Food and Agriculture Organization of the United Nations

WFP World Food Programme

SPECIAL REPORT

2019 FAO/WFP CROP AND FOOD SECURITY ASSESSMENT MISSION (CFSAM) TO THE REPUBLIC OF SOUTH SUDAN

27 May 2020

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CONTENTS

ACRONYMS AND ABBREVIATIONS

ACLED	Armed Conflict Location and Event Data Project
AFIS	Agriculture and Food Information System
BCS	Body Condition Score
BOSS	Bank of South Sudan
CARI	Consolidated Approach for Reporting of food security Indicators
COVID-19	Coronavirus Disease 2019
BQ	Black Quarter
CBPP	Contagious Bovine Pleuropneumonia
CBT	Cash-Based Transfer
CCPP	Contagious Caprine Pleuropneumonia
CCMC	County Crop Monitoring Committee
CFSAM	Crop and Food Security Assessment Mission
ECF	East Coast Fever
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
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)
hh	household
IDP	Internally Displaced Persons
IOM	International Organization for Migration
IPC	Integrated Food Security Phase Classification
kg	kilogramme
MAFS	Ministry of Agriculture and Food Security
mm	millimetres
MoA	Ministry of Agriculture
NBS	National Bureau of Statistics
NDVI	Normalized Difference Vegetation Index
NGOs	Non-Governmental Organizations
PET	Pictorial Evaluation Tool (Crop yield and livestock condition photo indicators)
PoC	Protection of Civilians
PPR	Peste des petits ruminants

PWG	Population Working Group
QQU	Quelea quelea birds
R-ARCSS	Revitalised 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
t	tonne
UNMISS	United Nations Mission in South Sudan
UN/OCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNHCR	Office of the United Nations High Commissioner for Refugees
USD	United States Dollar
US/EIA	United States Energy Information Administration
VAM	Vulnerability Assessment and Monitoring
WFP	World Food Programme

HIGHLIGHTS

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IMPORTANT: *This report is based on information gathered in South Sudan up to December 2019, prior to the COVID-19 pandemic outbreak, and thus the assessment does not take into consideration the impacts of the virus on the food security and agriculture sector of the country.*

➢ The 2019 net cereal production (after deduction of post-harvest losses and seed use) in the traditional sector is estimated at about 818 500 tonnes, 10 percent above the 2018 output and 4 percent below the average of the previous five years.

➢ With a projected population of about 11.8 million in mid-2020, the overall cereal deficit in the January-December 2020 marketing year is estimated at about 482 500 tonnes, 7 percent below the deficit estimated for 2019, but still 22 percent above the 2015-2019 average.

➢ In January 2020, 45 percent of the population (about 5.3 million people) were in Integrated Phase Classification (IPC) phases 3 "Crisis", 4 "Emergency" and 5 "Catastrophe", a 9 percent decrease compared to January 2019 and also an improvement relative to August 2019. This is likely due to a slow accumulation of improvements in security, trading and marketing activities as well as crop production. As expected, these proportions will increase in the lean period of mid-2020: the proportions of population in IPC phases 3 and higher are projected to reach 55.4 percent in May-July 2020. This is a modest improvement relative to last year, but does not foresee any population in IPC Phase 5.

➢ Household food insecurity reached record levels in mid-2019 (77 percent of the population, with 33 percent severely food insecure), likely due to extreme rises in staple food prices. The situation improved by late 2019 to values lower than at the same time last year and similar to those registered in December 2016 and 2017. The largest improvements were recorded in Upper Nile, Unity and Lakes states, while in Jonglei State flooding impacts led to a worsening of the situation.

➢ The increase in cereal production, compared to the previous year, was driven by abundant and well-distributed rains over most cropping areas, increasing yields, and by an expansion in the harvested area.

➢ The harvested area in 2019 is estimated at about 930 000 hectares, over 5 percent above the 2018 level, but still well below the pre-conflict levels. The increase is mainly due to security improvements that prompted some displaced households to return to their places of origin and engage in agricultural activities as well as encouraging farmers to expand plantings to fields far from their homesteads.

➢ Excessive rains in Northern Bahr el Ghazal, Jonglei, Upper Nile, Warrap and Unity states have triggered unusually widespread floods in the low-lying areas, which affected about 900 000 people and caused significant losses of crops and livestock.

➢ In 2019, outbreaks of Desert Locusts and Quelea Quelea birds (QQU) caused some localized crop losses, especially in Upper Nile State. Damages from Fall Armyworm (FAW) were less than in previous years as the heavy seasonal rains largely neutralized the pest. Weed infestations were exceptionally severe in most cropping areas this year due to abundant precipitation.

➢ The above-average rains benefited the availability of pasture and water for livestock, with a favourable impact on animal body conditions, assessed as generally good. In the flood-affected areas, a substantial increase in water-borne livestock diseases are reported.

➢ Despite the improvements, the security situation is still volatile and continues to alter livestock

➢ marketing activities and migration routes. Cattle raiding incidents have increased in 2019 compared to 2018, particularly in Jonglei, Warrap and Unity states.

➢ The Gross Domestic Product (GDP) increased by about 8 percent in 2019, mainly due to increased oil revenues, after having remained mostly stable in 2018 and having declined by 24 percent between 2014 and 2017.

➢ The South Sudanese Pound (SSP) depreciated by 32 percent in 2019 on the parallel market and the spread between official and parallel market exchange rates further widened, increasing from about 60 percent in late 2018 to almost 100 percent in late 2019.

➢ Inflation, already at high levels owing to insufficient food supplies, high fuel costs and a weak local currency, surged between August and October 2019, mainly due to flood-related trade disruptions, with the year on year inflation rate reaching 170 percent. It subsequently declined as food prices decreased with the 2019 harvest, but at about 70 percent in December, it remained very high.

➢ Prices of wheat, sorghum and maize continued to increase in 2019 and, in December, they were 45, 75 and 90 percent higher, respectively, than one year earlier and 15-20 times above their levels in July 2015, when they started to surge. The high prices are due to a weak local currency, limited cereal supplies and the lingering impact of the conflict on trade and agricultural activities.

➢ The number of Internally Displaced Persons (IDPs) in the country stood at 1.47 million in December 2019 and the number of South Sudanese refugees in neighbouring countries was close to 2.22 million. Following improvements in security, about 418 000 displaced people returned to their places of origin in 2019, of which about 277 000 from within South Sudan and 141 000 from abroad.

➢ Under the 2020 Emergency Livelihood Response programme, FAO plans to support 775 000 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.

OVERVIEW

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IMPORTANT*: This report is based on information gathered in South Sudan up to December 2019, prior to the COVID-19 pandemic outbreak, and thus the assessment does not take into consideration the impacts of the virus on the food security and agriculture sector of the country.*

An FAO/WFP Crop and Food Security Assessment Mission (CFSAM) visited South Sudan from 15 to 20 December 2019 to estimate the cereal production during 2019 and assess the overall food security situation in the country. The CFSAM reviewed the findings of several Crop Assessment Missions conducted from June to December 2019 at planting and harvest time in different agro-ecological zones of the country. As during the past five years, all the missions were carried out by a Task Force Team that comprised staff from the Ministry of Agriculture and Food Security (MAFS), the National Bureau of Statistics (NBS), FAO and the respective State Ministries of Agriculture. Task Force Team members have been trained during the past years to conduct rapid assessments using established CFSAM protocols and techniques, including walking transects, scoring standing crops according to the Pictorial Evaluation Tool (PET) yield levels and livestock body condition, perform key informant interviews and farmer case studies. Starting from 2016, 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), 64 County Crop Monitoring Committees (CCMCs) have been established with the aim to improve the local capacity to collect reliable and accurate data. The European Union, through the FAO Representation in South Sudan, has financially supported all assessments and training activities.

The 2019 annual crop assessment followed a year-long roadmap. However, insecurity, still prevailing in some areas, has precluded the full execution of the initial plan and field work activities were carried out only in accessible areas. Overall, 34 assessment missions (13 at planting time and 21 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. In Unity State and in parts of Jonglei, Central, Eastern and Western Equatoria states, access has been precluded at both planting and harvesting times. The CFSAM Team had access to the information on yields and production generated by the surveys carried out by FAO and other partners aiming at evaluating the impact of seeds distributed through the Emergency Livelihood Response Programme (ELRP) throughout the country. For instance, the Monitoring and Evaluation Team of FAO has managed to conduct yield assessment in three counties of Unity State, namely Abiemnhom, Panyijar and Mayom, where seed distributions were carried out by FAO and its partners. The reports from these counties were used to estimate yields and production also for similar agro-ecological zones of the State. In all visited areas, concerns over security precluded to conduct driving transects and yield assessments were mainly performed through walking transects and crop cutting (sampling) accomplished by both the Task Force teams and CCMCs. In addition, 1 448 interviews (1 342 farmer case studies and 106 interviews with key informants) were conducted between June and December 2019. A total of 51 counties were assessed by the Task Force teams in 2019.

Using standard CFSAM procedures, the Task Force Team reviewed secondary sources of information regarding the main factors that affected crop performance during the 2019 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 Task Force teams were sent to the crop assessment team in Juba through various means, including hand delivery of reports. The

aggregate cereal harvested area in the traditional farming sector in 2019 is estimated at about 929 600 hectares, over 5 percent above the 2018 level and almost similar to the average of the previous five years. The expansion in harvested area is due to an increase in the number of farming households (5.2 percent), following an improved security situation, which prompted about 417 000 displaced people to return to their places of origin in 2019. However, with 1.47 million individuals still displaced within the country and 2.22 million South Sudanese refugees still sheltering in neighbouring countries, the lingering impact of the prolonged conflict continues to affect agricultural activities and the overall harvested area in 2019 remained well below the pre-conflict level. At sub-national level, the harvested area increased in Unity (17.8 percent), Western Equatoria (17.7 percent), Western Bahr el Ghazal (15.1 percent), Central Equatoria (14.7 percent), Eastern Equatoria (9.7 percent), Jonglei (5.3 percent) and Lakes (3 percent) states. By contrast, a contraction of the harvested area has been recorded in Northern Bahr el Ghazal (-3.6percent), and Upper Nile (-13.5 percent) states due to persisting insecurity and to the impact of flooding on planting operations and harvestable areas.

The net cereal production in 2019 from the traditional sector, after deduction of post-harvest losses and seed use, is estimated at about 818 500 tonnes, 10 percent higher than 2018 and 4 percent below the average of the previous five years. Cereal production benefitted from the expansion of the harvested area and from abundant seasonal precipitation which boosted yields. However, in most flood-prone areas of the country, torrential rains triggered unusually widespread flooding, especially in Northern Bahr el Ghazal, Jonglei, Warrap, Unity and Upper Nile states, which resulted in significant crop losses. Infestation of migratory pests, including Desert Locusts, QQU and FAW were generally mild to moderate. FAW outbreaks were reported at the start of the season, but the pest was largely neutralized by heavy rains in the following months reducing losses in most maize and sorghum growing areas. Hence, less substantial losses were

reported in 2019 compared to recent years. Cereal production increased from the previous year in Central Equatoria (39.7 percent), Eastern Equatoria (35.6 percent), Western Equatoria (30.9 percent), Western Bahr el Ghazal (29.1 percent), Unity (21 percent), Lakes (12.2 percent) states, while it remained mostly stable in Warrap State (+0.3 percent). By contrast, cereal production decreased in Upper Nile (-25.3 percent), Northern Bahr el Ghazal (-21.6 percent) and Jonglei (-4.9 percent) states. With a mid-2020 projected population of about 11.81 million, consuming on average of about 110 kg of cereals/capita/year, the cereal requirement in 2020 is estimated at about 1.3 million tonnes. Accordingly, an overall rounded deficit of about 482 500 tonnes of cereals is estimated in the traditional sector during the January-December 2020 marketing year, 7 percent below the deficit estimated for 2019, but still 22 percent above the 2015-2019 average.

The country is facing a protracted macro-economic crisis. Although the GDP increased in 2019 for the first time since 2014, mainly due to increased oil revenues, the macro-economic situation remains dire. The South Sudanese Pound continued to depreciate in 2019 on the parallel market, and in December 2019 the average exchange rate was about SSP 315/USD, compared to about SSP 240/USD in December 2018. In addition, the already substantial spread between the official and the parallel market exchange rates further widened, increasing from about 60 percent in December 2018 to almost 100 percent in December 2019.

Prices of wheat, sorghum and maize, soaring since mid-2015, continued to increase in 2019, and in December they were 45, 75 and 90 percent higher, respectively than one year earlier. The high prices are due to a weak local currency, limited cereal supplies and the lingering impact of the conflict on trade and agricultural activities. As a result of reduced incomes and soaring food prices, large segments of the population are facing severe constraints in access to food and other basic services. Following the beginning of the peace talks in mid-2018 and the signing, in September 2018, of the Revitalized Agreement on the resolution of the conflict in the

Republic of South Sudan, the number of security incidents declined by about 35 percent in 2018 and further decreased by about 30 percent in 2019. The improved security situation benefited food trade and marketing operations in several areas of the country. However, market activity remain below the pre-conflict levels, mainly due to the macro-economic crisis severely affecting purchasing power, with high inflation reported to hamper credit operations.

In January 2020, 45 percent of the population of South Sudan (about 5.3 million people) were in IPC phases 3 "Crisis", 4 "Emergency" and 5 "Catastrophe", a 9 percent decrease compared to January 2019 and also an improvement relative to August 2019. This is likely due to a slow accumulation of improvements in security, trading conditions and crop production.

At subnational level, the highest prevalence of food insecurity was recorded in Jonglei (65.3 percent), Northern Bahr el Ghazal (54.7 percent) and Upper Nile (53.3 percent) states, almost unchanged from the same period of the previous year, likely as the result of the flood impacts. Floods also drove the increase in 2020 in the number of people in IPC Phase 5 to 40 000, all concentrated in Jonglei State.

By contrast, all other areas recorded improvements. The largest decline in population in IPC Phase 3 and higher from January 2019 to January 2020, were recorded in Eastern Equatoria, Unity, Western Bahr el Ghazal and Western Equatoria states. These improvements will continue if the trends in security, trade and marketing activities and crop production remain positive and may herald a reversion of the food security situation.

As expected, these proportions will increase in the lean period in mid-2020: the proportions of population in IPC phases 3 and higher are projected to reach 55.4 percent in May-July 2020. This is a modest improvement relative to last year, but does not foresee any population in IPC Phase 5.

Household food insecurity reached record levels in mid-2019 (77 percent of the population, with 33 percent severely food insecure), likely due to extreme rises in staple food prices. The situation improved by late 2019 to values lower than at the same time last year and similar to those registered in December 2016 and 2017. The largest improvements were recorded in Upper Nile, Unity and Lakes states, while in Jonglei State flooding impacts led to a worsening of the situation.

The dependency of households on markets for their staple food supply had a modest increase of about 3 percent in both lean period and post-harvest, interrupting a decreasing tendency since 2016. This is consistent with the reported improvement in trading conditions and commodity supply and it represents a positive development, since markets remain the most important source of cereals during the lean period. Food assistance remains a major component of the household food supply for Jonglei and Unity states.

The pronounced vulnerability of the population to the high market prices led to record proportions of households with very high food expenditures during the 2019 lean period (78 percent against 74 percent in mid-2018), due to spikes in staple food prices. The situation improved towards end of 2019 when these proportions decreased to 58 percent (with 48 percent very high) lower than December 2018. The most extreme values of high food expenditure were recorded in Upper Nile, North Bahr el Ghazal and Jonglei states.

In 2019, WFP plans to assist just under 5.9 million people in South Sudan with 325 000 tonnes of food assistance, including refugees and nutrition support activities.

SOCIO-ECONOMIC CONTEXT

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SOCIO-ECONOMIC CONTEXT

Population and population movements

Since the conflict started in mid-December 2013, population size and geographical distribution have significantly changed. According to the International Organization for Migration (IOM) and the Office of the United Nations High Commissioner for Refugees (UNHCR), as of December 2019, over 3.7 million people had been forced to flee their homes due to insecurity, including 1.47 million IDPs and 2.22 million people that fled into neighbouring countries (Uganda, the Sudan, the Democratic Republic of the Congo, Ethiopia and Kenya).

Displacements, which dramatically increased in the second half of 2016 and in 2017 following the spread of the conflict to most areas of the country, declined significantly in 2018 and 2019. The population sheltering inside the United Nations Mission in South Sudan (UNMISS) Protection of Civilians (PoC) sites, after having peaked at about 224 000 people in 2016, decreased by about 15 percent between 2016 and late 2019, when the number was estimated at about 190 000 people. The country's largest PoC site is located in Bentiu (Unity State), hosting about 118 000 people, followed by the PoC sites in Juba and Malakal with about 29 000 and 26 000 people, respectively.

Large numbers of South Sudanese are living in neighbouring countries as refugees and asylum seekers. The exodus, which started in late 2013 soon after the start of the conflict, sharply accelerated with the expansion of the conflict outside the Greater Upper Nile Region in July 2016 until the end of 2017, when about 1.6 million people left the country and moved mainly to Uganda, where about 1 million people sought refuge. The number of refugees remained firm at about 2.48 million people throughout most of 2018, subsequently declining by 10 percent during

2019, and in December the number was estimated at 2.22 million. At the same time, the country hosts about 298 000 refugees, mainly from South Kordofan and Blue Nile states of the Sudan.

According to IOM, in 2019 about 418 000 displaced South Sudanese returned to their places of origin, 277 000 of which from within South Sudan and 141 000 from abroad. The decline in new internal displacements and the returnee influx followed an improvement of the security situation, with the number of conflict incidents declining from more than 1 000 in 2017 to about 780 in 2018 (-34 percent) and to about 500 in 2019 (-28 percent). The reduction of the violent incidents is mainly due to the ceasefire imposed by the Declaration of Agreement Between Parties of the Conflict in South Sudan, signed in Khartoum in June 2018, and confirmed by the Revitalized Agreement on the Resolution of the Conflict in South Sudan (R-ARCSS) signed in Addis Ababa in September 2018. The armed conflict between State security forces and opposition armed groups is currently limited to a small number of areas in the Greater Equatoria Region. Episodes of inter-communal violence and cattle raiding are still frequent.

According to a recent UNHCR survey conducted among returnees from abroad, the main factors driving their returns since late 2017 were the perceived improvements of the security situation and in the availability of services. Almost 70 percent of the surveyed individuals indicated their intention to remain permanently in the same village. About 90 percent of respondents declared to own land, most of them indicating no major access constraints to their fields. About 80 percent of the surveyed returnees indicated the plan for their immediate family members to also return within six months.

According to NBS population projection data, revised by the South Sudan IPC Population Working Group (SS/IPC/PWG)[1] in cooperation with UNHCR

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[1] The The South Sudan IPC Population Working Group (SS/IPC/PWG) is a partnership between NBS, FAO, World Food Programme (WFP), FEWS NET and UN/OCHA.

Figure 1: South Sudan - 2017-2019 Occurrences and location of conflict incidents and 2016-2019 internal/external displacements (million people)
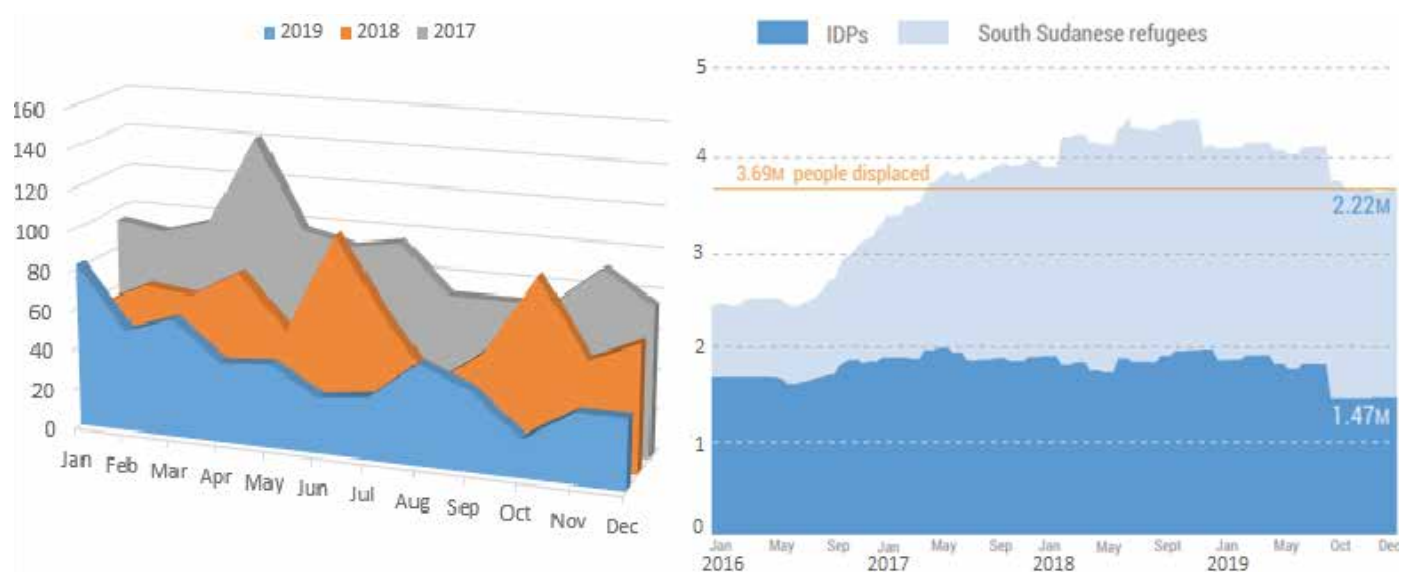
Source: Armed Conflict Location and Event Data Project (ACLED) data and the United Nations Office for the Coordination of Humanitarian Affairs (UN/OCHA).

and IOM, the country's population for 2019 was estimated at about 11 466 000. This figure has been used for the January 2019 IPC analysis, including the breakdown at county and State levels. Given the implicit annual increment of 3 percent, used by the NBS, the population for mid-2020 has been estimated by the Mission at 11.78 million.

Economy

Economic growth and national budget

The conflict, which started in 2013 and escalated in 2016, caused a major economic crisis. The gap between increasing Government military expenditures and falling revenues, mainly due to declining oil production, has been mainly bridged by domestic borrowing from the Bank of South Sudan (BOSS), with consequent depletion of foreign exchange reserves and the need to print money. The lack of US dollars hampered the ability of the BOSS to protect the local currency, leading to its accelerated depreciation in the parallel market. In mid-2016, the country began displaying signs of macro-economic collapse, with contraction of output, near hyper-inflationary price spikes and parallel exchange market premium spiralling. Some encouraging developments began in mid-2017,

when the winding down of the expansionary monetary policy eased inflationary pressures. The GDP, after having declined by 24 percent between 2014 and 2017, remained mostly stable in 2018 and increased by about 8 percent in 2019, owing mainly to an increased oil output. Despite these improvements, the macro-economic situation remains dire, with rampant inflation, a soaring foreign exchange rate, civil service salaries in arrears of several months and foreign currency reserves amounting to no more than one to two weeks of imports.

Oil production plays an important role in the economy of South Sudan, contributing slightly more than half of the GDP, 95 percent of exports, 90 percent of Government revenues and a significant share of private sector employment. The domestic oil sector remains closely linked to the Sudan, where processing facilities, pipelines, export terminals and refineries are located. Since independence in 2011, oil production has steadily declined and has experienced frequent disruptions due to disputes with the Sudan and to the civil war. Estimated at 350 000 barrels/day before independence, oil extraction was interrupted in January 2012, due to a dispute with the Sudan over transit fees and transfers. Production resumed in April 2013, but it never fully

recovered and in 2017 it was estimated at about 110 000 barrels/day. With the improvement of the security situation after the signing of the R-ARCSS, the output increased to about 140 000 barrels/day in early 2019. In the 2019/20 budget, oil production is expected to average 174 000 barrels/day, the expected increase being in line with estimates by the Famine Early Warning Systems Network (FEWS NET), which estimated oil production in October 2019 at 178 000 barrels/day. The sector's potential is large and its expansion is key to improve the macro-economic situation. Oil production capacity is still low compared to the unexploited oil reserves that are estimated at 3.75 billion barrels, potentially making the country the third largest oil producer in sub-Saharan Africa. However, prospects to increase oil production to and beyond pre-war levels rest on the adoption of enhanced oil recovery techniques in the existing oil wells and the construction of new oil fields.

Oil revenues were severely affected by the historically low levels of the international price of crude oil in early 2016. Prices have then increased in recent years, but dramatically declined in early 2020. As Figure 2 shows, crude oil prices dropped by more than 70 percent between mid-2014 and early 2016, from USD 112/barrel in June 2014 to a record low level of USD 31/barrel in January 2016. Prices increased, albeit irregularly, in the following years, and in 2019 they ranged between USD 60 and USD 70. Prices halved in early 2020, mainly due to lower global demand caused by the COVID-19 pandemic, and in March 2020, at USD 33/barrel, they almost reverted to the record-low levels in January 2016.

The increased demand for crude oils that can yield heavy marine fuel with relatively minor processing requirements, following the lowering in January 2020 of the sulphur limit in marine fuel by the International Marine Organization, is expected to increase investors' interest in the country's oil sector, potentially leading to stronger growth, as South Sudanese crude oil is characterized by a low sulphur content and high marine fuel yield. On the other hand, if oil prices will not rebound in 2020 after the sharp decrease in the first months of the year, South Sudanese oil revenues will be severely affected.

The 2019/20 budget was approved by the Transitional National Legislature in August 2019 and the forecast total spending from Government resources at USD 1 343 million, 155 percent up from

Figure 2: South Sudan - Crude oil - Europe Brent monthly spot prices (f.o.b.)

Source: United States of America Energy Information Administration (US/EIA).

the forecast of USD 526 million in 2018/19. In real terms, the budget increased by about 40 percent compared to the previous year, mainly bolstered by a substantial increase in infrastructure allocation. This reflects the planned investment in roads backed by an oil for infrastructure arrangement, with the revenues of 30 000 barrels of oil per day allocated to infrastructure building and rehabilitation. The allocation to the social and humanitarian affairs sector increased by about 3 percent, reflecting the planned payments to the commission of the R-ARCSS. All other sectors, including education, health and rural development, already accounting for negligible amounts of total spending in previous years, had further declines in their allocations, indicating an almost total donor dependency on financing service delivery (Table 1). In addition, as the budget execution continues to show significant divergences between budgets and outturns, some sectors have received just a fraction of the planned budgeted allocations.

According to Government authorities, the increase in spending in 2019/20 will be partially covered by a corresponding increase in revenues, in both the oil and non-oil sectors. In the oil sector, an almost twofold increase in revenues from about SSP 80-152 billion will mainly derive from an increase in oil production. In the non-oil sector, revenues are forecast to increase by 20 percent from SSP 25-30 billion, mainly due to a modest growth of the services sector, supported by developments in the Information and Communication Technology sub-sector. However, despite the introduction by the National Revenue Authority of an electronic collection system aimed to strengthen tax administration and reduce tax evasion, the actual collection of the forecast increased revenues will be a challenging task for the South Sudanese authorities: in the oil sector, sizeable oil quantities have been already sold in advance and doubts remain over the status and the management of Nilepet, South Sudan's national oil company,[2] while in the non-oil sector, the successful implementation of the policies against tax evasion is a lengthy and difficult process, especially in a context where the rule of law has been eroded by years of conflict.

Table 1: South Sudan – Sector share in 2019/20 budget and change compared to 2018/19 (percent)

Sector	Sector share in 2019/20 budget	Change compared to 2018/19 budget (real terms)
Accountability	11.7	-19.2
Economic functions	1.4	-1.6
Education	5.6	-1.7
Health	1.1	-0.7
Infrastructure	54.4	+72.2
Natural resources and rural development	0.7	-40.0
Public administration	9.7	-5.7
Rule of law	2.6	-2.1
Security	10.5	-4.6
Social and humanitarian	2.2	+2.7
Total	**100.0**	**+39.0**

Source: World Bank.

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[2] International Monetary Fund, Staff report for the 2019 article IV consultation, May 2019.

Despite the increase in revenues, the financing gap increased from an estimated 2.4 percent of the GDP in 2018/19 to 8.2 percent in 2019/20 (about USD 496 million), mainly due to rising Government spending on peace-related expenditures, high allocations to the infrastructure budget and the slow progress in generating non-oil revenues. The monetization of the fiscal deficit through borrowing from the BOSS, a practice that was one of the main drivers of inflation in recent years and that was abandoned in mid-2017, has been again ruled out in the 2019/20 budget. As a result, the Government plans to meet the financing gap through increased external borrowing, with the Africa Export-Import Bank having approved and disbursed a USD 373 million financing facility.

Exchange rate

The South Sudanese Pound was introduced following the country's independence in July 2011. Rationing of foreign currencies since early 2012 (due to the oil production shut-downs decided after the disagreement with the Sudan about transit fees), led to the development of a parallel market where the exchange rate was granted a premium. The parallel exchange rate has been quite stable until late 2014, when the shortage of foreign exchange due to shrinking oil revenues started to severely limit the ability of the BOSS to defend the value of the local currency. As a result, the exchange rate increased from SSP 6/USD in late 2014, to SSP 38/USD in mid-2016. Subsequently, it surged at faster rates after the escalation of the conflict in July 2016, peaking at SSP 310/USD in June 2018. Reversing the trend for the first time since late 2014, the exchange rate declined by about 20 percent in the second semester of 2018, following the signing of the Khartoum Agreement in June and of the R-ARCSS in September, which boosted speculator and investor confidence over the improved political stability and the resumption of oil production. However, the progress on the implementation of the R-ARCSS has been modest in 2019 as the signatories did not reach an agreement over key issues and the formation of a transitional

government has been postponed twice.[3] This dissipated the optimism climate among investors and the exchange rate resumed its increasing trend in 2019, increasing by about 25 percent between January and December, when, reaching SSP 320/USD, it surpassed the peak of June 2018 and recorded a new record high.

On 14 December 2015, with the aim to narrow the difference between official and parallel exchange rates, the BOSS decided to abandon the fixed rate, letting the rate to freely float. Under the new system, the BOSS supplies foreign exchange through market-based auctions and commercial banks are free to determine their rates with customers. As a consequence of the new regime, the official exchange rate at the end of 2015 went up to SSP 18/USD. The reform was initially successful in reducing the spread between the official market rate and the rates in the parallel cash market and the two rates converged to about SSP 30/USD in February 2016. Subsequently, as the civil war escalated and the economic crisis deepened in 2016, foreign exchange restrictions were put in place, a complex multiple exchange rate system was introduced and the BOSS abolished the foreign exchange auctions in 2017, with the introduction of a managed exchange rate regime. As the parallel exchange rate started to soar in July 2016, the spread between the official and the parallel market rates widened, increasing from about 20 percent in mid-2016 to 120 percent in June 2018, when the exchange rate peaked on the parallel market. As it declined in the second semester of 2018, the spread decreased to 63 percent in late 2018. Subsequently, with the exchange rate resuming its increasing trend in 2019 on the parallel market, the spread between the official and parallel exchange rates followed suit and, in December 2019, it reached 97 percent. The divergence between the two rates reflects the overvaluation of the indicative exchange rate set by the BOSS and that the demand for hard currency continues to outweigh the limited supply of foreign exchange, in the context of a degraded macro-economic environment.

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[3] A Government of national unity was finally formed on 22 February 2020, starting a three-year transitional period at the end of which national political elections will be held. The formation of the Government was made possible by an agreement on the number of states and their boundaries, the most contentious issue in the pretransitional period of the peace process, with the R-ARCSS signatories agreeing on a return to the ten-State system.

Figure 3: South Sudan (Juba) - Market exchange rates in commercial and parallel markets (SSP/USD)
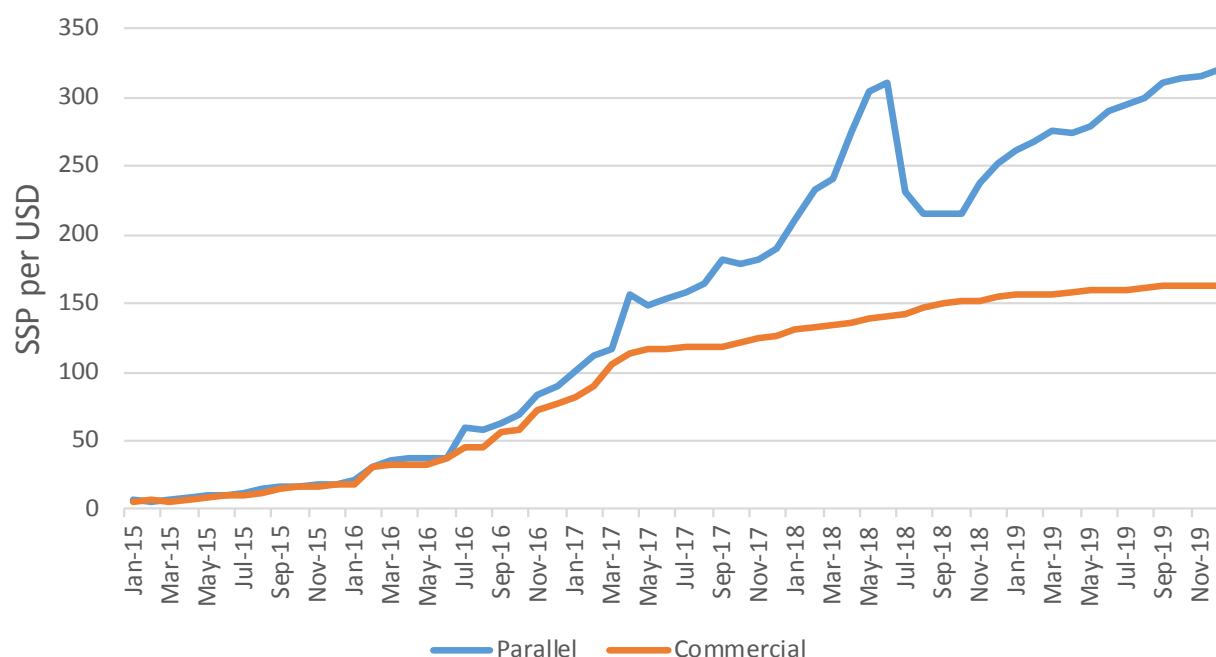
Source: WFP.

Inflation

Inflation started a sustained upward trend in February 2015, with the year on year national inflation peaking at about 550 percent in September 2016. In 2016, the annual consumer price index increased by 480 percent, slightly under the hyperinflation mark of 500 percent.[4] The main drivers of inflation were:

➢ Insufficient foreign reserves of the BOSS compared to the local demand, leading to a substantial increase of the exchange rate in the parallel market.

➢ Expansion of the monetary base as the Government financed a large portion of its increasing fiscal deficit through borrowings from the BOSS.

➢ Increasing transaction costs due to the supply/ chain bottlenecks caused by the conflict, which drove up prices of imported commodities.

Subsequently, the general inflation rate declined markedly, and the year-on-year inflation rate decreased from the 550 percent peak in September 2016 to 118 percent in December 2017

and to 42 percent in November 2018, mainly due to the winding down of the expansionary monetary policy in 2017 and to the appreciation of the local currency on the parallel market in the second half of 2018. Since late 2018, inflation resumed its increasing trend as the South Sudanese Pound lost again value on the parallel market, rising from 42 percent in November 2018 to 108 percent in August 2019. Subsequently, increased transport costs and trade disruptions caused by widespread floods compounded the upward pressure from the currency depreciation and inflation rates surged to 170 percent in October. Inflation declined in late 2019 as food prices decreased with the newly-harvested crops increasing supplies, but at almost 70 percent in December, it remained very high. The trend of the general inflation closely follows the trend of the food inflation, as the food component accounts for more than 70 percent of the total value of expenditures. Food inflation followed a sustained increasing trend between early 2015 and late 2016, peaking at 513 percent in December 2016 and declining to 55 percent in December 2018. Subsequently, it increased reaching 81 percent in July 2019, surged to 190 percent in October and declined to 102 percent in December.

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[4] World Bank, South Sudan Economic Update, July 2018.

