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SPECIAL REPORT

2020 FAO/WFP CROP AND FOOD SECURITY ASSESSMENT MISSION (CFSAM) TO THE REPUBLIC OF SOUTH SUDAN

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ACRONYMS AND ABBREVIATIONS

AFIS	Agriculture and Food Information System
BCS	Body Condition Score
BOSS	Bank of South Sudan
BQ	Black Quarter
CARI	Consolidated Approach for Reporting of food security Indicators
CBPP	Contagious Bovine Pleuropneumonia
CBTs	Cash-Based Transfers
CCPP	Contagious Caprine Pleuropneumonia
CCMC	County Crop Monitoring Committee
CFSAM	Crop and Food Security Assessment Mission
COVID-19	Coronavirus Disease 2019
ECF	East Coast Fever
EIA	United States of America Energy Information Administration
ELRP	Emergency Livelihood Response Programme
FAO	Food and Agriculture Organization of the United Nations
FAW	Fall Armyworm
FEWS NET	Famine Early Warning Systems Network
FMD	Foot and Mouth Disease
FSNMS	Food Security and Nutrition Monitoring System
FY	Fiscal Year
f.o.b.	Free on Board
GDP	Gross Domestic Product
GIEWS	Global Information and Early Warning System on Food and Agriculture
GPS	Global Positioning System
ha	hectare (0.42 hectares = 1 feddan)
IDPs	Internally Displaced Persons
IMF	International Monetary Fund
IOM	International Organization for Migration
IPC	Integrated Food Security Phase Classification
kg	kilogramme
MAFS	Ministry of Agriculture and Food Security
MoA	Ministry of Agriculture

NBS	National Bureau of Statistics
NDVI	Normalized Difference Vegetation Index
NGOs	Non-Governmental Organizations
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OPEC	Organization of Petroleum Exporting Countries
PET	Pictorial Evaluation Tool (Crop yield and livestock condition photo indicators)
PoC	Protection of Civilians
PPR	Peste des petits ruminants
QQU	Quelea quelea birds
R-ARCSS	Revitalized Agreement on the Resolution of the Conflict in the Republic of South Sudan
RFEs	Rainfall Estimates
SMoA	State Ministry of Agriculture
SSP	South Sudanese Pound
UNHCR	Office of the United Nations High Commissioner for Refugees
UNMISS	United Nations Mission in South Sudan
USD	United States Dollar
VAM	Vulnerability Assessment and Monitoring
WFP	World Food Programme

HIGHLIGHTS

- The 2020 net cereal production (after the standardized deduction of post-harvest losses and seed use) in the traditional sector is estimated at about 874 400 tonnes, 7 percent above both the 2019 output and the 2015–2019 annual average, but still well below the pre-conflict levels. The increase in cereal production compared to the previous year is driven by an increase in the harvested area and by good yields due to favourable rains in most cropping areas.

- The year-on-year increases in the 2020 cereal production occurred particularly in Western Bahr-el-Ghazal, Unity, Central Equatoria, Northern Bahr-el-Ghazal and Western Equatoria states.

- The harvested area in 2020 is estimated at about 987 400 hectares, about 6 percent up from 2019 and 7 percent above the 2015–2019 average, but still below the pre-conflict levels. The increase is mainly attributed to security improvements in localized areas that prompted returns of the displaced households and encouraged farmers to expand plantings to fields far from the homesteads.

- With a projected population of about 12.2 million in mid-2021, the overall cereal deficit in the January–December 2021 marketing year is estimated at about 465 600 tonnes, about 4 percent below the deficit estimated for 2020. This deficit, still above the past five-year average, contributes to record-high levels of food insecurity throughout the country, especially where conflict and flooding affected crops and livestock.

- Although the national conflict remained in 2020 at low levels as the ceasefire agreed in September 2018 continued to hold, episodes of organized violence at sub-national level have increased in 2020, particularly in Jonglei State, and remain a potent threat to the stability and food security of the country.

- In early 2021, 48 percent of the population (about 5.8 million people) was estimated to be in Integrated Phase Classification (IPC) Phases 3: "Crisis", 4: "Emergency" and 5: "Catastrophe", with 103 000 people facing famine-like conditions. This indicates a deterioration of the overall food security conditions, especially in the areas affected by insecurity and floods, compared to the same period in 2020, when 45 percent of the population (5.3 million people) was in IPC Phase 3: "Crisis" and above.

- The deterioration of the food security situation has been accompanied by a substantial increase in the number of people estimated to be in IPC Phases 4: "Emergency" and 5: "Catastrophe", which exceeded 1.8 million people (about 15 percent of the population) in early 2021. The estimated population in Phase 5: "Catastrophe" is located in Jonglei, Northern Bahr-el-Ghazal and Warrap states, due to the combined effect of large-scale floods and widespread insecurity.

- During the lean period of April–June 2021, the number of people in IPC Phase 3: "Crisis"and above is projected to reach 7.19 million people (about 60 percent of the population), with about 108 000 people in IPC Phase 5: "Catastrophe". The share of people experiencing IPC Phases 4: "Emergency" and 5: "Catastrophe" levels of food insecurity is projected to reach 21 percent of the total population over the same period.

- Food insecurity worsened particularly in the Greater Upper Nile Region, (Jonglei, Upper Nile and Unity states) as well as in Warrap and Central Equatoria states. All these areas are characterized by structural large food deficits and are still affected by conflict.

- Excessive rains and river overflows, particularly in the areas along the River Nile and its tributaries, triggered floods, especially in Jonglei, Lakes and Upper Nile states, which affected over 800 000 people and resulted in significant crop losses and livestock mortality. Abundant and well-distributed precipitation boosted yields, especially in the Greenbelt and the Western Corridor.

- Floods significantly affected Jonglei State and the neighbouring Pibor Administrative Area and the local cereal production declined by 13 percent from the already low output of 2019, reaching the lowest level on record since 2016. Substantial reductions in production were recorded in the counties of Pochalla, Pibor and Twic East.

- Weed infestations were severe in most cropping areas due to abundant precipitation, especially in waterlogged areas. By contrast, damages from Fall Armyworm (FAW) were limited as the seasonal rains largely neutralized the pest. Desert locusts were reported only in parts of Eastern Equatoria State with limited damage on crops and pastures.

- Despite an adequate availability of pasture and water for livestock in most areas, tens of thousands of animals died in flood-affected areas due to drowning and starvation as pastures were inundated. The above-average rains created also a favourable environment for the tick vector responsible for the East Coast Fever, especially in the Greater Equatoria Region.

- The Gross Domestic Product (GDP) is expected to contract by 3.4 percent in Fiscal Year (FY) 2020/21 as a result of the negative impact of the COVID-19 pandemic, especially on oil revenues.

- The South Sudanese Pound (SSP) depreciated by 200 percent between December 2019 and December 2020 on the parallel market, and the spread between official and parallel market exchange rates significantly widened over the same period.

- Cereal prices continued to rise in 2020, reflecting the depreciation of the local currency, limited supplies and the impact of conflict and floods on transportation costs and market integration. This was aggravated by COVID-19-related screening along the border with Uganda, an important source of imported food commodities.

- The slight increase in crop production is expected to have a short-lived and localized effect in terms of food security, mainly due to the weak market integration and transport constraints that limit trade flows from surplus to deficit areas. Continuing insecurity and recurrent displacements, high food prices, disrupted livelihoods, reduced incomes and low purchasing power are expected to drive further rises in the population affected by severe acute food insecurity.

- As a result of the deterioration of the food security situation, the adoption of adverse coping strategies has increased in late 2020 throughout the country and, at the beginning of 2021, it is at its highest level since 2015.

- The number of Internally Displaced Persons (IDPs) in the country stood at 1.62 million in January 2021 and the number of South Sudanese refugees in neighbouring countries was about 2.19 million. Following improvements in security, about 122 000

refugees returned to the country in 2020 and about 175 000 IDPs returned to their places of origin between January and September 2020. However, floods between July and October 2020 caused a large-scale displacement of people, estimated at 504 000 individuals, and cattle.

- Under the 2021 Emergency Livelihood Response Programme, FAO plans to support 700 000 severely food insecure farming, fishing and agro-pastoral households with emergency livelihood support, by giving priority to the most vulnerable people, including women-headed households, IDPs, returnees and host communities.

- In 2021, WFP plans to assist over 5.2 million people in South Sudan through life-saving food and cash assistance to crisis-affected people and refugees, nutrition support and resilience-building activities in communities affected by recurrent shocks.


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OVERVIEW

An FAO/WFP Crop and Food Security Assessment Mission (CFSAM) conducted an analysis from 7 to 16 December 2020 to estimate the cereal production in South Sudan during 2020, based on a review of data and information collected by the Ministry of Agriculture and Food Security (MAFS). The Mission also reviewed secondary data from a variety of sources in order to produce an overview of the overall food security situation in the country. Due to COVID-19-related travel restrictions, the analysis was performed remotely through several video-conferences with relevant staff of the FAO Office in South Sudan. The CFSAM reviewed the findings of several Crop Assessment Missions conducted at harvest time from August, following the removal of COVID-19-related travel restrictions, to December 2020, in different agro-ecological zones of the country.

All missions were carried out by an agricultural Task Force Team that comprised staff from the MAFS, the National Bureau of Statistics (NBS), FAO and the respective State Ministries of Agriculture, abiding to health protocols for the protection from the COVID-19 pandemic. The Task Force Team members were trained during the past years to conduct rapid assessments using established CFSAM instruments, protocols and techniques, including walking transects, assessing yields of standing crops and livestock body condition according to the Pictorial Evaluation Tool (PET), and to perform key informant interviews and farmer case studies. Since 2016, 64 County Crop Monitoring Committees (CCMCs) have been established[1] with the aim to improve the local capacity to collect reliable and accurate data. When travel restrictions were in place, the CCMC networks provided timely updates and reports on the performance of the 2020 cropping season through telephone and electronic communication means. The European Union, through the FAO Representation in South Sudan, financially supported all assessments and training activities.

The 2020 CFSAM followed a year-long roadmap. However, insecurity, still prevailing in some areas constrained the full execution of the initial plan and fieldwork activities were carried out only in accessible areas. Overall, 22 assessment missions at harvest time were conducted in Western, Central and Eastern Equatoria, Northern Bahr-el-Ghazal, Lakes, Warrap, Upper Nile, Jonglei and Western Bahr-el-Ghazal states. However, the coverage is not representative of all the counties and livelihood zones in each State. As in the past years, in Unity State and in parts of Jonglei, Central, Eastern and Western Equatoria states, access by the Task Force Team has been precluded.

In all visited areas, concerns over security precluded to conduct driving transects and yield assessments

[1] In the framework of the concluded FAO/AFIS Project and the ongoing FAO-European Union Project "Strengthening the resilience of pastoral and agro-pastoral communities in South Sudan's cross border areas with the Sudan, Ethiopia, Kenya and Uganda" (OSRO/SSD/703/EU).

were mainly performed through walking transects and crop cutting (sampling) accomplished by both the Task Force teams and CCMCs. Overall, 1 075 interviews (992 farmer case studies and 83 interviews with key informants) were conducted between August and December 2020 and 40 counties (out of 78) were visited by the Task Force teams in 2020.

Using standard CFSAM procedures, the Task Force Team reviewed secondary sources of information regarding the main factors that affected crop performance during the 2020 agricultural season, estimated the aggregate national cereal production and assessed the overall food security situation. Where risks to team safety due to insecurity were considered too severe to allow access at crucial times, telephone interviews with key informants were used to derive the estimates. Information from CCMCs operating in insecure areas not accessible by the Task Force teams were sent to the crop assessment Team in Juba through various means, including hand delivery of reports when travel restrictions were lifted.

The aggregate cereal harvested area in the traditional farming sector in 2020 is estimated at about 987 400 hectares, about 6 percent above the 2019 level and 7 percent above the average of the previous five years. At sub-national level, the largest increases in harvested area compared to 2019 were recorded in the states of Western Bahr-el-Ghazal (18.8 percent), Central Equatoria (16.9 percent), Unity (16.4 percent), Northern Bahr-el-Ghazal (10.4 percent), Lakes (7.3 percent) and Western Equatoria (6.1 percent).

The slight expansion in harvested area is due to a reported increase in the number of farming households (4.7 percent) following an improved security situation in some areas, which prompted about 122 000 refugees to return to the country over the year and about 175 000 IDPs to return to their places of origin between January and September 2020. However, unprecedented level of flooding between July and October 2020 caused large-scale displacement of people, estimated at 504 000 individuals, and cattle. The harvested area in 2020 remains still significantly below the pre-conflict levels, as the lingering impact of the prolonged conflict continues to affect agricultural activities.

The net cereal production in 2020 from the traditional sector, after standardized deduction of post-harvest losses and seed use, is estimated at about 874 400 tonnes, 7 percent above both the 2019 output and the 2015–2019 average, but still well below the pre-conflict levels. The agricultural performance varies greatly across states, with Greater Upper Nile experiencing a drastic reduction, while the Greenbelt and the Western Corridor experiencing an improvement, as compared to 2019.

The increase in cereal production compared to the previous year was driven by an expansion of harvested area and abundant and well-distributed rains. However, while the well above-average rainfall amounts benefited yields, excessive rains and river overflows, particularly in flood-prone areas along the River Nile and its tributaries, triggered floods, especially in Jonglei, Lakes and Upper Nile states, which affected over 800 000 people and resulted in localized but significant crop losses and death of livestock, with Jonglei State recording the most substantial flood-related crop losses, and consequently highest levels of food insecurity. At sub-national level, the 2020 cereal production increased from the previous year in the states of Western Bahr-el-Ghazal (28.9 percent), Unity (20.7 percent), Central Equatoria (13.6 percent), Northern Bahr-el-Ghazal (12.8 percent), Western Equatoria (8.4 percent), Upper Nile (6.7 percent), Lakes (4.5 percent) and Warrap (4.3 percent). By contrast, cereal production decreased in Jonglei State by 13 percent from the already low output in 2019, and is estimated as the lowest on record since 2016, mainly due to floods that had also a negative impact on livestock.

Infestations of pests and diseases were generally mild to moderate, while weed infestations were severe in most cropping areas due to abundant precipitation, especially in waterlogged areas. The damage from FAWs was limited as the heavy seasonal rains largely neutralized the pest. Similarly, desert locusts were reported in parts of Eastern Equatoria State with limited damage on both crops and pastures.

With a mid-2021 projected population of about 12.2 million, consuming on average about 110 kg of cereals/capita/year, the cereal requirement in 2021 is estimated at about 1.34 million tonnes. Therefore, an overall rounded deficit of about 465 600 tonnes of cereals is estimated in the traditional sector during the January–December 2021 marketing year, 3.5 percent below the deficit estimated for 2020, but 5 percent above the 2016–2020 average.

The country, which was already facing a protracted macro-economic crisis, has been severely affected by the economic impact of the COVID-19 pandemic. Gross oil revenues are expected to decline by 15 percent (SSP 34.4 billion) between FY 2019/20 and FY 2020/21 due to plummeting oil prices and production cuts imposed by the Organization of Petroleum Exporting Countries (OPEC). With oil production contributing to more than half of the GDP this is expected to contract by 3.4 percent in FY 2020/21, impacting negatively on the livelihoods of the South Sudanese people. As oil revenues contribute to more than 90 percent of Government revenues, in 2020 the authorities faced an unexpected increase of the fiscal deficit and they recurred to its monetization through domestic borrowing from the Bank of South Sudan (BOSS). The monetary base expansion undermined investors' confidence over the economic stability and led to a significant exchange rate depreciation on the parallel market. In turn, the exchange rate depreciation, due to the heavy reliance of the country on imports, resulted in marked inflationary pressures, with food prices soaring to exceptionally high levels. Prices were also underpinned, in the first half of 2020, by the introduction of the COVID-19 pandemic screening measures at border points in Uganda, the country's main source of imports, which hampered trade flows. As a result, in the capital, Juba, in December 2020, prices of sorghum, maize and wheat were three times the already high year-earlier levels, while prices of imported wheat were almost five times their year-earlier values. The exceptionally high food prices continue to constrain food access for large segments of the population, despite a limited increase in income levels.

In early 2021 (post-harvest season), 48 percent of the population of South Sudan (about 5.8 million people) was estimated to be in IPC Phases 3: "Crisis", 4 "Emergency" and 5 "Catastrophe". This is a modest seasonal decrease from the peaks of the lean period of 2020 and a worsening of the overall food security relative to the same period in 2020 (5.3 million, 45 percent of the population), indicating a deterioration of the food insecurity situation.

In addition, a marked increase in the numbers of people in IPC Phases 4: "Emergency" and 5: "Catastrophe" has been recorded. Between December 2020 and March 2021, these numbers reached over 1.8 million people (about 15 percent of the population). The estimated population in Phase 5: "Catastrophe" is located in Jonglei, Northern Bahr-el-Ghazal and Warrap states, as a result of the interaction of large-scale flood impacts and the widespread insecurity and conflict.

In the lean period of mid-2021, when most cereal stocks from own production are depleted and households are highly dependent on market purchases at high price levels, the proportion of people in IPC Phases 3: "Crisis", 4: "Emergency" and 5: "Catastrophe" is projected to reach 60 percent of the population in April–July 2021 (7.19 million people) with about 108 000 in IPC Phase 5: "Catastrophe". The proportion of people experiencing IPC Phase 4: "Emergency" or worse levels of food insecurity is projected to reach 21 percent of the total population over the same period. This represents an increase of 760 000 individuals on a yearly basis, mainly as a consequence of concurrent shocks and record-high food price levels.

Although in 2020 the national conflict remained at low levels as the ceasefire agreed in September 2018 continued to hold, episodes of organized violence at sub-national level increased in 2020, particularly in Jonglei State, and remain a potent threat to the stability and food security of the country. Despite a 7 percent increase in crop production and a 4 percent decrease in the cereal deficit, the number of people in IPC Phase 4: "Emergency" and 5 "Catastrophe" has markedly increased due to the impact of insecurity, floods and the COVID-19 pandemic. The areas that contributed the most to the increase in food insecurity are Greater Upper Nile Region (Jonglei, Upper Nile and

Unity states), which accounted for 48 percent of the increase, with significant contributions from Warrap and Central Equatoria states, accounting together for about 20 percent. These regions are characterized by structurally large food deficits and affected by inter-communal conflict.

Persisting constraints to commodity flows, high market prices and the lingering impacts of the prolonged conflict and major flood events imply that the estimated improvement in crop production is not sufficient to change an overall pessimistic picture and the population affected by severe acute food insecurity is likely to increase further.

Although the prevalence of households depending on markets did not considerably change in 2020, apart from a modest increase of 3 percent relative to 2019, possibly taking up some of the food assistance role, which is only significant in Greater Upper Nile Region, these households have been made even more vulnerable by the unprecedented high levels of food prices throughout the country.

In late 2020, 37 percent of the households in South Sudan had high or very high expenditure on food, varying from low levels in surplus areas of the Greenbelt to very high values in Northern Bahr-el-Ghazal and Warrap states, with pronounced seasonal dependence on markets. These proportions are expected to increase in the coming lean period when households will mostly depend on markets for their food supply and will, therefore, be exposed and vulnerable to price rises and market supply problems.

In late 2020, the country-wide adoption of more deleterious coping strategies, which are often irreversible, has increased. It is now at the highest levels since 2015, with some, including reduction of adult consumption, currently at record levels. The Greater Bahr-el-Ghazal Region registered large increases in adoption of coping strategies. Central Equatoria had a small increase, reaching record levels.

SOCIO-ECONOMIC CONTEXT

Population and population movements

Since the conflict started in December 2013, population size and geographical distribution have significantly changed. According to the International Organization for Migration (IOM) and the United Nations High Commissioner for Refugees (UNHCR), as of December 2020, over 3.8 million people had been forced to flee their homes due to insecurity, including 1.62 million IDPs and 2.19 million people that fled into neighbouring countries (Uganda, the Sudan, the Democratic Republic of the Congo, Ethiopia and Kenya).

Displacements, which increased in the second half of 2016 and in 2017 following the spread of the conflict across the country, have declined significantly since 2018. The population sheltering inside the United Nations Mission in South Sudan (UNMISS) Protection of Civilians (PoC) sites has almost halved in recent years and, in December 2020, it was estimated at about 125 000 people. According to UNHCR, about 100 000 and 122 000 refugees returned to the country from abroad in 2019 and 2020, respectively, while, according to IOM, 310 000 displaced people returned to their places of origin in 2019 and 175 000 people between January and September 2020. The slight decline in national conflict-related displacements and the returnee influx followed an improvement of the security situation after the signing in September 2018 of the Revitalized Agreement on the Resolution of the Conflict in South Sudan (R-ARCSS), which led to the formation of a Transitional Government of National Unity (TGoNU) in February 2020. The armed conflict between State security forces and opposition armed groups was limited to a small number of areas in the Greater Equatoria Region. However, episodes of organized violence at sub-national level increased in 2020, resulting in deaths, displacements, destruction and looting, especially in Jonglei State and the neighbouring Pibor Administrative Area. In addition, severe floods between July and October 2020 caused large scale displacement of people and cattle, particularly in the low-lying flood-prone areas of the country. An estimated 504 000 people across the country were displaced.[2]

According to the NBS, the country's population for mid-2020 was estimated at 11.81 million. Given the implicit annual increment of 3 percent, as suggested by the NBS, the population for mid-2021 is estimated at 12.17 million.

Macro-economic situation and impact of the COVID-19 pandemic on the economy

The first positive COVID-19 case in the country was reported on 5 April 2020 and, by end-2020, about 3 500 cases were confirmed. However, the

[2] OCHA Flooding Situation Report, 31 January 2021.

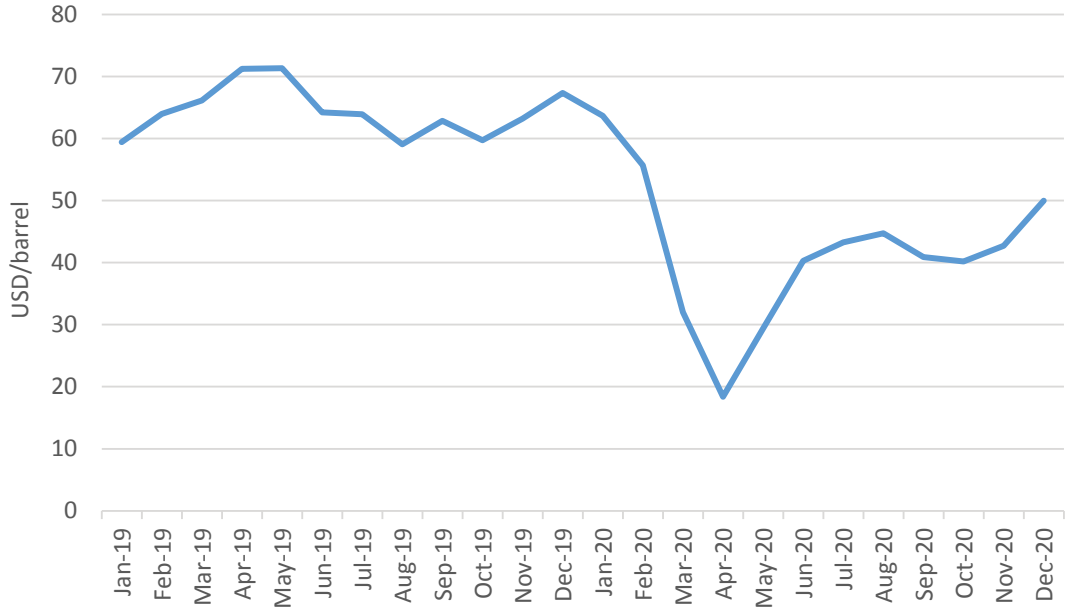
real infection rate is likely to be higher as testing coverage is limited to the capital, Juba. Local authorities rolled out the national COVID-19 preparedness response for the period April to September 2020 and implemented several preventive measures such as the closure of education institutions and health science institutes for 30 days, the suspension of events (sports, religious, weddings, funeral rites and political), the closure of non-essential businesses, the imposition of a nationwide curfew from 20:00 to 06:00, the suspension of all flights (except for cargo planes, emergency and relief flights), the closure all land border crossing points (except for food trucks and fuel tanks) and restrictions on all inter-State travels.

The national authorities have been able to provide only very limited support to the vulnerable segments of the population whose livelihoods were affected by these measures due to budget constraints. Lockdown restrictions were eased in May 2020 and businesses were allowed to re-open during non-curfew hours, the duration of the curfew was slightly reduced and all airports were re-opened to domestic and international flights.

With oil production contributing to more than half of the GDP, 95 percent of the exports, 90 percent of the Government's revenues and a significant share of private sector employment, the main economic shock due to the COVID-19 pandemic was transmitted to the country through the oil sector. In early 2020, oil prices plummeted, as global demand declined and oil exporting countries repeatedly cut exporting prices below those of their competitors. Oil prices dropped by more than 70 percent between January and April 2020 to a record low level of about USD 19/barrel (Figure 1). Although prices recovered in the following months, in December 2020, at about USD 50/barrel, they were still 25 percent lower than 12 months earlier and the average price in 2020, about USD 42/barrel, was about 35 percent lower than the average price in 2019, about USD 64/barrel.

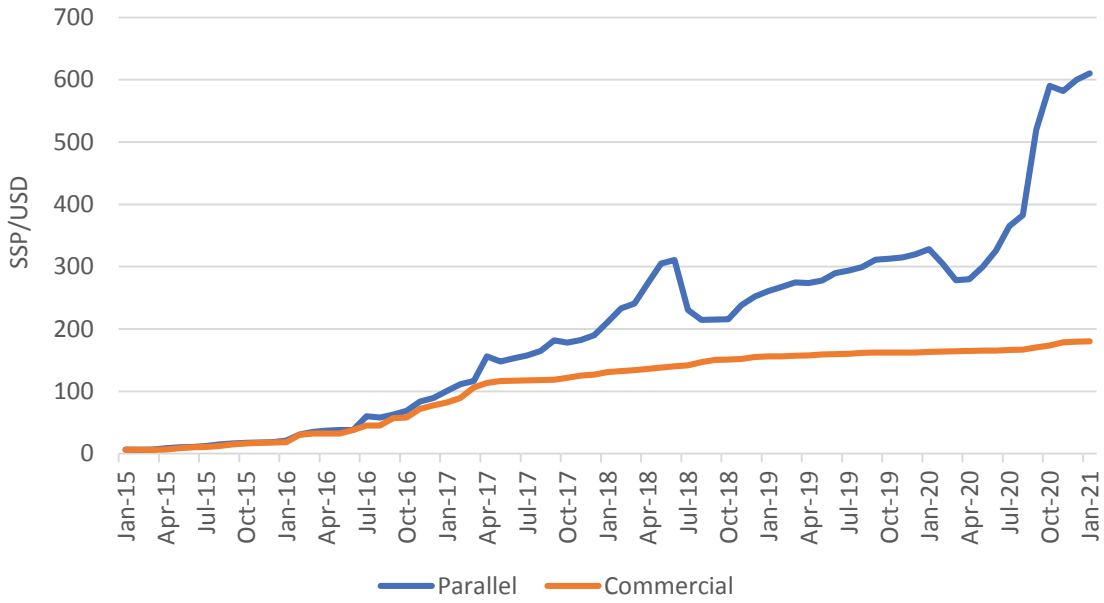
In FY 2019/20, oil production was estimated at 62.1 million barrels, representing a 27 percent increase from the 49.1 million barrels extracted in FY 2018/19, mainly due to an improved security situation following the signing of the R-ARCSS. In FY 2020/21, oil production is expected at 58.4 million barrels, with a decline of 6 percent compared to the previous year due to the signing, in April 2020, of an OPEC oil production cut agreement and COVID-19-related restrictions disrupting the extraction more than offset the positive impact of the improved security situation.

Figure 1: South Sudan - Crude oil - Europe Brent monthly spot prices (f.o.b.)



Source: United States of America Energy Information Administration (EIA), 2020.

Figure 2: South Sudan (Juba) - Market exchange rates in commercial and parallel markets (SSP/USD)



Source: WFP, 2020.

Due to declining prices and production, oil revenues significantly decreased. The 2019/20 budget envisaged the Government's share from oil exports to increase to SSP 235.5 billion from SSP 198.2 billion realized in FY 2018/19. However, gross oil revenues are estimated to have turned out at SSP 201.1 billion, representing a 15 percent decrease and a shortfall of about SSP 34.4 billion. To tackle with the unexpected increase of the fiscal deficit due to lower oil revenues, the Government recurred to deficit monetization through domestic borrowing from the BOSS. The monetary base expansion led to a significant exchange rate depreciation as it undermined investors' confidence over economic stability. The parallel market exchange rate increased by almost 40 percent between April and August 2020, reaching SSP 383/USD. Subsequently, following media reports about the possible introduction of a new local currency to improve the macro-economic situation, the demand of US dollars sharply increased as economic operators started to buy US dollars as a cautionary measure and the exchange rate sky-rocketed between August and October 2020, when it reached SSP 590/USD. The exchange rate registered further slight increases in late 2020 and, in December, it stood at SSP 600/USD, recording a depreciation of about 85 percent compared to one year earlier, the spread between the official and parallel market exchange rates significantly increased in 2020, and, in December, the exchange rate, on the parallel market was more than three times the official rate of SSP 180/USD.

In turn, the exchange rate depreciation resulted in marked inflationary pressures due to the heavy reliance of the country on imports (amounting to about 80 percent of the GDP), with food prices soaring to exceptionally high levels.

In addition, the reduced economic activity due to the COVID-19 pandemic and its containment measures in countries with large South Sudanese diaspora resulted in 2020 in a 6 percent decline in remittances, an important source of foreign currency which accounts for about one-third of the GDP.

The GDP, after having increased by 9.3 percent in FY 2019/20 due to improved security benefiting the oil industry and the economy at large, is expected to contract by 3.4 percent in FY 2020/21 as result

of the negative impact of the COVID-19 pandemic, especially on oil revenues, compared with a pre-pandemic growth projection of 6.6 percent.

The budget plan for 2020/21 seeks to stabilize the economy, provide basic services, consolidate peace and address COVID-19 pandemic impacts and it is characterized by a more balanced allocation of resources compared to previous budgets, with a significant reduction on security sector spending. Across the sectors, the budget envisions a large allocation to infrastructure (23 percent), which is expected to account for 85 percent of capital spending. The security sector is expected to absorb 8.4 percent of the budget, while education has been granted 10.3 percent; natural resources (including agriculture) 2.8 percent and health 1.9 percent. The budget plan includes an allocation for the clearance of payment arrears both for the central Government and State, which is expected to absorb 10 percent of the budget. As the budget is severely underfunded, the deficit is expected to increase to more than SSP 123 billion (13 percent of the GDP) as both oil and non-oil revenues are expected to under perform. However, the Government committed to a reform agenda of the public financial management, with the National Revenue Authority eliminating unduly applied tax exemptions.

In mid-November 2020, the International Monetary Fund (IMF) approved a USD 52.3 million loan to help the country to recover from the socio-economic impact of the COVID-19 pandemic. The loan aims to endow the Government with resources to stimulate the economy and channel funds towards poverty-reducing and growth-enhancing spending. The Government, which is required to cut back on borrowing from the Bank of South Sudan as a mean of financing deficits and tackle corruption, has set up a Public Financial Management Oversight Committee and has formulated a plan to regularly audit procurement processes to ensure transparency and accountability. National authorities have indicated that the disbursement would also be used to settle two months of civil service salary arrears. The IMF loan is also accompanied by technical assistance to strengthen budget management systems and provide staff training.

Agriculture

The country is endowed with a diverse ecology providing a growing season ranging from 280 to 300 days/annum in southwestern cropping areas, known as Greenbelt and from 130 to 150 days/annum in northern states. Bi-modal rainfall areas cover most of Greater Equatoria Region (Western, Central and parts of Eastern Equatoria states), while the rest of the country has a uni-modal rainfall regime. Agricultural performance varies markedly depending on latitude and longitude, with the possibility of two or three harvests/annum from the same plots in Greater Equatoria Region and a single harvest in the uni-modal rainfall areas further north.

The country's agriculture is almost entirely dependent on rainfall and hence the rainfall variability in terms of amount and distribution is usually the major factor in determining crop production. Rainfall generally increases from northeast to southwest, culminating in Greenbelt along the border with the Central African Republic, the Democratic Republic of the Congo and Uganda. However, there are usually considerable variations in rainfall from year to year and from location to location within the same year. In low-lying areas, flooding and water logging are a common occurrence, while prolonged dry periods are frequent in southeastern areas and along the border with the Sudan.

Crop production is mainly conducted by smallholder farmers on small plots of land cultivated manually using hand tools. The average family size is five to seven persons that belong to larger family aggregations. Despite an abundance of arable land throughout the country, the extent of the cultivated area is limited mainly by (a) the size of the household labour force and/or the ability of the households to provide in-kind payment (essentially food/local beer) for the mobilization of traditional working groups (*nafeer*); (b) the limited availability of efficient tools and power for land clearing and ploughing and (c) a limited security of access to land, including difficulty of cultivating fields far from living areas.

In recent years, farmers' interest to expand farm sizes has increased with steading-based farm areas merging with far-fields as communities increased the adoption of animal traction (e.g. Lakes, parts of Warrap and Northern Bahr-el-Ghazal states) and with emerging commercially-oriented farmers cultivating larger areas of cereals, groundnuts and cassava using, depending on location, different combinations of tractor services, labour gangs and pairs of oxen. However, after the escalation of the conflict in 2016, farm sizes in insecure areas have either decreased or remained unchanged due to the fear of accessing far fields. During the past 20 years, animal traction has been promoted by FAO and several NGOs in Central Equatoria, Eastern Equatoria, Lakes, Warrap and Western and Northern Bahr-el-Ghazal states in attempts to facilitate an increase in the area cultivated by each household. However, the high cost of mould-board ploughs and the lack of spare parts and skills to maintain and operate them, coupled with the low availability of raw materials for local blacksmiths still limit area expansion.

Despite the improvements of the security situation starting from 2018, the secure access to land, both near homesteads and the far fields, has been a critical issue, mainly in Greater Upper Nile Region and its bordering areas, the epicentre of the conflict, as well as in most areas of Greater Equatoria Region, where the civil war spread in 2016, resulting in the displacement of several farming households.

Large scale mechanized cereal production is practised only in some areas of Upper Nile, particularly in Renk and Melut counties, following the patterns of land use established before the independence by traders/farmers from both South Sudan and the Sudan. Small activities of commercial farming are also practiced in Northern Bahr-el-Ghazal State, including the Aweil Rice Scheme and some private commercial farming, mainly producing sorghum. The term "mechanization" applies only to a one-pass ploughing and a second sowing pass with a seed drill positioned over the ubiquitous disc harrows, while most other operations are performed manually. Elsewhere, limited numbers of both private and Government-owned tractors provide ploughing services to individuals and farmer groups. However, tractor service faces major problems related to the supply and high cost of fuel and spare parts, operator skills and maintenance, and repair capabilities persist, severely limiting the efficiency of the tractor service. This has increased the tractor hiring rate making it unaffordable for small farmers. In general, only one-fourth of the tractors purchased over the last 15 years is functional.

Sorghum is the main cereal crop cultivated in both the smallholder and mechanized sector, comprising about 70 percent of the area sown to cereals. The preferred sorghum seeds are found among many local landraces with lengths to maturity fitting agro-ecological niches[3] ranging from short-season (<90 days) to very long-season (>220 days) types. There are also several improved, short-cycle varieties of sorghum from the Sudan that have become well-established in both large-scale mechanized farms and traditional smallholder farming areas, with cross-border access to the Sudan.[4]

Maize is the second dominant cereal covering an estimated 20 percent of the total cereal area. However, there are significant regional differences. Maize is the most popular cereal in Greenbelt, where *Longi* varieties (especially *Longi-5*) from Uganda are grown in series in two crops/year on the same land (200 percent occupancy). It is also the main cereal crop in southern and central parts of Unity State, along the Sobat River in Upper Nile State and in eastern counties of Jonglei State near the Ethiopian border, where mixed *Longi* varieties, local landraces and Ethiopian varieties are noted. Elsewhere, maize is only cultivated in very limited areas close to homesteads, where it is consumed green with the first early sorghums in August–September.

