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Organization of the
United Nations**



World Food Programme

SPECIAL REPORT

FAO/WFP CROP AND FOOD SECURITY ASSESSMENT MISSION TO SOUTH SUDAN

15 March 2019



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TABLE OF CONTENTS

Page

| | |
|---|-----------|
| Acronyms and abbreviations | 6 |
| Mission Highlights..... | 7 |
| OVERVIEW | 7 |
| SOCIO-ECONOMIC CONTEXT | 9 |
| Population and population movements | 9 |
| Economy..... | 11 |
| Economic growth and national budget..... | 11 |
| Exchange rate..... | 12 |
| Inflation | 13 |
| Agriculture | 14 |
| CEREAL PRODUCTION IN 2018 | 16 |
| Cereal harvested area and yield estimates | 16 |
| Factors affecting yields | 22 |
| Rainfall | 22 |
| Inputs in the traditional smallholder sector | 26 |
| Pests, diseases and weeds | 27 |
| Agricultural production in 2018..... | 28 |
| Cereal production..... | 28 |
| Other crops | 34 |
| Livestock..... | 35 |
| CEREAL SUPPLY/DEMAND SITUATION | 36 |
| Cereal balance..... | 36 |
| Cereal and livestock markets | 38 |
| HOUSEHOLD FOOD SECURITY SITUATION..... | 42 |
| Methodology | 42 |
| Main drivers of food insecurity in 2019..... | 42 |
| Current and projected food security outcomes for 2019 | 43 |
| Evolution of the food security situation | 44 |
| Household staple food supply: Markets vs household production | 46 |
| Food expenditure: Recent patterns and at-harvest situation..... | 48 |
| Household coping strategies | 49 |
| Estimated food assistance requirements in 2019..... | 50 |
| RECOMMENDATIONS FOR 2019 | 50 |
| Agriculture | 51 |
| Livestock..... | 51 |
| Markets | 52 |
| Food security | 52 |
| Annex 1: Indicative seasonal cropping calendar | 53 |
| Annex 2: Agricultural situation by area, 2018..... | 54 |
| Annex 3: CCMC - Training provided by FAO, March-October 2018..... | 75 |
| Annex 4: Planting and harvest assessment missions and case studies in 2018..... | 76 |
| Annex 5: Number of Established CCMCs, 2016-2018..... | 78 |
| Annex 6: Tentative estimates of crop area, 2018..... | 79 |

Acronyms and abbreviations

| | |
|---------|---|
| AFIS | Agriculture and Food Information System |
| BCS | Body Condition Score |
| BOSS | Bank of South Sudan |
| CARI | Consolidated Approach for Reporting of food security Indicators |
| BQ | Black Quarter |
| CBPP | Contagious Bovine Pleuropneumonia |
| CBT | Cash-Based Transfer |
| CBPP | Contagious Bovine Pleuropneumonia |
| CCPP | Contagious Caprine Pleuropneumonia |
| CCMC | County Crop Monitoring Committee |
| CFSAM | Crop and Food Security Assessment Mission |
| DLCO | Desert Locust Control Organization |
| ELRP | Emergency Livelihood Response Programme |
| FAO | Food and Agriculture Organization of the United Nations |
| FAW | Fall Armyworm |
| FEWSNET | 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 |
| GRSS | Government of the Republic of South Sudan |
| Ha | hectare (0.42 hectares = 1 feddan) |
| Hh | household |
| IDPs | Internally Displaced Persons |
| IPC | Integrated Food Security Phase Classification |
| kg | kilogramme |
| MAFS | Ministry of Agriculture and Food Security |
| mm | millimetres |
| MoA | Ministry of Agriculture |
| NARO | National Agricultural Research Organization |
| NBHS | National Baseline Household Survey |
| NBS | National Bureau of Statistics |
| NDVI | Normalized Difference Vegetation Index |
| NGO | Non-Governmental Organization |
| PET | Pictorial Evaluation Tool (Crop yield and livestock condition photo indicators) |
| PoC | Protection of Civilians |
| PWG | Population Working Group |
| QQU | <i>Quelea quelea</i> |
| RFE | Rainfall Estimate |
| SMoA | State Ministry of Agriculture |
| SSP | South Sudanese Pound |
| t | tonne |
| UN | United Nations |
| UMMISS | 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 |
| VAM | Vulnerability Assessment and Monitoring |
| WFP | World Food Programme |

Mission Highlights

- The net cereal production in 2018 (after deduction of post-harvest losses and seed use) in the traditional sector is estimated at about 745 000 tonnes, 15.5 percent below the average of the previous five years and 2.5 percent less than 2017. It is the smallest recorded output since the start of the conflict.
- With a projected population of about 11.56 million in mid-2019, the overall cereal deficit in the January-December 2019 marketing year is estimated at about 518 000 tonnes, 11 percent above the deficit estimated for 2018.
- In January 2019, 54 percent of the population (about 6.2 million people) were in IPC (Integrated Phase Classification) Phase 3: "Crisis", Phase 4: "Emergency" and Phase 5: "Catastrophe". This is only a modest decrease from the levels reached in September 2018, but it shows a 13 percent increase compared to the same time last year, indicating a steadily worsening food security situation. These proportions are projected to increase in May-July 2019 to 60.3 percent, including a possible 50 000 people in Phase 5: "Catastrophe". This is despite the planned humanitarian assistance, in the absence of which the figure would reach 67 percent. The most serious situations are in Unity, Jonglei and Lakes states.
- Household food insecurity has reached new records in 2018: 74 percent of the population was estimated to be food insecure at post-harvest time. This mostly arises from a spike in severe food insecurity across the country, with 26 percent of the population severely food insecure by late 2018. In the coming lean period of mid-2019, food insecurity levels are expected to increase further.
- The poor performance of the 2018 cropping season was mainly due to below-average and erratic rains constraining yields, and persisting and protracted insecurity disrupting agricultural activities.
- Harvested area in 2018 remained well below the pre-conflict levels, despite a slight increase compared to 2017 due to localized security improvements that encouraged some displaced farmers to return and engage in agricultural activities.
- Outbreaks of Fall Armyworm (FAW) and other common pests caused mild to average damage to maize and sorghum crops.
- Despite below-average and erratic rains, the availability of pasture and water for livestock was adequate and animal body conditions were average. However, insecurity continued to alter marketing/migration routes.
- The country is facing a protracted macro-economic crisis, and the Gross Domestic Product, which has been decreasing since 2015, contracted by a further 3.5 percent in 2018.
- The South Sudanese Pound appreciated in the parallel market by about 25 percent in the second semester of the year, but it remains substantially depreciated.
- Inflation declined, albeit irregularly, throughout 2018. However, as of end-2018, it was still very high, with the year-on-year inflation rate estimated in October 2018 at more than 40 percent.
- Cereal prices declined by 10-50 percent in the second semester of 2018 as the South Sudanese Pound appreciated in the parallel market and newly harvested crops increased supplies. However, prices remained at very high levels, underpinned by tight supplies, insecurity-related market disruptions, high overall inflation and a weak currency.
- The number of Internally Displaced Persons (IDPs) in the country stood at 1.87 million in December 2018 and the number of refugees in neighbouring countries was close to 2.3 million. Following improvements in security, the refugee caseload declined by about 10 percent in the last quarter of 2018, decreasing for the first time since the start of the conflict in 2013.
- Under the 2019 Emergency Livelihood Response programme, FAO plans to support 800 000 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, internally displaced persons, returnees and host communities.
- In 2019, WFP plans to assist just under 5.4 million people in South Sudan with nearly 325 000 tonnes of food assistance, including refugees and nutrition support activities.

OVERVIEW

An FAO/WFP Crop and Food Security Assessment Mission (CFSAM) visited South Sudan from 3 to 13 December 2018 to estimate the cereal production during 2018 and assess the overall food security situation in the country. The CFSAM reviewed the findings of several Crop Assessment Missions conducted from May to December 2018 at planting and harvest time in different agro-ecological zones of the country. As during the past four 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 PET yield levels and livestock body conditions, perform key informant interviews and farmer case studies. Between 2016 and 2018, in the framework of the concluded FAO/AFIS Project and the ongoing FAO-EU Project “Strengthening the resilience of pastoral and agro-pastoral communities in South Sudan’s cross border areas with Sudan, Ethiopia, Kenya and Uganda” (OSRO/SSD/703/EU), 54 County Crop Monitoring Committees (CCMCs) have been established with the aim to improve the local capacity to collect reliable and accurate data. All assessment and training activities have been financially supported by the European Union through the FAO South Sudan office.

Building on the successful experience of the new assessment format introduced in 2014, also the 2018 annual crop assessment was planned to follow a year-long roadmap. Unfortunately, severe insecurity situations have precluded the full execution of the initial plan and field work activities were carried out only in accessible areas. Overall, 29 assessment missions (14 at planting time and 15 at harvesting 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, parts of Central, Eastern and Western Equatoria and parts of Jonglei states, access has been precluded both at planting and harvesting times. The slight improvement in security situation in 2018 has enabled the Task Force teams to reach four counties, two in Central Equatoria and one each in Eastern and Western Equatoria that were inaccessible in 2017. In all visited areas, concerns over security precluded to conduct driving transects and yield assessments were mainly performed through crop cutting (sampling) and walking transects. In addition, 1 492 interviews (1 391 farmer case studies and 101 interviews with key informants) were conducted between May and November 2018, compared to 1 039 interviews in 2017. A total of 45 counties were assessed by the Task Force in 2018. The CFSAM team has benefited from the yield and impact assessment surveys carried out by FAO and other partners aimed at evaluating the impact of seeds distributed through the Emergency Livelihood Response Programme in all states.

Using standard CFSAM procedures, the Task Force Team reviewed secondary sources of information regarding the main factors that affected crop performance during the 2018 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 to be too severe to allow access at crucial times, “remote” assessments, based on 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.

In the traditional farming sector, the aggregate cereal harvested area during the year 2018 is estimated at 882 862 hectares, 2.4 percent above the previous year’s level. The slight expansion in harvested area is due to a minor increase in the number of farming households, following some localized security improvements, which encouraged voluntary returning of displaced farmers. However, the conflict continues to severely affect agricultural activities constraining access to fields and the overall harvested area in 2018 remained well below the pre-conflict level. At sub-national level, harvested area increased in Western Equatoria (8.4 percent), Jonglei (5.6 percent), Eastern Equatoria (3.8 percent), Lakes (3.3 percent), Northern Bahr el Ghazal (3 percent) and Western Bahr el Ghazal (1.75 percent) states. By contrast, a reduction in the harvested area has been recorded in Central Equatoria (-5.6 percent), Unity (-3.7 percent) and Upper Nile (-3.2 percent) states due to persisting severe insecurity.

The 2018 net cereal production from the traditional sector, after deduction of post-harvest losses and seed use, is estimated at about 745 000 tonnes, 15.5 percent below the average of the previous five years and 2.5 percent less than 2017. It is the smallest output since the start of the conflict. The decrease in the 2018 estimated national production, despite the slight increase in cultivated area, is mainly due to unfavourable weather conditions, with recurrent and prolonged dry spells which affected yields, especially in Central and Eastern Equatoria and Warrap states. Mild to moderate level of pest infestations, including Fall Armyworm, contributed to constrain yields. Cereal production declined from the previous year in Central Equatoria (-21.6 percent), Warrap (-9.9 percent) and Upper Nile states (-9.3 percent). By contrast, increases of production are estimated in Jonglei (+9.9 percent) and Northern Bahr el Ghazal states (+4.2 percent). With a mid-2019 projected population of about 11.56 million people, consuming on average about 110 kg of cereals/capita/year, the cereal requirement in 2019 is estimated at about 1.27 million tonnes. Accordingly, an overall rounded cereal deficit of about 524 000 tonnes is estimated in the traditional sector for the January-December 2019 marketing year, 12 percent above the deficit estimated for 2018.

The country is facing a protracted macro-economic crisis, with contraction of domestic output, high inflation and a substantial parallel exchange market premium. Despite the appreciation of the local currency in the second semester of 2018 following the beginning of the peace talks, the macroeconomic situation remains dire

and the country's real GDP contracted for the third consecutive year due to shrinking export revenues from the oil sector and Government fixed investments.

In the capital, Juba, prices of sorghum, maize and wheat, surging since early 2016 and at record levels in mid-2018, declined by 30-50 percent in the second semester of the year, mainly due to the appreciation of the South Sudanese pound and to increased availabilities from newly harvested 2018 crops. Prices in December 2018 were lower than a year earlier, but still about 5 times their level in December 2015, immediately before they started escalating. Similarly, prices of sorghum declined in Aweil, Wau, Rumbek, and Yida markets by 10-35 percent between September and November, but remained up to twice their year-earlier levels and up to 20 times their levels of November 2015. Following the peace agreement and a decline in the number of security incidents, trade and marketing activities improved in some areas in the second half of 2018. However, they remain generally lower than their pre-conflict levels, as insecurity, still prevailing in several areas, curtails transport and marketing of food items and constrains households' physical access to the markets.

In January 2019, 54 percent of the population of South Sudan (about 6.2 million people) are in IPC (Integrated Phase Classification) Phases 3: "Crisis", 4: "Emergency" and 5: "Catastrophe". This is only a modest decrease from levels reached last September 2018 and a 13 percent increase compared to the same time last year, indicating a steadily worsening of the food security situation. In early 2019, the regions of Unity, Jonglei and Lakes register the highest proportions of the population in IPC Phase 3: "Crisis" and higher, in excess of 60 percent, including 45 000 estimated to be in Phase 5: "Catastrophe".

In May-July 2019, the overall proportion of the population in IPC Phase 3: "Crisis" and higher is projected to increase to 60.3 percent, including a possible 50 000 people in Phase 5: "Catastrophe". The worst affected populations are Internally Displaced Persons (IDPs) and host communities in locations affected by the conflict. These results arise from a lack of major overall improvement in the insecurity situation, the continuing extreme staple food prices interacting with significant market dependence by rural populations.

Household food insecurity has reached new records in mid-2018 (74 percent of the population at harvest time, with 26 percent severely food insecure), values comparable to those in the lean period of 2017. Severe food insecurity has spiked in late 2018 across many of the states. The coming lean period of mid-2019 is likely to see food insecurity levels rise further.

There have been further decreases in the importance of markets as main suppliers of staple foods to the household (23.4 percent at harvest time for South Sudan). This reflects increasingly poor economic access by households rather than increased own production. After the immediate post-harvest period, markets are still the dominant suppliers, rendering rural households in these regions highly vulnerable to rising staple commodity price shocks.

The pronounced vulnerability of the population to high market prices led to record proportions of households with very high and high food expenditure during the 2018 lean period (74 percent against 60 percent in mid-2017). The most extreme values of high food expenditure are in the Bahr el Ghazal regions, Upper Nile and Jonglei.

In 2019, WFP plans to assist just under 5.4 million people in South Sudan with nearly 325 000 tonnes of food assistance, including refugees and nutrition support activities.

SOCIO-ECONOMIC CONTEXT

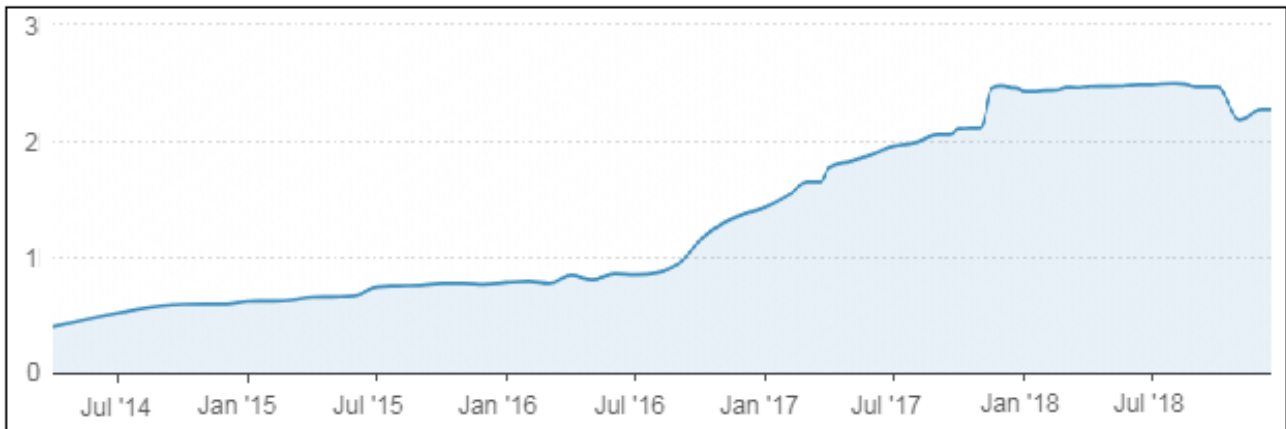
Population and population movements

Since the conflict started in mid-December 2013, population size and geographical distribution have significantly changed. According to UN/OCHA and UNHCR, by December 2018, over 4 million people were forced to flee their homes due to insecurity, including 1.87 million IDPs (with about 195 000 people in UNMISS Protection of Civilians sites across the country) and 2.27 million people that fled into neighbouring countries (Uganda, the Sudan, the Democratic Republic of the Congo, Ethiopia and Kenya).

The highest concentration of IDPs is in conflict-affected areas of the Greater Upper Nile Region, with almost 60 percent of the total caseload (roughly 1.2 million). Displacements, which increased in 2016 and 2017 following the spread of the conflict to most areas of the country, declined significantly in 2018. The population sheltering inside the UNMISS Protection of Civilian (PoC) sites, after having peaked at about 224 000 in 2016, decreased to 210 000 in 2017 and was estimated at about 195 000 in late 2018. The country's largest PoC site is in Bentiu (Unity State), hosting about 115 000 people, followed by the PoC sites in Juba and Malakal with about 32 000 and 29 000 people, respectively.

About 2.27 million people 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. Notably, the traditionally cereal surplus producing areas of Central and Eastern Equatoria states have experienced an exodus of about 670 000 people in 2017, with an ensuing sharp reduction of the number of households actively engaged in farming activities. Subsequently, the refugee caseload remained firm at around 2.48 million people throughout most of 2018. In the last quarter of 2018, the number of refugees appreciably declined for the first time since the start of the conflict in 2013, decreasing by about 10 percent. At the same time, the country hosts about 295 000 refugees, mainly from South Kordofan and Blue Nile states of the Sudan.

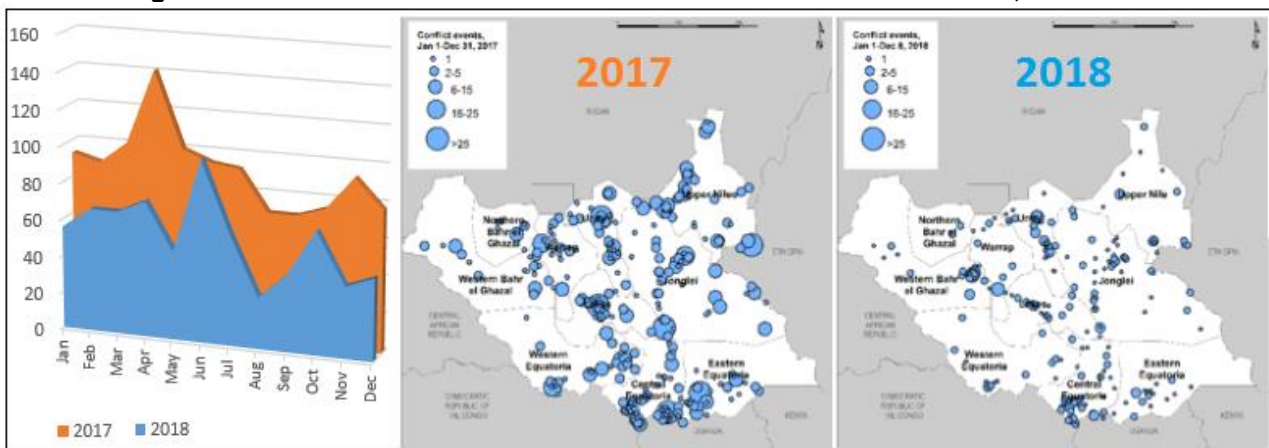
Figure 1: South Sudan: External displacement, 2014-2018 (million of people)



Source: UNHCR.

The decline in new internal displacements and the decrease in the caseload of refugees abroad in 2018 followed some improvements of the security situation, with the number of conflict incidents estimated at about 700 in 2018, almost 60 percent less than in 2017 following a significant decrease in the second semester of 2018. However, the situation still remains volatile. The relative reduction of the conflict intensity is mainly due to the ongoing peace process, which began in June with talks between parties to the conflict mediated by regional leaders. Surveys conducted among IDPs in PoC sites¹ and refugees in Uganda² in late 2018 and early 2019 indicate an increase in the number of people showing an intention to return compared to one earlier, as well as the intention of remaining at their destination in South Sudan for more than a year, suggesting the possibility of increased long term returns in 2019. However, concerns remain among the refugees about the durability of the peace, and the conditions in their desired areas of return.

Figure 2: South Sudan: Occurrences and location of conflict incidents, 2017-2018



Source: ACLED data and FEWSNET.

¹ IOM Wau PoC site intention-perception survey, 11 January 2019.

² IOM Flow Monitoring: South Sudan/Uganda border, 26 November 2018.

According to NBS population projection data, revised by the South Sudan IPC Population Working Group (SS IPC PWG)³ in cooperation with UNHCR and IOM to take into consideration movements of people within the country and the flow of refugees outside the country, the country's population for mid-2018 was estimated at about 11 225 000 people. The figure has been used for the October 2018 IPC analysis, including the breakdown at county and state levels. The population for mid-2019 has also been estimated by the by the South Sudan IPC Population Working Group Mission and is put at 11 467 000 people.

Economy

Economic growth and national budget

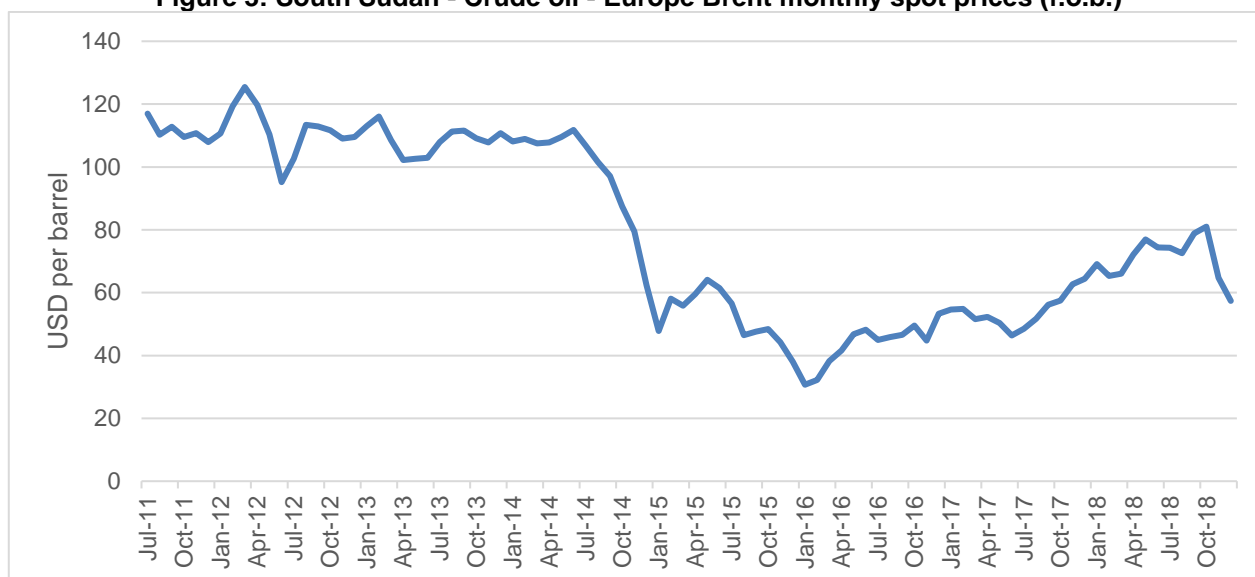
Since mid-2016, the country is displaying all the signs of macro-economic collapse, with output contracting, hyper-inflation and parallel exchange market premium spiralling. Despite some encouraging developments beginning in mid-2018, the macroeconomic situation remains dire. After two years of moderate growth in 2013 and 2014, the country's real GDP contracted by about 11 percent in 2015 and 2016, by about 7 percent in 2017 and by a further 3.5 percent in 2018, as a consequence of the severe impact of the protracted conflict on the overall economy, particularly on export revenues from the oil sector as well as on Government-fixed investments. The gap between Government expenditures and revenues has been mostly bridged by domestic borrowing from the Bank of South Sudan which depleted foreign exchange reserves and induced to print money with consequent increases in money supply and inflation. In addition, the lack of US dollars hampered the ability of the Bank of South Sudan to protect the local currency, leading to its accelerated devaluation in the parallel market.