Figure 4: South Sudan – Year-on-year inflation trend (2013-2019)
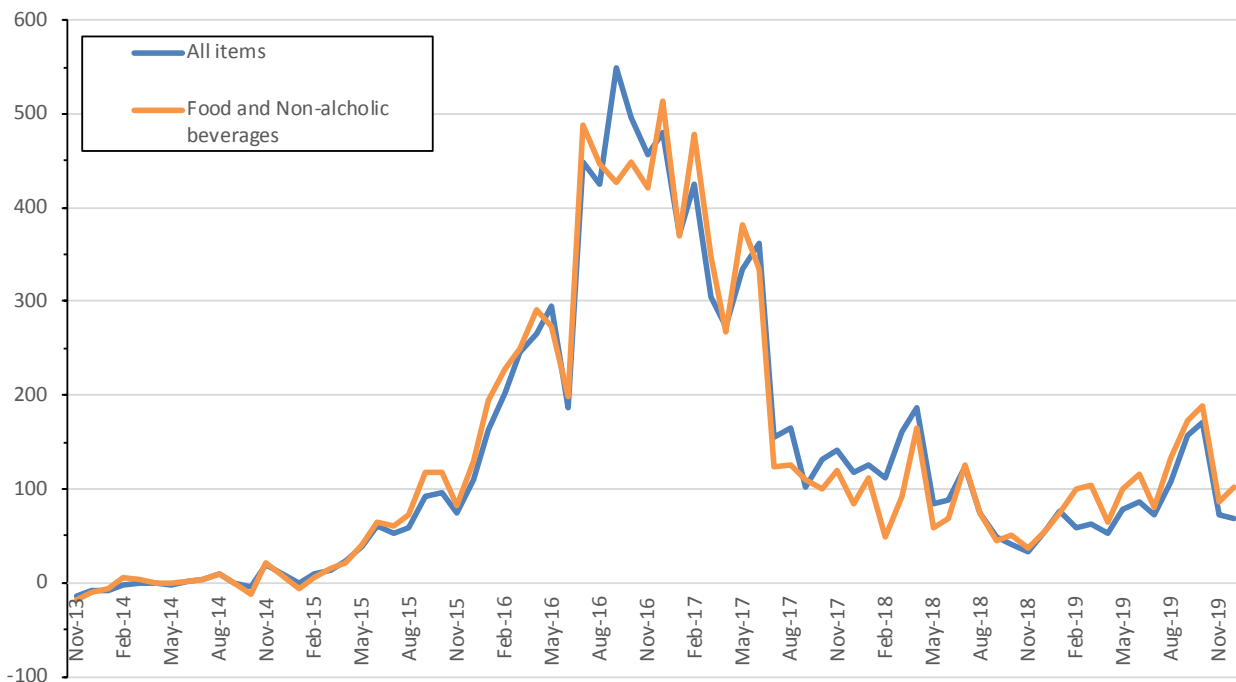
Source: National Bureau of Statistics.

Agriculture

The diverse ecology of the country provides a growing season ranging from 280 to 300 days per annum in southwestern cropping areas, known as the Greenbelt and from 130 to 150 days per annum in northern states. Bi-modal rainfall areas cover most of the Greater Equatoria Region (Western, Central and parts of Eastern Equatoria), 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 per annum from the same plots in the Greater Equatoria Region and a single harvest in the uni-modal rainfall areas further north.

Agriculture is almost entirely dependent on rainfall and hence the variability of precipitation in terms of amount and distribution is usually the major factor in determining crop production. Generally, rainfall increases in a northeast to southwest direction culminating in the 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 by hand. The family size is five to seven persons that belong to larger family aggregations. Despite an abundant availability of 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) the reduced security of access to land.

In recent years, average farm sizes have increased with steadings-based farm areas merging with far-fields as communities increased the adoption of animal traction (e.g. Lakes and parts of Warrap 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 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.[5]

Despite the improvements of the security situation in 2018 and 2019, 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.

Mechanized cereal production is practised at large scale 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. Elsewhere, limited numbers of both private and Government-owned tractors provide ploughing services to individuals and farmer groups. 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. Other operations are performed manually. Major problems related to the supply of fuel and spare parts, operator skills and maintenance, and repair capabilities persist, severely limiting the efficiency of the tractor service. In general, only one-fourth of the tractors purchased over the last ten 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[6] 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.[7]

At national level, the area planted to maize is estimated to be 20 percent of the total cereal area. However, this percentage hides some regional differences. Maize is the most popular cereal in the Greenbelt, where *Longi* varieties (especially *Longi-5*) from Uganda are grown in series in two crops per 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 releases 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.

Other cereals, namely bulrush millet, finger millet and rice, are estimated to account for the remaining 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 intercropped with maize, groundnuts and cassava. Other crops of major importance to food security include cassava and groundnuts, sweet potatoes and yams. Cassava is estimated to account for

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[5] In this regard, the local transfer of donkey plough (scuffler) technology from the Darfur Region in the Sudan to Western Bahr el Ghazal State offers an immediate solution for inter-row cultivation, including weeding and thinning of broadcasted crops.

[6] 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.

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

almost 20 percent of the planted area in Western Equatoria State and about 10 percent in Central Equatoria, Eastern Equatoria and Western Bahr el Ghazal states. The area planted with groundnuts covers about 20 percent of the cultivated land. 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, traditionally intercropped with sorghum. Recently, the crop's popularity is increasing in northern areas, especially in the commercial farming areas of Upper Nile, where it is sold at high, profitable prices to traders from the Sudan.

Okra, cowpea, green-gram, pumpkin, Bambara nut and tobacco are also widely grown around the homesteads in all areas. Vegetables, including onions and tomatoes, are increasingly cultivated near the cities to supply 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 saved 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 modern inputs, including chemical fertilizers, pesticides or herbicides, are not used by smallholder farmers on field crops, some use of herbicides 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 2019, 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 QQU bird 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. In 2019, there were reports of localized attacks on sorghum by QQU and desert locusts in some areas of Upper Nile, especially Renk and Melut counties, with moderate to mild damage to crops.

About 60 percent of the country's population is dependent on livestock rearing, which 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 2019

CEREAL PRODUCTION IN 2019

Cereal harvested area and yield estimates

In the absence of any nationally-generated, crop/yield estimates and empirical data from annual cropped land surveys disaggregated by crop, cereal production for the smallholder sub-sector is assessed by the CFSAM using estimates of 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 UN/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) Mission transect observations made using PET photo indicators and associated protocols, (b) farmer case studies by the Task Force teams, (c) crop-cut samples by the Task Force teams and CCMCs and (d) information from semi-structured interviews with key informants from State Ministries of Agriculture, NGOs and other stakeholders involved in agriculture.

Combining the data and information from these four sources, the annual cereal production estimates for each county is derived. 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 estimate was 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 harvest time. Since 2015, FAO South Sudan 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 for the decision-making of national and international institutions.

Aiming to increase coverage and participation of local line agencies, 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 crops using a standard form designed to capture qualitative and quantitative information. This approach has continued with wider coverage in 2018 and 2019, increasing the number of CCMCs to 54 in 2018 and to 64 in 2019, 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*

**Figure 5: South Sudan – Counties assessed by Task Force Teams
at planting/harvest time (December 2019)**
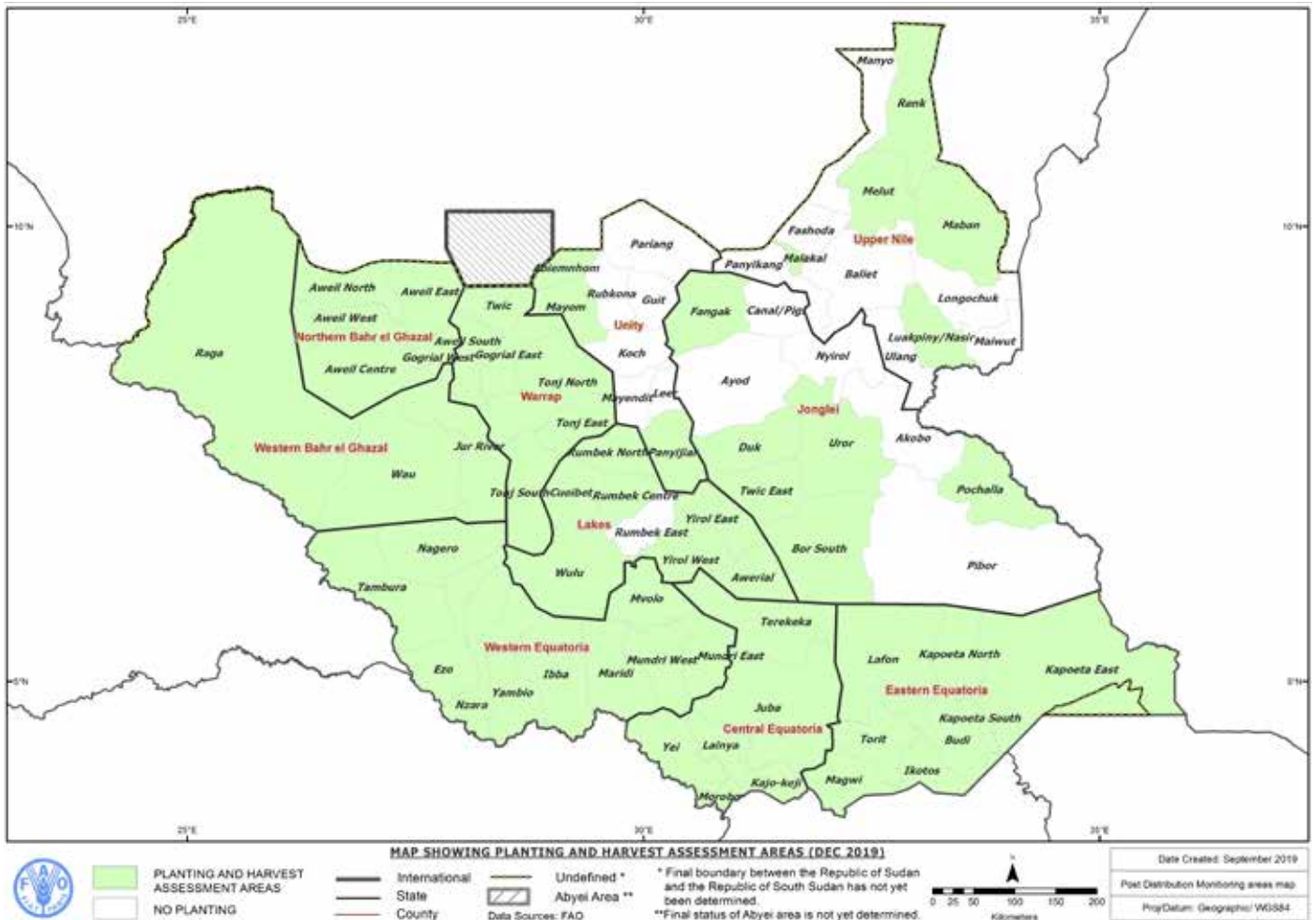
Source: FAO South Sudan.

*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 6. Therefore, since 2017, 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.

During all the planting and harvest assessment
missions carried out by the Task Force teams in 2019,
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.

Since 2015, walking[8] 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 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.

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8 Team members independently walk 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 are then converted from colour codes into tonnes/
   hectares and weighted averages calculated for each transect walked.

Figure 6: South Sudan - Location of CCMCs (December 2019)

Source: FAO South Sudan.

In 2019, the Task Force teams conducted 13 planting assessment missions and 21 harvest missions, visiting 51 counties, with most counties being visited twice. These assessments were conducted between June and December 2019 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 1 440 case studies during both planting and harvest assessment missions, including 1 342 interviews with farmers and 106 interviews with key informants including with senior staff of State Ministries of Agriculture (SMoA), county officials and staff of NGOs and international agencies based in the field. This represents an increase in the number of planting and harvest assessment missions (+17 percent) compared to last year, when 29 missions (14 planting and 15 harvest assessments) were conducted.

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 have been used, through e-mail and telephone conversations with key informants, as appropriate.

The 2019 aggregate cereal harvested area in the traditional farming sector is estimated at 929 548 hectares, 5.3 percent above the previous year's level due to a slight increase in the number

of farming households following the signing of the R-ARCSS in September 2018 peace deal and an ensuing improvement of the security situation, which encouraged the gradual voluntary returns of displaced farmers. However, the lingering impact of the prolonged conflict continues to severely affect agricultural activities constraining access to fields. As a result, despite the increase on a yearly basis, the harvested area in 2019 remained well below the pre-conflict level (-14.3 percent compared to 2012). Notably, despite the increasing trend in 2018 and 2019, cultivated area is still very low in the most productive lands of the Greenbelt and Western Bahr el Ghazal due to the large-scale displacements, which occurred in late 2016 and 2017.

At the sub-national level, the harvested area increased in Central Equatoria (+14.7 percent), Western Equatoria (+17.7 percent), Unity (+17.8 percent), Jonglei (+5.3 percent), Eastern Equatoria (+9.7 percent), Lakes (3 percent), Warrap (3.3 percent) and Western Bahr el Ghazal (+15.1 percent) states. By contrast, a reduction in the harvested area has been recorded in Upper Nile (-13.5 percent) and Northern Bahr el Ghazal (-3.6 percent) states as a result of the extensive flood damage that reduced the average area planted per household. In Upper Nile State, harvested area declined in Maban County by 74.4 percent from the previous year due to severe flooding that reduced the harvested area per household and a reduction in the number of

farming households caused by internal conflict that involved Sudanese refugees. This sharp decline offset the increases in the harvested area recorded in other counties of the State (Baliet, Manyo, Melut, Malakal and Renk), driven by the increases in the number of farming households following the significant returns of displaced and refugees. Flood-induced reductions of the harvested area were also recorded in Rumbek North County (Lakes State), where it declined by 19.3 percent, and in all the five counties of Northern Bahr el Ghazal State, where it decreased by up to 7.4 percent. In Jur River County in Western Bahr el Ghazal State and in Twic East County in Jonglei State, the harvested area decreased by about 9 percent as insecurity caused by inter-communal conflict resulted in a reduction of farming households and confined farmers to fields near the homesteads. Notably, in Renk County, while the overall cereal harvested area increased by 3.8 percent compared to the previous year, in the commercial farming areas area planted with cereals has declined due a shift to sesame, at the expense of sorghum. Sesame has become more marketable and profitable than sorghum, as it is sold at high prices to Sudanese traders. Despite the improvements in the overall security situation, several areas are still insecure. Here, farmers are confined to cultivate around the homesteads and are unable to cultivate far fields. The breakdown of the harvested areas for counties and states as well as all variables used for the calculations are presented in Table 2.

Table 2: South Sudan - Estimated settled population, farming households and harvested cereal area, (2019)

State/County	Population mid-2019	Households mid-2019	Farming households (percent)	Farming households mid-2019	Average cereal area (ha/hh)	Total cereal area (ha)
Central Equatoria	**1 060 191**	**177 884**	**62**	**70 440**	**1.10**	**64 844**
Juba	392 525	63 917	48	19 175	0.80	19 175
Kajo Keji[1/]	105 783	18 192	90	6 367	0.90	5 730
Lainya[1/]	100 263	16 290	60	5 701	0.70	5 131
Morobo[1/]	137 869	21 692	60	5 423	1.20	4 881
Terekeka	162 289	30 102	90	24 081	1.10	19 265
Yei[1/]	161 463	27 691	60	9 692	1.30	10 661
Eastern Equatoria	**994 188**	**177 887**	**73**	**126 486**	**1.10**	**122 355**
Budi	93 524	16 409	90	13 948	0.80	17 435
Ikotos	123 547	25 022	90	20 018	0.90	22 020
Kapoeta East	163 386	30 437	50	16 436	0.70	13 149
Kapoeta North	103 508	16 644	50	9 321	1.20	7 456
Kapoeta South	67 706	10 476	50	5 866	1.10	4 400
Lafon	102 514	17 233	85	14 648	1.30	13 183
Magwi[1/]	185 028	29 705	90	22 279	1.10	26 734
Torit	154 976	31 961	85	23 970	0.80	17 978
Jonglei	**1 744 475**	**257 137**	**71**	**92 943**	**0.90**	**59 507**
Akobo	183 167	24 717	78	9 887	0.70	6 426
Ayod	171 324	21 553	74	2 155	1.20	1 078
Bor South	239 320	35 217	87	17 608	1.10	11 445
Duk	115 793	18 763	84	6 567	1.30	2 758
Fangak	172 406	23 672	90	3 551	1.10	1 491
Khorflus/Pigi/Canal	98 636	12 360	88	1 236	0.80	865
Nyirol	174 578	25 455	85	8 909	0.90	4 455
Pibor	191 272	30 400	24	12 160	0.70	8 512
Pochalla	81 520	13 347	71	8 676	1.20	6 941
Twic East	120 140	20 999	38	8 400	1.10	5 880
Uror	196 318	30 654	74	13 794	1.30	9 656
Lakes	**1 225 771**	**170 829**	**78**	**125 414**	**1.10**	**132 502**
Awerial	146 865	24 235	50	14 541	0.80	17 449
Cueibet	187 348	28 534	92	25 110	0.90	27 621
Rumbek Centre	259 745	29 520	75	17 712	0.70	14 170
Rumbek East	211 555	27 727	79	22 181	1.20	19 963
Rumbek North	61 173	7 242	60	5 070	1.10	3 549
Wulu	74 568	12 436	92	9 948	1.30	11 938
Yirol East	110 778	15 302	90	11 476	1.10	12 624
Yirol West	173 739	25 834	90	19 375	0.80	25 188
Northern Bahr el Ghazal	**1 454 815**	**271 001**	**76**	**206 104**	**0.74**	**151 550**
Aweil Centre	114 099	24 772	60	14 863	0.75	11 148
Aweil East	571 728	104 923	80	83 938	0.65	54 560
Aweil North	290 850	56 068	80	44 854	0.80	35 883
Aweil South	155 498	29 605	70	20 723	0.80	16 579
Aweil West	322 640	55 633	75	41 725	0.80	33 380
Unity	**886 295**	**110 358**	**41**	**44 852**	**0.45**	**19 975**
Abiemnhom	30 068	3 192	60	1 915	0.50	958
Guit	39 971	3 914	45	1 761	0.50	881
Koch	127 682	13 567	40	5 427	0.50	2 713
Leer	109 998	14 613	35	5 114	0.50	2 557
Mayendit	89 553	11 002	35	3 851	0.42	1 617
Mayom	177 371	22 358	45	10 061	0.42	4 226
Panyijar	95 606	16 352	45	7 359	0.42	3 091
Pariang	138 364	17 556	40	7 022	0.42	2 949
Rubkona	77 683	7 803	30	2 341	0.42	983

Source: CFSAM South Sudan, 2019.
[1/] First and second harvest areas combined.

Table 3: South Sudan - Tentative estimates of 2019 cultivated area/household (hectare)

State	Sorghum	Maize	Other cereals[1]	Total cereals	Groundnuts	Cassava two years	Total cultivated area
Central Equatoria[2]	0.40	0.35	0.17	0.92	0.4 0	0.22	1.54
Eastern Equatoria	0.68	0.26	0.03	0.97	0.10	0.20	1.27
Western Equatoria[2]	0.32	0.66	0.31	1.29	0.38	0.65	2.64
Jonglei	n.a.	n.a.	n.a.	0.6	n.a.	n.a.	n.a.
Upper Nile	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Unity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lakes	0.90	0.09	0.07	1.06	0.8	0.04	1.90
Warrap	0.76	0.10	0.03	0.89	0.45	n.a.	1.34
Western Bahr el Ghazal	0.64	0.05	0.05	0.74	0.59	0.23	1.56
Northern Bahr el Ghazal	0.67	0.05	0.03	0.75	0.28	0.00	1.03

Source: CFSAM South Sudan, 2019.

[1] First and second harvest areas combined.

[2] Two seasons for cereals and mostly annual field crops.

n.a.: Not enough information collected.

The estimated areas of the other crops grown in 2019 are shown in Table 3. These are based on the proportions recorded between 2013 and 2018 and adjusted with information collected by the 2019 Task Force teams and provided by CCMCs. The estimates indicate: 1) the increased importance of groundnuts in Lakes, Warrap and Northern Bahr el Ghazal states; 2) the increased importance of rice in Western Equatoria State; and 3) an increase of the area planted with cassava by 4.5 percent compared to the previous year.

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

The 2019 rainy season was characterized by a favourable spatial and temporal distribution and average to well above-average amounts of precipitations over most cropping areas. Rains had a generally timely onset in April/May in southern bi-modal rainfall areas and in late May/early June in central and northern uni-modal rainfall areas. This was followed by average to above-average precipitation across the country throughout the growing period, resulting in favourable crop growing conditions and in higher yields of main crops compared to 2018. As opposed to the past four years, there were no prolonged dry spells in 2019, resulting in minimal or no replanting. Some short dry spells were reported only in a few pocket areas of Upper Nile State at the beginning of the season. Seasonal rains, usually subsiding in October in central and northern uni-modal rainfall areas and in November in southern bi-modal rainfall areas, unusually extended until December over most of the country, benefitting long cycle crops in uni-modal areas and late planted second season crops in

bi-modal areas. Precipitation was particularly abundant in several northern and eastern areas across Northern Bahr el Ghazal, Jonglei, Upper Nile, Unity and Warrap states, where torrential rains were received between August and late October almost without interruption. In particular, cumulative rains between late September and late October (see Figure 7) in Northern Bahr el Ghazal, Upper Nile and Jonglei states were estimated at more than twice the long-term average. These exceptionally heavy late-season rains, among the most abundant on record in the last 40 years, triggered widespread floods.

While episodic flooding events are seasonally normal and, associated with recession farming practices, are favourable for agricultural production, floods in 2019 were unprecedented and resulted in severe crop and livestock losses. In several low-lying eastern and northern areas, torrential rains and extensive overflow of rivers have triggered floods from June to September/October, which affected crops from planting to harvesting. Low-lying and riverine areas in Pibor, Duc, Twic East and Akobo counties in Jonglei State and in Aweil Centre and Aweil South counties in Northern Bahr el Ghazal State, as mid-December, were still submerged.

Figure 7: South Sudan – Precipitation anomaly, relative difference to LTA (2019)
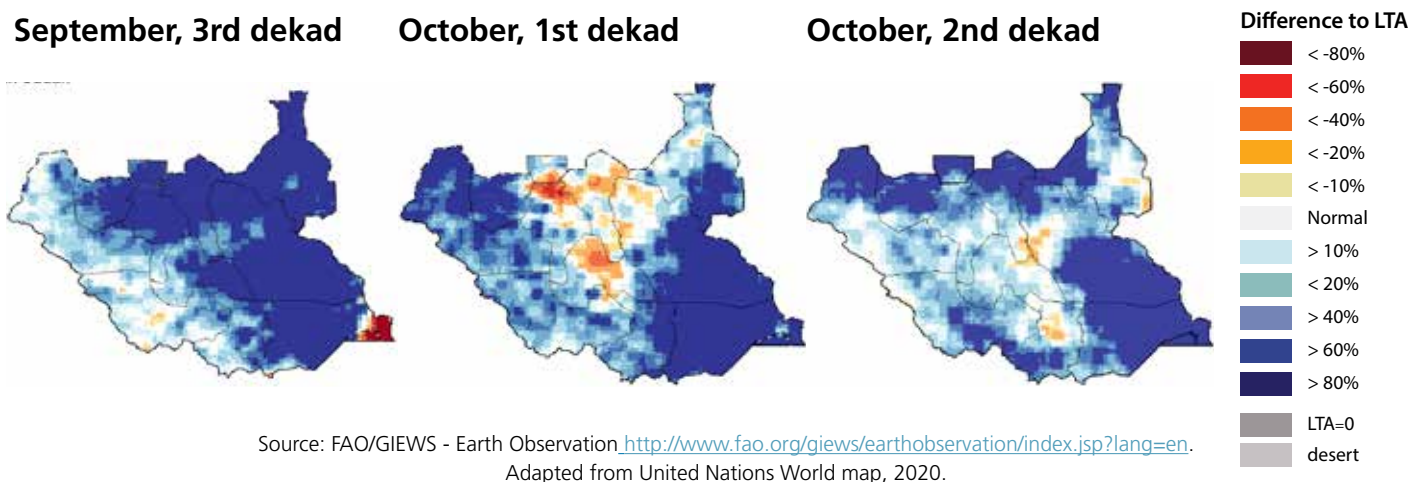
Source: FAO/GIEWS - Earth Observation http://www.fao.org/giews/earthobservation/index.jsp?lang=en. Adapted from United Nations World map, 2020.

Figure 8: South Sudan - Flood affected areas (2019)

SOUTH SUDAN FLOOD RELATED CEREAL PRODUCTION LOSS IN 2019
TOTAL ESTIMATED LOSS: 72,611 (TONNES)

* The figures indicate production loss in tonnes by State
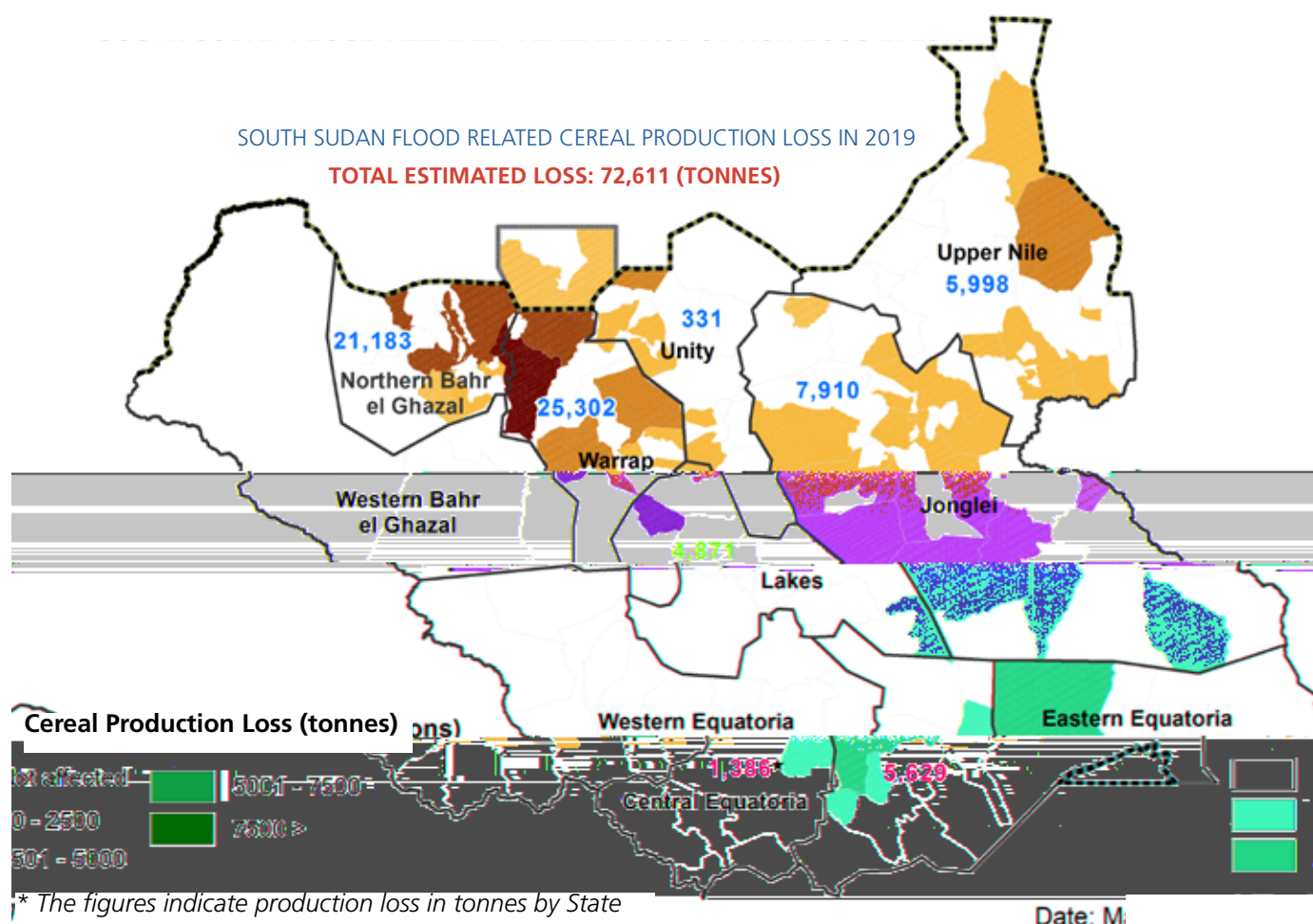
Source: FAO South Sudan.

In the mechanized farming areas in Renk and Melut counties of Upper Nile State, seasonal rains had a timely onset in early June, prompting planting of sorghum crops. Short dry spells in June, coupled with locust attacks, necessitated some sorghum replanting. Rains were above average and well distributed for the remainder of the season and continued after their normal cessation time in October, benefiting replanted sorghum crops. Sesame was sown at the normal planting time in July, after the dry spells occurred, and no replanting was needed. Some sorghum fields were damaged by locusts during their early vegetative stage and were replanted with sesame, due to its shorter cycle. Overall, weather conditions where more favourable in 2019 compared to the previous year, when a prolonged dry spell in July affected crop development.

In the commercial farming areas in Northern Bahr el Ghazal State, farmers in the Aweil Rice Scheme and in the mechanized sorghum farms in Ton Chol were unable to plant any crops due to torrential rains between early June[9] and October, which triggered floods and impeded agricultural activities. Only in Ayai Farm, located in Aweil South County, farmers were able to plant about 840 hectares with sorghum, but 60 percent of the crops was lost due to floods.

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[9] In Aweil town, 190 mm of rains (about 22 percent of the 2019 rainfall) were received on 5 June 2019 alone.

Figure 9: South Sudan - Rainfall amounts RFEs and NDVIs (2019)
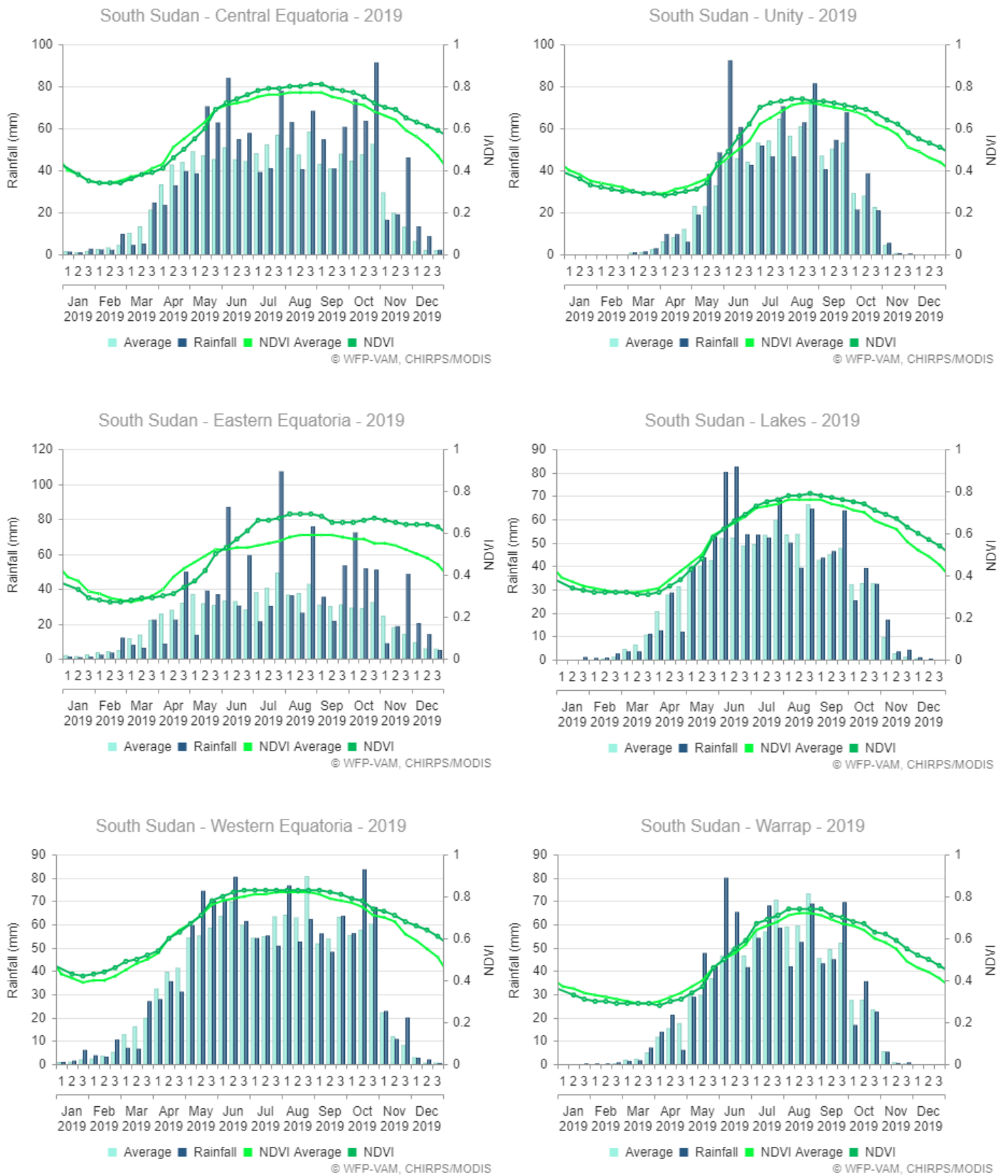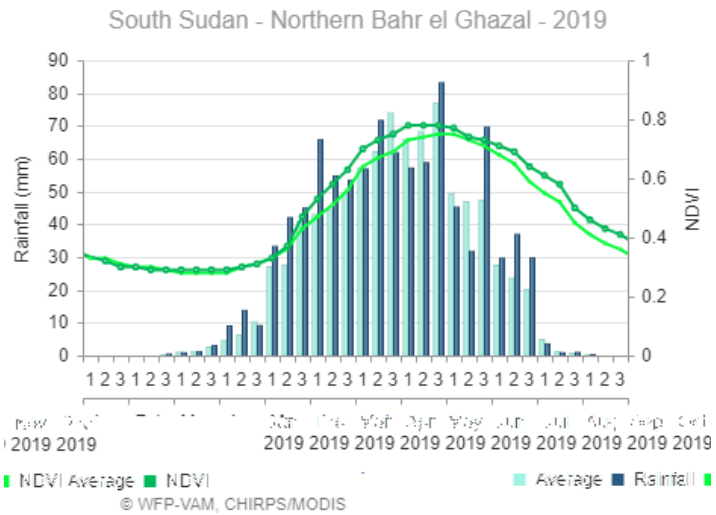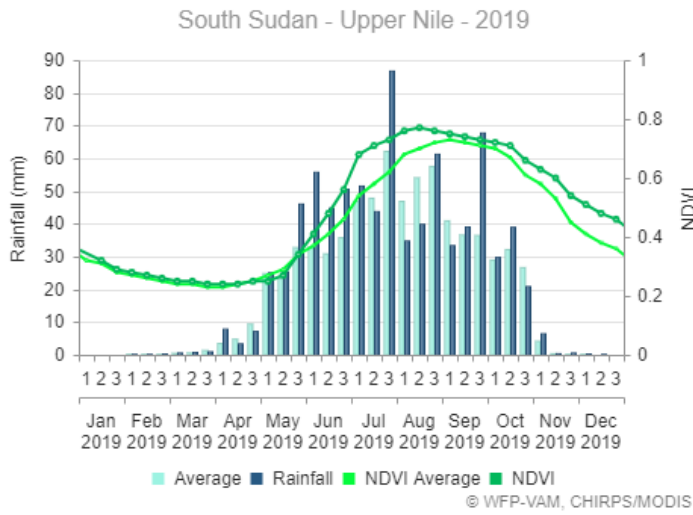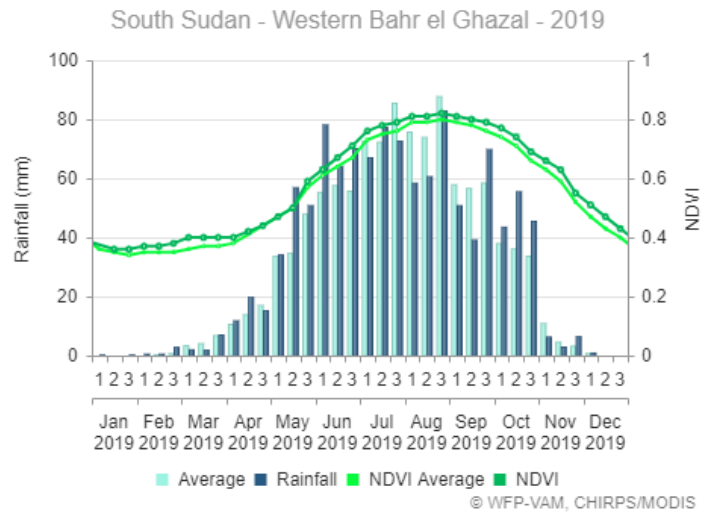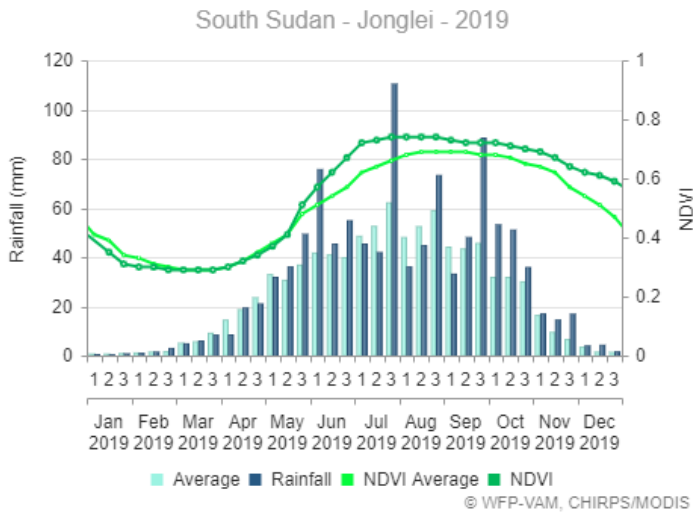
South Sudan - Central Equatoria - 2019

South Sudan - Unity - 2019

South Sudan - Eastern Equatoria - 2019

South Sudan - Lakes - 2019

South Sudan - Western Equatoria - 2019

South Sudan - Warrap - 2019

South Sudan - Jonglei - 2019

South Sudan - Western Bahr el Ghazal - 2019

South Sudan - Upper Nile - 2019

South Sudan - Northern Bahr el Ghazal - 2019

Source: WFP/VAM, 2019 https://dataviz.vam.wfp.org/seasonal_explorer/rainfall_vegetation/visualizations.