[3] Short-season landraces provide an early harvest in August/September, while long-season landraces, able to withstand both dry spells and waterlogging, are harvested in December/January.

[4] Arfa Gadameck, Wad Ahmed, Gaddam el Hamam.

Other cereals, namely bulrush millet, finger millet and rice, account for about 10 percent of the cereal area. In Northern and Western Bahr-el-Ghazal, Warrap and Lakes states, sorghum is inter-cropped with bulrush millet, while finger millet and upland rice are mainly found in Greater Equatoria Region. In recent years, the cultivation of rice in Western Equatoria State has been expanding with rice planted as a sole crop or inter-cropped with maize, groundnuts and cassava. Other crops of major importance to food security include groundnuts and cassava, sweet potatoes and yams. Groundnuts and cassava are estimated to account 22 and 7 percent, respectively, of all crops grown in the country. Cassava is estimated to account for almost 18 percent of the planted area in Western Equatoria State, 11 percent in Eastern Equatoria and about 13 percent in Western Bahr-el-Ghazal and Central Equatoria states. While groundnuts are grown in all states, the percentage of cultivated area varies: 36 percent in Lakes, 29 percent in Western Bahr-el-Ghazal, 27 percent in Northern Bahr-el-Ghazal, 23 percent in Central Equatoria, 20 percent in Warrap and 16 percent in Western Equatoria states. Groundnuts, mainly *Red Beauty* and *Mr Lake* varieties, are usually cultivated on sandier soils and, after cereals, they make the most important contribution to the households' diets in these areas, where they are also the main cash crop. Sesame is grown in almost all states, especially in Greater Bahr-el-Ghazal Region, traditionally inter-cropped with sorghum. At the national level, sesame accounts for about 5 percent of the crop output. Recently, the crop's popularity is increasing in northern areas, especially in the commercial farming areas of Upper Nile State, where it is sold at high, profitable prices to traders from the Sudan. Other main sesame growing areas include Warrap, Western Bahr-el-Ghazal, Northern Bahr-el-Ghazal and Western Equatoria states.

Okra, cowpea, green-gram, pumpkin, Bambara nut and tobacco, are also widely grown around homesteads throughout the country. Vegetables, including onions and tomatoes, are increasingly cultivated near the cities to supply the urban markets. In the absence of reliable farmers' shops, vegetable kits distributed by various NGOs have been the main sources of seeds.

Most farmers use their own seed retained from the previous year's harvest or local seeds purchased from the markets or borrowed from relatives. However, farmers close to the borders with the Sudan or Uganda and vulnerable households have been receiving seeds from FAO and NGOs.

Although purchased inputs, including chemical fertilizers, pesticides or herbicides, are not generally used by smallholder farmers on field crops, some herbicide use has been noted on large-scale mechanized farms in Upper Nile State, with access to supplies from bordering areas of the Sudan (mainly White Nile State). In 2020, the crop assessment Task Force teams have reported the use of pesticides in commercial farms of Upper Nile State on sesame and by few medium-scale vegetable farmers in Central Equatoria State. Regarding pest control campaigns, before South Sudan's independence, migratory Quelea quelea bird (QQU) populations near the mechanized areas were routinely controlled by aerial spraying of nesting sites. Although the practice was resumed in 2013, with some aerial spraying conducted by the Desert Locust Control Organization, no actions have been taken since then as the concerned areas were located in conflict-affected states, leaving the sorghum crops to be harvested in January in Upper Nile State vulnerable to bird attacks. Regarding the 2020 cropping season, there were no reports of serious damage on sorghum by migratory pests, including QQU, Fall Armyworms and desert locusts in Upper Nile State, especially Renk and Melut counties. However, the presence of common pests, including local birds, has caused mild to moderate damage to crops.

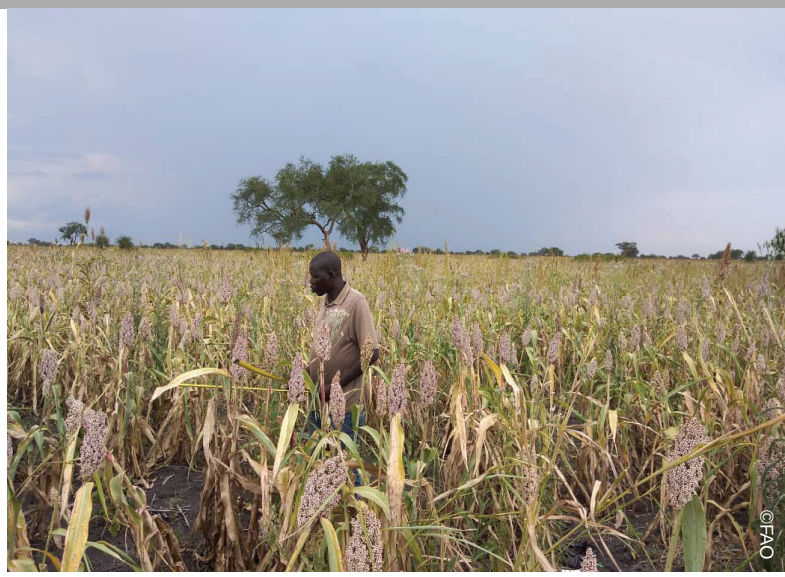
Livestock is a very important asset throughout the country, with about 60 percent of the population dependant on it. Livestock has a significant socio-economic importance in addition to its role in food security and income generation. The main species include cattle, goats and sheep, raised extensively under transhumant management systems. The sale of livestock, especially small ruminants, provides a significant contribution to incomes of the households and, therefore, to their food security situation.

CEREAL PRODUCTION IN 2020

Cereal harvested area and yield estimates

In the absence of any nationally generated, crop and yield estimates or disaggregated data on specific crops (e.g., from annual cropped land surveys), cereal production for the smallholder sub-sector is derived from the following variables: (1) estimates of the number of households actively farming in each county, based on: (a) total county population figures (NBS data adjusted with OCHA figures for population movements, notably refugees, IDPs, returnees) and (b) average household size and estimated proportion of households farming per county reflecting the proportion of rural to urban dwellers and access to land; (2) standard estimates of the average area per farming household under cereals for each county, adjusted according to Global Positioning System (GPS) measurement results performed during the field visits; (3) estimates of average cereal yield for each county, based on: (a) farmer case studies by the Task Force teams, (b) crop-cut samples by the Task Force teams and CCMCs, (c) Mission transect observations made using PET photo indicators and associated protocols, and (d) information from semi-structured interviews with key informants from State ministries of Agriculture, NGOs and other stakeholders involved in agriculture.

The annual cereal production estimates for each county is derived based on the data and information from these four sources. The county figures are then added to provide the cereal production figures for each of the ten states and for the country as a whole. The number of assumptions incorporated into this methodology implies that the final production figures should not be regarded as necessarily exact, but rather as the best estimates under the prevailing circumstances.

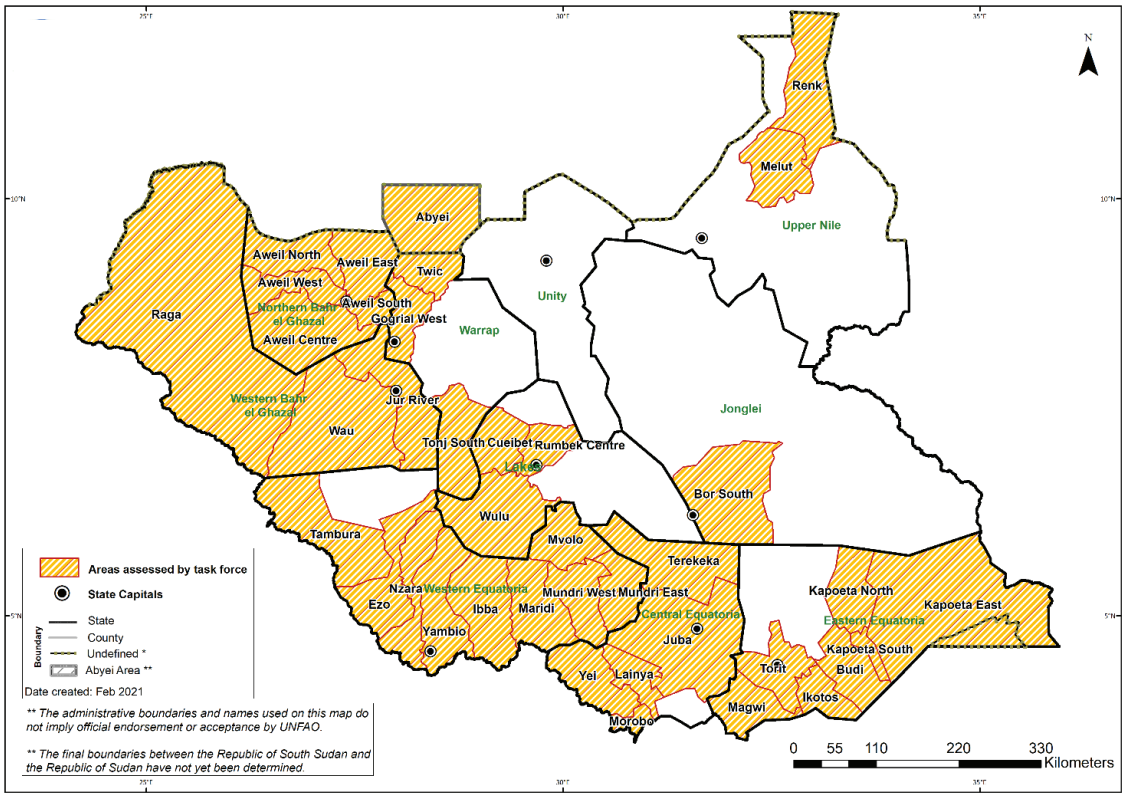


Until 2013, the production estimates were essentially undertaken by a team of international specialists during a six-week mission to the country in November–December, working with staff from MAFS, NBS and FAO national staff. Starting in 2014, in a departure from the usual one-off CFSAM exercise at harvest time, several teams led by the members of a Task Force of selected specialists from MAFS, NBS and FAO national staff conducted a series of intermediate missions at planting and harvesting time. Since 2015, FAO South Sudan office employed an international agronomist as Crop Assessment Supervisor/Trainer to support the capacity building efforts and year-round assessment of the main crops from planting up to harvesting. As a result, all missions were scheduled to match the pertinent agricultural activities that occur at different times of the year in different cropping areas and agro-ecological zones. The effect of the change in approach was noticeable in terms of broader coverage, including a continuous monitoring of the cropping season and a more accurate assessment of crop production of both the first and second season harvests in bi-modal rainfall areas. Therefore, the current approach, with monitoring activities from

planting to harvesting, has greatly improved the quality of the CFSAM estimates, providing more accurate agricultural data to enable well-informed decisions by national and international institutions. However, a different approach was used in insecure areas including Unity State and parts of Jonglei State, where data and information was gathered through telephone and electronic communication means and brining the State Task Force members to Juba during the final analysis.

In order to improve participation of local line agencies and to increase the area covered by the assessment, the former AFIS Project of FAO set up 39 CCMCs in 2016 and 2017, whose members are extension workers of the MAFS and staff of NGOs. Members of CCMCs were trained to monitor and report the progress of the cropping season and to assess the performance of the crops using a standard form designed to capture qualitative and quantitative information. This approach has continued with wider coverage in 2018, 2019 and 2020, increasing the number of CCMCs to 54 in 2018 and to 64 in 2019 and 2020, when they were present in all states, with the support of the new project "Strengthening the resilience of pastoral and agro-pastoral communities in South Sudan's cross border areas with the Sudan, Ethiopia, Kenya and Uganda" (OSRO/SSD/703/EU), funded by the European Union. The location of CCMCs is shown in Figure 4. Therefore, from 2017 to date, the annual crop assessment exercise in South Sudan is based on two main pillars: The Task Force Team-led approach and the work by CCMCs.

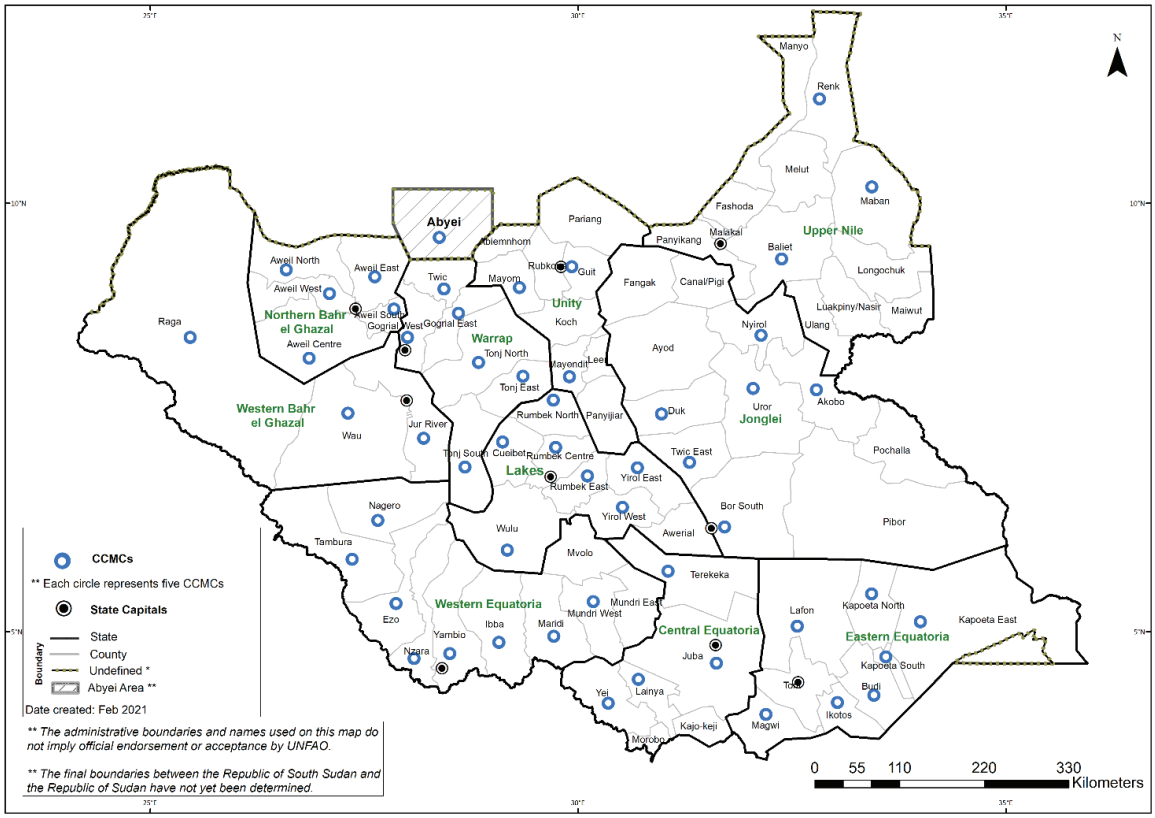
Figure 3: South Sudan - Counties assessed by Task Force Teams at harvest time (2020)



Source: FAO South Sudan, modified to comply with UN map, 2020.

Disclaimer: *Final boundary between the Sudan and South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.*

Figure 4: South Sudan - Location of CCMCs (December 2020)



Source: FAO South Sudan, modified to comply with UN map, 2020.

Disclaimer: *Final boundary between the Sudan and South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.*

In 2020, during all the assessment missions carried out by the Task Force teams at harvesting time, security-related access implications required the field work to be conducted only in pre-selected locations that were reachable by air or by main roads where at least two vehicles were required to drive in-tandem in the 40 assessed counties (out of 79). Since 2015, walking[5] transects in specific locations were mostly used rather than long-distance driving transects to estimate yields. In recent years, with the increased coverage of the cropping areas assessed by the Task Force teams and CCMCs and the scheduling of missions at harvest time in the diverse agro-ecological zones, there has been more reliance on crop-cuttings (sampling) rather than on PET-based transects to estimate yields, which were mostly used in the areas where crops were not fully mature or not ready for harvest at the time of the Task Force Team visits, in which case taking samples of immature crops would have been misleading in yield estimations due to the high moisture content of the grains. In 2020, the Task Force teams applied also important protocols and guidelines related to the COVID-19 pandemic and its containment measures.

In 2020, the Task Force teams conducted 22 harvest assessment missions, visiting 40 counties. These assessments were conducted between August and December 2020 in Northern Bahr-el-Ghazal, Lakes, Warrap, Central Equatoria, Eastern Equatoria, Upper Nile, Jonglei and Western Bahr-el-Ghazal states and Abyei Administrative Area. The Task Force Team completed a total of 1 075 case studies during the harvest assessment missions, including 992 interviews with farmers and 83 interviews with key informants including with senior staff of the State ministries

[5] Team members independently walked through crop fields, scoring yields in every plot/field passed by colour code according to "close-up level" of PET photo indicators for each major crop. Scores made were then converted from colour codes into tonnes/hectare and weighted averages calculated for each transect walked.

of Agriculture (SMoA), county officials and staff of NGOs and international agencies based in the field. Travel restrictions imposed by the Government due to the COVID-19 pandemic prohibited the assessment missions at planting time, while the number of assessment missions at harvesting time in 2020 were 22, compared to 15 conducted in 2019. In 2020, 830 case studies were conducted during harvesting, 30 percent more than the 630 case studies conducted in 2019.

In addition, reports from 64 functioning CCMCs offered qualitative and quantitative information on crop performance in their respective areas. Growing conditions reported in the case studies and interviews were then compared with remote sensing data and information from FAO/GIEWS and WFP/VAM, including Normalized Difference Vegetation Indices (NDVIs) data and rainfall anomaly estimates, along with rainfall data collected locally using manual rain gauges. Furthermore, in the areas where the risk to the teams' safety was too severe, "remote assessment" procedures were used, through e-mail and telephone conversations with key informants, as appropriate. The contribution of CCMC networks across the country was significant when COVID-19-related travel restrictions were in place, especially by providing seasonal and crop performance updates and pest infestations information through telephone calls and communications by internet.

The 2020 aggregate cereal harvested area in the traditional farming sector is estimated at 987 497 hectares, 6.2 percent above the previous year's level and 6.7 percent higher the average of the previous five years. This reflects an estimated 4.7 percent increase in the number of farming households following the signing of the R-ARCSS in September 2018 peace deal and an improvement of the security situation, which encouraged the gradual voluntary returns of the displaced farmers. The relative peace has encouraged several farmers to cultivate more even in fields far from their residences. In addition, the difficult economic situation encouraged more farmers to cultivate. However, the lingering impact of the prolonged conflict continues to severely constrain agricultural activities impairing access to the fields in several areas. As a result, despite the increase on a yearly basis, the harvested area in 2020 remained well below the pre-conflict level. Notably, despite the increasing trend in 2018, 2019 and 2020, cultivated area is still very low in the most productive lands of Greenbelt and Western Bahr-el-Ghazal due to the large scale displacements which occurred in late 2016 and 2017.

At the sub-national level, compared to previous year, the harvested area increased in Western Bahr-el-Ghazal (+18.8 percent), Central Equatoria (+16.9 percent), Unity (+16.4 percent), Northern Bahr-el-Ghazal (+10.3 percent), Lakes (+7.3 percent),

Table 1: South Sudan - Estimated settled population, farming households and harvested cereal area (2020)

State/County	Population (mid-2020)	Households (mid-2020)	Farming households (percent)	Farming households (mid-2020)	Average cereal area (hectare/ household)	Total cereal area (hectares)
Central Equatoria	**1 133 165**	**183 220**	**43**	**78 926**	**0.96**	**75 824**
Juba	419 542	65 834	30	19 750	1.00	19 750
Kajo Keji[1/]	113 064	18 738	45	8 432	0.95	8 010
Lainya[1/]	107 164	16 779	40	6 711	0.90	6 040
Morobo[1/]	147 359	22 343	35	7 820	1.00	7 820
Terekeka	173 459	31 005	80	24 804	0.85	21 083
Yei[1/]	172 576	28 522	40	11 409	1.15	13 120

State/County	Population (mid-2020)	Households (mid-2020)	Farming households (percent)	Farming households (mid-2020)	Average cereal area (hectare/ household)	Total cereal area (hectares)
Eastern Equatoria	**1 062 619**	**183 223**	**71**	**130 280**	**0.96**	**125 117**
Budi	99 962	16 902	85	14 367	1.20	17 240
Ikotos	132 051	25 773	80	20 618	1.10	22 680
Kapoeta East	174 632	31 350	54	16 929	0.70	11 850
Kapoeta North	110 632	17 143	56	9 600	0.90	8 640
Kapoeta South	72 366	10 790	56	6 042	0.65	3 927
Lafon	109 570	17 750	85	15 087	0.90	13 579
Magwi[1/]	197 763	30 596	75	22 947	1.25	28 684
Torit	165 643	32 919	75	24 689	0.75	18 517
Jonglei	**1 864 549**	**264 851**	**37**	**97 584**	**0.62**	**60 551**
Akobo	195 775	25 459	45	11 456	0.60	6 874
Ayod	183 117	22 200	10	2 220	0.50	1 110
Bor South	255 793	36 273	50	18 137	0.70	12 696
Duk	123 764	19 326	38	7 344	0.42	3 084
Fangak	184 273	24 382	15	3 657	0.42	1 536
Khorflus/Pigi/Canal	105 426	12 730	10	1 273	0.70	891
Nyirol	186 594	26 218	35	9 176	0.50	4 588
Pibor	204 437	31 312	40	12 525	0.60	7 515
Pochalla	87 131	13 748	65	8 936	0.70	6 255
Twic East	128 409	21 629	40	8 652	0.70	6 056
Uror	209 831	31 573	45	14 208	0.70	9 946
Lakes	**1 310 142**	**175 954**	**74**	**130 425**	**1.09**	**142 134**
Awerial	156 974	24 962	65	16 225	1.10	17 848
Cueibet	200 243	29 390	88	25 864	1.20	31 036
Rumbek Centre	277 623	30 405	60	18 243	0.85	15 507
Rumbek East	226 117	28 559	80	22 847	0.90	20 562
Rumbek North	65 384	7 460	70	5 222	0.75	3 916
Wulu	79 700	12 809	80	10 247	1.30	13 321
Yirol East	118 403	15 761	75	11 821	1.10	13 003
Yirol West	185 698	26 609	75	19 956	1.35	26 941
Northern Bahr-el-Ghazal	**1 498 460**	**279 131**	**76**	**212 288**	**0.79**	**167 362**
Aweil Centre	117 522	25 515	60	15 309	0.84	12 860
Aweil East	588 879	108 071	80	86 457	0.75	64 842
Aweil North	299 576	57 750	80	46 200	0.85	39 270
Aweil South	160 163	30 493	70	21 345	0.75	16 009
Aweil West	332 320	57 302	75	42 977	0.80	34 381
Unity	**912 883**	**113 669**	**42**	**47 965**	**0.48**	**23 245**
Abiemnhom	30 970	3 288	65	2 137	0.55	1 175
Guit	41 170	4 031	45	1 814	0.50	907
Koch	131 512	13 974	45	6 288	0.50	3 144
Leer	113 298	15 051	35	5 268	0.50	2 634
Mayendit	92 239	11 332	35	3 966	0.50	1 983
Mayom	182 692	23 029	45	10 363	0.50	5 181

State/County	Population (mid-2020)	Households (mid-2020)	Farming households (percent)	Farming households (mid-2020)	Average cereal area (hectare/ household)	Total cereal area (hectares)
Panyijar	98 474	16 843	45	7 579	0.50	3 790
Pariang	142 515	18 083	45	8 137	0.42	3 418
Rubkona	80 013	8 037	30	2 411	0.42	1 013
Upper Nile	**1 064 751**	**157 837**	**47**	**73 990**	**0.60**	**44 709**
Baliet	52 686	7 965	30	2 389	0.50	1 195
Fashoda[1/]	50 565	8 166	20	1 633	0.50	817
Longochuk	79 600	10 432	70	7 302	0.42	3 067
Luakpiny/Nasir	317 833	43 936	55	24 165	0.42	10 149
Maban	62 799	13 644	50	6 822	0.65	4 434
Maiwut	44 357	5 848	70	4 094	0.42	1 719
Malakal	79 214	10 579	15	1 587	0.42	667
Manyo	29 691	4 990	50	2 495	0.55	1 372
Melut	80 481	11 617	50	5 808	0.95	5 518
Panyikang	26 157	4 185	40	1 674	0.50	837
Renk	135 815	22 175	40	8 870	1.20	10 644
Ulang	105 554	14 299	50	7 150	0.60	4 290
Western Bahr-el-Ghazal	**579 360**	**103 117**	**62**	**63 631**	**0.80**	**51 165**
Jur River	169 145	27 496	75	20 622	0.80	16 497
Raga	104 939	19 695	48	9 454	0.65	6 145
Wau	305 276	55 926	60	33 556	0.85	28 522
Warrap	**1 570 108**	**272 449**	**69**	**187 394**	**0.86**	**160 652**
Abyei	83 794	12 512	60	7 507	1.00	7 507
Gogrial East	146 595	26 284	65	17 085	0.75	12 813
Gogrial West	364 420	67 212	80	53 769	0.90	48 392
Tonj East	124 946	21 252	65	13 814	0.70	9 670
Tonj North	257 272	46 229	70	32 360	0.80	25 888
Tonj South	138 252	23 215	75	17 411	1.15	20 023
Twic	454 828	75 745	60	45 447	0.80	36 358
Western Equatoria	**814 451**	**149 760**	**69**	**103 503**	**1.32**	**136 737**
Ezo[1/]	112 678	25 363	50	12 681	1.20	15 218
Ibba[1/]	42 144	10 546	70	7 382	1.45	10 704
Maridi[1/]	81 838	13 019	75	9 764	1.40	13 670
Mundri East[1/]	63 172	8 918	55	4 905	1.15	5 640
Mundri West[1/]	58 060	6 881	65	4 473	1.00	4 473
Mvolo	91 228	12 431	60	7 459	0.85	6 340
Nagero	15 321	3 259	65	2 118	0.80	1 695
Nzara[1/]	63 334	15 729	85	13 369	1.45	19 385
Tambura[1/]	79 442	19 107	90	17 196	1.50	25 794
Yambio[1/]	207 235	34 508	70	24 156	1.40	33 818
TOTAL	**11 810 488**	**1 883 212**	**60**	**1 125 986**	**0.88**	**987 497**

Source: CFSAM South Sudan, 2020.
[1/] First and second harvested areas combined.

and Western Equatoria (+6.1 percent) states. By contrast, it was similar to 2019 in Eastern Equatoria, Jonglei, Upper Nile and Warrap states.

The breakdown of the harvested area at County and State level as well as all variables used for its calculation are presented in Table 1.

The tentative estimated areas by cereal crops in 2020 are shown in Table 2. These are based on the proportions of all cereal crops collected and recorded by CCMCs from each county and cross-checked by the Task Force teams at State and national levels.

Factors affecting yields

Rainfall

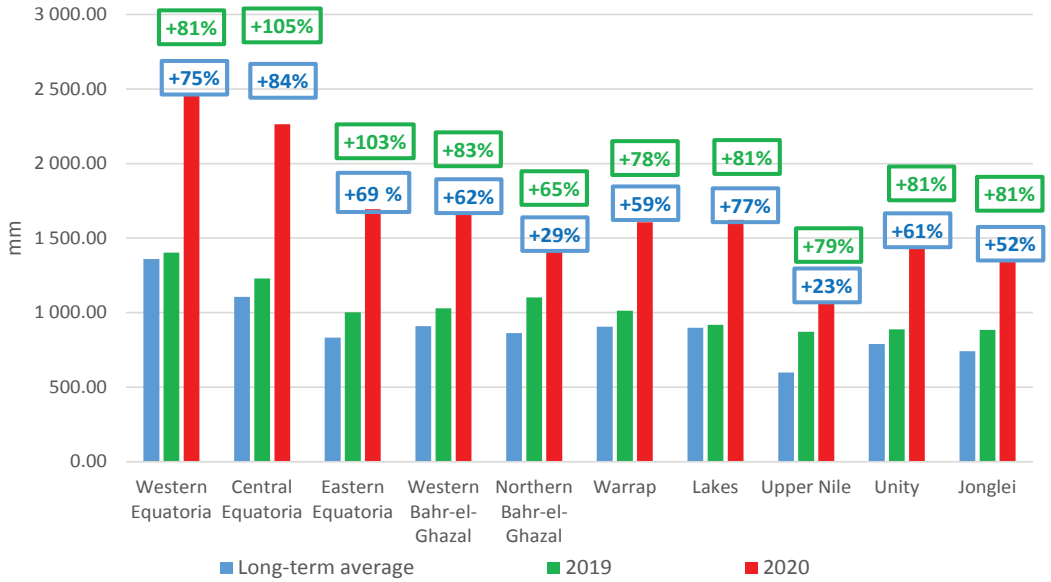
Rainfall is the main driver and limiting factor of crop production in the country. The rainfall analysis is based on data provided by FAO and WFP on Remote Sensing Rainfall Estimates (RFEs) and NDVIs as well as rain gauge data and farmers'

Table 2: South Sudan - Tentative estimates of 2020 cultivated areas by cereal crops (hectares)

State	Sorghum	Maize	Rice	Finger millet	Pearl millet	Total cereals
Central Equatoria	41 613	27 045	785	716	5 664	75 824
Eastern Equatoria	87 168	34 458	512	844	2 136	125 117
Jonglei	49 593	10 958	-	-	-	60 551
Lakes	124 282	9 234	-	-	8 619	142 134
Northern Bahr-el-Ghazal	158 642	3 099	3 277	-	2 345	167 362
Unity	11 662	11 254	-	-	329	23 245
Upper Nile	26 220	18 299	-	-	190	44 709
Western Bahr-el-Ghazal	41 623	6 925	-	792	1 824	51 165
Warrap	142 639	10 427	-	-	7 586	160 652
Western Equatoria	29 239	72 899	25 067	-	339	136 737
TOTAL	**712 679**	**204 597**	**29 642**	**11 545**	**29 033**	**987 497**
National percent	**72.2**	**20.7**	**3.0**	**1.2**	**2.9**	**100**

Source: CFSAM South Sudan, 2020.

Figure 5: South Sudan - Cumulative seasonal rains in 2020 compared to 2019 and to long-term average



Source: FAO/GIEWS, 2020.

observations compiled by the Task Force teams and monthly reports of CCMCs.

The 2020 rainy season was characterized by a favourable spatial and temporal distribution and by above-average amounts of precipitations over most cropping areas (Figure 5).

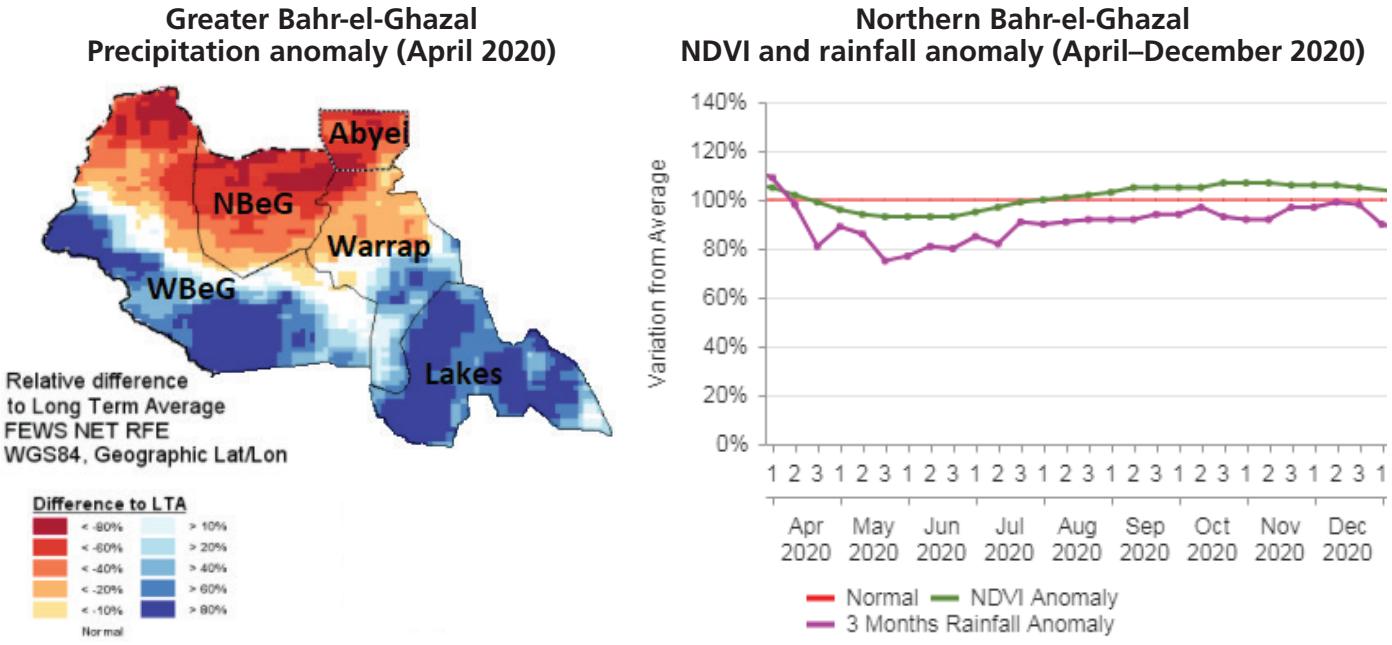
Rains had generally a timely onset in April 2020 in southern bi-modal rainfall areas and in May 2020 in central and northern uni-modal rainfall areas. However, in some areas of Greater Bahr-el-Ghazal Region and of Central Equatoria and Upper Nile states, the establishment of the rainy season was delayed by two to three weeks. In particular, early season dryness (Figure 6) was observed in April in northern areas of Greater Bahr-el-Ghazal Region (Northern Bahr-el-Ghazal State and northern areas of Western Bahr-el-Ghazal and Warrap states). Once the rains were fully established in May, however, above-average and well-distributed precipitation for the remainder of the cropping period offset early moisture deficits and boosted yields in most areas.

In general, the above-average precipitation amounts that characterized the 2020 rainy season resulted in favourable growing conditions and boosted yields in most cropping areas. However, the abundant rains triggered flooding and river overflows which affected over 850 000 people in low-lying areas, particularly in Jonglei, Lakes and Upper Nile states, damaging crops to various degrees and also resulting in livestock losses.

The area where the floods caused the most significant cereal production shortfall was Jonglei State and the neighbouring Pibor Administrative Area, especially the counties along the Nile River. Here, floods began early, in late May, and continued for most of the rainy season, triggered by excessive rains, run-off from surrounding highlands and the overflow of the Nile River. In the State, nine counties out of 11 were affected by flooding, which damaged about 27 000 hectares of cereals with a consequent significant contraction of the cereal output, that is estimated as the lowest on record since 2016. By contrast, in Lakes and Upper Nile states, the flood damage was comparatively lower.

In Lakes State, despite floods were reported in all counties and about 13 000 hectares planted with cereals were affected, cereal losses were less significant than in Jonglei State, as both in absolute terms and as a percentage of the total planted area, the flood-affected area was lower, and fields were flooded late during the season, in August. By that

Figure 6: South Sudan - Early season dryness



Source: FAO/GIEWS and WFP/VAM, modified to comply with UN map, 2020.