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. Although most of the former Sudanese oil fields are now in South Sudan, the processing facilities, pipelines, export terminals and refineries are still in the Sudan. Since independence in 2011, oil production has steadily declined and has experienced frequent disruptions due to disputes with the Sudan and to internal conflicts. 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 decreased from 165 000 barrels/day in 2014 to about 115 000 barrels/day in 2017. In the 2018/19 budget, oil production is expected to average 127 000 barrels/day. The increase is mainly due to the resumption of production from the Toma South oilfield, located in Unity State, after the signing of the Khartoum Declaration of Agreement. The agreement also includes broader provisions on collaboration between the Sudan and South Sudan for the rehabilitation and protection of other oilfields in Unity State (Blocks 1,2,4 and 5) and the eventual resumption of oil production to 290 000 barrels per day. However, concrete steps will be possible only after the signing of a comprehensive peace agreement, and the oil production target is unlikely to be reached in the short term. In the long term, since most oil fields in the country are mature, their output is expected to decline over time and investments in enhanced oil recovery techniques are needed.

In recent years, the impact on oil revenues of low oil production was compounded by the decline in international crude oil prices to historically low levels in early 2016. Prices have subsequently increased in recent years, but remain at comparatively low levels. As Figure 3 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 in the following years, and in 2018 they ranged between USD 60 and USD 80.

³ The South Sudan IPC Population Working Group (SS IPC PWG) is a partnership between NBS, FAO, WFP, FEWSNET, and UN/OCHA.

Figure 3: South Sudan - Crude oil - Europe Brent monthly spot prices (f.o.b.)



Source: United States of America Energy Information Administration.

The 2018/19 budget, approved by the Transitional National Legislature in August 2018, forecast total spending from Government resources at SSP 81.6 billion, 85 percent up from the forecast of SSP 43.7 billion in 2017/18⁴. A forecast capital spending of almost SSP 9 million (with a more than six-fold increase from the previous budget) and the allocation of about SSP 17 million for the payment of salary arrears will account for about 70 percent of the increase in total spending. The other allocations for different sectors have not changed markedly from the budgets in previous years. Security, Rule of Law and Public Administration are the largest sectors of expenditure, together accounting for about 70 percent of Government expenditures.

According to Government authorities, the increase in spending will be covered by a corresponding increase in revenues, both in the oil and in the non-oil sectors. In the oil sector, an almost threefold increase in revenues (from about SSP 26 to 72 million) will come mainly as a result of the lifting of fuel subsidies, and also from the slight increase in oil production and international prices. In the non-oil sector, revenues are forecast to increase by 80 percent from SSP 14 million in 2017/18 to SSP 25 million in 2018/19, mainly due to the introduction of National Revenue Authority, which is expected 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 questions remain over the status and the management of Nilepet, South Sudan's national oil company⁵, while In the non-oil sector, the successful implementation of 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. Recognizing the possibility that the revenue targets may not be reached, and that that it may not be possible for expenditure to reach budgeted levels, in the budget document the Ministry of Finance and Planning states that expenditure will be controlled and prioritised using monthly limits based on cash availability for disbursement to agencies. In addition, the monetization of the fiscal deficit through borrowing from the Bank of South Sudan (BOSS), a practice that was one of the main drivers of the rampant inflation of recent years and that was abandoned in mid-2017, has been again ruled out in the 2018/19 budget.

Exchange rate

The SSP was introduced following the independence in July 2011. Rationing of foreign currencies since early 2012 (due to the oil production shut-down 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 caused by reduced domestic oil production in conflict-affected areas as well as record low international oil prices) 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 when the conflict spread from the Greater Upper Nile Region to most

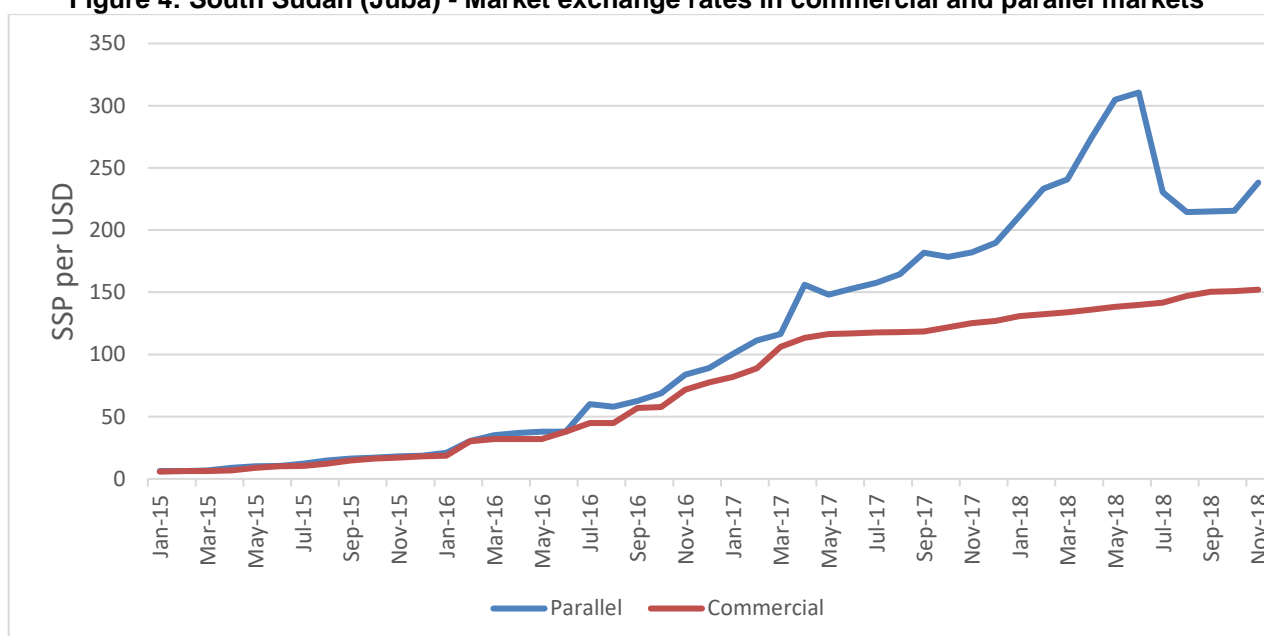
⁴ The value of the expenditure in USD has increased by about 60 percent, reaching USD 584 million from USD 366 million in 2017/18.

⁵ World Bank, South Sudan Economic Update, July 2018.

of the country in July 2016, reaching SSP 155/USD in mid-2017 and peaking at SSP 310/USD in June 2018. Reversing the trend for the first time since late 2014, the exchange rate declined by about 25 percent in the second semester of 2018, following the beginning of peace talks in late June and the signing of the peace agreement in August, which boosted speculator and investor confidence over improved political stability and the resumption of oil production. Despite the recent declines, the parallel exchange rate in November 2018, at SSP 240/USD, was still more than 40 times higher than the exchange rate of four years earlier.

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 rates in the parallel cash market and the two rates converged to about SSP 30/USD in February 2016. Subsequently, as the parallel exchange rate started to soar in July 2016, the spread between the official and the parallel market rates began to widen with an increasing gap, the monthly spread between the two rates was about 15 percent in December 2016, about 35 percent in June 2017 and more than 50 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, but at more than 35 percent in November 2108, it remained substantial. The divergence between the two rates reflects that demand for hard currency continues to outweigh the limited supply of foreign exchange in the context of a degraded macroeconomic environment.

Figure 4: South Sudan (Juba) - Market exchange rates in commercial and parallel markets



Source: WFP.

Inflation

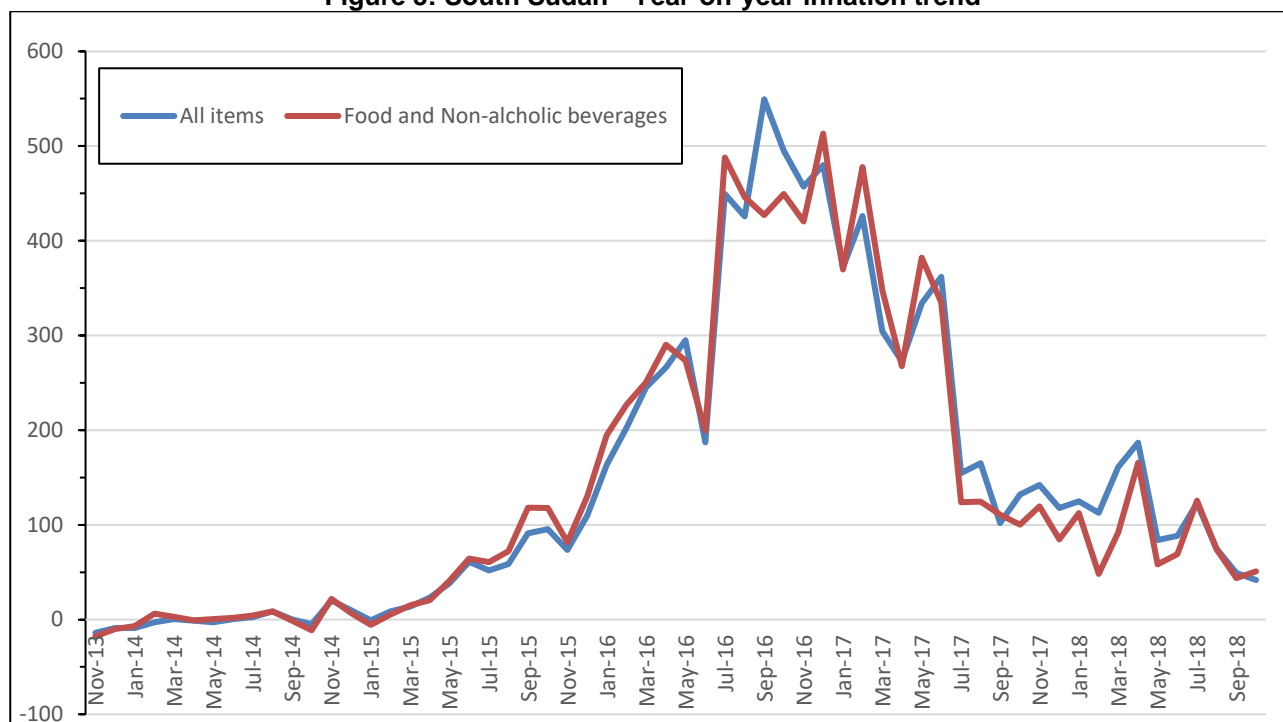
Inflation started a sustained upward trend in February 2015, with the year-on-year national inflation peaking at about 550 percent in September 2016 and leading to one of the worst ten episodes of hyper-inflation in the world during the last two centuries. The main drivers of inflation were:

- 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 through borrowings from the BOSS a large portion of its increasing fiscal deficit.
- Increasing transaction costs due to supply-chain bottlenecks caused by the conflict, which drove up prices of imported commodities.

Subsequently, the general inflation declined markedly, albeit irregularly, and the year-on-year inflation rate decreased from the 550 percent peak in September 2016 to 118 percent in December 2017, mostly due to the winding down of the expansionary monetary policy in the second semester of 2017. Inflation rates continued to decline in 2018, although at slower rates compared to late 2016 and 2017, and still exhibiting a marked volatility. In particular, they decreased from 123 percent in July to 42 percent in November 2018, mostly due

to the appreciation of the local currency on the parallel market. The trend of general inflation closely follows the trend of 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, subsequently declining to 51 percent in December 2018.

Figure 5: South Sudan - Year-on-year inflation trend



Source: National Bureau of Statistics.

Agriculture

The country's diverse ecology provides a growing season ranging from 280 to 300 days in south-western cropping areas (known as the Greenbelt) and from 130 to 150 days/annum in northern states. Bi-modal rainfall areas cover much of 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 Greater Equatoria Region and a single harvest in the uni-modal rainfall areas further north.

The country's agriculture is almost entirely dependent on rainfall and hence the variability of rainfall in terms of amount and distribution is usually the major factor in determining crop production. Historically, 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/water-logging is a common occurrence, while several areas, especially those towards the northern border with the Sudan and in the southeast corner of the country, are susceptible to prolonged dry periods.

Crop production is mostly conducted by smallholder farmers on small plots of land cultivated by hand. The family size is five-seven persons that belong to larger family aggregations, reflecting the polygamous nature of most communities. Despite an abundant availability of land throughout the country, the area cultivated by households has, hitherto, been limited by a combination of (a) the size of the household labour force and/or the ability of households to provide in-kind payment (essentially food/local beer) for the mobilization of traditional working groups (*nafeer*); (b) the lack of efficient tools and farm power for land clearing and ploughing; and (c) security of access.

In recent years, average farm sizes are noted to have increased with steadings-based farm areas merging with far-fields as communities adopt animal traction (e.g. Lakes and parts of Warrap states) and, with the emergence of commercially-oriented farmers cultivating larger areas of cereals, groundnuts and cassava for sale using combinations of tractor services, labour gangs and pairs of oxen, depending on location. However, over the past three years, farm sizes in insecure areas are either decreasing or remain the same due to fear of accessing far fields. During the past 20 years, animal traction has been promoted by FAO and many 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. At last, previously-noted constraints to its adoption appear to be lifting, with requests for increased access to purchase units reported to visiting Task Force teams in Lakes and Bahr el Ghazal states. However, lack of spare parts, high cost of mould-board ploughs, skills to maintain mould-board ploughs, raw materials for local blacksmiths and low levels of operator skill, still limit expansion; as does the lack of resources to capitalize on the increased area through more extensive and frequent weeding⁶.

Despite a slight improvement in terms of security in 2018, the secure access to land has been the defining characteristic of the areas farmed, not only in Greater Upper Nile Region and its bordering states as during the previous three years, but also in most areas of Greater Equatoria Region. Since July 2016, the situation in Central and Eastern Equatoria has sharply deteriorated resulting in the displacement of several farming households to neighbouring countries. In addition, farmers in the conflict-affected areas are not able to cultivate far-fields and are limited to homestead areas.

Apart from the activities of the Aweil Rice Scheme in Northern Bahr el Ghazal State, mechanized cereal production is only practised on a large scale in some areas of Upper Nile, particularly in Renk and Melut following the patterns of land occupancy established before independence by traders/farmers from both South Sudan and the Sudan. Elsewhere, limited numbers of both private and GRSS tractors provide ploughing services to individuals and farmer groups. "Mechanization" as a term applies only to a one-pass preparation and a second sowing pass with a seed drill positioned over the ubiquitous disc harrows. Other operations are done 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. On average, the tractors, purchased in the last ten years that lay idle are three-four times more than those functioning.

In both the smallholder and mechanized sectors, sorghum is the main cereal crop cultivated, comprising some 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 niches⁷ ranging from short-season (<90 days) to very long-season (>220 days) types. There are also several improved, short-term 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 Sudan⁸.

At national level, the area planted to maize is estimated to be 22 percent of the 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 southcentral parts of Unity State, along the Sobat River in Upper Nile 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. However, the prevalence of FAW over the past two years and the pest's preference for the crop has become a major limiting factor for maize cultivation.

Other cereals, namely bulrush millet, finger millet and rice, are estimated to make up the remaining 8 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 mostly found in Greater Equatoria Region. Other crops of major importance to food security include cassava and groundnuts, sweet potatoes and yams. Cassava is estimated to make up 18 percent of the planted area in Western Equatoria, 13 percent in Central Equatoria and 11 percent in Eastern Equatoria, while in Western Bahr el Ghazal and Lakes the cassava area ranges from 3-4 percent only. Groundnut areas cover about 20 percent of cultivated land at national level, with the largest area in Northern Bahr el Ghazal, Western Bahr el Ghazal, Lakes, Warrap and Central Equatoria ranging from 15 to 40 percent according to location. Groundnut, usually *Red Beauty* and *Mr Lake* varieties, is usually cultivated on sandier soils and, after cereals, make the most important contribution to 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 under the traditional system mostly intercropped with sorghum. Recently, the crop's popularity is increasing in the North, especially in Upper Nile, where it is sold at high, profitable prices to traders from Sudan.

⁶ In this regard, the local transfer of donkey plough (scuffler) technology from 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.

⁷ Short-season landraces provide an early harvest in August/September, while long-season landraces, able to withstand both dry spells and water logging, are harvested in December/January.

⁸ Afargadamek, Wad Ahmed, Gaddam el Hammam.

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

With the exception of farmers close to the borders with the Sudan or Uganda and vulnerable households receiving FAO and NGO distributions, most farmers use their own seed saved from the previous year's harvest or local seeds purchased from the markets or borrowed from relatives.

Chemical inputs such as commercial fertilizers, pesticides or herbicides are not used by small farmers on field crops, although some use of herbicides has been noted on large scale mechanized farms in Upper Nile with access to supplies from bordering areas of the Sudan (mainly Kosti in White Nile State). However, in 2018, the crop assessment Task Force teams have reported limited use of pesticides in commercial farms of Upper Nile on sesame and by few medium scale farmers in Central Equatoria⁹. Regarding pest control campaigns, before South Sudan independence, aerial spraying of nesting sites routinely controlled migratory *Quelea quelea* (QQU) bird populations near the mechanized areas. Although the practice was resumed in 2013, with some aerial spraying conducted by the Desert Locust Control Organization (DLCO) based in Nairobi, no widespread actions have been taken since then as the areas concerned are exclusively in conflict-affected states, which leaves the sorghum crops harvested in January in Upper Nile State increasingly vulnerable to bird attacks.

In South Sudan, about 60 percent of the population is dependent on livestock rearing, which is of significant socioeconomic importance in addition to its role in food security and income generation. The main species include cattle, goats and sheep, raised extensively under transhumant systems of management. The sale of livestock, especially small ruminants, provides a significant contribution to incomes and, therefore, household food security of both transhumant pastoralists and sedentary livestock rearers.

CEREAL PRODUCTION IN 2018

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 numbers 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 Mission observations made 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 Task Force teams; c) crop-cut samples by Task Force teams and CCMCs; and d) information from semi-structured interviews with key informants from State Ministries of Agriculture, NGOs and others involved in agriculture.

The combination of data and information from these four sources provides the cereal production estimates for each county. 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 means that the final production figures should not be regarded as necessarily exact, but rather as the best estimates under the prevailing circumstances.

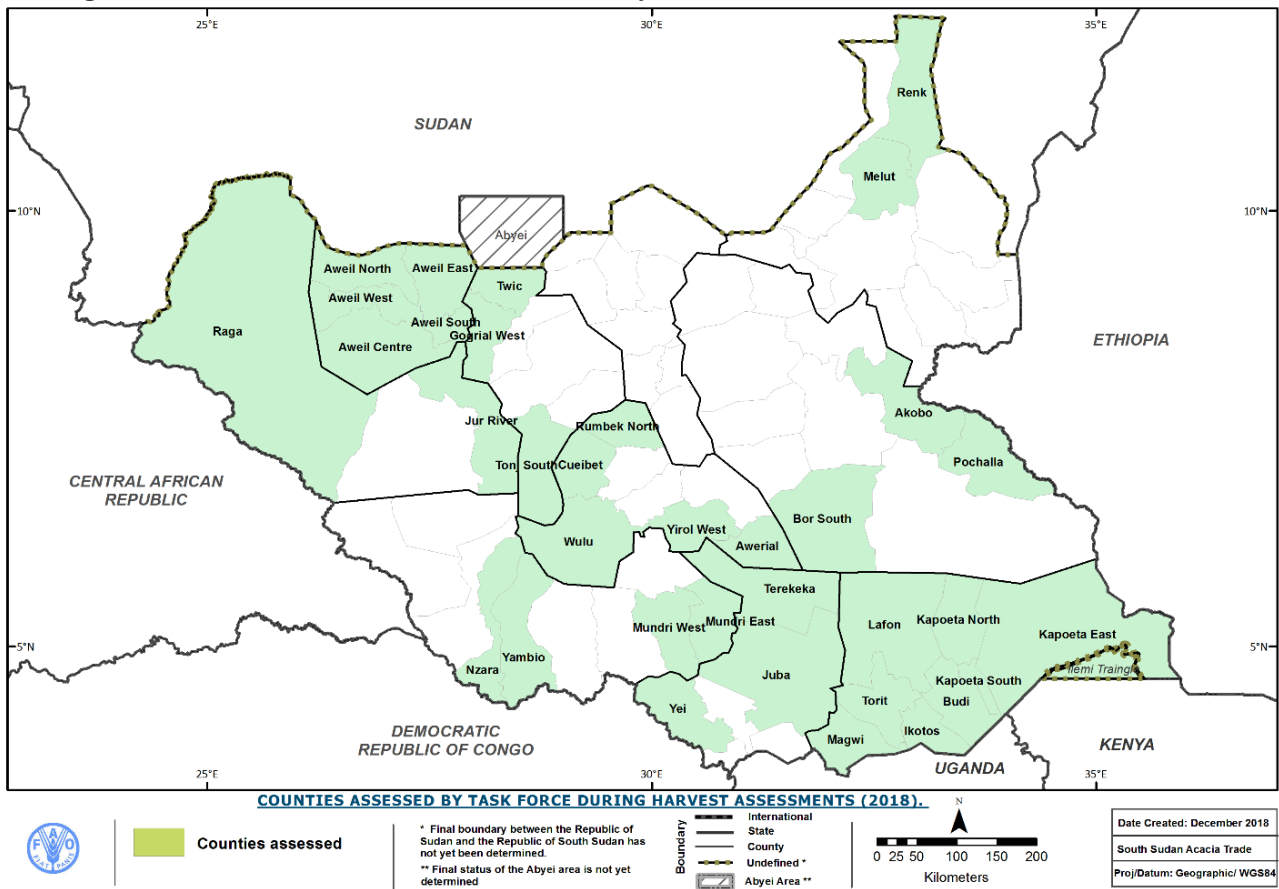
In years up to 2013, the actions noted above have all been undertaken by a CFSAM Rome-based team of specialists during a six-week mission to the country in November-December, working with staff from MAFS, NBS and FAO national staff. Starting in 2014, in a departure from the usual one-off CFSAM exercise at harvest time, teams led by 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 main crops from planting up to harvesting. As a result, all missions were timed to match the pertinent agricultural activities that occur at different times of the year in different cropping areas/agro-ecological zones. The effect of the change in approach was noticeable in the greater coverage

⁹ Green Horizon, an Israeli company, uses pesticides to control Fall Armyworm (FAW) and Triple Superphosphate (TSP) fertiliser in Juba County. It has been reported that few other commercial farmers have used chemicals purchased from Uganda to control FAW.

obtained, including a proper monitoring of the cropping season and assessment of production of both the first and second season harvests, in bimodal rainfall areas and the assessment of standing crops in Warrap State since 2016.

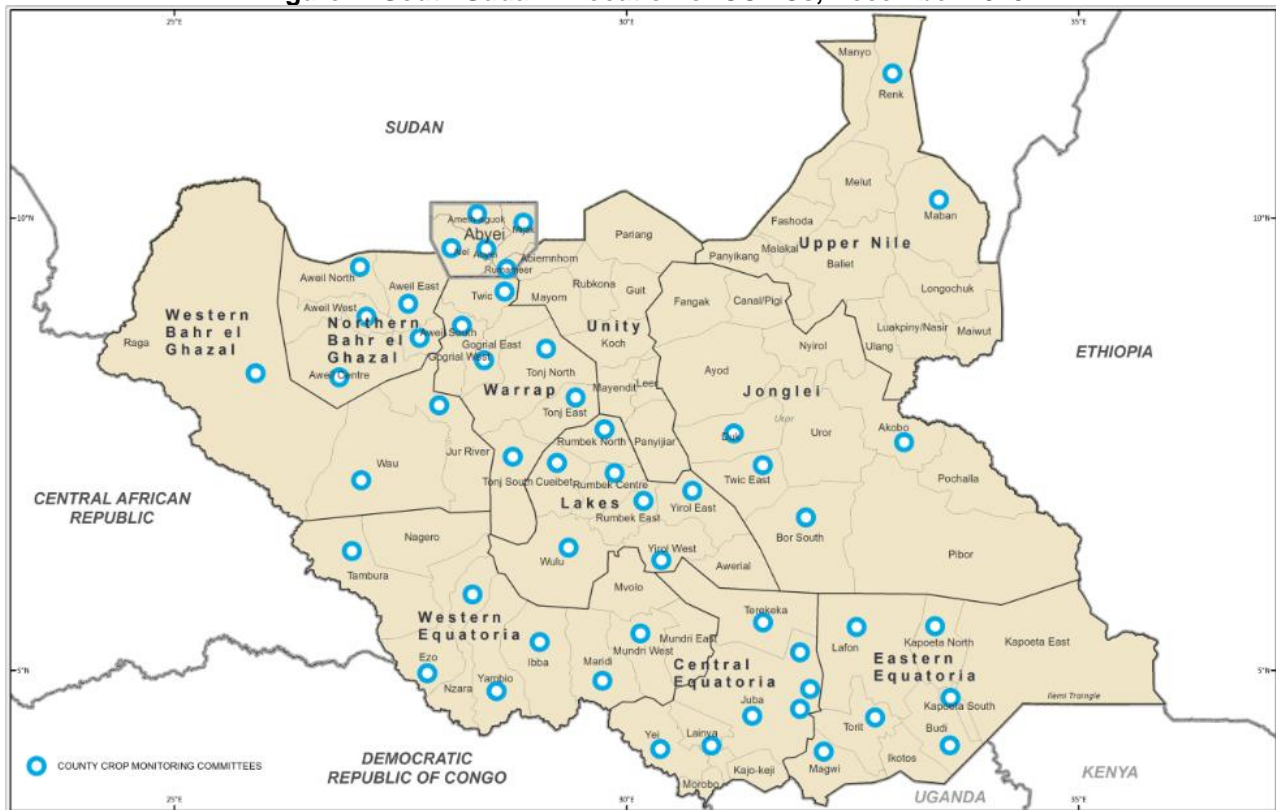
Aiming to increase coverage and participation of local line agencies, the former AFIS Project of FAO set up 39 CCMCs in 2016 and 2017, whose members are extension workers and staff of NGOs. Members of CCMCs were trained to monitor and report the progress of the season and performance of crops using a standard form designed to capture qualitative and quantitative information. This approach has continued with wider coverage in 2018, increasing the number of CCMCs to 54 in all states (except Unity State), supported by the new European Union project “Strengthening the resilience of pastoral and agro-pastoral communities in South Sudan’s cross border areas with Sudan, Ethiopia, Kenya and Uganda” (OSRO/SSD/703/EU). The location of CCMCs is shown in Figure 6. Therefore, since 2017, the crop assessment annual exercise in South Sudan is based on two pillars: the Task Force-led approach and the CCMCs established at county level.