Figure 10: South Sudan - Rainfall anomalies (2019)
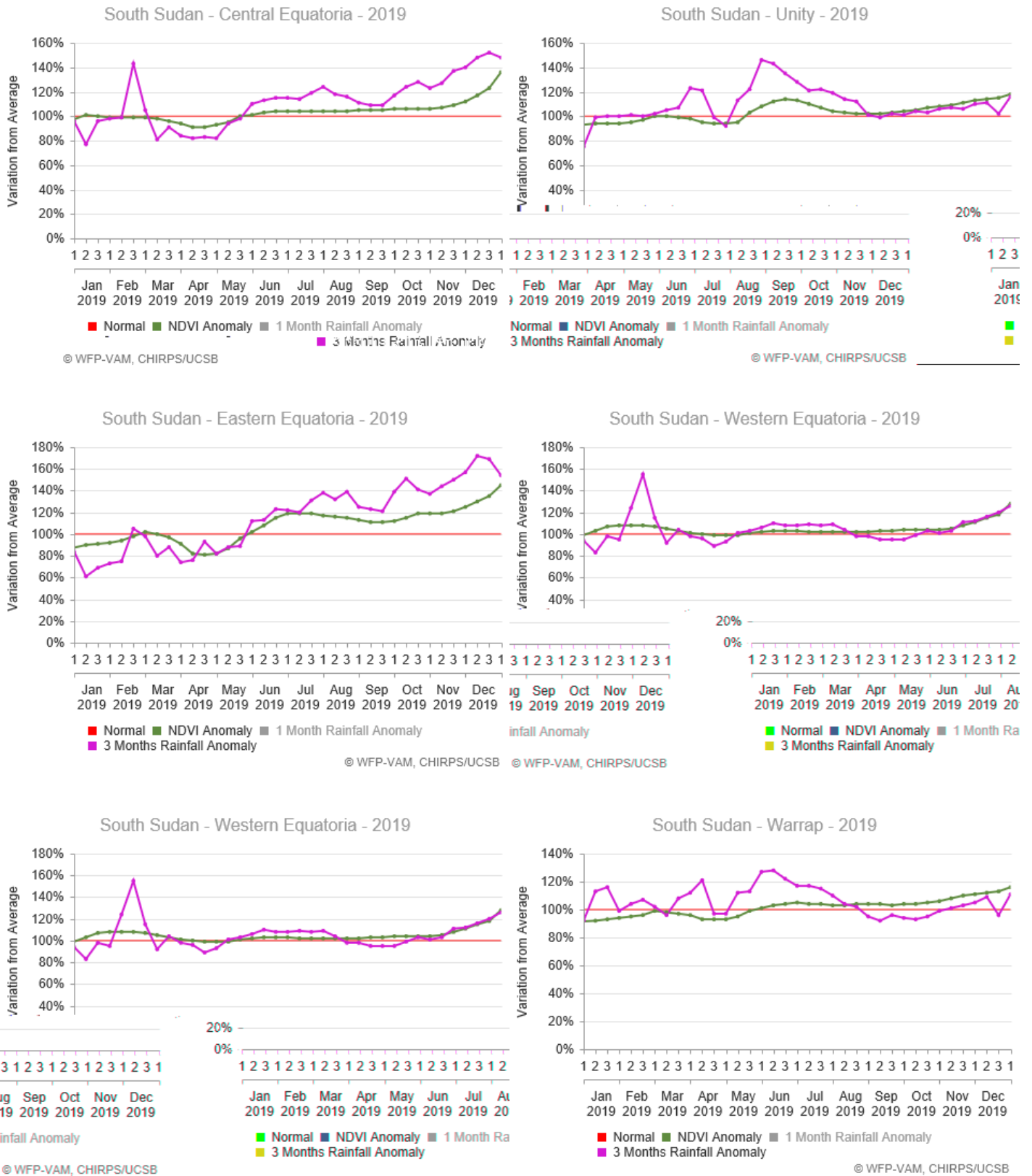
South Sudan - Central Equatoria - 2019
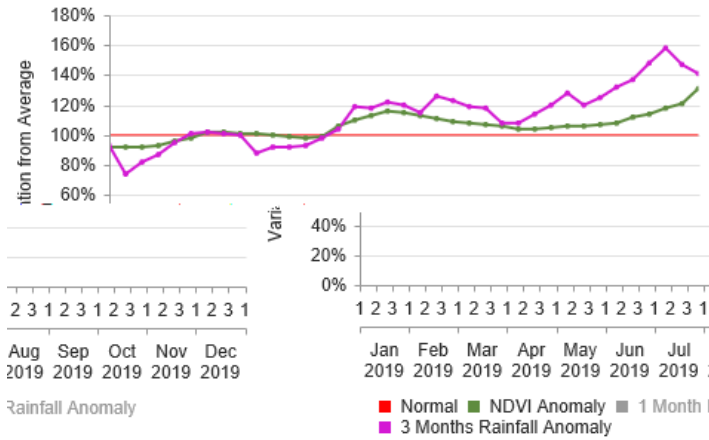
South Sudan - Unity - 2019

South Sudan - Eastern Equatoria - 2019

South Sudan - Western Equatoria - 2019

South Sudan - Western Equatoria - 2019

South Sudan - Warrap - 2019

South Sudan - Jonglei - 2019

South Sudan - Western Bahr el Ghazal - 2019

South Sudan - Upper Nile - 2019
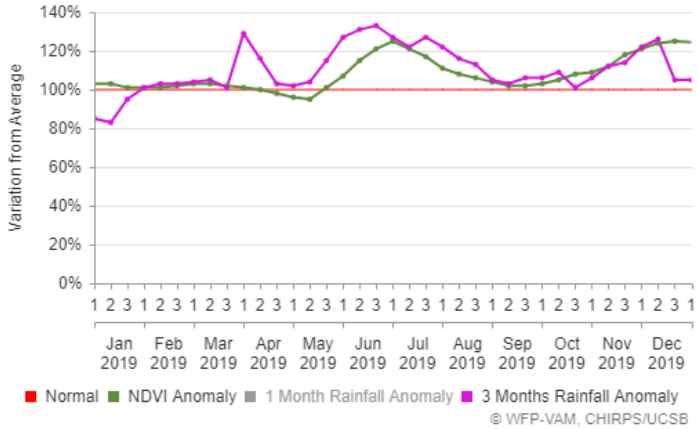
South Sudan - Northern Bahr el Ghazal - 2019
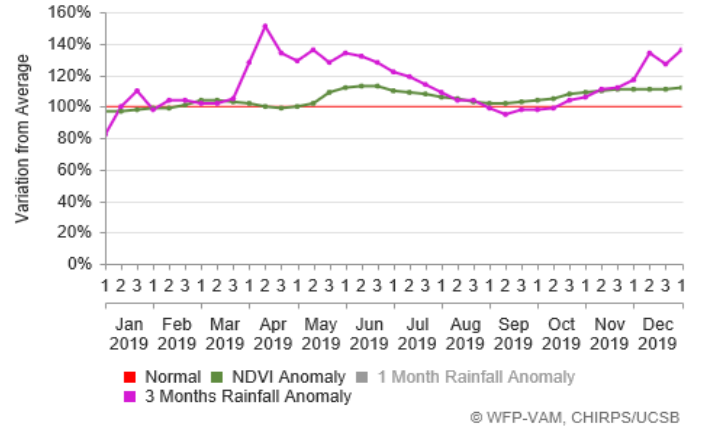
Source: WFP/VAM, 2019 https://dataviz.vam.wfp.org/seasonal_explorer/rainfall_vegetation/visualizations.

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 most areas except Northern Bahr el Ghazal State. The importance of using animal manure is increasing, with its application largely performed by keeping over crop fields large herds of cattle 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*.

Due to the economic crisis and the devaluation of the South Sudanese Pound, prices of hand tools continued in 2019 the increasing trend of the previous four years. For exam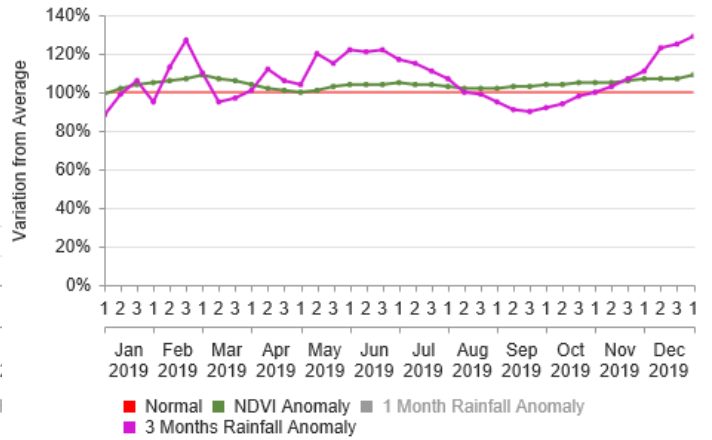ple, in Aweil County in Norther Bahr el Ghazal State, the average unit price of a hoe in 2019 was SSP 1 000, compared to SSP 700 in 2018.

The acceptance of animal traction in Lakes State, where the up-take of the technology appears to be the highest, and in parts of Warrap and Central Equatoria states, is reflected in the high hiring rates for 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.

Soil fertility maintenance practices are limited to shifting land and fallowing and the use of animal dung in Northern Bahr el Ghazal, Warrap, Western Bahr el Ghazal and Lakes states. Whereas in most locations the dung is sourced from the farmers' own livestock, in Northern Bahr el Ghazal State, where shifting land opportunities 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 yield and control *Striga* weed, the practice of hiring herds of cattle to stay in their farms is rarely affordable for poor farmers.

Agro-chemicals are not used 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. A few years ago, trials on the use of fertilizers on maize by the International Fertilizer Development Company in Central and Western Equatoria states have been discontinued with no apparent gains recorded. The Aweil Rice Scheme, which used to apply Triple Super Phosphate, has ceased using fertilizers six years ago due to access constraints. 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 purchases of fertilizers became increasingly difficult since 2016.

Regarding seeds, farmers in all regions use:

➢ Their own seeds of sorghum carried over from the previous harvest.

➢ Market-purchased seeds for crops with high storage losses, including locally multiplied, improved varieties of maize such as *Longi-5* and improved groundnut varieties such as *Red Beauty*.

➢ Seeds borrowed from extended family members and neighbours.

At planting time, prices of seeds in the local markets were significantly higher than in the previous year. In Western Equatoria State, prices of sorghum seeds were about SPP 170/kg (SSP 600/malwa), compared to SSP 115/kg (SSP 400/malwa) in 2018 and prices of groundnuts (unshelled) were SSP 85/kg (SSP 300/malwa) compared to SSP 43/kg (SSP 150/malwa) in 2018. In Northern Bahr el Ghazal State, prices of sorghum were SSP 143-228/kg compared to SSP 86/kg in 2018, while in Eastern Equatoria State, a kilogramme of sorghum was sold at about SSP 250 compared to SSP 200 in 2018 and was sold at SSP 350 compared to SSP 250 in 2018.

Pests, diseases and weeds

Several types of pests, diseases and weeds infest crops every year in South Sudan and, despite their significant damage, chemical treatments are not carried out due to 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. In December 2019, attacks by QQU and desert locusts in and around the mechanized commercial farms in Upper Nile State resulted in lower yields compared to 2018.

Fall Armyworm (*Spodoptera frugiperda*) was first identified in the country in 2017, quickly spreading to the major cropping areas within a short period. By 2018, FAW had reached maize and sorghum growing areas in all states, with varying levels of infestation. In 2019, high infestation levels were reported at the beginning of the season, especially on the maize growing areas of Greater Equatoria. However, the heavy precipitation that characterized the 2109 rainy season, particularly during its second half, washed away and weakened the worms, significantly reducing infestation levels and damage to crops. Therefore, the damage caused by the FAW in most of the maize and sorghum growing areas in 2019 was reported to be mild compared to the serious damage caused in 2018.

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

The most common non-migratory pests reported in 2019 included green grasshoppers, caterpillars, millipedes, termites, aphids, stalk (stem) borers, sorghum cinch bug, local birds, monkeys, rodents, wild pigs, porcupines and domestic livestock. Almost all infestations caused mild to average damages in most areas. However, the 2019 cropping season was characterized by heavy weed infestations over most areas due to the above-average rainfall 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, which were well drained and weeded, were in comparatively better conditions.

Weeding of grass and broadleaf weeds only once or twice during the growing period is a normal practice in the traditional sector. As observed by the Task Force teams, 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 crop assessment teams, deployed to 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 2019 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)[10] with cereals can also

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[10] 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.

be used to effectively control *Striga* weed through training of farmers and extension workers and the provision of well-designed extension packages on appropriate control measures.

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 the 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.

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

The common plant diseases observed during the current cropping season include rosette virus, leaf spot of groundnuts, mosaic virus of cassava and head smut on sorghum, among others.

Storage pests, particularly weevils, rats and moulds, continued to cause severe damage on harvested crops throughout the country in 2019. The wet conditions that prevailed during the first harvest season prevented farmers in the Greenbelt to adequately manage their grains (especially maize) and caused above-average losses due to fungus (mould). Farmers in most parts of the country use traditional practices to protect stored crops and do not have access to improved crop storage practices and facilities.

Agricultural production in 2019

Cereal production

A. Traditional smallholder sector

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

In 2019, the Task Force Team-led estimates of cereal production in each State were compiled from county-level disaggregated data. This information was gained from historical time-series data adjusted by the findings from a series of missions conducted by the Task Force teams during the planting and harvest assessments, which included (a) 1 448 detailed, on-farm case studies with sample farmers and key informant interviews with staff from State ministries, NGOs and projects; (b) empirical data obtained from a large number of localities using, where possible, the updated South Sudan's PET. In such transects, PET-based scores of crop yields are cross-checked by weighing crop-cut samples taken during the case studies. In addition, yield estimates made by the CCMCs in 64 counties through crop-cuttings and PET manuals were used as supplementary information to further improve the quality of the 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). The 2019 missions at planting and harvest time completed by the Task Force teams are listed below:

➢ In August and September, missions to assess yields of first season maize (*Longi-5* variety), other cereal crops and groundnuts were conducted in Western Equatoria State, covering Nzara, Yambio, Tambura, Ibba, Mvolo, Ezo, Mundri West and East counties. Subsequently, another Mission was conducted in November to assess second season crops in Tambura, Nzara, Nagero, Ezo, Mundri West and Mvolo counties.

➢ Between late August and early September, a Task Force teams to assess yields of first season cereals (maize and sorghum), groundnuts and cassava was conducted in Central Equatoria State, 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. This year, the Task Force Team has managed to assess Morobo County for the first time since the escalation of conflict in 2016.

➢ Similarly, during August/September, first season harvest assessments were conducted in Eastern Equatoria in the Pageri Administrative Area and in Torit, Ikotos and Magwi counties, followed by first harvest missions in September to Kapoeta South, Kapoeta East, Kapoeta North and Budi counties. In the Greater Kapoeta Region (Kapoeta North, East and South), assessment of yields of cereal crops, including local landraces of sorghum (*Kabi*) and small areas planted with maize were conducted. In November, second harvest assessments were conducted in Budi, Ikotos, Torit, Magwi counties and in the Pageri Area, while the long cycle sorghum and ratoon[11] sorghum were assessed in Kapoeta South, Kapoeta East and Kapoeta North.

➢ In late September, missions to assess yields of cereal crops, including rice, were conducted in Northern Bahr el Ghazal State (Aweil West, Aweil South, Aweil Centre, Aweil North and Aweil East counties), Western Bahr el Ghazal State (Raja, Jur River and Wau counties), Warrap State (Gogrial West, Twic, Tonj North, Tonj South counties and Abyei Administrative area) and in Lakes State (Yirol West, Cueibet and Wulu counties). The crops assessed included short-cycle sorghum landraces (*Cham*, *Nanjung*, *Rapjung*, *Abele*) plus medium-cycle sorghum landraces (*Alep Cham*, *Nyethin*, *Nyandok*, *Rabdit*, *Aleul*, *Aiyella*) and improved *feterita*-type sorghums from the Sudan, including *Arfa Gadameck*, *Wad Ahmed*, *Gaddam el Hamam*, late sorghum landrace (*kec*), 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 and Pochalla counties) in late September.

➢ In early December, 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 Team was able to assess a number of commercial farms growing sorghum and sesame, and minor crops including groundnuts, bulrush millet and sunflower.

➢ The Task Force Team was not able to visit Unity State as, despite the recent security improvements, risks to team safety were considered too severe to allow access to the area. However, the Team has taken advantage of the yield data collected by the FAO's Monitoring and Evaluation Team, using CFSAM methodology and aimed at estimating the production obtained from the seeds distributed through ELRP by FAO and its partners.

➢ Additional information was provided by 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.

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[11] A new (second) crop generating from the base of an already harvested sorghum plant. The ratoon crop is developed by cutting most of the portion above the ground but leaving the roots and the growing shoot apices intact so as to allow the plants to recover and produce a fresh crop in the next season.

As presented in Table 4, the national gross cereal production from the traditional smallholder sector in 2019 is estimated at about 1 023 100 tonnes, exceeding the threshold of 1 million tonnes for the first time since 2016. Post-harvest losses and seed use for sowing in 2020 are assumed, as in previous assessments, to account for 20 percent of the total production, leaving a net amount of about 818 500 tonnes available for local consumption. This result is about 10 percent above the low output obtained in 2018, but still 4 percent below the average of the previous five years. The increase of cereal production compared to 2018 is attributed to a 5 percent increase in the harvested area and favourable rains in terms of amounts and temporal/spatial distribution boosting yields, especially in the Greater Equatoria Region. However, the gains due to higher yields and the expansion of harvested areas were partly offset by significant flood-induced losses in Northern Bahr el Ghazal, Warrap, Upper Nile and Jonglei states.

The Task Force teams estimated that about 74 154 hectares of cultivated land have been affected by the floods, with an estimated loss of 72 600 tonnes of grain in Northern Bahr el Ghazal, Warrap, Upper Nile, Jonglei, Lakes, Eastern Equatoria and Central Equatoria. Losses represent about 7 percent of the total gross production of 2019, with a severe impact on the food security situation of the vulnerable population in the affected areas. However, the recession of flood waters offered also the opportunity for flood recession farming, mainly vegetables, with a favourable impact on diet diversification.

Significant increases in the 2019 cereal production compared to 2018 were recorded in Central Equatoria (+39.7 percent), Eastern Equatoria (+35.6 percent), Western Equatoria (+30.1 percent), Western Bahr el Ghazal (+29.1 percent) and Unity (+21 percent) states. Moderate increases in production were recorded in Lakes State (+12.2 percent), while in Warrap State the output was similar to the previous year. By contrast, cereal production declined in Upper Nile (-25.3 percent), Northern Bahr el Ghazal (-21.6) and Jonglei (-4.9 percent) states due to flood-induced crop losses.

In 2019, the average gross cereal yield from the traditional smallholder sector is estimated at 1.1 tonnes per hectare, 4.4 percent up from 2018. The increase reflects the favourable growing conditions in the areas not affected by the floods, mainly average to above-average rainfall amounts along with the absence of prolonged dry spells and minimal FAW damage on crops. Following the CFSAM standard procedure since 2014, conservative yield values have been used for the counties not visited by the Task Force teams at harvest time, where no independent assessments have been conducted and no CCMC reports were available.

Table 4: South Sudan - Estimated (traditional sector) cereal harvested area, yield, production, consumption and balance (2019-2020)

State/County	2019				2020		
	Cereal area (hectares)	Gross yield (tonne/hectare)	Gross cereal production (tonnes)	Net cereal production (tonnes)	Population (mid-2020)	Cereal requirement (tonnes)	Surplus/deficit (tonnes)
Central Equatoria	**64 844**	**1.32**	**85 432**	**68 345**	**1 133 165**	**145 235**	**-76 889**
Juba	19 175	1.2	23 010	18 408	419 542	58 736	-40 328
Kajo Keji[1/]	5 730	1.4	8 023	6 418	113 064	13 568	-7 150
Lainya[1/]	5 131	1.3	6 671	5 337	107 164	12 860	-7 523
Morobo[1/]	4 881	1.9	9 274	7 419	147 359	17 683	-10 264
Terekeka	19 265	1	19 265	15 412	173 459	20 816	-5 404
Yei[1/]	10 661	1.8	19 190	15 352	172 576	21 572	-6 220

[1/] First and second harvests combined.

State/County	2019				2020		
	Cereal area (hectares)	Gross yield (tonne/hectare)	Gross cereal production (tonnes)	Net cereal production (tonnes)	Population (mid-2020)	Cereal requirement (tonnes)	Surplus/deficit (tonnes)
Eastern Equatoria	**122 355**	**1.26**	**154 220**	**123 376**	**1 062 619**	**131 982**	**-8 606**
Budi	17 435	1.3	22 666	18 132	99 962	11 995	6 137
Ikotos	22 020	1.2	26 424	21 139	132 051	16 506	4 633
Kapoeta East	13 149	1	13 149	10 519	174 632	21 829	-11 310
Kapoeta North	7 456	1	7 456	5 965	110 632	13 829	-7 864
Kapoeta South	4 400	1.2	5 280	4 224	72 366	9 408	-5 184
Lafon	13 183	1.2	15 820	12 656	109 570	13 149	-493
Magwi	26 734	1.7	45 448	36 359	197 763	23 731	12 627
Torit	17 978	1	17 978	14 382	165 643	21 534	-7 152
Jonglei	**59 507**	**0.79**	**47 111**	**37 689**	**1 864 549**	**209 296**	**-171 607**
Akobo	6 426	1	6 426	5 141	195 775	21 536	-16 395
Ayod	1 078	0.8	862	690	183 117	20 143	-19 453
Bor South	11 445	0.75	8 584	6 867	255 793	29 416	-22 549
Duk	2 758	0.7	1 931	1 545	123 764	13 614	-12 069
Fangak	1 491	0.7	1 044	835	184 273	20 270	-19 435
Khorflus/Pigi/Canal	865	0.7	606	484	105 426	11 597	-11 112
Nyirol	4 455	0.6	2 673	2 138	186 594	20 526	-18 388
Pibor	8 512	1	8 512	6 810	204 437	24 532	-17 723
Pochalla	6 941	1.1	7 635	6 108	87 131	10 456	-4 348
Twic East	5 880	0.6	3 528	2 822	128 409	14 125	-11 303
Uror	9 656	0.55	5 311	4 249	209 831	23 081	-18 833
Lakes	**132 502**	**1.22**	**162 124**	**129 700**	**1 310 142**	**144 117**	**-14 418**
Awerial	17 449	0.9	15 704	12 564	156 974	17 267	-4 704
Cueibet	27 621	1.2	33 146	26 516	200 243	22 027	4 490
Rumbek Centre	14 170	1.2	17 003	13 603	277 623	30 539	-16 937
Rumbek East	19 963	1.3	25 952	20 762	226 117	24 873	-4 111
Rumbek North	3 549	0.9	3 194	2 555	65 384	7 192	-4 637
Wulu	11 938	1.4	16 713	13 371	79 700	8 767	4 604
Yirol East	12 624	1.2	15 149	12 119	118 403	13 025	-906
Yirol West	25 188	1.4	35 263	28 210	185 698	20 427	7 783
Northern Bahr el Ghazal	**151 550**	**0.87**	**131 776**	**105 420**	**1 498 460**	**164 830**	**-59 410**
Aweil Centre	11 148	0.75	8 361	6 689	117 522	12 928	-6 239
Aweil East	54 560	0.8	43 648	34 918	588 879	64 776	-29 858
Aweil North	35 883	0.9	32 295	25 836	299 576	32 953	-7 117
Aweil South	16 579	0.85	14 092	11 274	160 163	17 618	-6 344
Aweil West	33 380	1	33 380	26 704	332 320	36 555	-9 851
Unity	**19 975**	**0.72**	**14 366**	**11 493**	**912 883**	**78 396**	**-66 903**
Abiemnhom	958	0.7	670	536	30 970	2 632	-2 095
Guit	881	0.6	528	423	41 170	3 499	-3 076
Koch	2 713	0.8	2 171	1 737	131 512	11 178	-9 442
Leer	2 557	0.7	1 790	1 432	113 298	9 631	-8 199
Mayendit	1 617	0.65	1 051	841	92 239	7 841	-7 000
Mayom	4 226	0.7	2 958	2 366	182 692	15 529	-13 162
Panyijar	3 091	0.6	1 854	1 483	98 474	8 370	-6 887
Pariang	2 949	0.9	2 655	2 124	142 515	12 114	-9 990
Rubkona	983	0.7	688	551	80 013	7 601	-7 051

State/County	2019				2020		
	Cereal area (hectares)	Gross yield (tonne/hectare)	Gross cereal production (tonnes)	Net cereal production (tonnes)	Population (mid-2020)	Cereal requirement (tonnes)	Surplus/deficit (tonnes)
Upper Nile	**44 632**	**0.66**	**29 534**	**23 628**	**1 064 751**	**91 975**	**-68 347**
Baliet	1 160	0.75	870	696	52 686	4 478	-3 782
Fashoda[1/]	595	0.6	357	285	50 565	4 298	-4 013
Longochuk	3 545	0.6	2 127	1 701	79 600	6 766	-5 064
Luakpiny/Nasir	10 664	0.8	8 531	6 825	317 833	27 016	-20 191
Maban	3 974	0.6	2 384	1 908	62 799	5 338	-3 430
Maiwut	1 987	0.65	1 292	1 033	44 357	3 770	-2 737
Malakal	647	0.8	518	414	79 214	7 525	-7 111
Manyo	1 211	0.85	1 030	824	29 691	2 524	-1 700
Melut	5 639	0.56	3 158	2 526	80 481	6 841	-4 315
Panyikang	711	0.8	569	455	26 157	2 223	-1 768
Renk	10 334	0.6	6 200	4 960	135 815	12 223	-7 263
Ulang	4 165	0.6	2 499	1 999	105 554	8 972	-6 973
Western Bahr el Ghazal	**43 068**	**1.18**	**50 797**	**40 637**	**579 360**	**65 733**	**-25 095**
Jur River	14 015	1.1	15 416	12 333	169 145	18 607	-6 274
Raga	5 163	1.3	6 712	5 369	104 939	10 494	-5 124
Wau	23 891	1.2	28 669	22 935	305 276	36 632	-13 697
Warrap	**62 193**	**0.99**	**161 171**	**128 937**	**1 570 108**	**151 330**	**-22 394**
Abyei	7 653	0.8	6 122	4 898	83 794	7 541	-2 643
Gogrial East	13 270	0.75	9 952	7 962	146 595	13 927	-5 965
Gogrial West	49 593	1.1	54 552	43 642	364 420	38 265	5 377
Tonj East	9 388	0.8	7 511	6 008	124 946	12 494	-6 486
Tonj North	26 705	0.8	21 364	17 091	257 272	25 727	-8 635
Tonj South	20 285	1.3	26 371	21 096	138 252	12 442	8 654
Twic	35 299	1	35 299	28 239	454 828	40 935	-12 696
Western Equatoria	**128 923**	**1.45**	**186 577**	**149 262**	**814 451**	**118 095**	**31 166**
Ezo[1/]	13 543	1.6	21 669	17 335	112 678	16 338	997
Ibba[1/]	10 034	1.5	15 051	12 041	42 144	6 111	5 930
Maridi[1/]	12 798	1.5	19 197	15 357	81 838	11 867	3 491
Mundri East[1/]	4 329	1.15	4 978	3 983	63 172	9 160	-5 177
Mundri West[1/]	4 008	1.1	4 409	3 527	58 060	8 419	-4 891
Mvolo	6 517	1	6 517	5 214	91 228	13 228	-8 014
Nagero	1 645	1.2	1 974	1 580	15 321	2 222	-642
Nzara[1/]	18 172	1.7	30 892	24 714	63 334	9 183	15 530
Tambura[1/]	25 043	1.5	37 564	30 051	79 442	11 519	18 532
Yambio[1/]	32 833	1.35	44 325	35 460	207 235	30 049	5 411
Total	**929 548**	**1.1**	**1 023 108**	**818 486**	**11 810 488**	**1 300 990**	**-482 504**

Source: CFSAM South Sudan, 2019.
[1/] First and second harvests combined.

Table 5: South Sudan - Cereal harvested area and net production (rounded) in the traditional sector (2015-2019)

Region/State	2015 Area ('000 ha)	2015 Net Prod. ('000 t)	2015 Net Yields (t/ha)	2016 Area ('000 ha)	2016 Net Prod. ('000 t)	2016 Net Yields (t/ha)	2017 Area ('000 ha)	2017 Net Prod. ('000 t)	2017 Net Yields (t/ha)	2018 Area ('000 ha)	2018 Net Prod. ('000 t)	2018 Net Yields (t/ha)	2019 Area ('000 ha)	2019 Net Prod. ('000 t)	2019 Net Yields (t/ha)
Greater Upper Nile Region	**108**	**68**	**0.63**	**118**	**73**	**0.62**	**124**	**82**	**0.65**	**125**	**81**	**0.65**	**124 115**	**72 809**	**0.59**
Upper Nile	45	27	0.53	48	30	0.63	53	35	0.65	52	32	0.61	44 632	23 628	0.53
Unity	16	9	0.55	16	9	0.56	18	10	0.54	17	9	0.56	19 975	11 493	0.58
Jonglei	47	32	0.76	54	34	0.63	54	37	0.68	57	40	0.7	59 507	37 689	0.63
Greater Bahr el Ghazal Region	**440**	**379**	**0.86**	**480**	**416**	**0.87**	**470**	**417**	**0.89**	**480**	**410**	**0.85**	**489 313**	**404 694**	**0.83**
Northern Bahr el Ghazal	147	114	0.84	157	124	0.79	153	129	0.85	157	134	0.86	151 550	105 420	0.7
Western Bahr el Ghazal	65	58	0.89	51	45	0.88	37	33	0.89	37	31	0.84	43 068	40 637	0.94
Lakes	97	94	1.01	117	106	0.91	125	112	0.9	129	116	0.9	132 502	129 700	0.98
Warrap	131	113	0.9	155	141	0.91	156	143	0.92	157	129	0.82	162 193	128 937	0.79
Greater Equatoria Region	**467**	**465**	**1**	**346**	**336**	**0.97**	**268**	**266**	**0.99**	**278**	**254**	**0.91**	**316 121**	**340 983**	**1.08**
Central Equatoria	197	216	1.19	117	120	1.03	60	62	1.04	57	49	0.87	64 844	68 345	1.05
Eastern Equatoria	139	116	0.98	116	99	0.85	107	94	0.87	112	91	0.82	122 355	123 376	1.01
Western Equatoria	131	133	1	113	117	1.04	101	110	1.09	110	114	1.04	128 923	149 262	1.16
Total	**1 015**	**912**	**0.9**	**940**	**826**	**0.88**	**863**	**764**	**0.89**	**883**	**745**	**0.84**	**929 548**	**818 486**	**0.88**

Source: CFSAM South Sudan, 2019.

B. Mechanized sector

The largest mechanized rainfed agricultural schemes in the country are located in Upper Nile State. Here, the rainfed mechanized sector 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 un-demarcated 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 mechanized sector also includes 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, Aweil East County, both located in Northern Bahr el Ghazal State. There are also some mechanized farms in other states, particularly in the Greater Equatoria Region, which are normally unaccounted for during the assessments and some emerging commercial farms in the Greater Bahr el Ghazal Region, expanding using labour gangs, digging fields by hand or using animal traction.

In Upper Nile State, where the largest area of mechanized farms is located, 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 carried out manually using sickles and hoes. Due to shortages of combine harvesters, only sesame harvesting is mechanized.

The two dominant crops in the mechanized areas of Upper Nile State are sorghum and sesame, grown in medium to large-scale farms ranging from 800 to 1 500 feddans (from 336 to 630 hectares). Small quantities of other crops are also grown, including sunflower, pearl millet and groundnuts.

In Renk County, the main source of seeds in 2019 was from the Sudan, with improved sorghum seeds bought at SSP 16 000-20 000/90-kg bag, while the price of sesame seeds was SSP 45 000-50 000/90-kg bag. Few farmers used own saved seeds. Similarly, farmers in Melut and Paloich counties had to resort to purchased seeds due to last year's crop failure, caused by prolonged dry spells. Prices of sorghum and sesame seeds in these areas were SSP 10 000 and SSP 30 000/90-kg, respectively.

There are 424 tractors in commercial farming areas of Upper Nile State (250 in Renk and 174 in Melut counties, most of which functional). In 2019, the tractor hiring rate in Renk County for a two-time operation (ploughing and harrowing) was SSP 240 000/block (120 feddans), compared to last year's rate of SSP 150 000, plus the provision of two barrels of fuel, one for ploughing and one for harrowing. Almost all agricultural inputs including fuel, spare parts, hand tools and seeds are obtained from the Sudan through informal cross-border trade.

In 2019, the Task Force-led teams visited large-scale farms in Renk, Melut and Aweil counties. According to the teams' findings, mechanized farming was undertaken intensively, with large areas cultivated by Sudanese and local farmers. Based on the Task Force teams' estimates, about 119 000 hectares of sesame and 92 000 hectares of sorghum were sown in the mechanized sector in 2019, about 12 percent more than in 2018, mainly due to the improved security which facilitated the movement of the labour force, increasing its availability. In particular, the area planted with sesame increased by about 70 percent, partly at the expense of sorghum. The expansion of plantings is attributed to sesame's high profitability due to the sustained demand by Sudanese traders that purchase the produce at high prices for re-exporting purposes. By contrast, despite the instructions of the local Government, the area planted with sorghum declined by 23 percent compared to 2018 as most farmers preferred to plant sesame.

The 2019 rainy season across Renk and Melut counties had a good performance in terms of both temporal distribution and rainfall amounts, considerably better than in 2018, when crop development was affected by a prolonged dry spell in July. According to remote sensing data, cumulative seasonal rain amounts between May and October 2019 in both counties were about 15 percent above average, but floods were negligible and had no impact on crops. Although

a substantially increased production of all crops was anticipated due to the good rains, sorghum production declined due to a reduction in the planted area. Yields of both sorghum and sesame were higher than the previous year due to the favourable weather conditions, despite some losses caused by QQU, desert locusts, sorghum smut, aphids and bugs and Striga weeds. By contrast, FAW damage was minimal and well below the levels of 2017 and 2018.