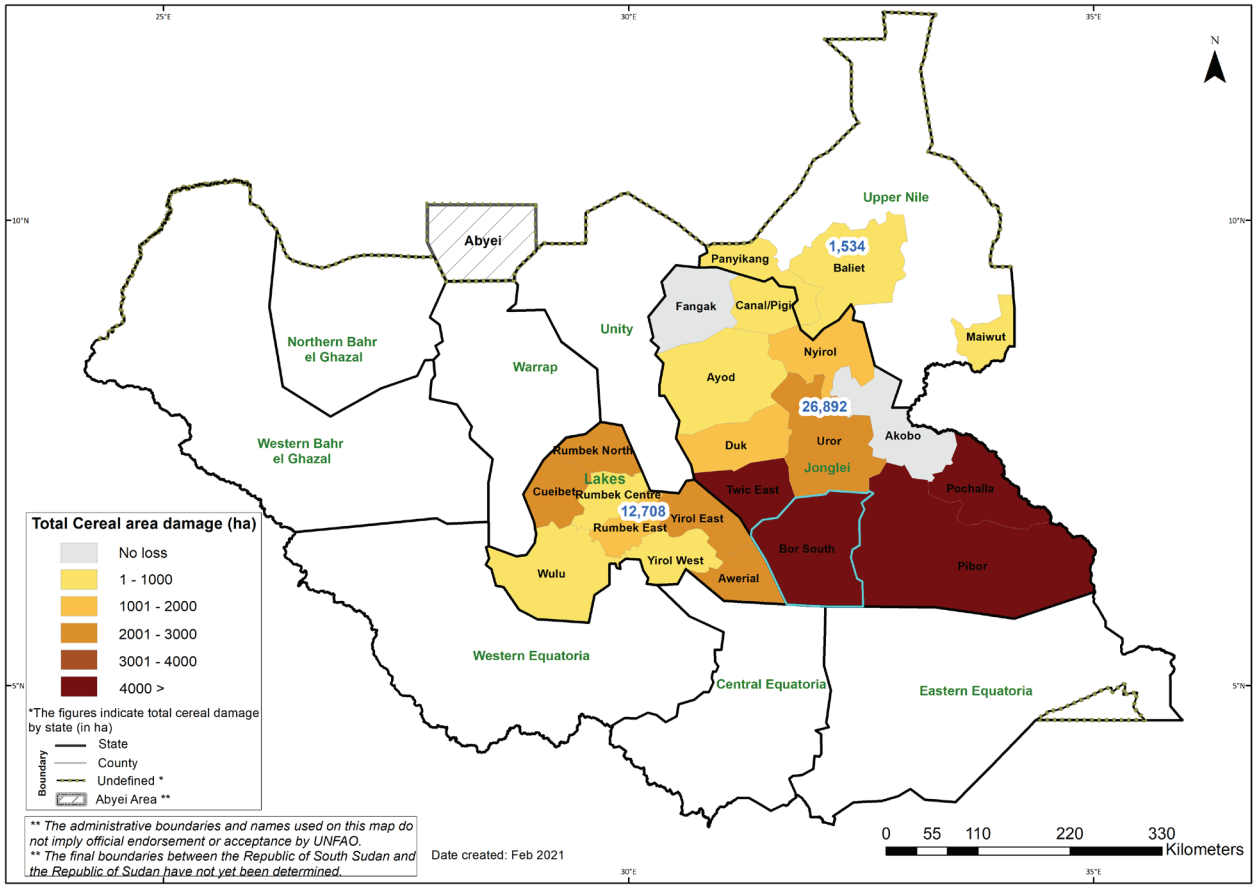
Disclaimer: *Final boundary between the Sudan and South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.*

time, most crops were already at maturity stage and almost ready to be harvested. As a result, in Lakes State, as opposed to Jonglei State, cereal production recorded an increase compared to 2019, as the positive impact of abundant rains on yields offset the flood-related losses. In addition, the crops most affected by the floods were cowpeas, green grams, groundnuts and sesame, while sorghum and millet performed well. Finally, in Upper Nile State, floods were reported in only three counties out of 12 and floods affected just about 1 500 hectares planted with cereals. Due to the limited area affected by the floods, an increase in cereal production was recorded also in this State compared to 2019.

Livestock was also affected by flooding, especially in Jonglei State. Here, in the flooded areas, pasture was in short supply as most of the grazing and shrub lands were submerged in water, forcing the movement of pastoralists with their livestock to higher grounds, triggering competition for settlement areas and pasture between the displaced communities. In Jonglei State, about 711 400 livestock heads were affected, with 47 500 animals dying in Twic East, Duk, Bor South and Canal Pigi counties. In addition, a threefold increase in livestock diseases was recorded and the limited availability of forage affected animal body condition and availability of livestock products. Figure 7 shows the counties most affected by floods in Jonglei, Lakes and Upper Nile states.

In the commercial farming areas of Renk and Melut counties in Upper Nile State, rainfall had an early start in June and amounts were average and lower than in 2019. Despite a dry spell of two to three weeks in August and, in some areas, in September, the overall crop performance of sorghum in the semi-mechanized commercial farming areas was good and yields in 2020 were generally higher than in 2019. In some areas, sesame fields that had been damaged by pests have been replaced with sorghum crops. However, in the areas affected by dry spells in September, the replanted sorghum crops were wilted and stunted due to moisture stress.

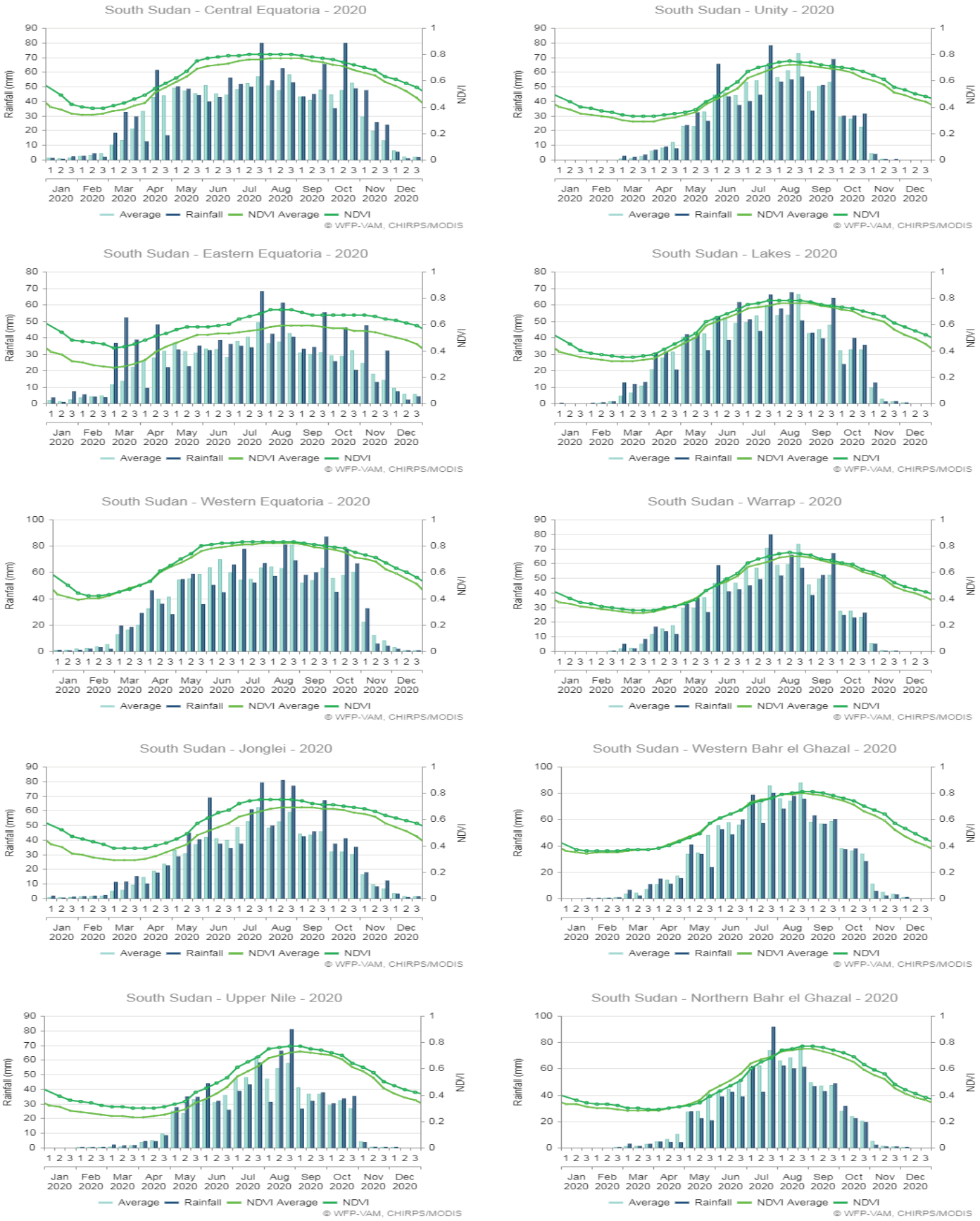
Figure 7: South Sudan - Flood affected areas (2020)



Source: FAO South Sudan, modified to comply with UN map, 2020.

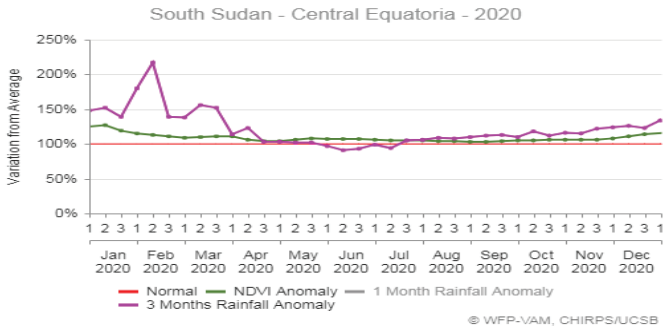
Disclaimer: *Final boundary between the Sudan and South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.*

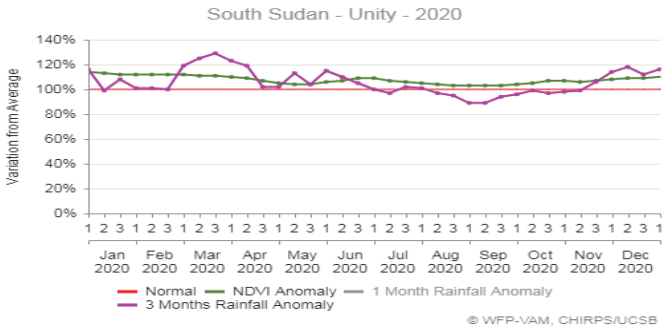
Figure 8: South Sudan - Rainfall amounts RFEs and NDVIs (2020)

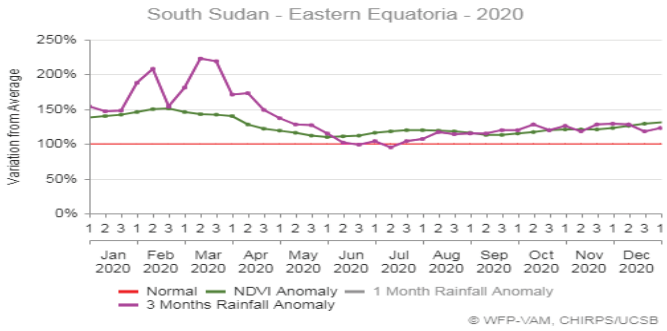


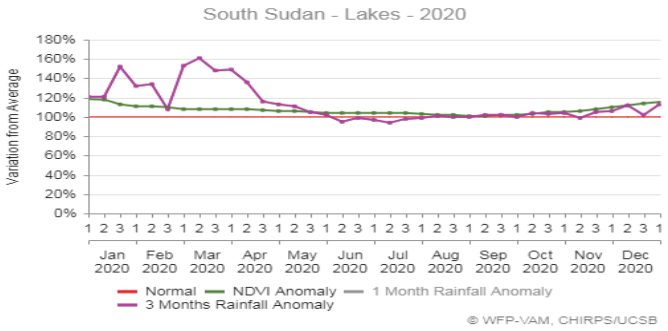
Source: WFP/VAM, 2020.

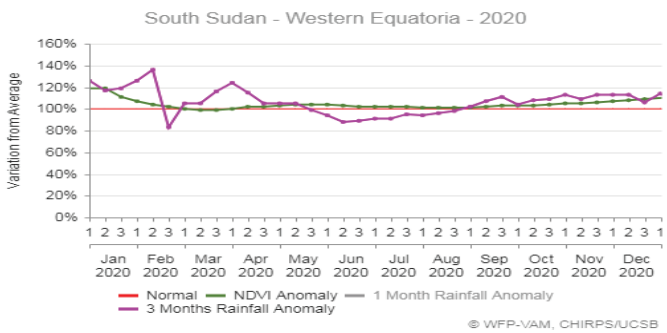
Figure 9: South Sudan - Rainfall anomalies (2020)

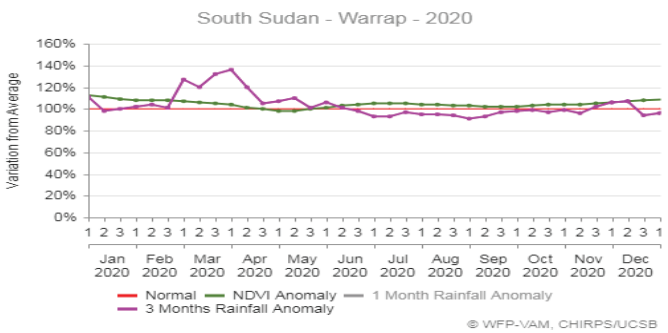


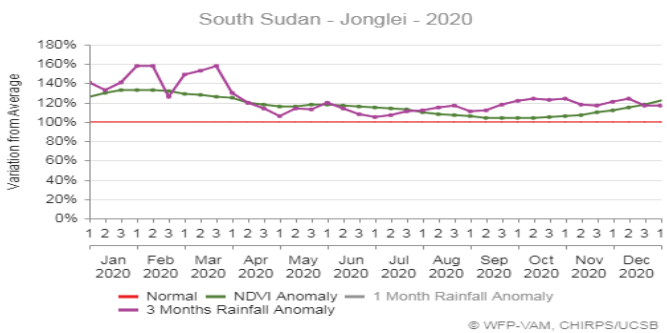


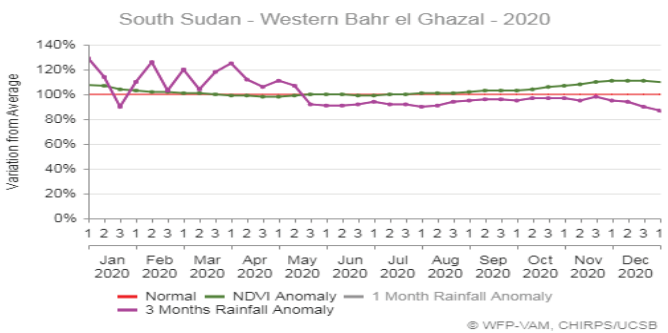


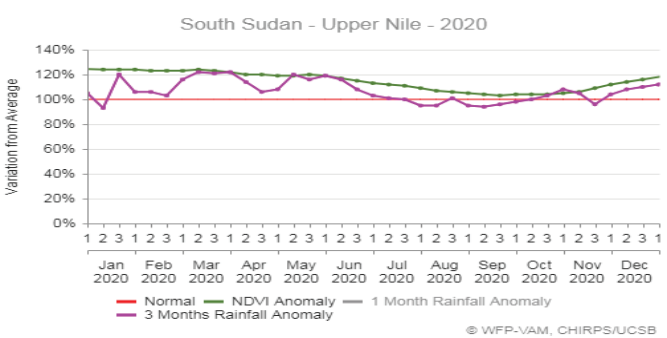


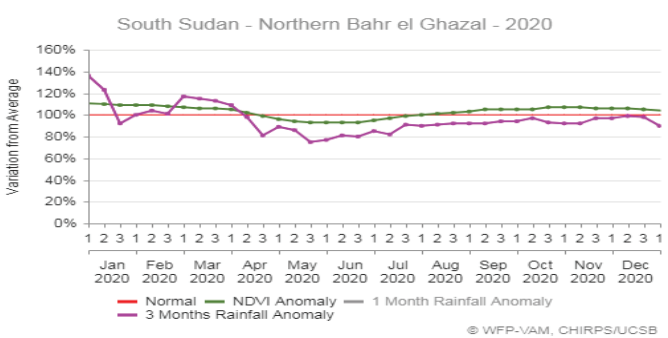












Source: WFP/VAM, 2020.

In the commercial farming areas of Northern Bahr-el-Ghazal State (Aweil East and the Ton Chol Scheme), the rainy season was characterized by a delayed onset, prolonged dry spells and an erratic distribution that affected crop performance which, however, was still better than in 2019, when farmers were not able to plant crops due to flooding that impeded agricultural activities.

Inputs in the traditional smallholder sector

In the traditional sector, the two main inputs are manual labour and local planting material (seeds and cuttings), with farmers relying on shifting cultivation to maintain soil fertility. In Northern Bahr-el-Ghazal State, the use of animal manure is gradually increasing, mainly on sorghum and vegetable crops.

The importance of using animal manure is increasing, with its application largely performed by keeping large herds of cattle over crop fields for a certain number of days. This is practiced through the negotiation of prices between farmers and cattle keepers. However, this practice is usually too expensive for poor farmers. Regarding cultivation practices, availability of hand tools and labour are the most significant limiting factors for smallholder farmers. For the majority of the households, farm size is limited to the area of land that they can clear, cultivate and weed with the traditional flat-bladed, long-handled hoe (called *maloda*), the local short-handled, bent hoe (called *toriah*) or the East African hoe or *jembe*.

The acceptance of animal traction in Lakes State, where the uptake of technology appears to be the highest and in parts of Warrap and Central Equatoria states, is reflected in the high hiring rates of oxen cultivation. In Lakes State, despite the high cost of plough boards, several households decided to buy or hire oxen for cultivation. As a result, the area cultivated using ox-ploughs has increased noticeably due to the high crop prices.

The prices of hand tools in 2020 continued the increasing trend of the previous five years, mainly due to the economic crisis and the devaluation of South Sudanese Pound. Hand tools, including hoe, *maloda*, Axe, Panga and rakes, are usually purchased from the local markets or provided by NGOs, particularly through FAO partners. In 2020, the price of one *maloda* ranged from SSP 500 to SSP 1 000, twice the price in 2019, while the price of a hoe was about SSP 1 200 compared to SSP 800 in 2019.

Tractors and draft animals (ox- and donkey ploughs) are also used by farmers. In 2020, there were about 23 Government tractors in Western Bahr-el-Ghazal State, but only four were functional. On the other hand, there were about 10 functional private tractors in the State. Overall, the efficient utilization of tractors has been constrained by shortage and high prices of fuel and unavailability of spare parts. In 2020, the hiring rate for Government tractors was about SSP 7 000/feddan (plus the cost of 20 litres of diesel), compared to SSP 5 000 in 2019. The hiring rate for private tractors was SSP 1 000/feddan plus 20 litres of fuel) in 2020, compared to SSP 800 in 2019.

In the absence of chemical fertilizers, soil fertility maintenance practices are limited to shifting cultivation and fallowing, while the use of animal manure is reported mainly in Northern Bahr-el-Ghazal, Warrap, Western Bahr-el-Ghazal and Lakes states. Whereas in most locations the manure is sourced from the farmers' own livestock, in Northern Bahr-el-Ghazal State, where opportunities for shifting to new land are limited, contract dunging by pastoralists' herds and flocks on private farming land is increasing from year to year. Such actions are practiced only by better-off farmers and payment can be performed in different modalities, including cash, grain/sorghum, supplying herders with drinks and meals, or goats. While most farmers are aware of the importance of animal dung to increase yields and to control *Striga* weed, the practice of hiring herds of cattle to stay in their farms is rarely affordable for the poor farmers.

There is no use of agro-chemicals by smallholder farmers on field crops, with some herbicides used only by a few large-scale mechanized farms in Upper Nile State with access to supplies from the Sudan. Fertilizers are currently used only on vegetables in locations near the border with Uganda by better-off farmers. However, displacement and insecurity along the border areas of Central Equatoria suggest that

Table 3: South Sudan - Crop seeds distributed in 2020 by FAO and its partners[1/]

State	Number of households reached	Quantity of main types of crop seeds distributed (tonnes)	Quantity of vegetable seeds distributed (tonnes)
Central Equatoria	72 261	715.3	12.2
Eastern Equatoria	103 878	14 35.4	20.9
Jonglei	88 606	915.6	7.7
Lakes	187 796	1 953.1	19.0
Northern Bahr-el-Ghazal	54 860	361.2	3.7
Unity	72 551	860.5	6.3
Upper Nile	59 618	641.7	6.4
Warrap	108 498	904.1	12.6
Western Bahr-el-Ghazal	45 180	340.6	4.7
Western Equatoria	57 826	568.2	11.8
TOTAL	**851 074**	**8 695.7**	**105.4**

Source: FAO South Sudan, 2020.
[1/] ELRP.

purchases of fertilizers became increasingly difficult since 2016.

In all regions, farmers mainly use their own seeds retained from the previous harvest or borrowed from extended family members and neighbours. Some farmers also purchase seeds from markets including improved varieties of maize (*Longi-5*) and groundnut (*Red Beauty*). In addition, through various emergency projects, FAO has provided seeds and planting materials through direct distribution by NGOs and organizing seed fairs. Through the Emergency Livelihood Response Programme (ELRP)/FAO, a total of 8 696 tonnes of assorted field crop seeds, 105 tonnes of vegetable seeds and 490 664 fishing kits were distributed to 851 074 farming households across the country for planting in both seasons of 2020 (Table 3). It also provided cash grants and vouchers to 70 381 farmers, and supported community-based animal health workers to vaccinate or treat about 941 931 livestock belonging to 20 912 households.

Pests, diseases and weeds

Every year numerous types of pests, diseases and weeds infest crops and cause significant yield reductions However, chemical treatments are not carried out due to their very limited supply and the lack of financial resources. Most smallholders carry out manual weeding of sorghum only once during the growing period, while groundnuts and maize are weeded twice in several cropping areas. Bird scaring and the protection of crop fields from wild animals and domestic livestock is usually practiced using family labour. No control measures have been carried out over migratory pests since 2013, especially QQU, a major threat to the late sorghum harvested in January.

Desert locust swarms were present in some counties of Eastern Equatoria for about three to four days in April 2020, before planting was carried out, but mostly stayed on trees and shrubs and caused only limited damage to crops before leaving the county.

FAWs infested cereals, particularly maize, at the beginning of the season. However, the damage was reported to be mild due to the abundant rainfall that washed away the worm and disrupted its multiplication and damaging capacity.

Infestations by snails were reported in parts of Western and Central Equatoria states, particularly in Tambura, Yambio, Ezo, Mundri, Yei, Lainya and Morobo counties, causing mild to average damage on crops. In the absence of chemical control measures, farmers used the traditional method

of collecting and burying the snails in order to minimize the damage.

In 2020, the most common pests included green grasshoppers, caterpillars, millipedes, termites, aphids, stalk (stem) borers, sorghum cinch bug, local birds, wild rats, monkeys, rodents, wild pigs, porcupines and domestic livestock. In general, almost all infestations caused mild to average damages in most areas. However, the 2020 cropping season was characterized by heavy weed infestations over most areas due to the above-average rainfall amounts that fostered weed growth, thus requiring frequent weeding. The situation in the flood-affected areas was extremely difficult as water impeded the access to the fields to perform weeding and other cultural practices including inter-row/inter-plant cultivations. As a result, crops planted in low-lying areas were observed to be more infested by weeds, stunted and with yellow leaves due to waterlogging, while crops grown on higher grounds showed relatively better performance.

In the traditional sector, crops are normally weeded only once or twice during the growing period. Continued cultivation of land for several consecutive years, compounded with inadequate weeding, has resulted in the build-up of weeds in most of the assessed areas. In this regard, *Striga* weed remains a major problem for sorghum cultivation in most growing areas. Farmers who have no access to new plots and continue to dig or plough the same exhausted plots are highly affected by *Striga* weed. The impact of *Striga* weed on sorghum crops has been serious and increasing over time. The main sorghum growing areas including Northern Bahr-el-Ghazal, Warrap, Western Bahr-el-Ghazal, Lakes, Jonglei and Upper Nile states, have reported an increasing trend of *Striga* infestation and the damage on sorghum crops in the 2020 season ranged from mild to severe. The problem may be addressed by using crop rotation (with leguminous crops, including groundnuts) and manure or by transplanting three to four-week old seedlings from nurseries or from *Striga* weed-free fields. Other methods, including inter-cropping of *Desmodium* (leguminous fodder crop)[6] with cereals can also be used to effectively control *Striga* weed through the training of farmers and extension workers and the provision of well-designed extension packages on appropriate control measures. However, it is advisable to adopt a comprehensive strategy for controlling *Striga* together with other cultural practices (full package) to improve sorghum productivity. Since sorghum is the most widely grown staple crop across the country, piloting a project on *Striga* control and sorghum yield improvement (to be extended to other areas) could be a viable strategy.

In recent years, infestation by a broadleaf weed locally known as *Babashiro* (*Chromolaena odorata*), reportedly from the Democratic Republic of the Congo, was reported in Greenbelt areas of Western and Central Equatoria states. *Babashiro* is an invasive weed of field crops and fallow lands and has become one of the most problematic weed dominating crop areas during shifting cultivation.

In addition, an invasive weed known as *Parthenium* (*Parthenium hysterophorus*) is rapidly spreading in Greater Kapoeta Region (Kapoeta East, South and North counties of Eastern Equatoria State) as reported over the past five years. *Parthenium* is a dominant weed found on roadsides, grazing lands, gardens and crop lands, and has become an issue of great concern for farmers and pastoralists.

The common plant diseases observed in 2020 include sorghum head smut, mosaic virus of cassava, rosette virus and leaf spot of groundnuts, among others. Storage pests, particularly weevils, rats and moulds, continued to cause severe damage on harvested crops throughout the country. Farmers in most parts of the country use traditional practices to protect their stored crops and do not have access to improved crop storage practices and facilities.

[6] Planting *Desmodium* between rows of cereal crops can effectively reverse declining crop yields by controlling *Striga* and improving soil fertility, at the same time providing farmers with a year-round supply of fodder.

Agricultural production in 2020

Cereal production

A. Cereal production

In the traditional smallholder sector, cereal production is determined by multiplying yield/unit area by the disaggregated area estimates derived from secondary data, as described in Section: Cereal harvested area and yield estimates.

The empirical data obtained was finally reviewed using secondary data from reports provided by FAO, WFP, FEWS NET, NBS and various NGOs, plus remote sensing data and information on vegetation conditions and precipitation amounts and anomalies as well as rainfall data collected at county level by FAO-trained operators, supported by the European Union-funded project "Strengthening the resilience of pastoral and agro-pastoral communities in South Sudan's cross border areas with the Sudan, Ethiopia, Kenya and Uganda" (OSRO/SSD/703/EU). In 2020, the missions by the Task Force were conducted only at harvesting time as COVID-19 restrictions prevented to carry out the assessments at planting time and these are listed below:

- In August, a first season harvest assessment was conducted in Western Equatoria State, covering Nzara, Yambio, Tambura, Ibba, Mvolo, Ezo, Mundri West and East counties to assess yields of maize (*Longi-5* variety), other cereal crops, cassava and groundnuts. It was followed by a mission in November to assess the second season crops in Tambura, Nzara, Nagero, Ezo, Mvolo, Mundri East, Mundri West, Maridi, Ibba and Yambio counties.

- In late August, members of the Task Force teams conducted several missions to Central Equatoria to assess yields of first season cereals (maize and sorghum), groundnuts and cassava covering Juba, Yei, Lainya, Terekeka and Morobo counties, followed by a second season harvest assessment in November covering Juba, Terekeka, Yei, Lainya and Morobo counties. In 2020, the Task Force Team managed to assess Morobo County for the second time since the escalation of conflict in 2016.

- In September, members of the Task Force teams conducted a first season harvest assessments in Eastern Equatoria, covering Ikotos, Torit, Magwi counties and the Pageri Administrative Area, followed by a first harvest assessment in Kapoeta North, Kapoeta East, Budi and Kapoeta South counties. The second harvest assessments were conducted in November in Budi and Magwi counties to assess long cycle crops.

- In late September/early October, a mission to assess yields of cereal crops, including rice, was conducted in Northern Bahr-el-Ghazal State (Aweil West, Aweil South, Aweil Centre, Aweil North and Aweil East counties), followed by a mission in November to assess yields of rice and sorghum in semi-mechanized commercial farming schemes in the State.

- In September and October, harvest assessment missions were carried out in Western Bahr-el-Ghazal State (Raja, Jur River and Wau counties), Warrap State (Abyei Administrative Area, Twic, Gogrial West, Tonj South) and in Lakes State (Rumbek Centre, Cueibet and Wulu counties). The crops assessed included short-and medium-cycle sorghum landraces as well as improved *Feterita*-type sorghums from the Sudan, groundnuts (*Red Beauty* and *Mr Lake*) and very limited maize areas in the vicinity of the homesteads. In addition, a harvest assessment mission took place in Jonglei State (Bor South County) in late September.

- In late October, missions to assess yields of local landraces of sorghum (*Leuwarding* and *Agono*) and maize in the smallholder sector plus improved *Feterita*-type sorghums from the Sudan (*Arfa Gadameck*, *Wad Ahmed*, *Gaddam el Hamam*) in the mechanized sector were conducted in Upper Nile State (Maban and Renk counties). Here, the Task Force Team was able to assess a number of commercial farms growing sorghum and sesame, and minor crops including groundnuts, bulrush millet and sunflower.

- In 2020, the Task Force Team was not able to visit Unity State as, despite the recent security improvements, risks to team safety were still considered too severe to allow access to the area. However, information was provided by the CCMC leaders that participated to the analysis workshop organized in Juba in December. Furthermore, telephone interviews with the State directors of Agriculture and NGOs extension workers in Unity State and by members of the CCMCs from inaccessible areas of other states were used as additional sources of information.

As presented in Table 4, the 2020 national gross cereal production from the traditional smallholder sector in 2020 is estimated at about 1 093 012 tonnes, exceeding the threshold of 1 million tonnes for the second consecutive time since 2016. Post-harvest losses and seed use for sowing in 2021 are assumed, as in previous assessments, to account for 20 percent of the total production, leaving a net amount of about 874 410 tonnes available for local consumption. This result is about 7 percent above the 2019 average output. The increase is attributed to a 6.2 percent increase in the harvested area and favourable rains in terms of amounts and temporal/spatial distribution, especially in Greater Equatoria Region. However, the gains due to higher yields and the expansion of harvested areas were partly offset by flood-induced losses in Jonglei, Lakes and Upper Nile states, which affected crops to various degrees.

The area where the floods caused the most significant cereal production shortfall was Jonglei State, which damaged about 27 000 hectares of cereals with a consequent significant contraction of the cereal output, that is estimated as the lowest on record since 2016. By contrast, in Lakes and Upper Nile states, the flood damage was comparatively lower. Increases in the 2020 cereal production compared to 2019 were recorded in Western Bahr-el-Ghazal (+28.9 percent), Unity (+20.7 percent), Central Equatoria (+13.6 percent), Northern Bahr-el-Ghazal (+12.8 percent), Western Equatoria (+8.4 percent), Upper Nile (+6.7 percent), Lakes (+4.5 percent) and Warrap (+4.3 percent) states. By contrast, cereal production declined in Jonglei (-13 percent) due to floods.

The average gross cereal yield in 2020 from the traditional smallholder sector is estimated, as in 2019, at 1.1 tonnes/hectare. The yield level reflects the favourable growing conditions in the areas not affected by the floods, mainly due to above-average rainfall amounts along with the absence of prolonged dry spells and minimal damage on crops by FAWs and other common pests. Following the CFSAM standard procedure since 2014, conservative yield values were used for the counties not visited by the Task Force teams at harvest time, where no independent assessments were conducted and no CCMC reports were available.

B. Mechanized sector

Almost all of the country's largest mechanized rainfed agricultural schemes are located in Upper Nile State. The rainfed mechanized sector in the State includes demarcated, large-scale farms with multiple aggregations of 500 feddan (about 200 hectares) units known as mushroor, mainly located between Renk and Malakal counties, and undemarcated traditional farms, where farmers cultivate units of up to 50 feddans (20 hectares) alongside large-scale farms, hiring tractors and equipment used by their farmers.

The other mechanized agricultural schemes are located in Northern Bahr-el-Ghazal State and include the Aweil Rice Scheme in Aweil Centre County, where water from the surrounding flood plains is used for irrigation and a mechanized sorghum farming area in Ton Chol in Aweil East County. In addition, there are some mechanized farms in other states, particularly in Greater Equatoria Region and some emerging commercial farms in Greater Bahr-el-Ghazal Region, expanding using labour gangs, digging fields by hand or using animal traction.