Figure 6: South Sudan – Counties assessed by Task Forces at harvest time, December 2018



Source: FAO South Sudan.

Figure 7: South Sudan - Location of CCMCs, December 2018



Source: FAO South Sudan.

For all the planting and harvest assessment missions carried out by the Task Force teams in 2018, security and related access implications required that field work be conducted in pre-selected locations reachable only by air or separated by main roads where at least two vehicles were required to drive in-tandem. Since 2015, “walking”¹⁰ transects in specific locations were mostly used rather than long-distance “driving” transects to estimate yields. However, with the increased coverage of cropping areas, by Task Forces and CCMCs at harvest time, there was more reliance on crop-cuttings (sampling) rather than PET-based transects to estimate yields. The PETs were mostly used in areas where crops were not fully mature or not ready for harvest at the time of Task Force visits, in which case taking samples of immature crops would have been misleading in yield estimations due to high moisture content of grains.

In 2018, the Task Force teams were able to conduct 14 planting assessment missions to visit 38 counties and 15 harvest missions to visit 45 counties, with most of the counties visited twice in both assessments. These assessments were conducted between May and November 2018 in Northern Bahr el Ghazal, Lakes, Warrap, Abyei Administrative Area, Central Equatoria, Eastern Equatoria, Upper Nile, Jonglei and Western Bahr el Ghazal. The Task Force completed a total of 1 492 case studies during both planting and harvest assessments out of which 1 391 were farmers interviews and 101 were key informant interviews with senior staff in previously-designated State Ministries of Agriculture (SMoA), county officials and staff of NGOs and international agencies based in the field (Annex 2). This represents an increase in number of planting and harvest assessment missions by 26 percent, compared to last year, when 23 missions (nine planting and 14 harvest assessments) were conducted.

In addition, reports from 54 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, including Normalized Difference Vegetation Indices (NDVIs) data and rainfall anomaly estimates for all areas, along with rainfall data collected locally using manual rain-gauges. Furthermore, for inaccessible areas, where the risks to the teams’ safety were considered to be too severe, the crop assessment teams used “remote assessment” procedures, through e-mail and telephone conversations with key informants, as appropriate.

¹³ Team members independently walk for about two hours along paths 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.

In the traditional farming sector, the 2018 aggregate cereal harvested area is estimated at 882 860 hectares, about 2.4 percent above the previous year's level, due to a slight increase in the number of farming households, following some localized security improvements, which encouraged voluntary returns of displaced farmers. However, the conflict continues to severely affect agricultural activities constraining access to fields, and the 2018 harvested area remained well below the pre-conflict level (-20 percent compared to 2012). Notably, despite the increase in 2018, cultivated area is still very low in the most productive lands of the Greenbelt (in Western Equatoria planted area in 2018 was 30 percent lower than in 2012), due to large-scale displacements in late 2016 and 2017.

At sub-national level, harvested area increased in Western Equatoria (8.4 percent), Jonglei (5.6 percent), Eastern Equatoria (3.8 percent), Lakes (3.3 percent), Northern Bahr el Ghazal (3 percent) and Western Bahr el Ghazal (1.75 percent). By contrast, a reduction in the harvested area has been recorded in Central Equatoria State (-5.6 percent), Unity (-3.7 percent) and Upper Nile (-3.2 percent) as a result of the combination of a reduced number of farming households and a smaller average area planted per household. The highest reduction in harvested area of cereals is reported in some of the most productive zone of the Greenbelt, including Kajo Keji, Lainya and Morobo counties in Central Equatoria State, followed by Khorflus/Pigi Canal, Guit, Leer, Mayendit in Unity and Yiroi East counties in Lakes state, where the number of farming households further decreased from the already low levels of the previous year due to severe insecurity. A notable reduction in the harvested area of cereals has been recorded in Renk and Melut counties (Upper Nile state) as farmers shifted cultivation to sesame production at the expense of sorghum, due to the high price incentives for sesame from Sudanese traders. A sizeable reduction in area planted per household is also recorded in Torit County (Eastern Equatoria), as several farmers preferred to work as paid labourers for a road construction project, with immediate income generation, at the expense of their farming activities. In most of the insecure areas, farmers are confined to cultivate around homesteads and are unable to cultivate far fields. The breakdown of harvested areas for counties and states as well as all variables used for the calculations are presented in Table 1.

Table 1: South Sudan - Estimated settled population, farming households and harvested cereal area, 2018

| State/County | Population mid-2018 | Households mid-2018 | Farming households (percent) | Farming households mid-2018 | Average cereal area (ha/hh) | Total cereal area (ha) |
|--------------------------------|---------------------|---------------------|------------------------------|-----------------------------|-----------------------------|------------------------|
| Central Equatoria | 1 060 191 | 171 421 | 37 | 64 016 | 0.9 | 56 524 |
| Juba | 392 525 | 61 595 | 25 | 15 399 | 1.00 | 15 399 |
| Kajo Keji ^{1/} | 105 783 | 17 531 | 35 | 6 136 | 1.00 | 6 136 |
| Lainya ^{1/} | 100 263 | 15 698 | 30 | 4 709 | 0.80 | 3 768 |
| Morobo ^{1/} | 137 869 | 20 904 | 25 | 5 226 | 0.90 | 4 703 |
| Terekeka | 162 289 | 29 008 | 80 | 23 206 | 0.70 | 16 244 |
| Yei ^{1/} | 161 463 | 26 685 | 35 | 9 340 | 1.10 | 10 274 |
| Eastern Equatoria | 994 188 | 171 424 | 71 | 121 890 | 0.9 | 111 524 |
| Budi | 93 524 | 15 813 | 85 | 13 441 | 1.25 | 16 802 |
| Ikotos | 123 547 | 24 113 | 80 | 19 291 | 1.00 | 19 291 |
| Kapoeta East | 163 386 | 29 331 | 54 | 15 839 | 0.80 | 12 671 |
| Kapoeta North | 103 508 | 16 039 | 56 | 8 982 | 0.80 | 7 186 |
| Kapoeta South | 7 706 | 10 095 | 56 | 5 653 | 0.75 | 4 240 |
| Lafon | 102 514 | 16 607 | 85 | 14 116 | 0.90 | 12 704 |
| Magwi ^{1/} | 185 028 | 28 626 | 75 | 21 469 | 1.10 | 23 616 |
| Torit | 154 976 | 30 799 | 75 | 23 100 | 0.65 | 15 015 |
| Jonglei | 1 744 475 | 247 795 | 35 | 87 226 | 0.6 | 56 537 |
| Akobo | 183 167 | 23 819 | 40 | 9 528 | 0.65 | 6 193 |
| Ayod | 171 324 | 20 770 | 10 | 2 077 | 0.50 | 1 039 |
| Bor South | 239 320 | 33 937 | 45 | 15 272 | 0.65 | 9 927 |
| Duk | 115 793 | 18 082 | 35 | 6 329 | 0.42 | 2 658 |
| Fangak | 172 406 | 22 812 | 15 | 3 422 | 0.42 | 1 437 |
| Khorflus/Pigi/Canal | 98 636 | 11 911 | 10 | 1 191 | 0.70 | 834 |
| Nyirrol | 174 578 | 24 530 | 35 | 8 586 | 0.50 | 4 293 |
| Pibor | 191 272 | 29 296 | 40 | 11 718 | 0.70 | 8 203 |
| Pochalla | 81 520 | 12 862 | 60 | 7 717 | 0.80 | 6 174 |
| Twic East | 120 140 | 20 236 | 40 | 8 094 | 0.80 | 6 476 |
| Uror | 196 318 | 29 540 | 45 | 13 293 | 0.70 | 9 305 |
| Lakes | 1 225 771 | 164 623 | 73 | 120 858 | 1.1 | 128 665 |
| Awerial | 146 865 | 23 355 | 60 | 14 013 | 1.20 | 16 815 |
| Cueibet | 187 348 | 27 498 | 88 | 24 198 | 1.10 | 26 618 |
| Rumbek Centre | 259 745 | 28 447 | 60 | 17 068 | 0.80 | 13 655 |
| Rumbek East | 211 555 | 26 719 | 80 | 21 376 | 0.90 | 19 238 |
| Rumbek North | 61 173 | 6 979 | 70 | 4 885 | 0.90 | 4 397 |
| Wulu | 74 568 | 11 984 | 80 | 9 587 | 1.20 | 11 504 |
| Yirol East | 110 778 | 14 746 | 75 | 11 059 | 1.10 | 12 165 |
| Yirol West | 173 739 | 24 895 | 75 | 18 671 | 1.30 | 24 273 |
| Northern Bahr el Ghazal | 1 401 961 | 261 156 | 76 | 198 617 | 0.8 | 157 131 |
| Aweil Centre | 109 954 | 23 872 | 60 | 14 323 | 0.84 | 12 032 |
| Aweil East | 550 956 | 101 111 | 80 | 80 889 | 0.72 | 58 240 |
| Aweil North | 280 284 | 54 031 | 80 | 43 225 | 0.84 | 36 309 |
| Aweil South | 149 848 | 28 529 | 70 | 19 971 | 0.84 | 16 775 |
| Aweil West | 310 919 | 53 612 | 75 | 40 209 | 0.84 | 33 776 |
| Unity | 970 292 | 121 092 | 33 | 40 372 | 0.4 | 16 956 |
| Abiemnhom | 28 976 | 3 076 | 60 | 1 846 | 0.42 | 775 |
| Guit | 38 519 | 3 772 | 25 | 943 | 0.42 | 396 |
| Koch | 123 043 | 13 074 | 40 | 5 230 | 0.42 | 2 196 |
| Leer | 106 002 | 14 082 | 10 | 1 408 | 0.42 | 591 |
| Mayendit | 86 299 | 10 603 | 25 | 2 651 | 0.42 | 1 113 |
| Mayom | 170 927 | 21 546 | 40 | 8 618 | 0.42 | 3 620 |
| Panyijar | 92 132 | 15 758 | 45 | 7 091 | 0.42 | 2 978 |
| Pariang | 249 534 | 31,662 | 35 | 11 082 | 0.42 | 4 654 |
| Rubkona | 74 860 | 7 520 | 20 | 1 504 | 0.42 | 632 |

| State/County | Population mid-2018 | Households mid-2018 | Farming households (percent) | Farming households mid-2018 | Average cereal area (ha/hh) | Total cereal area (ha) |
|-------------------------------|---------------------|---------------------|------------------------------|-----------------------------|-----------------------------|------------------------|
| Upper Nile | 1 055 944 | 165 771 | 47 | 77 159 | 0.7 | 51 588 |
| Baliet | 7 924 | 1 198 | 20 | 240 | 0.60 | 144 |
| Fashoda ^{1/} | 13 979 | 2 257 | 10 | 226 | 0.50 | 113 |
| Longochuk | 74 473 | 9 760 | 70 | 6 832 | 0.50 | 3 416 |
| Luakpiny/Nasir | 297 365 | 41 107 | 50 | 20 553 | 0.50 | 10 277 |
| Maban | 203 803 | 44 280 | 50 | 22 140 | 0.70 | 15 498 |
| Maiwut | 41 501 | 5 472 | 70 | 3 830 | 0.50 | 1 915 |
| Malakal | 74 113 | 9 898 | 12 | 1 188 | 0.42 | 499 |
| Manyo | 17 190 | 2 889 | 50 | 1 445 | 0.50 | 722 |
| Melut | 75 298 | 10 869 | 40 | 4 347 | 1.00 | 4 347 |
| Panyikang | 24 473 | 3 916 | 35 | 1 370 | 0.50 | 685 |
| Renk | 127 069 | 20 747 | 40 | 8 299 | 1.20 | 9 959 |
| Ulang | 98 756 | 13 379 | 50 | 6 689 | 0.60 | 4 014 |
| Western Bahr el Ghazal | 542 050 | 96 476 | 55 | 52 827 | 0.7 | 37 434 |
| Jur River | 158 253 | 25 725 | 75 | 19 294 | 0.80 | 15 435 |
| Raga | 98 181 | 18 427 | 40 | 7 371 | 0.50 | 3 685 |
| Wau | 285 616 | 52 324 | 50 | 26 162 | 0.70 | 18 314 |
| Warrap | 1 469 582 | 254 991 | 67 | 170 606 | 0.9 | 156 965 |
| Abyei | 78 984 | 11 794 | 60 | 7 076 | 1.10 | 7 784 |
| Gogrial East | 137 155 | 24 591 | 60 | 14 755 | 0.80 | 11 804 |
| Gogrial West | 340 952 | 62 883 | 80 | 50 307 | 1.00 | 50 307 |
| Tonj East | 116 899 | 19 884 | 65 | 12 924 | 0.70 | 9 047 |
| Tonj North | 240 704 | 43 252 | 70 | 30 276 | 0.85 | 25 735 |
| Tonj South | 129 349 | 21 720 | 75 | 16 290 | 1.20 | 19 548 |
| Twic | 425 538 | 70 867 | 55 | 38 977 | 0.84 | 32 741 |
| Western Equatoria | 760 463 | 139 788 | 63 | 88 704 | 1.2 | 109 537 |
| Ezo ^{1/} | 105 421 | 23 729 | 40 | 9 492 | 1.00 | 9 492 |
| Ibba ^{1/} | 39 430 | 9 867 | 70 | 6 907 | 1.40 | 9 670 |
| Maridi ^{1/} | 76 568 | 12 181 | 75 | 9 135 | 1.30 | 11 876 |
| Mundri East ^{1/} | 59 104 | 8 343 | 45 | 3 755 | 0.90 | 3 379 |
| Mundri West ^{1/} | 54 321 | 6 438 | 60 | 3 863 | 0.90 | 3 476 |
| Mvolo | 85 353 | 11 631 | 50 | 5 815 | 0.80 | 4 652 |
| Nagero | 12 795 | 2 722 | 65 | 1 769 | 0.80 | 1 415 |
| Nzara ^{1/} | 59 255 | 14 716 | 85 | 12 508 | 1.30 | 16 261 |
| Tambura ^{1/} | 74 326 | 17 876 | 90 | 16 088 | 1.50 | 24 133 |
| Yambio ^{1/} | 193 890 | 32 286 | 60 | 19 372 | 1.30 | 25 183 |
| Total | 11 224 915 | 1 794 538 | 57 | 1 022 276 | 0.9 | 882 862 |

^{1/} First and second harvest areas combined.

Tentative estimates of areas of other crops grown in 2018 are shown in Table 2. The estimates are based on the proportions recorded between 2013 and 2017 adjusted by information from the 2018 Task Force teams' case studies and information collected by the CCMCs. The estimates reflect the following issues: i) increased importance of groundnuts in Lakes, Warrap and Northern Bahr el Ghazal states; ii) the Mission assumed resilience of cassava as a safety net in times of temporary displacement of farming communities due to the transitory presence of armed groups. Reports by the Task Force teams show a reduction in area of new plantings of cassava since 2016 in insecure areas where farming households are displaced, especially in Central and Eastern Equatoria states. However, reports compiled from 54 CCMCs and verifications by the Task Force teams indicate that there might be some underestimates of the area planted to cassava in previous reports (Table 9).

Table 2: South Sudan - Tentative estimates of cultivated areas per household (hectare), 2018

| State | Sorghum | Maize | Other cereals ^{1/} | Total cereals | Ground-nuts | Cassava 2 years | Total cultivated area |
|---------------------------------|---------|-------|-----------------------------|---------------|-------------|-----------------|-----------------------|
| Central Equatoria ^{2/} | 0.36 | 0.50 | 0.02 | 0.88 | 0.13 | 0.5 | 1.51 |
| Eastern Equatoria | 0.69 | 0.13 | 0.09 | 0.91 | 0.04 | 0.2 | 1.23 |
| Western Equatoria ^{2/} | 0.61 | 0.55 | 0.05 | 1.21 | 0.28 | 1.16 | 2.65 |
| 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 | 0.15 | 0.01 | 1.06 | 0.50 | 0.1 | 1.66 |
| Warrap | 0.81 | 0.06 | 0.05 | 0.92 | 0.42 | 0.02 | 1.36 |
| Western Bahr el Ghazal | 0.6 | 0.1 | 0.01 | 0.71 | 0.15 | 0.57 | 1.43 |
| Northern Bahr el Ghazal | 0.71 | 0.03 | 0.05 | 0.79 | 0.21 | 0.00 | 0.99 |

1/ Bulrush/finger millets and upland/paddy rice.

2/ Two seasons for cereals and mostly annual field crops.

n.a.: Not enough information collected.

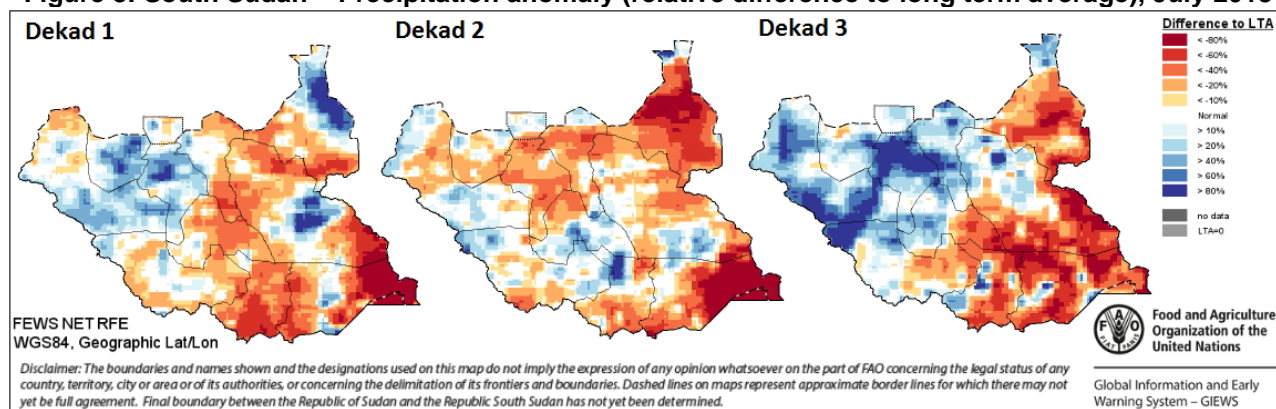
Factors affecting yields

Rainfall

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 CCMCs' monthly reports.

The 2018 rainy season was characterized by an erratic spatial and temporal distribution and below-average amounts of precipitations over most the cropping areas of the country. The rainy season, had a timely onset in early April in southern bi-modal rainfall areas and in early May in central and northern uni-modal rainfall areas. Subsequently, early-season dryness and prolonged dry spells were reported in May in several cropping areas, especially in Eastern Equatoria, Central Equatoria, Northern Bahr El Ghazal, Upper Nile, Warrap and Jonglei, where cereal crops required multiple replanting. Average to above-average rains in June were followed by prolonged dry spells in July and early August (see Figure 8), especially in Central and Eastern Equatoria States, where the first season maize and sorghum crops were severely affected during the critical grain filling stages and delayed harvesting of first season crops and planting of second season crops.

Figure 8: South Sudan – Precipitation anomaly (relative difference to long term average), July 2018



Unlike 2017, when most low-lying areas were flooded in August, this did not happen in 2018 due to low amount of rainfall in July and August. Subsequently, rainfall improved from late August and September, with a positive impact on vegetation conditions, lifting crop prospects in the areas previously affected by the dry spells. However, the rainy season ended with below-average precipitations in most cropping areas in October and November, slightly affecting yields of some late-maturing sorghum varieties. On the other hand, this reduction in precipitation had minor effects on short season crops, including short maturing sorghum varieties, groundnuts and maize, which had already been harvested in September. Overall, the performance of the rainy season was unfavourable, with an ensuing reduction in yields of main crops compared to 2017.

In the mechanized farming sector in Upper Nile State, an early onset of seasonal rains in Renk and Melut Counties prompted a timely cultivation from the first week of June. As a result, commercial farmers started planting from June and continued up to August. Farmers in both Renk and Melut this year have reported that the 2018 rainfall has not been adequate and ceased earlier than normal, which has resulted in low crop yields,

compared to last year, especially for cereals. Serious yield reduction and even drying of crops were noted by the Task Force team, which visited these areas in October 2018. In 2018, commercial farmers have expanded their farmlands significantly, mostly to plant sesame, due to sustained demand at high prices from Sudanese traders.

Seasonal rains in other commercial farming areas including the Aweil Rice Scheme and Ton Chol, in Northern Bahr el Ghazal, were also characterized by an erratic distribution and recurrent dry spells, which resulted in planting delays and constrained crop yields.

Figure 9: South Sudan - Rainfall amounts RFE and NDVI, 2018

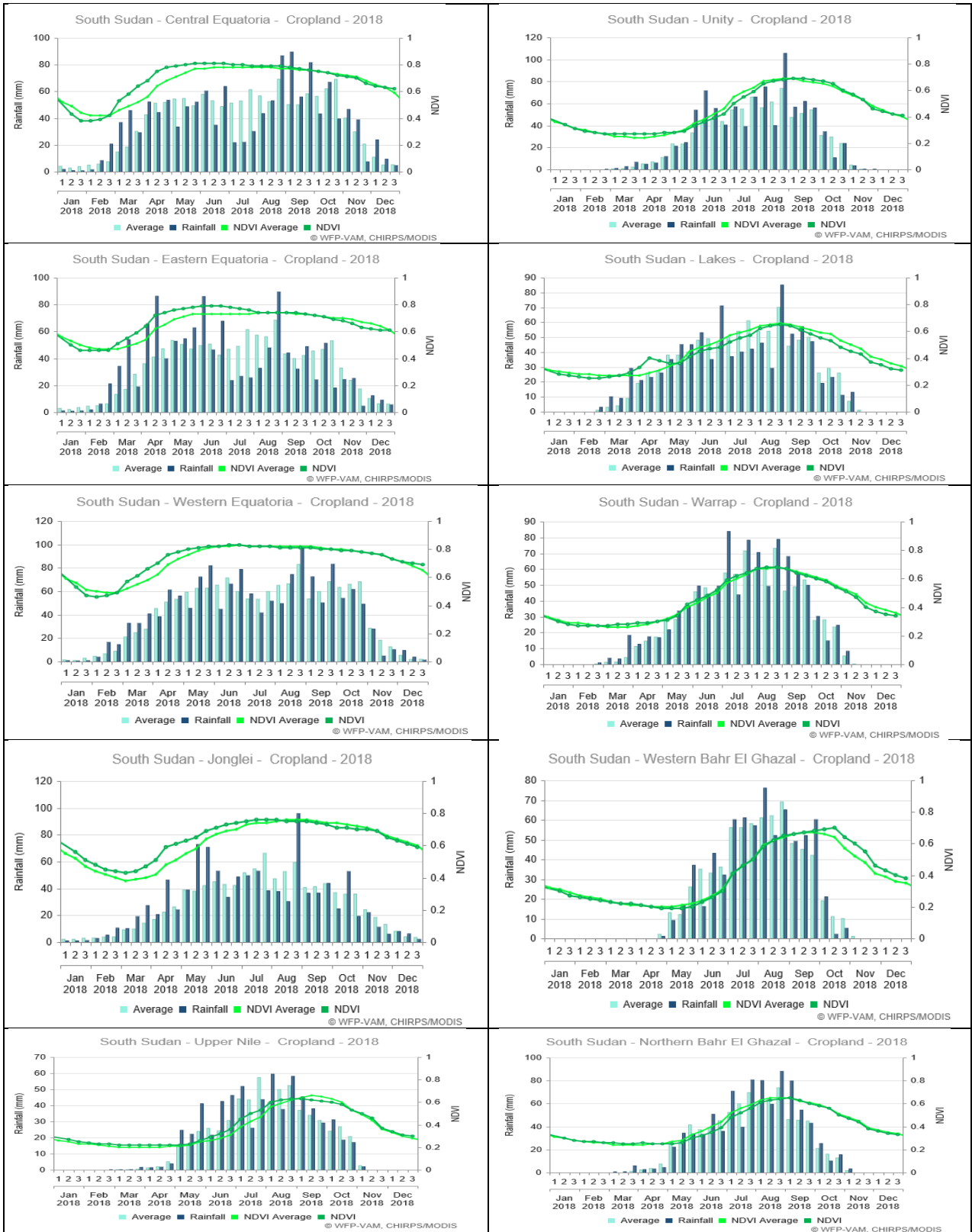


Figure 10: South Sudan - Rainfall anomalies, 2018



Inputs in the traditional smallholder sector

The two main inputs in the traditional sector are manual labour and local planting material (seeds and cuttings), with farmers relying on shifting cultivation to sustain soil fertility in most areas except Northern Bahr el Ghazal State. The importance of using animal manure is increasing. Its application is performed by keeping large herds of cattle for an agreed number days on individual farms through negotiation of price with cattle keepers. However, this practice is usually too expensive for resource poor farmers. Regarding hand cultivation, availability of hand tools and people to use them are the most significant limiting factors for agricultural activities. For the majority of the households, farm size is limited to the area of land that the farming families themselves can clear, cultivate and weed with the ubiquitous cutlass, the flat-bladed, long-handled hoe called the *maloda*, the local short-handled, bent hoe called the *toriah*, or the East African hoe or *jembe*.

