.81	1.70	60	74	-	-	-	-	-	-	-	-	-	-
Sennar	1.61	1.44	1.40	97	87	-	-	-	-	-	-	-	-	-	-
White Nile	1.91	1.89	2.12	112	111	-	-	-	-	-	2.20	2.38	2.38	100	108
Rahad	2.26	2.86	2.16	76	96	-	-	-	-	-	1.79	-	1.59	-	89
New Halfa	2.20	1.80	2.19	122	100	-	-	-	-	-	2.19	2.38	2.38	100	109
Gash	1.95	1.94	2.02	104	104	-	-	-	-	-	-	-	-	-	-
Kassala	1.70	1.59	1.73	109	102	-	-	-	-	-	-	-	-	-	-
Tokar	1.55	1.62	1.43	88	92	0.81	0.95	0.95	100	118	-	-	-	-	-
North Kordofan	0.71	0.95	1.00	105	142	-	-	-	-	-	-	-	-	-	-
Total	**2.04**	**2.14**	**2.16**	**101**	**106**	**0.81**	**0.95**	**0.95**	**100**	**118**	**2.38**	**2.46**	**2.40**	**98**	**101**
Semi-mechanized															
Sennar	0.67	0.43	0.44	103	66	0.50	-	-	-	-	-	-	-	-	-
White Nile	0.62	0.52	0.43	83	69	0.42	0.49	0.46	95	109	-	-	-	-	-
Blue Nile	0.62	0.54	0.43	80	70	0.38	-	-	-	-	-	-	-	-	-
Gadarif	0.57	0.56	0.37	65	65	0.33	0.32	0.43	136	129	-	-	-	-	-
Kassala	0.56	0.51	0.42	82	74	-	-	-	-	-	-	-	-	-	-
North Kordofan	0.52	0.45	-	0	0	-	-	-	-	-	-	-	-	-	-
West Kordofan	0.54	0.64	0.48	75	89	-	-	-	-	-	-	-	-	-	-
South Kordofan	0.52	0.53	0.43	81	82	0.35	0.54	0.13	23	36	-	-	-	-	-
Total	**0.59**	**0.54**	**0.41**	**76**	**71**	**0.46**	**0.36**	**0.42**	**115**	**90**	**-**	**-**	**-**	**-**	**-**
Traditional rainfed															
River Nile	0.87	0.60	1.43	240	164	-	-	-	-	-	-	-	-	-	-
Khartoum	0.46	0.48	0.72	151	156	-	-	-	-	-	-	-	-	-	-
Gezira	0.57	0.64	0.81	126	142	0.50	0.60	0.69	116	137	-	-	-	-	-
Sennar	0.62	0.53	-	-	-	0.40	0.36	0.36	100	90	-	-	-	-	-
White Nile	0.39	0.43	0.33	78	85	0.39	0.42	0.37	88	93	-	-	-	-	-
Blue Nile	0.63	0.50	-	-	-	0.30	0.27	0.30	113	102	-	-	-	-	-
Kassala	0.53	0.53	0.43	81	81	0.40	0.34	-	-	-	-	-	-	-	-
Red Sea	0.51	0.64	0.48	75	93	0.25	0.30	0.48	160	190	-	-	-	-	-
North Kordofan	0.27	0.22	0.45	205	169	0.34	0.34	0.29	85	85	-	-	-	-	-
West Kordofan	0.36	0.34	0.60	174	165	0.20	0.17	0.13	77	63	-	-	-	-	-
South Kordofan	0.64	0.69	0.83	121	129	0.32	0.43	0.34	78	106	-	-	-	-	-
North Darfur	0.51	0.64	0.26	41	51	0.91	1.19	0.71	60	79	-	-	-	-	-
West Darfur	1.12	1.50	0.75	50	67	0.53	0.83	0.42	50	79	1.45	1.59	1.59	100	110
South Darfur	0.73	0.95	0.96	101	132	0.49	0.71	0.20	28	42	1.19	1.19	1.19	100	100
Centre Darfur	1.15	1.50	0.98	65	85	1.02	1.31	0.48	36	47	-	-	-	-	-
East Darfur	0.31	0.64	0.86	133	275	0.34	0.60	0.64	108	191	-	-	-	-	-
Total	**0.59**	**0.73**	**0.74**	**101**	**126**	**0.47**	**0.72**	**0.37**	**52**	**79**	**1.33**	**1.36**	**1.36**	**100**	**102**
Grand total	**0.65**	**0.68**	**0.63**	**94**	**97**	**0.47**	**0.71**	**0.38**	**53**	**79**	**2.36**	**2.45**	**2.39**	**98**	**101**

Source: CFSAM.

Cereal production estimates

The total production of sorghum and millet in 2019/20 is estimated at 5.1 million tonnes, 57 percent below the previous year and 18 percent less than the five year average. The drop in total production is due to a decline in the overall area planted with cereals in favour of more remunerative cash crops (mainly sesame and groundnuts), and to lower yields resulting from unfavourable weather conditions and pest attacks.

Sorghum production is estimated at about 4 million tonnes, 26 percent lower than the level of the previous year and 19 percent less than the five-year average. National millet production is estimated at 1.1 million tonnes, 63 percent lower than the bumper production of the 2018 and 16 percent less than the five-year average. Wheat production is forecast, based on planting intentions, at 727 000 tonnes, about 4 percent higher than the previous year's high level, reflecting above-average plantings.