Sesame production in 2019 is estimated at 59 500 tonnes, more than 70 percent up from last year, mainly as a result of an expansion of planted area. The increased 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. Sorghum production in 2019 is estimated at 46 000 tonnes, about 15 percent lower than in 2018, mainly due to the decline in planted area in favour of sesame. The reduction in output was partly contained by higher yields compared to 2018 due to favourable weather.

The Aweil Rice Scheme is a national project for rice production in South Sudan. The area prepared for rice planting in 2019 was 1 050 hectares (630 hectares by the Government scheme and 420 hectares by private farmers), compared to 490 hectares planted in 2018. However, in the Aweil Rice National Project and mechanized farms located in the rice basins, a total crop failure occurred as torrential rains throughout the cropping period triggered severe flooding between early June and October which completely impeded planting and other agricultural operations, also displacing a large part of the local population.

Similarly, in Ton Chol mechanized farming areas in Aweil East County, farming practices did not take place due to heavy flooding in August, when the short cycle sorghum varieties (Wad Ahmed or Gaddam el Hamam) are planted. The flooding continued up to October and no output was produced. On the other hand, in the Ayai farm, located in Aweil South County, farmers managed to plant about 840 hectares of sorghum, despite the floods. However, waterlogging resulted in a severe contraction of yields (-60 percent) and just 420 tonnes were harvested.

In 2019, the overall area and production estimates for sorghum[12] and rice in the mechanized sub-sector are shown in Table 6, with a contribution of 46 420 tonnes of sorghum to the 2019 national cereal harvest.

Table 6: South Sudan - Cereal area and production estimates of the mechanized sub-sector (2019)

Location	Estimated area harvested (ha)	Yields (t/ha)	Estimated production (t)	Remarks
Upper Nile (sorghum)	92 000	0.5	46 000	424 tractors in Renk and Melut counties
Aweil Rice Scheme (paddy rice) including the surrounding private farmers	Nil	-	Nil	No planting due to serious flooding
Aweil-Udham (sorghum)	Nil	-	Nil	No planting due to serious flooding
Ayai Farm (sorghum)	840	0.5	420	Low production due to flood damage
Ton Chol (sorghum)	Nil	-	Nil	No planting due to serious flooding
Total			**46 420**	

Source: CFSAM South Sudan, 2019.

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

Other crops

Groundnuts and cassava are the main non-cereal crops grown in the country. 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 also provide income as cash crops 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 the Greenbelt and the southern areas of the 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 the 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 left un-weeded until harvesting. As it is usually the last crop in a rotation, it may well be left for a third year depending on the needs. Although 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 or cassava flour. Cassava yields vary significantly with the agro-ecology and, based on the PET photo-indicators (plant densities, crown sizes and canopies) and occasional cross-check sample weightings, the Task Force-led teams noted that yields in 2019 ranged from 11 to 18 tonnes of fresh tubers/hectare in the major growing areas of the country.

Since 2018, the increased numbers 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 in 2019 also included Jonglei[13] Upper Nile[14] and Unity[15] states. The 2019 aggregate outputs are estimated at about 1.4 million tonnes of cassava and 144 150 tonnes of groundnuts (see Table 7). Production of groundnuts increased by 52 percent and production of cassava by 10.7 percent compared to the previous year. These production increases are due to an expansion of the planted area, but also to the wider geographical coverage of the assessments carried out in 2019.

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

Table 7: South Sudan – Cassava and groundnuts indicative area, yield and production estimates (2019)

State	Cassava (two years)[1]			Groundnuts[2]		
	Area (ha)	Yields (t/ha)	Production (t)	Area (ha)	Yields (t/ha)	Production (unshelled, t)
Central Equatoria	14 280	16.0	228 480	21 700	0.70	15 190
Eastern Equatoria	19 700	13.0	256 100	10 300	0.80	8 240
Western Equatoria	36 100	18.0	649 800	37 400	0.80	29 920
Jonglei	400	11.0	4 400	2 350	0.60	1 410
Upper Nile	-	-	-	4 120	0.50	2 060
Unity	-	-	-	1 170	0.50	585
Lakes	10 000	12.0	120 000	63 440	0.70	44 408
Warrap	-	-	-	22 800	0.60	13 680
Western Bahr el Ghazal	10 890	12.0	130 680	20 500	0.70	14 351
Northern Bahr el Ghazal[1]	-	-	-	23 850	0.60	14 310
Total	**91 370**	**15.2**	**1 389 460**	**207 632**	**0.69**	**144 151**

Source: CFSAM South Sudan, 2019.

[1] First and second harvests combined.

[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 2019.

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[13] Both cassava and groundnuts.

[14] Only groundnuts.

[15] Only groundnuts.

LIVESTOCK

LIVESTOCK

Updated statistics on livestock numbers are not available. The most recent documented estimate of cattle numbers produced by FAO in 2009 suggests a cattle population of 11.7 million heads, plus about 24 million heads for sheep and goats. It is difficult to assess whether the distribution by State is still valid.

Using the conservative cattle population growth rate of 0.06 percent per annum derived for Ethiopia, the 2019 cattle population is estimated at 12 555 100 heads, disaggregated at State level as shown in Table 8.

Since the start of the conflict in 2014, enforced and voluntary livestock migration from the conflict-affected states into more secure areas and across the international borders and the redistribution through *systematic theft* within the states by the parties has reportedly taken place at large scale. Livestock raiding has been particularly prominent in Unity and Jonglei states, but its effect on the existing livestock population was difficult to be assessed during the field interviews. Although raiding is traditionally common amongst the Nuer, Murle and Dinka tribes, recently, cattle raiding is increasingly exercised by the Murle tribes. The disruption of traditional livestock migration routes and patterns, coupled with frequent and widespread cattle raiding incidents, has resulted in significant displacements of farming households in recent years. Despite the overall improvement of the security situation, cattle raiding incidents involving losses of human lives were reported in 2019 in some areas. These incidents took place mainly in the Abyei Administrative Area in Warrap and Lakes states, where cattle raiding episodes have significantly increased in 2019. Notably, in Twic County of Warrap State, over 13 000 cattle were looted in 2019. In Lakes State, according to data collected during the 25th Round of the Food Security and Nutrition Monitoring System (FSNMS), between 17 and 42 percent of the households reported that raiding had reduced their livestock holdings compared to the same period in 2018, Here, in addition, in late 2019, more than half of the households in Yirol East County and nearly 40 percent in Rumbek Centre County reported owning no livestock.[16]

Table 8: South Sudan - Estimated number of cattle by State ('000)

State	2014	2015	2016	2017	2018	2019
Central Equatoria	885	885.5	886.0	886.5	887.0	940.2
Eastern Equatoria	895	895.5	896.0	896.5	897.0	950.8
Western Equatoria	679	679.4	679.8	680.2	680.6	721.4
Jonglei	1 475	1 475.8	1 476.7	1 477.5	1 478.4	1 567.1
Upper Nile	989	989.5	990.1	990.6	991.2	1 050.7
Unity	1 188	1 188.7	1 189.4	1 190.1	1 190.8	1,262.2
Lakes	1 320	1 320.7	1 321.5	1 322.2	1 323.0	1,402.4
Warrap	1 539	1 539.9	1 540.8	1 541.7	1 542.6	1 635.2
Western Bahr el Ghazal	1 257	1 257.7	1 258.5	1 259.2	1 260.0	1 335.6
Northern Bahr el Ghazal	1 590	1 590.9	1 591.9	1 592.8	1 593.8	1 689.4
Total	**11 817**	**11 823.7**	**11 830.8**	**11 837.5**	**11 844.4**	**12 555.1**

Source: CFSAM (2013) and Draft FAO Livestock Strategy Paper (2014).

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[16] FEWS NET, South Sudan Food Security Outlook, February to September 2020.

In 2019, above-average rainfall amounts across the country benefited pasture and water availability with a favourable impact on animal body condition that was on average scored 3 for cattle and 4 for sheep and goats. By contrast, in the flood-affected lowland areas, severe access constraints to grazing areas, feed shortages, displacements of herders and confinement of animals in higher ground areas were reported. The states most affected by feed shortages include Warrap, Northern Bahr el Ghazal, Lakes, Jonglei, Unity, Upper Nile, plus the Abyei Administrative Area.

The floods affected an estimated 3 million livestock through:

➢ Widespread livestock mortality, up to 80 percent of the herds in the worst affected areas.

➢ A threefold increase in the incidence of livestock waterborne diseases, including Rift Valley Fever, East Coast Fever (ECF), trypanosomiasis, Anthrax, Haemorrhagic Septicaemia and intestinal worms.

➢ Limited availability of forage as pastures were submerged in the flooded areas, with an ensuing decrease in livestock productivity, including milk production.

In addition, livestock routes and marketing activities have been disrupted by the floods, resulting in higher prices of animals due to the limited market supply.

The floods have also increased the prevalence of endemic livestock diseases such as Contagious Bovine Pleuropneumonia (CBPP), BQ, Foot-and-Mouth Disease, Peste des petits ruminants (PPR), Haemorrhagic Septicaemia, Newcastle disease and coccidiosis. In order to mitigate the impact of the floods on livestock health, FAO and its partners conducted vaccination and treatment campaigns against various diseases across the country (Tables 9 and 10). By contrast, in the areas not affected by the floods, the incidence of livestock diseases has been normal in 2019, with no reports of serious disease outbreaks.

Table 9: South Sudan - Number of animals vaccinated (2019)

State	Cattle	Sheep and goats	Poultry	Dogs	Donkeys	Total	Number of households
Central Equatoria	270 933	51 398	3 504	234	0	326 069	4 573
Eastern Equatoria	12 422	10 914	210	70	0	23 616	610
Jonglei	688 408	308 765	3 586	610	0	1 001 369	52 733
Lakes	86 486	23 985	996	90	20	111 577	3 434
Northern Bahr el Ghazal	128 355	52 448	0	0	0	180 803	4 099
Unity	718 092	105 953	12 206	870	0	837 121	27 441
Upper Nile	235 423	107 769	786	100	0	344 078	15 839
Warrap	125 794	98 277	10 385	833	74	235 363	13 056
Western Bahr el Ghazal	87 630	15	0	0	0	87 645	226
Western Equatoria	40 315	13 112	5 710	487	0	59 624	2 040
Total	**2 393 858**	**772 636**	**37 383**	**3 294**	**94**	**3 207 265**	**124 051**

Source: FAO South Sudan.

Table 10. South Sudan – Number of animals treated (2019)

State	Cattle	Sheep and goats	Poultry	Dogs	Donkeys	Total	Number of households
Central Equatoria	15 169	11 062	1 055	427	0	27 713	4 189
Eastern Equatoria	15 038	13 714	1 336	50	17	30 155	4 007
Jonglei	33 394	22 533	10 940	766	5	67 638	6 371
Lakes	4 120	2 474	0	0	0	6 594	364
Northern Bahr el Ghazal	19 282	7 557	375	200	70	27 484	2 079
Unity	94 519	49 925	37 259	0	5	181 708	39 537
Up 87	5	5070					

Source: FAO South Sudan.

CEREAL SUPPLY/DEMAND SITUATION

CEREAL SUPPLY/DEMAND SITUATION

Cereal balance

Total cereal consumption in 2020 is estimated at the slightly above level of 1.3 million tonnes, using a projected 2020 mid-year population of 11.8 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. In particular, the estimated production of at least 1.4 million tonnes of fresh cassava and over 144 000 tonnes of unshelled groundnuts is expected to provide about 415 190 tonnes and 129 000 tonnes of grain equivalents, respectively, bringing the estimated average per capita consumption to about 135 kg of cereal equivalent per year, suggesting a level fairly close to the estimates for neighbouring countries.

With an estimated net cereal production from the traditional sector of about 818 500 tonnes, a cereal deficit of about 483 000 tonnes is forecast for the 2020 marketing year, 7 percent less than the 2019 deficit of about 518 000 tonnes, but still 22 percent above the 2015-2019 average.

Table 11 summarizes the estimated cereal supply situation for each State in 2020 and compares it with the Mission's estimates for the previous five years.

The largest shortfall is forecast in the 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 tonnes in recent years. In 2020, the deficit in this region is expected to increase by about 7 percent to 307 000 tonnes as the flood-induced cereal production declines recorded in 2019 in Upper Nile and Jonglei states offset the increased output obtained in Unity State. The Greater Equatoria

Table 11: South Sudan - Estimated cereal surplus/deficit (tonnes)

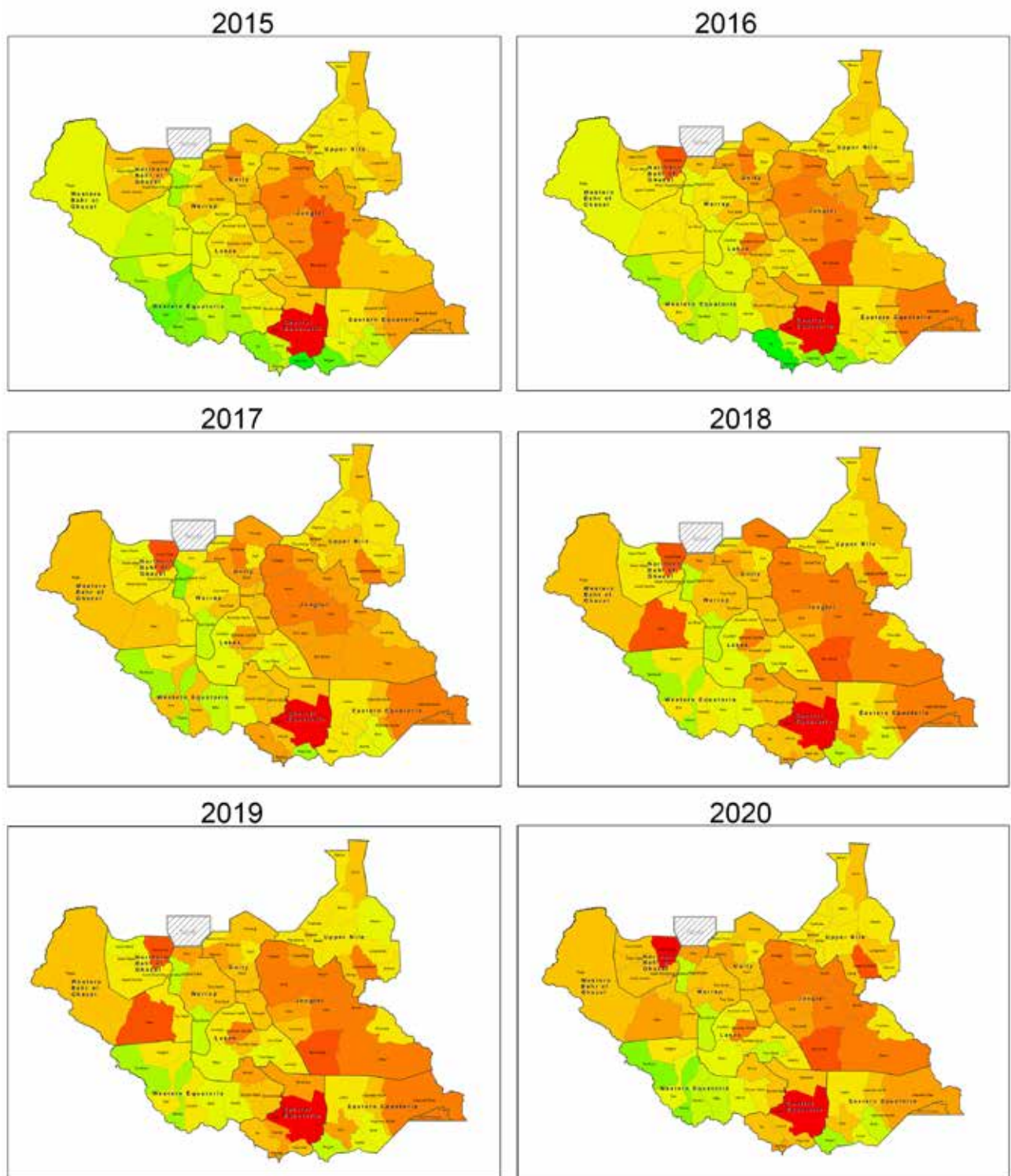| State/Region	2015	2016	2017	2018	2019	2020
Central Equatoria	25 196	14 291	-13 294	-73 528	-92 092	-76 889
Eastern Equatoria	6 338	-16 750	-21 355	-29 889	-37 177	-8 606
Western Equatoria	86 767	18 542	10 601	52	- 589	31 166
Greater Equatoria Region	**118 302**	**16 083**	**-24 048**	**-103 365**	**-129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

Source: CFSAM South Sudan, 2019.

Region (Western, Central and Eastern Equatoria states), which used to produce a moderate surplus up to 2016, moved to a deficit position of about 24 000 tonnes in 2017, with the cereal deficit quadruplicating to more than 100 000 tonnes in 2018 and further increasing to about 130 000 tonnes in 2019. This trend was caused by the spread of the conflict to the region in 2016 and by the protracted and widespread episodes of violence in the following years, which resulted in massive displacements that severely disrupted agricultural operations. In 2020, the deficit, forecast at about 54 000 tonnes, is expected to be less than half than in 2019, as the combined cereal production in the three states increased by about 35 percent due to an expansion in the harvested area following the improved security situation and higher yields due to abundant rains. Notably, in traditional food surplus-producing areas of Yei, Morobo, Lainya and Magwi counties, that recorded increasing deficits in recent years due to widespread violence, the gap is expected to halve in 2020, declining from 22 000 to 11 000 tonnes due to substantial cereal production increases in 2019, especially in Lainya and Magwi counties. In addition, a sizable surplus of about 31 000 tonnes is expected for the first time since 2015 in Western Equatoria State. By contrast, in Kajo Keji County, which used to produce the country's largest cereal surplus (about 30 000 tonnes on average between 2015 and 2017) and moved to a deficit position of more than 6 000 tonnes in 2019 as the planted area sharply declined due to the conflict, the gap is projected to increase in 2020 by 13 percent to more than 7 000 tonnes, as insecurity continued to severely affect agricultural operations. In Western Bahr el Ghazal State, that produced a surplus of about 16 000 tonnes in 2015 and recorded increasing

deficits in recent years due to the conflict, the gap is expected to decline for the first time in 2020, decreasing by 22 percent to about 25 000 tonnes, due to a 30 percent increase of cereal production in 2019. In Warrap State, the deficit is expected to rise by 22 percent to about 22 000 tonnes in 2020, as cereal production in 2019 was affected by the floods. In Northern Bahr el Ghazal State, the deficit in 2020 is expected to be more than twice than in 2019, reaching almost 60 000 tonnes, as cereal production is estimated at a record low level of 131 800 tonnes due to the floods. The county with the largest food deficit is Juba County, where about 40 000 tonnes of cereals will be needed in 2020 to cover the food requirements of mostly urban households. The gap declined by about 12 percent compared to 2019 as cereal production in rural and peri-urban areas in 2019 increased by nearly 70 percent from the record low 2018 output due to expanded plantings following the improvements in the security situation and high yields due to favourable rains.

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 46 420 tonnes of cereals, mainly sorghum. 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 the international organizations providing food assistance in the surrounding food deficit areas.

Figure 11: South Sudan - Estimated cereal surplus/deficit, 2015-2020 (tonnes)

Source: FAO South Sudan.

Cereal and livestock markets

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 only temporarily interrupted during the last quarters of 2016 and 2017 when the newly harvested crops increased availabilities and, by mid-2018, prices reached record levels. Cereal prices declined by 30-50 percent in the second semester of 2018, mainly driven by the appreciation of the local currency on the parallel market. Prices reversed their trend and started to increase in early 2019 as the local currency depreciated again, with prices of imported wheat flour reaching new record highs in July 2019, while prices of maize and sorghum reached again the peaks of mid-2018 in August and October 2019, respectively. In late 2019, as the South Sudanese Pound held steady on the parallel market, prices of imported wheat declined, while prices of sorghum and maize remained firm. In December 2019, sorghum and maize grains were traded at about SSP 140/kg, between 75 and 90 percent above the levels of 12 months earlier. Wheat flour was traded in December 2019 at about SSP 220/kg, about 45 percent up from a year earlier. In December 2019, groundnuts and cassava were traded in Juba at SSP 300/kg and SSP 115/kg, respectively. Prices of groundnuts were at the same levels of one year earlier, while prices of cassava were over 20 percent higher on a yearly basis. Overall, in Juba, prices of the main staples as of end-2019 were 15-20 times above their levels in July 2015, when they started to surge. 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 and the lingering impact of prolonged conflict.

Figure 12: South Sudan (Juba) - Retail prices of selected cereals (SSP/kg)
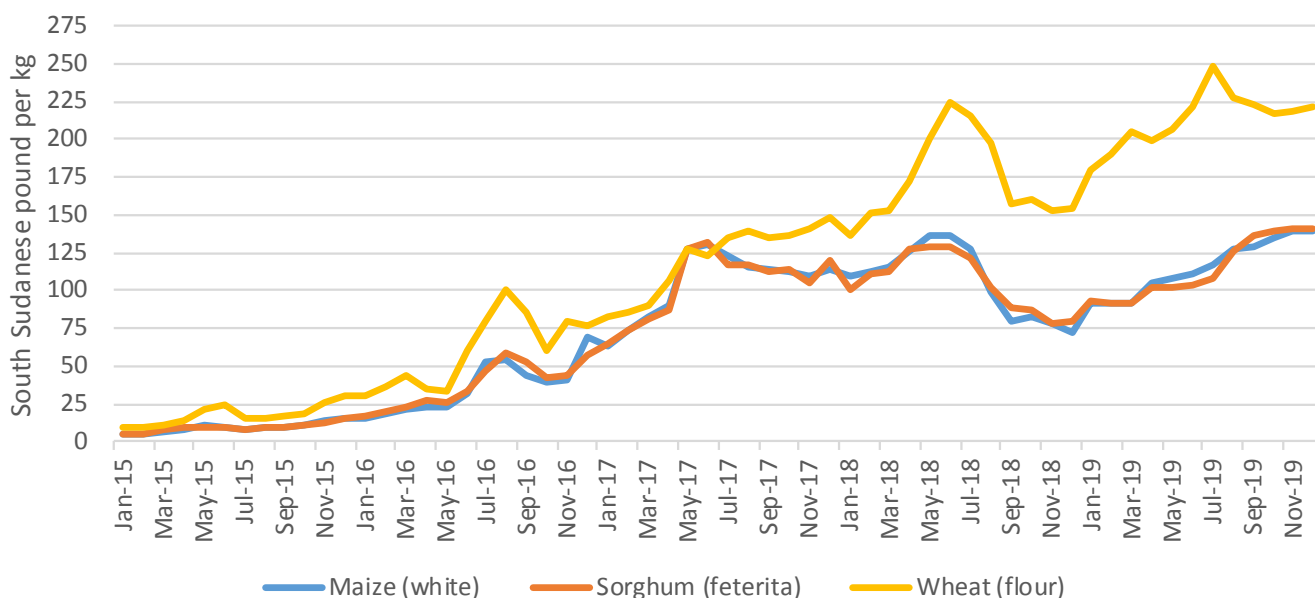

Source: South Sudan Crop and Livestock Market Information System.

Prices of sorghum started to surge in mid-2015 also in other markets across the country (Figure 13), peaking in mid-2018. Between August and December 2018, they declined by 10-35 percent in the markets of Aweil (Northern Bahr el Ghazal State), Wau (Western Bahr el Ghazal State), Rumbek (Lakes State) and Yida (Unity State), as the downward pressure from the newly harvested 2018 crops entering the markets was compounded by the improved market activity and trade flows after the signing of the R-ARCSS. Prices sharply increased between January and August 2019 due to the combined impact of an earlier-than-normal depletion of stocks from the record low 2018 harvest, the depreciation of the local currency and torrential rains and floods disrupting trade flows. Prices declined in late 2019 as the newly harvested crops increased supplies and floodwaters receded facilitating transportation activities. However, despite the declines, sorghum prices in December 2019 were still at exceptionally high levels in several markets, up to 60 percent higher than their one-year earlier levels, severely constraining access to food for market-dependant households.

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 supply flows. Transportation costs are in general more than proportional to the distance from 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 can rely on the regular supplies of locally produced and imported commodities, food and livestock prices record a high volatility throughout the country, as local economies are always very shallow and prices tend to quickly react to situations that may be contingent and short-lived such as a one-day road block, the delivery of food assistance even in limited quantities or an isolated episode 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-ARCSS, despite the improvements in 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 marked volatility of the exchange rate of the South Sudanese Pound vis-à-vis the US Dollar.

Figure 13: South Sudan - Retail prices of white sorghum in selected markets (SSP/kg)
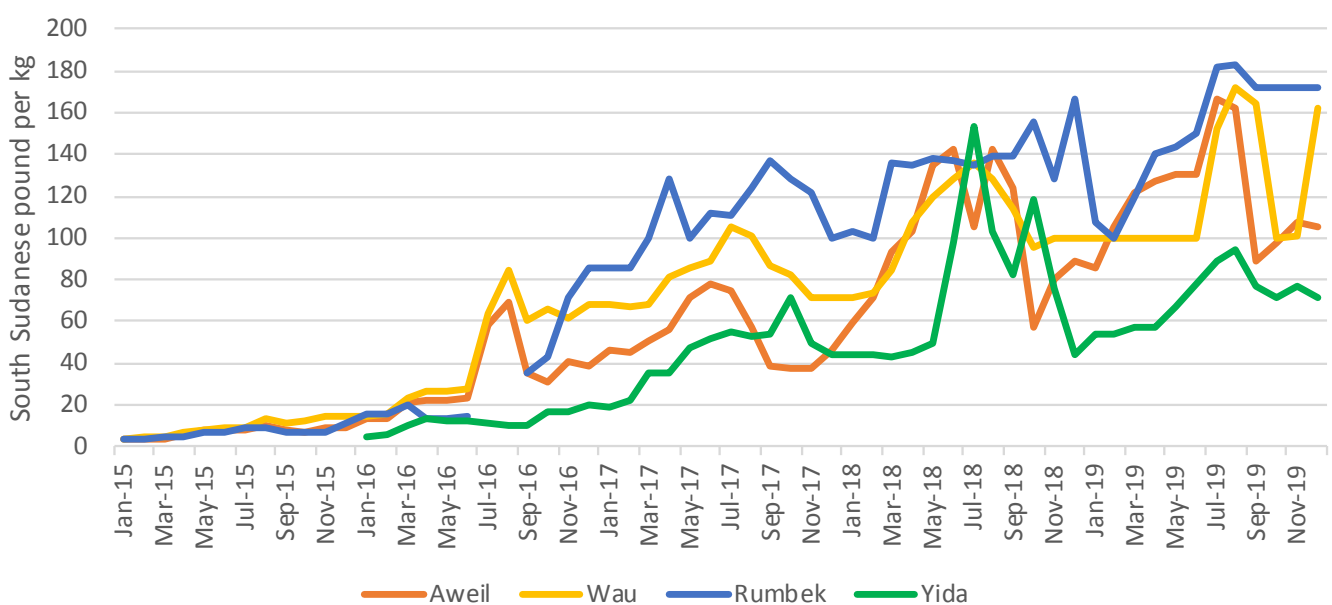
Source: WFP.

Price volatility and market segmentation were exacerbated by the escalation of the conflict between 2016 and mid-2018 and in 2019 by flood-related trade disruptions. In the areas worst affected by floods in the Greater Bahr el Ghazal and Greater Upper Nile regions, prices of cereals were extremely volatile in late 2019. In Maban and Maiwut counties in Upper Nile State and Akobo and Pibor counties of Jonglei State, the reduction in trade flows and market supplies has caused food prices to nearly double between November and December 2019. Subsequently, as flood waters began to recede and market supply improved, prices sharply dropped. In Bunj market of Maban County, the retail price of 1 kg of sorghum declined by over 70 percent, from SSP 430-115, between December 2019 and mid-January 2020. Despite the improvements of the security situation, food markets remained substantially segmented due to structural logistical constraints and the impact of floods. As of December 2019, the prices of 1 kg of sorghum varied from SSP 70 in Yida, to SSP 105 in Aweil, to about SSP 160 and SSP170 in Rumbek and Wau, respectively.

The difficult access to fuel and its high price also played an important role in determining food price differentials. Compared to previous years, fuel availability has improved since mid-2018, especially in Juba, after the Government lifted fuel subsidies and allowed private companies to import fuel. Fuel prices declined in the second semester of 2018 in several markets including the capital, Juba. Subsequently, prices resumed their increasing trend in 2019 and, in December, they were in Juba about 15 percent higher than one year earlier. In addition, significant fuel price differentials remain across the country due to transport constraints and unavailability of adequate distribution facilities in several markets and, in December 2019, prices of petrol varied from SSP 250 in Juba to SSP 300-350 in Bor and Aweil, to SSP 400-470 in Wau, Renk and Melut, up to SSP 500-550 in Yambio and Yida.

Following the signing of the R-ARCCS in September 2018, relatively stable security conditions in 2019 facilitated overall market recovery and trade flows within the country and with neighbouring Sudan, Ethiopia and Uganda. Trade flows have remarkably improved along major

corridors, including Uganda-Juba through Nimule, Rumbek-Wau and 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. However, in several areas of the Greater Upper Nile and Greater Bahr el Ghazal regions, trade flows and market functioning have been severely affected by torrential rains and flooding since September 2019. Feeder roads were rendered impassable, especially in Jonglei State and along the Juba-Yirol-Rumbek corridor, the Ikwoto-Torit corridor in Eastern Equatoria State, the Rweng-Rubkona corridor in Unity State and the Melut-Maban corridor in Upper Nile State. In late 2019, trade flows and market functioning gradually improved as flood waters began to recede. In January 2020, the road from Bor South to Duk through Twic East in Jonglei State was again open as flood waters dried up, facilitating the movement of heavy trucks and improving supply flows. However, as of early February 2020, some roads remained impassable, leading to reduced trade flows in Leer and Mayendit counties in Unity State, Maban county in Upper Nile State and Ayod, Duk, Twic East and Pibor counties of Jonglei State.

Improved security 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. According to FEWS NET and the East Africa Grain Council, about 28 000 tonnes of maize and 23 000 tonnes of sorghum were imported from Uganda during the fourth quarter of 2019, 49 and 137 percent higher, respectively, than in the same period of 2018. Similar trends were observed in sorghum imports from the Sudan. However, these favourable developments in external trade risk to be undermined by the impact of the recent COVID-19 pandemic. While the Government of Uganda has indicated that it will allow commercial and food aid cargos to continue moving across the borders, screenings implemented in the framework of the measures to contain the spread of COVID-19 have significantly slowed down the commodity movement. According to FEWS NET, maize imports from Uganda to South Sudan declined by nearly 30 percent in the second week of March. As a result, cereal prices sharply increased in Juba,

with prices of sorghum and maize rising by 20 to 25 percent between February and April, and prices of wheat, totally imported, surging by more than 40 percent over the same period. Price spikes due to the disruption of trade flows from Uganda have also been recorded in other markets. For example, in Yei (Central Equatoria State) and Magwi (Eastern Equatoria State) markets, located near the border, prices of maize increased between February and April by 25 and 85 percent, respectively.

Figure 14: South Sudan - Market and trade functioning (October 2018-February 2020)
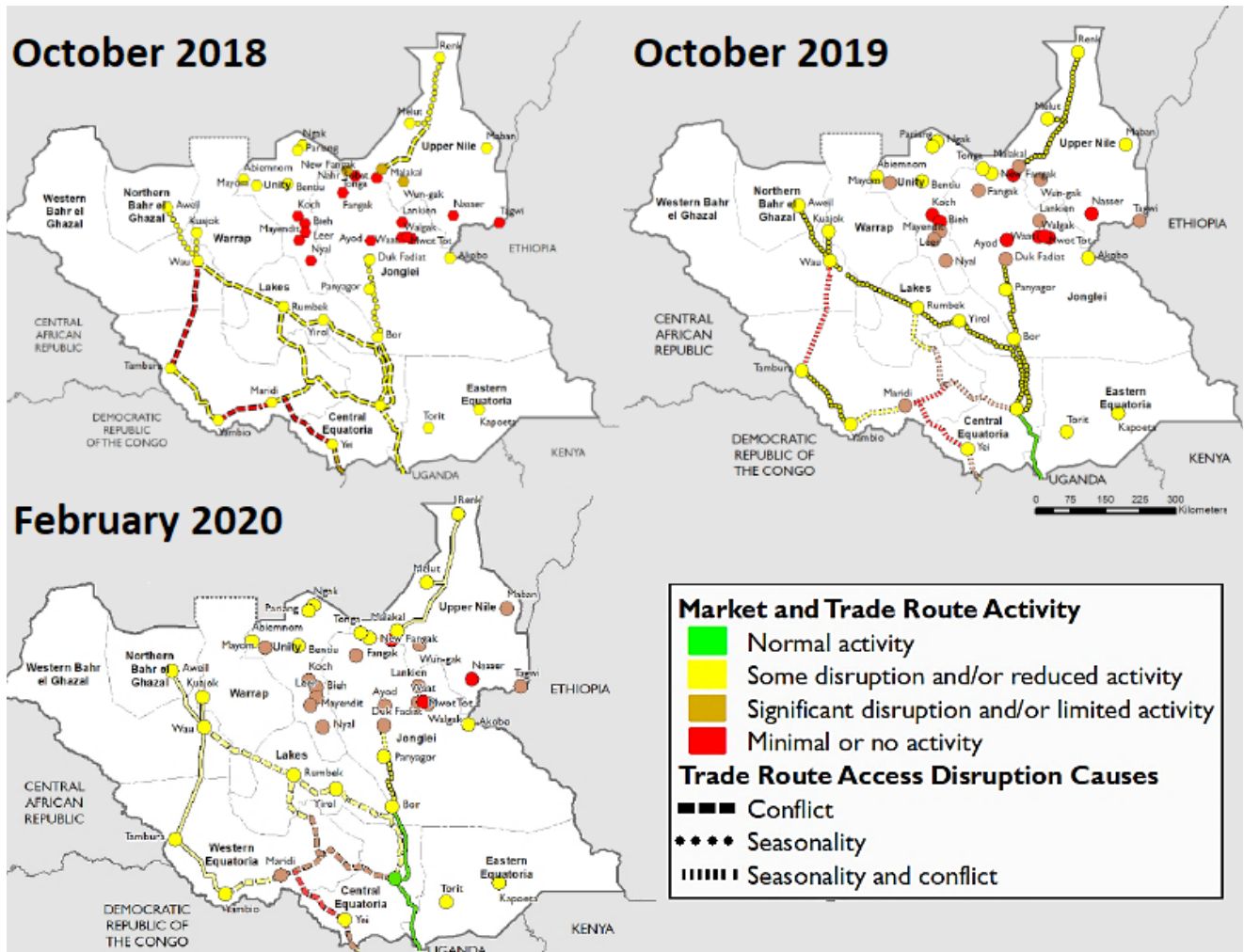
Source: FEWS NET.

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. In 2019, prices continued to increase, mainly driven by inflation, but at slower rate compared to previous years, as the improved security situation resulted in increased market supplies. In December 2019, goats were traded in Juba at about SSP 23 000/head, about 20 percent above the price of 12 months earlier and more than twice the prices of two years earlier.

In 2019, prices of goats increased at slower rates than the prices of sorghum and terms of trade for pastoralists deteriorated. In December 2019, in Juba, a goat was equivalent to about 160 kg of sorghum, about 30 percent less than the equivalent in sorghum 12 months earlier.

The terms of trade of the average daily wage against white sorghum deteriorated in 2019 in Juba as a result of increasing cereal prices coupled with poor macro-economic conditions constraining demand for casual labour and depressing wage rates. In early 2020, the equivalent in sorghum of one day of casual labour was about 11 kg, about 20 percent lower than 12 months earlier.