Over the past three years, prices of hand tools have increased dramatically mainly due to the economic crisis and the devaluation of the SSP. In Jonglei, the price of a *maloda* increased from SSP 500 of last year to more than SSP 1 000 in the current season, while in Torit (Eastern Equatoria) the cost of a hoe increased from SSP 300 to SSP 500 over the same period.

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 implements (a plough board), many households were buying their own or hiring 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 the farm lands and fallowing within a recognizable farm area or domain 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 opportunities are limited, contract dunging by pastoralists' herds and flocks on private farm lands is increasing from year to year. Such actions were practiced by better-off farmers, with contracted terms clearly depending on relationships between herders and farmers, with payment in cash, grain/sorghum, supplying all meals and drinks for the herders, including slaughtering goats, as needed. 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 has been difficult for poor farmers.

Agrochemicals are not used by small farmers on field crops, although some use of herbicides has been noted in previous CFSAMs by some large-scale mechanized farms in Upper Nile State with access to supplies from Sudan. A few years ago, the trials made 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 (TSP), 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 entrepreneurs. However, displacement and insecurity around the border areas of Central Equatoria, suggest that such purchases became increasingly difficult since 2016. This year, in Juba County, chemical fertilizers were used by Rejaf vegetable growers and the Israeli Green Horizon company. Green Horizon used Nitrogen, Phosphorus and Potassium (N-P-K), urea and Triple Super Phosphate (TSP), and Rejaf Vegetable Growers used Diammonium Phosphate (DAP), and Calcium Ammonia Nitrate (CAN). Green Horizon also used selective herbicides to control weeds, and insecticides to control the Fall Armyworm on maize fields.

Regarding seeds, farmers in all regions use either a) their own seeds of sorghum carried over from the previous harvest; b) market-purchased seeds for crops with high storage losses, including locally-multiplied, improved varieties of maize such as the ex-NARO¹¹ (Uganda) Longi-5 and improved groundnut varieties (Red Beauty); or c) they borrow seeds from extended family members and neighbours. In addition, significant amount of seeds and hand tools were distributed to vulnerable farmers by FAO and NGOs in 2018.

In 2018, through various emergency projects, FAO has provided seeds through direct distribution by NGOs and organizing seed fairs (Table 4). A total of 5 970 tonnes of seeds were distributed to target farmers in all regions, with 5 254 tonnes through direct distribution and 716 tonnes through seed fairs, benefiting a total of 426 408 households selected in 77 counties. An average of 14 kg of seeds were provided to each farmer, out of which 11.6 kg were planted and the rest was used for other purposes.

¹¹ National Agricultural Research Organization.

Overall, 5 970 tonnes of sorghum, maize, sesame, cowpea, groundnuts, rice and bean seeds were distributed by FAO in 2018, more than three times the quantity distributed in 2017. FAO has also distributed large quantities of different vegetable and watermelon seeds during the cropping season.

Table 3: South Sudan – Crop seeds distributed by FAO and its partners, 2018 (tonnes)

| Type of seed | | Quantity of seeds (tonnes) | Number of beneficiary households |
|------------------|----------|----------------------------|----------------------------------|
| Crop seeds | Cowpea | 2 106 | |
| | Maize | 1 871 | |
| | Sorghum | 1 236 | |
| Sub-total | | 5 213 | 374 162 |
| Vegetable seeds | Amaranth | 5.20 | |
| | Collard | 11.09 | |
| | Eggplant | 2.86 | |
| | Okra | 30.44 | |
| | Onion | 6.03 | |
| | Tomato | 4.47 | |
| | Pumpkin | 1.52 | |
| Watermelon | 3.29 | | |
| Sub-total | | 64.9 | 360 557 |

Source: FAO South Sudan.

Pests, diseases and weeds

Several types of pests, diseases and weeds are infesting crops every year in South Sudan. Despite the damage caused by insect pests and diseases, they remain untreated, with farmers accepting the losses as inevitable, while weeds and vertebrate pests are treated manually. Weeding of the majority of sorghum, for instance, is not carried out adequately by most smallholder farmers, usually done only once during the growing period, while groundnuts are weeded twice. On the other hand, bird scaring and protecting crop fields from wild animals and domestic livestock is usually practiced using family labour. No control measures have been carried out over migratory pests, especially migratory *QQU* birds since 2013. This year, *QQU* birds were not reported in Upper Nile State, despite the continuous concern from both traditional smallholder farmers and large-scale mechanized farmers as they consider them a major threat to the late sorghum harvest in January.

Fall Armyworm - FAW (*Spodoptera frugiperda*) made its first appearance in the country in 2017, quickly spreading to major cropping areas within a short period. The first FAW infestation was reported in May 2017 in Magwi County of Eastern Equatoria State attacking the late-planted maize crops. Since the pest was unknown, the agricultural extension staff in Magwi and other counties were unable to determine whether it was FAW or not. In that period, access to Magwi County was not possible to FAO staff due to insecurity-related access constraints. Subsequently, the pest was identified to be FAW and reported to have spread in Central and Western Equatoria, Northern Bahr El Ghazal, Jonglei, Western Bahr El Ghazal and Upper Nile states. In 2018, FAW was reported to be present in all states of the country, with higher incidence in Greater Equatoria state where maize is the dominant cereal crop. The damage caused on the maize crops in major growing areas, including Yambio, Nzara, Tambura, Magwi and Pochalla counties, was reported as serious. In most cases, the early planted crops were not infested by the FAW, since they usually escape the peak migration period of FAW adult insects to fields. The FAW attacked also sorghum, especially young plants, in some pocket areas of Greater Bahr el Ghazal and Greater Upper Nile regions, but the damage levels were lower compared to maize.

In 2018, the most commonly-occurring non-migratory pests included green grasshoppers, caterpillars, millipedes, termites, aphids, sorghum midge, stalk (stem) borers, sorghum cinch bug, local birds, monkeys, rodents, wild pigs, porcupines and domestic livestock. All insect pest infestations were considered to be mild to average in most areas. Controlling grass and broadleaf weeds¹² by weeding once or twice was noted throughout 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. Farmers who have no access to new plots and continued to dig or plough 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 Harvest Assessment Teams, deployed to main sorghum growing areas including Northern Bahr el Ghazal, Warrap, Western Bahr el Ghazal, Lakes, Jonglei and Upper Nile have reported the expanding trend

¹² An unusual new broadleaf weed called *babashiro*, supposedly from the Democratic Republic of the Congo, is noted to be causing concern in Western Equatoria Greenbelt.

of *Striga* infestation and damage on sorghum crops in 2018. The extent of damage varied in different areas and ranged from mild to severe. The problem may be addressed by using crop rotation (with leguminous crops including groundnuts) and through the use of manure or by transplanting three-four weeks old seedlings from nurseries or from *Striga* weed-free fields. Other methods, including intercropping of Desmodium (leguminous fodder crop)¹³ with cereals can also be used to effectively control *Striga* weed through the support of trained extension workers.

Another invasive weed known as Parthenium (*Parthenium hysterophorus*) is rapidly spreading in the Greater Kapoeta region (Kapoeta East, South and North) over the past three-four years. The 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 that occurred during the current cropping season include rosette virus and leaf spot of groundnuts, mosaic virus of cassava and head smut on sorghum.

Agricultural production in 2018

Cereal production

A. Traditional smallholder sector

Cereal production in the traditional sector 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 2018, Task Force-led teams' estimates of production of cereals in each state were compiled from county-level disaggregated data. Such 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 harvest assessments, which included a) 1 492 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 estimations made by the CCMCs in 54 counties through crop-cuts and PET manuals are used as supplementary information to further improve the quality of yield estimations.

The empirical data obtained was finally reviewed using secondary data from reports provided by FAO, WFP, NBS and various NGOs plus remote sensing data on vegetation conditions and precipitation amounts and anomalies, as well as rainfall data collected at county level by FAO-trained operators, supported by the EU-funded European Union project "Strengthening the resilience of pastoral and agro-pastoral communities in South Sudan's cross border areas with Sudan, Ethiopia, Kenya and Uganda" (OSRO/SSD/703/EU). The planting/harvest time missions completed by the Task Force teams are listed below:

- In August, missions to assess the yields of first season maize (*Longi-5* variety) and other cereal crops were conducted in Western Equatoria State covering Nzara, Yambio, Tambura, Mundri West and East counties, followed by another Mission in November to assess the second season crops in Tambura, Ibba, Nzara, Maridi, Mundri West and Mvolo counties.
- In September and early October, missions to assess the 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), Warrap State (Twic and Gogrial West counties) and in Lakes State (Rumbek North, Cueibet, Wulu and Yirol West counties). 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, such as *Afargadamek*, *Wad Ahmed*, *Gaddam el Hammam*; late sorghum landrace *kec* and groundnuts (*Red Beauty* and *Mr Lake*); plus very limited maize areas around the steadings.
- In October, missions to assess the yields of cereal crops, including local landraces of sorghum (*Kabi*) and small areas of maize in Greater Kapoeta Region (North, East and South) were conducted in Eastern Equatoria State. The teams also conducted similar missions in Central Equatoria State, in Juba County to assess the yields of first season crops, and in Tarekeka County to assess sorghum and groundnut harvests.
- In November, missions to assess the yields of local landraces of sorghum (*Leuwarding* and *Agono*) and maize in the smallholder sector plus landraces *Afargadamek*, *Wad Ahmed*, *Gaddam el Hammam* in the mechanized sector were conducted in Maban and Renk counties in Upper Nile State; in Pochalla, Twic

¹³ 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.

East and Bor counties in Jonglei State and late-maturing sorghums in Jur River, Raja and Wau counties in Western Bahr el Ghazal State. In Upper Nile State, the Team was able to assess a number of commercial farms growing sorghum and sesame, and minor crops including groundnuts, bulrush millet and sunflower.

- Although the Task Force team was not able to visit Unity State, the Team has taken advantage of the yield data collected by FAO's Monitoring and Evaluation Team, using CFSAM methodology and aimed at estimating the production obtained from the seeds distributed by FAO and its partners, through ELRP in 2018¹⁴.
- Further information was provided by telephone interviews with the State directors of Agriculture and NGO extension workers in Unity State and by members of the CCMCs from inaccessible areas of Eastern Equatoria State.

The 2018 cereal production estimate in the traditional sector, disaggregated by state and county, are presented in Table 5. The national gross cereal production from the smallholder sector in 2018 is estimated at about 931 000 tonnes, below the threshold of 1 million tonnes for the second consecutive year. As in previous assessments, post-harvest losses and seed use for sowing in 2019 are assumed to account for 20 percent of the total production, leaving a net amount of about 745 000 tonnes available for local consumption. This result is the smallest amount harvested since the start of the conflict, about 2.5 percent below the low output obtained in 2017 and 16 percent below the average of the previous five years. The decline of cereal production compared to 2017, despite the small increase in harvested area, is mainly due to lower yields resulting from prolonged and recurrent dry spells during the growing season. Significant reduction in production compared to 2017 are recorded in the states of Central Equatoria (-21.6 percent), Warrap (-9.9 percent) and Upper Nile (-9.3 percent). Notably, in Central Equatoria and Warrap states, the decline in yields due to the unfavourable weather conditions was compounded by a further decline in harvested area due to protracted displacements of farmers and disruption of farming activities owing to the insecurity and violence. Smaller declines are recorded in Western Bahr el Ghazal (-3.7 percent), and Eastern Equatoria (-2.8 percent) states. By contrast, production was higher compared to 2017 in Western Equatoria State, by 3.4 percent, where the decline in yields was offset by an increase in harvested area due to improved security and access to land, and in Jonglei and Northern Bahr el Ghazal states (+9.9 percent and +4.2 percent, respectively), where the erratic rains affected cereal yields only in some parts and localized security improvements allowed for an increase in planted area. Production levels of the other states have remained similar to 2017.

The mean gross cereal yield from the smallholder sector in 2018 is estimated at 1.05 tonnes/hectare, which is lower than the 2017 level by 4.7 percent. The decrease reflects unfavourable growing conditions, mainly the negative impact of prolonged and recurrent dry spells in most growing areas and the losses caused by FAW infestation. As has been done since 2014, conservative yield values have been used for the counties not visited by the Task Force teams at harvest time and where no independent assessments have been conducted¹⁵ and where there were no CCMC reports available.

¹⁴ The FAO M&E Team carried out harvest assessments in 39 counties of the country covering 4 600 household samples in all the three greater regions where seeds were distributed. About 426 408 farming households benefited from the FAO's seed support this year throughout the country. About 36 teams comprising 116 field workers were mobilized for data collection between August and November 2018.

¹⁵ It applies especially to the whole Unity State and some locations in Jonglei State.

Table 4: South Sudan - Estimated cereal harvested area, yield, production, consumption and balance (traditional sector), 2018 and 2019

| State/ County | 2018 | | | | 2019 | | |
|------------------------------------|---------------------------|---------------------------------------|---|---|--------------------------|--|---------------------------------|
| | Cereal area (hectares) | Gross yield (tonne/ hectare) | Gross cereal production (tonnes) | Net cereal production (tonnes) | Population (mid-2019) | Cereal require- ment (tonnes) | Surplus/ deficit (tonnes) |
| Central | | | | | | | |
| Equatoria | 56 524 | 1.1 | 61 141 | 48 913 | 1 091 997 | 139 958 | -91 045 |
| Juba | 15 399 | 0.90 | 13 859 | 11 087 | 404 300 | 56 602 | -45 515 |
| Kajo Keji ^{1/} | 6 136 | 1.40 | 8 590 | 6 872 | 108 956 | 13 075 | -6 203 |
| Lainya ^{1/} | 3 768 | 0.80 | 3,014 | 2 411 | 103 271 | 12 393 | -9 981 |
| Morobo ^{1/} | 4 703 | 1.80 | 8 466 | 6 773 | 142 005 | 17 041 | -10 268 |
| Terekeka | 16 244 | 0.60 | 9 747 | 7 797 | 167 157 | 20 059 | -12 262 |
| Yei ^{1/} | 10 274 | 1.70 | 17 465 | 13 972 | 166 306 | 20 788 | -6 816 |
| Eastern | | | | | | | |
| Equatoria | 111 524 | 1.0 | 113 701 | 90 961 | 1 024 014 | 127 187 | -36 226 |
| Budi | 16 802 | 1.00 | 16 802 | 13 441 | 96 330 | 11 560 | 1 882 |
| Ikotos | 19 291 | 1.10 | 21 220 | 16 976 | 127 253 | 15 907 | 1 069 |
| Kapoeta East | 12 671 | 0.50 | 6 336 | 5 068 | 168 287 | 21 036 | -15 968 |
| Kapoeta North | 7 186 | 0.90 | 6 467 | 5 174 | 106 613 | 13 327 | -8 153 |
| Kapoeta South | 4 240 | 0.70 | 2 968 | 2 374 | 69 737 | 9 066 | -6 691 |
| Lafon | 12 704 | 1.10 | 13 975 | 11 180 | 105 590 | 12 671 | -1 491 |
| Magwi | 23 616 | 1.50 | 35 424 | 28 339 | 190 578 | 22 869 | 5 470 |
| Torit | 15 015 | 0.70 | 10 510 | 8 408 | 159 625 | 20 752 | -12 343 |
| Jonglei | 56 537 | 0.9 | 49 552 | 39 641 | 1 796 809 | 201 692 | -162 051 |
| Akobo | 6 193 | 1.00 | 6 193 | 4 954 | 188 662 | 20 753 | -15 799 |
| Ayod | 1 039 | 0.80 | 831 | 665 | 176 464 | 19 411 | -18 746 |
| Bor South | 9 927 | 0.65 | 6 452 | 5 162 | 246 500 | 28 347 | -23 185 |
| Duk | 2 658 | 0.80 | 2 126 | 1 701 | 119 267 | 13 119 | -11 418 |
| Fangak | 1 437 | 0.70 | 1 006 | 805 | 177 579 | 19 534 | -18 729 |
| Khorflus/ Pigi/Canal | 834 | 0.70 | 584 | 467 | 101 595 | 11 175 | -10 709 |
| Nyirol | 4 293 | 0.80 | 3 434 | 2 747 | 179 815 | 19 780 | -17 033 |
| Pibor | 8 203 | 1.10 | 9 023 | 7 218 | 197 010 | 23 641 | -16 423 |
| Pochalla | 6 174 | 1.30 | 8 026 | 6 421 | 83 965 | 10 076 | -3 655 |
| Twic East | 6 476 | 0.90 | 5 828 | 4 662 | 123 744 | 13 612 | -8 950 |
| Uror | 9 305 | 0.65 | 6 048 | 4 839 | 202 207 | 22 243 | -17 404 |
| Lakes | 128,665 | 1.1 | 144 495 | 115 596 | 1 262 544 | 138 882 | -23 285 |
| Awerial | 16,815 | 1.00 | 16 815 | 13 452 | 151 271 | 16 640 | -3 188 |
| Cueibet | 26,618 | 1.00 | 26 618 | 21 294 | 192 968 | 21 226 | 68 |
| Rumbek Centre | 13 655 | 1.20 | 16 386 | 13 109 | 267 537 | 29 430 | -16 321 |
| Rumbek East | 19 238 | 1.20 | 23 086 | 18 468 | 217 902 | 23 969 | -5 501 |
| Rumbek North | 4 397 | 1.20 | 5 276 | 4 221 | 63 009 | 6 931 | -2 710 |
| Wulu | 11 504 | 1.20 | 13 805 | 11 044 | 76 805 | 8 449 | 2 596 |
| Yirol East | 12 165 | 1.10 | 13 382 | 10 705 | 114 101 | 12 552 | -1 846 |
| Yirol West | 24 273 | 1.20 | 29 127 | 23 302 | 178 951 | 19 685 | 3 617 |
| Northern Bahr el Ghazal | 157 131 | 1.1 | 168 100 | 134 480 | 1 444 020 | 158 842 | -24 362 |
| Aweil Centre | 12 032 | 0.95 | 11 430 | 9 144 | 113 253 | 12 458 | -3 314 |
| Aweil East | 58 240 | 0.90 | 52 416 | 41 933 | 567 485 | 62 423 | -20 490 |
| Aweil North | 36 309 | 1.20 | 43 570 | 34 856 | 288 692 | 31 756 | 3 100 |
| Aweil South | 16 775 | 1.00 | 16 775 | 13 420 | 154 344 | 16 978 | -3 558 |
| Aweil West | 33 776 | 1.30 | 43 908 | 35 127 | 320 246 | 35 227 | -100 |
| Unity | 16 956 | 0.7 | 11 873 | 9 499 | 999 401 | 85 721 | -76 222 |
| Abiemnhom | 775 | 0.60 | 465 | 372 | 29 845 | 2 536 | -2 164 |
| Guit | 396 | 0.50 | 198 | 158 | 39 674 | 3 372 | -3 213 |
| Koch | 2 196 | 0.70 | 1 538 | 1 230 | 126 734 | 10 772 | -9 542 |
| Leer | 591 | 0.60 | 355 | 284 | 109 182 | 9 281 | -8 998 |
| Mayendit | 1 113 | 0.70 | 779 | 623 | 88 888 | 7 556 | -6 933 |
| Mayom | 3 620 | 0.70 | 2 534 | 2 027 | 176 055 | 14 965 | -12 938 |
| Panyijar | 2 978 | 0.55 | 1 638 | 1 310 | 94 896 | 8 066 | -6 756 |
| Pariang | 4 654 | 0.85 | 3 956 | 3 165 | 257 020 | 21 847 | -18 682 |
| Rubkona | 632 | 0.65 | 411 | 328 | 77 106 | 7 325 | -6 997 |

| State/ County | 2018 | | | | 2019 | | |
|-----------------------------------|---------------------------|---------------------------------------|---|---|--------------------------|--|---------------------------------|
| | Cereal area (hectares) | Gross yield (tonne/ hectare) | Gross cereal production (tonnes) | Net cereal production (tonnes) | Population (mid-2019) | Cereal require- ment (tonnes) | Surplus/ deficit (tonnes) |
| Upper Nile | 51 588 | 0.8 | 39 526 | 31 621 | 1 087 622 | 93 865 | -62 245 |
| Baliet | 144 | 0.70 | 101 | 80 | 8 161 | 694 | -613 |
| Fashoda ^{1/} | 113 | 0.60 | 68 | 54 | 14 399 | 1 224 | -1 170 |
| Longochuk | 3 416 | 0.60 | 2 050 | 1 640 | 76 708 | 6 520 | -4 881 |
| Luakpiny/Nasir | 10 277 | 0.85 | 8 735 | 6 988 | 306 286 | 26 034 | -19 046 |
| Maban | 15 498 | 0.80 | 12 398 | 9 919 | 209 917 | 17 843 | -7 924 |
| Maiwut | 1 915 | 0.65 | 1 245 | 996 | 42 746 | 3 633 | -2 638 |
| Malakal | 499 | 0.70 | 349 | 279 | 76 336 | 7 252 | -6 972 |
| Manyo | 722 | 0.85 | 614 | 491 | 17 705 | 1 505 | -1 014 |
| Melut | 4 347 | 0.70 | 3 043 | 2 435 | 77 557 | 6 592 | -4 158 |
| Panyikang | 685 | 0.80 | 548 | 439 | 25 207 | 2 143 | -1 704 |
| Renk | 9 959 | 0.80 | 7 967 | 6 374 | 130 881 | 11 779 | -5 406 |
| Ulang | 4 014 | 0.60 | 2 408 | 1 927 | 101 719 | 8 646 | -6 720 |
| Western Bahr el Ghazal | 37 434 | 1.1 | 39 346 | 31 477 | 558 311 | 63 344 | -31 868 |
| Jur River | 15 435 | 1.10 | 16 978 | 13 583 | 163 000 | 17 931 | -4 348 |
| Raga | 3 685 | 1.10 | 4 054 | 3 243 | 101 126 | 10 112 | -6 869 |
| Wau | 18 314 | 1.00 | 18 314 | 14 651 | 294 184 | 35 301 | -20 651 |
| Warrap | 156 965 | 1.0 | 160 753 | 128 602 | 1 513 669 | 145 887 | -17 285 |
| Abyei | 7 784 | 0.90 | 7 006 | 5 604 | 81 354 | 7 321 | -1 717 |
| Gogrial East | 11 804 | 0.80 | 9 443 | 7 554 | 141 269 | 13 421 | -5 866 |
| Gogrial West | 50 307 | 1.10 | 55 337 | 44 270 | 351 181 | 36 875 | 7 395 |
| Tonj East | 9 047 | 0.70 | 6 333 | 5 066 | 120 406 | 12 041 | -6 974 |
| Tonj North | 25 735 | 0.90 | 23 161 | 18 529 | 247 925 | 24 792 | -6 263 |
| Tonj South | 19 548 | 1.20 | 23 458 | 18 766 | 133 229 | 11 990 | 6 776 |
| Twic | 32 741 | 1.10 | 36 015 | 28 812 | 438 304 | 39 448 | -10 636 |
| Western Equatoria | 109 537 | 1.3 | 142 584 | 114 067 | 783 276 | 113 575 | 492 |
| Ezo ^{1/} | 9 492 | 1.50 | 14 238 | 11 390 | 108 584 | 15 745 | -4 355 |
| Ibba ^{1/} | 9 670 | 1.35 | 13 054 | 10 443 | 40 613 | 5 889 | 4 555 |
| Maridi ^{1/} | 11 876 | 1.35 | 16 033 | 12 826 | 78 865 | 11 435 | 1 391 |
| Mundri East ^{1/} | 3 379 | 1.00 | 3 379 | 2 703 | 60 877 | 8 827 | -6 124 |
| Mundri West ^{1/} | 3 476 | 1.10 | 3 824 | 3 059 | 55 951 | 8 113 | -5 054 |
| Mvolo | 4 652 | 0.70 | 3 257 | 2 605 | 87 914 | 12 747 | -10 142 |
| Nagero | 1 415 | 1.10 | 1 557 | 1 246 | 13 179 | 1 911 | -665 |
| Nzara ^{1/} | 16 261 | 1.50 | 24 391 | 19 513 | 61 033 | 8 850 | 10 663 |
| Tambura ^{1/} | 24 133 | 1.30 | 31 373 | 25 098 | 76 555 | 11 101 | 13 997 |
| Yambio ^{1/} | 25 183 | 1.25 | 31 479 | 25 183 | 199 706 | 28 957 | -3 774 |
| Total | 882 862 | 1.1 | 931 071 | 744 856 | 11 561 663 | 1 268 954 | -524 098 |

^{1/} First and second harvests combined.