In the largest mechanized farms of Upper Nile State, mechanization is limited to land preparation and sowing using seed boxes placed over disc harrows, with most of the other operations including weeding and harvesting are carried out manually using sickles and hoes. However, only sesame

Table 4: South Sudan - Estimated (traditional sector) cereal harvested area, yield, production, consumption and balance (2020 and 2021)

State/County	2020				2021		
	Cereal area (hectares)	Gross yield (tonnes/ hectare)	Gross cereal production (tonnes)	Net cereal production (tonnes)	Population (mid-2021)	Cereal requirement (tonnes)	Surplus/ deficit (tonnes)
Central Equatoria	**75 824**	**1.28**	**97 068**	**77 654**	**1 167 160**	**149 592**	**-71 937**
Juba	19 750	1.20	23 700	18 960	432 129	60 498	-41 538
Kajo Keji[1/]	8 010	1.40	11 215	8 972	116 456	13 975	-5 003
Lainya[1/]	6 040	1.30	7 852	6 282	110 379	13 246	-6 964
Morobo[1/]	7 820	1.80	14 076	11 261	151 780	18 214	-6 953
Terekeka	21 083	0.85	17 921	14 337	178 663	21 440	-7 103
Yei[1/]	13 120	1.70	22 304	17 843	177 754	22 219	-4 376
Eastern Equatoria	**125 117**	**1.22**	**152 071**	**121 657**	**1 094 498**	**135 941**	**-14 284**
Budi	17 240	1.20	20 688	16 550	102 960	12 355	4 195
Ikotos	22 680	1.20	27 216	21 773	136 012	17 002	4 771
Kapoeta East	11 850	0.90	10 665	8 532	179 870	22 484	-13 952
Kapoeta North	8 640	0.90	7 776	6 221	113 951	14 244	-8 023
Kapoeta South	3 927	1.00	3 927	3 142	74 537	9 690	-6 548
Lafon	13 579	1.10	14 936	11 949	112 857	13 543	-1 594
Magwi[1/]	28 684	1.75	50 196	40 157	203 696	24 443	15 714
Torit	18 517	0.90	16 665	13 332	170 612	22 180	-8 848
Jonglei	**60 551**	**0.68**	**40 994**	**32 795**	**1 920 485**	**215 575**	**-182 780**
Akobo	6 874	0.90	6 186	4 949	201 648	22 182	-17 233
Ayod	1 110	0.70	777	622	188 610	20 747	-20 126
Bor South	12 696	0.65	8 252	6 602	263 467	30 298	-23 697
Duk	3 084	0.60	1 851	1 481	127 477	14 022	-12 542
Fangak	1 536	0.70	1 075	860	189 802	20 878	-20 018
Khorflus/Pigi/Canal	891	0.70	624	499	108 588	11 945	-11 446
Nyirol	4 588	0.55	2 524	2 019	192 192	21 142	-19 123
Pibor	7 515	0.85	6 388	5 110	210 570	25 268	-20 158
Pochalla	6 255	0.85	5 317	4 254	89 745	10 769	-6 516
Twic East	6 056	0.50	3 028	2 422	132 262	14 549	-12 127
Uror	9 946	0.50	4 973	3 978	216 126	23 774	-19 796
Lakes	**142 134**	**1.19**	**169 484**	**135 587**	**1 349 446**	**148 441**	**-12 854**
Awerial	17 848	0.90	16 063	12 851	161 683	17 785	-4 935
Cueibet	31 036	1.10	34 140	27 312	206 250	22 688	4 624
Rumbek Centre	15 507	1.25	19 383	15 507	285 952	31 455	-15 949
Rumbek East	20 562	1.25	25 703	20 562	232 900	25 619	-5 057
Rumbek North	3 916	0.90	3 525	2 820	67 345	7 408	-4 588
Wulu	13 321	1.40	18 649	14 919	82 091	9 030	5 889
Yirol East	13 003	1.10	14 303	11 442	121 955	13 415	-1 973
Yirol West	26 941	1.40	37 718	30 174	191 269	21 040	9 134

State/County	2020				2021		
	Cereal area (hectares)	Gross yield (tonnes/ hectare)	Gross cereal production (tonnes)	Net cereal production (tonnes)	Population (mid-2021)	Cereal requirement (tonnes)	Surplus/ deficit (tonnes)
Northern Bahr-el-Ghazal	**167 362**	**0.89**	**148 659**	**118 927**	**1 543 413**	**169 775**	**-50 848**
Aweil Centre	12 860	0.85	10 931	8 745	121 048	13 315	-4 571
Aweil East	64 842	0.75	48 632	38 905	606 546	66 720	-27 814
Aweil North	39 270	1.00	39 270	31 416	308 563	33 942	-2 526
Aweil South	16 009	0.75	12 007	9 605	164 967	18 146	-8 541
Aweil West	34 381	1.10	37 820	30 256	342 289	37 652	-7 396
Unity	**23 245**	**0.75**	**17 337**	**13 870**	**940 270**	**80 748**	**-66 878**
Abiemnhom	1 175	0.75	882	705	31 899	2 711	-2 005
Guit	907	0.60	544	435	42 405	3 604	-3 169
Koch	3 144	0.85	2 673	2 138	135 458	11 514	-9 376
Leer	2 634	0.75	1 975	1 580	116 697	9 920	-8 340
Mayendit	1 983	0.70	1 388	1 111	95 006	8 076	-6 966
Mayom	5 181	0.70	3 627	2 902	188 173	15 995	-13 093
Panyijar	3 790	0.65	2 463	1 971	101 428	8 622	-6 651
Pariang	3 418	0.90	3 076	2 461	146 790	12 477	-10 017
Rubkona	1 013	0.70	709	567	82 413	7 829	-7 262
Upper Nile	**44 709**	**0.71**	**31 524**	**25 219**	**1 096 694**	**94 734**	**-69 515**
Baliet	1 195	0.80	956	765	54 266	4 613	-3 848
Fashoda[1/]	817	0.60	490	392	52 082	4 427	-4 035
Longochuk	3 067	0.60	1 840	1 472	81 987	6 969	-5 497
Luakpiny/Nasir	10 149	0.80	8 119	6 496	327 368	27 826	-21 331
Maban	4 434	0.70	3 104	2 483	64 683	5 498	-3 015
Maiwut	1 719	0.60	1 032	825	45 688	3 883	-3 058
Malakal	667	0.70	467	373	81 590	7 751	-7 378
Manyo	1 372	0.90	1 235	988	30 581	2 599	-1 611
Melut	5 518	0.65	3 587	2 869	82 895	7 046	-4 177
Panyikang	837	0.80	670	536	26 942	2 290	-1 754
Renk	10 644	0.70	7 451	5 961	139 890	12 590	-6 629
Ulang	4 290	0.60	2 574	2 059	108 720	9 241	-7 182
Western Bahr-el-Ghazal	**51 165**	**1.28**	**65 479**	**52 383**	**596 741**	**67 705**	**-15 322**
Jur River	16 497	1.20	19 797	15 837	174 220	19 165	-3 327
Raga	6 145	1.40	8 603	6 882	108 087	10 809	-3 926
Wau	28 522	1.30	37 079	29 663	314 434	37 731	-8 068
Warrap	**160 652**	**1.05**	**168 118**	**134 495**	**1 617 211**	**155 870**	**-21 376**
Abyei	7 507	0.95	7 132	5 705	86 308	7 767	-2 062
Gogrial East	12 813	0.85	10 891	8 713	150 993	14 344	-5 631
Gogrial West	48 392	1.20	58 071	46 457	375 353	39 413	7 044
Tonj East	9 670	0.70	6 769	5 415	128 694	12 869	-7 454
Tonj North	25 888	0.75	19 416	15 533	264 990	26 498	-10 966
Tonj South	20 023	1.20	24 028	19 222	142 400	12 815	6 407
Twic	36 358	1.15	41 811	33 449	468 473	42 163	-8 714

State/County	2020				2021		
	Cereal area (hectares)	Gross yield (tonnes/ hectare)	Gross cereal production (tonnes)	Net cereal production (tonnes)	Population (mid-2021)	Cereal requirement (tonnes)	Surplus/ deficit (tonnes)
Western Equatoria	**136 737**	**1.48**	**202 278**	**161 822**	**838 884**	**121 638**	**40 184**
Ezo[1/]	15 218	1.65	25 109	20 087	116 058	16 828	3 259
Ibba[1/]	10 704	1.55	16 592	13 274	43 408	6 294	6 979
Maridi[1/]	13 670	1.60	21 872	17 498	84 293	12 223	5 275
Mundri East[1/]	5 640	1.15	6 487	5 189	65 067	9 435	-4 246
Mundri West[1/]	4 473	1.10	4 920	3 936	59 802	8 671	-4 735
Mvolo	6 340	0.90	5 706	4 565	93 965	13 625	-9 060
Nagero	1 695	1.20	2 034	1 627	15 781	2 288	-661
Nzara[1/]	19 385	1.75	33 924	27 140	65 234	9 459	17 681
Tambura[1/]	25 794	1.55	39 980	31 984	81 825	11 865	20 120
Yambio[1/]	33 818	1.35	45 654	36 524	213 452	30 951	5 573
TOTAL	**987 497**	**1.11**	**1 093 012**	**874 410**	**12 164 802**	**1 340 019**	**-465 610**

Source: CFSAM South Sudan, 2020.

[1/] First and second harvested areas combined.

Table 5: South Sudan - Cereal harvested area and net production (rounded) in the traditional sector (2016–2020)

Region/State	2016			2017			2018			2019			2020		
	Area ('000 hectares)	Net Prod. ('000 tonnes)	Net Yields (tonnes/ hectare)	Area ('000 hectares)	Net Prod. ('000 tonnes)	Net Yields (tonnes/ hectare)	Area ('000 hectares)	Net Prod. ('000 tonnes)	Net Yields (tonnes/ hectare)	Area ('000 hectare)	Net Prod. ('000 tonnes)	Net Yields (tonnes/ hectare)	Area ('000 hectares)	Net Prod. ('000 tonnes)	Net Yields (tonnes/ hectare)
Greater Upper Nile	**118**	**73**	**0.62**	**124**	**82**	**0.65**	**125**	**81**	**0.65**	**124**	**73**	**0.59**	**129**	**72**	**0.56**
Upper Nile	48	30	0.63	53	35	0.65	52	32	0.61	45	24	0.53	45	25	0.56
Unity	16	9	0.56	18	10	0.54	17	9	0.56	20	11	0.58	23	14	0.60
Jonglei	54	34	0.63	54	37	0.68	57	40	0.70	60	38	0.63	61	33	0.54
Greater Bahr-el-Ghazal	**480**	**416**	**0.87**	**470**	**417**	**0.89**	**480**	**410**	**0.85**	**489**	**405**	**0.83**	**521**	**441**	**0.85**
Northern Bahr-el-Ghazal	157	124	0.79	153	129	0.85	157	134	0.86	152	105	0.70	167	119	0.71
Western Bahr-el-Ghazal	51	45	0.88	37	33	0.89	37	31	0.84	43	41	0.94	51	52	1.02
Lakes	117	106	0.91	125	112	0.9	129	116	0.90	133	130	0.98	142	136	0.95
Warrap	155	141	0.91	156	143	0.92	157	129	0.82	162	129	0.79	161	134	0.84
Greater Equatoria	**346**	**336**	**0.97**	**268**	**266**	**0.99**	**278**	**254**	**0.91**	**316**	**341**	**1.08**	**338**	**361**	**1.07**
Central Equatoria	117	120	1.03	60	62	1.04	57	49	0.87	65	68	1.05	76	78	1.02
Eastern Equatoria	116	99	0.85	107	94	0.87	112	91	0.82	123	123	1.01	125	122	0.97
Western Equatoria	113	117	1.04	101	110	1.09	110	114	1.04	129	149	1.16	137	162	1.18
TOTAL	**940**	**826**	**0.88**	**863**	**764**	**0.89**	**883**	**745**	**0.84**	**930**	**818**	**0.88**	**987**	**874**	**0.89**

Source: CFSAM South Sudan, 2020.

harvesting is mechanized due to shortages of combine harvesters in these areas.

In the mechanized areas of Upper Nile State, sorghum and sesame are the two dominant crops, grown in medium- to large-scale farms ranging from 800 to 1 500 feddans (from 336 to 630 hectares). Other crops grown to a smaller extent include sunflower, pearl millet and groundnuts. Groundnuts are mostly grown by smallholder farmers both for family consumption and selling.

Almost all agricultural inputs including fuel, spare parts, hand tools and seeds are obtained from the Sudan through informal cross-border trade. In Renk, improved seeds of sorghum, imported from the Sudan through smugglers were sold in 2020 at a price of SSP 20 000/100 kg bag (mainly Wad Ahmed or Gaddam el Hamam varieties), compared to the previous year's price of SSP 10 000. Seeds of sesame were sold at SSP 40 000/100 kg bag, compared to a price of SSP 25 000 the previous year.

About 85 percent of the farmers operate using their own tractors and only 15 percent use through hiring. The wider use of tractors was constrained by shortage of fuel, lubricants, disc ploughs and other spare parts. The supply of these items is through smuggling from the Sudan and were sold at very high price. Tractor hiring rate in 2020 was about SSP 200 000/block (120 feddans) plus 2 drums of diesel for ploughing and planting. The average cost of diesel was SSP 150 000/drum, compared to SSP 75 000 in 2019. The hiring rate for a plough disc was about SSP 500 000/season (for three months).

The cost of labour for weeding varies according to the stage of crops during the season. In 2020, the cost of first weeding (called *tak*) was about SSP 50 000/120 feddans, while the cost of second and third weeding was estimated at SSP 200 000 and SSP 300 000/120 feddans. Sesame is normally weeded up to three times, while the weeding frequency for sorghum is one to two times during the full growing season. In 2019, the cost of labour for weeding 120 feddans was between SSP 70 000 and SSP 120 000.

In 2020, the Task Force-led teams visited large-scale farms in Renk, Melut and Aweil counties. According to the teams' findings, mechanized farming in Upper Nile State was undertaken extensively, with large areas cultivated by Sudanese and local farmers. Although it is difficult to get accurate figures, the planted areas in the mechanized sector estimated by Task Force teams in 2020 was about 171 000 hectares of sesame and 114 000 hectares of sorghum, about 44 and 24 percent higher than in 2019, respectively. The expansion of sesame plantings is mainly attributed to its high profitability due to the continued demand by Sudanese traders that purchase the produce at high prices for re-exporting purposes. Despite the instructions of the Government to increase the area with sorghum, most farmers continued to prefer to plant sesame. In 2020, the yield of sesame was lower than in 2019 due to pest damage, while both area planted and yields of sorghum were higher than in 2019.
In the commercial farming areas of Renk and Melut counties in Upper Nile State, rainfall amounts in 2020 were average and lower than in 2019. Although rains had an early start in June, a dry spell of two to three weeks occurred in August and, in some areas, in September, which to some extent affected sorghum crops. Despite the dry spells, crop performance of sorghum in the semi-mechanized commercial farming areas was good and yields were higher than in 2019. In some areas, sesame fields that had been damaged by pests were replaced with sorghum crops. However, the replanted sorghum crops in September were often wilted and stunted due to moisture stress. Sorghum production in 2020 is estimated at 91 200 tonnes, almost double compared to 2019, mainly due to an increased planted area (+24 percent) and relatively favourable growing conditions that benefited yields.

In 2020, sesame production is estimated at 61 560 tonnes, just 3.5 percent higher than in 2019, despite the year-on-year increase in planted area of about 44 percent, due to lower yields. In 2020, the average yield of sesame declined compared to 2019 due to damage by pests like the Leaf Roller Moth (*Antigastra catalaunalis*) and the Sesame Gall Midge coming from surrounding Sudanese farms. The sesame output is entirely sold to Sudanese traders, not only due to the high prices they offer, but also due to the poor state of the road network linking Upper Nile State with the capital, Juba, and to insecurity still affecting some trade routes.

In the Aweil Rice Scheme, the area planted with rice in 2020 was 670 hectares and production is estimated at 430 tonnes, compared to a total crop failure in 2019, as extensive flooding throughout the cropping period impeded agricultural operations.

In 2020, the area planted in Ton Chol and Ayai farming areas was 63 and 40 hectares, respectively, with an estimated production of 81.3 and 38.4 tonnes, respectively, compared to a total crop failure in Ton Chol and just 420 tonnes produced in Ayai in 2019, due to extensive flood damage.

The overall area and production estimates for sorghum[7] and rice in the mechanized sub-sector are shown in Table 6, with a contribution of 93 552 tonnes of sorghum to the 2020 national cereal harvest.

Other crops

The two major non-cereal crops grown in the country are groundnuts and cassava. Groundnuts, with a short growing season and the possibility to be used as both staple and cash crops, are an important safety net crop for farming households in the northern states where cassava does not grow. Groundnuts is also a major cash crop for farmers, especially in southern cropping areas where the longer rainy season allows for two harvests per year. However, cassava is the major safety net and the preferred staple crop in Greenbelt and the southern areas of Ironstone Plateau. In Western Bahr-el-Ghazal State, two-year cassava is planted either as a sole crop or inter-cropped with groundnuts, sorghum and sesame. Similarly, in Greater Equatoria Region, two-year cassava is inter-cropped with a wide range of crops, including cereals, sesame, groundnuts, pigeon peas and beans, during the first year of its development. In the second year, it is usually left unweeded until harvesting. Cassava is usually the last crop in a rotation, as it may well be left for a third year depending on the needs of the owners for sale or family consumption. While the one-year varieties of cassava are planted for home use and sale as fresh tubers, most farms in the main cassava-growing areas follow the two-year cycle, harvesting tubers 18–24 months from planting, which are traded locally in the form of tubers for processing and farther afield from the farms as dried cassava chips

Table 6: South Sudan - Cereal area and production estimates of the mechanized sub-sector (2020)

Location	Estimated area harvested (hectares)	Yields (tonnes/hectare)	Estimated production (tonnes)
Upper Nile (sorghum)	114 000	0.80	91 200
Aweil Rice Scheme (paddy rice) including surrounding private farmers	670	0.64	429
Aweil-Udham (sorghum)	2 003	0.90	1 803
Ayai Farm	40	0.96	38.4
Ton Chol (sorghum)	63	1.29	81.3
TOTAL (mixed cereals)	**116 776**	**1.29**	**93 552**

Source: CFSAM South Sudan, 2020.

[7] The main varieties grown are short cycle, including Gaddam el Hamam, Wad Ahmed and Ruth.

or cassava flour. Cassava yields vary significantly with the local agro-ecology and, based on the PET photo-indicators (plant densities, crown sizes and canopies) and occasional cross-check sample weightings, yields are estimated in 2020 to range from 10 to 18 tonnes of fresh tubers/hectare in the major growing areas of the country.

During the past three years, the increased number and wider geographical coverage of CCMCs at field level have improved the accuracy of the estimates on the planted area and the output of cassava and groundnuts, which included Jonglei[8] Upper Nile[9] and Unity[10] states since 2019. The aggregate outputs in 2020 are estimated at about 1.43 million tonnes of cassava and 171 075 tonnes of groundnuts (Table 7). In 2020, production of groundnuts increased by 52 percent and production of cassava by about 20 percent compared to 2019. These production increases are due to higher yields and an expansion of the planted area, but also to the wider geographical coverage of the assessments carried out in 2020.

Information on other field crops grown at household level, particularly on oilseeds (sesame, safflower and sunflower) is insufficient for deriving accurate production figures.

[8] Both cassava and groundnuts.

[9] Only groundnuts.

[10] Only groundnuts.

Table 7: South Sudan - Cassava and groundnuts indicative area, yields and production estimates (2020)

State	Cassava (two years)[1/]			Groundnuts[2/]		
	Area (hectares)	Yields (tonnes/ hectare)	Production (tonnes)	Area (hectares)	Yields (tonnes/ hectare)	Production (unshelled, tonnes)
Central Equatoria	15 338	15	230 071	22 589	0.70	15 813
Eastern Equatoria	18 798	13	244 376	11 288	0.75	8 466
Western Equatoria	39 803	18	716 456	40 550	0.90	36 495
Jonglei	380	10	3 800	1 948	0.55	1 071
Upper Nile	-	-	-	3 183	0.50	1 592
Unity	-	-	-	646	0.50	323
Lakes	5 700	14	79 800	68 799	0.80	55 039
Warrap	-	-	-	25 616	0.70	17 931
Western Bahr-el-Ghazal	12 555	12	150 666	23 093	0.80	18 474
Northern Bahr-el-Ghazal	-	-	-	26 453	0.60	15 872
TOTAL	**92 575**	**15.4**	**1 425 169**	**224 164**	**0.76**	**171 075**

Source: CFSAM South Sudan, 2020.

[1/] Area harvested increased because of the bigger importance of cassava and under-estimation of the areas planted in past years.

[2/] Harvested area and production of groundnuts is bigger because of under-estimation of the area and favourable growing conditions, which increased yields in most areas, except the flood-prone areas, affected by serious flooding in 2020.

LIVESTOCK

The above-average rainfall during the 2020 rainy season across the country had a two-folded effect. On one hand, excessive rains have caused flooding in the flood-prone low-land areas that caused severe access constraints to grazing areas, feed shortages, displacements of herders and confinement of animals in higher ground areas, in addition to creating favourable habitat for the tick vector responsible for the East Coast Fever (ECF), especially in the Greater Equatoria regions. On the other hand, in areas where rains were average to slightly above average, and flooding did not occur, rainfall benefited pasture and water availability, with a beneficial impact on animal body condition, which on average scored 3 for cattle and 3–4 for sheep and goats.

In 2020, the impact of floods on livestock was serious in Jonglei, Lakes and Upper Nile states. The floods have increased disease outbreaks and shortage of feed leading to vulnerability to starvation-related deaths. Cases of diseases such as Contagious Bovine Pleuropneumonia (CBPP), Black Quarter (BQ), Foot-and-Mouth Disease, foot rot, increased internal parasites, anthrax, black quarter, Trypanosomiasis, haemorrhagic septicaemia among others. Flooding also increased the risk of an outbreak of Rift Valley Fever, a zoonotic disease. In the flooded areas, pastures were in short supply as most of the grazing and shrub lands were submerged in water, resulting in movement to higher grounds where competition for settlement by the displaced communities and their livestock. Disease outbreaks on cattle were reported in Malakal, Baliet and Panyikang counties (Upper Nile State), Bentiu County (Unity State) and Rumbek East County (Lakes State).

The areas where livestock were most affected by flooding was Jonglei State. Here, in the flooded areas, pasture were in short supply as most of the grazing and shrub lands were submerged in water, forcing movement of pastoralists with their livestock to higher grounds, triggering competition for settlement areas and pasture between the displaced communities. In Jonglei State, about 711 400 livestock heads were affected, with 47 500 animals dying in Twic East, Duk, Bor South and Canal Pigi counties. In addition, a threefold increase in livestock diseases was recorded and the limited availability of forage affected animal body condition and availability of livestock products.

During the 2020 agricultural season, a total of 5 664 554 animals were vaccinated and 852 974 animals treated against priority livestock diseases, benefitting an estimated 198 083 households across the country (Table 8).

Table 8: South Sudan - Number of animals vaccinated and treated against selected diseases (2020)

Types of animals	Number of animals vaccinated	Number of animals treated	Total number of households reached
Cattle	2 958 426	405 982	198 083
Goats	1 692 116	247 136	
Sheep	908 333	123 323	
Donkeys	385	2 256	
Chickens	102 818	71 277	
Dogs	2 476	3 000	
TOTAL	**5 664 554**	**852 974**	

Source: CFSAM, 2020.

CEREAL SUPPLY/DEMAND SITUATION

Cereal balance

Total cereal consumption in 2021 is estimated at 1.34 million tonnes, using a projected 2021 mid-year population of 12.16 million and an average per capita consumption of about 110 kg of cereals per year. The estimates of cereal per capita consumption are based on information provided by the 2009 National Baseline Household Survey at State level and adjusted, at County level, to take into account the differences between the urban and rural areas and the relative importance in the local diets of other crops (notably cassava and groundnuts), livestock and wild foods. The estimated production of 1.43 million tonnes of fresh cassava and over 171 000 tonnes of unshelled groundnuts is expected to provide about 419 000 tonnes and 153 900 tonnes of grain equivalents, respectively, bringing the estimated average per capita consumption to about 135 kg of cereal equivalent per year, a level fairly close to the estimates for neighbouring countries.

With an estimated net cereal production from the traditional sector of about 874 410 tonnes, a cereal deficit of about 465 610 tonnes is forecast for the 2021 marketing year, about 3.5 percent less than the 2020 deficit of about 482 504 tonnes, but still 5 percent above the 2016–2020 average.

Table 9 summarizes the estimated cereal supply situation for each State in 2021 and compares it with the Mission's estimates for the previous five years.

The largest shortfall is forecast in Greater Upper Nile Region (Upper Nile, Unity and Jonglei states), where the aggregate cereal deficit, after having increased by 40 percent between 2014 and 2015 due to the impact of the conflict, remained firm at around 290 000 between 2016 and 2019. The deficit increased by 7 percent to about 307 000 tonnes in 2020 and is expected to further increase by 4 percent to about 320 000 tonnes in 2021, as two consecutive cropping seasons affected by floods resulted in substantial losses in Jonglei State, where the cereal deficit is expected to increase by 7 percent in 2021.

In Greater Equatoria Region (Western, Central and Eastern Equatoria states), where moderate surpluses were produced up to 2016, increasing deficits followed between 2017 and 2019 due to the spread of the conflict to the region in 2016, which resulted in massive displacements that severely disrupted agricultural operations. Subsequently, the deficit decreased by almost 60 percent to about 54 000 tonnes in 2020 and is expected to further decline by 15 percent to about 46 000 tonnes in 2021, as the aggregate cereal production increased for two consecutive years due to an expansion in the harvested area following the improved security situation and higher yields due to abundant rains. In addition, in Western Equatoria State, where a sizable surplus of about 31 000 tonnes was recorded in 2020 for the first time since 2015, the surplus is expected to increase by almost 30 percent to about 40 000 tonnes in 2021.

Table 9: South Sudan - Estimated cereal surplus/deficit (tonnes)

Region/State	2015	2016	2017	2018	2019	2020	2021
Greater Equatoria	**118 302**	**16 083**	**-24 048**	**-103 365**	**-129 858**	**-54 329**	**-46 038**
Central Equatoria	25 196	14 291	-13 294	-73 528	-92 092	-76 889	-71 937
Eastern Equatoria	6 338	-16 750	-21 355	-29 889	-37 177	-8 606	-14 284
Western Equatoria	86 767	18 542	10 601	52	-589	31 166	40 184
Greater Upper Nile	**-308 978**	**-300 630**	**-297 984**	**-289 697**	**-287 848**	**-306 858**	**-319 173**
Jonglei	-149 738	-148 937	-159 079	-159 753	-163 559	-171 607	-182 780
Upper Nile	-78 942	-72 429	-58 864	-56 258	-57 675	-68 347	-69 515
Unity	-80 298	-79 264	-80 041	-73 686	-66 614	-66 903	-66 878
Greater Bahr-el-Ghazal	**-57 989**	**-80 704**	**-62 253**	**-75 332**	**-100 535**	**-121 317**	**-100 400**
Lakes	-30 812	-28 889	-24 600	-22 459	-24 324	-14 418	-12 854
Warrap	-4 907	-19 459	2 132	1 027	-18 321	-22 394	-21 376
Western Bahr-el-Ghazal	16 044	-4 350	-14 256	-28 802	-32 341	-25 095	-15 322
Northern Bahr-el-Ghazal	-38 315	-28 006	-25 529	-25 098	-25 549	-59 410	-50 848
TOTAL	**-248 666**	**-365 248**	**-384 285**	**-468 395**	**-518 240**	**-482 504**	**-465 610**

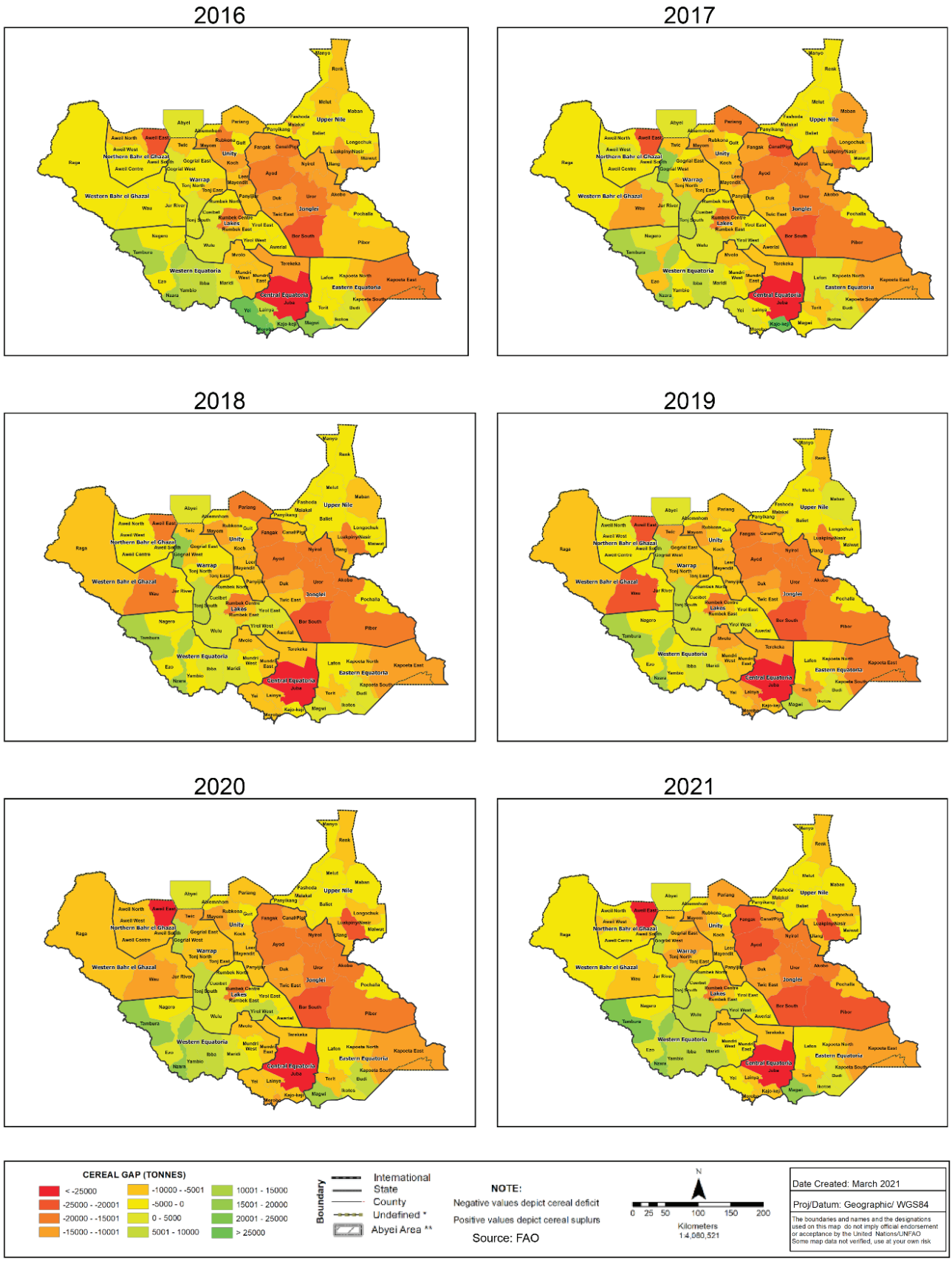
Source: CFSAM, 2020.

In Greater Bahr-el-Ghazal Region, Western Bahr-el-Ghazal State, where moderate surpluses were produced until 2015, increasing deficits were recorded between 2016 and 2019 due to the conflict. Subsequently, the deficit decreased by about 22 percent to about 25 000 tonnes in 2020 and is expected to further decline by almost 40 percent to about 15 000 tonnes in 2021, as cereal production increased by almost 30 percent both in 2019 and 2020 due to improved security and favourable weather conditions. In Warrap and Northern Bahr-el-Ghazal states, where the deficit increased in 2020 as cereal production was severely affected by floods, the deficit is expected to decline by 5 and 14 percent, respectively, in 2021 as favourable growing conditions resulted in an increased cereal production.

The county with the largest food deficit is Juba County, where about 42 000 tonnes of cereals will be needed in 2021 to cover the food requirements of mostly urban households. The gap is expected to slightly increase by 3 percent compared to 2020, as a modest increase in cereal production was outpaced by the population growth.

Production of cereals from the rainfed large and small mechanized sector in Upper Nile and Northern Bahr-el-Ghazal states is expected to provide an additional 93 552 tonnes of cereals, mainly sorghum. More than 97 percent of this production comes from Upper Nile's mechanized farms. Although some sorghum is expected to be traded across the border in the Sudan, some amounts are expected to be marketed internally, depending on security conditions, transportation costs compounded by local "taxes" imposed on traders moving grains to major markets and fluctuations of exchange rates between currencies in the Sudan and South Sudan. As in past years, a portion of this production may represent an option for the local purchases by international organizations providing food assistance in the surrounding food deficit areas. In recent years, given the high potential of the area for agriculture and availability of abundant land, the involvement of local South Sudanese investors is gradually increasing despite limited input availability, including credit. If these challenges are overcome by the Government, the mechanized sector can provide significant amounts of cereal products for local consumption and for purchase by WFP and other international humanitarian partners.

Figure 10: South Sudan - Estimated cereal surplus/deficit, 2016–2021 (tonnes)



Source: FAO South Sudan, modified to comply with UN map, 2020.

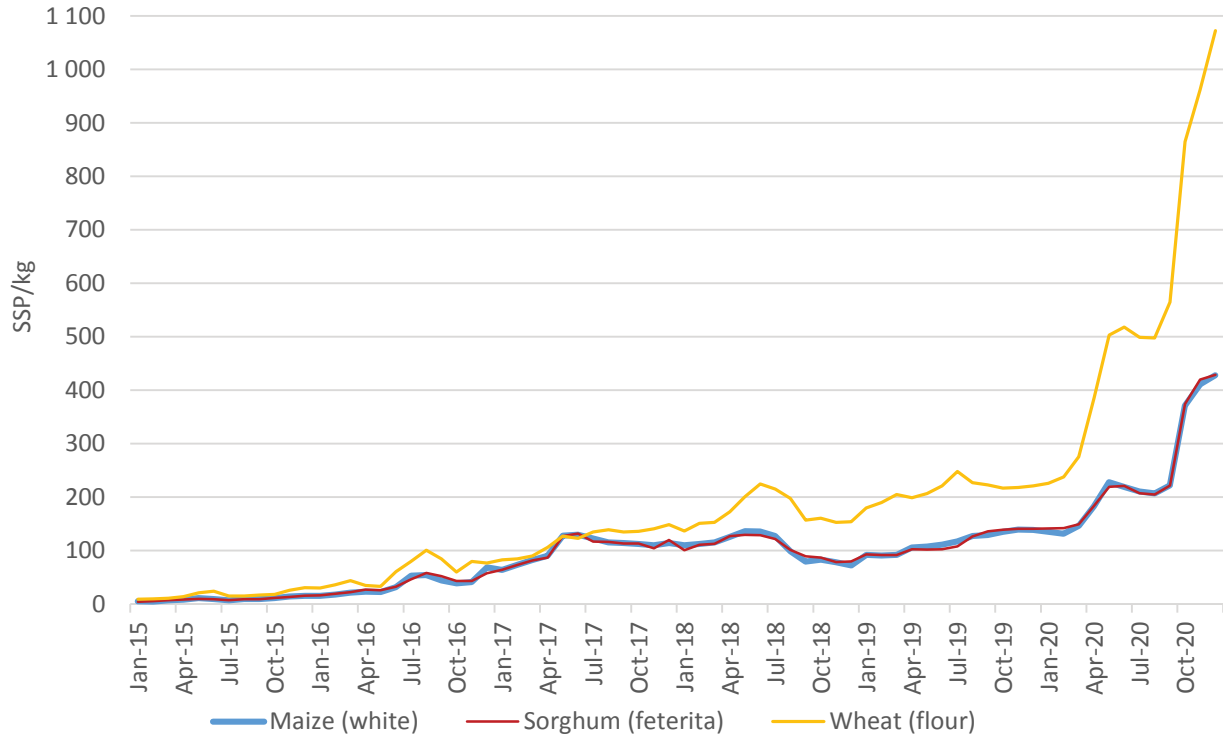
Disclaimer: *Final boundary between the Sudan and South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.*

Cereal and livestock markets

In the capital, Juba, prices of cereals started to soar in mid-2015 on account of the depreciation of the local currency, the general economic downturn and widespread insecurity. The sustained upward trend was temporarily interrupted during the last quarters of 2016, 2017, 2018 and 2019, when the newly harvested crops increased availabilities. In 2020, prices of sorghum, maize and imported wheat, already at high levels, surged between February and May by up to 110 percent as COVID-19 screening measures at border points in Uganda, the country's main source for cereals, disrupted commodity trade flows. Between May and August 2020, prices of maize and sorghum declined by about 10 percent as the first season harvest increased market availabilities, while prices of wheat remained firm. Prices of cereals surged again by 55–70 percent as the local currency depreciated abruptly in the parallel market in mid-October. In December 2020, sorghum and maize grains were traded at about SSP 430/kg, about three times the already high levels of 12 months earlier. Wheat flour was traded in December 2020 at about SSP 1 100/kg, almost five times its year-earlier price. In December 2020, groundnuts and cassava were traded in Juba at SSP 1 200/kg and SSP 430/kg, respectively, almost four times than 12 months earlier. The high price levels are mainly driven by inadequate domestic supplies, high transport costs due to high fuel prices and informal taxation, the difficult macro-economic situation, the lingering impact of prolonged conflict and, in 2020, COVID-19-related disruptions to the local markets.

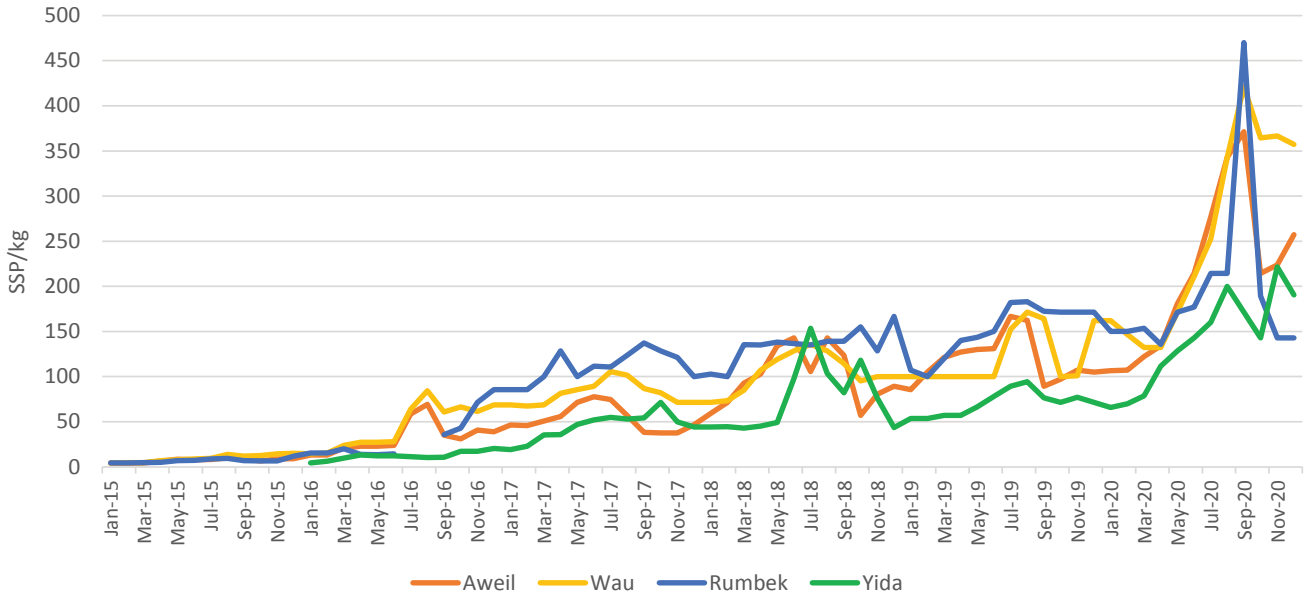
Prices of sorghum started to surge in mid-2015 also in other markets across the country (Figure 12). In 2020 prices sharply increased since April in the markets of Aweil (Northern Bahr-el-Ghazal State), Wau (Western Bahr-el-Ghazal State), Rumbek (Lakes State) and Yida (Unity State), showing a marked volatility and underpinned by currency weakness, trade disruptions related to torrential rains, floods, restrictive measures linked to curb the spread of the COVID-19 pandemic. Prices of sorghum in December 2020 were exceptionally high in several markets, more than twice than their already high year-earlier levels, severely constraining access to food for the market-dependant households.