Figure 15: South Sudan (Juba) - Retail prices of goats and terms of trade
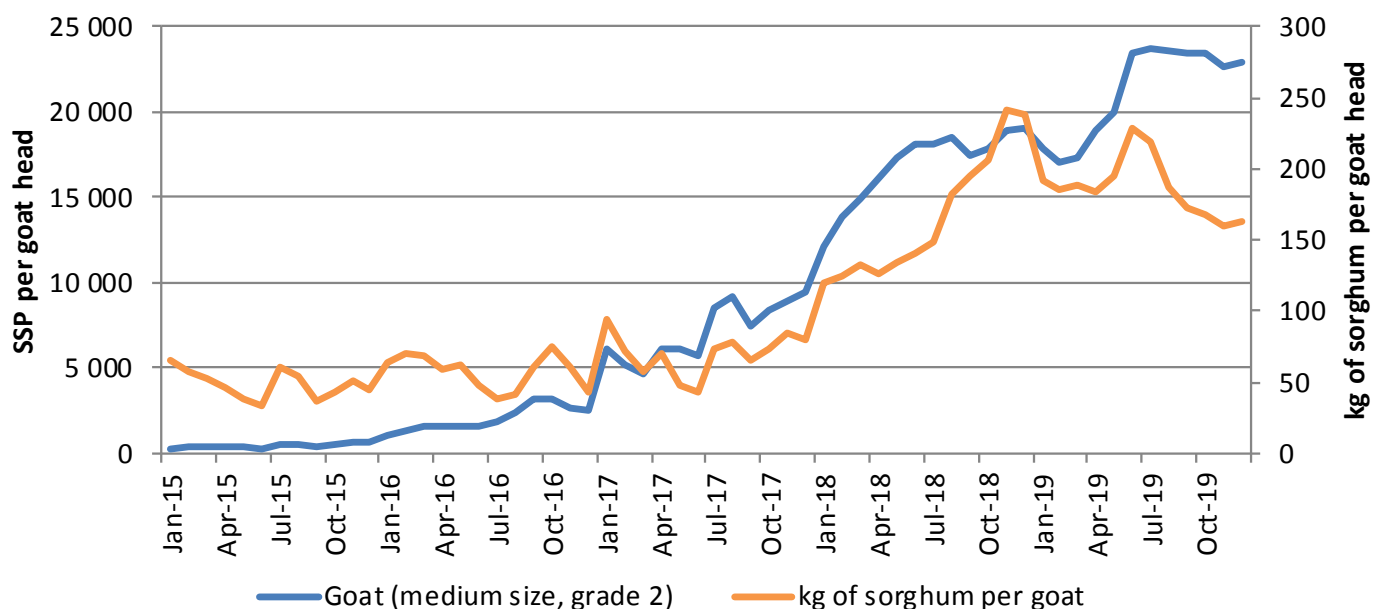
Source: South Sudan Crop and Livestock Market Information System.

Special Feature: Market assessment in Renk County

Trade flows and commodities traded

Renk County, the northernmost county of Upper Nile State bordering the Sudan, has a population of about 130 000 inhabitants and is a major transit centre and border crossing for people and goods traveling to and from the Sudan. In addition, the largest and most productive mechanized, market-oriented cereal producing areas of the whole country, where mainly sorghum and sesame are grown, are located in Renk and neighbouring Melut counties. As a result, Suk Asabi, the main market in Renk County, located in downtown Renk, whose population was estimated in 2004 at about 27 000 inhabitants, originates and receives trade flows at international (the Sudan), national (other states, up to the capital, Juba), regional (within Upper Nile State) and local level (Renk town, Renk County and neighbouring counties, mainly Melut County).

The border with the Sudan is intermittently open for people but permanently closed for goods. As a result, supplies are imported from and exported to the Sudan through alternate routes, including smaller roads to the east of the Wunthow border customs point, through Blue Nile State, or along the west bank of the Nile. However, circumventing the customs point entails longer routes and higher transport costs, and is sanctioned by the Government of the Sudan. During the Mission's visit to the border customs point, vehicle traffic on the all-weather 45 km tarmac road from Renk to Wunthow was low and mainly comprised private cars and taxis. Only a few heavy trucks were observed, heading unloaded for the border. According to key informants, trucks usually take advantage of the tarmac road until a few kilometres from the border, then drivers wait for the night hours for the detour to circumvent the border point. The closure of the border constitutes a severe impair to commerce despite the customary practice of cross-border trade, as the alternate routes are longer, less secure and the security forces of the Sudan detain smugglers and confiscate the vehicles and transported goods. However, according to key informants and interviewed traders, since the profound changes in the political situation in the Sudan took place in April 2019, border controls have been significantly eased, with a beneficial impact on informal trade flows between the two countries.

The commodities traded in Suk Asabi market in Renk Town are:

Staple foods:
* **Sorghum**, the main cereal staple grown and consumed in the area and in most of the country. On average, about 135 tonnes are traded per week, mostly sold in 90 kg sacs. According to key informants, about 60 percent of the sorghum produced in the mechanized farms is locally consumed, while 40 percent is sold to traders transporing it southwards (the Upper Nile State as a whole is a cereal deficit area). Traders purchase sorghum (and other food commodities) in Renk, then they transport them using the road up to Melut. The goods are then loaded onto barges transiting the White Nile to Kodok and to Malakal. Trade flows moving further southwards along the White Nile, reaching eventually Juba, sharply decline in intensity, due to high transport costs and insecurity along the river banks.
* **Wheat flour**, sourced from the Sudan.
* **Maize** and **millet**, locally produced and sold in limited quantities.
* **Cassava**, negligible amounts sourced irregularly from Juba.

Cash crops:
* **Sesame**, the main cash crop grown in the area, mostly bought by Sudanese traders for re-exporting purposes. Demand by Sudanese traders increased since 2017, as the surge in prices in the Sudan due to high production costs and general inflation made purchases from South Sudan more competitive. As a result, the area planted with sesame in Renk County increased since 2017, partly at the expense of sorghum. According to key informants, up to 10 tonnes (mostly sold in 50 kg sacs) are traded per week after the harvest and up to 2.5 tonnes during the lean season, the wide fluctuation deriving from the bulk purchases from Sudanese traders at harvest time, resulting in a fast stock depletion.
* **Groundnuts**, **Arabic Gum**, **Honey**, **Sunflower**, grown and consumed locally and in neighbouring counties.

Livestock and livestock products:
- *Cattle*, *sheep*, *goats*, reared locally and in neighbouring counties, sold directly by pastoralists or sourced from Shemedi and Jelhak markets. On average, about 200 small ruminants (sheep are more important than goats in the local diet) and 25 cattle are sold per day.
- *Chicken*, locally reared (limited amounts).
- *Milk*

Other:
- *Fuel*, *vegetable oil*, *sugar*, imported from the Sudan.
- *Okra*
- *Charcoal*
- *Unskilled labour*
- *Fish*
- *Vegetables* (according to key informants, limited amounts are transported southwards up to Juba).

Impact of the conflict on marketing and trade activities

The Greater Upper Nile Region has been the epicentre of the civil war that broke out in 2013, with several areas falling to opposition forces and the Government engaged in regaining their control. Renk County, located on the east bank of the White Nile, was in a Government-controlled area, while the west bank was controlled by the opposition forces. As a result, it was extremely close to the frontline. However, in Upper Nile State, the most intense fighting occurred in central and southern areas, where strategic nodes are located, including the capital, Malakal, and the Paloich oilfield, which, after the shutdown of the Unity oilfields early in the conflict, was one of the few working oilfields in the country and constituted the source of almost all of the Government's revenues. In addition, Renk was garrisoned by the 1st Division of the Sudan People's Liberation Army (SPLA), one its best trained and equipped units, which effectively operated as a deterrent. As a result, the city was spared the toll of death, displacement and destruction suffered by Malakal, which changed hands several times during the conflict. However, in 2014, the opposition forces repeatedly shelled the city from the west bank of the White Nile and conducted several raids against SPLA forces in Renk County. As a result of these attacks, market infrastructures in Renk town were significantly damaged and insecurity severely disrupted the movement of people and goods, reducing market activity and attendance. Nevertheless, the market remained functional and, according to key informants, it began to serve several nearby localities where trade ceased due to the conflict, including the towns of Jerbana, Guz Fami, Shemedi and Jelhak.

The security situation in Renk County improved in 2017 after SPLA forces conducted an offensive against opposition forces on the west bank of the White Nile, which secured the east bank and Renk from shelling and raids, but resulted in widespread displacements. During 2017, some rehabilitation activities were carried out in Suk Asabi market, with the repair of some of the structures damaged by the shelling. Since mid-2016, however, the country began displaying all the signs of macro-economic collapse, with output contracting, rampant inflation and parallel exchange market premium spiralling. The economic crisis had a major impact on market activities, constraining the purchasing power of the households whose livelihoods had already been affected by the losses caused by the conflict. In addition, the economic crisis negatively affected credit operations, with traders demanding customers to repay debts in less time not to incur in losses due to the inflation and restricting the number of customers accessing to credit due to the uncertainty on their ability to repay the debts. This further constrained market activity and, ultimately, food access.

In Renk County, the economic crisis was compounded by the macro-economic challenges that began to grip the Sudan in late 2017 and that resulted since then in sustained inflation and in soaring market prices of food and other essential commodities, including fuel. Notably, the soaring prices of fuel imported from the Sudan were, according to the majority of the traders interviewed in Renk, the main constraint to transport and marketing activities, along with the depreciation of the local currency and high taxation. As a result, despite remaining under Government control and suffering relatively minor physical damage, Suk Asabi market in Renk was severely affected by the combined impact of the conflict (mainly

deriving from restricted movements due to insecurity and from displacements in neighbouring counties), of the domestic economic crisis and of the severe macro-economic challenges in neighbouring Sudan. According to key informants and interviewed traders, by September 2018, immediately before the signing of the Revitalized Agreement on the resolution of the conflict in the Republic of South Sudan, market activity had declined to just 30-50 percent of the pre-conflict levels.

Impact of the Revitalized Agreement on the resolution of the conflict and situation in late 2019

The Revitalized Agreement on the resolution of the conflict in the Republic of South Sudan, signed in Khartoum in September 2018, resulted in a significant improvement of the security situation in Upper Nile State and across the country. According to the ACLED data, the number of security incidents (monthly average), estimated at 4.5 between September 2017 and August 2018, more than halved in the State, declining to 2.1 between September 2018 and August 2019. Here, as a result, the number of Internally Displaced People declined from 364 000 in September 2018 to 181 000 in September 2019 and significant numbers of South Sudanese that sought refuge in the Sudan were observed returning through Renk town since September 2018.

Figure 16: South Sudan - Average daily number of individuals inbound to and outbound from South Sudan with the intention to stay in their final destination for more than six months recorded in Renk County (September 2018-June 2019)
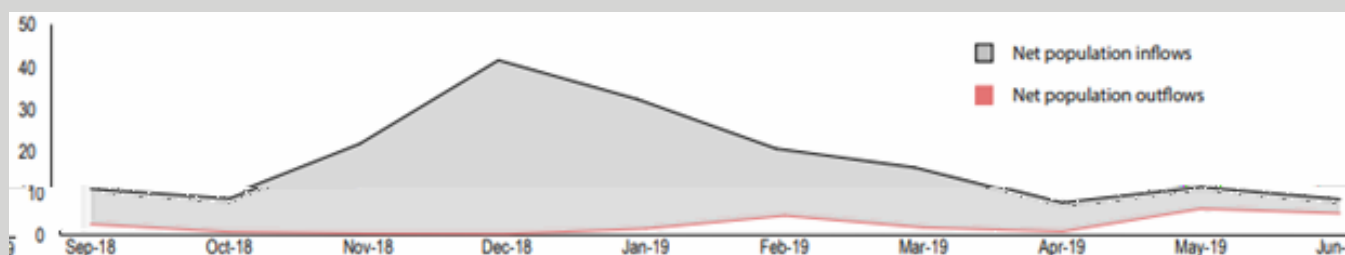
Source: REACH Initiative.

According to key informants and traders interviewed in Suk Asabi market in Renk, the improved security situation, allowing for an increased freedom of moment for persons and goods and for the return of refugees and internally displaced persons to their places of origin, resulted in increased market demand. Traders responded by increasing market supplies. For example, the owner of one of the largest wholesale trading companies in the market has indicated that the quantities of key commodities held in stock in its warehouse in October 2019 were significantly higher than one year earlier (Table 12).

Table 12: South Sudan - Suk Asabi market, quantities held in stock of selected commodities by interviewed wholesale traders

Commodity	Measure/unit	Stocks as of October 2019	Stocks as of October 2018	Variation (%)
Sorghum	90 kg sack	5 000	4 000	+25
Sesame	50 kg sack	5 000	3 000	+66
Wheat flour	50 kg sack	12 000	12 000	-
Sugar	50 kg sack	8 000	4 000	+100
Fuel (diesel)	48 gallons drums	1 000	600	+66

Source: Data collected by the Mission.

To keep pace with the increased demand, also the frequency of re-stocking increased compared to the previous year. According to small-scale sorghum wholesalers, the quantities held in their shops in October 2019 (about 40 sacks) had to be re-stocked every three days, compared to one week, one year earlier. Market prices in October 2019 were generally higher than one year earlier (Table 13).

Table 13: South Sudan - Suk Asabi market, wholesale prices of selected commodities (SSP)

Commodity	Measure/unit	Prices as of October 2019	Prices as of October 2018	Variation (%)
Sorghum	90 kg sack	7 500	5 000	+50
Sesame	50 kg sack	8 500	8 500	-
Wheat flour	50 kg sack	13 000	9 000	+44
Sugar	50 kg sack	13 000	10 000	+30
Sheep	head	35 000	17 000	+105
Fuel (diesel)	48 gallons drums	1 000	600	+66

Source: Data collected by the Mission.

Prices of wheat flour, sugar and fuel, imported from the Sudan in late 2019 were at high levels due to high prevailing market prices in the Sudan. Prices of sorghum, locally grown, were higher than a year earlier mainly due to the increased demand as a result of higher market attendance and the output contraction due to the reduction in plantings in favour of sesame. Prices of sesame, conversely, were at the same level of the previous year as supply kept pace with the sustained demand from Sudanese traders. Finally, prices of livestock were well above their year earlier levels due to the increased export demand from the Sudan as a consequence of the relaxation of border controls. Overall, market activity significantly increased over the past 12 months as the security situation considerably improved following the signing of the Revitalized Agreement on the resolution of conflict in South Sudan in September 2018. However, the high market prices and the economic crisis, with its negative impact on household purchasing power, still constrain market transactions and credit operations and, according to key informants and interviewed traders, in October 2019, despite the significant improvements over the last 12 months, market activity was assessed to be still 30 to 40 percent lower than the pre-conflict levels.

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 as well as the economics data presented in previous sections. The analysis is based on data from the FSNMS run by WFP and partners (FAO, UNICEF, NBS, MAFS, 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 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. The survey uses a two-stage cluster design with the first stage involving randomised selection of cluster/enumeration areas and the second stage involving randomised selection of households. In the latest round (December 2019), 698 clusters were selected with at least 12 households interviewed from each cluster, for a total sample of 8 529 households. So far, 25 rounds of data collection have taken place, providing a solid basis to distinguish the effects of seasonality from different shocks.

Main drivers of food insecurity for 2020

Conflict and population movements in 2019

The situation in 2019 continued to improve following the ceasefire agreed in mid to late 2018, with the number of political conflict incidents continuing to decrease, sporadically and inter-communal violence escalated dramatically in several key areas of the country such as the Greater Equatoria, Warrap and Greater Upper Nile regions.

This improvement in peace and security has been driving growing numbers of returns of IDPs and refugees to their places of origin, a trend

that accelerated in 2019. If peace holds and improvements in the availability of services occurs, 2020 should see even higher rates of returns and a concomitant increase in the extent of planted area.

A stable security situation allowing improved commodity flows and some stabilization of the macro-economic situation is also 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 2019

In 2019, net cereal production reached 818 000 tonnes, an increase of almost 10 percent relative to 2018 but still well below pre-conflict level. This reflects the small increase in cultivated area by returnees and the absence of significant dry spells despite the significant losses due to flooding.

This leads to a cereal deficit of just over 482 000 tonnes, a small improvement on the deficit of the previous two years (524 000 and 500 000 tonnes). Greater Upper Nile contributes 64 percent to the overall deficit. However, this year, Western Equatoria managed to post a small surplus.

Market prices

Cereal prices increased from early 2019 due to the continued depreciation of the South Sudanese Pound with prices of maize and sorghum reaching the same peaks of mid-2018. Despite the improvements in peace and the security situation, food markets remain substantially fragmented due to structural logistical issues affecting commodity flows. As a result, cereal prices remained highly volatile, a situation compounded by exchange rate volatility and extensive flooding (particularly in the Greater Bahr el Ghazal and Greater Upper Nile regions) aggravating the logistical problems.

For the coming months, market prices will be determined by the competing influences of improved security, a large cereal deficit and the macro-economic evolution. The improved economic access to markets remains the most efficient driver for better food security in South Sudan.

Figure 16: South Sudan - IPC maps (2019-2020)

January 2019

January 2020
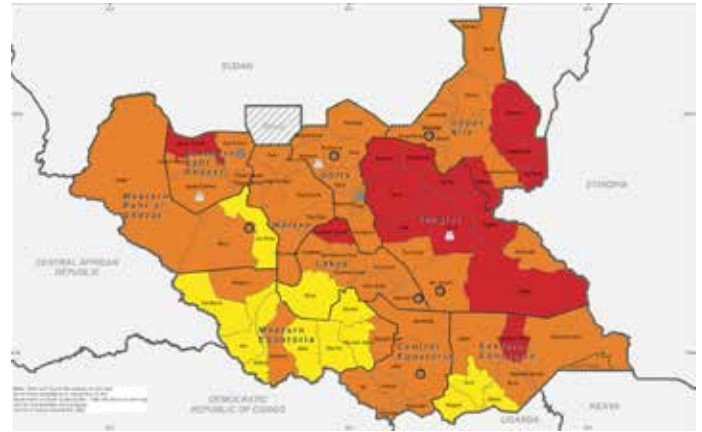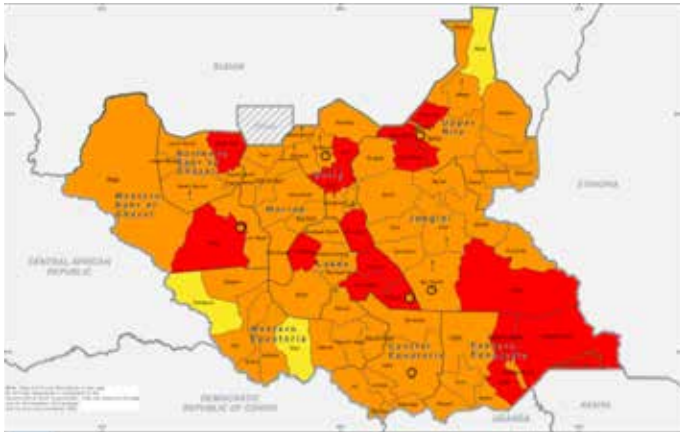
May-July 2020 (projected)
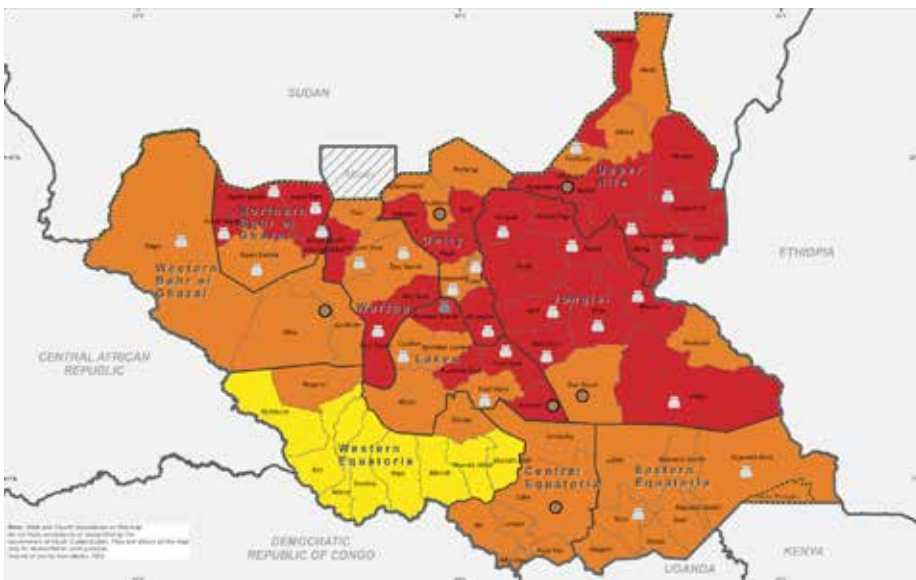
KEY FOR THE MAP

IPC Acute Food Insecurity
Phase Classification

Source: IPC.

In January 2020, an estimated 5.29 million people (45 percent of the population) were classified as facing severe acute food insecurity (IPC Phase 3 and higher), a 9 percent decrease in percentage terms (14 percent decrease in population numbers) compared to January 2019. This may be due to a slow accumulation of improvements in security, trading conditions and crop production. The January 2020 figures are also lower than the lean season figures (August 2019) which stood at 6.35 million. This contrasts with the situation one year ago, when in January 2019 offered only a very modest improvement relative to the situation in the lean season of 2018.

However, there has been an increase in the number of people in IPC Phase 5: "Catastrophe" to 40 000 in January 2020 up from 30 000 in January 2019. The current numbers are all concentrated in Jonglei State, which indicates that these are mostly due to the large scale floods that affected the region in late 2019.

Table 14: South Sudan – Proportion of population in IPC phases 3, 4 and 5 (January 2019, August 2019 and January 2020)

State	Phases 3-5 JANUARY 2019 (%)	Phases 3-5 AUGUST 2019 (%)	Phases 3-5 JANUARY 2020 (%)
Central Equatoria	49.8	27.5	40.4
Eastern Equatoria	56.3	52.6	31.9
Jonglei	64.1	64.8	65.3
Lakes	60.6	57.9	52.0
Northern Bahr el Ghazal	56.5	59.3	54.7
Unity	67.8	62.3	46.2
Upper Nile	53.1	61.5	53.3
Warrap	40.5	58.2	35.7
Western Bahr el Ghazal	51.3	67.7	31.0
Western Equatoria	32.9	30.8	15.0
Total	**54.1**	**54.3**	**45.2**

Source: IPC http://www.ipcinfo.org/ipc-country-analysis/details-map/en/c/1152422/?iso3=SSD.

In early 2020, the highest proportions of the population in IPC phases 3 and higher were in Jonglei (65.3 percent), North Bahr el Ghazal (54.7 percent) and Upper Nile (53.3 percent). These regions remain almost unchanged since January 2019 – this is also likely to be the result of the flooding, since these are the areas where flood impacts were more severe.

By contrast, all other regions show improvements: The largest drops in population in IPC phases 3 and higher from January 2019 to January 2020, were verified in Eastern Equatoria (minus 24.7 percent), Unity (minus 21.6 percent), Western Bahr el Ghazal (minus 20.3 percent) and Western Equatoria (minus 17.9 percent).

These proportions are expected to increase across the board as we approach the lean period of mid-2020. This is reflected in the proportions of the population in IPC phases 3 and higher that are projected to reach 55.4 percent in May-July 2020. This is a modest improvement relative to last year and do not foresee any population in IPC Phase 5.These improvements will continue if the trends in security, macro-economic factors, trade logistics and crop production remain positive and may herald a reversion of the food security situation.

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 the 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 areas of the Equatoria and the Bahr el Ghazal states, against a backdrop of a severe macro-economic crisis and hyperinflation.

The situation worsened since 2018, while the overall levels of food insecurity remained at about 75 percent, the proportion of severely food insecure rose to record levels: around 30 percent during the mid-2019s lean period before dropping down to 23 percent in the post-harvest period (Figure 17). The December 2019 figures show a modest improvement compared with one year ago, but still way below the pre-crisis period.

At State level, food insecurity in the post-harvest period has decreased from the 2018 peak across most of the country (Figure 18) except for Jonglei (32 to 38 percent due to the end of season flooding), Central Equatoria (where it increased further from 26 to 33 percent). This could be attributed to poor food insecurity in rural Yei, Morobo, Kajo-Keji and Lainya, where localized insecurity has persisted, North Bahr el Ghazal (stable) and Warrap (a small increase from 11 to 13 percent). Elsewhere, we see improvements already noticed in the IPC figures: Lakes, Unity, Eastern and Western Equatoria have seen sharp decreases in severe food insecurity in some cases back to pre-2018 levels.

Figure 17: South Sudan – Food security status (2014-2019)
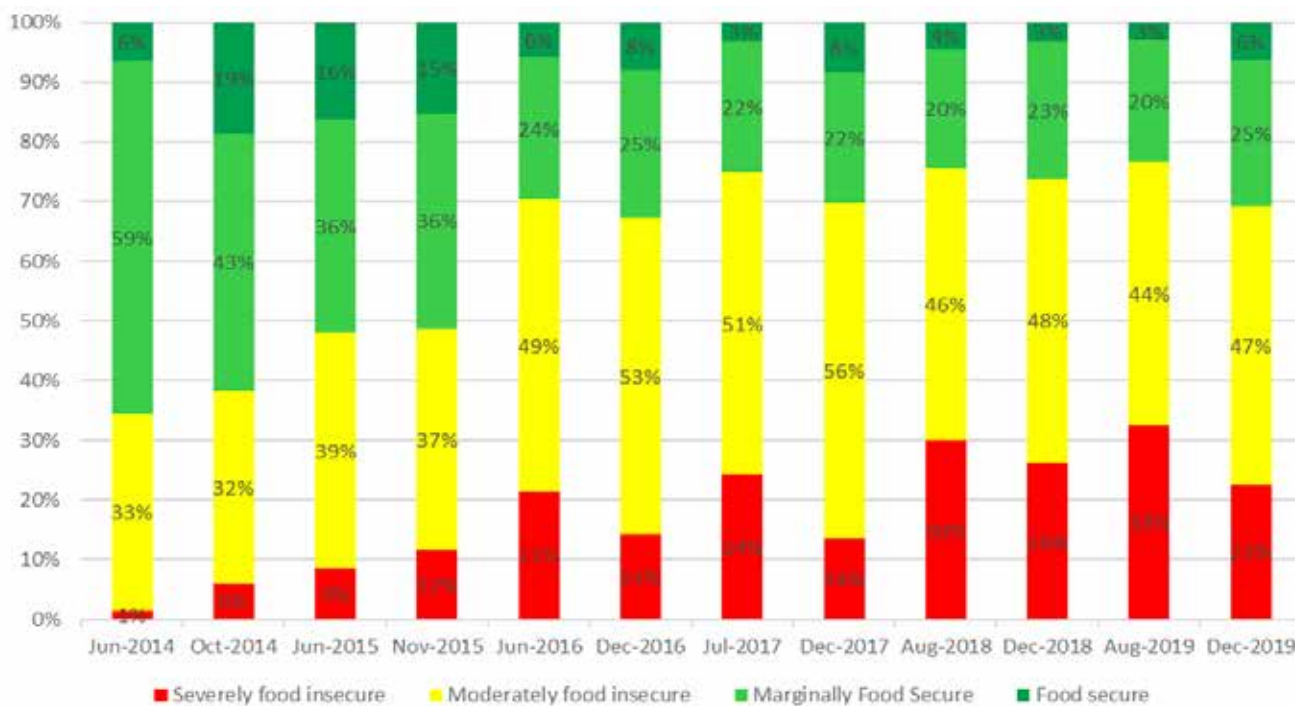
Source: WFP.

Figure 18: South Sudan – State level harvest time severe food insecurity (2014-2019)
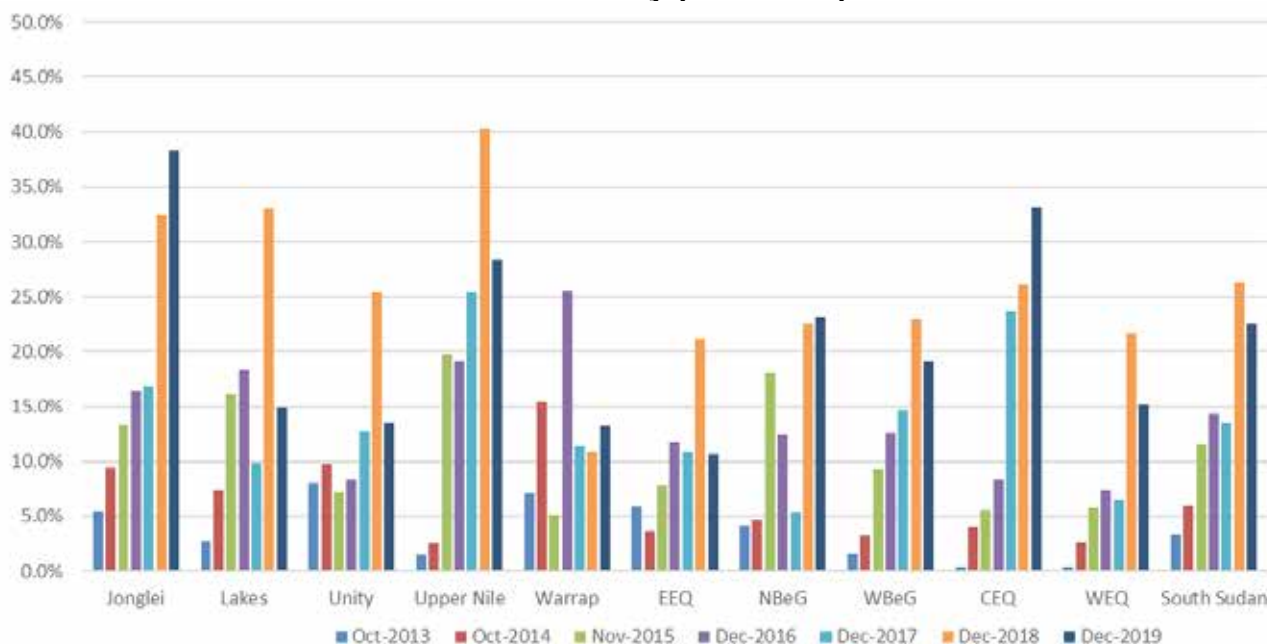
Source: WFP.

Household staple food supply: Markets vs household production

This section analyses 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 and Jonglei to a lesser degree).

Figure 19 shows the contribution of the four sources of cereal and roots to households in South Sudan since June 2016. As expected, the two dominant sources are markets and the household's 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 household's own stocks are exhausted; The seasonal variation is least marked in West Equatoria, where own production is always largely dominant and is most noticeable in North Bahr el Ghazal, where market dependence reaches 80 percent of the households during the lean period. This pattern has not changed since data collection began in spite of conflict and displacement. This dependency on the markets means that the 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.

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 2019 when it became the main supplier of staples for close to

19 percent of the households nationally during the lean period of mid-2019 and 13.5 percent around harvest time (end-2019), this could be attributed to the lean season scale-up in 2019 and extended distribution past the harvest period to cater for the flood affected. It is very significant during the lean period (Figure 20) in Jonglei and Unity (and West Bahr el Ghazal in mid-2019) and also appears in Upper Nile and Eastern Equatoria. Elsewhere, its

contribution is mostly below 4 percent. At harvest period it is only significant in Jonglei and Unity and to a lesser extent in Upper Nile and Lakes.

At the country level in 2019, the dependency on markets had a modest increase of about 3 percent in both the lean period and post-harvest, attributed to improved market access following the September 2018 peace agreement, interrupting a decreasing

Figure 19: South Sudan - Relative importance of different sources of cereals and roots consumed by households (2016-2019)
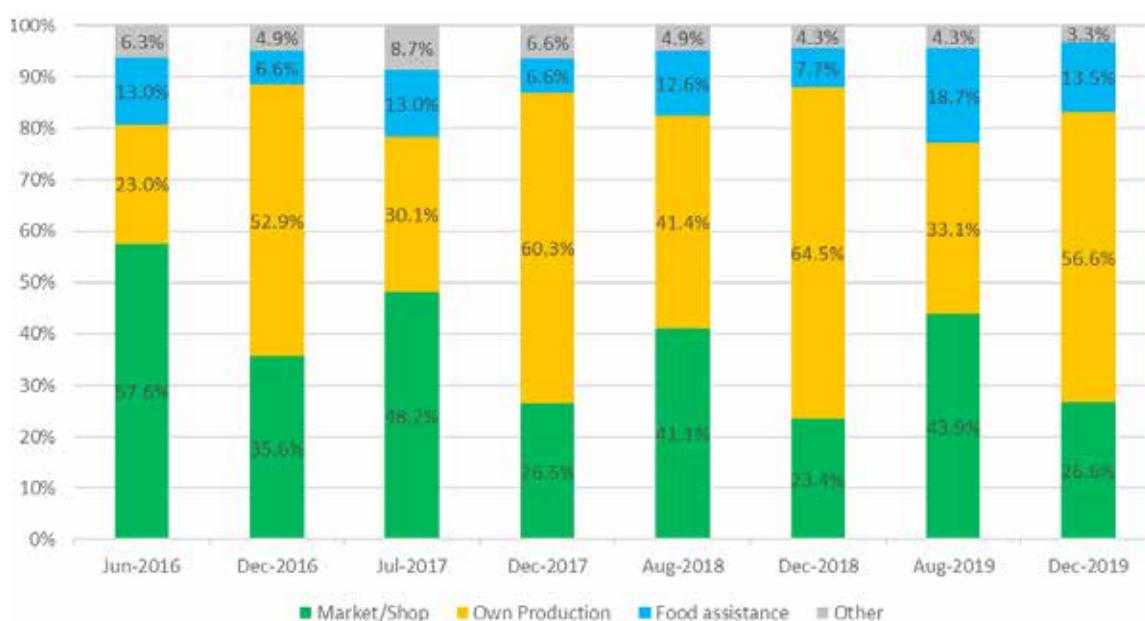
Source: WFP.

Figure 20: South Sudan - State level relative importance of different sources of cereals and roots consumed by households (lean period 2016-2019)
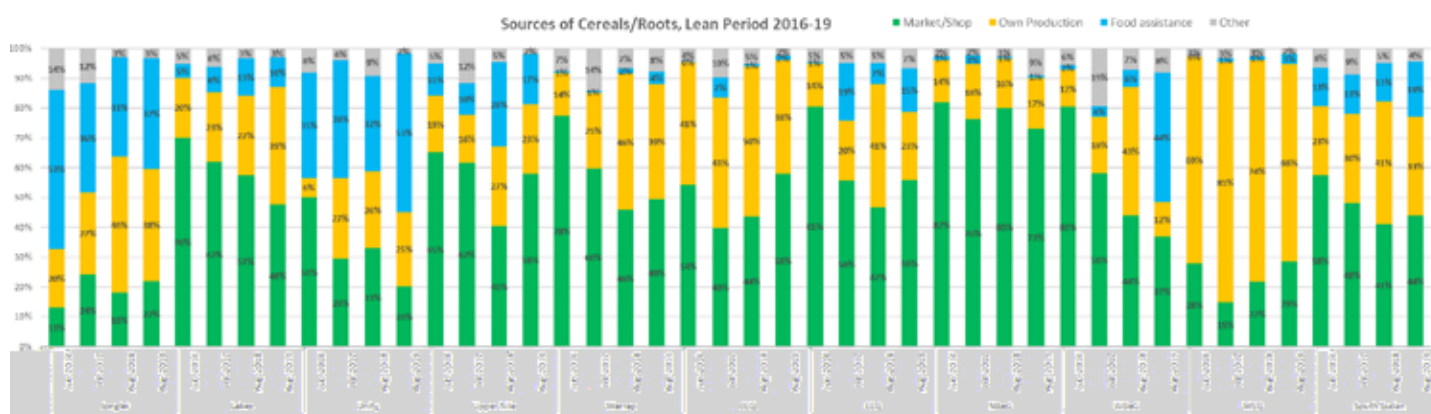
Source: WFP.