Table 5: South Sudan - Cereal harvested area and net production (rounded) in the traditional sector, 2014-2018

| Region/State | 2014 | | | 2015 | | | 2016 | | | 2017 | | | 2018 | | |
|--------------------------|----------------|--------------------|-------------------|----------------|--------------------|-------------------|----------------|--------------------|-------------------|----------------|--------------------|-------------------|----------------|--------------------|-------------------|
| | Area ('000 ha) | Net Prod. ('000 t) | Net Yields (t/ha) | Area ('000 ha) | Net Prod. ('000 t) | Net Yields (t/ha) | Area ('000 ha) | Net Prod. ('000 t) | Net Yields (t/ha) | Area ('000 ha) | Net Prod. ('000 t) | Net Yields (t/ha) | Area ('000 ha) | Net Prod. ('000 t) | Net Yields (t/ha) |
| Upper Nile | 82 | 50 | 0.61 | 108 | 68 | 0.63 | 118 | 73 | 0.62 | 124 | 82 | 0.65 | 125 | 81 | 0.65 |
| Upper Nile | 36 | 19 | 0.53 | 45 | 27 | 0.53 | 48 | 30 | 0.63 | 53 | 35 | 0.65 | 52 | 32 | 0.61 |
| Unity | 15 | 8 | 0.53 | 16 | 9 | 0.55 | 16 | 9 | 0.56 | 18 | 10 | 0.54 | 17 | 9 | 0.56 |
| Jonglei | 31 | 23 | 0.74 | 47 | 32 | 0.76 | 54 | 34 | 0.63 | 54 | 37 | 0.68 | 57 | 40 | 0.70 |
| Bahr el Ghazal | 415 | 403 | 0.97 | 440 | 379 | 0.86 | 480 | 416 | 0.87 | 470 | 417 | 0.89 | 480 | 410 | 0.85 |
| Northern Bahr el Ghazal | 128 | 113 | 0.88 | 147 | 114 | 0.84 | 157 | 124 | 0.79 | 153 | 129 | 0.85 | 157 | 134 | 0.86 |
| Western Bahr el Ghazal | 69 | 75 | 1.06 | 65 | 58 | 0.89 | 51 | 45 | 0.88 | 37 | 33 | 0.89 | 37 | 31 | 0.84 |
| Lakes | 94 | 92 | 0.99 | 97 | 94 | 1.01 | 117 | 106 | 0.91 | 125 | 112 | 0.90 | 129 | 116 | 0.90 |
| Warrap | 124 | 123 | 0.99 | 131 | 113 | 0.9 | 155 | 141 | 0.91 | 156 | 143 | 0.92 | 157 | 129 | 0.82 |
| Greater Equatoria | 517 | 562 | 1.09 | 467 | 465 | 1.00 | 346 | 336 | 0.97 | 268 | 266 | 0.99 | 278 | 254 | 0.91 |
| Central Equatoria | 199 | 223 | 1.12 | 197 | 216 | 1.19 | 117 | 120 | 1.03 | 60 | 62 | 1.04 | 57 | 49 | 0.87 |
| Eastern Equatoria | 151 | 142 | 0.94 | 139 | 116 | 0.98 | 116 | 99 | 0.85 | 107 | 94 | 0.87 | 112 | 91 | 0.82 |
| Western Equatoria | 167 | 197 | 1.19 | 131 | 133 | 1.00 | 113 | 117 | 1.04 | 101 | 110 | 1.09 | 110 | 114 | 1.04 |
| Total | 1 014 | 1 015 | 1.00 | 1 015 | 912 | 0.90 | 940 | 826 | 0.88 | 863 | 764 | 0.89 | 883 | 745 | 0.84 |

B. Mechanized sector

The rainfed mechanized sector includes demarcated, large-scale farmers in Upper Nile State with multiple aggregations of 500 feddan units (about 200 hectares) known as *mushroor*, mainly located between Renk and Malakal counties; plus un-demarcated *traditional* farms, where farmers cultivate units up to 50 feddans (20 hectares) alongside the lands of large scale farmers, hiring their tractors and equipment.

The sector includes the Aweil Rice Scheme in Aweil Centre and a mechanized sorghum area in Ton Chol, Aweil East, 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 in assessments, and some emerging commercial farms in the Greater Bahr el Ghazal region, expanding through the use of labour gangs, digging fields by hand or using animal traction.

The largest area of mechanized farms is located in Upper Nile State. Here, mechanization is limited to land preparation and sowing using seed boxes placed over disc harrows, with most of all 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.

Sorghum and sesame are the dominant crops in the mechanized areas of Upper Nile, grown by medium and large scale farmers who are cultivating big farms ranging from 800 to 1 500 feddans (from 336 to 630 hectares). Groundnuts are mostly grown by smallholder farmers, both for family consumption and selling.

In 2018, the Task Force-led teams visited large-scale farms in Renk, Melut and Aweil counties. According to missions' findings, mechanized farming was undertaken intensively in 2018, with large areas cultivated by locally-based farmers in Upper Nile State. According to the Minister of Agriculture, Forestry and Animal Resources the area planted with sesame in this agricultural season has increased, while that of sorghum decreased compared to 2017. The areas under other crops including sunflower, groundnuts and bulrush millet remained the same. Expansion of sesame area this year is attributed to its high economic value and the high demand by Sudanese traders, who are buying the product at high prices for re-exporting purposes.

Based on the Task Force teams' estimations, a total of 120 000 hectares of sorghum and 68 900 hectares of sesame were sown in the mechanized sector in 2018. There are 395 tractors in Upper Nile commercial farming areas (280 in Renk and 115 in Melut), all functional. The tractor-hire rate in Renk for a two-time operation (ploughing and harrowing) was SSP 150 000/block (120 feddans) and two barrels of fuel, one barrel each for ploughing and harrowing, respectively. The average cost of a 200-litre barrel fuel was about SSP 70 000, much higher than in 2017 (SSP 23 000 per barrel) and 2016 (SSP 11 000 per barrel).

Spare parts for tractors are very scarce and farmers have to source them from the Sudan. Similarly, hand tools were obtained from the Sudan. Ivory Bank provided loans amounting to 60 percent of the cash required by farmers to those who have collateral. At an interest rate of 10 percent. Since this deal is considered as expensive, only 20 farmers received loans from Ivory bank, to be returned within six months. The amount of loan ranges from SSP 1 million to 10 million per farmer. The Agricultural Bank of South Sudan provided loans amounting to a total of 39 million to 104 commercial farmers mostly used for the purchase of fuel. The Bank requires collateral in the form of buildings, tractors and vehicles. In general, the loans provided by both Banks is not sufficient and the deals are not in favour of the commercial farmers.

The rainy season across Upper Nile State in 2018 was characterized by an erratic distribution and was less favourable compared to the previous year especially in Melut commercial farming areas, where, after a timely onset of seasonal rains in May, a prolonged dry spell in July affected crop development. Here, sorghum and maize crops were also affected by poor rains in September and October 2018, during the critical flowering and seed formation stages. This has resulted in drying out of crops and in substantial yield reductions, while sesame, groundnuts and millet crops, less vulnerable to moisture deficits, were less affected by the dry spells.

Precipitations over Renk commercial farming areas were comparatively better and average yields are reported. There were no reports of flooding during the current cropping season, due to the below-average rains received.

Farmers' own seeds were available for sowing in July and August for the early-maturing improved sorghum varieties of *Wad Ahmed*, *Gaddam el Hammam* and *Afargadamek* that currently account for most of the planted area instead of the long-maturing local landrace *Agono*. Sorghum smut and *Striga* weed were the main pests reported in sorghum fields. FAW, which was reported in 2017 for the first time, was also reported in many areas of Upper Nile this year, attacking maize moderately and, to a lesser extent, sorghum. Regarding the migratory QQU birds, there were no reports of attacks up the end of December 2018.

In 2018, the cultivated area increased by 15 percent compared to 2017, following increased sesame plantings mainly due to market incentives from the high sesame prices offered by Sudanese traders, the provision of loans, and improved security which also allowed the movement of labour force. Sesame production, estimated at 34 450 tonnes was significantly higher than last year when only 8 600 tonnes were gathered. The output increase resulted from the expansion of planted area and from the short cycle of the crop, which helped it to avoid the dry spells. By contrast, sorghum production decreased from 2017 due to a decline in planted area and erratic rainfall.

In 2018, the overall output of sorghum in the mechanized farms in all locations in Upper Nile State is estimated at 54 000 tonnes (Table 7) with a yield of 0.45 tonnes/hectare from 120 000 hectares, which is about 28 percent lower than 2017. The increased sesame output has been almost entirely sold to Sudanese traders, not only due to the high prices they offered, but also due to the poor state of the road network to the capital, Juba, and to insecurity affecting trade routes.

In the Aweil Rice National Project and mechanized farms located in the rice basins, about 588 tonnes of rice are expected to be harvested from the total 490 hectares planted in 2018. In Ton Chol mechanized farming areas in Aweil East, 288 tonnes of sorghum production is expected from 720 hectares, while in the Aweil Udham mechanized farming areas, an estimated 1 680 hectares of sorghum were cultivated, with an estimated 1 176 tonnes of production expected. The total number of farmers in Ton Chol sorghum scheme is 300 farmers (294 small scale farmers and 6 large-scale farmers). In these areas, the output sharply declined from 2017, due to a reduction in planted area following the decline in the number of large scale farmers for security reasons, coupled with lower yields due to a delayed onset and an early cessation of rains, late weeding due to high cost of labour, and pest infestations by sorghum midge and FAW. No ratoon crops were harvested this year in Ton Chol due to the early cessation of rain in September.

The overall area and production estimates for sorghum¹⁶ and rice in the mechanized sub-sector for the 2018 planting season are given in Table 7, showing a contribution of 55 464 tonnes of sorghum and 588 tonnes of paddy rice to the 2018 national harvest.

Table 6: South Sudan - Cereal area and production estimates of the mechanized sub-sector, 2018

| Location | Tractor (units) | Estimated area harvested (ha) | Yields (t/ha) | Estimated production (t) |
|--|--|-------------------------------|---------------|--------------------------|
| Upper Nile (sorghum) | 395 ^{1/} | 120 000 | 0.45 | 54 000 |
| Aweil Rice Scheme (paddy rice) including the surrounding private farmers | 13 (only seven active) | 490 | 1.2 | 588 |
| Aweil-Udham (sorghum) | 15 | 1 680 | 0.7 | 1 176 |
| Ton Chol (sorghum) | 5 ^{2/} (four private and one provided by the Government) | 720 | 0.4 | 288 |
| Total (mixed cereals) | | | | 56 052 |

^{1/} Two-hundred-eighty tractors in Renk and 115 in Melut, which were all functional.

^{2/} Only five out of 23 tractors are functional in Ton Chol.

Other crops

With a short growing season and the possibility to be used as both staple and cash crops, groundnuts are an important safety net 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. Its importance increases towards the south and west in the three Rumbek counties in Lakes State where the crop is planted around plots and household boundaries. In Western Bahr el Ghazal, 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 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

¹⁶ The main varieties grown are short cycle including *Gaddam el Hammam*, *Wad Ahmed* and *Ruth*.

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. 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), are noted by the Task Force-led teams this year to fall between 11-17 tonnes of fresh tubers/hectare in the major growing areas of the country.

As a result of the increased numbers of CCMCs at field level, the accuracy of estimates on planted area and output of cassava and groundnuts benefitted from a wider geographical coverage, which included Jonglei¹⁷ and Upper Nile¹⁸ states. The 2018 aggregate outputs are estimated at about 1.26 million tonnes of cassava (about 370 400 cereal equivalent) and 95 000 tonnes of groundnuts (see Table 8). Compared to 2017, production of groundnuts increased by 19 percent and production of groundnuts by 43 percent. These production increases are due to an expansion of planted area and to the wider geographical coverage of assessments in 2018.

Regarding other field crops grown at household level, information on oilseeds (sesame, safflower and sunflower) is too scanty to try deriving production figures. However, in 2018 the mechanized sector in Upper Nile State is expected to produce some 34 450 tonnes of sesame from about 68 900 hectares, mainly purchased directly from farmers by traders of the Sudan. The 2018 production of sesame is estimated to be about three times higher than 2017, mainly due to the increase in planted area driven by high price incentives.

Table 7: South Sudan - Indicative area, yield and production estimates of cassava and groundnuts, 2018

| State | Cassava (two years) ^{1/} | | | Groundnuts | | |
|---------------------------------------|-----------------------------------|---------------|------------------|----------------|---------------|---------------------------|
| | Area (ha) | Yields (t/ha) | Production (t) | Area (ha) | Yields (t/ha) | Production (unshelled, t) |
| Central Equatoria | 16 400 | 15 | 246 000 | 15 210 | 0.6 | 9 126 |
| Eastern Equatoria | 16 700 | 12 | 200 400 | 9 200 | 0.7 | 6 440 |
| Western Equatoria | 33 500 | 17 | 569 500 | 26 700 | 0.5 | 13 350 |
| Jonglei | 360 | 11 | 3 960 | 2 100 | 0.6 | 1 260 |
| Upper Nile | n.a. | n.a. | n.a. | 4 400 | 0.5 | 2 200 |
| Unity | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Lakes | 9 600 | 12 | 115 200 | 55 780 | 0.6 | 33 468 |
| Warrap | 0 | 0 | 0 | 18 500 | 0.6 | 11 100 |
| Western Bahr el Ghazal | 9 900 | 11 | 108 900 | 13 160 | 0.6 | 7 896 |
| Northern Bahr el Ghazal ^{1/} | 1 000 | 11 | 11 000 | 16 600 | 0.6 | 9 960 |
| Total | 87 460 | 14.3 | 1 254 960 | 161 650 | 0.58 | 94 800 |

^{1/} Area harvested increased because of the bigger importance of cassava and under-estimations of the areas planted in the past years.

n.a.: Not enough information collected.

Livestock

The most recent documented estimate of cattle numbers made by FAO in 2009 suggests a cattle population of 11.7 million head, plus about 24 million head for sheep and goats. The validity of these theoretical livestock data, particularly the distribution by State, is difficult to assess.

Using the conservative population annual growth rate of 0.06 percent determined for Ethiopia, the 2018 cattle population is estimated at 11 844 400 head, disaggregated at state level as shown in Table 8.

¹⁷ Both cassava and groundnuts.

¹⁸ Only groundnuts.

Table 8: South Sudan - Cattle estimates by State, 2014-2018 ('000)

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

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

Since the start of the conflict in 2014, enforced and voluntary livestock migration from the conflict-affected states into more secure areas and across international borders and the redistribution through *systematic theft* within the states by the parties has reportedly taken place at large scale. Looting seems to have been particularly prominent in Unity and Jonglei states, but its effect on 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. Reportedly, large numbers of pastoralists, including an estimated 60 000 livestock, have been displaced from Jonglei, Central and Eastern Equatoria states.

Despite the below-average and erratic precipitations that have characterized the 2018 rainy season, the pasture and water availability was generally near normal levels, with the exception of few eastern and south eastern areas of the country. Hence, the overall PET Body Condition Score (BCS) of adult cattle is noted to be at average level 3, with few cases estimated at level 2.

In 2018, the incidence of livestock diseases has been normal. The most prevalent diseases, as reported by the FAO Livestock Team as well as the Task Force teams, gathered from case studies and key-informant interviews, included: Haemorrhagic septicaemia (HS), Contagious bovine pleuropneumonia (CBPP), Contagious caprine pleuropneumonia (CCPP) and *peste des petits ruminants* (PPR), Foot-and-Mouth Disease, anthrax and internal and external parasites, among others. East Coast Fever was the only disease outbreak confirmed by laboratory tests and it was reported in Juba, Terekeka, Bor South and Awerial counties and in parts of Eastern Equatoria State. To mitigate the effects of livestock diseases, FAO and its partners conducted vaccination and treatment campaigns against CBPP, CCPP, PPR, HS, ECF and anthrax across the country.

CEREAL SUPPLY/DEMAND SITUATION

Cereal balance

Total cereal consumption in 2019 is estimated at slightly below 1.26 million tonnes, using a projected 2019 mid-year population of 11.47 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 (NBHS) 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 1.26 million tonnes of fresh cassava and over 95 000 tonnes of unshelled groundnuts is expected to provide about 375 000 tonnes and 85 000 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 745 000 tonnes, a cereal deficit of about 518 000 tonnes is forecast for the 2019 marketing year, 11 percent up from the 2018 (revised) deficit of about 468 000 tonnes. As the 2018 population figures used in last year CFSAM report have been slightly revised downwards to take into account the refugee outflow (see Section: Population and population movements), it induced a decline in the forecast of the 2018 food requirements with a consequent downward revision of the 2018 estimated deficit at about 468 000 tonnes from the estimate of 483 000 tonnes which was reported in the 2017 CFSAM report.

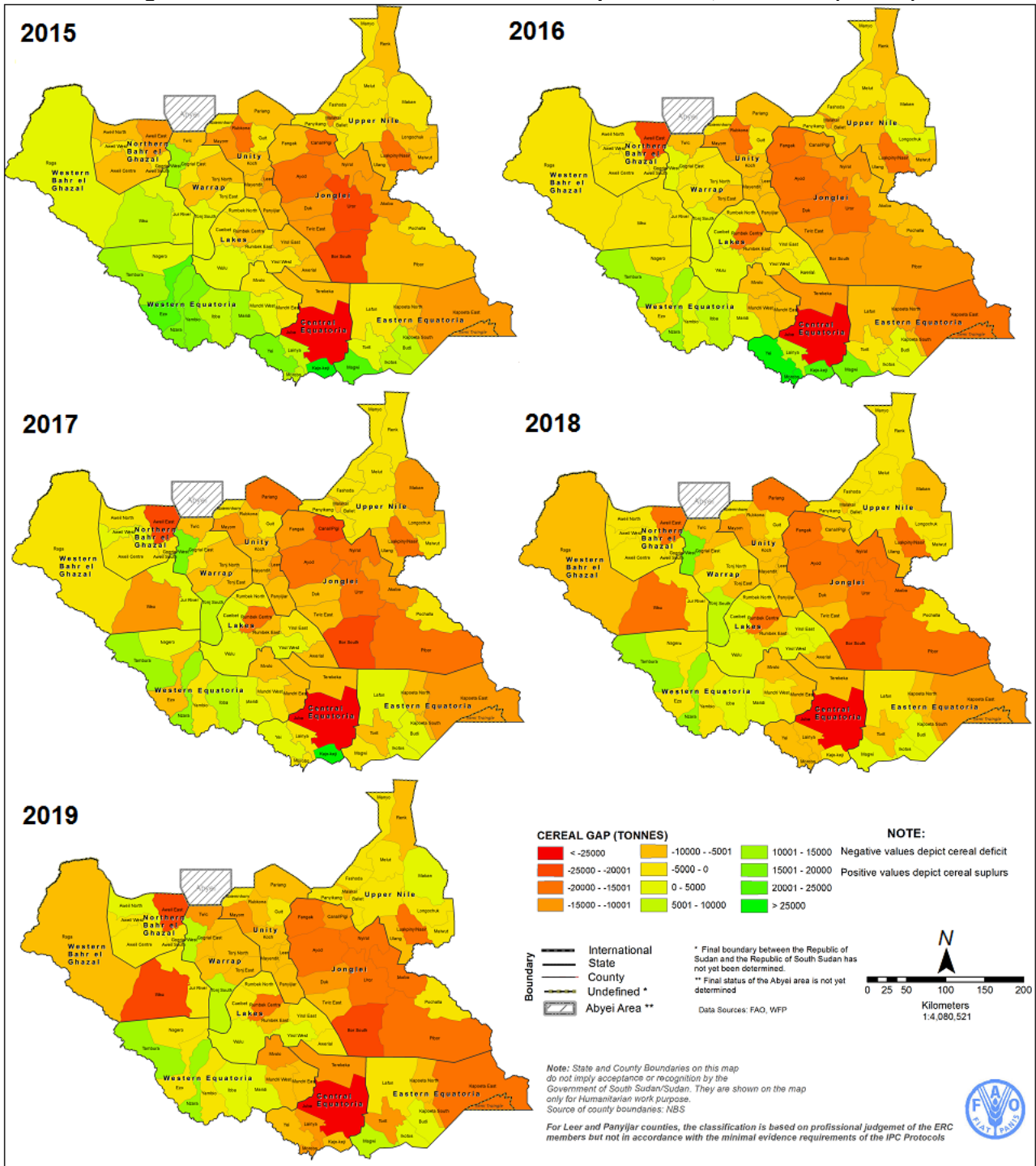
Table 9 summarizes the estimated cereal supply situation for each previously-designated State in 2019 and compares it with the Mission's estimates for the previous five years. The largest shortfall is forecast in the Greater Upper Nile Region, where the aggregate cereal deficit, after having increased by 40 percent between 2014 and 2015 due to the impact of the conflict, remained firm at around 300 000 tonnes in recent years. The situation is particularly worrisome in the Greater Equatoria Region (Western, Central and Eastern Equatoria states). The Region, which used to produce a moderate surplus in past years, moved to a deficit position of about 25 000 tonnes in 2017, as the area was affected by the expansion of the conflict. Subsequently, the aggregate cereal deficit quadruplicated to more than 100 000 tonnes in 2018 due to the deterioration of the security situation and to the massive refugee outflow in 2017 (see Section: Population and population movements), and is expected to further increase to about 130 000 tonnes in 2019. Traditional food surplus-producing areas of Yei, Morobo, Lainya and Magwi counties, that combined accounted for a surplus of about more than 85 000 tonnes in 2016, moved to a deficit position of about 10 000 tonnes in 2017, which more than doubled to about 23 000 tonnes in 2018. The combined deficit of these counties is expected to slightly decline to 22 000 tonnes in 2019 as improvements in Magwi and Yei counties, where cultivated area increased due an improved security situation and yields benefited from favourable weather, were mostly offset by an increased deficit in Morobo and Lainya counties, where cereal production declined due to persisting insecurity and erratic rainfall. Notably, Kajo Keji County, which used to produce the country's largest cereal surplus (about 30 000 tonnes on average between 2015 and 2017), is expected to move in 2019 to a deficit position of more than 6 000 tonnes as planted area dramatically declined due to severe insecurity. Western Bahr el Ghazal State, that produced a surplus of about 16 000 tonnes in 2015, moved to a deficit position of about 4 000 tonnes in 2016, which increased by more than six times to about 29 000 tonnes in 2018. The deficit is expected to further increase by 12 percent to about 32 000 tonnes in 2019, as an increase in planted area in Jur River and Wau counties due to improved security has been more than offset by an area decline in Raga county, where the security situation further deteriorated, and by lower yields in most cropping areas of the State due to erratic rainfall. In Warrap State, which was self-sufficient in 2018, the deficit is anticipated to sharply increase to more than 18 000 tonnes, as planted area remained mostly stable, but yields were severely affected by poor rains. The county with the largest food deficit is Juba County, where about 46 000 tonnes of cereals will be needed in 2019 to cover the food requirements of mostly urban households.