Table 14: The Sudan - Cereal production by State/Scheme and sector ('000 tonnes)

State/Scheme and sector	Sorghum					Millet					Wheat				
	5-yr average 2014/15-2018/19	2018/19	2019/20	2019/20 as % 2018/19	2019/20 as % 5-yr average	5-yr average 2014/15-2018/19	2018/19	2019/20	2019/20 as % 2018/19	2019/20 as % 5-yr average	5-yr average 2014/15-2018/19	2018/19	2019/20	2019/20 as % 2018/19	2019/20 as % 5-yr average
Irrigated															
Northern	3	2	1	50	31	-	-	-	-	-	113	132	172	130	152
River Nile	21	16	29	181	137	-	-	-	-	-	39	48	64	133	164
Khartoum	0	2	2	120	600	-	-	-	-	-	-	-	-	-	-
Gezira Scheme	316	285	306	107	97	-	-	-	-	-	308	359	340	95	110
Suki	28	26	20	77	70	-	-	-	-	-	-	-	-	-	-
Sennar	40	32	37	116	92	-	-	-	-	-	-	-	-	-	-
White Nile	83	81	58	72	70	-	-	-	-	-	32	73	78	107	244
Rahad	69	66	50	76	72	-	-	-	-	-	1	-	2	-	333
New Halfa	62	37	47	127	76	-	-	-	-	-	51	84	67	80	131
Gash	51	57	51	89	100	-	-	-	-	-	-	-	-	-	-
Kassala	2	2	24	1 200	1 200	-	-	-	-	-	-	-	-	-	-
Tokar	14	17	12	71	87	7	4	4	105	62	-	-	-	-	-
North Kordofan	2	4	8	210	525	-	-	-	-	-	-	-	-	-	-
Total	**692**	**627**	**646**	**103**	**93**	**7**	**4**	**4**	**105**	**62**	**544**	**696**	**723**	**104**	**133**
Semi-mechanized															
Sennar	462	213	248	116	54	36	-	-	-	-	-	-	-	-	-
White Nile	244	157	91	58	37	13	8	8	100	62	-	-	-	-	-
Blue Nile	260	257	173	67	66	10	-	-	-	-	-	-	-	-	-
Gadarif	1 104	1 019	408	40	37	30	32	56	175	187	-	-	-	-	-
Kassala	196	249	110	44	56	-	-	-	-	-	-	-	-	-	-
North Kordofan	6	7	0	0	0	-	-	-	-	-	-	-	-	-	-
West Kordofan	96	412	148	36	154	-	-	-	-	-	-	-	-	-	-
South Kordofan	299	184	216	117	72	4	8	1	13	25	-	-	-	-	-
Total	**2 667**	**2 498**	**1 394**	**56**	**52**	**93**	**48**	**65**	**135**	**70**	**-**	**-**	**-**	**-**	**-**
Traditional rainfed															
River Nile	35	30	117	390	332	-	-	-	-	-	-	-	-	-	-
Khartoum	15	10	13	130	87	-	-	-	-	-	-	-	-	-	-
Gezira	155	245	260	106	167	4	16	13	81	342	-	-	-	-	-
Sennar	144	116	-	0	0	9	27	34	126	386	-	-	-	-	-
White Nile	55	81	60	74	109	6	7	4	57	63	-	-	-	-	-
Blue Nile	43	44	-	-	-	4	13	17	131	447	-	-	-	-	-
Kassala	41	119	49	41	121	3	2	-	0	0	-	-	-	-	-
Red Sea	5	15	4	27	83	2	1	1	100	63	-	-	-	-	-
North Kordofan	70	64	128	200	182	14	14	10	71	69	-	-	-	-	-
West Kordofan	57	36	28	78	49	118	95	45	47	38	-	-	-	-	-
South Kordofan	111	109	141	129	127	135	146	73	50	54	-	-	-	-	-
North Darfur	59	151	56	37	95	158	329	140	43	88	-	-	-	-	-
West Darfur	207	390	128	33	62	215	469	273	58	127	3	2	2	100	77
South Darfur	311	460	489	106	157	211	567	132	23	63	2	2	2	100	83
Centre Darfur	155	278	201	72	130	304	734	129	18	42	-	-	-	-	-
East Darfur	115	162	294	181	255	60	175	193	110	323	-	-	-	-	-
Total	**1 580**	**2 310**	**1 968**	**85**	**125**	**1 243**	**2 595**	**1 064**	**41**	**86**	**5**	**4**	**4**	**100**	**80**
Grand total	**4 939**	**5 435**	**4 008**	**74**	**81**	**1 343**	**2 647**	**1 133**	**43**	**84**	**549**	**700**	**727**	**104**	**133**

Source: CFSAM.

Table 15: The Sudan - Cereal production by sector ('000 tonnes)

Sector	Sorghum			Millet			Wheat		
	5-yr average[1]	2018/19	2019/20 (forecast)	5-yr average[1]	2018/19	2019/20 (forecast)	5-yr average[1]	2018/19	2019/20 (forecast)
Irrigated	692	627	646	7	4	4	544	696	723
Semi-mechanized rainfed	2 667	2 498	1 394	93	48	65	-	-	-
Traditional rainfed	1 580	2 310	1 968	1 243	2 595	1 064	5	4	4
Total	**4 939**	**5 435**	**4 008**	**1 343**	**2 647**	**1 133**	**549**	**700**	**727**

Source: CFSAM.
[1] 2014/15-2018/19 average.

Table 16: The Sudan - Sorghum production by sector

Sector	Five-year average[1]			2018/19			2019/20		
	Area ('000 ha)	Production ('000 t)	Yield (t/ha)	Area ('000 ha)	Production ('000 t)	Yield (t/ha)	Area ('000 ha)	Production ('000 t)	Yield (t/ha)
Irrigated	339	692	2.04	293	627	2.14	299	646	2.16
Semi-mechanized rainfed	4 556	2 498	0.59	4 586	2 498	0.54	3 363	1 394	0.41
Traditional rainfed	2 693	2 310	0.59	3 166	2 310	0.73	2 662	1 968	0.74
Total	**7 588**	**5 435**	**0.65**	**8 046**	**5 435**	**0.68**	**6 325**	**4 008**	**0.63**

Source: CFSAM.
[1] 2014/15-2018/19 average.