Figure 21: South Sudan - State level relative importance of different sources of cereals and roots consumed by households (harvest period 2016-2019)
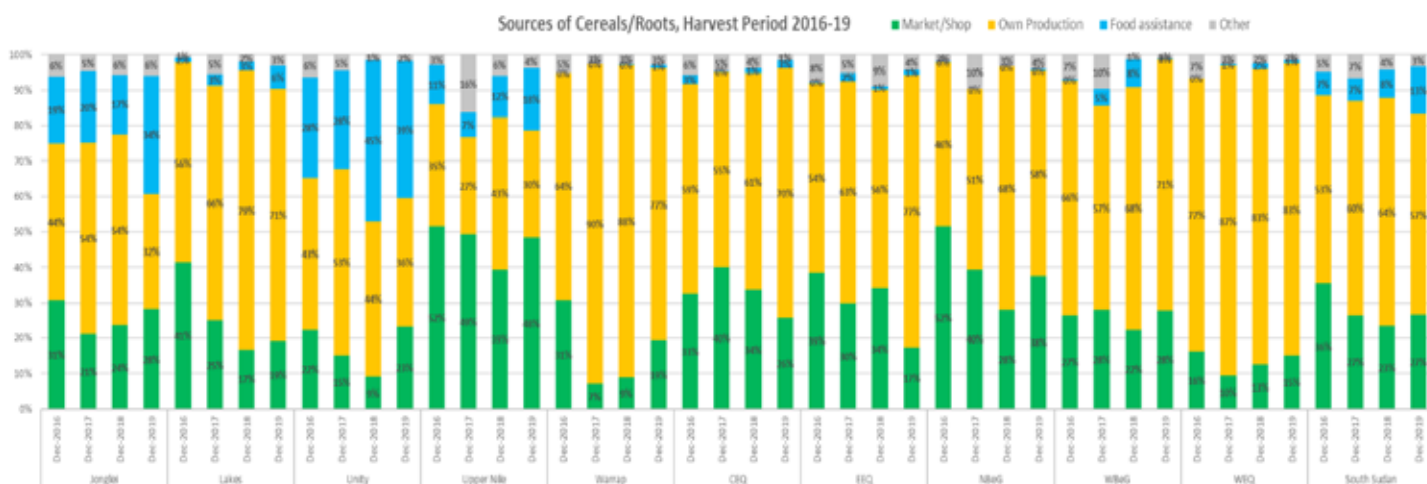
Source: WFP.

tendency since 2016. In the post-harvest period, this is general across the country, except for Central and Eastern Equatoria. In the lean period, except for Unity and West Bahr el Ghazal.

Against a backdrop of improved crop production, the post-harvest increase in market dependency agrees consistent with the reported improvement in trading conditions and commodity supply. This is welcome news since the markets remain the most important source of household cereals and roots across most of the country, the exceptions are Jonglei and Unity, where food assistance has filled the gaps arising from the lack of supply and economic access by the households and West Equatoria, the major crop producer of the country.

Food expenditure: Recent patterns and at-harvest situation

Households in South Sudan spend a large proportion of their incomes on food. Household 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 markets in a context of very high food prices and rampant inflation. The households with high expenditure on food are more vulnerable to market price rises as they have a narrower band of income to absorb 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.

➢ High food expenditure: Between 65 and 75 percent of expenditure allocated to food.

➢ Medium food expenditure: Between 50 and 65 percent of expenditure allocated to food.

➢ Low food expenditure: Less than 50 percent of expenditure allocated to food.

Figure 22 shows the national level of proportion of households in each food expenditure class and its variation from June 2014 to December 2019.

Typically, household food expenditure would present a minimum around harvest time (October-December), in principle more pronounced in years of good harvests, e.g. 2014. As households always rely on markets to a significant degree and generally exhaust their stocks in the second quarter of the following year, the prevalence of high food expenditure is highest in the lean period (July-August).

After the initial food expenditure spikes, in June 2014 and February 2015, right after the onset of conflict in December 2013, there has been a steady worsening in high and very high levels of food expenditure superimposed on the seasonal pattern of harvest time minima and lean period maxima, this is linked to the spread of conflict into productive areas. As a result, the levels of high and very high food expenditure reached an all-time record of 78 percent in August 2019, with 70 percent of very high food expenditure. This decreased to 58 percent in December 2019 (48 very high and 10 high), an improvement of 5 percent compared to December 2018 likely related to improved crop

production. The mid-2019 peak relate to price rises in staple agricultural commodities discussed before.

Note that extreme food expenditure rates at the harvest time of 2019 are comparable to those during the lean period of 2017 and before. This is a clear demonstration of the extent of the degradation in living conditions that South Sudanese households have to contend with.

As far as the State level picture is concerned, the highest proportions of high and very high food expenditure in mid-2019 are registered in Upper Nile (93 percent), North Bahr el Ghazal (94 percent) and Jonglei (82 percent). The Equatoria regions, where extreme food expenditure was usually the lowest, registered record rates on a par with other regions, e.g. in West Equatoria it rose from 43 percent in December 2018 to 74 percent in August 2019 decreasing slightly to 65 percent in December 2019. The high expenditure is partly explained by high food prices mainly driven by the high exchange rate to the dollar, the increase in food prices in the source markets of Uganda due to the reduced production following the drought and the insecurity following the unrest in the Sudan, the main source of sorghum for the northern states such as North Bahr el Ghazal.

Figure 22: South Sudan - Proportion of households in food expenditure class for South Sudan (2014-2019)
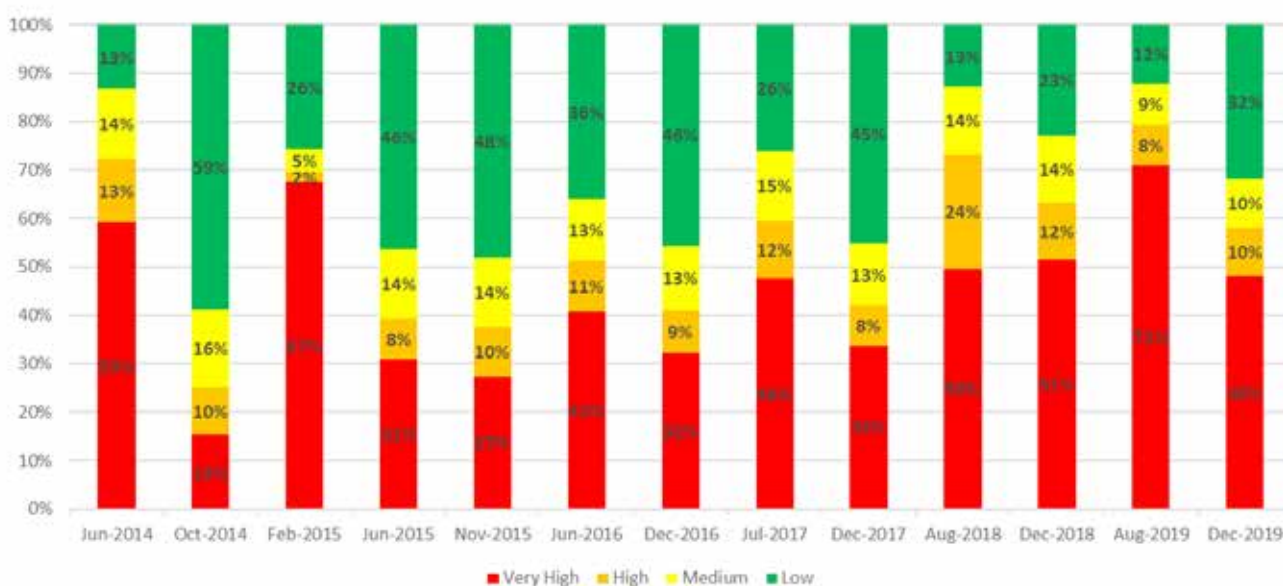
Source: WFP.

Hence, improvements that may have occurred in trade routes and market supply have not yet translated into acceptable food expenditure levels. On the contrary, import dependency of the country resulted in record levels of extreme food expenditure that continue to bind South Sudanese households to poverty and food insecurity.

Household coping strategies

Following the start of the hostilities in late 2013, the prevalence of coping strategies involving a decrease in food intake (eating less preferred foods, limiting portion size, reducing adult consumption and eating fewer meals) around the harvest period underwent a very sharp increase from a 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 household 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 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 and December 2019. At State level, the broad patterns of a post-conflict spike, followed by some improvement and an increase in 2018/19 are also present, though Warrap and West Bahr el Ghazal did not see the latter increase compared to other states. In 2019, there have been noticeable improvements in Unity, North Bahr el Ghazal and Eastern Equatoria and a marked worsening in Central Equatoria, from 50 to 85 percent, in agreement with the worsening in severe food insecurity, and little change elsewhere.

Figure 23: South Sudan - National prevalence of coping strategies involving decreases in food intake (2013-2019)
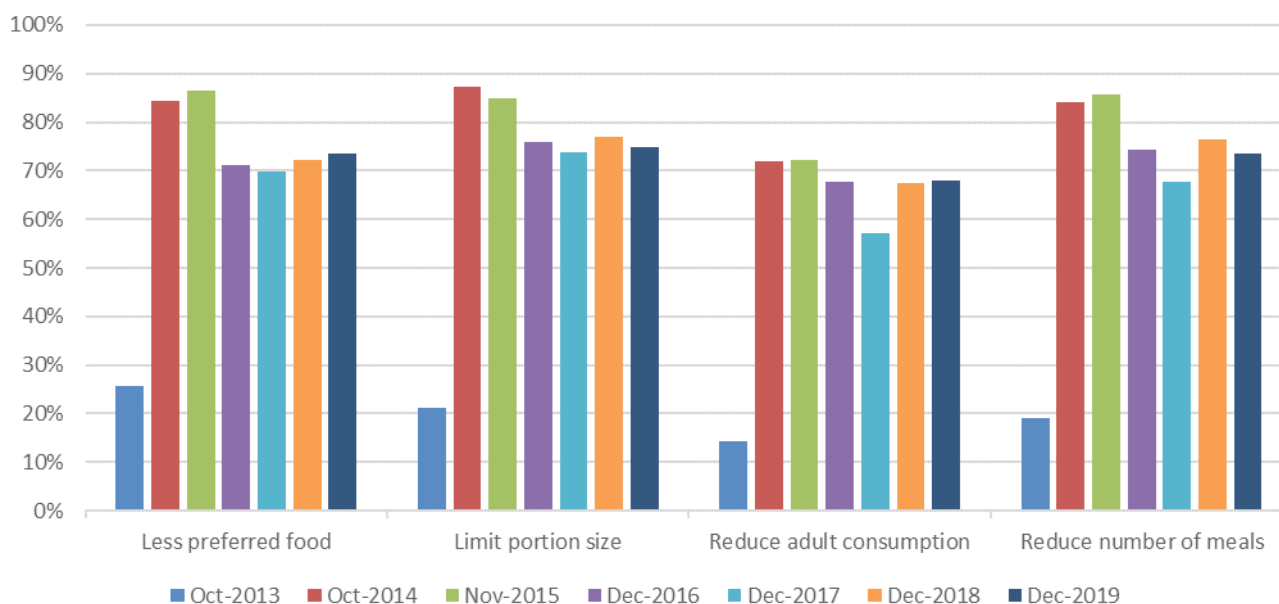
Source: WFP.

Figure 24: South Sudan - Prevalence of "reduced number of meals" coping strategy (harvest periods 2013-2019)

Source: WFP.

Estimated food assistance plans in 2020

WFP plans to assist 5.9 million people in South Sudan in 2020 with 324 999 tonnes of food assistance, if fully resourced, as at the end of March 2020 the funding outlook for 2020 stood at 57 percent of the requirements. Hence, reprioritization of available resources will be done by the Country Office, that will negatively impact the overall food security situation of the estimated 6.5 million people facing severe acute food insecurity (IPC phases 3 and above) at the peak of the lean season (May-September 2020). If full funding is received, the distribution per State is specified in Table 15. Note that these numbers include refugees and nutrition support activities.

Table 15: South Sudan - Estimated food assistance requirements based on operational plan (2020)

State	Unique beneficiaries	Total (tonnes)
Central Equatoria	358 348	14 617
Eastern Equatoria	348 496	13 688
Jonglei	735 911	55 690
Lakes	595 190	21 414
Northern Bahr el Ghazal	826 869	26 403
Unity	886 830[1/]	79 501
Upper Nile State	850 146	63 892
Warrap	743 601	25 658
West Bahr el Ghazal	260 518	15 083
Western Equatoria	181 018	5 390
Contingency Plan	200 233	3 663
Total	**5 987 159**	**324 999**

Source: WFP.
[1/] Includes refugees.

RECOMMENDATIONS

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RECOMMENDATIONS

The signing of the Revitalized Agreement on the Resolution of the Conflict in South Sudan in September 2018 led to a significant improvement of the security situation, which encouraged returns 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 following recommendations are made assuming that the national peace deal continues to hold, for a better future of the people of South Sudan.

Agriculture

In order to strengthen domestic food production and reduce the food requirement/needs in 2020, it is recommended to:

➢ Provide seeds and tools (farm inputs) to stimulate production to reach the pre-conflict surplus levels in the more productive and stable states and counties.

➢ Maintain support to small-scale subsistence producers in less productive pastoral/agro-pastoral areas.

➢ Provide support to the 2020 cropping season by providing agricultural inputs, 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.

➢ Support targeted farmers to use improved agricultural practices including adequate land preparation, proper weeding and provide training on Striga weed control techniques, integrated pest management and soil fertility maintenance practices.

➢ Develop a strategy to minimize the impact of Striga weed, which severely affects yields of

sorghum, the main staple food crop in the country. This may include the urgent preparation and dissemination of a package for Striga management and control.

➢ Significant post-harvest losses are sustained every year. Farmers need to be provided with training and equipment to enable them to manage storage losses of crops due to various storage pests.

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

➢ Strengthening the county based CCMCs and establishing strong linkages between the counties and the State MoAs as well as between national institutions (MAFS and NBS) and Task forces.

➢ To avoid any over-estimation of the cultivated area during the specific year in CFSAM analysis, farming populations need to be estimated discriminating the households actively involved in agricultural activities from recent returnees which were not able to plant, as they returned when the cropping season was too advanced. The CCMCs should be used to track population movement at county level for cross-checking the population figures provided by the other concerned agencies.

➢ A further increase in locust swarms is likely to continue in 2020 due to the continuation of favourable weather conditions for desert locust breeding. Hence, desert locust monitoring and control is 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 to increase added value along the value chain, including improved fodder production, training of livestock owners in 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 (animal breeding, e.g. using Sudanese cattle breeds like Botana and Kenana, trainings in improved animal husbandry practices).

- Conduct a comprehensive study of the national livestock economy.

- Carry out livestock fairs (emphasis on the quality of animals as opposed to numbers).

➤ 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 that 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

➤ Provide market-based livelihood support by enhancing the capacity of existing marketing institutions in the country.

➤ Promote the local purchases of seed 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.

➤ Maintain and strengthen existing price and market monitoring activities by expanding monitored commodities and improving cross-border market monitoring.

➤ Expand the use of Cash-Based Transfers (CBTs) in the areas where markets are functioning to encourage crop production and improve market supply stability through demand-side incentives.

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

Food security

➤ Target food assistance to the most vulnerable households in the areas with the highest food deficits and with highest levels of food insecurity, especially in Upper Nile, Jonglei, Northern Bahr el Ghazal and some counties of Unity, Lakes and Warrap. Household food insecurity will remain persistently high in 2020 due to the high cereal deficit, the reduced humanitarian assistance and high local and eastern Africa region cereal prices coupled with localized insecurity in the Greater Upper Nile Region. Thus, scaled-up efforts are required to support populations most in need of assistance. Which should be provided using a combination of in-kind distribution and Food Assistance for Assets where appropriate.

➤ The design and implementation of food assistance activities should take into consideration an in-depth analysis of local contexts: CBTs should be carried out in locations where the markets are functional and prices are relatively stable with assured food availability and the rest 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.

➢ Immediate scale-up of humanitarian food assistance is needed to save lives and avert the total collapse of livelihoods and avert the looming malnutrition crisis in the affected counties.

➢ Provide context-specific 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 support the returnees with both food and livelihoods support for better integration into the communities.

➢ Encourage the design and implementation of multi-sectoral interventions: both through conditional and unconditional modalities and explore market-based transfers in the areas where the markets are properly functioning to address household food insecurity as well as support the local economy.

➢ Encourage a shift 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 diets, 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 and in line with the changing context, refine the prioritization matrix for the identification of locations for food security and nutrition response in order to effectively use the available resources.

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

➢ Strengthen early warning systems by improving the monitoring of rainfall, desert locusts, market prices, access to land 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

Figure 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;	Rainfall	Dry season	Dry season	Wet season	Wet season	Wet season	Wet season	Wet season	Wet season	Dry season	Dry season	Dry season	Dry season
	Main Crop		Land preparation and planting	Land preparation and planting	Growing season	Growing season	Growing season	Harvest	Harvest				
Greater Upper Nile	Long-cycle crops			Land preparation and planting	Growing season	Growing season	Growing season	Growing season		Harvest	Harvest	Harvest	Harvest
Bi-modal rainfall zone found in Greater Equatoria	Rainfall	Dry season	Wet season	Wet season	Wet season	Wet season	Wet season	Wet season	Wet season	Wet season	Dry season	Dry season	Dry season
	First crop	Land preparation and planting	Land preparation and planting	Growing season	Growing season	Growing season	Harvest	Harvest					
	Second and third crops					Land preparation and planting	Land preparation and planting	Growing season	Growing season	Growing season	Harvest	Harvest	

Note: Recent changes are blurring the divisions.

Recommendations for strengthening Roadmap and CCMCs, 2020:

- 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 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 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 a 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.

South Sudan - Agricultural situation by State

GREATER EQUATORIA

Western Equatoria

A total of eight missions were conducted in 2019 by three to five members of the Task Force Team, covering the two cropping seasons. Since most areas lie in bi-modal rainfall areas of the Greenbelt, assessments were conducted for the first and second seasons during planting and harvesting times, by deploying the teams based on security and accessibility. Two planting assessments were carried out: one from 7 to 16 June 2019, visiting Tambura, Ezo, Nzara, Maridi, Ibba and Yambio counties, and one from 15 to 21 June 2019, visiting Mundri East and Mundri West counties. These were followed by three first season harvest assessment missions, the first to Tambura, Ezo and Yambio counties (26 August-4 September 2019), the second to Mundri West, Mundri East and Mvolo (31August-7 September 2019) and the third mission to Maridi, Nzara and Ibba (2-11 September 2019). The final two missions were conducted to assess the second season harvest in Tambura, Nagero, Ezo and Nzara (5-14 November 2019) counties and in Mundri West and Mvolo (9-16 November 2019). In all the eight missions conducted in Western Equatoria State, 272 case studies were performed (24 key informants and 248 farmer interviews). The number of missions was increased to eight from six in 2018, to expand the assessment's coverage and improve the accuracy of the estimates.

In 2019, as confirmed by all reports of the Task Force Team, seasonal rains began over most cropping areas in April and in May in some areas, with a delay of up to two weeks. However, the precipitation over most areas was average to above average throughout the cropping period without prolonged dry spells, resulting in favourable growing conditions for the crops. Therefore, yields of almost all crops were higher than last year for both the first and second season harvests, including those of groundnuts, which were constrained in 2018 by dry spells. The continued rainfall up to November/December benefited late-planted second season crops and some long-cycle varieties. As a result, the overall performance of the 2019 cropping season in the State was very good and better than last year. There were no reported access constraints to land in the visited counties except in some areas, where far fields continued to be not safe. Task Force Team members and most respondents in the visited counties indicated an increase in cultivated area compared to last year 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. Land preparation for the second season started in July, soon after harvesting of the first season crops in most areas. 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. Despite the above-average rainfall received, there were minimal reports of flooding and impact on crops. However, the continued rainfall in July and August has hindered harvesting and drying of first season crops, especially maize.

Almost all farmers in the State use hand tools sourced mainly from the market with some distribution from NGOs. The most commonly used tools include hoe, maloda, axe, rake, slasher and machete, which are bought by farmers from the local markets. Although there are about 16 tractors in the State, most are not functional due to the lack of implements and spare parts. Almost all of the required agricultural labour originates from families and communal labour. The use of ox-ploughs is minimal and almost all land preparation is performed manually using hand tools. However, there are more than 150 pairs of oxen in Mvolo County, that are allowing an increase in the area cultivated among the owners and those using rented oxen. The hiring rate for ox-ploughing in Mvolo was SSP 2 500/day for sorghum fields and SSP 3 000/day for groundnuts.

The most prevalent pests in 2019 were snails, FAW, millipedes, wild pigs, monkeys, porcupines, rats, squirrels, termites, green grasshoppers, local birds and stem borers, and the damage levels were mild to average, varying from place to place. This year, FAW infestations were minimal due to the effect of the heavy rains that killed the insects throughout the season. Hence, the damage caused on crops is mild compared to last year, when infestation levels were severe. Chemical pesticides are not used in the State, and farmers resort to traditional pest control measures including manual collection and burying of snails. For FAW control, farmers used extracts of a plant species known as *Babashiro (Chromolaena odorata)*, mixed with hot pepper and powder soap. However, a wider use of this plant as a natural pesticide requires further research and a well-designed protocol before expansion. On the other hand, *Babashiro* is an invasive weed noted to be expanding and causing concerns to farmers. FAO, in cooperation with the Ministry of Agriculture, introduced a pesticide for the control of FAW in a few areas. While the results are encouraging, there is a need for a cost-benefit and affordability analysis for small farmers, due to the high cost of the pesticide. Farmers and extension workers also need adequate training on pesticide management and personal protection against the negative effects of pesticides. On the other hand, the season was characterized by heavy infestation of weeds, the growth of which was fostered by the abundant rains. Farmers, despite repeated weeding, had difficulties in containing weed infestations.

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 cover (NDVI) over most of the season, followed by near-average rains and vegetation conditions from September to December 2019. The average to above-average rainfall and vegetation conditions up to the end of the year indicate favourable growing conditions for both first and second season crops and long-cycle varieties.

Farmers mostly use their own saved seeds carried over from the previous harvest or purchased in

the local markets. Regarding other crops, cassava is grown throughout the Greenbelt, covering about 17 percent of the total cultivated area in Western Equatoria and serving as a safety net to the community. Groundnuts are also an important crop, covering an estimated 14 percent of the total planted area in the State.

Production
The annual production estimates have been made based on time-series information, adjusted downwards due to insecurity. Cereal yields are estimated at an average 1.45 tonnes/hectare for all cereals and both harvests, higher than the previous year's level of 1.31 tonnes/hectare. The yield increase is due to adequate amount and favourable distribution of rainfall throughout the growing season that favoured crop production over most of the State and lower levels of damage by pests, including FAW. In addition, the overall harvested area for the State increased by 17.7 percent due to an increase in the number of farming households and the area planted per household was higher than last year due to an improved security situation. Consequently, the gross cereal production from all the harvests is estimated at 186 577 tonnes, 31 percent higher than last year's low level of 142 584 tonnes, with a surplus production of about 31 166 tonnes, compared to the slight deficit recorded last year.

The contribution of cassava to households' food consumption at State level is significant and the area covered by cassava is higher than in the previous year. Assuming all second year crops are harvested, around 191 000 tonnes of cereal equivalent, calculated using 42 percent dry matter and a gross processing efficiency of 70 percent, are likely to be available for use. Groundnuts may also add an estimated 29 920 tonnes of gross dry matter (unshelled).

The livestock numbers in the State are very small (mostly small ruminants) compared to other states, with livestock rearing practised only in northeastern counties of the State, particularly Mvolo. However, the number of animals, particularly shoats, is reported to be increasing annually. Pasture and water availability were abundant in 2019 due to above-average rains,

Figure A2-1: South Sudan (Western Equatoria) - Seasonal Rainfall and NDVI
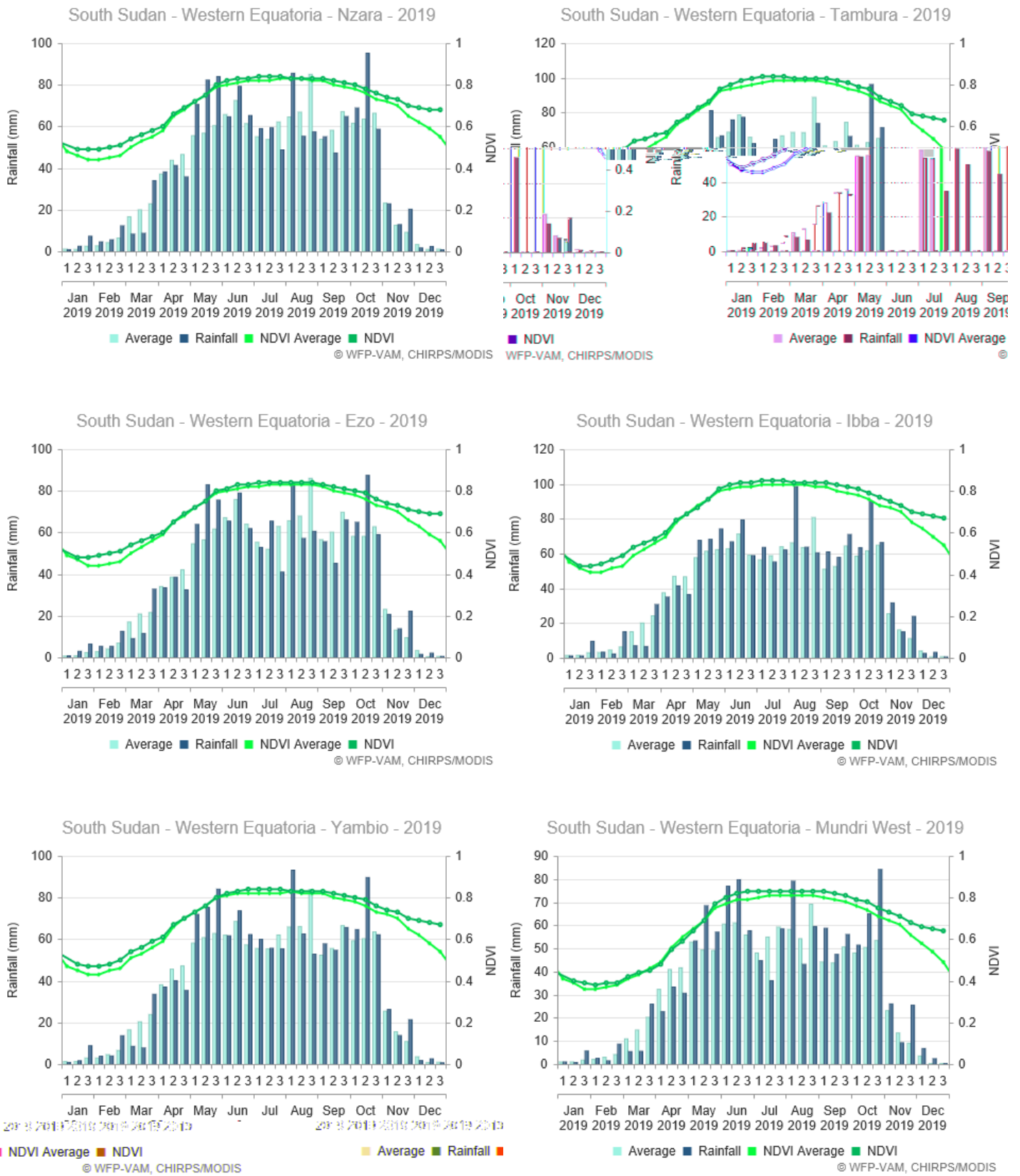
Source: WFP/VAM, 2019.

resulting in PET Body Condition Score (BCS) of 4 for shoats and 3-4 for cattle. A cattle raiding incident was reported in Mvolo County in June 2019, with 139 cattle raided and some people killed by raiders from Eastern Lakes State. Damage to standing crops usually occurs in Mundri and Mvolo counties around November by intruding cattle from bordering Terekeka County and Lakes State (Yirol and Rumbek counties). Endemic livestock diseases include Black Quarter (BQ), CBPP, Contagious Caprine Pleuropneumonia (CCPP), PPR, Foot and Mouth Disease (FMD), diarrhoea and mange.

Central Equatoria

In 2019, the Task Force teams undertook six missions to the Central Equatoria State, including two missions to assess planting of first season crops, two missions to assess harvesting of first season crops and two harvest assessment missions to assess second season crops. The number of missions was higher than in 2018 and 2017, when five and two missions were carried out, respectively. The two planting assessments of the first season crops were conducted during the second half of June 2019, covering Yei, Lainya, Morobo, Juba and Terekeka counties. The first harvest assessment missions were conducted from 26 August4 September 2019 to assess the 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 93 interviews/case studies (81 farmers and 12 key informants). The second season harvest assessment was carried out from 18-27 November 2019 and covered the same five counties visited during first harvest/second season planting assessments. In the two harvest assessments, 103 case studies (98 farmers and 5 key informants) were performed, compared to 36 case studies in 2018, due to the improved security that enabled Task Force teams to travel and conduct assessments in Morobo, Yei River and Lainya counties. However, assessment teams were unable to visit Kajo Keji County since 2016 due to persistent insecurity. In addition to the previously established and functioning CCMCs in Juba and Lainya counties, CCMCs in Yei and Morobo have started reporting in 2019. Information

from inaccessible areas, particularly Kajo Keji County, were collected from NGOs and through personal/phone communications. Remote sensing information including rainfall estimates and NDVI were used to analyse the performance of the rainy season.

Growing conditions
Combined rainfall estimates and vegetation index graphs are shown in Figure A2-2 for all the six counties of Central Equatoria State (Terekeka, Juba, Lainya, Kajo Keji, Yei and Morobo). In 2019, the rainy season had a timely onset in April and was characterized by average to above-average rainfall amounts and a good spatial and temporal distribution over most of the State throughout the season, with no reports of prolonged dry spells. The continuation of rains during the last quarter of the year (until December 2019) had resulted in favourable growing conditions for late-planted second season crops and long-cycle sorghum varieties. Most of the interviewed farmers have confirmed that in terms of amount and distribution of rains, weather conditions were more favourable in 2019 than in 2018. Figure A2-2 shows the average to above-average rainfall and vegetation index (NDVI) over most of the season across all the counties of Central Equatoria State.

Pests and diseases have remained at mild levels, including FAW, which had mild effects on maize fields this year, due to abundant rains, which created unfavourable conditions for the multiplication of the FAW. However, common pests, including snails, stalk-borers (attacking sorghum and maize), local birds, termites, grasshoppers, rodents and weeds were reported. *Striga* weed has continued to be of concern to farmers in areas dominated by mono-cropping of sorghum and minimal or no crop rotation, especially in Terekeka County.

Production
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.

Figure A2-2: South Sudan (Central Equatoria) - Seasonal Rainfall and NDVI
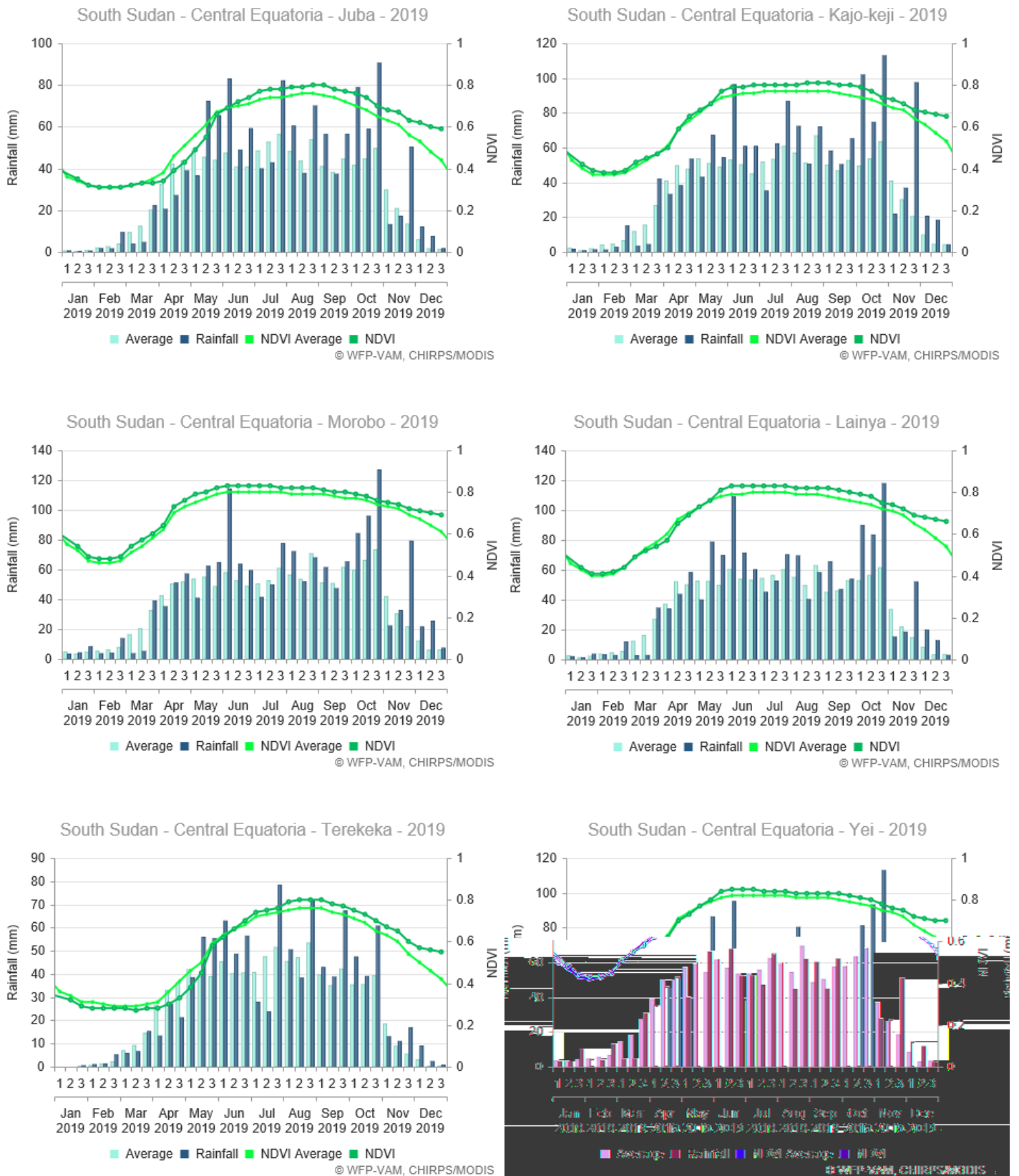
Source: WFP/VAM, 2019.

Over the past three years, agricultural activities were severely disrupted by rampant insecurity, which resulted in large-scale displacement of the farming population. Although the security situation improved in 2019 and cultivated area increased by 14.7 percent compared to the very low levels of the previous year, agricultural activities and cultivated area remained well below the pre-conflict levels. The gross cereal production for 2019 is estimated at 85 432 tonnes, 39.2 percent up from the previous year. As a result, the 2020 net cereal deficit is forecast to decrease to about 76 889 tonnes from about 92 000 tonnes in 2019. If all second year crops (cassava) are harvested, about 67 170 tonnes of cereal equivalent, calculated using 42 percent dry matter and a gross processing efficiency of 70 percent are likely to be available for use. Groundnuts may also add an estimated 15 120 tonnes of gross dry matter (unshelled). There is heavy reliance on fresh cassava, but access to cassava fields is still limited by insecurity, especially in far fields. Abandoned cassava fields in Morobo and Kajo Keji remained unharvested due to insecurity and the poor state of feeder roads used to transport harvested cassava.