Table 9: South Sudan - Estimated cereal surplus/deficit, 2015-2019 (tonnes)

| State | 2015 | 2016 | 2017 | 2018 | 2019 |
|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Central Equatoria | 25 196 | 14 291 | -13 294 | -73 528 | -92 092 |
| Eastern Equatoria | 6 338 | -16 750 | -21 355 | -29 889 | -37 177 |
| Western Equatoria | 86 767 | 18 542 | 10 601 | 52 | -589 |
| Jonglei | -149 738 | -148 937 | -159 079 | -159 753 | -163 559 |
| Upper Nile | -78 942 | -72 429 | -58 864 | -56 258 | -57 675 |
| Unity | -80 298 | -79 264 | -80 041 | -73 686 | -66 614 |
| Lakes | -30 812 | -28 889 | -24 600 | -22 459 | -24 324 |
| Warrap | -4 907 | -19 459 | 2 132 | 1 027 | -18 321 |
| W Bahr al Ghazal | 16 044 | -4 350 | -14 256 | -28 802 | -32 341 |
| N Bahr al Ghazal | -38 315 | -28 006 | -25 529 | -25 098 | -25 549 |
| Total | -248 666 | -365 248 | -384 285 | -468 395 | -518 240 |

Cereal production from the rain-fed large and small mechanized sector in Northern Bahr el Ghazal and Upper Nile states is expected to provide an additional 56 052 tonnes of cereals. 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, this production may represent an option for the local purchases by the international institutions providing food assistance in the localities of production.

Figure 11: South Sudan - Estimated cereal surplus/deficit, 2015-2019 (tonnes)



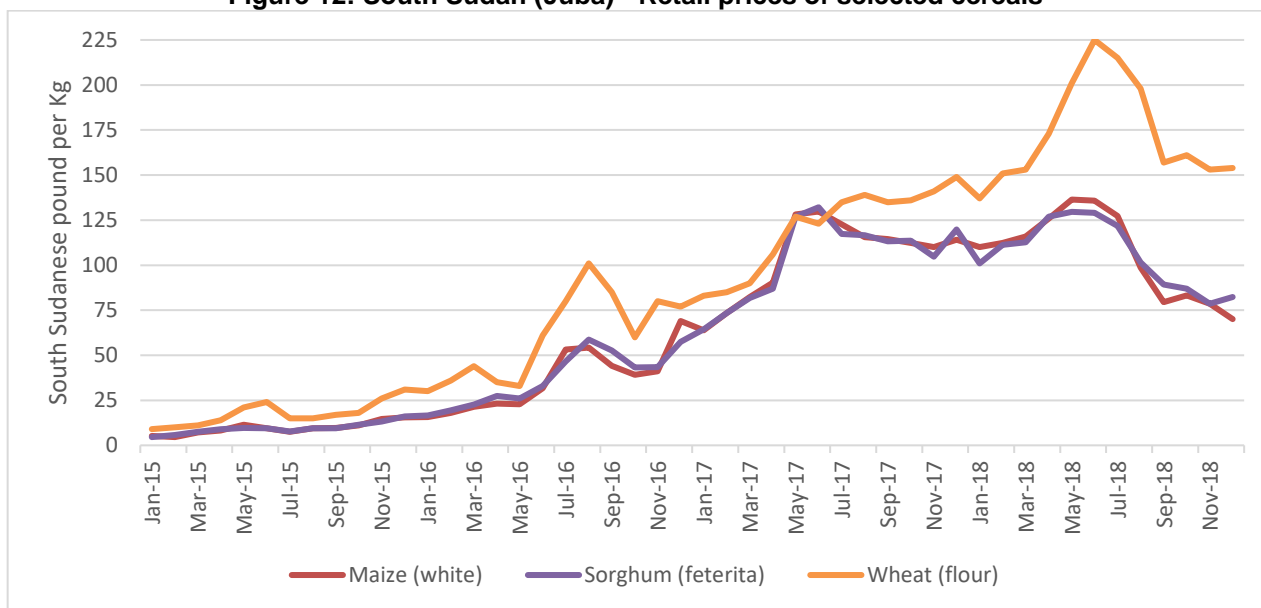
Source: FAO South Sudan.

Cereal and livestock markets

Prices of cereals started to soar in late 2015 on account of the depreciation of the local currency, the general economic downturn and widespread insecurity. The sustained upward trend was only momentarily interrupted in the last quarters of 2016 and 2017 as newly harvested crops increased availabilities, and by mid-2018 prices were at 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. Improved availabilities from newly harvested 2018 crops, increased imports from neighbouring Uganda following improved security along the Juba-Nimule route and lower demand due to increased cultivation for self-consumption in peri-urban and urban areas contributed to the price declines. In December 2018, sorghum and maize grains were traded at about SSP 80/kg and SSP70/kg, respectively, 30-40 percent below the high levels of 12 months earlier, but still about 5 times their levels in December 2015, immediately before they started escalating. Similarly, wheat flour was

traded in December 2018 at about SSP 150/kg, a price similar to one year earlier, but still about five times its level in December 2015.

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



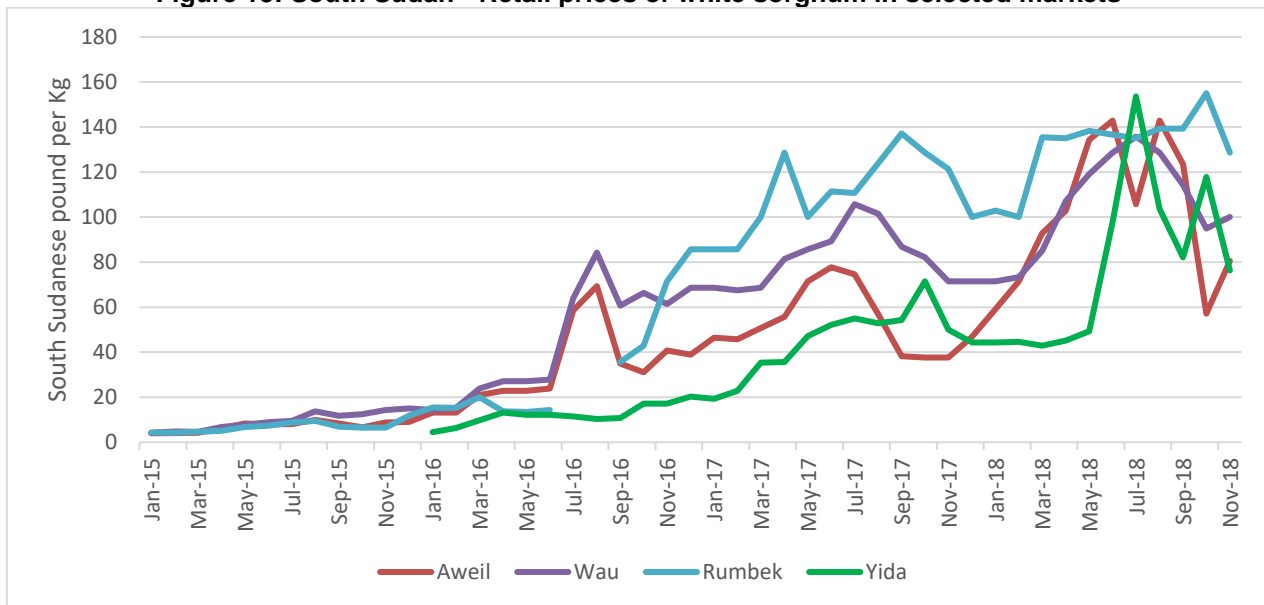
Source: South Sudan Crop and Livestock Market Information System.

Similarly, prices of groundnuts and cassava declined by 15-35 percent in the second semester of 2018. In December 2018, they were traded in Juba at SSP 300/kg and SSP 90/kg, respectively, 10 and 30 percent below their prices one year earlier, but still ten and four times their levels of December 2015.

Prices of sorghum started to surge in late 2015 also in other monitored markets across the country (see Figure 13), reaching record highs in July/August 2018. Subsequently, they declined in Aweil, Wau, Rumbek, and Yida markets by 10-35 percent between September and November with the 2018 harvest. Despite the recent declines, sorghum prices in November were at exceptionally high levels in several markets, up to twice their year-earlier levels and up to 20 times their levels of November 2015, severely constraining access to food for market-dependant households.

Food prices normally show a marked volatility and differ significantly among markets in the country, as a consequence of the poorly-developed road network, the high level of fuel prices and transport costs which include the economic losses due to the high risk of looting along the main roads. Most 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 become often impassable compromising 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 road blocks as well as increasing risks of looting.

Figure 13: South Sudan - Retail prices of white sorghum in selected markets



Source: WFP.

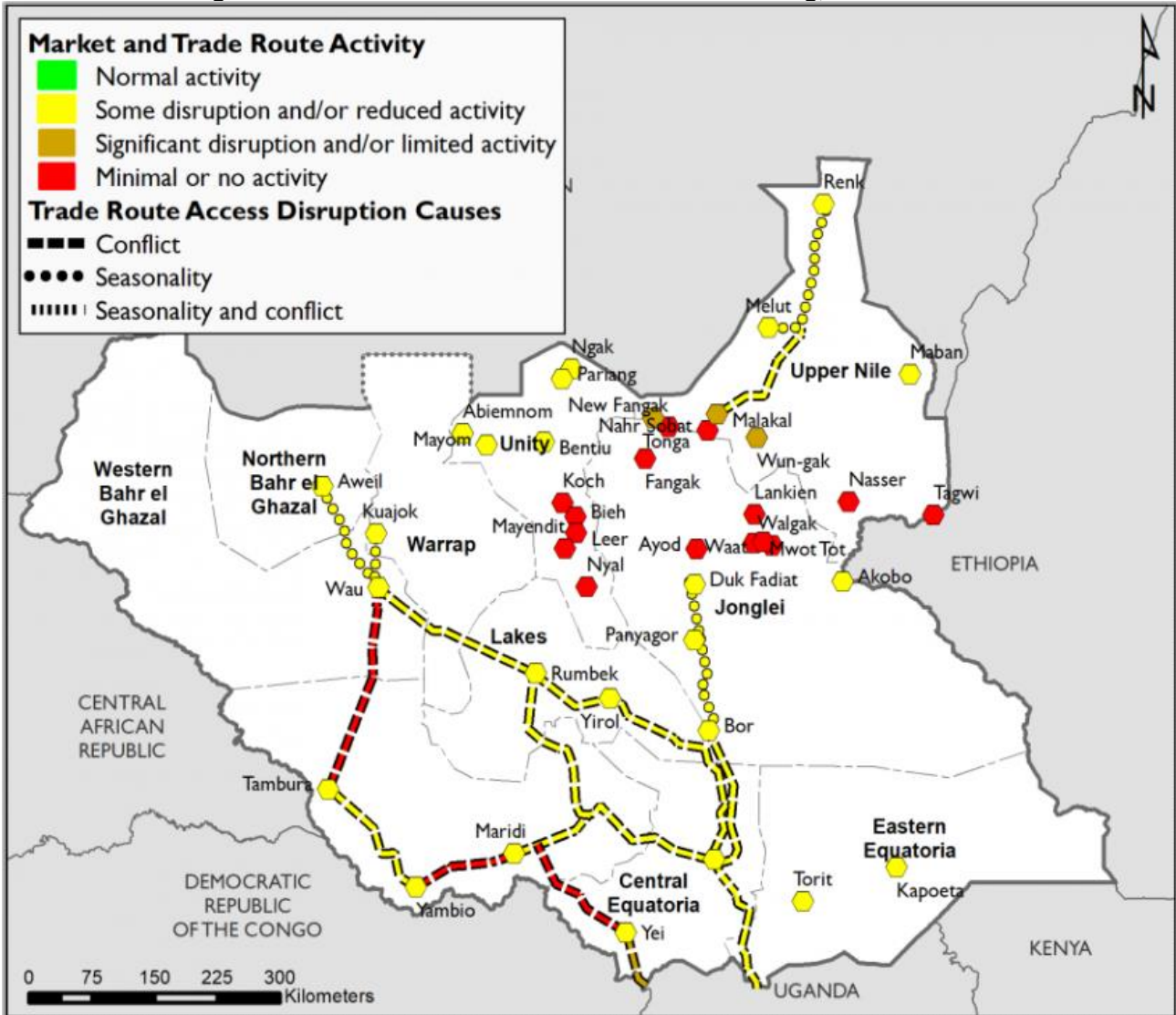
The intensification of the conflict since 2016 and its differential impact on various parts of the country further exacerbated price volatility and market fragmentation. For instance, as of November 2018, prices of 1 kg of sorghum varied from SSP 75-80 in Aweil and Yida, to SSP 100 in Wau, to about SSP 130 in Rumbek. 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 in 2018, especially in Juba, as the Government allowed private companies to import fuel. As a result, fuel prices declined in 2018 in several markets, and in November they were around or below their year-earlier levels in several markets, including the capital Juba. However, they remained at comparatively high levels, between 2 and 7 times higher than in November 2016. In addition, significant fuel price differentials remained across the country due to transport constraints and unavailability of adequate distribution facilities in several markets, with November prices of petrol varying from SSP 190 in Juba to SSP 230-285 in Torit, Bor and Wau, up to SSP 350-450 in Rumbek, Yida and Aweil.

Following the June peace talks and the decline in the number of security incidents, trade flows and market activities have improved in some areas in the second semester of 2018. Notably, improved security along the road between Nimule and Juba, a key trade route with Uganda, has resulted in increased imports of maize compared to early 2018 and 2017¹⁹. Improvement in trade flows and market functioning have been reported also in central parts of Unity State and in southern parts of Jonglei and Lakes states. In March 2018, the border with the Sudan has been opened to allow trade activities. However, prices of food imports from the Sudan have remained high, mainly due to the presence of multiple checkpoints along trade routes²⁰. Overall, despite some recent improvements, trade and marketing activities remain lower than their pre-conflict levels as insecurity still prevailing in several areas hinders transport and marketing of food items and households' physical access to the markets. In addition, uncertainty over a lasting improvement in the security situation seems to deter traders from investing in a long term expansion of activities.

¹⁹ FEWSNET, South Sudan Food Security Outlook, October 2018 to May 2019.

²⁰ WFP, Monthly Market Price Monitoring Bulletin, March 2018.

Figure 14: South Sudan - Market and trade functioning, October 2018

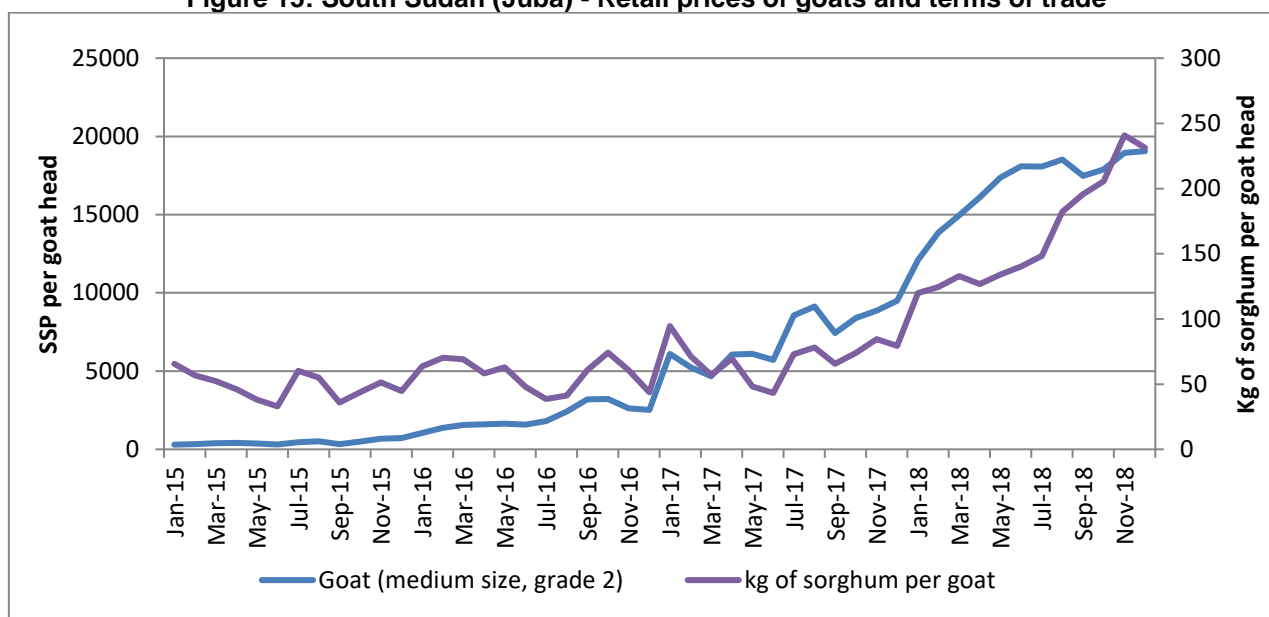


Source: FEWSNET.

As livestock is an integral part of local livelihoods, 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 hyper-inflation and insecurity-related market disruptions. In December 2018, prices of goats were at about SSP 20 000/head, twice their year-earlier levels, and eight times higher than 24 months earlier. Since mid-2017, prices of goats increased at faster rates than prices of sorghum, and terms of trade for pastoralists dramatically improved. In December 2018, in Juba, a goat was equivalent to about 230 kg of sorghum, almost three times the equivalent in sorghum 12 months earlier. However, considering the declines in household livestock assets due to widespread looting by warring factions²¹, these increases in terms of trades are unlikely to translate into solid food security improvements for pastoralist households.

²¹ According to data collected during the Food Security and Nutrition Monitoring System (FSNMS), 33 percent of households reported access to a milking cow in mid-2018, down by nearly half from 64 percent in mid-2014.

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



Source: South Sudan Crop and Livestock Market Information System.

The Terms of Trade of the average daily wage against white sorghum in Juba considerably improved in 2018, as a result of declining cereal prices coupled with increasing wage rates. In November 2018, the equivalent in sorghum of one day of casual labour was about 4.6 kg, almost 80 percent higher than 12 months earlier.

HOUSEHOLD FOOD SECURITY SITUATION

Methodology

This section looks at food security trends in South Sudan and how they relate to the agricultural production data presented in previous sections. The analysis is based on data from the FSNMS (Food Security and Nutrition Monitoring System) run by WFP and partners (FAO, UNICEF, NBS, MOAF, RRC and NGOs) which is a key input to the IPC analysis undertaken in January 2019.

The FSNMS was initiated in 2010 (then known as FSMS) and has established itself as the crucial source of information on the food security situation in South Sudan. Since 2016, the FSNMS is conducted twice per year: one round in July-August, at the peak of the lean season and in 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 2018), 711 clusters were selected with 12 households from each cluster, for a total sample of 8 378 households. So far, 23 rounds of data collection have taken place, providing a solid basis to distinguish the effects of seasonality from those of shocks.

Main drivers of food insecurity in 2019

Conflict in 2019 – Peace talks between key actors in the five-year long conflict that has affected South Sudan in mid-2018 have led to some improvements in the security situation in the second half of the year. Consolidation of these agreements into a viable peace process may signal the beginning of a turn-around in the country's food security status. A measure of peace in the productive areas of the Greenbelt and other main crop production areas would boost agricultural production and allow displaced populations to contribute to national food contribution. 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 2018 – In 2018, crop production decrease again, by 2.5 percent relative to the amounts produced in 2017. It is the smallest amount recorded since conflict began and 15.5 percent below the average of the last five years (see Section: Cereal production). This is mostly due to decreased yields arising from unfavourable weather conditions and presence of pests, in spite of a small increase in planted area. Improved production in North Bahr el Ghazal and Jonglei was not enough to offset large losses in Central Equatoria, Warrap and Upper Nile. This leads to a cereal deficit of just under 524 000 tonnes, worse than last year's

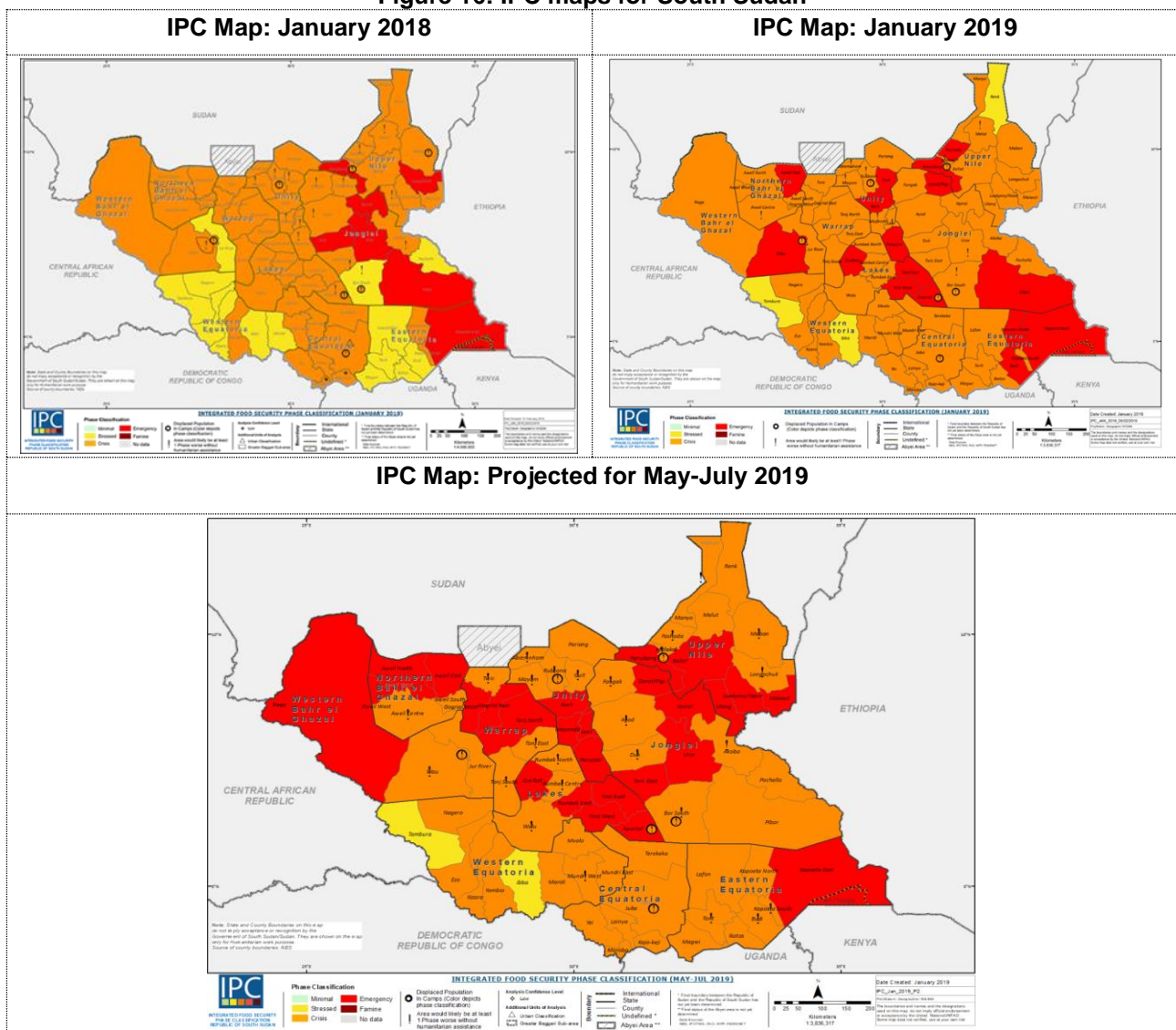
deficits of 468 000 tonnes. While Greater Upper Nile contributes 60 percent to the overall deficit, no region was able to post a significant surplus.

Market Prices – Trade flows into and out of the country remain disrupted, leading to problems in the supply of commodities to households and inflation remains fairly high. Although the new harvest lowered prices as usual, they remain higher than at the same time last year. For the coming months market prices will be dictated by competing influences of a possible enhanced stability and decreased insecurity, a record cereal deficit, and the macro-economic evolution. Improved economic access would be the most efficient driver for improved food security in the country.

Population Displacements: IDPs, Refugees – A major output of the conflict was the displacement of over 4 million people from which 1.98 million remain in country (the majority in the Greater Upper Nile region) and 2.18 million people fleeing into neighbouring countries (see Section: Population and population movements for details). In 2018, there was a first decrease in the number of refugees probably as a result of the first peace efforts.

Current and projected food security outcomes in 2019

Figure 16: IPC maps for South Sudan



In January 2019, an estimated 6.17 million people (54 percent of the population) were classified as facing (IPC Phase 3: “Crisis” levels of food insecurity or worse, a 13 percent increase compared to January 2018. The levels in January 2019 (the post-harvest period) offer only a modest improvement relative to those of September (lean season) - this implies that the recent harvest had only a small positive effect on the national food security situation. Coupled with the marked increase relative to the same time last year, this shows that food security in South Sudan is on a steadily worsening trend.