Table 17: The Sudan - Millet production by sector

Sector	Five-year average[1]			2018/19			2019/20		
	Area ('000 ha)	Production ('000 t)	Yield (t/ha)	Area ('000 ha)	Production ('000 t)	Yield (t/ha)	Area ('000 ha)	Production ('000 t)	Yield (t/ha)
Irrigated	8	7	0.81	4	4	0.95	4	4	0.95
Semi-mechanized rainfed	231	93	0.46	132	48	0.36	156	65	0.42
Traditional rainfed	2 621	1 243	0.47	3 616	2 595	0.72	2 856	1 064	0.37
Total	**2 860**	**1 343**	**0.47**	**3 753**	**2 647**	**0.71**	**3 016**	**1 133**	**0.38**

Source: CFSAM.
[1] 2014/15-2018/19 average.

Table 18: The Sudan - Wheat production by sector

Sector	Five-year average[1]			2018/19			2019/20		
	Area ('000 ha)	Production ('000 t)	Yield (t/ha)	Area ('000 ha)	Production ('000 t)	Yield (t/ha)	Area ('000 ha)	Production ('000 t)	Yield (t/ha)
Irrigated	230	544	2.38	284	459	2.46	301	593	2.40
Semi-mechanized rainfed	–	–	–	–	–	–	–	–	–
Traditional rainfed	4	5	1.33	3	4	1.36	3	4	1.36
Total	**234**	**549**	**2.36**	**287**	**700**	**2.45**	**304**	**727**	**2.45**

Source: CFSAM.
[1] 2014/15-2018/19 average.

Other crops

Sesame

Production of sesame in 2019 is estimated at 1.21 million tonnes, 26 percent higher than in 2018, with major increases reported in Sennar, North Kordofan and South Kordofan states. The increase was mainly due to a 38 percent expansion of the planted area in Gadarif, Kassala, Gezira, White Nile, Kordofan states and most of Darfur as farmers substituted sorghum and millet in expectation of high market prices and an early start to seasonal rains. However, owing to unfavourable weather and to pest outbreaks, only 68 percent of the area planted at national level was eventually harvested. Drought, floods and pest attacks at the beginning of the season led to pronounced losses and forced farmers to switch to shorter cycle crops. Farmers in South Kordofan,

North Kordofan and Gadarif states were the most affected.

Average yields in the mechanized rainfed sector were lower than in 2018, although output improved in Sennar thanks to more favourable weather conditions compared to other eastern states. In Kassala and Gadarif states, attacks by the Sesame Gall Midge and the spread of weeds, both consequences of late and intense rains in September and October, sharply reduced yields and led to a lower final output.

In the traditional rainfed sector, where family farming is the predominant form of agriculture and plots are smaller, farmers have greater control over their crops and are more able to cope with weeds and floods. As a result, they obtained higher yields and good overall production. Consequently, the national average yield of 0.28 tonnes per hectare was in line with that of the previous year (Table 19).

Table 19: The Sudan - Sesame production, 2018/19 and 2019/20

State/Scheme and sector	2018/19				2019/20			
	Area planted ('000 ha)	Area harvested ('000 ha)	Production ('000 t)	Yields (t/ha)	Area planted ('000 ha)	Area harvested ('000 ha)	Production ('000 t)	Yields (t/ha)
Mechanized rainfed								
Sennar	861	717	225	0.31	899	674	271	0.40
White Nile	294	179	58	0.32	253	189	59	0.31
Blue Nile	336	218	65	0.30	315	236	75	0.32
Gadarif	508	451	145	0.32	653	457	98	0.21
Kassala	147	102	31	0.30	252	202	43	0.21
South Kordofan	256	218	68	0.31	396	238	51	0.21
Total	**2 402**	**1 885**	**592**	**0.31**	**2 768**	**1 997**	**597**	**0.30**
Traditional rainfed								
Gezira	51	46	15	0.32	135	125	59	0.47
White Nile	126	88	22	0.25	302	211	45	0.21
Kassala	-	-	-	-	42	34	8	0.23
North Kordofan	1 159	785	127	0.16	1 518	746	166	0.22
West Kordofan	135	127	27	0.21	361	217	65	0.30
South Kordofan	136	102	27	0.26	475	427	104	0.24
North Darfur	88	75	8	0.11	155	124	23	0.19
West Darfur	100	96	46	0.48	218	177	78	0.44
South Darfur	191	172	74	0.43	69	67	29	0.43
Centre Darfur	98	95	41	0.43	101	82	18	0.22
Eastern Darfur	12	8	2	0.26	69	36	17	0.48
Total	**2 097**	**1 594**	**389**	**0.24**	**3 445**	**2 247**	**612**	**0.27**
Grand Total	**4 500**	**3 480**	**981**	**0.28**	**6 213**	**4 244**	**1 209**	**0.28**

Source: CFSAM.

At the time of the Mission, the sesame harvest was almost complete, while in a few areas threshing operations were delayed due to the lack of labour or postponement given the unusual rains in October.

Groundnuts

National production of groundnuts in 2019 is estimated at 2.8 million tonnes, about 2 percent lower than in 2018, but almost double compared to the five-year average (Table 20). In the irrigated sector, total output was 6 percent higher, with slightly improved production and yields in Gezira, Rahad and New Halfa schemes. In the traditional rainfed sector, production was 3 percent lower, year on year, with yields falling due to less favourable weather conditions compared to the previous cropping year.