Figure 11: South Sudan (Juba) - Retail prices of selected cereals (SSP/kg)



Source: FAO - South Sudan Crop and Livestock Market Information System, 2020.

Figure 12: South Sudan - Retail prices of white sorghum in selected markets (SSP/kg)



Source: WFP, 2020.

The food and livestock markets in South Sudan are characterized by a weak integration, mainly as a consequence of the poorly developed road network. The tarmac road connecting Nimule, on the Ugandan border, with Juba is virtually the only all-season trading route in the country. All other roads, including those in the western corridor connecting Juba with Rumbek to Wau up to Aweil, are subject to significant constraints during the rainy season (May–October) when they may become impassable undermining the stability of the supply flows. Transportation costs are in general more than proportional to the distance from the markets, due to multiple taxation (both official and unofficial), time spent at customs, check points and roadblocks. With the exception of Juba's market, which relies on a regular supply of commodities, prices record a high volatility throughout the country, as local economies are very shallow and prices tend to quickly react to contingent and short-lived events as road blocks, the delivery of food assistance or episodes of violence. This aspect was exacerbated during the conflict by low market stocks and high turnover practiced by traders in order to minimize the losses due to looting and damage of markets. After the signing of the R-ARCCS, despite the improvements in the trade flows and marketing activities, market availability remains constrained as traders continue to adopt a strategy of high turnover in order to minimize the risk posed by the sustained depreciation of the South Sudanese Pound vis-à-vis the US dollar.

The difficult access to fuel and its high price also played an important role in determining food price differentials. Fuel availability has improved since mid-2018, especially in Juba, after the Government lifted fuel subsidies and allowed private companies to import fuel, resulting in declining prices in the second semester of 2018. Fuel prices resumed their increasing trend in 2019 and 2020 due to the continuing depreciation of the local currency and, in December 2020, petrol prices in Juba were 30 and 50 percent higher than 12 and 24 months earlier, respectively. Significant fuel price differentials remain across the country due to transport constraints and unavailability of adequate distribution facilities in several markets. In December 2020, prices of petrol varied from SSP 325 to SSP 350 in Juba and Kapoeta, to SSP 500 to SSP 565 in Bor, Bentiu, Agok and Mingkaman, to SSP 670 to SSP 860 in Aweil, Malakal, Wau, and Yida, up to SSP 1 000 to SSP 1 400 in Yambio, Bunj, and Makpandu.

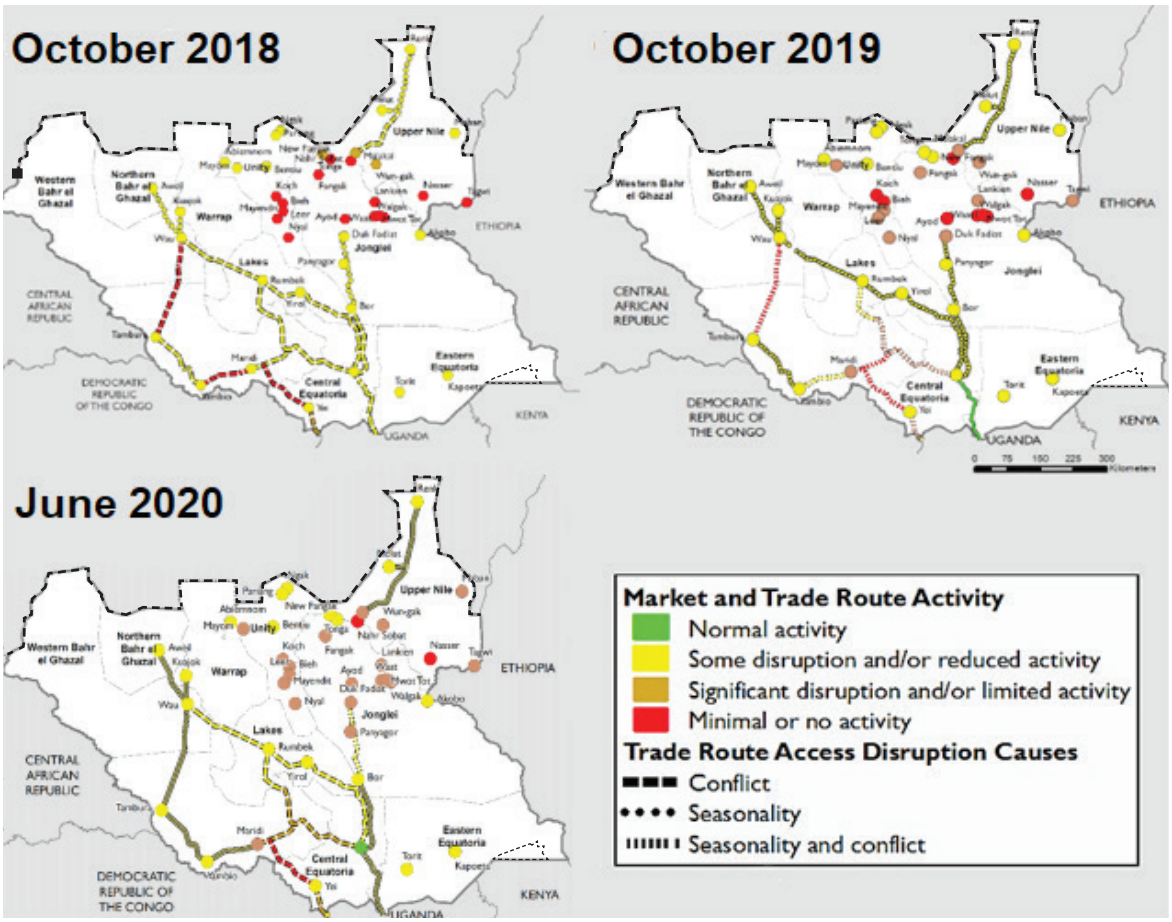
Following the signing of the R-ARCCS in September 2018, relatively stable security conditions in 2019 and 2020 facilitated overall market recovery and trade flows within the country and with neighbouring the Sudan, Ethiopia and Uganda. Trade flows have remarkably improved along the major corridors, including Uganda-Juba through Nimule, Rumbek-Wau and the Sudan-Aweil through Warwar and GokMachar. River routes are also open

from the Sudan to Fashoda and Leer, Juba to Bor, Juba to Yei and Uganda to Kapoeta through Ikotos. As of mid-2020, markets and trade routes were operational in all State capitals and most rural areas. However, especially in the first semester of the year, COVID-19-related restriction measures and longer clearance times at border entry points resulted in trade flow delays and market disruptions.

Improved security since late 2018 along the road between Nimule and Juba, a key trade route with Uganda, and a renewed confidence by traders in a durable peace have resulted in increased cereal imports from Uganda, the country's main source for cereals, during 2019 and early 2020. Subsequently, following the outbreak of the COVID-19 pandemic, screenings implemented by the Government of Uganda in the framework of the measures to contain the spread of the virus have significantly slowed down both formal and informal, cross-border trade. According to the FSNWG's Market Analysis Sub-group, informal maize imports from Uganda to South Sudan declined by about 75 percent between the first and the second quarter of 2020. Maize imports resumed their upward trend in the third and fourth quarters of 2020 as traders adapted to comply more efficiently with the restrictive measures, and some of them were removed. In the fourth quarter of 2020, about 40 000 tonnes of maize were imported through informal, cross-border channels from Uganda, 38 percent up from one year earlier and 2.5 times the average of the previous five years.

Livestock is an integral part of the local livelihoods and sales of small ruminants are an important source of income that largely determine pastoralists' capacity to purchase food items. As shown in Figure 15, in Juba, prices of goats (medium size, grade 2), started following an increasing trend in early 2016 due to high inflation and insecurity-related market disruptions. During 2019 and most of 2020, prices increased at a slower rate compared to previous

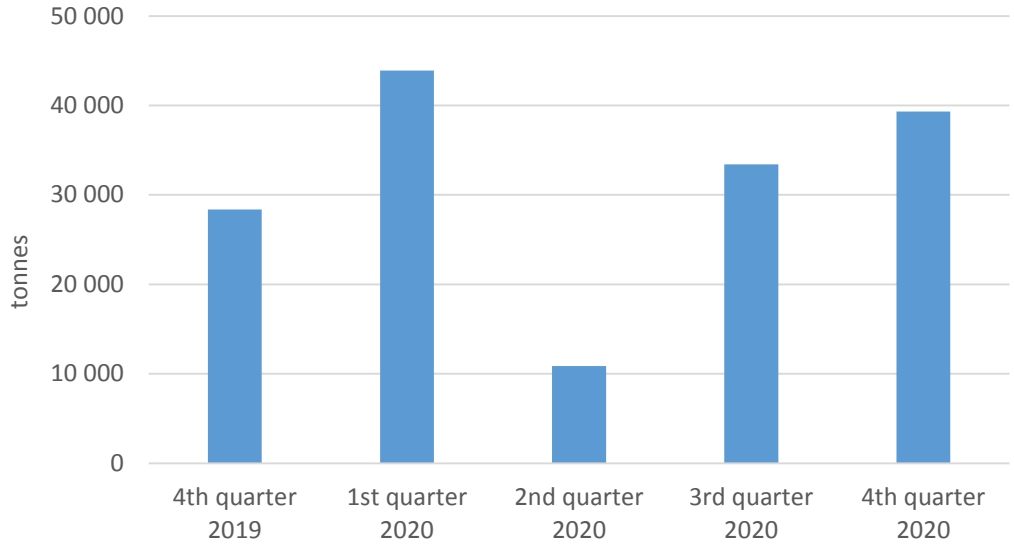
Figure 13: South Sudan - Market and trade functioning (October 2018–June 2020)



Source: FEWS NET, modified to comply with UN map, 2020.

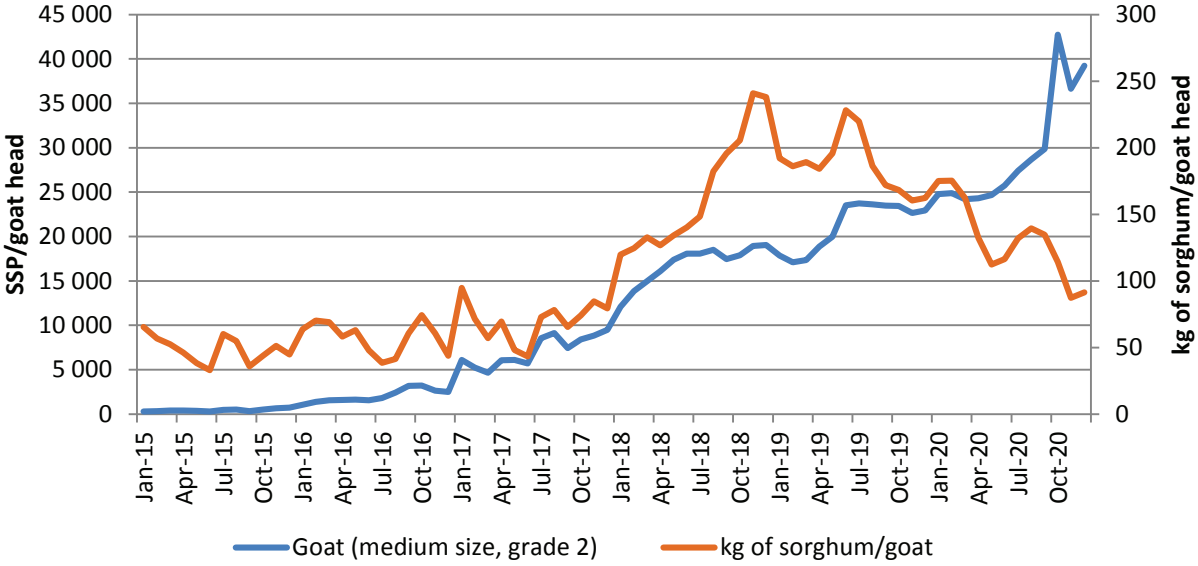
Disclaimer: *Final boundary between the Sudan and South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.*

Figure 14: South Sudan - Informal imports of maize, 4th quarter 2019 to 4th quarter 2020 (tonnes)



Source: FSNWG, 2020.

Figure 15: South Sudan (Juba) - Retail prices of goats and terms of trade



Source: FAO - South Sudan Crop and Livestock Market Information System, 2020.

years, as the improved security situation resulted in increased market supplies. Subsequently, prices surged by more than 40 percent following a sharp depreciation of the local currency on the parallel market. Despite some declines in late 2020, in December, goats were traded in Juba at about SSP 39 000/head, more than 70 percent above the price of 12 months earlier. However, in 2020, prices of goats increased at slower rates than the prices of sorghum, and terms of trade for pastoralists deteriorated. In December 2020, in Juba, a goat was equivalent to about 91 kg of sorghum, about 45 percent less than the equivalent in sorghum 12 months earlier.

Similarly, the terms of trade of the average daily wage against white sorghum deteriorated in 2020 in Juba as wage rates for casual labour increased at slower rates than the prices of sorghum. As a result, in December 2020, one day of casual labour was equivalent to about 5 kg of sorghum, about half the equivalent in sorghum 12 months earlier.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HOUSEHOLD FOOD SECURITY SITUATION

Methodology

This section looks at food security trends in South Sudan and how they relate to the agricultural production and market and economics data presented in the previous sections. The analysis is based on data from the Food Security and Nutrition Monitoring System (FSNMS) run by WFP, FAO and partners (UNICEF, NBS, MOAF, RRC and NGOs). The FSNMS is a key input to the IPC analysis.

The FSNMS was initiated in 2010 (then known as FSMS) and has established itself as the crucial source of information on the food security situation in South Sudan. Since 2016, the FSNMS is conducted twice per year: one round in July–August, at the peak of the lean season and in November–December, at the end of the harvest period. Since 2017, the survey is based on a sampling plan provided by the National Bureau of Statistics designed to obtain statistically representative results at the county level for food security and domain level for nutrition. The survey uses a two-stage cluster design with the first stage involving randomized selection of cluster/enumeration areas and the second stage involving randomized selection of households.

In 2020, due to the impact of the COVID-19 pandemic, it was only possible to carry out a single round of the FSNMS which took place in October 2020. In this round, 711 clusters were selected with at least 12 households interviewed from each cluster, for a total sample of 8 532 households. Most previous years had an FSNMS round in December. Away from Greenbelt, this places the late 2020 round right after the main harvests, hence there may be a tendency for some indicators to look slightly more favourable than in previous years.

Main drivers of food insecurity for 2021

Conflict: While large-scale political conflict remains at low levels in agreement with the ceasefire agreed in September 2018, inter-communal violence will remain a potent threat to stability and food security in the country. While these typically flare-up in Jonglei and the wider Great Upper Nile Region, they may also occur elsewhere as was the case of Warrap in 2020.

A stable security situation allowing improved commodity flows and some stabilization of the macro-economic situation is essential to guarantee the food security of a population that depends to a large extent on markets for the supply of staple foods.

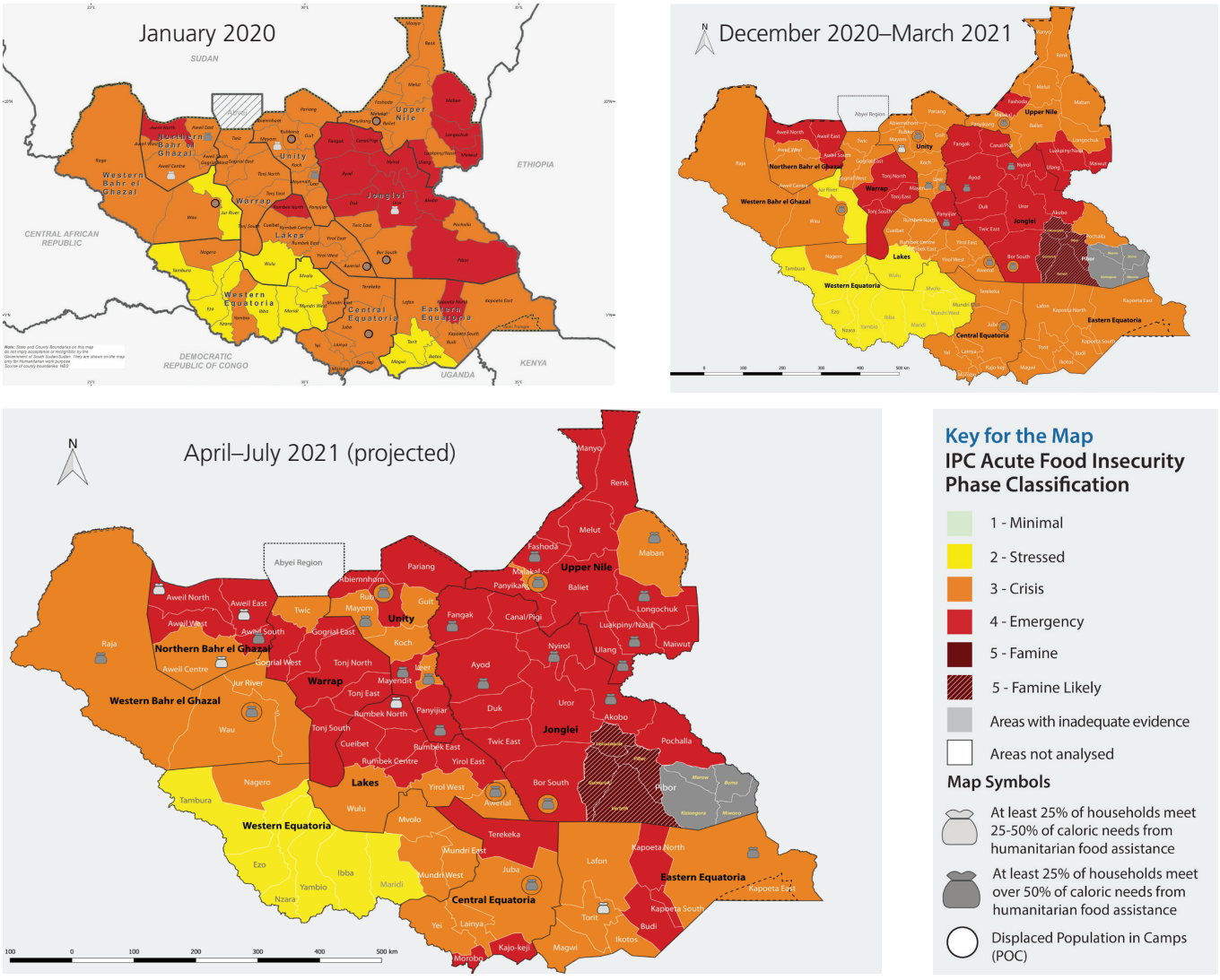
Crop production in 2020: In 2020, net cereal production reached 874 400 tonnes, an increase of 6.5 percent relative to 2019 but still well below pre-conflict levels. This reflects the small increase in cultivated area by returnees and the relatively good performance of crops in Greenbelt Region.

This leads to a cereal deficit of just over 465 000 tonnes; while this represents a modest 3.5 percent improvement on last year's deficit, it remains 5 percent above the average of the last five years. The bulk of the deficit (64 percent) arises from Greater Upper Nile Region, the most vulnerable and food insecure.

Market prices: The depreciation of the South Sudanese Pound continued through 2020 and may continue in 2021. Inflation surged again in late 2020 and is likely to remain high in 2021. Cereal prices increased in 2020 and with no major improvement in the structural logistical issues constraining commodity flows and fragmenting food markets, they are likely to remain elevated in 2021, in a country where the population spends a considerable proportion of their income on food. These factors will tend to nullify the potential benefits of improved crop production.

Floods: The country was hit by two large flood events in both 2019 and 2020, with the extent of seasonally flooded areas hitting record levels. Wetter-than-average conditions are forecast for the 2021 rainfall season and a repeat of a large flood event is very likely. These shocks interact with the other drivers by triggering inter-communal conflict through the destruction of livelihood resources (winter pastures, livestock and crop land), making commodity flows even more difficult and decreasing crop production in the most fragile regions of the country.

Figure 16: South Sudan - Current and projected IPC food security outcomes (2020–2021)



Source: IPC, modified to comply with UN map, 2020.

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The small increase in crop production (see Section "Agricultural Production in 2020") and the smaller decrease in the cereal deficit, drove a seasonal improvement of the situation in early 2021: the population in IPC Phases 3: "Crisis", 4: "Emergency" and 5: "Catastrophe", seasonally decreased to 5.77 million (48 percent of the country's population) from the highs of mid- and late 2020. We note that the 2021 data covers an earlier time bracket closer to the harvest time which may have contributed to the improvement from the zones not affected by flooding or insecurity.

However, these modest improvements have been accompanied by a marked increase in the number of people in IPC Phases 4: "Emergency" and 5: "Catastrophe":

- For December 2020–March 2021, 1.73 million people (over 14 percent of the population analyzed) faced (IPC Phase 4: "Emergency") acute food insecurity or higher. This represents an increase compared to the same period in 2020, when just under 1.5 million people (12.6 percent of the population) were projected to experience IPC Phase 4: "Emergency" conditions or worse.

- Population in Phase 5: "Catastrophe" increased markedly from 40 000 people in January 2020 to 105 000 in December 2020–March 2021. These numbers arise from three states, Jonglei, Northern Bahr-el-Ghazal and Warrap, as a result of the interaction of large-scale flood impacts and the widespread insecurity and conflict that flared up (or continued) in these regions. In Warrap State, localized conflict interrupted trade flows and humanitarian interventions in Greater Tonj.

As we approach the lean period of mid-2021, the proportion of people in IPC phases 3: "Crisis", 4: "Emergency" and 5: "Catastrophe" is expected to increase across the board and is projected to reach 60 percent in April–July 2021 (7.19 million people) with about 108 000 facing IPC Phase 5: "Catastrophe". The proportion of people experiencing IPC Phase 4: "Emergency" outcomes or worse is expected to reach 21 percent of the total population by mid-2021. This represents an increase of 4.6 percent in the proportion and of 760 000 in population numbers relative to the lean season of 2020.

Comparing the two lean periods of 2020 and 2021, we see that the greater contribution to this increase comes from the Greater Upper Nile Region, Jonglei, Upper Nile and Unity (contributing 48 percent of the increase) with significant contributions from Warrap and Central Equatoria (another 21 percent). These are regions with chronic large food deficits and affected by conflict: in the Greater Upper Nile Region, the coverage of the food requirements by local production is thinnest: the region is responsible for about 68 percent of the national cereal deficit; Central Equatoria, with the largest urban population, mainly depending on market purchases for their food consumption and, therefore, largely impacted by record-high food prices, has the second highest individual State-level cereal deficit.

Given the problems affecting commodity flows and high market prices, and the lingering impacts of major flood events, the slight positive effect of the minor increase in crop production will be short lived. Households will again depend on a problematic market supply, against an extremely unfavourable economic scenario due to price inflation and currency depreciation. Continuing insecurity and displacements, high food prices, disrupted livelihoods, reduced incomes and low purchasing power will continue to compound vulnerabilities of populations hit by concurrent shocks and drive further rises in the population affected by severe acute food insecurity.

We are also seeing the playing out of significant and repeated natural hazard shocks after the record floods of 2019, even more extensive flooding took place in 2020. While the 2019 events affected mostly eastern areas of the country (Jonglei and southern Upper Nile), the 2020 flooding was more dominant in the centre of the country (Jonglei, Unity and Eastern Warrap mainly affected).The effects of these flooding episodes are still being felt considering the expansion of water-logged soils even during the dry season. The 2019 flooding contributed (though was not necessarily the main driver) to major sub-national organized conflict in Jonglei State in early 2020, by destroying winter pastures and decreasing key resources for livestock. The large areas affected by flooding in late 2020 are

Table 10: South Sudan - Proportion of population in IPC phases[1/] (January 2020, early and mid-2021)

State	Phases 3–5 January 2020 (percent)	Phases 3–5 December 2020–March 2021 (percent)	Phases 3–5 April–July 2021 (percent)
Central Equatoria	40.4	27.9	51.6
Eastern Equatoria	31.9	37.9	46.2
Jonglei	65.3	78.3	84.7
Lakes	52.0	42.1	57.4
Northern Bahr-el-Ghazal	54.7	60.4	69.7
Unity	46.2	55.3	68.7
Upper Nile	53.3	58.8	70.8
Warrap	35.7	51.2	61.3
Western Bahr-el-Ghazal	31.0	29.4	43.3
Western Equatoria	15.0	9.0	13.5
TOTAL	**45.2**	**48.3**	**60.0**

Source: IPC (http://www.ipcinfo.org/ipc-country-analysis/details-map/en/c/1152422/?iso3=SSD), 2020.
[1/] Phase 3: "Crisis", Phase 4: "Emergency" and Phase 5: "Catastrophe".

still poorly accessible and water-logged, a factor in significant livestock deaths and disease propagation. Flooding and water logging will also disrupt planting activities. The situation is expected to worsen in 2021 given seasonal forecasts for above-average precipitation both in-country and within catchments of the Nile River basin.

Evolution of the food security situation

The FSNMS surveys use the Consolidated Approach for Reporting of food security Indicators (CARI) approach to assess food security since Round 13 of June 2014. The CARI approach integrates food consumption and coping capacity and is derived from a combination of the following indicators:

- Food consumption, measured by the Food Consumption Score, based on dietary diversity and food frequency.
- The share of household expenditure on food.
- The type/degree of livelihood coping strategies employed by households.

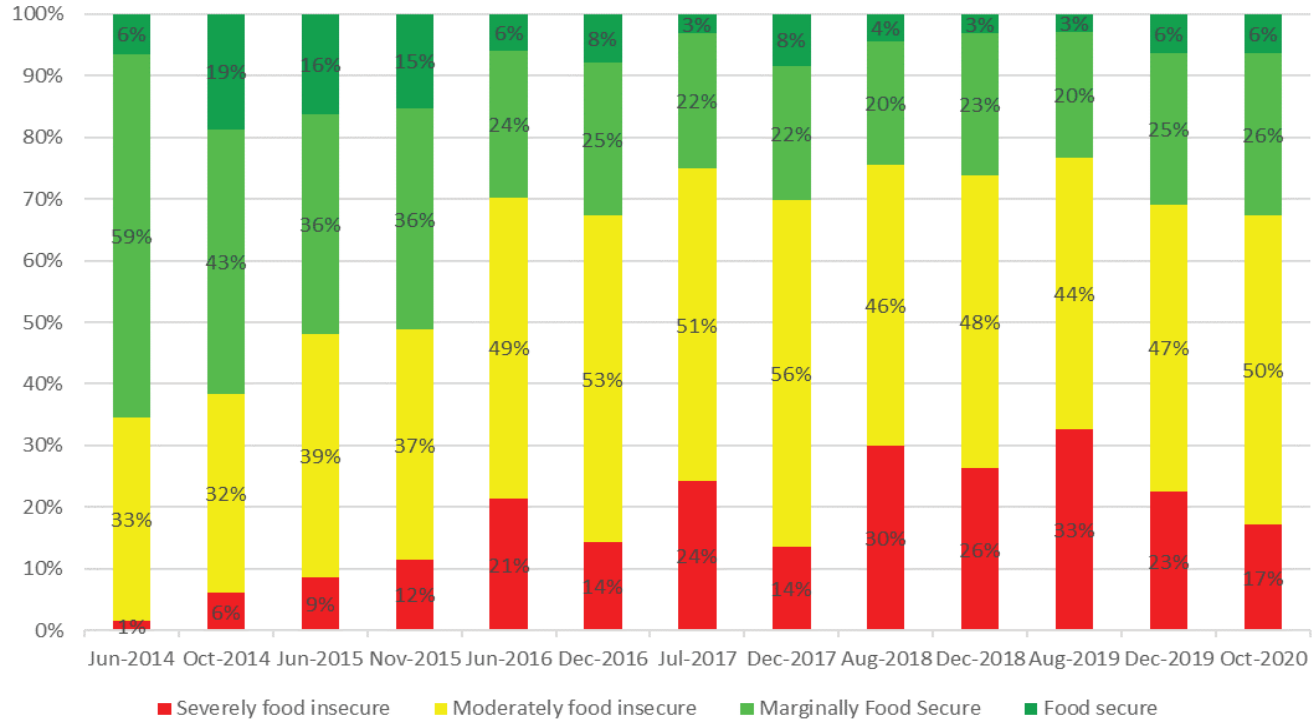
CARI classifies households into four categories: Severely food insecure, moderately food insecure, marginally food secure and food secure.

Food insecurity (meaning severely plus moderately food insecure) in South Sudan increased markedly since the onset of conflict from about 30 percent to above 70 percent, levels which have been maintained since 2016: this was due to the expansion of conflict into the more populated and most productive areas of the Equatorias and the Bahr-el-Ghazals, against a backdrop of a severe macro-economic crisis and hyperinflation. The situation worsened in 2018 and 2019, while the overall levels of food insecurity remained at about 75 percent, the proportion of severely food insecure increased to record levels: around 30 percent during the mid-2019 lean period before dropping down to 23 percent in the post-harvest period (Figure 17).

The October 2020 figures show a modest decrease in food insecurity (3 percent from 70 percent to 67 percent) compared with late 2019. Severe food insecurity decreased more noticeably (-6 percent) due to some of the population improving to a moderately food insecure status (now at 50 percent).

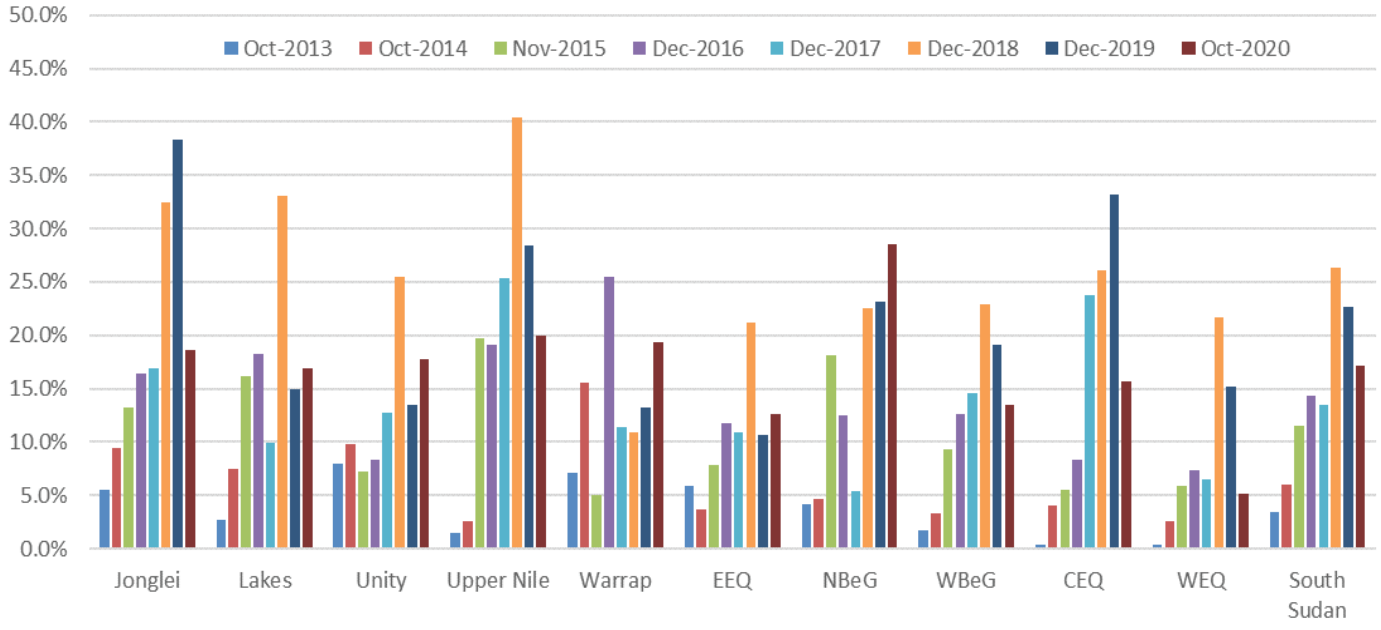
Though improved, relative to the extremes of 2018 and 2019, the situation remains very unfavourable, with food insecurity remaining at higher levels than during the first three years of conflict. This is also evident at State level, with post-harvest severe food insecurity increasing in 2020 relative to 2019 across Northern Bahr-el-Ghazal, Lakes, Warrap, Central Equatoria and, to a smaller extent, in Unity State (see Figure 18). The improvement at national level

Figure 17: South Sudan - Food security trends (2014–2020)



Source: WFP, 2020.

Figure 18: South Sudan - State level harvest time food insecurity (2013–2020)



Source: WFP, 2020.

came from large drops in severe food insecurity in Jonglei and Eastern Equatoria; note that these are drops from extreme spikes in 2018 and 2019.

Increases in severe food insecurity during the post-harvest period in five states raise pessimistic scenarios for the lean season of mid-2021.

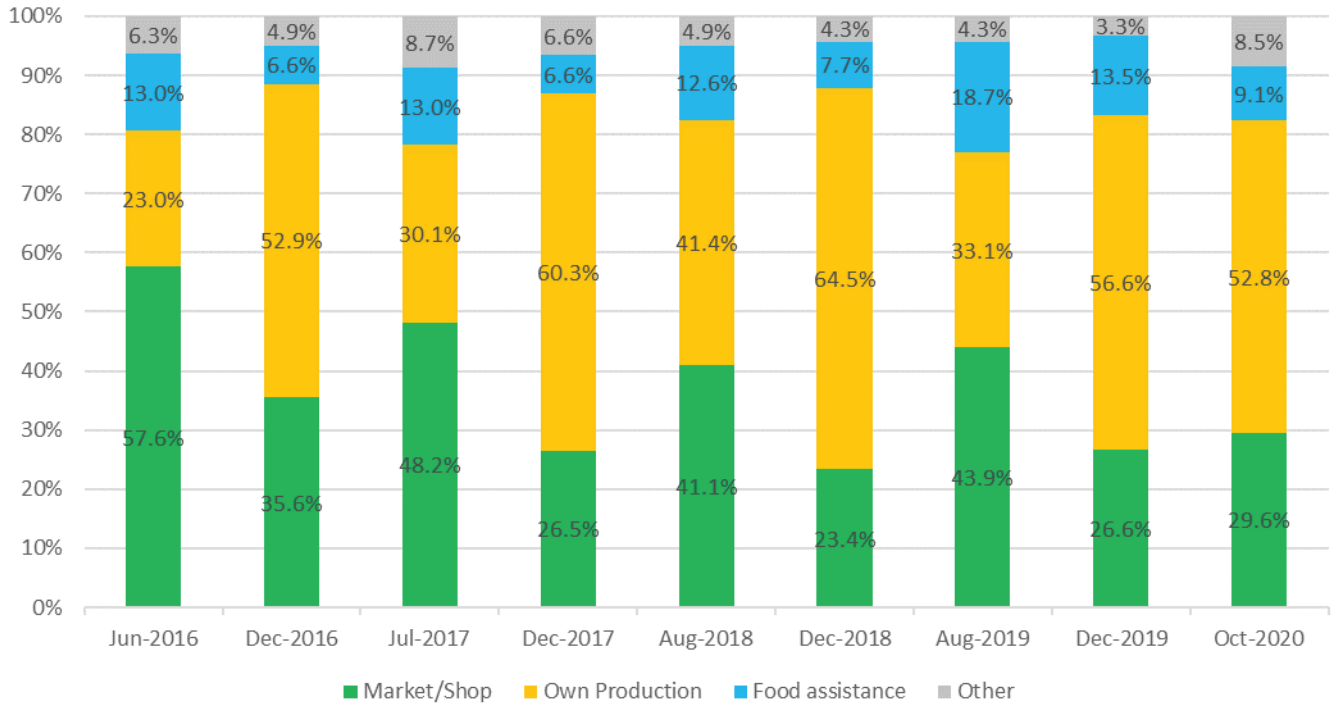
Household staple food supply: Markets vs household production

This section analyzes the relative importance of markets and own production in the supply of staple foods to the household and how this changes across the country and along the season.