Table 10: South Sudan - Proportion of population in IPC Phase 3: “Crisis”, Phase 4: “Emergency” and Phase 5: “Catastrophe” in January 2018, September 2018 and projected for January-March 2019 (percent)

| State | Phase 3-5 January 2018 | Phase 3-5 September 2018 | Phase 3-5 January-March 2019 |
|-------------------------|---------------------------|-----------------------------|---------------------------------|
| Central Equatoria | 51.2 | 53.0 | 49.8 |
| Eastern Equatoria | 31.8 | 39.2 | 56.3 |
| Jonglei | 54.7 | 62.5 | 64.1 |
| Lakes | 41.4 | 73.2 | 60.6 |
| Northern Bahr el Ghazal | 54.6 | 53.9 | 56.5 |
| Unity | 54.4 | 71.3 | 67.8 |
| Upper Nile | 61.8 | 69.6 | 53.1 |
| Warrap | 47.5 | 52.9 | 40.5 |
| Western Bahr el Ghazal | 45.0 | 60.8 | 51.3 |
| Western Equatoria | 21.7 | 44.4 | 32.9 |
| Total | 48.0 | 58.6 | 54.1 |

Source: http://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/IPC_South%20Sudan_AFI_2019JanJuly.pdf

In early 2019, the highest proportions of population in IPC Phase 3: “Crisis” and higher are in Unity (67.8 percent), Jonglei (64.1 percent) and Lakes (60.6 percent). Only Western Equatoria and Warrap show proportions significantly below 50 percent. These proportions include up to 45 000 people that may be in Phase 5: “Catastrophe”, in specific areas of Jonglei, Lakes and Unity.

These proportions are expected to increase across the board towards the lean period (mid-2019). Projected proportions for May-July 2019 reach 60.3 percent of the population in IPC Phase 3: “Crisis” and higher, including a possible 50 000 people in Phase 5: “Catastrophe”. This is despite the planned humanitarian assistance, in the absence of which the figure would reach 67 percent. The worst affected populations are IDP and host communities in locations affected by the conflict.

These figures arise from the generalized spread of conflict and the continuing extreme staple food prices interacting with heavy market dependence by rural populations. Generalized insecurity and adverse economic circumstances lead to continuing disruption of commodity trade flows and the spread of critical humanitarian conditions into areas not directly involved in major conflict.

Evolution of the food security situation

The FSNMS surveys use the 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:

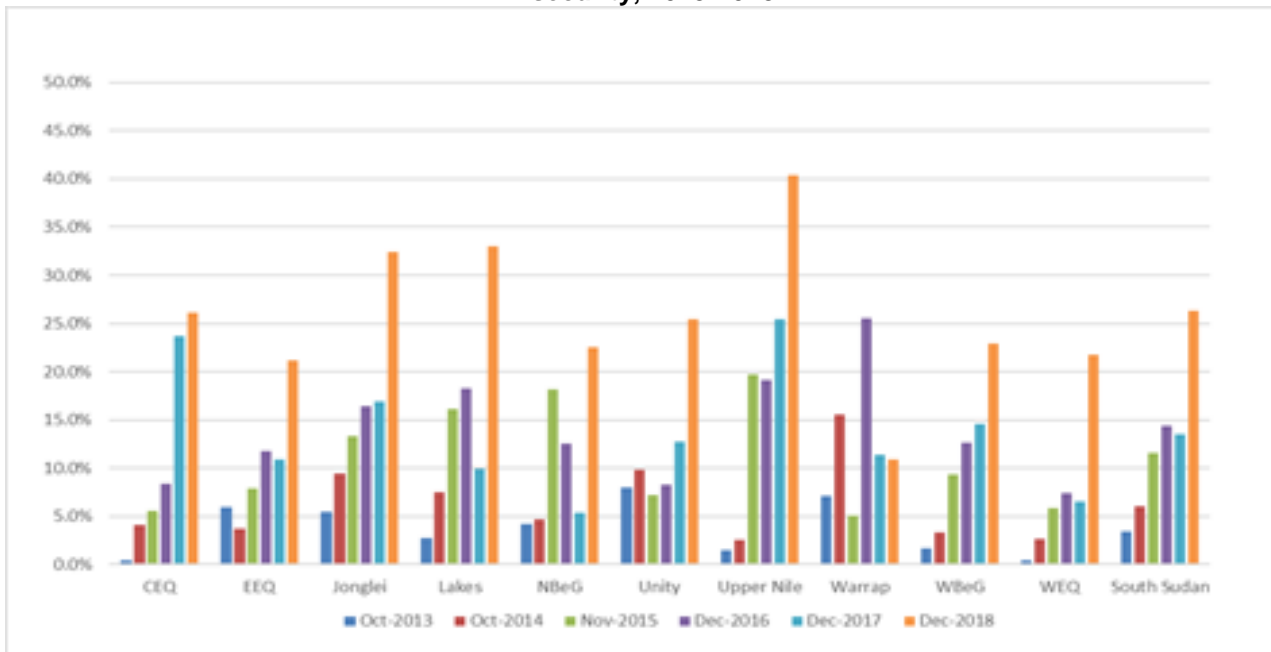
1. Food consumption, measured by the Food Consumption Score, based on dietary diversity and food frequency.
2. The share of household expenditure on food.
3. The type/degree of livelihood coping strategies employed by households.

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

Figure 17: South Sudan - Food security status around harvest time (October-December), 2014-2018



Figure 18: South Sudan - State level harvest time severe food insecurity, 2013-2018



Food insecurity (severely plus moderately food insecure) in South Sudan has been increasing from the 30 or so percent typically verified before generalized conflict took hold. In early 2016, as conflict spilled into the more populated areas of the greater Equatoria and the Greater Bahr el Ghazal regions, against a backdrop of a severe macro-economic crisis and hyperinflation, the proportion of food insecure population increased significantly from 49 percent in late 2015 to 70 percent in mid-2016, values which broadly held throughout 2017.

The situation worsened in 2018: while the overall levels of food insecurity remained at about 75 percent, the proportion of severely food insecure rose to record levels - 30 percent in mid-2018, 6 percent higher than at the same time in the previous year. As expected, severe food insecurity decreased slightly (to 26 percent) at the end of the year due to the impact of the new harvests, but this value is still the highest ever seen during a post-harvest period and is higher than during the 2017 lean season.

This increase in severe food insecurity to record levels during the post-harvest period of late 2018 is general across most of the country with the exception of Warrap. In many states, severe food insecurity increased several fold (Jonglei, Lakes, North Bahr el Ghazal, Unity, West Bahr el Ghazal, Western Equatoria), even in places where it had improved or stabilized in 2017.

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.

Figure 19: South Sudan - Relative importance of different sources of cereals and roots consumed by households, June 2016-December 2018

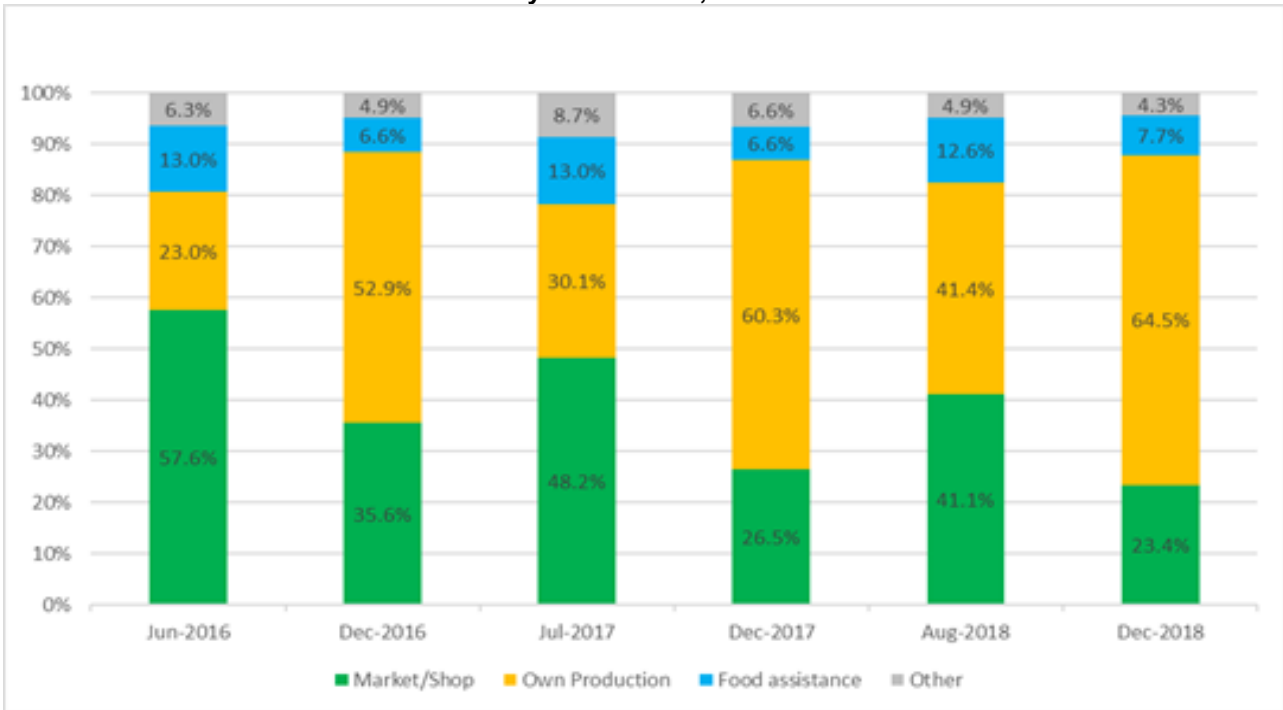
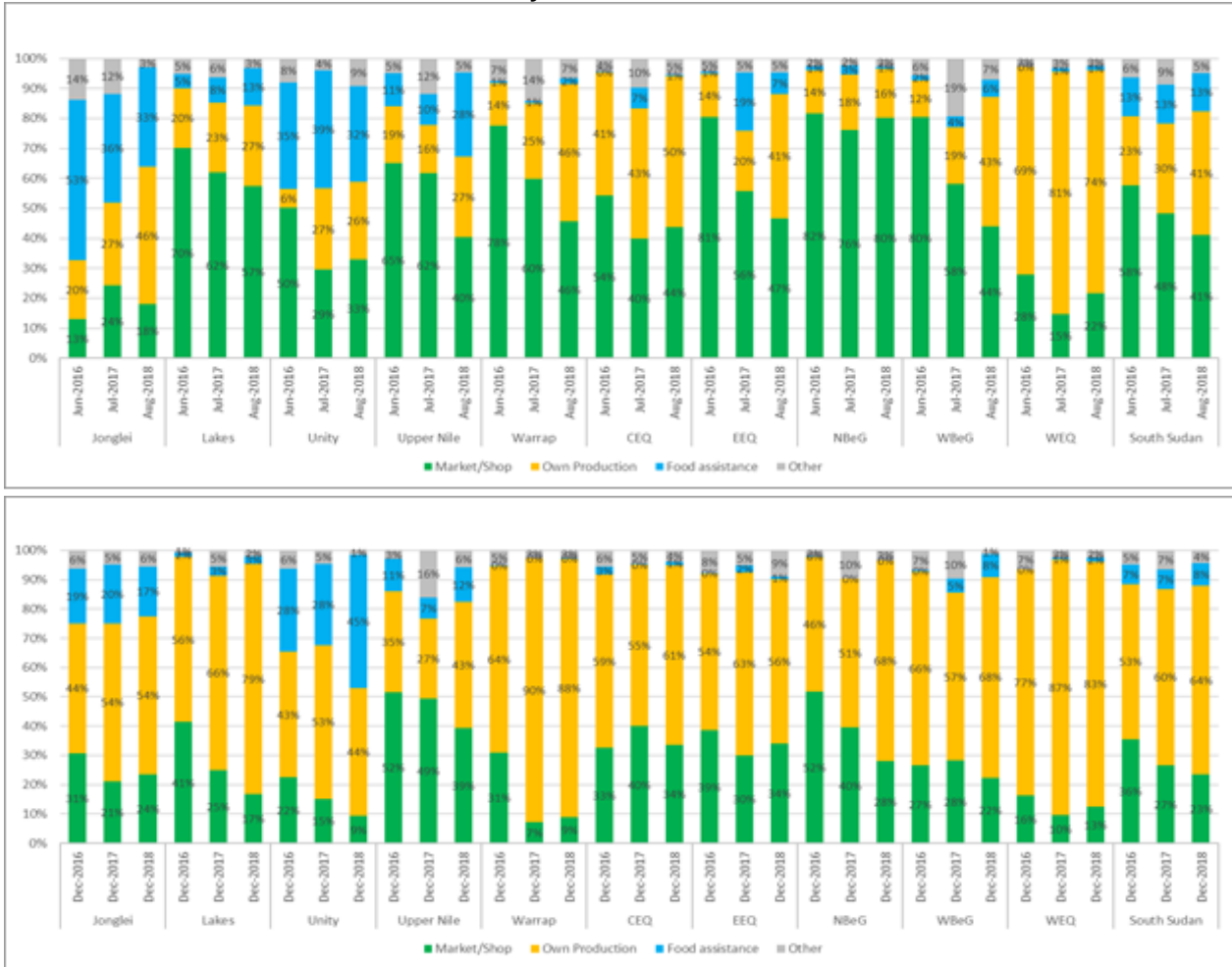


Figure 20: State level relative importance of different sources of cereals and roots consumed by South Sudan households



The analysis focuses on the sources of cereals and roots consumed by 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 markets. Dairy products arise from own production only in states where livestock has a significant presence (Unity, Warrap, East Equatoria and, to a lesser degree, Jonglei).

Figure 19 shows the contribution of the four sources of cereal and roots to household consumption 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 on-going harvest; away from this period, dependence on markets increases and reaches a peak mid-way through the year (June-July, 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 households in the lean period. This pattern has not changed since data collection began in spite of conflict and displacement.

Food assistance became a noticeable contribution at the national aggregate level after the conflict started and agencies scaled up their assistance. It is now the main supplier of staples for about 13 percent of the households nationally during the lean period and 7 to 8 percent around harvest time. While food assistance contribution used to be significant only in the three original conflict states (Upper Nile, Jonglei and Unity) it has since become relevant elsewhere during the lean period (see values for the Great Equatoria regions and Lakes in Figure 20).

At country level in 2018, the dependency on markets decreased relative to 2017, both at harvest period (23 percent down from 27 percent) and in the lean period (41 percent down from 48 percent), continuing the tendency from 2016. At harvest period, the decrease is more pronounced for North Bahr el Ghazal, Lakes and

Upper Nile, while during the lean period, the decrease takes place mostly in West Bahr el Ghazal, East Equatoria, Warrap, Lakes and Upper Nile.

The decrease in market dependence needs to be judged against a backdrop of stagnated crop production, large cereal deficits and record cereal prices in mid-2018. These rule out a favourable reason for the decline (such as increased own crop production) and may signal instead extreme difficulty in obtaining staple foods from regular market supply, be it from commodity flow disruption or extreme prices. Food assistance might be considered if it had absorbed some of the market dominance, but it is not important enough and has not varied much from one year to the next.

Indeed, we have seen increases in severe food insecurity (CARI) which arises from increases in food expenditure and increased coping capacities involving caloric reduction (see next sections).

Note that in spite of a decrease in the dominance of markets as main suppliers of household staples, they remain the most important source of household cereals and roots – the exceptions are in the states where food assistance has filled the gaps arising from lack of supply and economic access by households. Therefore, rural households are highly exposed to price shocks during the lean period. The current situation is characterized by very high market prices and inflationary pressures and it provides pessimistic perspectives for the food security status of local population.

Food expenditure: Recent patterns and at-harvest situation

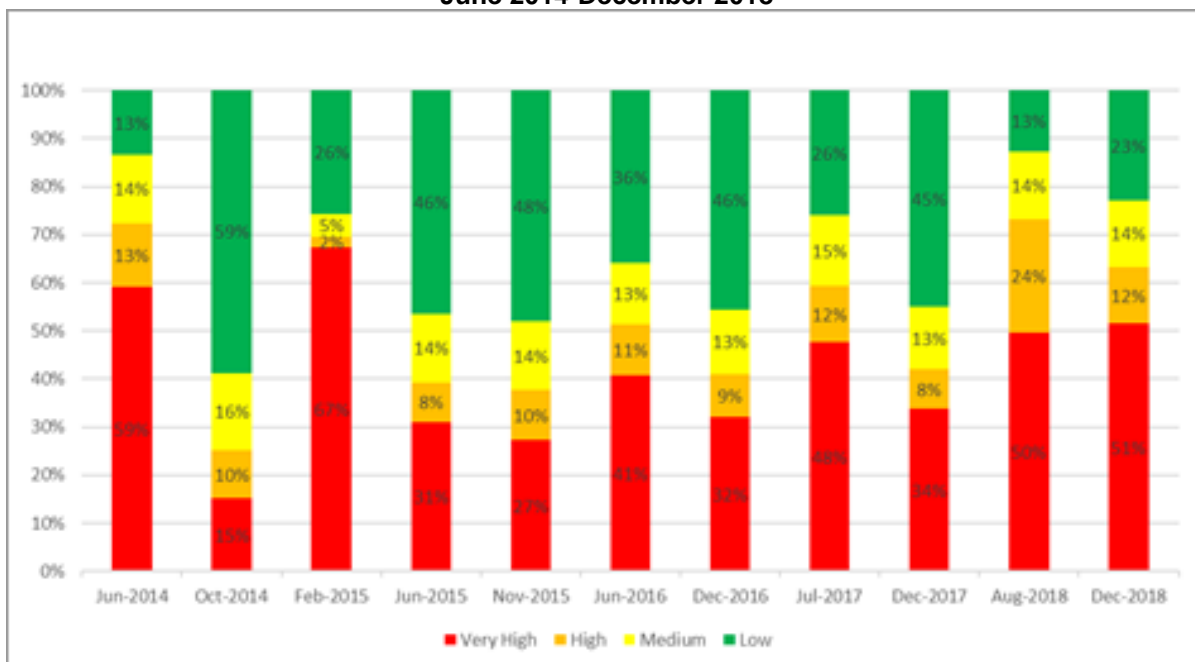
Households in South Sudan spend a large proportion of their incomes on food. Household incomes are very meagre and primarily spent on food since crop production will not cover all the requirements which have to be sourced from markets in a context of very high food prices and rampant inflation. Households with high expenditure on food are more vulnerable to market price rises as they have a narrower band of income to absorb 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 percent and 75 percent of expenditure allocated to food.
- Medium food expenditure: between 50 percent and 65 percent of expenditure allocated to food.
- Low food expenditure: less than 50 percent of expenditure allocated to food.

Figure 21 shows the national level proportion of households in each food expenditure class and its variation from June 2014 to December 2018.

Figure 21: South Sudan - Proportion of households in food expenditure class, June 2014-December 2018



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

The impact of the conflict on the supply of food and other commodities to local markets led to a sharp increase in overall food expenditure levels in mid-2014 and early-2015, when the national level proportion of households with high and very high food expenditure reached an all-time high of 69 percent.

After a brief stabilization after this crisis in mid-2015, there has been a steady worsening of the situation with a clear increase in the food expenditure rates: the proportion of very high and high expenditure on food in the lean period (July-August) increased from 39 percent in mid-2015 to 74 percent in mid-2018. While harvest time extreme food expenditure rates showed little variation until 2017, they increased sharply in 2018, reaching 64 percent in December 2018 (up from 42 percent in December 2017). Particularly worrying are very high food expenditure rates of 52 percent in December 2018, the highest ever since the early 2015 record and above those of the lean period of 2018.

As far as the state level picture is concerned, the highest proportions of high and very high food expenditure in December 2018 are registered in Upper Nile, the Bahr el Ghazal regions, Warrap and Jonglei. The Equatoria region registered the lowest rates. However, irrespective of the sub-national distribution, all states registered a worsening in the food expenditure situation compared with December 2017.

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 2015, there was a modest improvement in 2016 and 2017, particularly in the more intense coping options (reducing adult consumption and eating fewer meals). However, the 2018 harvest period saw a worsening of the coping situation, with the improvements of 2017 being wiped out and the value returning or exceeding the 2016 values. In fact, proportions of coping in late 2018 are higher than those during the preceding lean period of mid-2018.

Figure 22: South Sudan - National prevalence of coping strategies involving decreases in food intake, 2013-2018

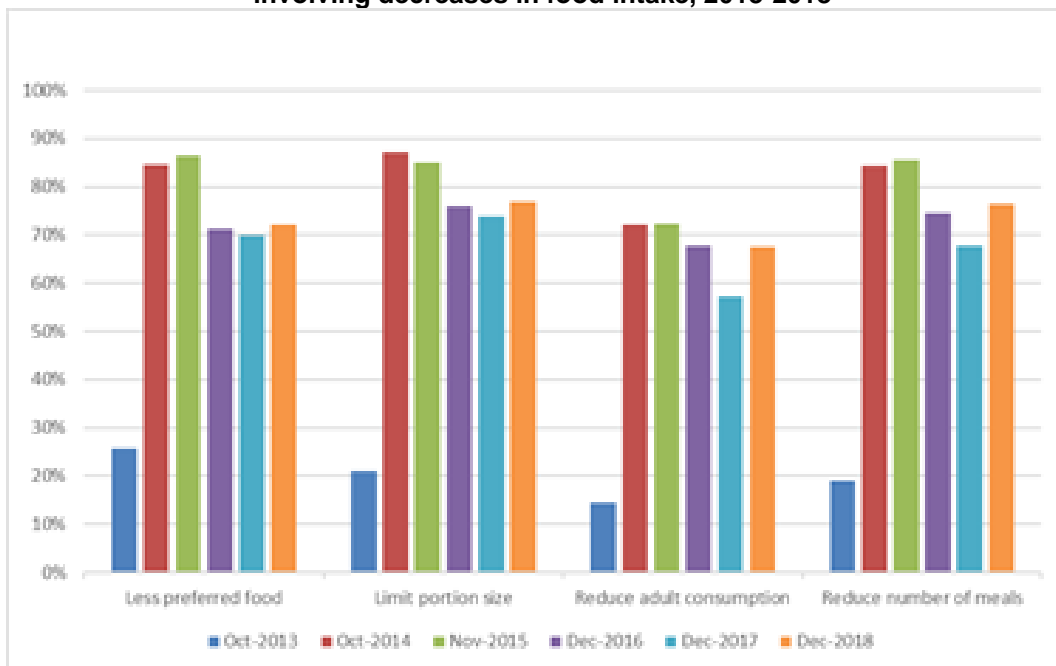
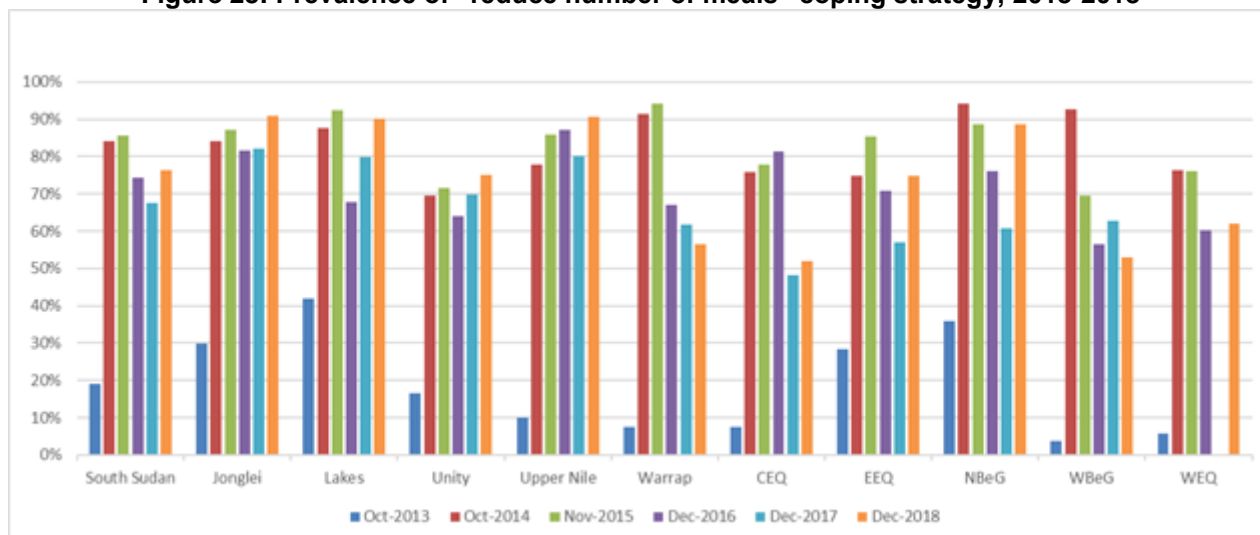


Figure 23: Prevalence of “reduce number of meals” coping strategy, 2013-2018



The worsening in the coping situation is general across the country, except for a modest improvement in Warrap. The most acute situations (where coping at harvest period increased relative to the preceding lean period) can be found in Jonglei, Upper Nile, East Equatoria and North Bahr el Ghazal.