Table 20: The Sudan - Groundnuts production, 2018/19 and 2019/20

State/Scheme and sector	2018/19				2019/20			
	Area planted ('000 ha)	Area harvested ('000 ha)	Production ('000 t)	Yields (t/ha)	Area planted ('000 ha)	Area harvested ('000 ha)	Production ('000 t)	Yields (t/ha)
Irrigated								
Gezira	72	68	143	2.09	63	56	151	2.68
Rahad	13	11	26	2.29	16	15	29	1.97
New Halfa	22	22	73	3.34	21	20	77	3.82
Total	**108**	**102**	**242**	**2.38**	**100**	**91**	**257**	**2.82**
Rainfed								
White Nile	44	25	9	0.36	29	26	9	0.35
Blue Nile	3	2	1	0.48	-	-	-	-
Gadarif	55	47	35	0.75	21	18	13	0.74
North Kordofan	84	67	29	0.43	100	80	34	0.43
South Kordofan	63	38	22	0.58	32	27	19	0.71
West Kordofan	946	899	602	0.67	979	881	730	0.83
North Darfur	315	223	95	0.43	336	235	105	0.45
South Darfur	739	664	640	0.96	727	618	496	0.80
West Darfur	177	164	194	1.18	145	138	138	1.00
Centre Darfur	118	108	82	0.76	163	155	104	0.67
Eastern Darfur	907	726	933	1.29	964	862	923	1.07
Total	**3 450**	**2 963**	**2 642**	**0.89**	**3 495**	**3 039**	**2 571**	**0.85**
Grand Total	**3 558**	**3 065**	**2 884**	**0.94**	**3 595**	**3 130**	**2 828**	**0.90**

Source: CFSAM.

Sunflowers

Sunflowers are grown under both irrigated and rainfed conditions in the semi-mechanized sector. Although market prices are high and there are ideal growing conditions in the country, production in 2019 is estimated at the same low level of the previous year, despite a slight increase in the area planted (Table 21). In Gadarif State, lower yields and poor production were caused by flooding and water logging. The year-on-year fluctuations in area and productivity are caused by the shortages of hybrid seeds and their high cost. Further, the lack of clear marketing strategies hinders crop sales, which makes farmers' planting decisions uncertain.

Table 21: The Sudan - Sunflowers production, 2018/19 and 2019/20

State/Scheme and sector	2018/19				2019/20			
	Area planted ('000 ha)	Area harvested ('000 ha)	Production ('000 t)	Yields (t/ha)	Area planted ('000 ha)	Area harvested ('000 ha)	Production ('000 t)	Yields (t/ha)
Irrigated								
Gezira	-	-	-	-	0	0	0	0.79
White Nile	-	-	-	-	-	-	-	-
Sennar	1	1	1	0.79	-	-	-	-
Suki	2	2	2	0.95	1	1	1	0.79
Rahad	3	3	4	1.36	3	3	4	1.59
New Halfa	0.4	0.4	1	2.38	0	0	0	1.59
Total	**7**	**7**	**8**	**1.19**	**5**	**4**	**6**	**1.51**
Rainfed								
Blue Nile	131	118	56	0.48	206	165	82	0.50
Sennar	13	11	8	0.71	14	6	5	0.85
Gadarif	84	72	36	0.50	39	32	14	0.44
Total	**228**	**201**	**100**	**0.52**	**259**	**202**	**101**	**0.50**
Grand Total	**236**	**208**	**108**	**0.56**	**263**	**206**	**107**	**0.52**

Source: CFSAM.

Sugar

Sugar is produced by the Kenana Sugar Company, the White Nile Sugar Company and the Sudanese Sugar Company, located in the cities of Guneid, New Halfa, Sennar and Asalaya. According to preliminary estimates, the area harvested at national level was 68 000 hectares, 6 percent less than in 2018, while sugarcane production was 6 million tonnes, 10 percent less, year on year (Table 22).

Table 22: The Sudan - Sugar production, 2016/17 to 2019/20

Company	Year	Area harvested ('000 hectares)	Sugarcane production ('000 tonnes)	Sugar production ('000 tonnes)	Sugar yields (tonnes/ hectare)
Sudanese Sugar Co.	2016/17	33.5	2 439	233	6.96
	2017/18	34.3	2 569	251	7.32
	2018/19	35.2	2 484	248	7.05
	2019/20	33.7	2 251	217	6.43
Kenana Sugar Co.	2016/17	35.4	3 009	301	8.50
	2017/18	34.5	3 500	350	10.14
	2018/19	34.4	3 500	328	9.53
	2019/20	34.4	3 198	315	9.15
White Nile Sugar Co.	2016/17	13.3	412	42	3.19
	2017/18	13.4	413	43	3.17
	2018/19	3.2	100	10	3.12
	2019/20	n.a	n.a	n.a	n.a
Total	**2016/17**	**82.2**	**5 860**	**576**	**7.01**
	2017/18	**82.2**	**6 482**	**644**	**7.83**
	2018/19	**72.8**	**6 084**	**586**	**8.04**
	2019/20	**68.1**	**5 449**	**532**	**7.81**

Source: Sugar producing companies..

Cotton

The expansion of the cotton producing area in recent years is largely due to high market prices and to the adoption of high-yielding, genetically modified crop varieties. Many private companies operate under contract farming, providing inputs and technical assistance and assuring the purchase at pre-set prices.

Total production in 2019 was estimated at 441 000 tonnes, 20 percent less than 2018, due to an average decline in yields of 22 percent (Table 23). In Gadarif State, the area planted with cotton declined slightly compared to the previous year due to labour shortages and the unavailability of seeds, which prevented farmers in Tokar Scheme from planting.

In New Halfa and Rahad schemes, private companies failed to reach an agreement with many cotton producers and refused to finance farmers who had been unable to deliver the agreed production in 2018. As a result, many producers could not self-finance the full input packages, which led to reduced yields and lower production. The 2019 cotton production was affected especially by the heavy seasonal rains in August, which caused flooding and water logging, favouring the growth of weeds during the following months.

In general, pest control was effective in 2019, with only some minor damage caused by jassid leafhoppers. Localized shortages of labour caused some delays in harvesting and reduced the total number of pickings.