We focus on the sources of cereals and roots consumed by the households as this covers the staple sources of food used in the country. Other food items have fairly fixed supply sources, e.g. for vegetables, the major source is own production complemented by gathering, while fish, meat, oils and fats are overwhelmingly sourced from the markets. Dairy products arise from own production only in the states where livestock has a significant presence (Unity, Warrap, East Equatoria, Jonglei to a lesser degree).

Figure 19 shows the contribution of the four sources of cereals and roots to households in South Sudan since June 2016. As expected, the two dominant sources are the markets and the households' own crop production. These sources have a pronounced seasonal variation: in the post-harvest period (October–December) the households depend more on their own production as a result of the recent or ongoing harvest; away from this period, dependence on the markets increases and reaches a peak mid-way through the year (July–August, lean period), as the households' own stocks are exhausted. The seasonal variation is least marked in West Equatoria, where own production is always largely dominant (mostly above 70 percent) and is most noticeable in Northern Bahr-el-Ghazal, where market dependence may exceed 80 percent of the households in the lean period. This pattern has not changed since data collection began in spite of conflict and displacement. This dependency on

Figure 19: South Sudan - Relative importance of different sources of cereals and roots consumed by households (2016–2020)



Source: WFP, 2020.

the markets means that households in South Sudan are highly exposed to price shocks during the lean period, drivers of high market prices and price volatility particularly the exchange rate given that most of the food is imported are, therefore, also drivers for food insecurity.

At country level, in late 2020, the dependency on the markets had a modest increase of about 3 percent relative to the year before, likely taking up some of the food assistance role.

Food assistance became a noticeable contribution at the national aggregate level after the conflict started and agencies scaled up their assistance. This contribution reached record levels in the lean period of (mid-) 2019 when it became the main supplier of staples for close to 19 percent of the households nationally. This decreased to 13.5 percent by the end of 2019 and again to 9 percent of the households in October 2020. Mostly, dependency on food assistance for staple food supply is only significant for Jonglei, Unity and Upper Nile, in particular during the lean period.

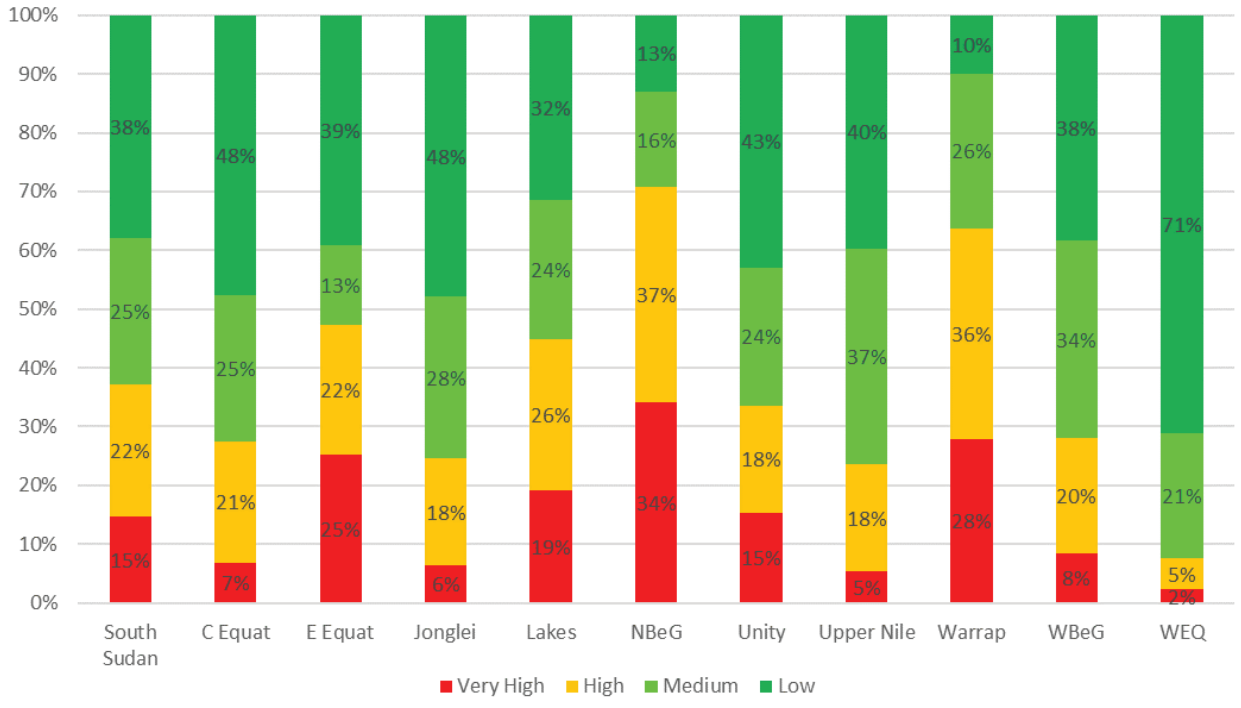
Food expenditure: Recent patterns and at-harvest situation

Households in South Sudan spend a large proportion of their incomes on food. Households' incomes are very meagre and primarily spent on food since crop production will not cover all the requirements and most staple shortfalls have to be sourced from the markets in a context of very high food prices and rampant inflation. Households with high expenditure on food are more vulnerable to market price rises as they have a narrower band of income to absorb the expenditure increases and are, therefore, more likely to engage in coping activities with detrimental impacts on their nutritional status and food security.

Based on FSNMS data, households are classified in terms of their expenditure on food:

- Very High food expenditure: Over 75 percent of expenditure allocated to food.

Figure 20: South Sudan - Proportion of households in food expenditure class for country and regions (October 2020)



Source: WFP, 2020.

- High food expenditure: Between 65 percent and 75 percent of expenditure allocated to food.
- Medium food expenditure: Between 50 percent and 65 percent of expenditure allocated to food.
- Low food expenditure: Less than 50 percent of expenditure allocated to food.

Figure 20 shows the proportion of households in each food expenditure class for October 2020 for the country and its regions.

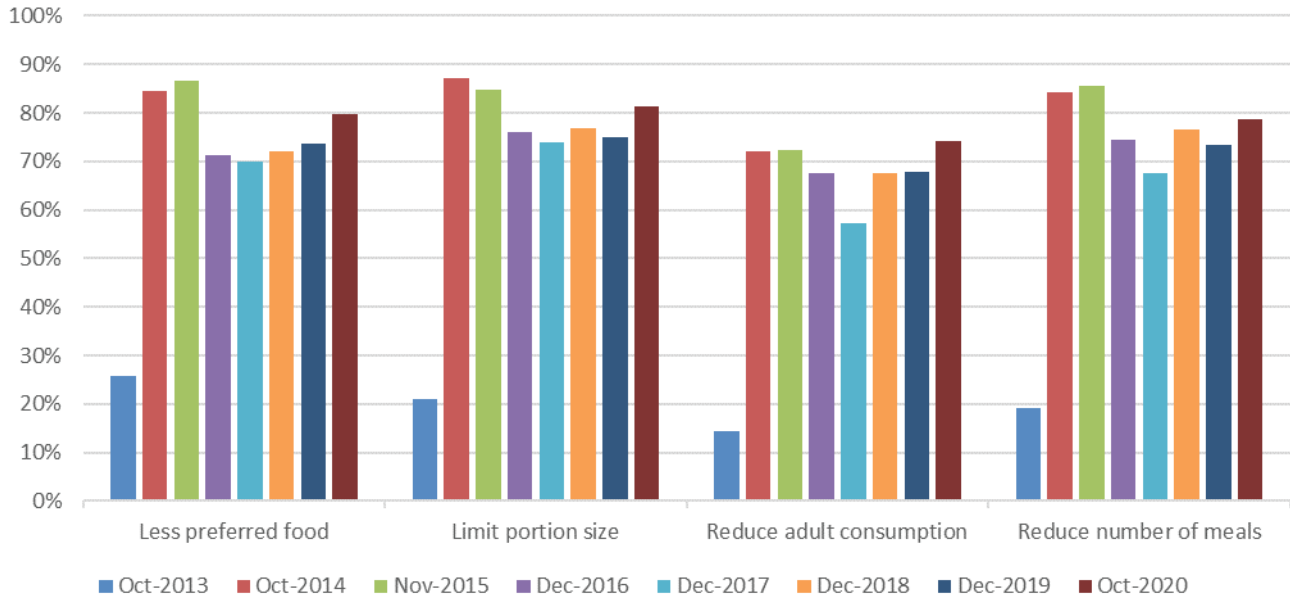
In late 2020, 37 percent of the households in South Sudan had high or very high expenditure on food. At State level, the lowest levels unsurprisingly can be found in West Equatoria, where high crop production ensures low expenditure on food. At the other end of the scale, Northern Bahr-el-Ghazal and Warrap, register higher values with 71 percent and 64 percent, respectively, of the households having high and very high food expenditure. These are states with more pronounced market dependence. The Greater Upper Nile Region does not exhibit very high or high food expenditure, which could be related to a heavier reliance on humanitarian assistance as the main source of staple food. These proportions are expected to increase in the coming lean period when the households will mostly depend on the markets for their food supply and will, therefore, be exposed and vulnerable to price rises and market supply problems.

Household coping strategies

Following the start of the hostilities in late 2013, the prevalence of coping strategies involving a decrease in food in-take (eating less preferred foods, limiting portion size, reducing adult consumption and eating fewer meals) around the harvest period underwent a very sharp increase from 15–25 percent to 70–80 percent in late 2015. Besides this sharp increase, conflict also strongly attenuated what was a pronounced seasonal variation in the degree of coping (increase from a harvest time minimum to a lean period peak, as households' food stocks decreased and market prices increased), now coping takes place all year round at much higher levels.

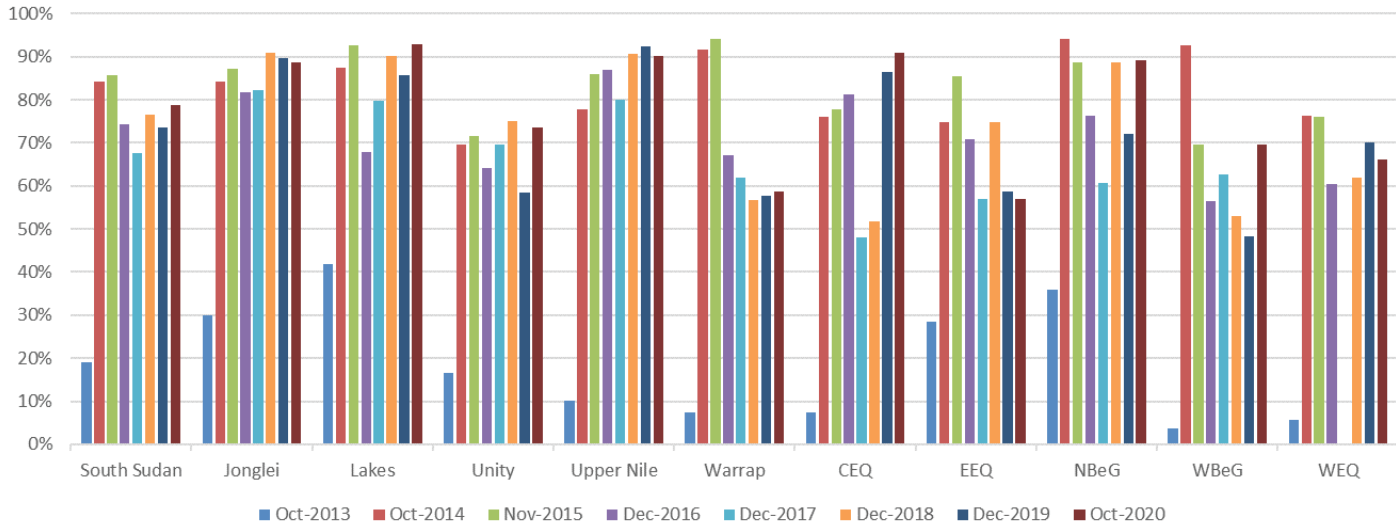
After the peak in adoption of coping strategies in 2014 and 2015 due to the initial shock of the conflict, there was a modest improvement in 2016 and 2017, particularly in the more intense coping options (reducing adult consumption and eating

Figure 21: South Sudan - National prevalence of coping strategies involving decreases in food intake (2013–2020)



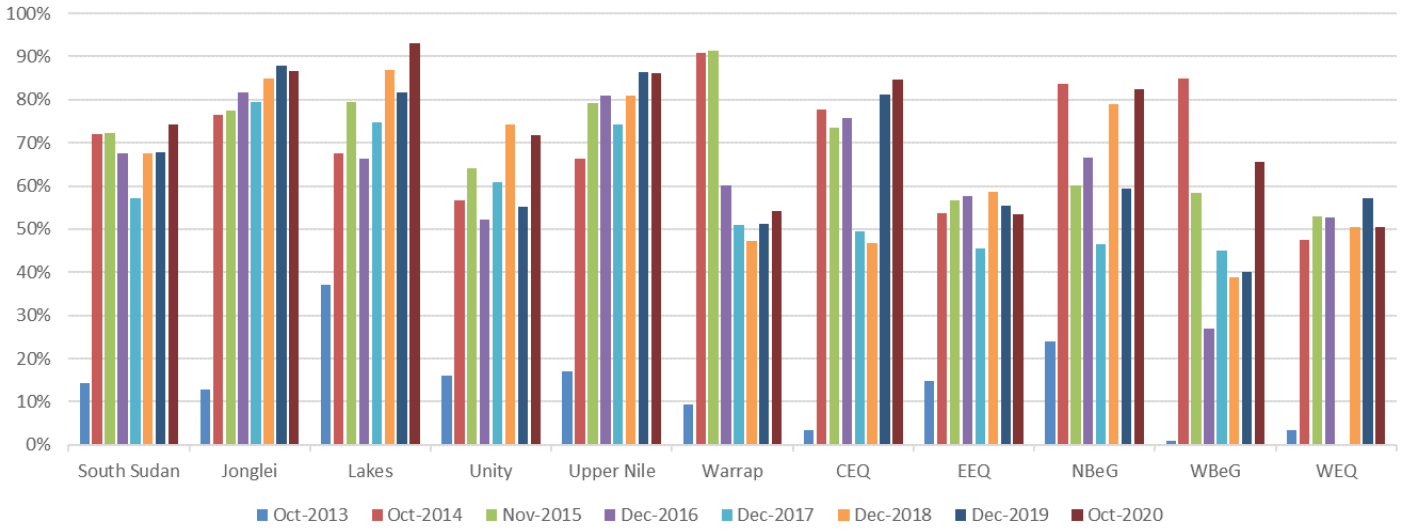
Source: WFP, 2020.

Figure 22: South Sudan - Prevalence of reduce number coping strategies (harvest periods: 2013–2020)



Source: WFP, 2020.

Figure 23: South Sudan - Prevalence of reduce adult consumption coping strategies (harvest periods: 2013–2020)



Source: WFP, 2020.

fewer meals) as trade routes and staple crop supply improved somewhat. However, the economic crisis and out-of-control inflation led to a worsening of the coping situation at country level in December 2018 that continues to this day. At State level, the broad patterns of a post-conflict spike, followed by some improvement and an increase from 2018 are also present, though Warrap and Western Bahr-el-Ghazal did not see the later increase compared to other states.

In late 2020, the country wide adoption of more intense coping strategies has increased and is now at the highest levels since 2015, with some (reduction of adult consumption) now at record levels. At State level, Lakes, Unity and the Bahr-el-Ghazals all registered large increases in the adoption of coping strategies. Central Equatoria had a small increase from 2019 but to record levels. Where coping strategies did not increase, they essentially stayed at the same elevated levels of 2019.

Estimated food assistance plans in 2021

WFP plans to assist just over 5.2 million people in South Sudan in 2021 with a combination of food and cash distribution according to the State level distribution in Table 11.

Table 11: South Sudan - Estimated food assistance requirements in 2021 based on operational plan ('000 tonnes)

State	Number of beneficiaries	Sorghum	Pulses	Oil	Salt	CSB++[1/]	Plumpy	LNS-MQ[2/]	Cash (USD)
Central Equatoria	**300 648**	7 833	939	505	87	379	233	111	10 232 292
Eastern Equatoria	**257 446**	7 894	985	535	108	1 057	387	292	243 000
Jonglei	**1 120 806**	50 475	4 931	2 905	499	1 599	786	1 670	8 714 764
Lakes	**502 644**	15 802	1 745	1 067	183	1 046	388	240	6 898 794
Northern Bahr-el-Ghazal	**692 371**	19 610	2 017	1 463	215	1 323	500	496	8 490 033
Unity	**682 924**	31 887	3 368	1 968	277	887	646	840	1 211 355
Upper Nile State	**614 207**	25 376	2 268	1 169	131	1 031	632	642	9 157 197
Warrap	**700 678**	21 851	2 733	1 632	289	1 982	609	426	3 721 788
Western Bahr-el-Ghazal	**195 640**	6 101	714	399	75	612	260	153	4 248 000
Western Equatoria	**155 298**	2 637	427	193	50	677	330	4	1 893 375
TOTAL	**5 222 662**	**189 466**	**20 127**	**11 835**	**1 913**	**10 594**	**4 772**	**4 875**	**54 810 599**

Source: CFSAM South Sudan, 2020.

[1/] CSB++ = Super Cereal Plus-CSB (Corn-soy blend).

[2/] LNS-MQ is a food supplement that is intended to prevent malnutrition for children 6 months and older. LNS = Lipid-based Nutrient Supplements. MQ = Medium quantity.

RECOMMENDATIONS

After the signing of the Revitalized Agreement on the Resolution of the Conflict in South Sudan in September 2018, there has been a significant improvement of the security situation, which encouraged the return of displaced farming households and contributed to the recorded increase in production. Therefore, the cessation of all hostilities and the implementation of the Peace Agreement is the primary recommendation to progress in terms of agricultural development in order to improve the country's food security situation. While understanding the complexity of the reconciliation and peace-building process, the Mission recommend the following actions, with the perspective that the national peace deal will continue to hold.

Agriculture

In order to strengthen domestic food production and reduce the gap between production and requirements in the 2021 season, it is recommended to:

- Support the 2021 cropping season by providing agricultural inputs (seeds and tools) and carrying out farmers' training/orientation activities and seed fairs. Flood-impacted areas are to be prioritized, as crop failures did not allow farmers to retain adequate quantities of crops for seed use.

- Maintain support to small-scale subsistence producers in pastoral and agro-pastoral areas by protecting their livelihoods and enhancing their resilience at household and community level, through the provision of agricultural inputs and training on alternative livelihood opportunities including bee-keeping, small-scale vegetable production, home gardening, sheep/goat fattening and related income-generating packages depending on the resource potentials of specific areas.

- Support targeted farmers to use improved agricultural practices, including adequate land preparation, proper weeding (especially providing training on *Striga* weed management and control techniques), integrated pest management and soil fertility maintenance.

- Provide training and equipment to enable farmers to manage storage losses of crops due to various pests.

- Address the challenges posed by FAW damage through sustainable and integrated pest management which includes prevention, control, knowledge-sharing and action.

- Strengthen the county-based CCMCs through the provision of office and field equipment and continuation of training programmes. The SMoAs should be involved in establishing two-way communication linkages with the counties and with the institutions at national

level (MAFS and NBS), so as to improve the quality of the CCMC reports at State level before submitting them to national institutions.

- Involve CCMCs to track population movements at county level by cross-checking the population figures provided by the other concerned agencies and assessing if recent returnees were able or not to be engaged in cropping activities. This will improve the accuracy of the number of farming households that is used by the Mission as an input to estimate the annual planted area.

- In collaboration with the DLCO, continuously monitor movements of Desert locust swarms and implement control measures, if necessary.

Livestock

- Design a strategy to conduct a comprehensive livestock census for the whole country using remote sensing.

- Expand animal health interventions, in particular:
  - Train new community animal health workers to replace drop-outs and expand delivery of animal health services at community level.
  - Review the vaccination programme in terms of coverage/effectiveness and adopt a risk-based approach.
  - Promote privatized/cost recovery delivery of animal health services and support access to veterinary drugs and supplies.

- Support the evolution of livestock rearing activities towards a modern, commercial-oriented livestock sector, in particular:
  - Promote activities that add value along the supply chain, including training of livestock owners in improved fodder production, processing and conservation techniques, introduction of livestock conditioning and pen fattening, promotion of peri-urban smallholder milk production and support of backyard poultry production.
  - Support community-based livestock improvement programmes through the delivery of training on improved animal husbandry practices (including animal breeding using Sudanese cattle breeds including Botana and Kenana).
  - Conduct a comprehensive study of the national livestock economy.
  - Carry out livestock fairs (with a premium for the quality of animals).

- Support the implementation of the "Strategic Response plan to mitigate cattle raiding-related conflict in South Sudan (2019–2025)".

- Re-establish access to seasonal grazing areas and routes, which have been disrupted since the start of the conflict, by supporting a process of negotiation amongst various pastoral communities.

- Establish a livestock information system to monitor key indicators, including animal production, productivity, marketing, movements and health.

Markets

- Enhance the capacity of existing institutions to provide market-based livelihood support promoting cash-based interventions, skills development (access to trainings and business development services), transfer of assets and/or construction of small-scale infrastructure (fish dryers, auction yards, slaughter slabs/houses, small meat/milk production enterprises, etc.), access to financial institutions and to information and support through farmers groups platforms.

- Promote local purchases of seeds and crops by facilitating the distribution of seed and food from surplus to deficit areas, taking into consideration local market dynamics and trade flows along the main corridors for both commercial and humanitarian commodities.

- Strengthen existing price and market monitoring activities by expanding the number

of monitored commodities and improving information on cross-border trade.

- Expand the use of CBTs to sustain local demand, thus stimulating market-oriented crop production and improving market supply stability.

- Promote livestock trade and improve access to livestock markets, including in cross-border areas. This will involve the cooperation with the North Eastern Africa Livestock Council (South Sudan Chapter).

Food security

- Given the high in-country cereal deficit, record high cereal prices coupled with large animal and livelihoods losses and localized violence, household food insecurity will remain persistently high in 2021, especially during the lean season, which is expected to have an early start. Hence, an immediate and sustained scale-up of unconditional humanitarian food assistance is needed to save lives and the total collapse of livelihoods and avert the looming malnutrition crisis in the most affected counties all year round.

- Targeted food assistance is recommended to support the vulnerable households during the extended lean season, when they will face an increased market dependency coupled with exceptionally high food prices in order to alleviate food and hunger gaps and preserve livelihoods.

- Assistance should be context-specific and provided using a combination of in-kind distribution with Food Assistance for Assets where appropriate: Cash-Based Transfers should be carried out in locations where markets are functional and prices are relatively stable with assured food availability, together with close market monitoring and, where possible, interventions to support markets and supply chains. The other areas where markets are not functioning should be considered for in-kind assistance.

- With the positive development of the peace following the establishment of the Government of National Unity in February 2020, interventions that contribute to peace-building and rebuilding of livelihoods should be given high priority, to reduce inequality and exclusion, and in line with a strong conflict-sensitive approach.

- Provide context-appropriate livelihood support through improved market access, provision of seeds and tools (farm inputs) to stimulate production back to surplus levels in the more productive and stable counties as well as sustain the returnees with both food and livelihood support for better integration into the communities.

- Prioritize and support the design and implementation of multi-sectoral interventions, both through conditional and unconditional modalities.

- Encourage a shift and move from a clinical and crisis approach on dealing with high levels of malnutrition to preventive and community-based and multi-sectoral collaboration approaches promoting adequate in-take of diverse diet, access to micro-nutrient and protein-rich food through locally-sourced vegetables, fish and milk as well as nutrition education.

- In the face of resource shortfalls, refine a prioritization matrix for the identification of locations for food security and nutrition response in order to effectively use the limited available resources in line with the changing context.

- Continuously monitor food security and nutrition conditions, especially in the face of increasing food prices following the COVID-19 pandemic in the country, in order to periodically fine-tune the humanitarian emergency strategy and response. Increase monitoring of food security in urban contexts.

- Strengthen joint early warning systems by improving the monitoring of rainfall, desert locusts, market prices, humanitarian access conditions and cropping conditions along the season. Promote the application of Sentinel-2 data to country scale crop type mapping. This should involve: i) monitoring rainfall performance through remote sensing and GIS techniques in order to improve the quality of crop forecasting and thus the reliability of assessments; and ii) exploring the availability of high resolution satellites imagery, which can be used to estimate the area planted, yield and production.

ANNEXES

ANNEX 1

Table A1: South Sudan - Indicative seasonal cropping calendar

		March	April	May	June	July	August	September	October	November	December	January	February
Uni-modal rainfall zone found in Greater Bahr-el-Ghazal; Greater Upper Nile	Rainfall	Dry season		Wet season						Dry season			
	Main Crop		Land preparation and planting		Growing season			Harvest					
	Long-cycle crops				Growing season					Harvest			
Bi-modal rainfall zone found in Greater Equatoria	Rainfall	Dry season	Wet season								Dry season		
	First crop	Land preparation and planting		Growing season			Harvest						
	Second and third crops						Land preparation and planting		Growing season		Harvest		

Note: Recent changes are blurring the divisions.

Recommendations for strengthening Roadmap and CCMCs, 2021:

- During the travel restriction imposed by the Government in 2020 due to the COVID-19 pandemic, CCMCs have proved to be very important assets in providing grassroots-based information regarding the progress of the rainy season, the performance of the crops and the negative impacts of the floods and pests through telephone calls, e-mails, Skype and other social media like WhatsApp. Hence, it is recommended to strengthen the CCMC networks across the country and the on-line communication capacity of the CCMC members.
- The estimation of planted areas in the mechanized sector needs to be supported with satellite-based estimation due to the difficulty of measuring areas by the Task Force teams and CCMCs on the ground.
- Maintain planting assessments to spot checks on planted area only in representative sample counties.
- As soon as security allows, conduct crop assessment and yield estimation training for carefully selected SMoAs and NGOs staff in all the new states.
- Provide CFSAM guides and training, for county level CCMCs established by FAO and MAFS to the new states.
- Introduce mobile apps for use by the National Task Force teams and CCMCs that have already demonstrated willingness and capacity to assess progress of the season and timely reporting to FAO/MAFS Crop Assessment Team. The introduction could be planned during a short series of training courses early in the first season in Western and Central Equatoria states.
- Increase the range of timing of full harvest assessments to allow each main crop, in each State to be assessed.
- Continue to transfer the responsibility of conducting the field work of all assessments in a staggered manner (to accommodate harvest dates) to SMoAs, funded by FAO-European Union project, **ONLY** where suitable levels of competence and integrity have been demonstrated. This means adjusting the role of the National Task Force teams to "remote" supervisory and analytical duties only in the states where the MoA teams have exhibited sufficient competence. In the states that continue to misrepresent performance presenting hearsay as evidence, the Task Force teams should conduct independent assessments.
- CCMC membership should be re-assessed with Committee members to be selected based on their competencies.

ANNEX 2

Agricultural situation by State (2020)

GREATER EQUATORIA

Western Equatoria

In 2020, the Task Force teams conducted six missions, covering the two cropping seasons at harvest time. No planting assessments were carried out due to the travel restrictions introduced by Government to curb the spread of the COVID-19 pandemic. However, the established CCMCs provided information from grassroots. Three first season harvest assessment missions were carried out in Greater Mundri and Mvolo State (1–8 August 2020), Tambura, Ezo and Nzara (4–13 August 2020) and Maridi, Ibba and Yambio (4–13 August 2020). Then, three missions were conducted to assess the second season harvest in Tambura, Ezo and Nzara counties (9–18 November 2020), in Mvolo, Mundri East and Mundri West counties (7–14 November 2020) and in Maridi, Ibba and Yambio counties (9–18 November2020). In all six missions conducted in Western Equatoria State, 265 case studies were performed (20 key informants and 245 farmer interviews).

Seasonal rains over most cropping areas had a timely onset in April/May. The amount of rainfall over most areas was average to above average, especially from July to October and it was fairly distributed in most counties. In general, there were no reports of serious dry spells or waterlogging, except in a few areas where they had no relevant effect on growing crops. As a result, the overall performance of the 2020 cropping season in the State was very good and better than in 2019.

In the counties visited, no access constraints to land were reported, with far fields still unsafe only in some areas. Informants and direct observations indicated an increase in cultivated area compared to 2019 due to an improved security situation and high market prices that encouraged farmers to cultivate more land and prompted town dwellers to engage in agricultural activities. In addition, the improved security situation resulted also in a returnee influx, with an ensuing increase in farming households. This resulted in an increase of area plated to cereals. The main cereals grown in the State include maize, sorghum, rice and finger millet.

In most areas, land preparation for the second season started in July, soon after the harvesting of the first season crops. The main crops grown include maize, cassava, groundnuts, rice, sorghum, finger millet, sesame and a number of fruit varieties. The Task Force Team and CCMC reports have confirmed that the area planted with rice and cassava is increasing each year.

Almost all farmers in the State use hand tools including hoe, *maloda*, axe, rake, slasher and machete, sourced mainly from the markets with some distribution by NGOs. While a few privately owned tractors are functional, most of the Government tractors are not functional, including the 80 tractors supplied to the State by the Central Government. There is limited access to tractor service due to unavailability of spare parts and high cost of fuel. In 2020, the hiring rate for private tractors was between SSP 12 000 and SPP 15 000 for ploughing a feddan (0.42 hectares) in Maridi and Greater Mundri counties. Most farmers used their own local seeds, while FAO and its partners distributed some improved seeds across the State. Almost all the required agricultural labour originates from families and the community. The use of ox-ploughs is minimal and almost all land preparation is performed manually using hand tools. Ox ploughing is practiced only in some areas, such as Mvolo County, and it allows an increase of the cultivated area of the owners of oxen and of those using rented oxen.

In 2020, the most common pests were rodents, red monkeys, birds, foxes, bush rats, snails, millipedes, green grasshoppers, local birds, FAWs, porcupines, squirrels, termites and stem borers, with damage

levels ranging from mild to average, depending on locations. In particular, FAW infestations were minimal due to the effect of the heavy rains that killed the pest and damages on crops were limited. Chemical pesticides are not used in the State and farmers resort to traditional pest control measures. For instance, farmers use leaf extracts of a plant species known as *Babashiro (Chromolaena odorata)*, mixed with hot pepper and powder soap to kill FAWs, while hand collection and burying is used to control snails. Scaring of birds and wild animals is also a common practice to minimize the damage on crops. The most common diseases were cassava mosaic virus and groundnut rosette virus which caused mild damages on crops. The distribution of healthy cassava cuttings of improved varieties by some NGOs has helped farmers to reduce the use of locally available infested planting material and thereby it has contributed to reduce the expansion of the cassava mosaic virus. Weed infestation was high, similar to 2019, because of abundant rainfall amounts and, despite the required two-three weeding rounds, farmers were often not able to contain weed infestations. In particular, *Striga* (a parasitic weed) and *Babashiro*[11] *(Chromolaena odorata)* continue to be a major constraint to crop production.

Growing conditions

Figure A2-1 shows combined rainfall estimates and vegetation index graphs for six locations selected across Western Equatoria State (Nzara, Tambura, Ezo, Ibba, Yambio and Mundri West). The figures show average to above-average rainfall and vegetation conditions (NDVI) over most of the year, indicating favourable growing conditions for both first and second season crops as well as the long-cycle varieties.

Most farmers used their own saved seeds from the previous harvest or purchased seeds in the local markets. Cassava is grown throughout Greenbelt, covering about 18 percent of the total cultivated area in Western Equatoria State and serving as a safety net to the community. Groundnuts are also an important crop, covering an estimated 16 percent of the total planted area in the State.

Production

In 2020, the annual production estimates have been based on time-series information, adjusted downwards due to insecurity. Cereal yields are estimated at an average 1.48 tonnes/hectare for all cereals and both harvests, slightly higher than the previous year's level of 1.45 tonnes/hectare. The yield increase is due to the adequate amount and favourable distribution of rainfall during most of the growing seasons and the low levels of damage by pests, including FAWs. The overall harvested area in the State increased by 6.6 percent. Consequently, the gross cereal production from all the harvests is estimated at about 202 000 tonnes, 8.4 percent higher than in 2019.

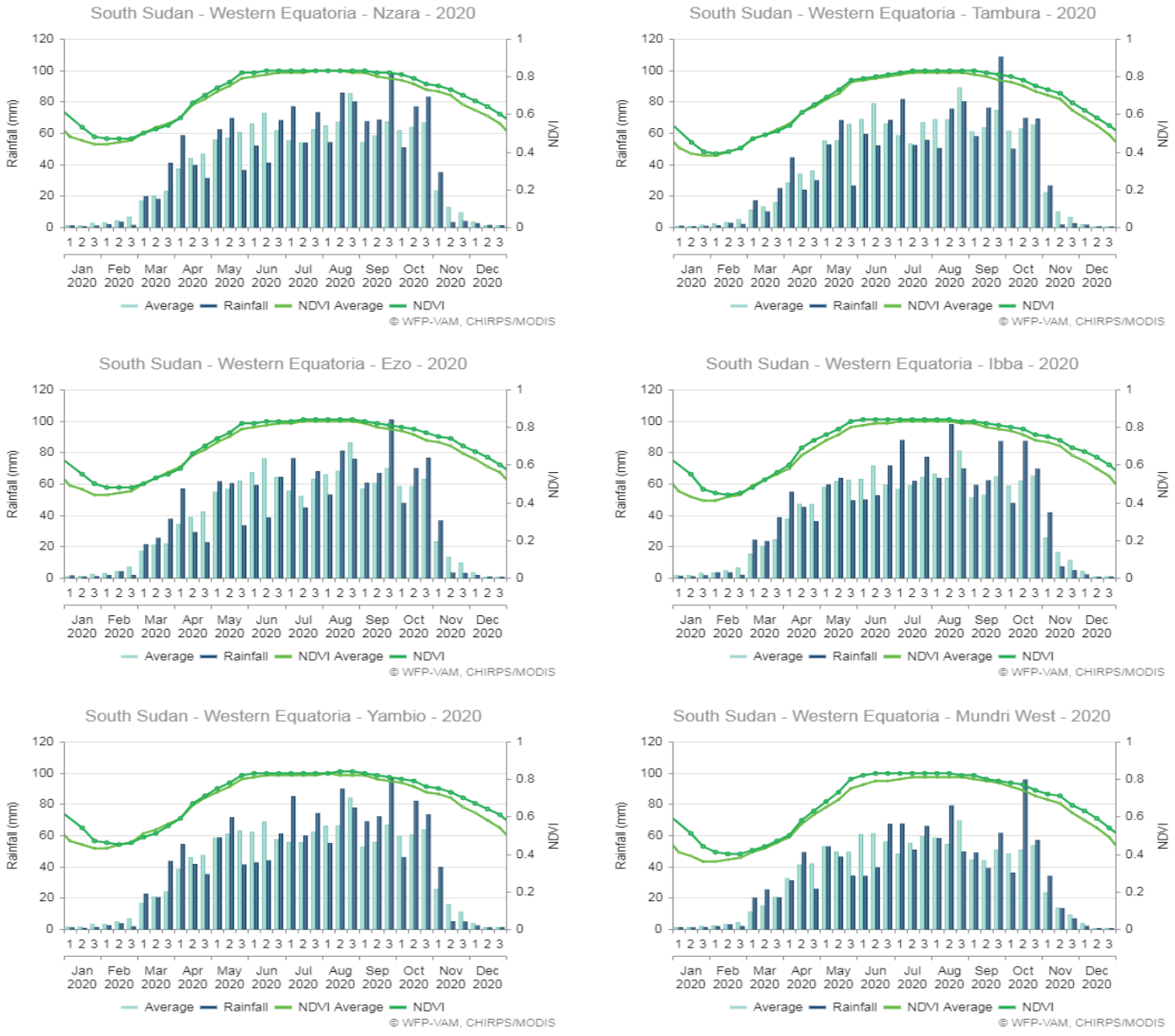
The contribution of cassava to households' food consumption at State level is significant and the area covered by cassava in 2020 is estimated to be higher than in 2019. This is mainly because, being cassava a buffer crop, most heads of returnee families plant the crop in advance of the return of all the family members. In 2020, an estimated 210 640 tonnes of cereal equivalent, calculated using 42 percent of dry matter and a gross processing efficiency of 70 percent, are likely to be available for use. Groundnuts also add an estimated 36 495 tonnes of gross dry matter (unshelled).