Livestock movement in Central Equatoria is 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 has decreased significantly in recent years mainly due to the prevailing insecurity. Livestock conditions, pasture/browse and water supplies were noted to be better than last year, due to the abundant and well-distributed rains this year. The PET BCS for goats was 3-4, while that of cattle was 3, on average. There were no reports of disease outbreaks in the State, except the normal occurrences of endemic diseases including CCP, FMD, PPR, CBPP, BQ, mange and internal and external parasites. In addition, Coccidiosis and Newcastle diseases were reported on poultry in Yei and Lainya counties. Vaccination and treatment against selected diseases were carried out by an NGO in Morobo and Yei this year, but were unable to cover all animals due to shortage of vaccines and storage facilities.
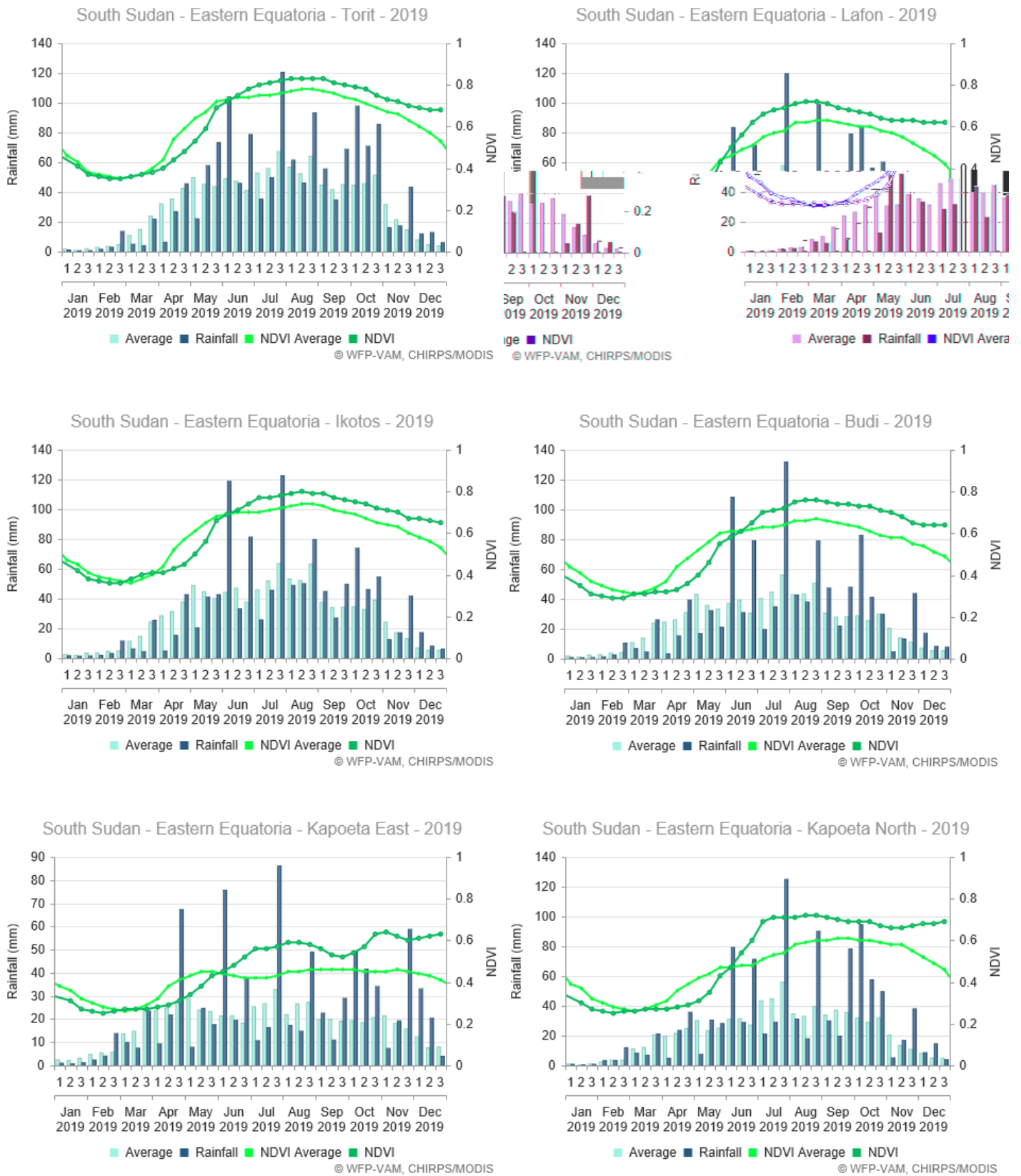
Eastern Equatoria

In 2019, the Task Force teams undertook six missions (two at planting time and four at harvest time) to Eastern Equatoria State. The two planting assessments took place from 1 to 11 July 2019 and from 10 to 15 July 2019, with one team covering Torit, Lopa/Lafon, Ikwoto, Magwi counties and the Pageri Administrative Area, and another team assessing the Greater Kapoeta Region (Kapoeta South, Kapoeta East, Kapoeta North and Budi counties). In Torit, Lopa/Lafon, Ikwoto, Magwi and Pageri (a largely bi-modal area), the first and second season harvest assessments were carried out from 25 August-5 September 2019 and 19-27 November 2019, respectively, while the harvest assessment in the Greater Kapoeta Region (a uni-modal rainfall area) was carried out from 9-18 September 2019. Overall, during the missions the team members conducted 206 interviews/case studies (188 farmers and 18 key informants).

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 North and East). Remote sensing data in all the six locations indicates below-average rainfall and vegetation conditions at the beginning of the season, especially until May 2019. The situation has subsequently improved, with above-average rainfall and vegetation (NDVI) conditions throughout the remainder of the cropping season.

In most cropping areas in Ikotos, Torit, and Magwi counties and in the Pageri Administrative Area, seasonal rains, normally beginning in mid-April, started around mid-May. Short dry spells occurred in June in localized areas of some payams with sandy soils, which have poor moisture retention capacity, but the impact on crops was not severe. In the Greater Kapoeta area (Kapoeta East, North and South) rains had a timely onset in April (Kapoeta East), while in Kapoeta South and North rains had a delayed start in June. All respondents indicated above-average amounts of seasonal rains and no dry spells. Waterlogging and flooding were reported along the Kineti River.

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

Source: WFP/VAM, 2019.

In general, interviewed farmers and key informants across Eastern Equatoria State have confirmed that the amount of rainfall in 2019 was generally average to above average and that the distribution of the rains was better than last year. On the other hand, there were incidences of flooding in flood-prone areas of Lafon and Lower Kineti, affecting a few farmers along the Kineti River. The 2019 cropping season had a good performance across the State and it is assessed as the best season in the last three to four years. Continuing rainfall up to the end of the year has also provided farmers with an opportunity of ratoon cropping, allowing them to harvest a second crop from the re-growth of the harvested sorghum stalks.

Farmers mainly use own local seeds carried over from the previous harvest or purchased in the market with dry planting being common, especially in the areas where rains have a comparatively later onset. Sorghum is the main cereal grown, with *Lonyang* and *Lodoka* being the preferred landraces. Maize (*Longi-5*) growing 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 higher amounts of precipitations are normally received, while pearl millet is mainly grown in Ikotos County and eastern drier areas.

In the absence of a widespread adoption of ox ploughing, hand-digging is the normal method of cultivation, with labour provided by the family in most areas. Ox-ploughs are mainly used by farmers in Magwi County. There are about 20 Government tractors and 12 private tractors in Eastern Equatoria State. The hiring rate for Government tractors is SSP 10 000/feddan in Torit and SSP 7 500 in Magwi. These few functional tractors and ox-ploughs have contributed to the cultivation of more land during the 2019 season. However, efficient utilization of existing tractors is highly constrained by shortage of spare parts and high fuel prices.

The main pests and diseases reported during the season were FAW, squirrels, *Striga* weed, local birds, sorghum bug, *Parthenium (Congress weed)*, stalk borers, millipedes, aphids, cassava mosaic virus and wild rats. FAW caused mild damage on maize in Budi, Magwi, Ikwotos, Torit, and Lopa/

Lafon counties, and it had minimal impact on sorghum crops. The damage caused by FAW was minimized by the heavy rainfall of the season that suppressed its activity by killing the worms. The expansion of *Parthenium* weed has continued to negatively impact crops, especially in Kapoeta, while the damage caused by other pests and diseases were generally mild. Weeding was undertaken, on average, two times per season for most crops. There is no use of fertilizers, pesticides and manure by farmers.

Production
Production estimates have been calculated on the basis of the case studies, CCMC reports (based on crop sampling) and time series data. Crop performance has improved in both seasons of 2019 compared to the previous year. Consequently, gross cereal production is estimated at 154 220 tonnes from all cereal harvests, 35.6 percent up from the low levels of the previous season. The 2019 deficit is forecast at about 8 600 tonnes, about 77 percent down from 2019 and the lowest deficit since 2016.

The contribution of cassava to households' food consumption at State level is significant, with an estimated 75 300 tonnes of cereal equivalent likely to be available if all second year crops are harvested. The estimate is based on fresh tubers with 42 percent dry matter and a gross processing efficiency of conversion from tuber to chips/flour of 70 percent. Groundnuts may also add a further, conservatively estimated, 8 200 tonnes of gross dry matter (unshelled).

Livestock condition was assessed as generally good and better than last year, with a PET BCS of 3 for cattle and 3-4 for shoats. This is the result of increased pasture and water availability due to the good performance of the 2019 rainy season, as opposed to 2018. However, the invasion of grazing lands by *Parthenium* weed has continued to negatively affect rangeland resources. Although there were no reports of livestock disease outbreaks, a normal occurrence of endemic diseases including BQ, ECF, Anthrax, CBPP, FMD, HS, diarrhoea, Hemorrhagic Septicemia, sheep and goat pox, PPR, NCD and internal and external parasites was reported.

GREATER BAHR EL GHAZAL

Northern Bahr el Ghazal

The Task Force teams undertook a planting assessment in July and a harvest assessment in October, along with members of the State Ministry of Agriculture and CCMC members. Two additional field missions were conducted to assess the negative impacts of flooding caused by heavy rains and overflow of rivers in the State. The activities carried out by the Task Force Team during the assessments to the State comprised 196 case studies, consisting of 183 farmer interviews and 13 key informant interviews and walking transects with crop sampling in all the five counties.

Growing conditions
Combined rainfall estimates and vegetation index graphs for the whole State and 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 timely onset of the rains in May and well above-average amounts, with no dry spells. However, the abundant rains caused severe and widespread flooding in most low-lying areas, which had a serious negative impact on agricultural activities and resulted in population displacements. Northern Bahr el Ghazal was one of the states most affected by the floods in 2019, with two episodes occurring during the year: flash floods due to excessive rainfall in June and floods due to river overflows in September/October. The heavy rains, which started in the first week of June, affected planting operations and damaged planted crops at seedling stage. Weed infestation was also high in most of the flooded/waterlogged fields due to the difficulties faced by farmers in accessing the fields to perform weeding and other agricultural practices.

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

The most preferred cereal throughout the State is sorghum. Seed sources are mostly local/own seeds carried over 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*. However, this year planting of these varieties was not possible in most of the mechanized areas due to flooding. Local groundnuts and sesame seeds were planted at the same time as the early sorghum, while small areas were planted with maize around the homesteads for early green consumption.

Farmers do not use chemical fertilizers to maintain soil fertility. Hence, the most common way of maintaining soil fertility include shifting farming locations and grazing over farmland by local and transhumant herds on contractual basis.

The most common pests and diseases include FAW, *Striga* weed, wild and domestic animals and birds. While weed infestation was serious this year, the level of infestation by other pests including FAW was mild on all crops in the State. FAW infestation was only mild this year.

Production
Production estimates have been performed on the basis of the case studies, crop sampling, spot PET scores and time series data for the traditional smallholder sector. In 2019, the cereal area harvested from the traditional smallholder sector is estimated at 151 550 hectares, 3.6 percent lower than 2018, mainly due to floods at planting time which impaired sowing activities. The gross cereal production has been estimated at 131 776 tonnes, 21.6 percent down from the previous year, mainly due to serious flood-related losses. Consequently, the estimated cereal deficit for 2020 is estimated at about 59 400 tonnes, which is more than twice the deficit estimated for the previous year.

In addition to the traditional smallholder farming sector, the severe floods have also affected mechanized farms, including the Aweil Rice

Figure A2-4: South Sudan (Northern Bahr el Ghazal) - Seasonal Rainfall and NDVI
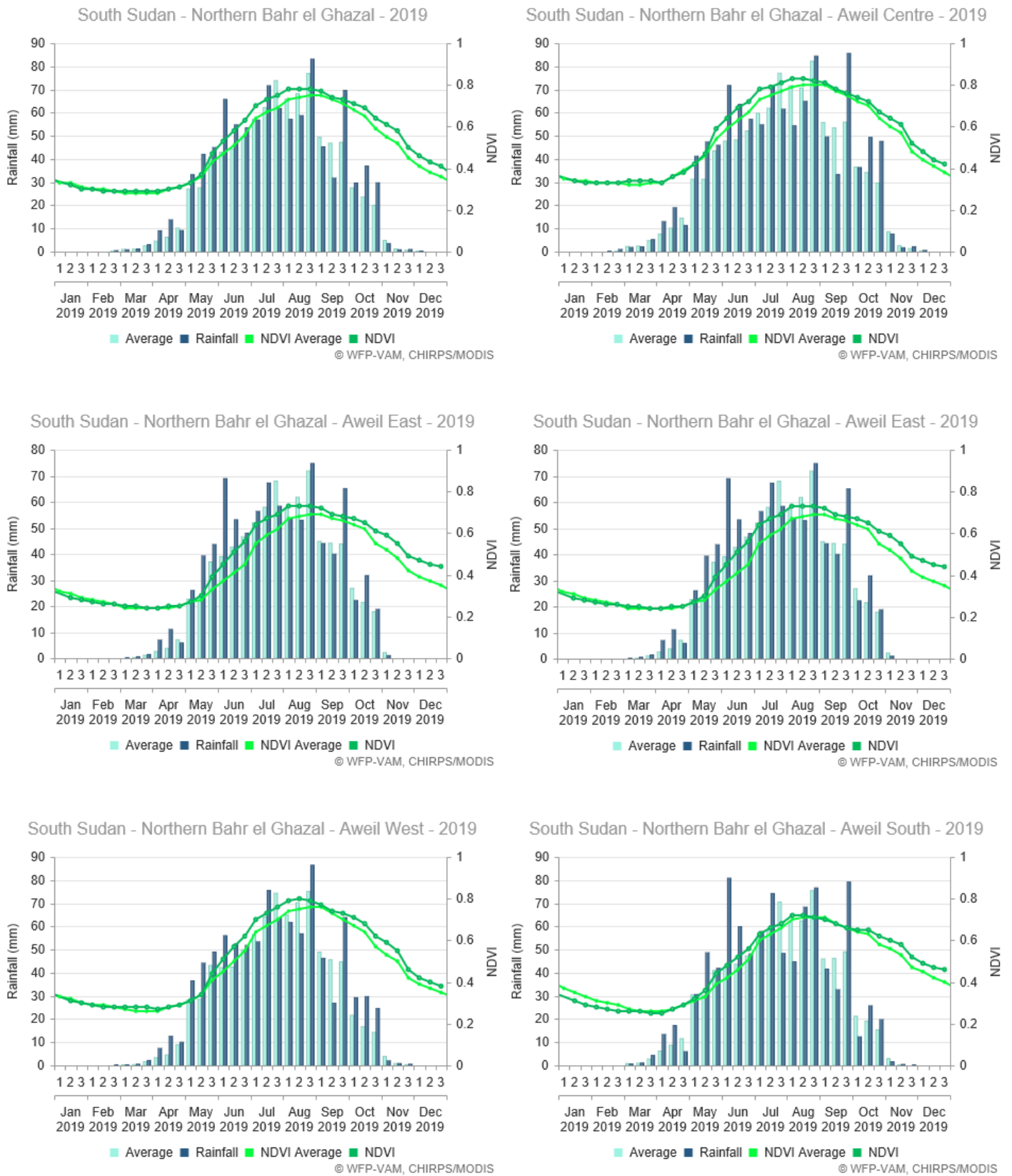
Source: WFP/VAM, 2019.

Scheme, Ton Chol and Ayai farms. All these mechanized farming areas were unable to plant any crops this season, resulting in no production of crops.

In Ton Chol mechanized farming areas in Aweil East County, farming activities could not be carried out, as heavy flooding occurred when the short-cycle sorghum varieties (*Wad Ahamed* or *Gadam hamam*) are usually planted, in August. Floods continued up to October.

A complete crop failure occurred in the Aweil Rice Scheme in 2019 due to heavy flooding of the rice fields that impeded planting, despite efforts made by the Scheme's farmers to plough land. Similarly, the widespread flooding has impeded planting of sorghum in most mechanized farms except the Ayai Farm, which managed to produce only 420 tonnes of sorghum from 840 hectares. A complete crop failure also occurred in the other mechanized farms including Ton Chol in Aweil East. As a result, ratoon cropping did not take place in these areas.

Since cassava is not commonly grown in the State, production from isolated plots in Aweil Centre County is considered as insignificant. However, groundnuts contribute to the households' food economies and may augment the harvest by an estimated 14 300 tonnes of unshelled product.

Large numbers of livestock are found in all the counties of the State. However, the number is reported to have declined in 2019 due to the high mortality rates caused by water borne diseases induced by floods and constrained access to pastures in flood-affected areas. However, due to the abundant rains received, pasture and water availability in the areas not affected by the floods were higher than last year. The floods have also resulted in an increased prevalence of endemic livestock diseases in most areas of the State. The most prevalent diseases include FMD, CBPP, BQ, Anthrax, PPR, CCPP, HS, mange and fowl fox as well as internal and external parasites.

Western Bahr el Ghazal

The Task Force teams undertook a planting assessment mission from 29 July to 8 August 2019 (Jur River and Raja counties) and a harvest assessment mission from 20-30 September 2019. Overall, 138 interviews were made, including 129 farmer case studies and 9 key informant interviews. The case studies conducted at planting and harvest time were 64 and 74, respectively.

Growing conditions
Figure A2-5 shows the combined rainfall estimates and vegetation index graphs for the whole State and three counties (Raga, Jur River and Wau). According to remote sensing data, seasonal rains started around April/May and vegetation conditions were average to slightly above average. According to the interviewed farmers and key informants, the onset of seasonal rainfall was slightly late (around mid-May), but the performance of the rainy season was better than last year in terms of amount and distribution throughout the season. As confirmed by CCMCs and Task Force teams' reports, adequate rains up to the end of the season resulted in more favourable growing conditions in all the counties compared to last year. As a result, the yields of cereals (maize and sorghum) and groundnuts in 2019 were higher than in 2018.

The majority of smallholder farmers use hand tools 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, hoe, panga and rack. The price of hand tools was very high in the local markets since they were brought by traders from other areas. The price of one maloda was about SSP 1 500 in 2019, compared to SSP 700 in the previous year, while the price of a hoe was about SSP 1 500 compared to SSP 700 during the previous year.

The use of draft animals (oxen and donkeys) either owned or hired has helped farmers to increase the cultivated land. In 2019, the hiring rate for ox-ploughing was SSP 7 000/feddan, on average, compared to SSP 5 000 in 2018.

Furthermore, 21 Government tractors (9 functional and 12 non-functional) and 8 private tractors (all functional) were available. The utilization of tractors is severely constrained by shortages of spare parts and high fuel prices. The hiring rate for Government tractors was about SSP 3 000/feddan, in addition to 2 gallons of diesel (SSP 300/litre) and breakfast for the driver and his assistant, while the rate for private tractors was SSP 6 000/feddan for ploughing.

Regarding labour, most of the labour force required for farming activities is sourced from family members, followed by communal labour (nafeer) and limited hired labour for digging and weeding. The hiring rate in 2019 was SSP 6 000/feddan compared to last year's price of SSP 4 000/feddan. The prices of seeds were high at the time of planting. Sorghum seed was sold at about SSP 700/malwa (3.5 kg) compared to SSP 400 in 2018, the price of groundnuts (unshelled) was SSP 250 compared to SSP 200/malwa in 2018, and sesame was sold at SSP 1 200/malwa compared to SSP 800 in 2018.

Sorghum is by far the preferred cereal and seeds are mainly local/own seeds carried over from the previous harvest. Several farmers did not plant the traditional long-cycle landraces of *Mabior* or *Ulela* sorghum, since it is subject to damage by transhumant livestock that are returning home before the crop is harvested. Therefore, the production from these traditional long-cycle landraces of sorghum decreased. 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* and *Luana* and *Bene*. These varieties are harvested together with groundnuts and, therefore, are not damaged by early 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 manure in their fields by collecting and spreading goat and cattle manure in their fields. Inviting cattle keepers to keep the animals on their farmlands for manuring (by establishing

temporary camping in farmers' fields) is also practiced, but mainly by better-off farmers as the practice is expensive. Farmers using this system obtain higher cereal yields. An alternative practice of maintaining soil fertility is composting, manuring and shifting cultivation. This is practiced by smallholder farmers when soil fertility is depleted due to repeated cultivation of the same land for consecutive years.

FAW was reported in several areas causing mild damage on maize and to some extent on sorghum seedlings. Overall, occurrences of endemic pests were within the normal range, causing mild damage in most cases. Other pests and diseases commonly reported during the season include millipedes, grasshoppers, stalk borers, squirrels, local birds, wild rats, blights (on groundnuts), wild and domestic animals, various types of weeds including *Striga*. The damage caused by the *Striga* parasitic weed on sorghum crops was reported to be moderate, mainly occurring in areas where the soil fertility is depleted and no animal manure is used.

Production
The gross cereal production in 2019 is estimated at 50 797 tonnes, 29.1 percent higher than in 2018, as a result of both an increase in yields due to favourable rains and an expansion of plantings due to improved security conditions. Therefore, the 2020 cereal deficit, forecast at about 25 000 tonnes, is 22 percent lower than in 2019.

A two-year system of cassava production is commonly used in the State. Yields in 2019 are estimated at an average level of 12 tonnes per hectare by the Task Force-led teams. The contribution of cassava to the 2020 food consumption in the State is estimated at 38 000 tonnes of cereal equivalent (gross dry matter). Groundnuts are likely to add an estimated 14 000 tonnes of unshelled product at household level.

Small ruminants, particularly shoats, are owned by most farmers in the State and kept to graze around homesteads, but prevented from intruding into crop fields. Livestock body conditions were reported at PET BCS of 3-4 for shoats and 3 for cattle,

Figure A2-5: South Sudan (Western Bahr el Ghazal) - Seasonal Rainfall and NDVI
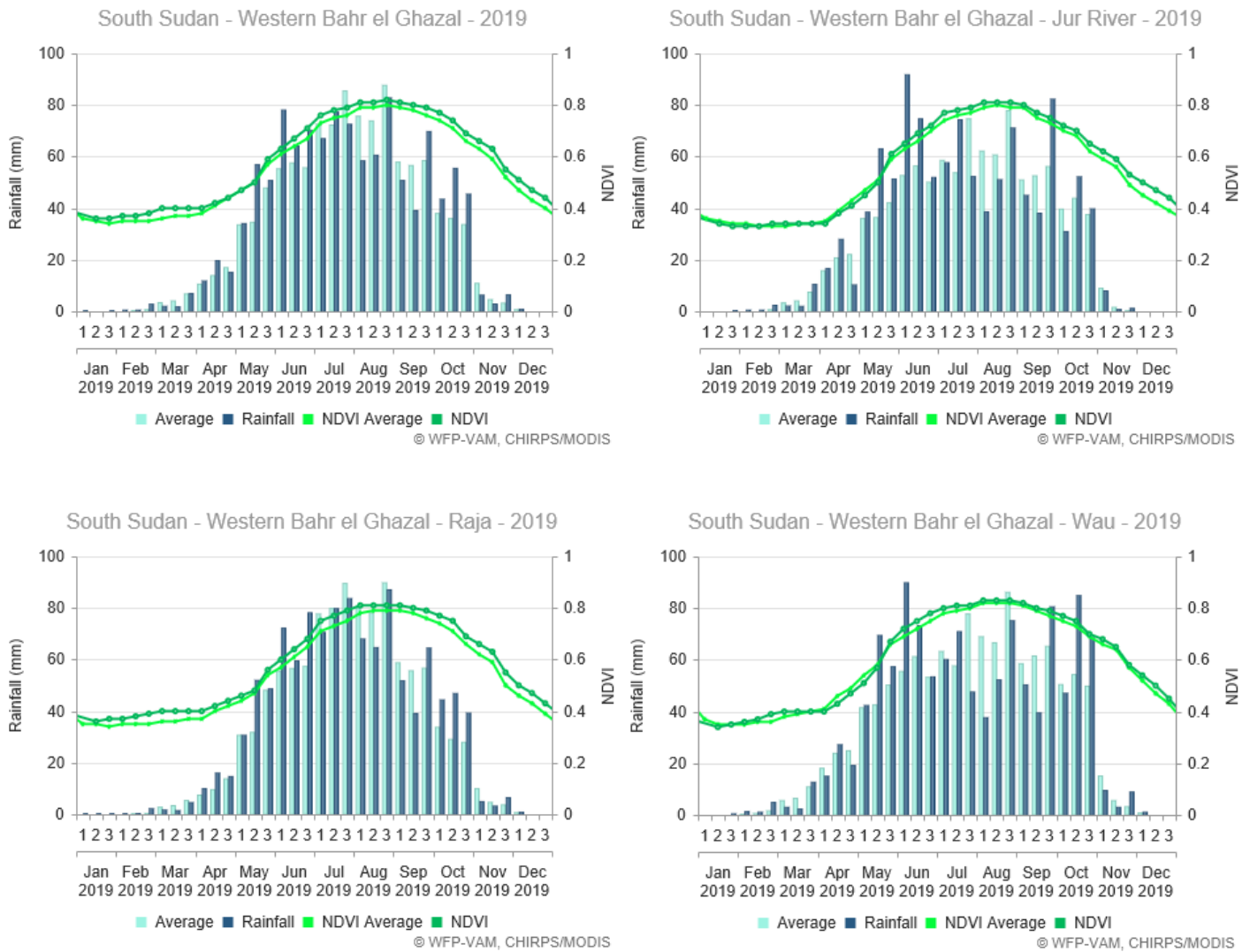
Source: WFP/VAM, 2019.

on average. In general, in all the visited counties the body condition of animals was good due to adequate pasture and water availability, resulting from the larger rainfall amounts compared to last year. There were no reports of disease outbreaks.

However, normal occurrences of CBPP, CCPP, Anthrax, BQ, FMD, New Castle Disease, diarrhoea, Haemorrhagic Septicaemia, internal and external parasites, mange on goats, heart water disease and tick-borne diseases were reported.

Warrap (including Abyei)

The Task Force teams undertook a planting assessment Mission from 23 July to 1 August 2019 and a harvest assessment Mission from 20-30 September 2019 to assess the output of the main harvest in the State, with a total of 127 case studies. The planting assessment was based on 67 case studies (65 farmers and 2 key informant interviews), while the harvest time assessment was based on 60 case studies (57 farmers and 3 key informants). The counties visited during the two assessments include Abyei, Twic, Gogrial West, Tonj North and Tonj South.

Growing Conditions

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 and well above-average rainfall was received throughout the cropping period. Warrap is one of the states most affected by the floods, which occurred in all the six counties and in the Abyei Administration Area. Flood-related crop damage occurred starting from July and has continued even after harvesting was completed in October. Most of the survived sorghum fields were seriously infested with weeds, with the heads of sorghum (panicles) reported to be of small size. Groundnut pods in the flood-affected fields were found to be rotten, especially in Tonj North County. Sesame, particularly vulnerable to waterlogging, failed totally in the counties affected by severe flooding, especially in Abyei and Twic. Harvesting of crops started in September and extended into October. Floods and waterlogging resulted in a significant reduction in sorghum yields.

The majority of farmers use hand tools, mainly maloda purchased from local blacksmiths. However, compared to other states, in Warrap there is a wider use of ox-ploughs and tractor hiring service. In 2019, there were 81 Government owned and 30 private tractors in the State, out of which 31 Government and 30 private tractors were functional.

The use of ox-ploughs is increasing in Tonj South, Tonj North, Gogrial and Twic counties. The hiring rate for Government tractors is SSP 5 000/feddan plus 20 litres diesel costing SSP 5 000 to be covered by the farmer. The hiring rate for private tractors is about SSP 13 000-17 000 including fuel. Last year, the hiring rates for Government and private tractors were SSP 15 000 and 18 000/feddan, respectively. On the other hand, the cost of ploughing using ox-ploughs ranges from SSP 5 000-6 000/feddan compared to last year's rate of SSP 3 500. Generally, farmers used family labour and a few practice communal and hired labour. The use of hired labour is confined to Abyei and Ajakuac areas. Labour availability increased this year due to the presence of returnees from the Sudan.

Sorghum, groundnuts, maize and sesame are the main crops grown in the State. Sorghum is by far the preferred cereal, with seeds being local/ own seeds carried over from the previous harvest with a preference for the short landraces (*yaar*, *athel* and *nyanjung*) to be harvested in September. Late-maturing sorghum (*kec*) sown in Tonj South was too early in its growing cycle to be effectively assessed during the Mission. Local groundnuts and sesame seeds were planted at the same time as sorghum, in addition to the small areas planted with cowpeas and local maize.

In 2019 there were no reports of serious pest infestations except for the normal occurrence of common pests including millipedes, foxes, squirrels and monkeys on groundnuts, black ants on sesame and sorghum. FAW was observed on maize and sorghum at very minimum infestation levels for early planted crops, but average damage was reported on late planted maize and sorghum crops, especially in Tonj South. However, maize is not a major crop in the State. Weed infestation was high due to the high rainfall that encouraged the fast growth of weeds and also due to the difficulty of accessing waterlogged/flooded fields by farmers that hindered timely weeding operations. In addition to weeds like Johnson grass and Striga, major pests reported by the Task forces and CCMCs were sorghum midge, sorghum smut, local birds and aphids, among others. Roaming livestock have also caused some damage on crops, but they were mitigated by scaring or fencing of crop fields.

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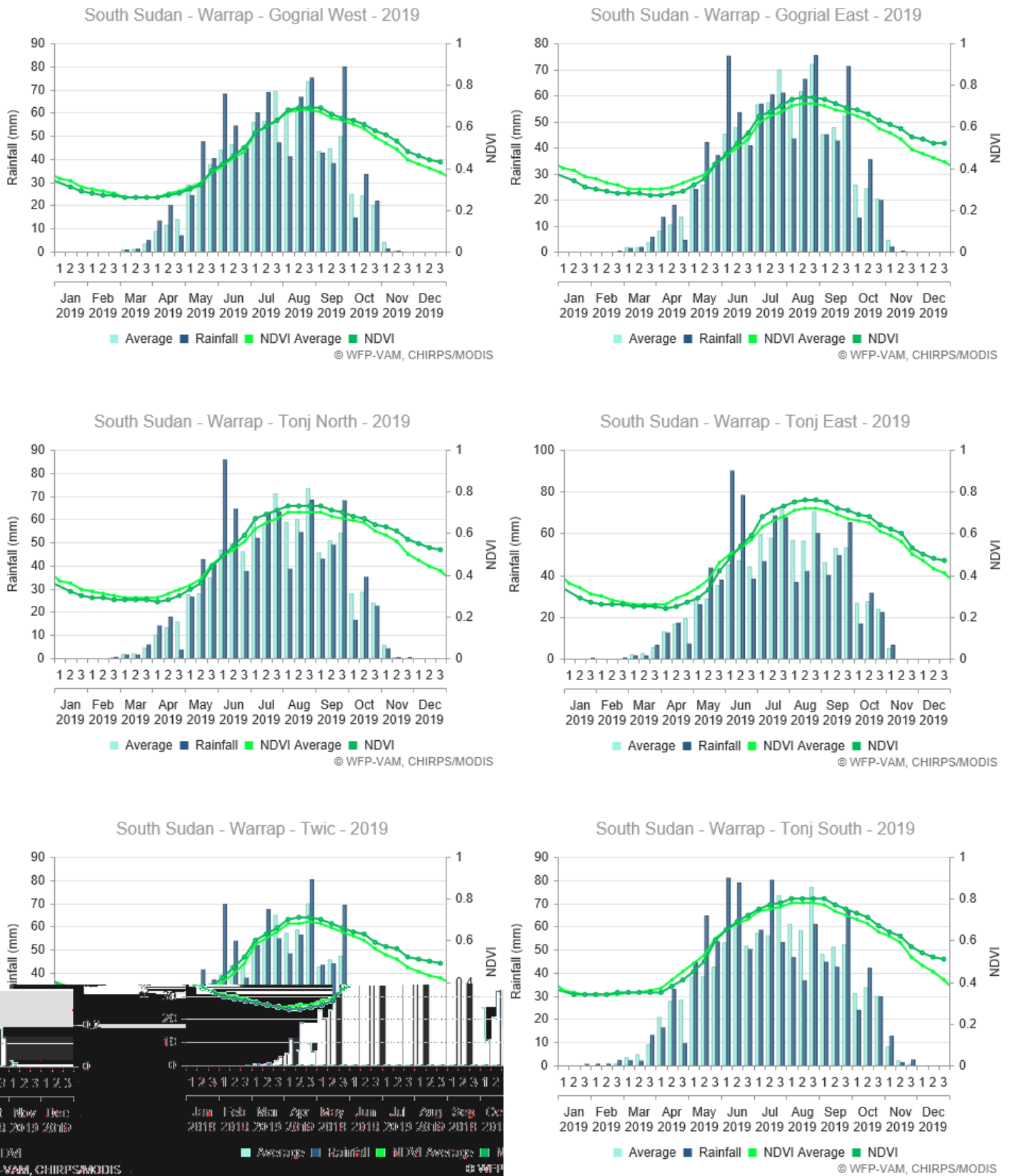
Production

The gross cereal production in Warrap State (including Abyei Administration) is estimated at 161 171 tonnes, almost similar to that of last year. The cereal area has been estimated at 162 191 hectares, 3.3 percent higher than the previous year. The cereal production level remained the same despite the slight increase in harvested area and high rainfall of the season, mainly due to the negative effect of the widespread flooding on crop production in most flood-prone areas of the State.

Cassava is not a common crop in Warrap State, mainly due to the agro-ecological unsuitability of the area to support the growth, which limited 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 13 600 tonnes of unshelled product to the households' food consumption.

There are large numbers of cattle and shoats in Warrap State. Cattle are largely transhumant, usually moving to dry season grazing areas and water points around December and January. However, this year, cattle movement occurred later than usual, around January or February, due to the availability of water and pasture in most areas, except in Tonj South, where water and pasture were exhausted earlier in November and migration took place in November-December. The return home and wet season grazing areas occurred in April-May.

The PET BCS was 3-4 for cattle and 2-3 for shoats due to access constraints to grazing areas caused by flooding. However, water availability has significantly improved due to above-average rainfall and flooding. Access to pastures improved in early 2020 when flood waters receded.

Livestock mortality in the flood-affected areas was high at the beginning of the season due to an increased incidence of diseases including anthrax, CBPP, FMD and BQ. There were also endemic diseases including CCPP, HS, PPR, Rabies, ND, lumpy skin disease, shoat pox, diarrhoea and internal and external parasites during the season. Cattle raiding has increased in 2019 in Twic County, while also Tonj North, Tonj South and Abyei counties have experienced cattle raiding.

Lakes

The Task Force teams undertook planting and harvest assessment missions in Lakes State in July and September, respectively, performing 80 case studies. The activities performed during the harvest assessment included 59 case studies (57 farmers and 2 key informant interviews) and walking transects with crop sampling, allowing yields to be estimated objectively in spot locations. In most of the visited areas, access to land was unimpeded, except in a few insecure areas of the State.

Growing conditions

Figure A2-7 shows the combined rainfall estimates and vegetation index graphs for six counties of Lakes State (Rumbek Centre, Rumbek East, Cueibet, Wulu, Awerial and Yirol East). The seasonal rains started in June with a delay of three to four weeks in most parts of the State, except in a few pocket areas where the rains had a timely onset in May. The rainfall amounts were above average during most of the rainy season. Interviewed farmers and Task Force teams have indicated that, despite the delayed onset, seasonal rains had a good performance, better than in 2018, with above-average rainfall amounts and a favourable spatial and temporal distribution. However, localized flooding occurred in some counties, especially in the lowlands of Rumbek North and Awerial counties, resulting in crop damage.

Use of ox-ploughs across the State has increased in recent years and a higher number of ox-ploughs was used this year compared to last year. According to the SMoA, more than 80 percent of the farmers in Awerial, Cueibet, Rumbek Centre, Rumbek East, Yirol East and Yirol West counties used ox-ploughs, while most farmers in Wulu County used hand tools, with only a few using oxen. There are about 60 tractors in the State, out of which 26 are functional. In Cueibet County, the hiring rate for tractors was SSP 10 000 and the rate for ox-ploughs was SSP 5 000-6 000/feddan, compared to last year's oxen hiring rate of SSP 4 000/feddan. The main types of hand tools used by the farmers are maloda, machete, hoe, axe, rakes and sickles. These tools are used for various agricultural activities including land clearance, planting, weeding and harvesting.