Table 23: The Sudan - Cotton production, 2018/19 and 2019/20

State/Scheme and sector	2018/19				2019/20			
	Area planted ('000 ha)	Area harvested ('000 ha)	Production ('000 t)	Yields (t/ha)	Area planted ('000 ha)	Area harvested ('000 ha)	Production ('000 t)	Yields (t/ha)
Irrigated								
Gezira	66	59	263	4.44	63	56	186	3.33
Suki	10	8	25	2.98	9	9	15	1.70
Sennar	12	12	30	2.55	22	21	49	2.33
White Nile	6	5	6	1.10	3	3	3	1.19
Blue Nile	25	23	41	1.81	-	-	-	-
Rahad	28	19	44	2.33	26	22	47	2.15
New Halfa	16	15	41	2.79	21	17	58	3.37
Tokar/Gash	0.84	0.42	-	-	2	1	1	1.19
North Kordofan	-	-	-	-	2	2	4	1.71
Total	**163**	**142**	**450**	**3.18**	**148**	**130**	**363**	**2.78**
Rainfed								
Sennar	-	-	-	-	11	2	3	1.79
Blue Nile	-	-	-	-	34	30	50	1.65
Gadarif	63	50	101	2.02	47	35	25	0.72
Total	**63**	**50**	**101**	**2.02**	**91**	**67**	**78**	**1.17**
Grand Total	**226**	**192**	**551**	**2.88**	**239**	**197**	**441**	**2.24**

Source: CFSAM.

Livestock

At the end 2019, grazing land was in excellent conditions and water availability was very good throughout the country following the extended rainy season.

Concerns about the availability of water points were reported from Gezira and Blue Nile states, where *hafirs* (artificial water basins) are low in number and unevenly distributed, and in North Kordofan State, where the expansion of cropped area forced herders to move to new grazing lands and to cover long distances to reach the nearest water points.

Pastures were in very good condition at the end of 2019 and are expected to support animal production until the start of the 2020 rainy season in May-June. In Gezira, West Darfur, Sennar and Blue Nile states, pastoralists sow nutrient-rich grass species, following the local authorities' training on measures to preserve pastures and enrich their quality. During the dry season, when food and water become scarcer, pastoralists in the eastern regions are expected to move to the irrigated schemes of Rahad, Gezira and Suki, where water is always available in the irrigation channels. Although it may incur high costs, this will allow pastoralists to pasture animals in crops residues.

Wildfires were reported to have damaged pastureland in West and Centre Darfur states, where local authorities did not have the logistic capacity to set up efficient firebreaks, which were also needed in the eastern part of Gezira, where the risk of fire outbreaks is considered high.

As the security situation has largely improved, Government restrictions on the movement of livestock were completely removed, allowing herds to move freely and graze in the best areas.

However, the expansion of the cropped area at the expense of pastures and animal routes resulted in a large number of conflicts between farmers and pastoralists. Clashes were reported in Blue Nile, Sennar, North Kordofan and White Nile states. Also, in White Nile State floods caused by heavy rains restricted the access of animals to grazing lands in August.

Given the good overall state of pastures and water availability, livestock health at the time of the Mission was very good and no major disease outbreaks were observed. The annual vaccination campaign was affected, however, by shortages of vaccines and medicines. The Central Veterinary Research Laboratory in Soba is the only vaccine manufacturer present in the country and, due to limited technological and structural capacity, it can provide only 20 percent of the needed vaccine doses. In general, the Government tends to allocate vaccines to the states where livestock production is mainly for export as foreign markets have more stringent health standards.

However, due to the lack of capillary checks and to the inadequacy of veterinary extension services, the misuse of vaccines and their smuggling to neighbouring countries have been reported. Herds from Chad and from South Sudan usually cross borders without any control, an efficient veterinary service is needed to ensure an efficient surveillance for livestock diseases and prevent their uncontrolled spread.

In October, in response to an OIE announcement concerning documented cases of RVF in the Sudan, Saudi Arabia banned livestock imports from the country. As a result of the ban, it is reported that thousands of sheep and goats that were kept in quarantine died of hunger and thirst. In January 2020, the RVF outbreak was declared over.

CEREAL SUPPLY/DEMAND SITUATION

CEREAL SUPPLY/DEMAND SITUATION

Crop and livestock markets

In general, prices of locally produced sorghum and millet 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, prices of sorghum (*feterita*) and millet that had begun to rise from late 2017 increased throughout 2018 despite the above-average 2018 production and continued the increasing trend in 2019. In December 2019, prices of sorghum were, on average, more than three-folded than in the same month of 2017 and nearly double than in 2018. The surge in prices was driven mostly by the sharp depreciation of the local currency and a significant growth in inflation rates, which exerted upward pressure on the prices of agricultural inputs.

Prices of cereals declined slightly in October and November 2019 in most markets, with the start of the main summer season harvest and the release of stocks from the last season by traders. However, they rebounded in December, as the below-average output gathered in 2019 did not significantly improve market supplies. High production and transportation costs are likely to continue driving prices up in 2020, unless the general macro-economic situation stabilizes.

As illustrated in Figure 7, nominal wholesale prices of sorghum reached record highs in most markets in the September-October period in 2019, ranging from SDG 2 100 to SDG 2 400 per 90 kg sack, mainly due to concerns over the 2019 output affected by the floods. In the observed markets, the year-on-year increase in prices ranged from 63 to 132 percent, following the increasing inflation and sharp devaluation of the local currency.

Wholesale prices of millet, mainly grown and consumed in Darfur Region, followed a similar increasing trend during 2019. After reaching a peak in August in North Darfur State, reflecting the concerns over the impact of excessive rainfalls on 2019 production, prices declined seasonally in September and October. However, they increased again in the subsequent month and reached record levels in December 2019 as a result of increased production costs and the sharp inflation, compounded by a sharp yearly decrease in the 2019/20 production. In December 2019, prices were about SDG 2 800 per 90 kg sack in the main millet producing North Darfur State, which represents an increase by 90 percent compared to the same month in 2018.