Compared to other states, the number of livestock is very limited, with livestock rearing practiced only in northeastern counties, particularly in Mvolo. However, the number of animals, particularly shoats, is reported to be increasing annually. According to Task Force reports, about 40–60 percent of the households in Yambio, Tambura, Nzara and Nagero counties own an average of 10–15 shoats. In Mundri East, Mundri East and Mvolo counties, the percentage of households owning shoats increases to 80 percent. In Ezo and Ibba counties, an estimated 30–50 percent of the households own animals and each household keeps on average of 5–10 animals. In Maridi County, about 50–70 percent of the households own shoats and each household keeps between15 and 20 animals.

[11] *Babashiro* is an invasive weed noted to be expanding and causing concerns to farmers in Western and Central Equatoria.

In 2020, pasture and water for livestock were abundantly available in most areas due to the average to above-average rains, resulting in high PET Body Condition Score (BCS): 4 for shoats and 3–4 for cattle. Some of the endemic livestock diseases include BQ, CBPP, Contagious Caprine Pleuropneumonia (CCPP), Peste des petits ruminants (PPR), Foot and Mouth Disease (FMD), diarrhoea and mange. Cattle raiding incidents were reported in Mvolo County.

Figure A2-1: South Sudan (Western Equatoria) - Seasonal Rainfall and NDVI



Source: WFP/VAM, 2020.

Central Equatoria

The Task Force teams undertook four missions at harvesting time, including two missions to assess first season crops and two missions to assess the second season crops. The first harvest assessment missions were conducted from 18–29 August 2020 to assess yields of first season crops and the progress of the second season planting. This Mission covered Yei, Lainya, Terekeka, Morobo and Juba counties and involved 130 interviews/case studies (125 farmers and 5 key informants). The second season harvest assessment was carried out in two periods, from 5–11 November 2020 and from 19–26 November 2020, that covered the same counties visited during the first season harvest assessment and involved 101 interviews (94 farmers and 7 key informants). In total, in the two harvest assessments, 231 case studies (219 farmers and 12 key informants) were performed, compared to 103 case studies in 2019, due to the improved security that enabled the Task Force teams to travel and conduct assessments in Morobo, Yei River, Lainya and Terekeka counties. However, the Task Force teams were unable to visit Kajo Keji County since 2016 due to persistent insecurity. Functioning CCMCs in Juba, Lainya, Yei, Morobo and Terekeka counties have started reporting since 2019. Information from inaccessible areas, particularly Kajo Keji County, was collected through telephone communications.

Growing conditions

Figure A2-2 shows the combined rainfall estimates and vegetation index graphs for all the six counties of Central Equatoria State (Terekeka, Juba, Lainya, Kajo Keji, Yei and Morobo). The 2020 rainy season had a timely onset in April/May, especially in bi-modal areas, while there were delays by two-three weeks in some uni-modal areas of the State. Rainfall was characterized by average to above-average amounts and good distribution over most of the State throughout the season, with no prolonged dry spells and serious flooding, but only some localized waterlogging in riverine areas. This resulted in favourable growing conditions, very similar to those of 2019, for both first and second season crops.

Pests and disease infestations have remained at mild to average levels in 2020. The common pests include millipedes, snails, aphids, stalk-borers (attacking sorghum and maize), local birds, termites, green grasshoppers (locally known as waja waja) and rodents mostly causing average damage on crops. FAWs had mild effects on maize fields in 2020, as abundant rains created unfavourable conditions for the multiplication of the pest. *Striga* (parasitic weed) has continued to be of concern to farmers in the areas dominated by mono-cropping of sorghum and minimal or no crop rotation, especially in Terekeka County. Monkeys are causing mild to serious damages to crops planted in far fields. There are also roaming migratory cattle mostly from Jonglei and Terekeka in Aru Junction, Lobonok, Rejaf, Mangalla, Jebel Ladu and Rokon resulting in damage to crops.

Production

The 2020 production estimates are based on the Task Force teams' harvest assessment reports of the two seasons and on CCMC reports for Juba, Lainya, Yei, Morobo and Terekeka counties, compared and cross-checked with time series data.

Although the security situation started to improve since 2019, agricultural activities and cultivated area in 2020 remained well below the pre-conflict levels. The 2020 gross cereal production is estimated at 97 068 tonnes, about 14 percent above the level of the previous year. As a result, the net cereal deficit is forecast to decrease from about 77 000 tonnes in 2020 to about 72 000 tonnes in 2021. In addition, from the cassava harvest, about 67 640 tonnes of cereal equivalent, calculated using 42 percent of dry matter and a gross processing efficiency of 70 percent are likely to be available for use. Groundnuts also add an estimated 15 810 tonnes of gross dry matter (unshelled).

Livestock movements in Central Equatoria State are seasonally practiced by pastoralists from Terekeka County starting from May, moving to the uplands of Juba, Lainya and Yei counties and then returning home between September and November. The number of animals in Juba, Lainya, Yei, Morobo and Kajo Keji counties has decreased significantly in recent years mainly due to the prevailing insecurity. However, an influx of cattle from Jonglei State was reported in Kajo Keji and Morobo counties, which is expected to disrupt agricultural

activities in the next agricultural season and result in conflicts between herders and farmers. Owing to good rains during the season, livestock conditions, pasture/browse and water supplies for livestock in 2020 were noted to be the same as or better than in 2019, although the above-average rains created a conducing environment for the spreading of ECF. The average PET Body Condition Score for goats was 3–4, while it was 3 for cattle. There were no reports of disease outbreaks in the State, except the normal occurrences of endemic diseases including CCPP, FMD, PPR, CBPP, BQ and internal and external parasites. In addition, *Coccidiosis* and *Newcastle* diseases were reported on poultry in Morobo, Terekeka, Yei, Kajo Keji and Lainya counties.

Figure A2-2: South Sudan (Central Equatoria) - Seasonal Rainfall and NDVI

Source: WFP/VAM, 2020.

Eastern Equatoria

In 2020, the Task Force teams undertook six missions at harvesting time of the first and second crops. The first harvest assessments took place from 2–12 September 2020 and from 2–16 September 2020, with Team 1 covering Kapoeta North, Kapoeta East, Budi and Kapoeta South counties and Team 2 assessing Ikwoto, Torit, Magwi and Pageri Administrative Area. The second harvest assessments were conducted in Magwi (16–23 November 2020) and Budi (19–26 November 2020). Overall, 236 interviews/case studies (217 farmers and 19 key informants) were carried out.

Growing conditions

Figure A2-3 shows the combined rainfall estimates and vegetation index graphs for six locations selected across Eastern Equatoria State (Budi, Ikotos, Lafon, Torit, Kapoeta South and East). Remote sensing data in all the six locations indicates average to above-average rainfall and vegetation conditions.

There were no reports of prolonged dry spells. However, the flooding/waterlogging in low-lying and riverine areas caused reduction in planted/harvested area. In greater Kapoeta Region, floods occurred in July and August due to heavy rainfall and affected sorghum and groundnuts in lowland areas in Kapoeta North (Narus/Lomuta, Naposoriet) and in Kapoeta South (Awoyapa). Floods also occurred in flood-prone areas of Lopa/Lafon County.

The 2020 cropping season was characterized by adequate rainfall amounts and a slight increase in harvested cereal area, compared to previous year. However, 2020 production is slightly lower than in 2019, which was the best season since 2015, and the reduction is mainly due to flooding/waterlogging, heavy weed infestations, particularly by *Parthenium* species (congress weed) and conflict in some areas (Ngauro).

Farmers mainly use their own seeds of local varieties retained from the previous harvest or purchased in the market with dry planting being common, especially where rains have a late onset. Sorghum is the main cereal grown, with *Lonyang* and *Lodoka* being the preferred landraces. Maize, especially the *Longi-5* variety, is more prominent in Magwi and parts of Torit counties. Among other crops, cassava is grown in the southern and western areas of the State, where high amounts of precipitations are normally received, while pearl millet is mainly grown in Ikotos County and in the eastern dry areas of the State. There is no use of fertilizers, pesticides and manure by farmers.

Hand digging is the normal method of cultivation, with most labour usually provided by the household members. There are more than 375 pairs of ox ploughs (63 pairs of oxen in Ikwoto, 8 pairs in Magwi, 4 pairs in Obbo and more than 300 pairs in Lobone area) in the State. There are also 52 Government tractors and 22 private tractors, out of which only 22 are functional (20 private and 2 Government owned). In 2020, the average hiring rate for Government tractors was SSP 10 000/feddan (0.42 hectares) compared to SSP 8 000 in 2019, while the hiring rate for private tractors was SSP 15 000/feddan compared to SSP 10 000 in 2019. However, despite the shortage of spare parts and the high prices of fuel, the few functional tractors and ox-ploughs have contributed to the cultivation of more land during the 2020 cropping season.

The two main migratory pests reported during the season were FAWs and desert locusts. FAW infestations caused some damage on crops, particularly maize during the first season. However, the damage was reported to be mild as abundant rainfall, especially during the second season, washed away the worms. In April 2020, desert locust swarms landed for just three-four days in different areas of the State, before the start of planting operations, but only limited damage has been reported. Other commonly reported pests and diseases include sorghum smut, cassava mosaic virus, stalk borers, squirrels, porcupines, local birds, wild rats, termites, *Striga* weed, *Parthenium* (Congress weed), wild and domestic animals (monkeys and pigs). Overall, these endemic pests caused mild to average damage on crops. The expansion of *Parthenium* (Congress weed) had a significant impact on crop yields, especially in Greater Kapoeta, while the damage caused by other pests and diseases was generally mild. Weeding was undertaken, on average, two times per season for most crops.

Production

Production estimates have been based on evidence from case studies, the CCMC reports (based on crop sampling) and time series data. In 2020, crop performance has been good in both the first and second seasons and the gross cereal production is estimated at 152 071 tonnes, slightly below the 2019 high levels but still about 16 percent above the average of the previous five years.

At State level, the contribution of cassava to households' food consumption is significant, with an estimated 71 840 tonnes of cereal equivalent likely to be available from the 2020 harvest. The estimate is based on fresh tubers with 42 percent of dry matter and a gross processing efficiency of conversion from tuber to chips/flour of 70 percent. Groundnuts also add a further, conservatively estimated, 8 470 tonnes of gross dry matter (unshelled).

Based on the PET manual, the livestock body condition score for cattle and shoats was 4 and 3–4, respectively, as a consequence of good pasture and water availability. However, the invasion of grazing lands by *Parthenium* weed continued to negatively affect rangeland resources. Endemic diseases, including BQ, CBPP, FMD, HS, diarrhoea, Haemorrhagic Septicaemia, sheep and goat pox, PPR, NCD and internal and external parasites, were reported.

Figure A2-3: South Sudan (Eastern Equatoria) - Seasonal Rainfall and NDVI

Source: WFP/VAM, 2020.

GREATER BAHR-EL-GHAZAL

Northern Bahr-el-Ghazal

The Task Force Team undertook a harvest assessment mission from 21 September–2 October 2020, along with members of the State Ministry of Agriculture and CCMC. An additional field mission was conducted from 16–23 November 2020 to assess the production of commercial farms. During both assessments, the Task Force Team carried out 88 case studies (85 farmer interviews and 3 key informant interviews) and performed walking transects with crop sampling in most areas.

Growing conditions

Combined rainfall estimates and vegetation index graphs for the whole State and its five counties (Aweil North, Aweil Centre, Aweil East, Aweil West and Aweil South) are shown in Figure A2-4. In all five locations, the Task Force Team reports confirmed a late onset of the rains around mid-May and the amount was below average to average. Below-average rains at the beginning of the season and a two-three week dry spell in June affected crop germination and early development. Subsequently, abundant rainfall, from August to October, lifted crop prospects and improved vegetation conditions but caused flooding/waterlogging in some counties of the State.

Access to land has not been a challenge in the State in both near and far fields. Smallholder farmers mainly use local tools with only a minority of farmers using ox-ploughs. The use of donkey ploughs is gradually increasing especially in Aweil West and Aweil North counties, helping users to expand plantings.

Sorghum is the most preferred cereal throughout the State. The main sources of seeds are farmers' own seeds of local varieties retained from the previous harvest, known collectively as *cham*, *alep cham* and *nyanchung* or *athel*. The preferred improved sorghum seeds in the mechanized and traditional sectors are of Sudanese origin and the main varieties are *Wad Ahmed*, *Gaddam el Hamam* and *Arfa Gadameck*. Local groundnuts and sesame seeds were planted at the same time as the early sorghum, while small areas planted with maize around the homesteads for early green consumption.

In the absence of chemical fertilizers, farmers use alternative local practices. The most common way of maintaining soil fertility is shifting farming locations and grazing over farmlands by local and transhumant herds on contractual basis.

In 2020, the most common pests and diseases included FAWs, grasshoppers, stalk borers, groundnuts rosette virus, rodents, millipedes, wild and domestic animals and birds. The damage on crops caused by FAWs was minimal. *Striga* weed infestation continued to be a major problem for sorghum farmers, while other weeds, such as grasses and wild rice, caused reduction of rice crop yields.

Production

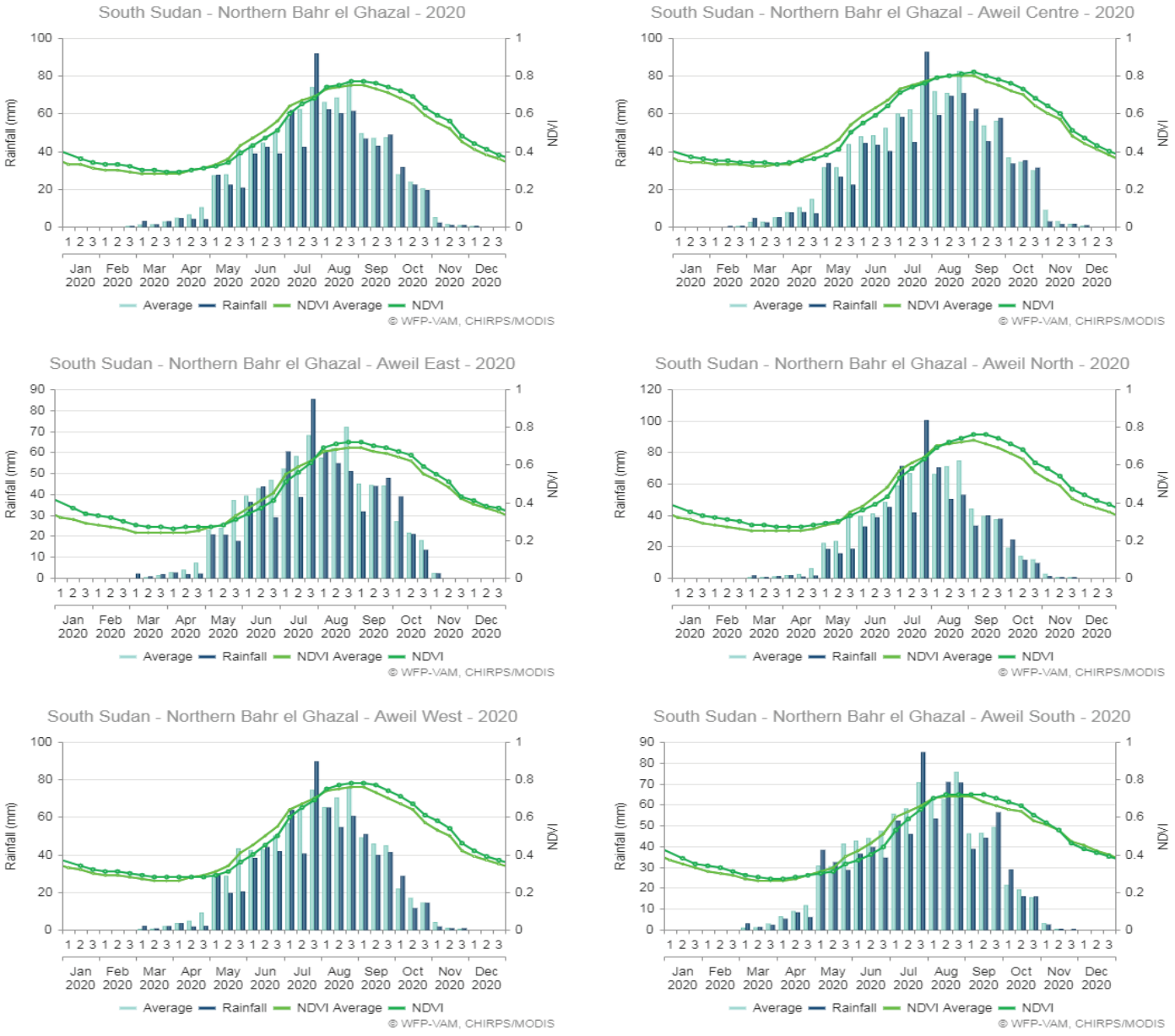
In 2020, the gross cereal production was estimated at 148 659 tonnes, about 13 percent up from the previous year, for the whole State. While improved security, increase in cultivated area, better rainfall and normal access to land including far fields impacted positively on production levels in Aweil Centre, Aweil East, Aweil West and Aweil North, a different outcome was reported in Aweil South, which experienced a decrease of 15 percent in production as compared to 2019. In this county, the decreased agricultural production was a main driver of high food insecurity. The impact of waterlogging on crops was minimal in 2020 and well below the wide damage caused by the floods in 2019. The estimated cereal deficit for 2021 is estimated at about 50 845 tonnes, about 8 500 tonnes lower than the deficit in 2020.

Cassava is not commonly grown in the State and production from isolated plots in Aweil Centre County is considered as insignificant. However, groundnuts contribute to the households' food economy and production is estimated at 15 870 tonnes of unshelled product.

Large numbers of livestock are found in all the counties of the State. The availability of pastures and water for livestock was adequate in 2020 due to abundant rains, although floods displaced livestock in low-lying areas and forced them to move to higher

grounds. This movement of animals is common in the State and they return to their places of origin as soon as the floods recede. The extent of flooding was in 2020 much lower than in 2019, when the negative effect on livestock condition, pasture and water availability was serious. There were no livestock disease outbreaks during the season, but the occurrence of endemic livestock diseases like CBPP, CCPP, Anthrax, BQ, FMD, *Newcastle* disease, diarrhoea, HS, external parasites, mange on goats and tick-borne diseases were reported. The body condition score for cattle and small ruminants was 3–4, mainly due to the good availability of pastures and plenty of water in almost all areas.

Figure A2-4: South Sudan (Northern Bahr-el-Ghazal) - Seasonal Rainfall and NDVI



Source: WFP/VAM, 2020.

Western Bahr-el-Ghazal

The Task Force teams undertook a harvest assessment mission from 21 September–1 October 2020 (Jur River and Raja counties), carrying out 97 interviews, including 91 farmer case studies and 6 key informant interviews.

Growing conditions

Figure A2-5 shows the combined rainfall estimates and vegetation index graphs for the whole State and for three counties (Raga, Jur River and Wau). According to remote sensing data, seasonal rains started around April/May and vegetation conditions were average to above average. According to the interviewed farmers and key informants, the onset of seasonal rainfall was slightly late (around mid-May) in most places, although there were some areas that received early rains already from end-April to early May. Only pocket areas experienced some localized dry spells of two-three weeks that necessitated some replanting and gap filling and the overall impact on crop yield was minimal. Farmers have confirmed that the amount of rainfall during the 2020 season was generally average to above average and better than in 2019.

The harvested area, yields and production of cereals (maize and sorghum) and groundnuts in 2020 were higher than in 2019. The increased crop production was mainly due to the adequate rainfall amount and distribution, an increase in planted areas due to the improved security, following the 2018 peace agreement signed between the Government and the rebel groups, and the limited impact of pests and diseases. However, in some areas in Jur River County, farmers were still reluctant to plant in remote fields due to fear of insecurity and the risk that cattle and wild animals could destroy the crops.

Hand tools are used by the majority of smallholder farmers for land preparation and other agricultural activities, along with some ox-ploughs and a few tractors. Hand tools usually purchased from the market include, *maloda*, axe, hoe, panga and rack. Through its partners, FAO has distributed seeds and hand tools to resource poor farmers. In addition, farmers also use tractors and draft animals (ox- and donkey ploughs). The CCMCs have reported that the use of ox and donkey to plough is increasing in the area. There are about 23 Government tractors, but only 4 are functional. There are more than 10 functional private tractors in the State. However, the efficient utilization of these tractors has been constrained by shortages and high prices of fuel and unavailability of spare parts. Some Government tractors are not equipped with disk ploughs.

Most of the labour force required for farming activities is sourced from family members, followed by communal labour (*nafeer*), while only some progressive farmers are able to hire daily workers for digging and weeding. The average hiring rate in 2020 was SSP 8 000/feddan compared to SSP 5 000 in 2019.

Sorghum is by far the preferred cereal and farmers mainly use their own seeds of local varieties retained from the previous harvest. In 2020, several farmers decided not plant the traditional long-cycle landraces of *Mabior* or *Ulela* sorghum as they are subject to damage by transhumant livestock that return home before the crop is harvested. Over the past few years, progressive farmers and those living close to pastoralists have started substituting the long-cycle sorghum with improved short-cycle varieties that include *Sesso 2*, *Gaddam el Hamam*, *Luana* and *Bene*. These varieties are harvested early, together with groundnuts and are not damaged by the returning livestock. In addition, planting of short-cycle improved sorghum varieties was also encouraged by insecurity.

Chemical fertilizers are not used by small-scale farmers and only farmers who own livestock apply some goat and cattle manure in their fields. Better-off farmers establish temporary camps and invite cattle owners to keep animals on their fields for manuring. It has been confirmed that this system allows farmers to obtain high cereal yields. Other practices of maintaining soil fertility used by smallholder farmers are composting and shifting cultivation.

The common pests and diseases include millipedes, black ants, termites, grasshoppers, sorghum midge, stalk borers, weevils, squirrels, local birds, wild rats, rosette virus, blights (on groundnuts), wild and domestic animals and various types of weeds including *Striga*. In 2020, the level of infestation and

damage caused by the endemic pests was generally mild to average in most cases. It is reported that damage on sorghum caused by *Striga* was more severe in the areas where soil fertility is depleted and no animal manure is used by farmers. Outbreaks of FAWs were reported in some areas of Raja and Wau counties, causing only mild damage on maize and sorghum crops.

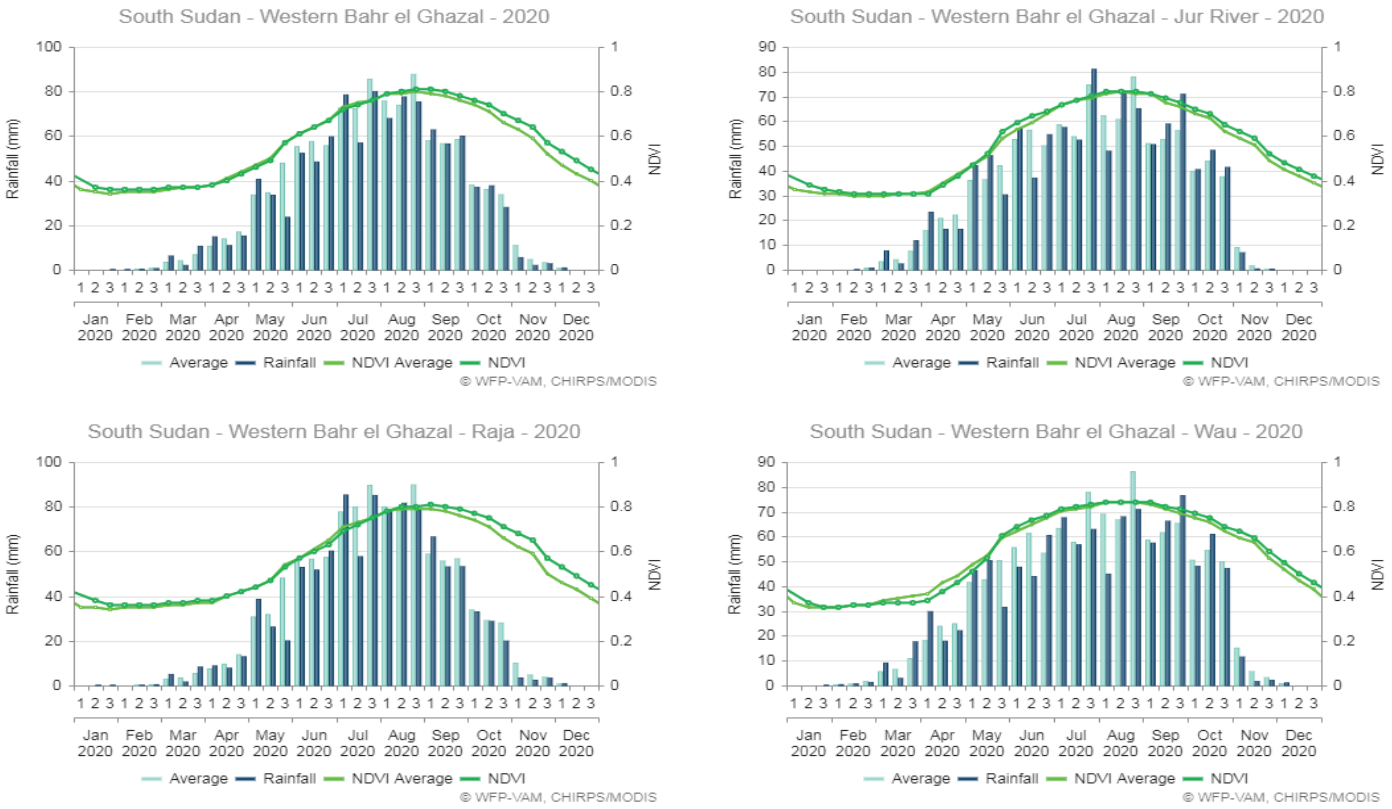
Production

The 2020 gross cereal production is estimated at 65 479 tonnes, about 30 percent more than in 2019, mainly due to an increase in yields following favourable rains and an expansion of plantings due to improved security conditions.

Yields of cassava in 2020 are estimated by the Task Force teams at an average level of 12 tonnes/hectare. The contribution of cassava to the 2021 food consumption in the State is estimated at 44 300 tonnes of cereal equivalent (gross dry matter). Groundnuts are likely to add an estimated 18 470 tonnes of unshelled product at the household level.

Most farmers in the State own small ruminants, particularly shoats, which mostly graze around the homesteads, without entering into crop fields. Based on the PET manual, the livestock body condition score for both cattle and goats on average was 3–4 in 2020 due to adequate availability of pasture and water. Regarding diseases, normal occurrences of CBPP, CCPP, Anthrax, BQ, FMD, *Newcastle* disease, diarrhoea, HS, internal and external parasites, mange on goats, heart water disease and tick-borne diseases were reported in 2020. No vaccinations were carried out across the State in 2020.

Figure A2-5: South Sudan (Western Bahr-el-Ghazal) - Seasonal Rainfall and NDVI



Source: WFP/VAM, 2020.

Warrap (including Abyei)

The Task Force teams undertook a harvest assessment Mission from 21 September–1 October 2020 to assess the output of the main harvest in the State, with a total of 57 case studies (50 farmers and 7 key informants). The counties visited during the assessment included Abyei, Twic, Gogrial West and Tonj South.

Growing conditions

The combined rainfall estimates and vegetation index graphs for six locations across Warrap State (Gogrial West, Gogrial East, Twic, Tonj North, Tonj East and Tonj South) are shown in Figure A2-6. In most cropping areas, remote sensing data and information from the field indicate a timely onset of seasonal rains in May in most counties, with the exception of Twic County where rains started late in June. In general, the amount of rainfall was average and better than in 2019, except in Tonj South County with above-average rainfall. There were no prolonged dry spells across the State, with the exception of a few pocket areas with a mild effect on crops. Flooding occurred in Tonj South, Abyei, Gogrial West, Gogrial East, Tonj North, Tonj East and Twic counties that caused mild damage to the crops in low-lying areas.

The majority of farmers use hand tools that are sourced from the markets. Some households also received hand tools from FAO and its partners. In 2020, there were 65 functional tractors, while 73 tractors were grounded due to shortage and high cost of spare parts, lubricants and fuel. Tractor hire service was available and the Government tractors were charging SSP 10 000/feddan including fuel, while private tractors were charging SSP 22 000/feddan, including fuel. The hiring rate for ox ploughs was SSP 7 000/feddan, compared to SSP 5 000 in 2019.

The major crops grown in the State are sorghum, groundnuts, maize and sesame. Sorghum is by far the preferred cereal and farmers use their own seeds of local varieties carried over from the previous harvest, with a preference for the short landraces (*yaar*, *athel* and *nyanjung*) to be harvested in September. In Tonj South County, the late maturing sorghum variety (*kec*) was at a too early stage to be effectively assessed during the Mission. Local groundnuts and sesame crops were planted at the same time of sorghum, together with a small area planted with cowpeas and local maize. The main pests noted in 2020 were stalk borer, with mild to serious damage on sorghum crops, and *Striga* (parasitic weed), with medium damage on sorghum, especially where crops were uninterruptedly cultivated over the years. Other pests that had mild infestation were grasshoppers, sorghum bug, local birds, domestic and wild animals, squirrels, millipedes and termites. Overall, the infestation level and the damage caused by pests was minimal across the State.

Production

The 2020 gross cereal production in the State (including the Abyei Administration) is estimated at 168 118 tonnes. Although the 2020 planted area was similar to 2019, the cereal production level has increased by about 4 percent due to higher yields as a result of a low level of pests and diseases, the low level of flooding and the absence of dry spells in most areas.

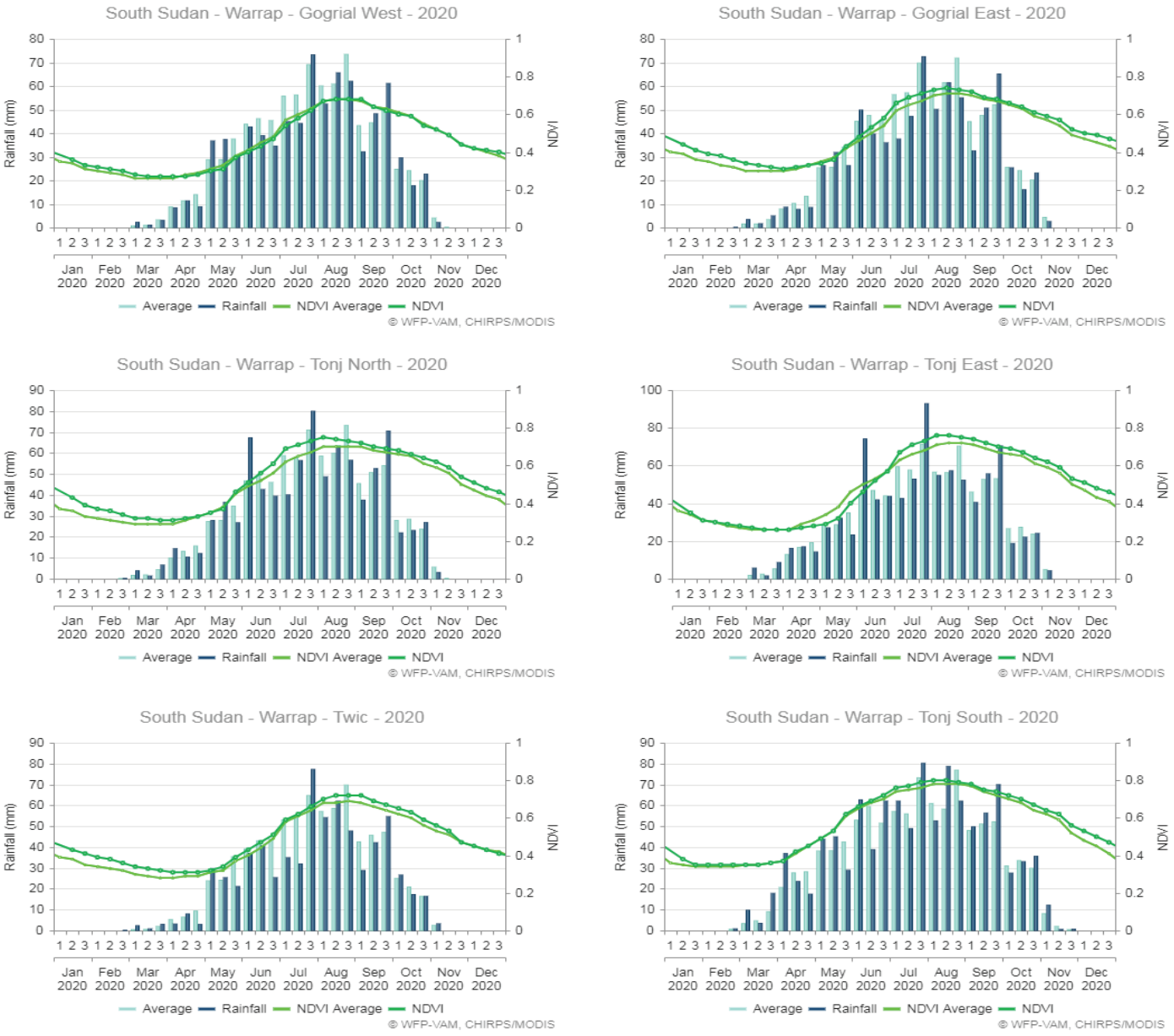
Growing cassava is not common in the State, mainly due to the local agro-ecological characteristics that support its cultivation only around the edges of the fields and pathways. Groundnuts, however, make a more substantial contribution to the local diet and may add an estimated 17 900 tonnes of unshelled product to the households' food consumption.

Generally, livestock numbers are increasing, except for sheep and goats in Abyei areas and in Tonj South County due to an outbreak of PPR disease. The body condition score for cattle and shoats was 3, except in Tonj South County where it was rated at 2 due to cattle movement restrictions and floods that affected pasture availability and access. An outbreak of Anthrax Haemorrhagic septicaemia occurred in Twic and Tonj South counties (Thiet and Jak payam), while a BQ outbreak was reported in Gogrial West County. Other common diseases include ECF, FMD, CBPP and CCPP. The main poultry diseases include coccidiosis, fowl pox and NCD. In all counties, mortality of sheep and goats was higher compared to cattle. Vaccination against Anthrax, CBPP, PPR and NCD started in August. In five payams of Tonj South County (Thiet, Jak, Manyang Ngok, Tonj and

Wanh Alel) administered BQ, HS, anthrax, CBPP, PPR, CCPP and Rabis vaccines.

In 2020, livestock movements were mostly confined around the homesteads. Pasture availability was adequate in most areas, except in Tonj South County where grazing resources were poor in the areas affected by floods and overgrazing occurred in flood-free zones. Water was generally sufficient for livestock. Cattle raiding increased in 2020 as low levels of flooding allowed easy movements of animals.

Figure A2-6: South Sudan (Warrap State) - Seasonal Rainfall and NDVI



Source: WFP/VAM, 2020.

Lakes

The Task Force Team undertook a harvest assessment mission in Lakes from 23 September–3 October 2020 and performed 48 case studies (45 farmers and 3 key informant interviews). The assessment was supported by walking transects and crop cuttings/sampling, allowing yields to be estimated objectively in spot locations. With the exception of a few insecure areas, land was generally accessible.

Growing conditions

The combined rainfall estimates and vegetation index graphs for six counties of Lakes State (Rumbek Centre, Rumbek East, Cueibet, Wulu, Awerial and Yirol East) are shown on Figure A2-7. The seasonal rains started normally in April and were established in May in most areas. In 2020, the amount of rainfall was above average throughout the State and higher than in 2019. Short dry spells towards the end of May and the second week of June in some pocket areas had minimal impact on crops, due to intermittent showers that allowed young plants to survive. Widespread flooding due to heavy rains and overflowing of rivers occurred in low-lying areas of all counties in the State, resulting in varying levels of crop damage. The most affected crops were cowpeas, green grams, groundnuts and sesame, while sorghum and millet performed well.