Figure A2-7: South Sudan (Lakes) - Seasonal Rainfall and NDVI
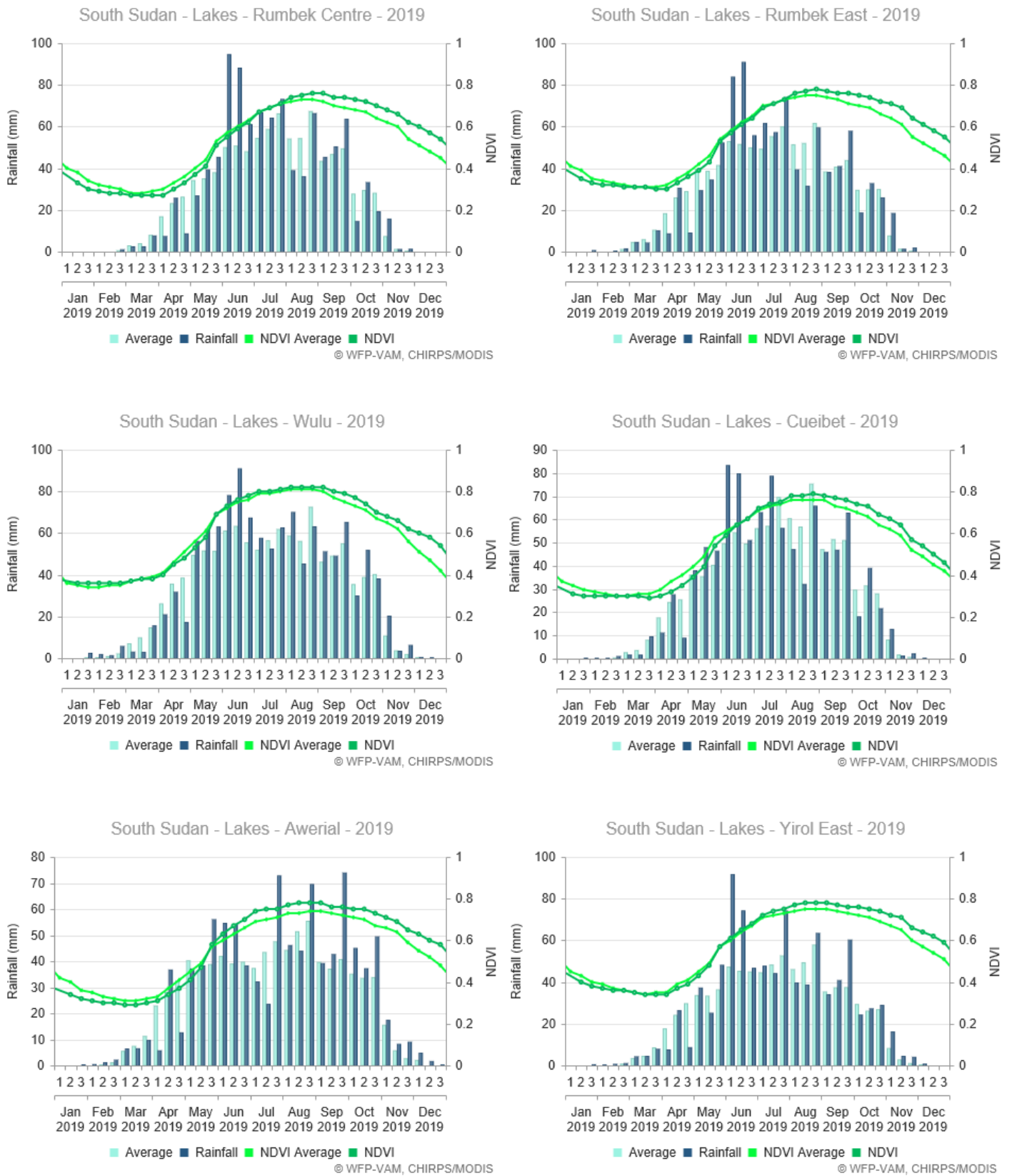
Source: WFP/VAM, 2019.

Regarding seeds, the majority of the farmers in the State use local seeds of long, medium and short-cycle sorghum. Other crops including groundnuts, cassava, sesame, green gram and cowpeas, are mainly inter-cropped with the main crops. The main sources of seeds are from own savings or purchased from the markets. Planting is performed at different times depending on the onset of the rains and types of crops. In 2019, planting of groundnuts, early maturing sorghum, sesame and green gram took place from June to July. In several areas of the State, the early planted sorghum and groundnuts, sown in May required replanting due to the delayed onset of the rains.

The main pests and diseases reported during the season were millipedes on groundnuts, FAW on maize, stalk borers and birds on sorghum and maize, while monkeys, porcupines and squirrels attacked sorghum and groundnuts. Overall, damage levels were mild to average. In Wulu, crop damage by moles was reported on cassava and sweet potatoes. Weed infestations remained a serious challenge for the cultivation of all crops across the State. Mild to serious losses of harvested crops was reported due to storage pests including weevils and rats. However, no control measures were undertaken. There is no application of fertilizers in the State, except for some use of manure (especially cow dung and goats droppings) on maize and vegetables fields around homesteads. Maize is mostly grown in abandoned cattle camps, since the accumulation of cow dung benefits soil fertility.

Production
The estimates of the 2019 cereal production have been performed on the basis of time series data adjusted with evidence from crop sampling, PET scores and case studies. The 2019 gross cereal production is estimated at 162 124 tonnes, 12.2 percent up from 2018, mainly reflecting a 3 percent increase in the harvested area and a slight increase in yields. The groundnut output is estimated at 44 400 tonnes of unshelled product, 32.7 percent up from 2018, mainly due to higher yields and an improved methodology of the assessment, which has been conducted at county level since last year.

The cultivation of cassava in Lakes State is hindered by cattle-keeping practices, with uncontrolled animals causing damage to growing crops during herd movement. In 2019, cassava production is estimated at 120 000 tonnes of fresh tubers, corresponding to 35 200 tonnes of cereal equivalent.

In Lakes State, a transhumant livestock rearing system prevails, with animals migrating in search of water and pasture. During these movements, pastoralists are affected by cattle raiding, especially in Rumbek North County. Livestock body conditions in 2019 were generally better compared to the previous year due to adequate pasture and water availability. The PET livestock body condition score in most of the State, as reported by Task Force teams, was average, assessed as 3-4 for cattle and 3 for shoats. However, the PET BCS in Yirol West and Wulu was 3 for both cattle and shoats. There were no reported cases of disease outbreaks during the season. However, endemic diseases including CBPP, BQ, FMD, PPR, Newcastle Disease and coccidiosis were reported. Floods have affected the movement of cattle by forcing them to move to higher grounds, where the animals caused damage to crops and cattle keepers sometimes have driven out the farming communities from their villages. Cattle raiding has substantially increased in 2019 and it has extended to rural villages, where trained bulls used for ox-ploughing were also stolen.

GREATER UPPER NILE

Upper Nile

The Task Force teams undertook planting and harvest assessment missions in August and December 2019, respectively, visiting Renk, Melut and Maban counties. The total number of case studies conducted during both missions was 42, with 37 farmer interviews and five key informant interviews. The number of case studies during the harvest assessment was 16, consisting of 14 farmers interviews and 2 key informants. Upper Nile State has the largest number and size of semi-mechanized schemes in the country. In all the areas visited by the Task Force teams, access to land was unimpeded and an expansion of commercial farming was noted,

with increasing areas under cultivation both in the mechanized and in the traditional (small holder and emerging farmer) sectors. However, challenges for the establishment of land ownership rights for commercial farmers continued, especially in Renk County. The same plot could be allocated to two or more farmers by different authorities, thus creating disputes over land ownership and disrupting agricultural activities.

Growing conditions
Combined rainfall estimates and vegetation index graphs for six locations selected across Upper Nile State (Renk, Maban, Melut, Longochuk, Baliet and Panyikang counties) are shown in Figure A2-8. In most locations, remote sensing data indicate a timely onset of seasonal rains, followed by average to above-average rainfall and vegetation conditions up to the end of the season. There were no reports of prolonged dry spells except in a few areas affected by short dry spells, where replanting of sorghum was required.

Seasonal rains started in May and the rainy season was characterized by average to above-average rainfall amounts and a good spatial and temporal distribution over most cropping areas. Interviewed farmers and Task Force teams confirmed that the performance of the 2019 rainy season was significantly better than in 2018. An annual rainfall amount of 641 mm was recorded in one station this year, compared to the long-term average of 410 mm per annum. Mild flooding occurred in the low-lying areas of the State, but with a minimal effect on crops, especially in the commercial farming areas of Renk and Melut counties. In 2019, there were no significant dry spells that affected crop development in most cropping areas of the State, including in commercial farming areas. The season was generally favourable for crops compared to last year, when a prolonged dry spell in July affected crop development. However, although a much better production of all crops was anticipated due to the good rains, sorghum production has declined mainly due to a reduction in the planted area in favour of sesame and damage by migratory pests.

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 life cycle, being ready for harvest as early as August, while sorghum must remain in the field until November/December, with more uncertainty about the continuation of the rainfall. The expansion of *Striga* (parasitic weed of sorghum) is also another factor that discouraged the cultivation of sorghum in several areas.

The Task Force-led teams visited farmers in major farming areas of Renk and Melut counties at the time of harvesting. The State Director 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. The local Government imposed high taxes on crops produced and sold by commercial farmers, including SSP 1 500/90 kg bag for sorghum and SSP 4 000/90 kg bag for sesame. As confirmed by the Task Force teams, the area cultivated with sorghum has decreased, while the area under sesame increased compared to last year.

Over the past few years, there were some improvements in the support to commercial farmers through the provision of new tractors and fuel that contributed to the cultivation of more land. In 2019, the number of functional tractors in the commercial farming areas of Upper Nile was 424 (250 in Renk and 174 in Melut counties). Most of these tractors belong to Sudanese nationals who provided tractor hiring services to commercial farmers. In 2019, the hiring rate of tractors without fuel, lubricants and spare parts was about SSP 750 000-800 000/ season (three months) compared to last year's rate of SSP 650 000 (SSP 400 000 for the tractor and SSP 250 000 for a disc plough). Sometimes *morbu* (120 feddans) is used as a unit of area measurement. The cost of cultivating a *morbu* is about SSP 180 000-200 000 plus two drums of diesel, costing SSP 54 000-70 000 in the black market. The price of diesel subsidized by the Government is SSP 20 000/drum. Local farmers are only entitled to buy three to five barrels of diesel per tractor at the subsidized price. Tractor operators and assistant operators are paid by the farmer. Each tractor needs two operators and two assistant operators to work on two shifts per day

Figure A2-8: South Sudan (Upper Nile) - Seasonal Rainfall and NDVI
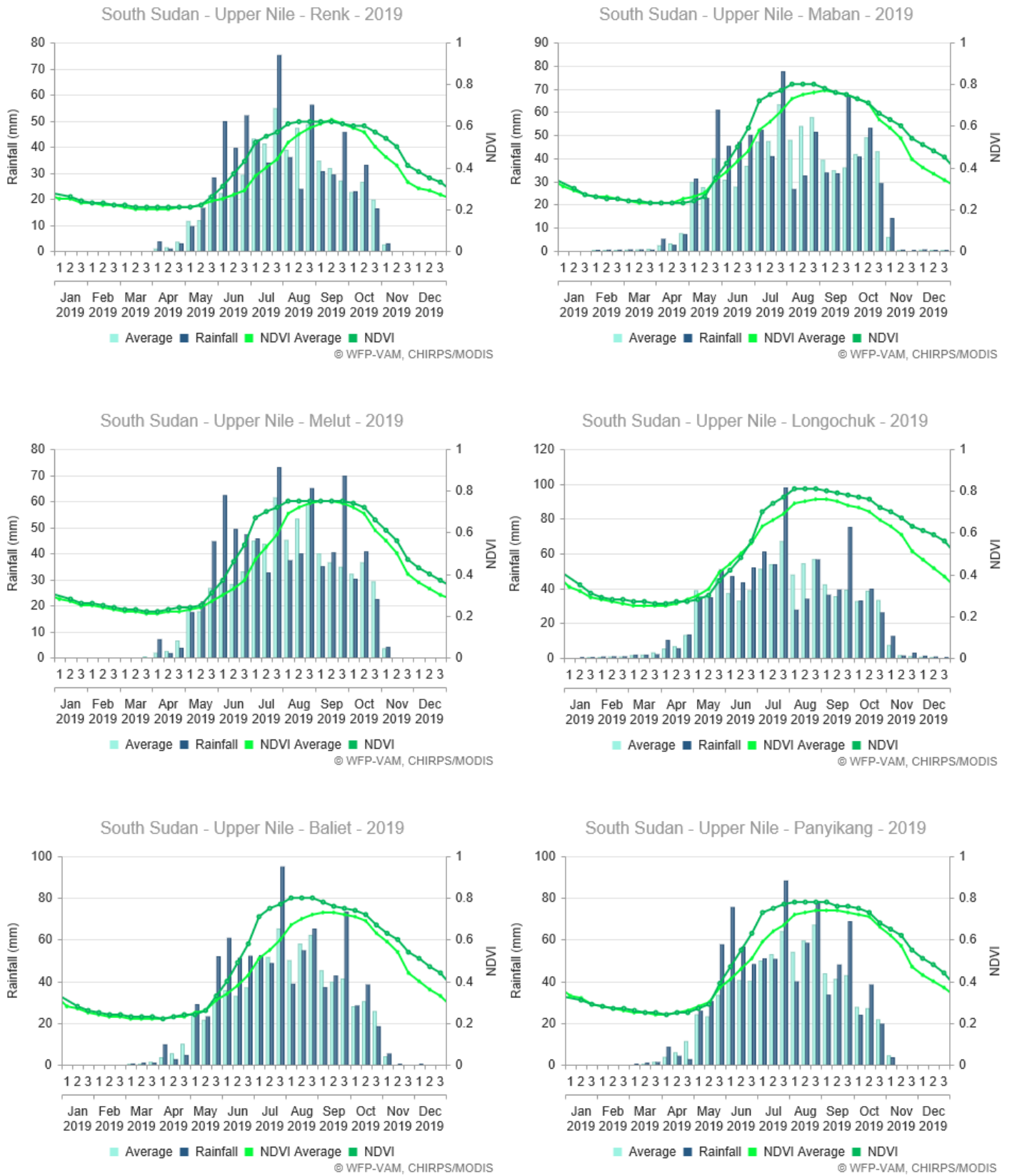
Source: WFP/VAM, 2019.

(24 hours), one team for the day time and the other for the night shift. Tractor operators are paid SSP 20 000-40 000/month per operator, while each assistant driver earns SSP 15 000-20 000/month. Spare parts and fuel are supplied by Sudanese traders through smuggling and sold at high prices in the black market.

Labour is available, but expensive, ranging from SSP 180 000-200 000 for weeding a block of land (120 feddans) compared to last year's price of SSP 120 000-150 000. There are also some combine harvesters in the schemes used for sesame harvesting only.

Hand tools (hoes and sickles) are used in the commercial sector for weeding and harvesting of sorghum. The spare parts for tractors are very scarce and have to be smuggled from the Sudan along with fuel and lubricants. Fertilizers and manure were not used, while hand weeding is noted to have been undertaken two to three times for all crops.

The farmer-saved seeds were available for sowing in July and August for the short maturing improved sorghum varieties of *Wad Ahmed*, *Gaddam* el *Hamam* and *Arfa Gadameck* currently being planted instead of the long maturing, local landrace *Agono* that was the main variety ten years ago.

In the semi-mechanized farming and the surrounding areas, infestation by migratory QQU and locusts caused moderate to serious damage on maturing sorghum crops in the area. Sesame yields were also mildly affected by pests including aphids and bugs. As a result of the damage on growing sorghum by locusts, farmers replanted the affected fields with sesame due to its shorter cycle. Other common pests reported during the season were black ants, stinkbugs, millipedes, rats, stalk borers, grasshoppers and aphids, all with mild level of damage. By contrast, weed infestations on sorghum and sesame were severe, and *Striga* weed, continuously expanding in recent years, caused moderate damage on sorghum crops. The only control measures practiced by farmers to control *Striga* was through mechanical removal and sometimes by crop rotation.

Chemical fertilizers are not common in both the traditional and semi-mechanized farming systems. Farmers practice shifting cultivation and crop rotation to improve soil fertility. In the traditional farming areas, almost all fields were cultivated by hand using family labour.

Upper Nile State is a relatively minor livestock-producing area. Pasture and water availability were adequate in 2019, and better than last year, due to the average to above-average rainfall received over most of the State. The PET BSC for cattle was 3-4, while that of shoats was 4.There were no reports of disease outbreaks during the season, apart from the normal occurrence of endemic diseases including CBPP, CCPP, FMD, BQ, PPR and external and internal parasites, all with minimal effects on livestock conditions.

Production
Gross production in the traditional sector in Upper Nile State is estimated at 29 534 tonnes of mixed cereals, 25.3 percent down from 2018. The decrease in production is due to a decline in planted area (-13.5 percent), resulting from the shifting to sesame, and due to damage caused by pests (QQU and locusts). For the mechanized sector, the Task Force teams estimated a gross production of 46 000 tonnes of sorghum in the mechanized farms in all locations, which is 14.8 percent lower than the 2018 estimate.

Unity

As in previous years, no Task Force Team missions were conducted in the State in 2019, mainly due to insecurity, which severely constrained movement to and through the cropping areas to assess growing conditions and cereal output. However, the Task Force Team has taken advantage of the yield data collected by the Monitoring and Evaluation (M and E) Team of FAO. The FAO Crop Assessment/Monitoring Team trained staff of the M and E Team and partners, which ensured that the data collection process followed the CFSAM Methodology. The aim was to estimate the production obtained from the seeds distributed by FAO and its partners, through ELRP in 2019. In addition, the CFSAM Team used phone communication to obtain more information on the performance of the season and yields of the main crops, which were used by the CFSAM Team during the final analysis.

Remote sensing analysis and information were the main data source used to evaluate the performance of the rainy season. FAO and MAFS have managed to train SMoA field workers and established four CCMCs in Unity 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 9 to 19 December 2019 in the capital, Juba.

Growing conditions

Figure A2-9 shows the combined rainfall estimates and vegetation index graphs for six selected locations across Unity State. Remote sensing data and information indicate a timely onset of seasonal rains around April in most cropping areas, which benefited planting activities, except in Guit and Koch counties, where rainfall was below average at the beginning of the season. Since July, rainfall improved throughout the State with average to above-average amounts of precipitation received throughout the season. However, some areas of the Sate were affected by flooding that caused damage on crops. The security situation has slightly improved compared to 2018, encouraging some displaced households to return and cultivate their land and enabling resident farmers to cultivate far fields.

There were no reports of serious pest damage this year and losses from FAW and stalk borer were reportedly low. In addition to these and other common pests, the infestation by weeds has caused mild to average damage on growing crops.

The 2019 CFSAM gross production estimate from the traditional sector is 14 366 tonnes of mixed cereals, mainly comprising maize and sorghum, which is 21 percent higher than the previous year. The increase in production was driven by an expansion in plantings, with the harvested area increasing by 17.8 percent from 2018 to 19 975 hectares and to higher yields resulting from larger amounts and improved distribution of rainfall in the 2019 cropping season.

Figure A2-9: South Sudan (Unity State) - Seasonal Rainfall and NDVI
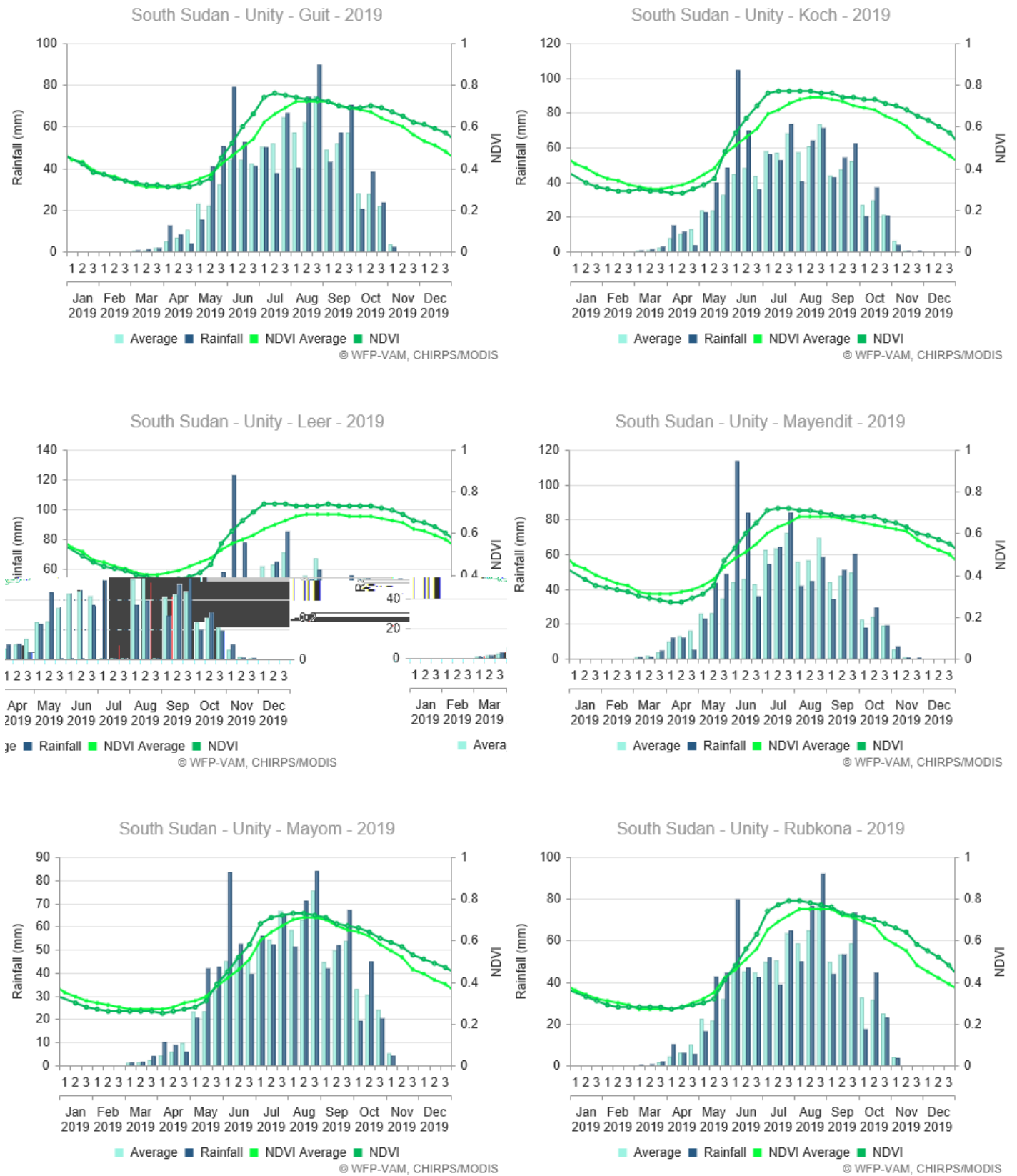
Source: WFP/VAM, 2019.

Jonglei

Access to information from Jonglei State has again been constrained by insecurity. Two short missions, at planting and harvest time, were conducted from 6 to 19 August 2019 and from 25 September to 2 October 2019, respectively. The planting assessments were carried out in Bor South and Pochalla counties, while the harvest assessment took place in Bor South County only. The Task Force-led teams carried out 62 case studies, comprising 55 farmer interviews and 7 key informant interviews. The teams conducted short walking transects during the harvest assessment mission. More families were noted to be farming around homesteads compared to 2018, due to fear of insecurity in the far fields, although there is a shortage of farmland near the homesteads. Cultivation of far fields is also limited by the lack of energy (due to food insecurity), fear of destruction of crops by wild animals, lack of resources and fear of theft.

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, Twic East and Bor South). According to remote sensing data and information, seasonal rains had a timely onset in April/May across the State, but were below average until mid-May. Subsequently, rains continued at above-average levels for the remainder of the cropping period. This was confirmed by The Task Force teams, which indicated that the inadequate amounts of rainfall at the beginning of the season necessitated the replanting of crops. They have also reported that above-average rains starting from late June/July caused mild to serious flooding over most low-land areas of the State. The counties most affected by the floods were Uror, Pibor, Duk and Twic East, while the damage in the remaining counties was mild. Floods started when crops were at the vegetative growth stage (June/July) and displaced farmers to higher grounds. The crops planted on higher grounds performed better than last year due to good drainage of these areas. Harvesting of the crops took place in September.

Hand-digging is the normal method of cultivation, accomplished by family or labour-sharing groups.

Farmers mainly use local tools, animal traction is not commonly used and there are no tractors except in a few areas including Bor South. The hiring rate of tractors was SSP 15 000/feddan, including fuel for land preparation, and the farmer has to pay again for the second round tractor service at planting time.

The main pests reported by the Task Force teams include local birds, millipedes, squirrels, Guinea fouls, monkeys, wild pigs, FAW, stem borers, rats, nematodes, green grasshoppers and sorghum midge, all with mild damage on crops. Although FAW infestations were favoured by below-average rains at the beginning of the season, abundant rains in the following months killed a large proportion of the worms and curbed their multiplication. Therefore, crops, especially maize, have recovered.

Production
The 2019 cereal production from the traditional farming sector in Jonglei State is estimated at 47 111 tonnes, 4.9 percent lower than in 2018, despite an increase of the harvested area by 5.3 percent from 2018, to 59 507 hectares. The decline in production is due to the severe impact of flooding in most areas of the State. Cassava production is observed in Pochalla County only, where it is reported to be gradually expanding, while none of the CCMCs in Bor South, Duk and Twic East counties reported cassava production. An estimated 1 300 tonnes of cereal equivalent, which is slightly higher than in 2018, will contribute to the households' food intake at State level. By contrast, groundnuts are grown, albeit on a small scale, in 8 of the 11 counties of the State. A production of 1 400 tonnes of unshelled product is estimated, slightly higher than last year.

Livestock management in Jonglei State is based on the transhumance system. Pasture and water availability were above average in 2019, although access to pasture in most of the flooded areas was restricted to road sides. As a result, the PET BCS was reported to be 3 for cattle and 2-3 for shoats during the season. There were no reports of disease outbreaks this year, except for the normal occurrence of endemic diseases including BQ, CBPP, CCPP, ECF, PPR, mange, FMD, diarrhoea, internal and external parasites.

Figure A2-10: South Sudan (Jonglei State) - Seasonal Rainfall and NDVI
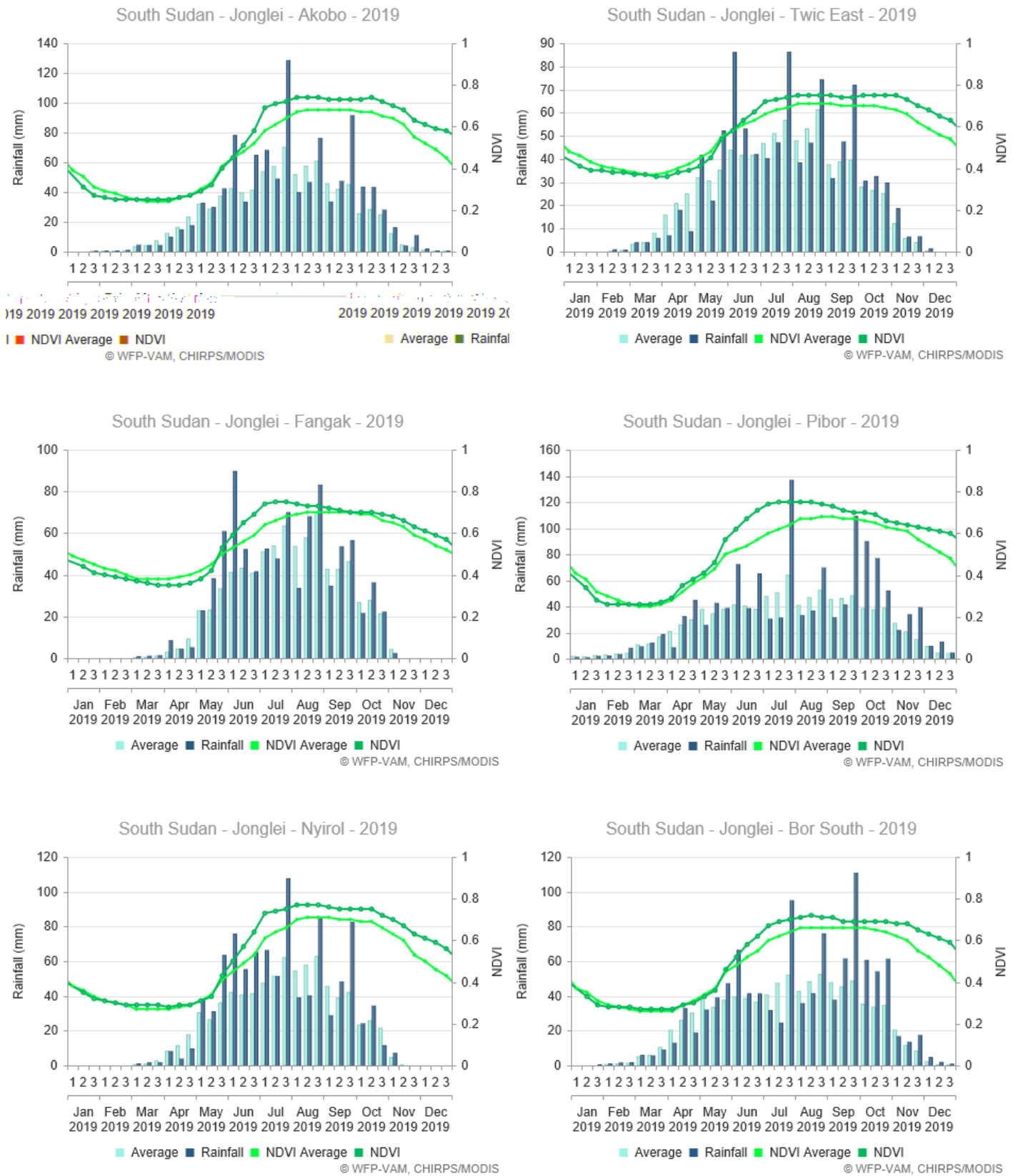
Source: WFP/VAM, 2019.

South Sudan - Planting and harvest assessment missions and case studies

State	Type of assessment	Date of assessments (2019)	Counties visited	Number of case studies		
				Farmers	Key informants	Total
Western Equatoria	First season planting	7-16 June	Maridi, Ibba, Yambio	55	0	55
	First season planting	7-16 June	Tambura, Ezo, Nzara	47	4	51
	First season planting	15-21 June	Mundri East, Mundri West	25	6	31
	First harvest assessment	2-11 September	Maridi, Nzara, Ibba	31	2	33
	First harvest	31August-7 September	Mundri West, Mundri East and Mvolo	6	2	8
	First harvest	26 August-4 September	Tambura, Ezo, Yambio	35	3	38
	Second harvest	5-14 November	Tambura, Nagero, Ezo, Nzara	33	3	36
	Second harvest	9-16 November	Mundri West and Mvolo	16	4	20
Central Equatoria	First season planting	18-24 June	Yei, Lainya, Morobo	47	6	53
	First season planting	20-29 June	Juba, Terekeka	76	0	76
	First harvest	27 August-3 September	Yei, Lainya, Morobo	40	7	47
	First harvest	26 August-4 September	Juba, Terekeka	41	5	46
	Second harvest	18-27 November	Juba, Terekeka	53	2	55
	Second harvest	19-26 November	Yei, Lainya, Morobo	45	3	48
Eastern Equatoria	Planting	1-11 July	Torit, Lopa/ Lafon, Ikwoto, Magwi, Pageri Area	58	6	64
	Planting	10-15 July	Kapoeta South, Kapoeta East, Kapoeta North, Budi	15	2	17
	First harvest assessment	25 August-5 September	Torit, Pageri AA, Ikotos, Magwi	49	5	54
	Harvest assessment	9-18 September	Kapoeta South, Kapoeta East, Kapoeta North, Budi	23	4	27
	Second harvest assessment	19-27 November	Ikwoto, Torit, Magwi, Pager Area	19	1	20
	Second harvest assessment, including ratoon crops	18-27 November	Kapoeta South, Kapoeta East, Kapoeta North, Budi	24	0	24
Northern Bahr el Ghazal	Planting assessment	29 July-8 August	Aweil West, Aweil East, Aweil South, Aweil Centre, Aweil North	52	1	53
	Flood damage assessment	25-29 July	Aweil West, Aweil East, Aweil South, Aweil Centre, Aweil North	20	3	23
	Harvest assessment mission (flood impact verification) 2nd round	3-10 December	Aweil West, Aweil East, Aweil South, Aweil Centre, Aweil North	54	7	61
	Harvest assessment	20-30 September	Aweil West, Aweil East, Aweil South, Aweil Centre	57	2	59
Warrap	Planting assessment	23 July-1 August	Abyei, Twic, Gogrial West, Tonj South	65	2	67
	Harvest assessment	20-30 September	Gogrial West, Twic, Tonj North, Tonj South, Abyei	57	3	60
Lakes	Planting assessment	23 July-1 August	Awerial, Wulu, Rumbek North, Yirol West	20	1	21
	Harvest assessment	20-30 September	Yirol West, Cueibet, Wulu	58	1	59
Western Bahr el Ghazal	Planting assessment	29 July-8 August	Jur River, Raja	59	5	64
	Harvest assessment	20-30 September	Raja, Jur River, Wau	70	4	74
Jonglei	Planting and first harvest assessment	6-19 August	Bor, Pochalla	34	6	40
	Harvest assessment in Bor	25 September-2 October	Bor South	21	1	22
Upper Nile	Planting assessment	8-14 August	Renk, Melut, Maban	23	3	26
	Harvest assessment in Renk and Melut	3-10 December	Renk, Melut	14	2	16
Total				1 342	106	1 448

Source: FAO South Sudan.

South Sudan - Source of flood waters and time of occurrence

State	Source of flood water	Time of flooding (June-October 2019)
Northern Bahr el Ghazal	Excess rainfall and overflow of rivers	July-October
	Overflowing of Lol River	September-October
Upper Nile	Excess rainfall and flood water from Ethiopian Highland (Sobat/Baro River and Khoryabus River)	July-October
Eastern Equatoria	Excess rainfall and overflow of Kiniete River coming from the Imotong Mountains	July-October
Unity	Excess rainfall	June
Central Equatoria	Overflow of Nile River	July
Warrap/Abyei	Excess rainfall and overflow of River Kiir	July
Jonglei	Excess rainfall and overflow of Nile River	July-October
Lakes	Excess rainfall	July

Source: FAO South Sudan.

South Sudan – Number of established CCMCs

State	As of December 2019	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.

South Sudan – Tentative estimates of 2019 traditional sector crop area (percent)

County/State	Sorghum	Maize	Rice	Finger millet	Pearl millet	Groundnuts	Cassava	Beans	Sesame	Cow peas	Others crops 1/	All crops
Central Equatoria	27.5	17.3	0.5	0.7	3.5	23.6	10.9	1.7	2.3	2.3	17.5	100
Eastern Equatoria	49.4	19.2	-	1.1	1.1	6.0	11.4	1.4	2.7	0.6	13.2	100
Jonglei	73.2	17.2	-	-	-	3.6	0.6	-	0.5	0.6	7.9	100
Lakes	33.7	5.3	-	1.1	5.9	27.6	3.5	-	8.2	4.5	10.3	100
Northern Bahr el Ghazal	58.4	4.1	0.7	-	2.1	22.9	-	-	11.8	-	-	100
Unity	45.0	34.0	-	-	5.0	5.0	-	-	3.0	1.0	13.0	100
Upper Nile	50.0	10.0	-	-	5.0	6.0	-	-	18.0	1.0	16.0	100
Western Bahr el Ghazal	35.1	3.0	-	1.4	1.4	32.4	12.5	1.4	6.7	1.2	5.0	100
Warrap	57.6	7.3	-	-	2.7	19.0	-	-	7.6	0.7	9.5	100
Western Equatoria	10.6	24.8	6.8	4.7	0.1	14.2	17.2	2.4	2.8	1.3	15.0	100
South Sudan	**40.9**	**12.1**	**1.3**	**1.2**	**2.6**	**18.8**	**6.5**	**0.8**	**6.6**	**1.6**	**7.7**	**100**
CEREALS	**58.1**											

Source: FAO South Sudan.

1/ Other crops include okra, yam, sweet potato, various fruits and garden crops.

This report has been 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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