Prices of wheat grain, mostly consumed in urban areas, continued to rise during 2019, supported by

Figure 7: The Sudan - Wholesale prices of sorghum (*feterita*) in selected markets, by State
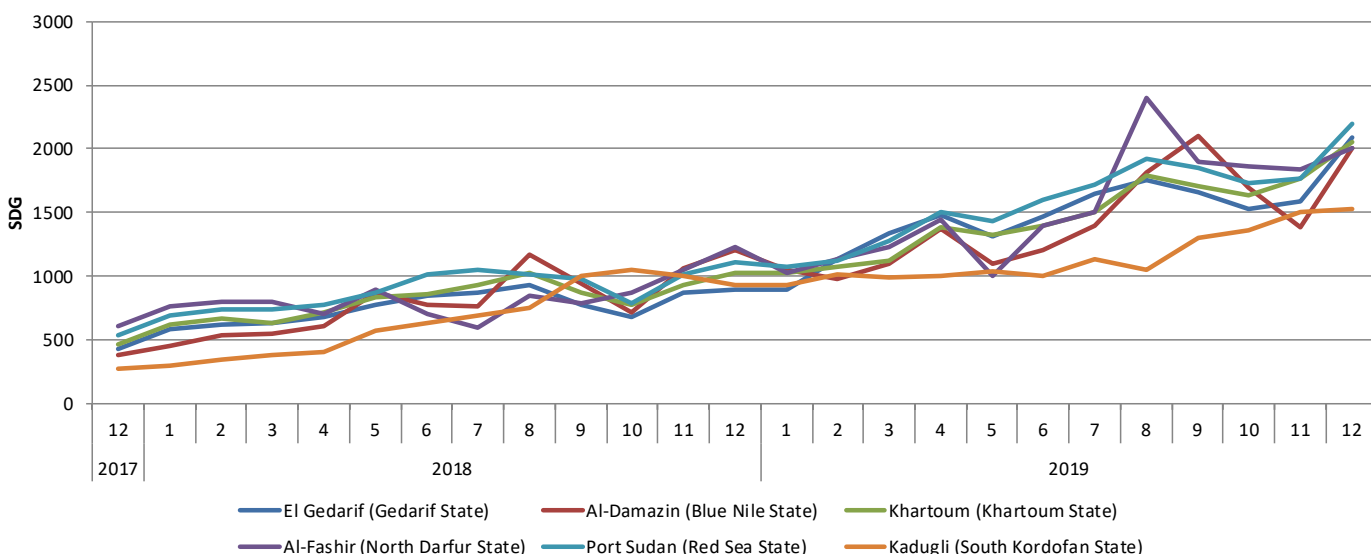
Source: Food and Agriculture Real Time Messaging and Reporting System.

the overall currency depreciation and associated price inflation together with increased production costs. In December 2019, wheat grain was traded at about SDG 2 625 per 90 kg sack in Khartoum, about 25 percent higher compared to the first month of the year.

In El Gedaref market, located in the main sesame-producing area, wholesale prices of sesame increased from SDG 3 813/kantar in December 2018 to SDG 4 165/kantar in December 2019, in spite of a record-high production in 2019. The sustained increase in sesame exports, mainly owing to high international prices, lowered domestic availabilities in most markets and contributed to further upward pressure on domestic prices.

Prices of livestock followed an increasing trend during the whole of 2019 and, in December, they were well above their values a year earlier. In December 2019, sheep and calves were traded in the El Obeid wholesale livestock market in North Kordofan State at SDG 8 500 and SDG 26 750/head, respectively. Prices of sheep and calves increased by between

Figure 8: The Sudan - Wholesale prices of millet in selected markets, by State
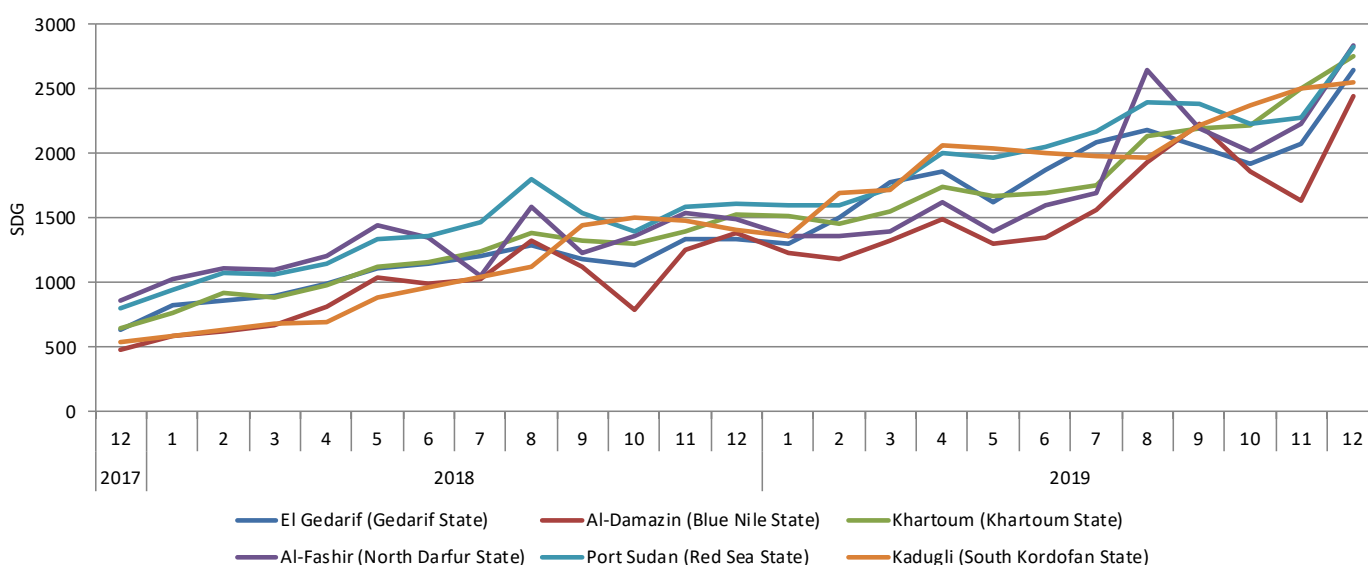
Source: Food and Agriculture Real Time Messaging and Reporting System.