The main types of tools used by farmers are *maloda*, machete, hoe, axe, rakes and sickles. These tools are used for various agricultural activities including land clearance, planting, weeding and harvesting. Use of ox-ploughs across the State has been increasing in recent years. According to the SMoA, more than 80 percent of the farmers in Awerial, Cueibet, Rumbek Centre, Rumbek East, Yirol East and Yirol West counties use ox-ploughs, while most farmers in Wulu County mainly use hand tools, with only a few using oxen. There are about 63 tractors in the State, out of which 26 are functional (23 owned by the Government and 3 private).

The majority of farmers uses local seeds of long, medium and short-cycle sorghum varieties. Groundnuts, cassava, sesame, green gram and cowpeas are usually inter-cropped. The main sources of seeds are from the previous harvests or the markets. Planting is performed at different times depending on the onset of the rains and types of crops.

Outbreaks of FAWs were reported with mild effects on maize, which is mainly grown around the homesteads. In 2020, there were no reports of desert locust invasions in the State. The other common pests and diseases were millipedes on groundnuts, stalk borers and birds on sorghum and maize, while monkeys, porcupines and squirrels attacked both sorghum and groundnuts. Overall, damage levels were mild to average. Weed infestations remained high, seriously affecting crop cultivation across the State. In particular, *Striga* (a parasitic weed) has continued to cause significant losses of sorghum. Storage pests including weevils and rats also caused mild to serious losses on harvested crops. No control measures were undertaken by the farmers to minimize the negative impact of the different types of pests. There is no application of fertilizers in the State, except for the localized use of manure (especially cow dung and goat droppings) on maize and vegetables fields around the homesteads.

Production

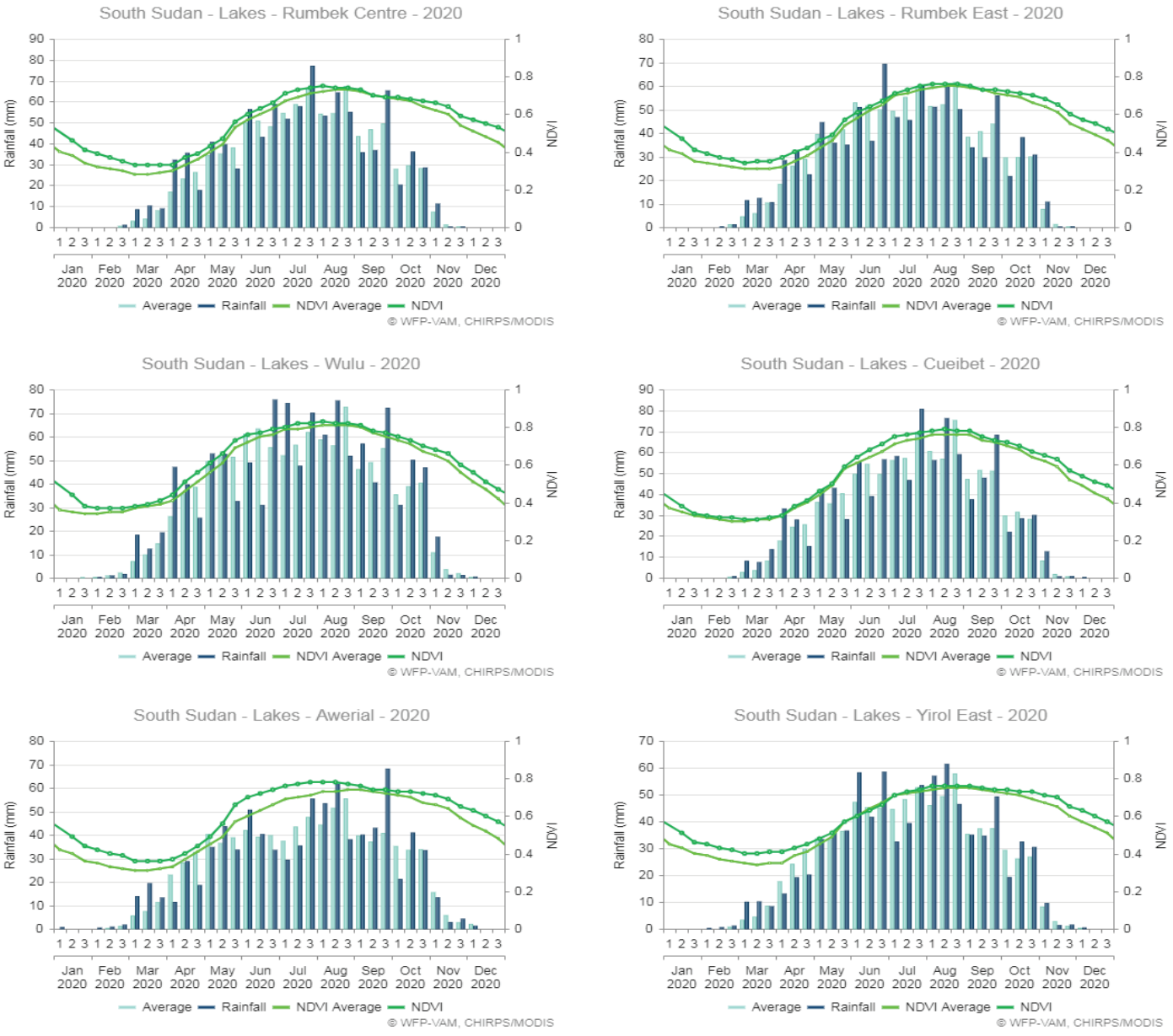
The estimates of the 2020 cereal production are based on time series data adjusted with evidence from crop sampling, PET scores and case studies. Despite the impact of the floods, the 2020 gross cereal production is estimated at about 170 000 tonnes, 4.5 percent up from 2019, mainly reflecting an increase in the harvested area. Groundnut output is estimated at about 55 000 tonnes of unshelled product, 8.4 percent up from 2019, mainly due to high yields resulting from the good rains.

The cultivation of cassava in the State is hindered by cattle-keeping practices, with uncontrolled animals causing damage to growing crops during herd movement. Cassava production in 2020 is estimated at about 80 000 tonnes of fresh tubers, corresponding to about 23 460 tonnes of cereal equivalent.

The transhumant livestock rearing system is prevalent in the State, with animals migrating in search of water and pasture. Episodes of cattle raiding occurred mainly in Rumbek North County, but also in Yirol West and Yirol East counties where cattle raiding was not common.

Livestock numbers have slightly increased due to adequate availability of water and pasture in 2020. Endemic diseases were CBPP, FMD, BQ, CCPP, PPR, diarrhoea, internal and external parasites. Livestock are present across the State and their body condition score was 3 for cattle, goats and sheep.

Figure A2-7: South Sudan (Lakes) - Seasonal Rainfall and NDVI



Source: WFP/VAM, 2020.

GREATER UPPER NILE

Upper Nile

The Task Force Team undertook a harvest assessment mission from 27 October–3 November 2020 and visited Renk and Melut counties, conducting a total number of 50 case studies, with 42 farmer interviews and 8 key informant interviews. The State has the largest number and size of semi-mechanized schemes in the country. The Task Force Team confirmed that access to land was unimpeded and noted an expansion of commercial farming, with increasing areas under cultivation in both mechanized and traditional (small holder and emerging farmer) sectors. However, land access problems were reported in some flood-affected areas in Baliet, Maiwut and Malakal counties.

Growing conditions

Figure A2-8 shows the combined rainfall estimates and vegetation index graphs for six locations selected across the State (Renk, Maban, Melut, Longochuk, Baliet and Panyikang counties). In most locations, remote sensing data indicate a late onset of the rainy season, from end-June to early July, with the exception of Maban and Malakal counties where rainfall started in mid-May. Rainfall amount was below average to average and lower than in 2019 in Manyo, Melut, Panyikang and Renk counties, while it was average to above average in the remaining counties and higher than in 2019. In Maban, Manyo and Maiwut, Panyikang, Melut and Renk counties, a dry spell occurred from mid-August to early September interrupting planting operations of sorghum and affecting crops already at vegetative stage. In the mechanized farming areas of Renk and Melut counties, rains started in late June and were established in July, with average amounts, lower than in 2019. However, floods occurred in September in the low-lying areas of Baliet, Panyikang and Maiwut counties due to heavy rainfall from the neighbouring Ethiopian highlands and overflow of the Nile and Lul rivers.

In recent years, most commercial farmers shifted to sesame at the expense of sorghum due to the high economic return of sesame, sold to Sudanese traders at high prices. In addition, sesame is less vulnerable to dry spells due to its short cycle, being ready for harvest as early as October, while sorghum remains in the field until November/December, with more uncertainty about the continuation of the rainfall. The expansion of *Striga* (parasitic weed) is also another factor that discouraged the cultivation of sorghum in several areas. However, the production gains of sesame in 2020, especially in Renk County, were halted by pest infestations in September when crops were at flowering stage. Some farmers managed to spray their sesame fields with chemical pesticides, including Malathion, and were able to obtain a good output. Other farmers lost completely their sesame crops, which were replanted with sorghum, with varying degrees of success in different areas depending on the availability of moisture and the occurrence of dry spells just a few weeks after planting. In the traditional farming areas of Melut County, there was a slight reduction in planted area of sorghum due to repeated failures of the crop in previous years caused by pests and dry spells that de-motivated farmers.

The Task Force-led teams visited farmers in major farming areas of Renk and Melut counties at the time of harvesting. The State Ministry of Agriculture reported an increase in the total planted area in the mechanized sector despite the shortages of credit services, high fuel prices and shortages of spare parts.

In 2020, commercial farming activities were affected by insecurity along the border that disrupted the flow of spare parts, fuel and other commodities and displaced farmers. The usual support to farmers by the National Government in terms of fuel was not provided in 2020 and commercial banks applied more stringent measures that made loans to farmers almost inaccessible.

In Renk County, the exact number of tractors (especially those operating within the semi-mechanized schemes) is not known due to the lack of registration and documentation by the State and County Agriculture Office. However, according to estimates by key informants, 131 commercial farmers cultivated in Geger area in the 2020 cropping season, with each farmer owing one-three tractors. Similarly, in Jalhak area, 16 farmers owned one-two tractors each. In

general, about 85 percent of the farmers use their own tractors and only 15 percent of them prefer to hire. The use of tractors has been affected by the shortage of fuel, lubricants, disc harrows and spare parts. These items are sourced through the smuggling from the Sudan and they are sold at a very high price In 2020, the tractor hiring rate was SSP 200 000/block (120 feddans) plus 2 drums of diesel for ploughing and planting operations. The price of diesel was SSP 150 000/drum in 2020, compared to SSP 75 000 in 2019. A plough disc was hired at SSP 500 000/season (three months). According to key informants, a tractor cultivates 120 to 180 feddans in 24 hours (in three shifts of day and night).

In Melut County, there were 95 tractors out of which 67 were functional and 28 grounded. The tractor hiring rate was SSP 4 000/0.42 hectare plus 20 litres of diesel that costs SSP 12 000 (SSP 600/litre). The cost of casual labour for weeding was SSP 1 000/feddan (0.42 hectares). In Maban County, there were three non-functional Government tractors and there was no use of animal traction. The cost of a tractor hiring service was SSP 25 000/feddan compared to SSP 17 000 in 2019. The cost of casual labour for digging was SSP 30 000/feddan, compared to SSP 15 000 in 2019, while the cost of weeding was SSP 20 000/feddan, compared to SSP 12 000 in 2019. Similarly, the cost of harvesting crops was SSP 25 000/feddan (0.42 hectares) compared to SSP 16 000 in 2019.

Improved seeds of sesame and sorghum were available through smuggling from the Sudan and a bag of 100 kg of sorghum improved seed (mainly *Gaddam Hamam*, *Wad Ahmed* and *Arfa Gadameck* varieties) was sold at SSP 20 000 compared to the 2019 price of SSP 10 000.

The common pests in 2020 were grasshoppers, local birds and weeds, all causing mild damage on growing crops over most areas of the State. *Striga* weed has been expanding in recent years, causing moderate damage on sorghum crops in many areas. Farmers try to minimize the impact of *Striga* through its mechanical removal and sometimes practicing crop rotations. In the semi-mechanized farming areas, especially in Renk County, sesame was affected by leaf roller moth (*Antigastra catalaunalis*) during the vegetative and flowering stages, destroying leaves and seed capsules. This was the consequence of the over cultivation and mono-cropping of sorghum for several years without any rotation and application of fertilizers. Flea beetle (*Chaetocnema spp.*), popularly known as Commando, affected sorghum grains in most areas visited by the Task Force teams, but with a minimal impact on yields.

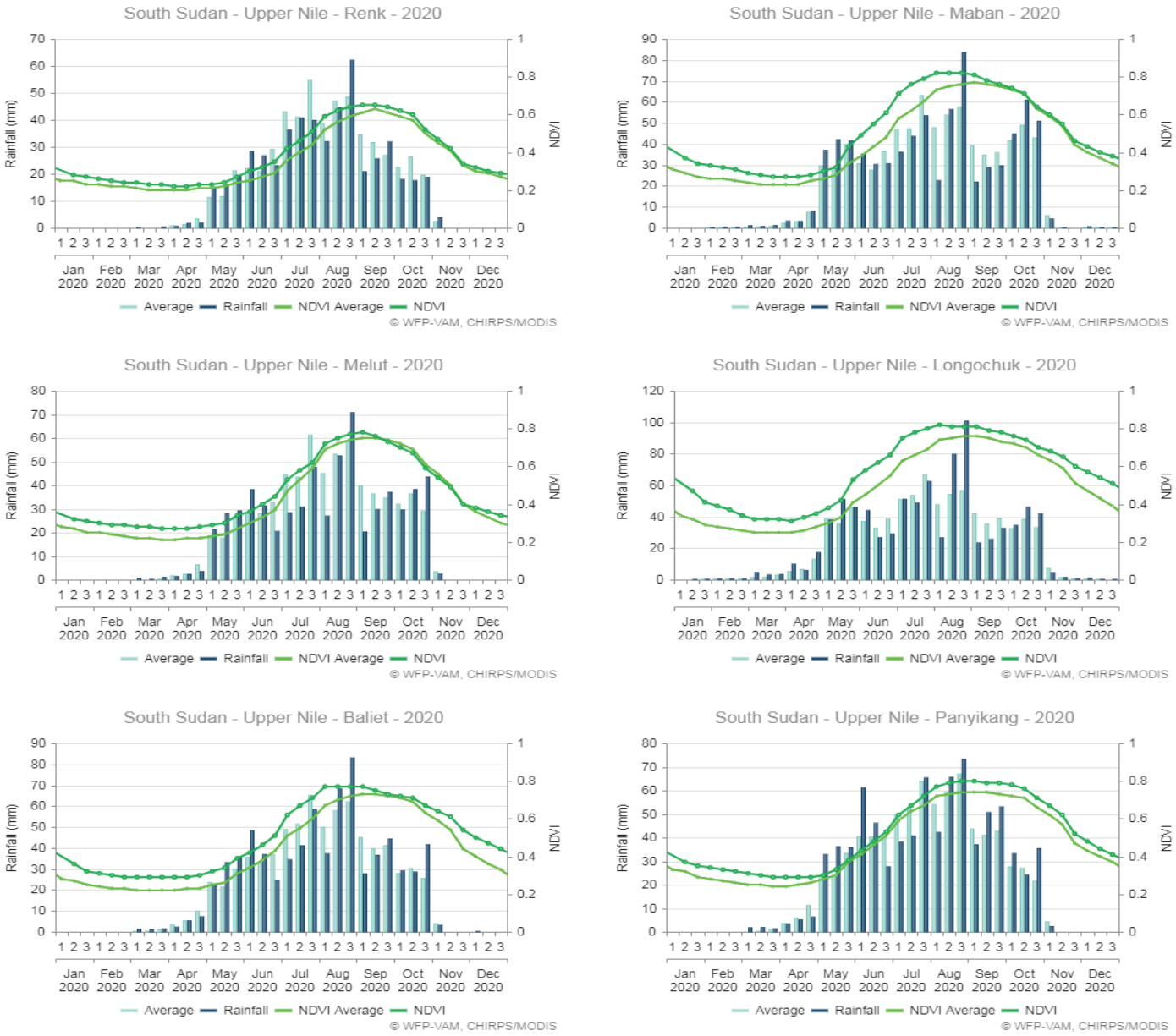
While application of chemical fertilizers is not common in both the traditional and semi-mechanized farming systems, farmers practice shifting cultivation and crop rotation to maintain soil fertility. In the traditional farming areas, almost all fields were cultivated by hand using family labour.

The State is a relatively minor livestock-producing area. Pasture and water were available in most areas due to the good rains across the State, except in the areas affected by the floods. In general, the PET body condition score for cattle was 2–3, while it was 3–4 for shoats. There were no reports of disease outbreaks during the season, apart from the normal occurrence of endemic diseases, all with minimal effects on livestock. In the flooded areas, the excessive rains and wet conditions aggravated diseases such as BQ, CBPP, CCPP, PPR, HS, FMD and the occurrence of internal and external parasites.

Production

The gross production in the traditional sector in Upper Nile State is estimated at 31 524 tonnes of mixed cereals, 6.7 percent up from 2019. The increase in production is due to an increase in yields of cereals (+6.6 percent), resulting from higher amounts and a more regular distribution of rains compared to 2019. Similarly, for the mechanized sector, the Task Force teams estimated a gross production of 91 200 tonnes of sorghum in the mechanized farms in all locations, which is almost twice the 2019 estimate.

Figure A2-8: South Sudan (Upper Nile) - Seasonal Rainfall and NDVI



Source: WFP/VAM, 2020.

Unity

As in previous years, no Task Force Team missions were conducted in the State in 2020 due to insecurity, which impeded the access to cropping areas to assess growing conditions and cereal output. However, the Task Force Team obtained yield data that were collected by the CCMCs and the State Ministry of Agriculture staff, both trained by FAO and MAFS on the CFSAM Methodology. Telephone communications were also used to obtain more detailed information on the performance of the season and yields of the main crops. The county level information was coordinated and collected through the State Focal Person and a member of the Task Force Team from the State.

Remote sensing analysis and information from CCMCs and SMoA were the main sources of data used to evaluate the performance of the rainy season. FAO and MAFS have managed to train SMoA field workers since 2018 and established four CCMCs in the State, which send monthly reports to the Crop Assessment Team in Juba. The data from all these sources was then cross-checked and triangulated with information provided by a team of local extension workers of Unity State that participated in the final CFSAM analysis workshop, which took place from 7–16 December 2020 in the capital, Juba.

Growing conditions

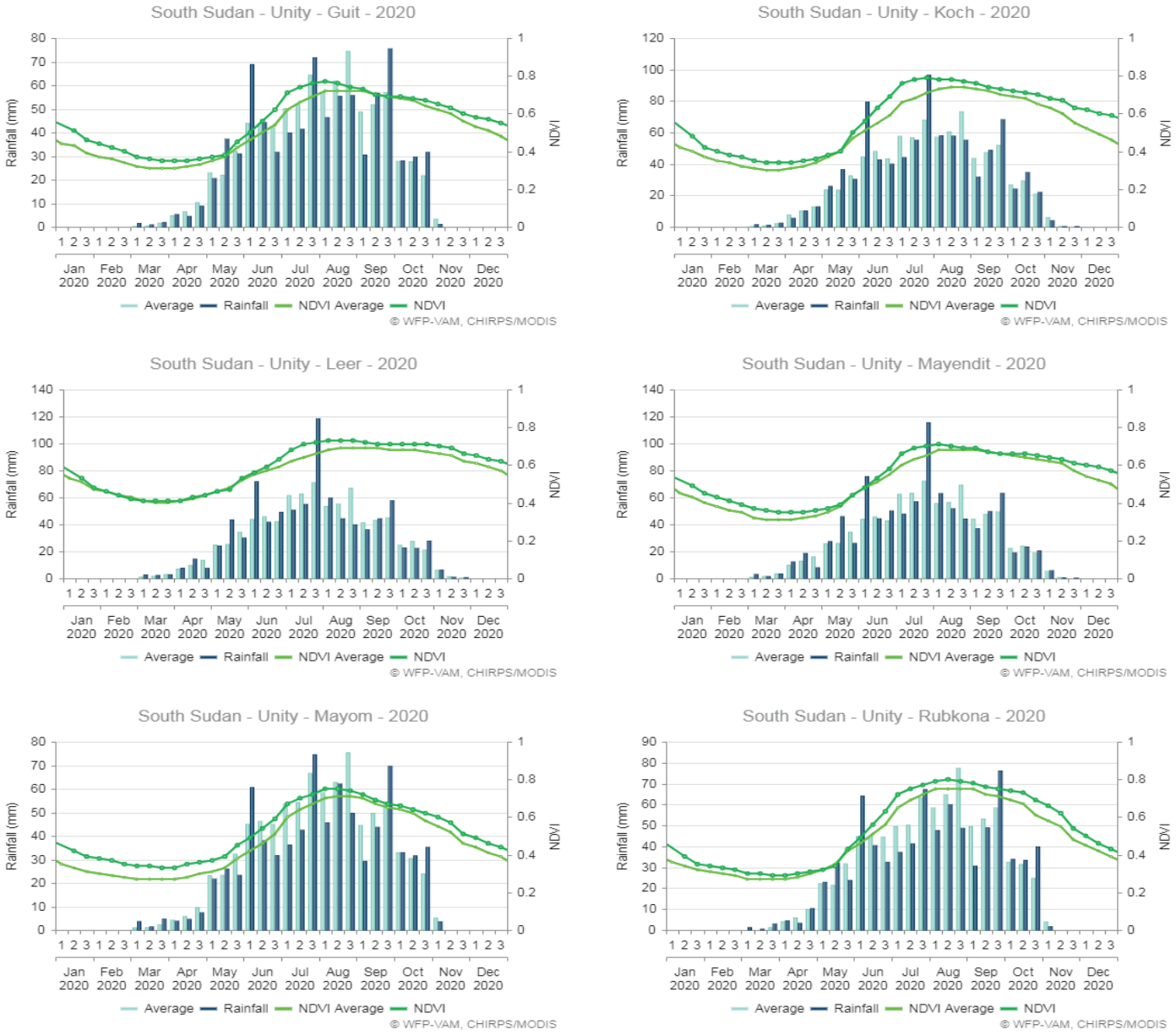
The combined rainfall estimates and vegetation index graphs for six selected locations across Unity State are shown in Figure A2-9. Remote sensing data and information indicate that seasonal rains had a timely onset in April and were established in May in most cropping areas. The rainy season had a better performance than 2019 over most of the State. However, heavy rainfall and overflow of the Nile River caused flooding and waterlogging in August and September in seven counties of the State causing large number of deaths of livestock as well as some localized losses of crops in low-lying flood-prone areas.

In the non-flooded areas of the State, the availability of pastures and water was adequate. Livestock were displaced by the floods from lowland to higher grounds, then returning to their places of origin when the floods receded. The most common diseases in 2020 included HS, BQ, FMD, anthrax, PPR, ECF, diarrhoea, *Trypanosomiasis* and foot rot (in sheep, goats and cattle). Floods also increased worm burden, high numbers of biting flies further increasing pneumonia and abortions in some areas. The body condition score was 3 for cattle and 2–4 for small ruminants due to the adequate availability of pasture and water.

There were no reports of serious pest damage in 2020 and losses from FAWs and stalk borers on maize and sorghum were low. Infestations by weeds caused mild to average damage on growing crops. Other common pests include grasshoppers, *Striga*, domestic animals and local birds that caused mild damage to the crops over most cropping areas.

The 2020 gross production from the traditional sector is estimated at 17 337 tonnes of mixed cereals, mainly maize and sorghum, which is about 20 percent higher than the previous year. The increase in production was driven by an expansion in plantings, with the harvested area increasing by 16.4 percent from the 2019 area of 19 975 hectares to 23 245 hectares in 2020 and by higher yields resulting from a better performance of the rainy season.

Figure A2-9: South Sudan (Unity State) - Seasonal Rainfall and NDVI



Source: WFP/VAM, 2020.

Jonglei

Access to information from Jonglei State has again been constrained by insecurity and only one short mission in Bor South County was carried out at harvest time, from 22–29 September 2020. The Task Force-led Team carried out three interviews with key informants. Farmers' access to nearby fields was normal in most areas of the State, but cultivation of far fields was limited by fear of destruction of crops by wild animals, insecurity, lack of resources and fear of thefts.

Growing conditions

Figure A2-10 shows the combined rainfall estimates and vegetation index graphs for six locations selected across Jonglei State (Akobo, Fangak, Nyirol, Pibor Administrative Area, Twic East and Bor South). According to remote sensing data and information, seasonal rains had a timely onset in April across the State and rainfall amounts were above average. There were no reports of dry spells in the State during the whole cropping season. The abundant rains and overflowing of the Nile River and its tributaries in June/July negatively affected growing crops and livestock, causing displacement of communities in nine counties. Heavy flooding occurred in August/September also in Akobo County, displacing households to higher grounds.

Cultivation is normally accomplished using hand-digging by family or labour-sharing groups. Farmers mainly use local tools, with limited use of animal traction and tractors that are present only in a few areas, including Bor South County. The majority of the farmers purchase hand tools from the market, while others received tools and seeds from development partners. In Bor South County, there were 13 functional Government tractors and 23 privately-owned tractors, half of them were grounded due to lack of spare parts.

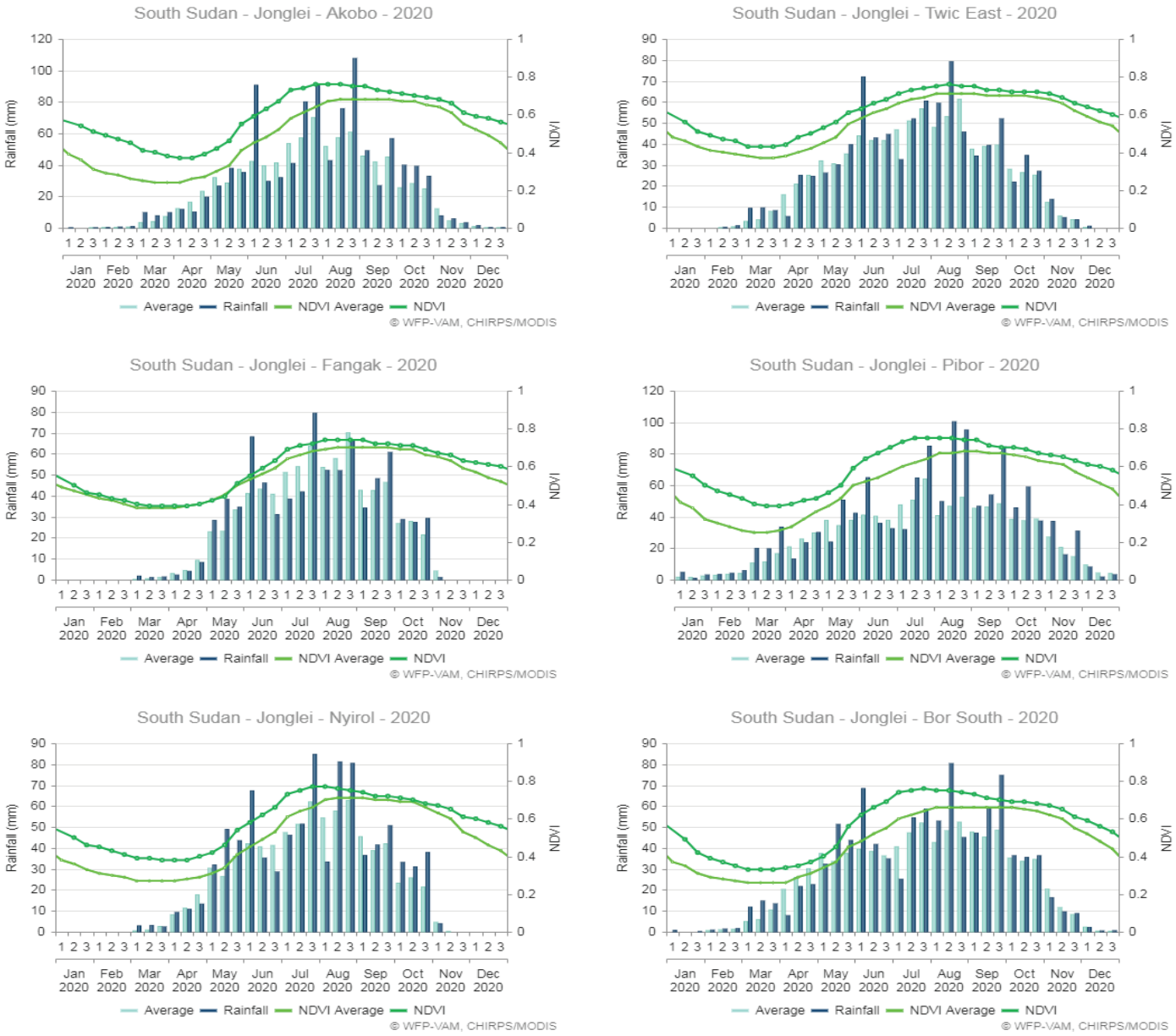
FAW infestations were reported in most counties, but caused only mild effects on maize and sorghum crops as the pests were washed away by the heavy rainfall. Other common pests included local birds, millipedes, squirrels, monkeys, wild pigs, stem borers, rodents and sorghum midge, all with a mild effect on crops.

Production

The 2020 cereal production from the traditional farming sector is estimated at about 41 000 tonnes, 13 percent lower than in 2019, showing a decline for the second consecutive year due to a reduction of both the area cultivated by each household and yields. Overall, the decline in production is due to the severe impact of flooding in most areas of the State. Cultivation of cassava is noted only in Pochalla County, where it is reported to be gradually expanding, with an estimated production of 1 120 tonnes of cereal equivalent, slightly lower than in 2019. None of the CCMCs in Bor South, Duk and Twic East counties reported cassava production. Small scale cultivation of groundnuts is reported in nine counties of the State and production is estimated at about 1 000 tonnes of unshelled product, slightly lower than in 2019.

With the exception of Pochalla County, all counties have large numbers of cattle and shoats. Livestock management is mainly based on transhumance. In 2020, pasture and water availability were above average and the body condition score was 3 for cattle and 3–4 for shoats. In the flooded areas, the quality of pasture was poor and access was allowed only along the roads. Floods have caused the death of a large number of animals and led to migration of households with their animals to higher grounds in Central and Eastern Equatoria. Floods created a conducive environment for a substantial increase of endemic diseases including BQ, CBPP, CCPP, PPR, FMD, diarrhoea, internal and external parasites.

Figure A2-10: South Sudan (Jonglei State) - Seasonal Rainfall and NDVI



Source: WFP/VAM, 2020.

ANNEX 3

Table A3: South Sudan - Planting and harvest assessment missions and case studies (2020)

State	Description of assessment	Date of assessments	Counties visited	Number of case studies		
				Farmers	Key informants	Total
Western Equatoria	First season harvest assessment in Western Equatoria	4–13 August 2020	Tambura, Ezo, Nzara	59	5	64
	Second harvest assessment to Western Equatoria	9–18 November 2020	Tambura, Ezo, Nzara	35	6	41
	First Crop Harvest Assessment to Greater Mundri and Mvolo State	1–8 August 2020	Greater Mundri and Mvolo State	21	3	24
	Second harvest assessment to Western Equatoria	7–14 November 2020	Mvolo, Mundri East, Mundri West	22	4	26
	First season harvest assessment in Western Equatoria	4–13 August 2020	Maridi, Ibba, Yambio	73	2	75
	Second harvest assessment to Western Equatoria	9–18 November 2020	Maridi, Ibba, Yambio	35	-	35
Eastern Equatoria	First crop harvest assessment mission to Eastern Equatoria State	2–16 September 2020	Ikwoto, Torit, Magwi, Pageri Administrative Area	93	7	100
	First crop harvest assessment mission to Eastern Equatoria State	2–12 September 2020	Kapeta North, Kapoeta East, Budi, Kapoeta South	64	5	69
	Season crop harvest assessment report for Eastern Equatoria	16–23 November 2020	Magwi	36	3	39
	Second season harvest assessment Kapoeta	19–26 November 2020	Budi	24	4	28
Western Bahr-el-Ghazal	Crop harvest assessment mission to Western Bahr-el-Ghazal State	21 September–1 October 2020	Jur River, Raga, Wau	91	6	97
Jonglei	Crop harvest assessment mission to Jonglei State, Bor South County	22–29 September 2020	Bor South	-	3	3
Lakes	Crop harvest assessment mission to Lakes State	23 September–3 October 2020	Rumbek Centre, Cueibet, Wulu	45	3	48
Warrap	Crop harvest assessment mission to Warrap State	21 September–1 October 2020	Abyei Administrative Area, Twic, Gogrial West, Tonj South	50	7	57
Upper Nile	Crop harvest assessment report for Upper Nile	27 October–3 November 2020	Renk	23	7	30
	Crop harvest assessment report for Upper Nile	27 October–3 November 2020	Melut	19	1	20
Northern Bahr-el-Ghazal	Crop harvest assessment in Northern Bhar-el-Ghazal	21 September–2 October 2020	Awiel East, A/West, A/South, A/North, A/Centre	83	2	85
	Crop harvest assessment in Agricultural Schemes in Northern Bhar-el-Ghazal	16–23 November 2020	Aweil Scheme	-	3	3
TOTAL				**992**	**83**	**1 075**

Source: FAO South Sudan, 2020.

ANNEX 4

Table A4: South Sudan - Number of established CCMCs (2017–2020)

State	December 2020	Remarks
Central Equatoria	8	
Eastern Equatoria	10	Including Pageri
Jonglei	3	
Lakes	7	
Northern Bahr-el-Ghazal	5	
Unity	4	
Upper Nile	4	
Warrap	11	Including Abyei
Western Bahr-el-Ghazal	3	
Western Equatoria	9	
Total	**64**	

Source: FAO South Sudan, 2020.

ANNEX 5

Table A5: South Sudan - Tentative estimates of 2020 traditional sector crop area (percent)

State	Sorghum	Maize	Rice	Finger millet	Pearl millet	Groundnuts	Cassava	Beans	Sesame	Cow peas	Others crops [1/]	All crops
Central Equatoria	26.0	17.0	0.0	0.0	3.0	23.0	13.0	2.0	2.0	3.0	10.0	100
Eastern Equatoria	46.1	18.2	0.3	0.4	1.1	8.5	10.6	2.0	3.1	0.9	8.8	100
Jonglei	74.8	16.5	0.0	0.0	0.0	3.7	0.5	0.0	0.5	0.8	3.3	100
Lakes	42.3	3.1	0.0	0.0	2.9	36.0	1.9	0.0	3.3	2.2	8.4	100
Northern Bahr-el-Ghazal	56.2	1.1	1.2	0.0	0.8	26.8	0.0	0.0	6.3	0.9	6.8	100
Unity	43.7	42.1	0.0	0.0	1.2	2.0	0.0	0.0	1.6	2.1	7.2	100
Upper Nile	43.6	30.5	0.0	0.0	0.3	5.9	0.0	0.1	13.0	0.9	5.7	100
Western Bahr-el-Ghazal	31.8	5.3	0.0	0.6	1.4	29.4	12.9	0.0	7.4	2.6	8.6	100
Warrap	56.7	4.1	0.0	0.0	3.0	20.4	0.0	0.0	8.8	1.0	6.0	100
Western Equatoria	9.7	24.1	8.3	3.0	0.1	15.8	17.6	2.0	3.9	1.6	13.9	100
TOTAL	**40.4**	**11.6**	**1.7**	**0.7**	**1.6**	**21.5**	**6.6**	**0.7**	**5.1**	**1.6**	**8.7**	**100**
CEREALS			**55.9**									
Percent of all cereals	**72.2**	**20.7**	**3.0**	**1.2**	**2.9**							

Source: FAO South Sudan, 2020.

[1/] Other crops include okra, yams, sweet potatoes, various fruits and garden crops.

This report was prepared by Alessandro Costantino, Wondimagegne Shiferaw (FAO) and Rogério Bonifácio (WFP) under the responsibility of the FAO and WFP secretariats with information from official and other sources. Since conditions may change rapidly, please contact the undersigned for further information, if required:

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