Figure 9: The Sudan - Wholesale prices of wheat grain in selected markets, by State
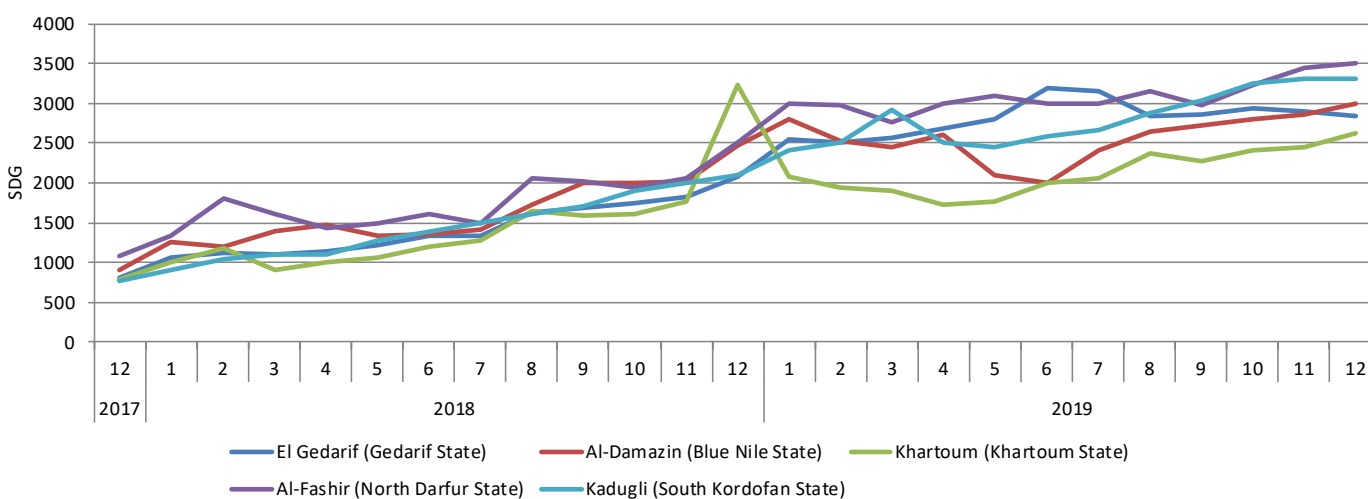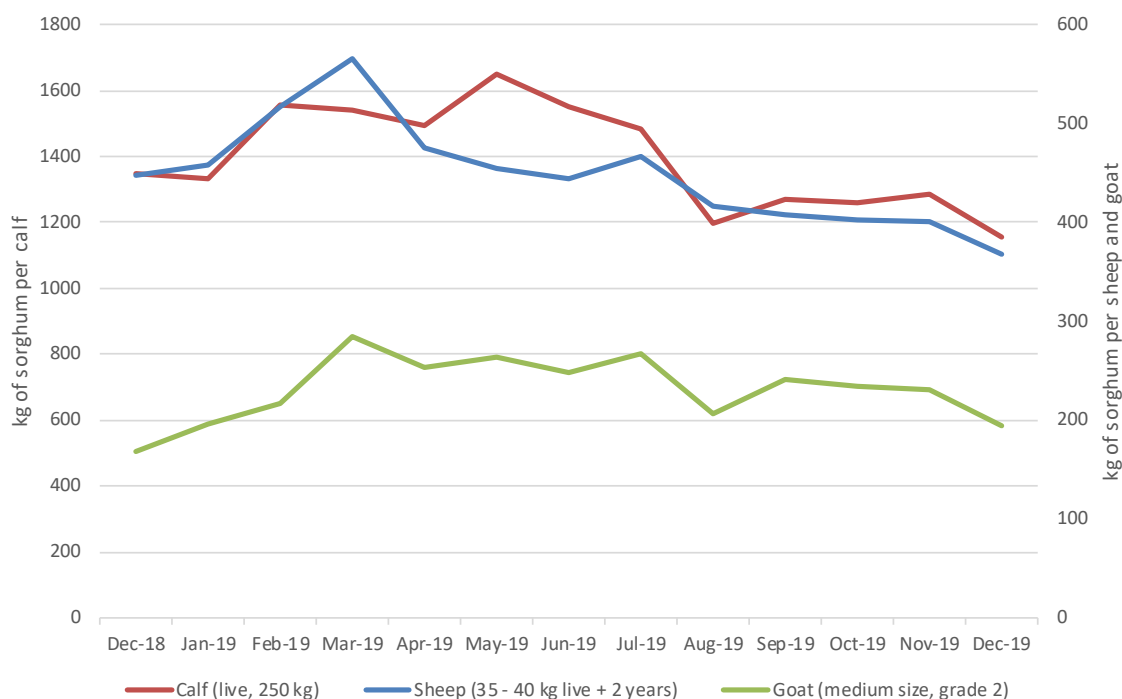

Source: Food and Agriculture Real Time Messaging and Reporting System.

60 and 70 percent over the year as a result of high inflation rates and transportation costs. Prices of goats more than doubled, reaching SDG 4 500 in December 2019.

The terms of trade for pastoralists, calculated as prices of a kg of sorghum per animal, were mostly stable throughout 2019 due to soaring prices of both sorghum and animals, driven by macro-economic conditions. The terms of trade decreased in August 2019 as prices of sorghum soared, following the excessive rainfall that caused flooding and elevated concerns over the 2019 output. After some months of stability, the terms of trade for pastoralists decreased in December 2019, reflecting the unseasonal rebound of sorghum prices and were slightly lower their year earlier levels (Figure 10).

Figure 10: The Sudan – Terms of trade in El Obeid market, North Kordofan State

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

Cereal supply/demand balance, 2020

The national cereal supply/demand balance for marketing year January-December 2020 is summarized in Table 24, 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 in March 2020) and the latest information on consumption, feed use, trade and stocks availability. The following assumptions were used:

➤ Total cereal production is estimated at 5.9 million tonnes, including a forecast of an above-average 726 000 tonnes of wheat to be harvested in March 2020.

➤ Opening stocks of wheat held by the SRC were reported to be 54 000 tonnes, while there were no stocks of sorghum and millet. The amounts of grain stored by private and community underground stores are not included in the opening stocks due to the lack of information.

➤ Food use is estimated at 6.7 million tonnes, using the estimated population figure of 44.4 million in 2020. Per capita average consumption is set at 152 kg of cereals per year, which includes 75 kg of sorghum, 58 kg of wheat (with a 5 percent increase in Khartoum

to reflect the growing demand by the urban population), 16 kg of millet, 2 kg of rice and 1 kg of maize.

➢ Feed use is forecast at 258 000 tonnes. Based on discussions with farmers and extension officers, it is estimated that about 5 percent of the sorghum and millet is going to be used as feed for livestock and poultry.

➢ Seed requirements for 2020 planting are estimated at about 121 000 tonnes on the basis an average of planted areas during the latest three years and the recommended seed rate in the country. 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 569 000 tonnes, with rates ranging from 10 percent for sorghum and millet and 7 percent for wheat, rice and maize.

➢ Closing stocks of millet are expected to build up due to the surplus produced in 2019. In case of wheat, which the country mostly depends on imports, closing stocks are forecast at 260 000 tonnes, about 10 percent of the quantity of the cereal is anticipated for food use.

➢ The structural deficits between production and consumption for wheat, maize and rice are expected to be covered by commercial imports. However, the declining local currency could continue exerting upward pressure on prices of imported goods, which could have a detrimental impact on the country's ability to import. Therefore, a close follow up on changes in the local currency and its impact on wheat imports is required to guarantee adequate food availability in the country.

Table 24: The Sudan - National cereal supply/demand balance, January-December 2020 ('000 tonnes)

	Sorghum	Millet	Maize	Wheat	Rice	Total
Availability	**4 008**	**1 133**	**25**	**780**	**32**	**5 978**
Opening stocks	0	0	0	54	0	**54**
Production	4 008	1 133	25	726	32	**5 924**
Total utilization	**4 008**	**1 133**	**48**	**2 944**	**92**	**8 225**
Food	3 333	711	44	2 602	89	**6 779**
Feed	200	57	1	0	0	**258**
Seed	71	17	0.5	32	0.6	**121**
Post-harvest losses	401	113	2	51	2	**569**
Closing stocks	3	235	0	260	0	**498**
Estimated import requirements	**0**	**0**	**23**	**2 164**	**60**	**2 247**

Source: CFSAM.

RECOMMENDATIONS

RECOMMENDATIONS

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

➢ The Government's support to farm mechanization should be enhanced, with an increased focus on tractor and machinery maintenance.

➢ The availability of certified seeds and other agricultural inputs should be increased, with timely delivery to farmers.

➢ Irrigation schemes need both routine and special maintenance work to restore satisfactory efficiency.

➢ Agricultural extension services should be reinforced to promote the adoption of new technologies by farmers, while the starting point should always be the adoption of Good Agricultural Practices.

➢ Pre- and post-harvest preventive measures should be taken to reduce losses of food crops and to strengthen the food value chain.

➢ The early warning system should be working in constant communication with State authorities during the summer season to prevent weather related setbacks to agriculture.

➢ New cropping patterns should be put in place to adapt to climate change.

➢ Provide capacity strengthening support to farmers and agricultural institutions such as post-harvest management to enhance productivity and resilience.

➢ Financial institutions should provide simplified credit lines to smallholders using alternative collaterals, such as part of forward contracting

to allow investments in agricultural assets and farm machinery.

➢ *Salam* prices should be adjusted during the season according to increased cost of production.

➢ Adding value to the country's exportable agricultural commodities (livestocks, cotton, Gum Arabic, sesame and groundnuts) is strongly encouraged, as against exporting raw products.

➢ A new agriculture and livestock census should be conducted to provide a more realistic and updated picture of these important sectors in the economy of the Sudan.

➢ The capacity of the Central Veterinary Research Laboratory in Soba should be improved to bring the production of vaccines to the full national requirement. Also, decentralized veterinary services should be reinforced to make sure that vaccination campaigns are carried out in the most effective and efficient way.

➢ With food accessibility remaining a major concern, vulnerable populations need to receive food, cash based transfers, nutrition and livelihood support to meet their basic food and nutrition needs.

➢ While diversification in to cash crops is promoted, production of staple cereals should also be supported to address food security concerns.

➢ Some inputs could be supplied through international aid in order to reduce production costs, if the upsurge of inflation continues.

➢ The National Plant Protection Department could be more effective in the identification and treatment of pests and provide capacity building to State ministries on these issues.

This report has been prepared by Luigi Castaldi, Jung-Eun Sohn and Azhari Farah (FAO) under the responsibility of the FAO Secretariat with information from official and other sources. Since conditions may change rapidly, enquiries for further information may be directed to:

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