Estimated food assistance requirements in 2019

WFP plans to assist 5.4 million people in South Sudan in 2019 with 325 000 tonnes of food assistance. The distribution per state is specified in Table 11. Note that these numbers include refugees and nutrition support activities.

Table 11: South Sudan - Estimated food assistance requirements based on operational plan, 2018

| State | Unique beneficiaries | Total requirement (tonnes) |
|----------------------|-------------------------|----------------------------|
| Central Equatoria | 330 195 | 11 366 |
| Eastern Equatoria | 352 758 | 19 982 |
| Jonglei | 739 181 | 63 694 |
| Lakes | 627 975 | 25 518 |
| North Bahr el Ghazal | 577 377 | 29 453 |
| Unity | 1 196 978 ^{1/} | 87 855 |
| Upper Nile State | 746 810 | 53 257 |
| Warrap | 403 126 | 15 213 |
| West Bahr el Ghazal | 220 746 | 12 705 |
| Western Equatoria | 222 970 | 5 974 |
| Total | 5 418 115 | 325 017 |

1/ Including refugees.

RECOMMENDATIONS FOR 2019

Generally, the country experienced a period of relative calm from 2011-2013 after gaining independence. However, in December 2013 the civil war broke out increasing the conflict events in early 2014, mostly in the greater Upper Nile region (Upper Nile, Unity and Jonglei states). The resurgence of internal conflicts in 2016 led to a rapid spread of violence to other previously non-affected areas. Frequent incidences of conflict have been reported in several areas since then, mainly battles between actors and violence against civilians. Reports of resource-based conflict, though minimal, is also affecting livelihoods seriously. The conflicts have displaced millions of people from their homesteads into Protection of Civilian (POCs), and others have fled the country as refugees into neighbouring countries. The number of displaced people (internally and outside the country) exceeds 4.5 million. With the signing of the Peace Agreement in November 2018, it is anticipated that conflicts will decline. While conflict incidences are widespread, there is a notable concentration in some states, some of which are characterized by high food insecurity. The conflict exacerbates food insecurity and vulnerability through restricted access to markets and disruption of livelihoods, limits access to agricultural/grazing fields, constrains supply of goods and services, and restricts people in need from accessing areas where they can get assistance. Similarly, attacks on aid workers pose a serious challenge to

humanitarian access for provision of humanitarian assistance. All these factors bear negatively on food security and nutrition by increasing vulnerability among the affected population.

The cessation of all hostilities and the implementation of the Peace Agreement is the primary recommendation to progress in terms of agricultural development and improving food security.

While understanding the complexity of the prevailing situation during the process of reconciliation and peace-building, the following recommendations are made with the hopes that the national peace deal is sustained 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 2019 it is recommended to:

- Provide seeds and tools (farm inputs) to stimulate production deficit to former surplus levels in the more productive and stable counties.
- Maintain support to small scale subsistence producers (often the pastoral/ agro-pastoral areas) in less agricultural productive locations.
- Provide support to the 2019 cereal production by timely provision of agricultural inputs and seed fairs, together with the necessary technological packages and farmers' training/orientation.
- In addition to the provision of seeds and tools through emergency projects, also focus on supporting targeted farmers to use improved cultural practices like good land preparation, proper weeding, *Striga* weed control techniques, integrated pest management and soil fertility maintenance practices, among others. Develop a strategy to minimize the impact of some problems like *Striga* weed that seriously reduce the productivity of sorghum, which is the main staple food crop in the country.
- Strengthen extension support to farmers to use improved production technologies and thereby increase agricultural productivity.
- One of the main constraints reported by Task Force teams is poor plant population and patchy fields resulting from dry spells and/ or poor germination of seeds. In order to mitigate this it is advisable to promote of sorghum transplanting technologies through establishing small group/ family-based sorghum nurseries, from which seedlings can be used for replanting or gap filling whenever rains are available, even after the planting window is over.
- Address the main challenges of the FAW damage, the magnitude of which is expected to increase annually, in case of favourable seasons for the FAW infestation.
- Provide coordinated support to the people returning to some conflict-affected areas to reconstruct their livelihood systems by facilitating their access to land and agricultural inputs, while ensuring adequate food assistance to meet their short-term needs.
- Strengthen farmer and pastoral field schools to support the adoption and utilization of sustainable agro-pastoral production systems.
- Continue improving crop assessment tools and methodology, with particular emphasis on strengthening the assessment skills of agricultural officers at county level by broadening the involvement of local Government officers and NGOs in the annual crop assessment and seasonal monitoring exercise and by providing them with specific training.
- While strengthening the county-based County, there is a need for establishing strong linkages between the counties and SMOAs, and also the states with national Task Forces (MAFS and NBS).
- Make efforts to disaggregate data on crop areas and production, by individual crops rather than the aggregated figures provided by the CFSAM up to now. The current status of the Task Force teams and the Crop Monitoring Committees could provide these and the related cropping pattern-related information, if the necessary quality control work is done starting from the beginning of the 2019 season.

Livestock

- Expand animal health interventions. In particular: (1) train community animal health workers and allow them to move freely in order to discharge their duties in all states; (2) review the vaccination programme in regard to its effectiveness; (3) support access to veterinary drugs and supplies; (4) promote value addition activities, including improved fodder production, peri-urban smallholder milk production working with producer groups and women's groups; (5) support backyard poultry production.
- Re-establish the 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 herding groups.
- Establish a livestock information system to monitor key indicators, including animal production, productivity, marketing, movements and health.

Markets

- Provide livelihood support through improved market access.
- Closely monitor food stocks and trade behaviours in the main markets and facilitate the distribution of food from surplus to deficit areas, taking into consideration local market dynamics, as well as along the main corridors for both commercial and humanitarian commodities.
- Maintain and strengthen the market and price monitoring system in order to inform about food availability and price situations in different markets across the country and allow timely interventions.
- Expand the use of Cash-Based Transfers (CBTs) in the areas where markets are functioning to encourage supply and greater market stability through demand side stimulation.
- Promote livestock trade and improve access to livestock markets, including in cross-border areas.

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 Unity, Upper Nile and Lakes. Given the high cereal deficit and localized insecurity in some parts of Great Equatoria, the level of household food insecurity is likely to be higher than in 2018. Thus scaled up efforts are required to support populations most in need of assistance. Assistance, where appropriate, should be provided through Food-For-Assets interventions and agriculture-based livelihood support programmes as these activities could provide opportunities to rehabilitate livelihoods and strengthen coping mechanisms. The design and implementation of food assistance activities should take into consideration an in-depth analysis of local contexts: Cash-Based Transfers should be carried out in locations where markets are functional with assured food availability and on farm surpluses, subject to close attention to seasonality and price fluctuations. Considering a winding down of hostilities following the implementation of the Peace Agreement, livelihood re-building interventions and specific assistance to returnees need to be considered. In areas needing food assistance and where the above-mentioned conditions are not satisfied, in-kind assistance should be considered.
- Encourage the design and implementation of multi-sectorial interventions: both through conditional and unconditional modalities and explore market-based transfers in areas where the markets are properly functioning to address households' food insecurity as well as support the local economy.
- Provide context-appropriate emergency livelihood support for food insecure and displaced households in conflict-affected areas by delivering vegetable seeds and fishing kits.
- Improve access to micro-nutrient and protein-rich food through the use of nutrition vouchers to be traded against locally-sourced vegetables, fish and milk.
- Integrate a nutrition education component (infant and young child feeding) in the food security interventions (General Food Distribution, Framework for Assets, Cash-Based Transfers).
- Refine a prioritization matrix for the identification of locations for food security and nutrition response in the conflict-affected states to include, when feasible, available screening data on maternal nutrition.
- Continuously monitor food security and nutrition conditions, especially in conflict-affected areas, in order to periodically fine-tune the humanitarian emergency strategy and response.
- Strengthen early warning systems by improving the monitoring of rainfall and cropping conditions along the season. Promote the application of Sentinel-2 data to country scale crop type mapping. This should involve: i) monitoring the 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.

South Sudan - Indicative seasonal cropping calendar

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

Note: Recent changes are blurring the divisions.

Recommendations for strengthening Roadmap and CCMCs, 2019:

- The estimation of planted areas in the mechanized sector requires a satellite based estimation due to the difficulty of measuring areas by Task Force 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 NGO 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 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/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-EU project*, **ONLY** where suitable levels of competence and integrity have been demonstrated. This means adjusting the role of the National Task Force 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 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 area, 2018

GREATER EQUATORIA

Western Equatoria

In the 2018 cropping season, a total of six short missions, consisting of 3-6 members of the Task Force were conducted. Since most areas lie in bimodal rainfall areas of the Green Belt, 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 from 16-30 May, visiting Yambio and Nzara counties, and second one from 29 May-4 June, visiting Mundri East and Mundri West counties. These were followed by two harvest assessment missions, from 17-27 August to Yambio, Nzara and Tambura counties, and the second from 25-31 August to Mundri West and Mundri East counties. The final two missions to assess the second season harvest were conducted from 17-24 November, visiting, Tambura, Ibba, Nzara, Mundri West and Mvolo counties. In all the six missions, 198 case studies were performed in Western Equatoria (178 farmer interviews and 20 key informants).

All reports of the Task Force Team confirmed that rainfall over most cropping areas started in March and April in Yambio, Nzara and Tambura. Subsequently, a short dry spell in May affected groundnuts, resulting in a poor formation of pods. Prolonged dry spells in July affected the planting of second season maize in some areas, but its impact was not as severe as in neighbouring Central and Eastern Equatoria. The precipitations received were generally favourable in terms of amount and distribution in most areas, while some counties including Mundri East and Mvolo were affected by prolonged dry spells and below-average rainfall. With the exception of groundnuts, yields of the other crops including maize were better than last year. Yields of the second season crops were lower than the first season due to the July dry spell and an early cessation of rains in early November in some areas. However, the overall performance of the cropping season in the state is good and comparable to last year. There were no reported access constraints of land in the visited counties except in some areas, where far fields are not safe. Most respondents in the visited counties indicated a slight increase in cultivated area compared to last year due to an improved security situation and high market prices encouraging farmers. 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 variety of fruits. Task Force and CCMC reports have confirmed that the area planted to rice and cassava is increasing annually.

Hand tools were sourced mainly from the market with some distribution from the Star Trust Organization in Yambio County (hoes, axes and *pangas*). There are seven functional tractors in the State, including four in Yambio and three in Tambura counties. There is no use of ox-ploughs in the State and almost all of the required labour originates from families and communal labour.

FAW infestations were rampant during the first and second season in the maize growing areas of the state, and higher infestation levels were reported during the second season. The most prevalent pests during the season were, snails, wild pigs, monkeys, porcupines, rats, termites, green grasshoppers, local birds, sorghum midges and stem borer, and the damage levels were mild to average and varies from place to place. Since chemical pesticides are not used in these areas, farmers have resorted to traditional pest control measures for FAW using extracts of a plant species known as *babashiro* (*Chromolaena odorata*), mixed with hot pepper and powder soap. However, wider use of this plant as natural pesticide requires further research and a well-designed protocol before expansion. On the other hand, *babashiro* is a notorious weed noted to be expanding and causing concern to the farmers.

Growing conditions

Figure A2-1 shows combined rainfall estimates and vegetation index graphs for six locations selected across Western Equatoria State (Tambura, Yambio, Ibba, Maridi, Mundri West and Ezo). The figures show normal to slightly below-normal rainfall and above average vegetation cover (NDVI) until about the first

dekad of June, followed by near-average rains and vegetation conditions up to the end of October 2018. However, the NDVI has declined to below-average levels in November and December, indicating less favourable conditions for long cycle crops.

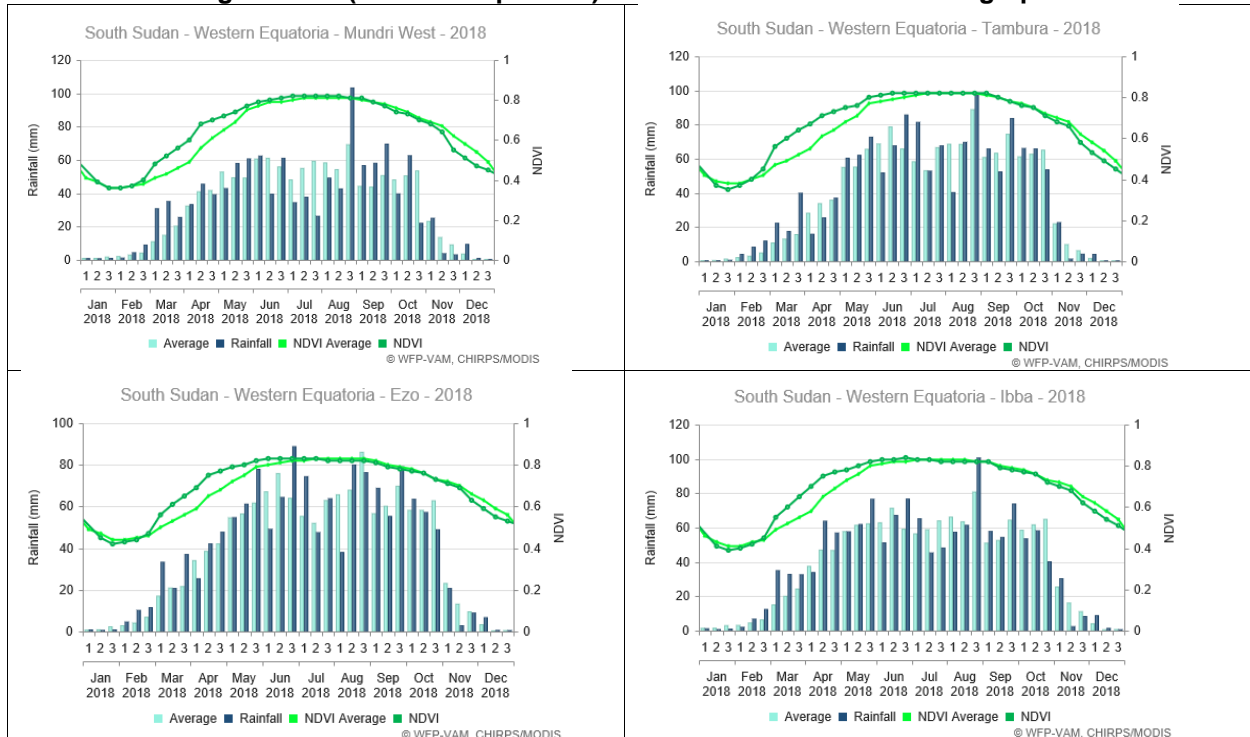
The seeds used are mostly farmers' own seeds carried over from the previous harvest or purchased in the local markets. Of the other crops, cassava is grown throughout the Greenbelt, covering about 17 percent of the total crop area in Western Equatoria and serves as a safety net to the community. Groundnut is also an important crop covering an estimated 13 percent of the total cropped area in the state.

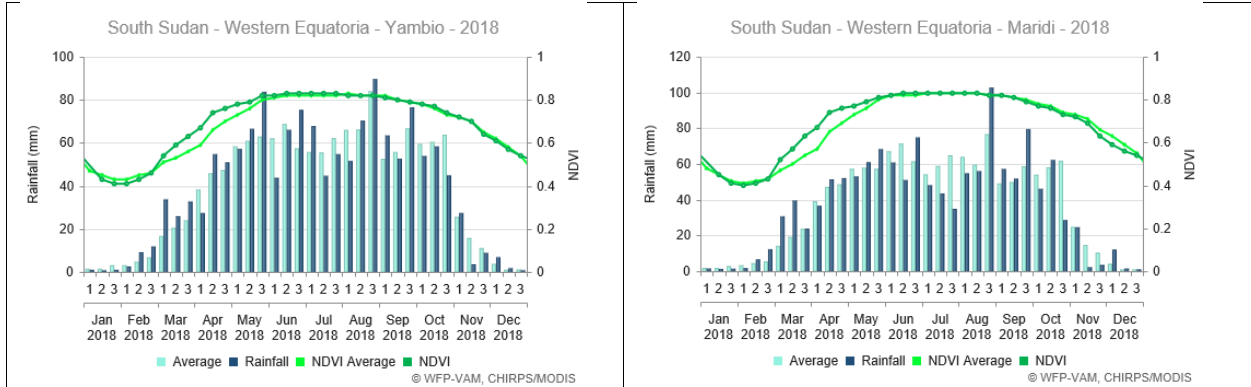
Production

Production estimates have been made based on time-series information, adjusted downwards due to insecurity. Cereal yields are estimated at an average 1.3 tonnes/hectare for all cereals and both harvests, slightly lower than the previous year's level of 1.36 tonnes/hectare. The slight decrease in yield is due to erratic rainfall and the July dry spells, especially in Mvolo, Mundri East and West, and FAW. However, the overall harvested area for the State increased by about 8 percent due to an increase in Ibba, Mundri West, Yambio, Nagero and Tambura as both the number of farming households and the area planted per household were higher than last year due to an improved security situation. Consequently, the gross cereal production from all the harvests is estimated at 142 584 tonnes, slightly higher than last year's low level of 137 898 tonnes, with a small deficit of about 590 tonnes.

The contribution of cassava to households' food consumption at State level is significant and the area covered by cassava is higher than previous estimations mainly because of a detailed assessment methodology used by CCMCs and Task Forces, at county level, this year. Assuming all second year crops are harvested, around 167 400 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 13 350 tonnes of gross dry matter (unshelled).

Figure A2-1 (Western Equatoria) - Seasonal Rainfall and NDVI graphs





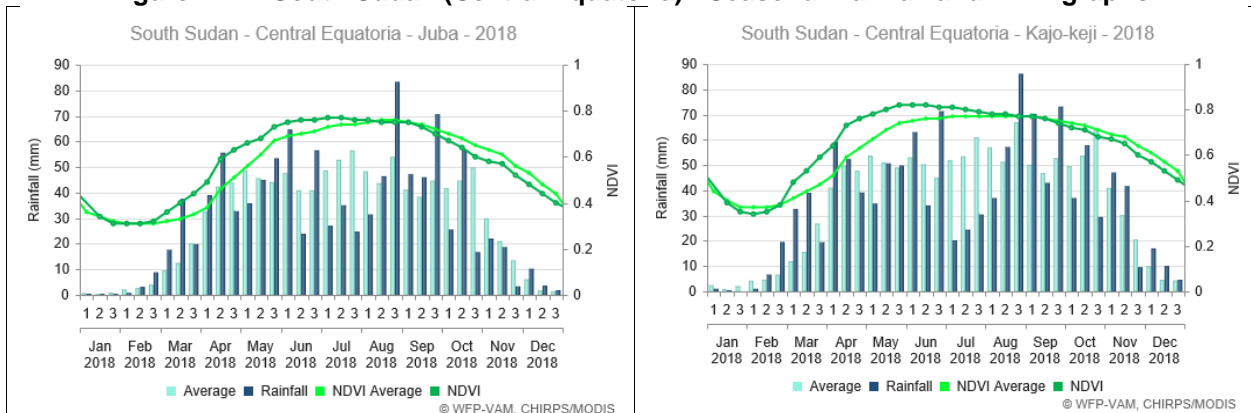
Source: WFP/VAM, 2018.

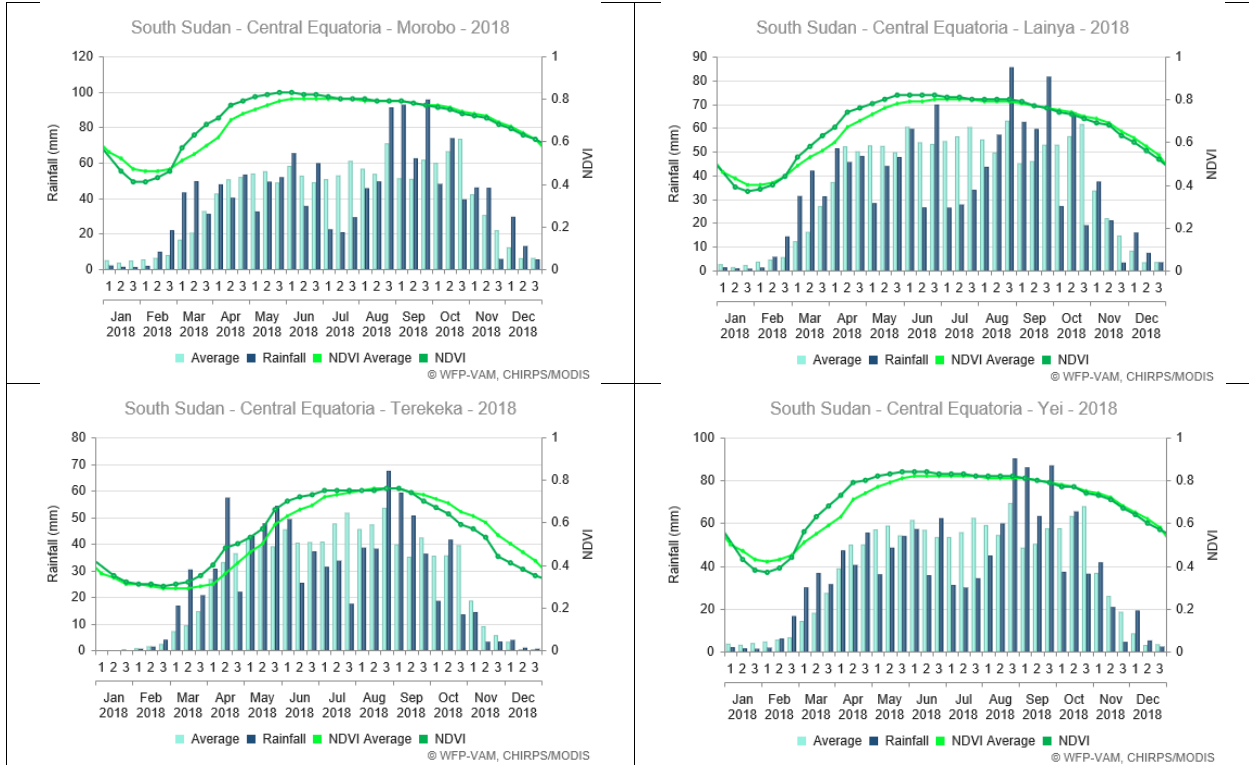
The livestock numbers in the State are very small (mostly small ruminants) compared to other states. Livestock rearing is practised only in northeastern counties of the State, while the forested zones that dominate the remaining counties are largely unsuitable for livestock due to *tse-tse* infestation. However, the number of animals, particularly shoats is reported to be increasing annually. The PET BCS is 4 for shoats and 3 for cattle, due to normal availability of pasture and water in most places. As usual, damage to standing crops caused by intruding cattle from the bordering Terekeka County and Lakes State (Yirol and Rumbek) was reported in parts of Mundri and Mvolo counties, respectively.

Central Equatoria

In 2018, the Task Force teams undertook five missions to Central Equatoria State, including three missions to assess planting of first season crops and two harvest assessment missions, compared to only two missions conducted last year. Planting assessments of first season crops were conducted during the second half of May 2017, covering Yei, Terekeka and Juba. The first harvest assessment mission was conducted from August 16 to September 3, 2018 to assess the yields of the first season crops and the progress of second season planting. This Mission covered Yei, Lainya, Terekeka and Juba counties and involved 107 interviews/case studies (102 farmers and five key informants). The second season harvest assessment was carried out from 20 to 27 November 2018 and covered only Yei and Lainya counties, with 36 case studies (33 farmers and 3 key informants) as it was not possible for the Task Force teams to travel and conduct assessments in Morobo, Kajo Keji, Yei River and Lainya counties due to widespread insecurity. The continued deterioration of security situation in Morobo and Kajo Keji did not allow the teams to travel to these areas in 2018 as well. In addition, the previously established CCMCs, except in Juba and Lainya counties, are not functional due to the displacement of all the members from these locations. As a result, information from these areas was 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.

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





Source: WFP/VAM, 2018.

Growing conditions

Combined rainfall estimates and vegetation index graphs are shown in Figure A2-2 for six locations selected across Central Equatoria State (Terekeka, Juba, Lainya, Kajo Keji, Yei and Morobo counties). Seasonal rains had a delayed onset and there were prolonged dry spells in May, which necessitated multiple replanting of cereal crops in several areas. After the improved rains in June, dry spells in July that extended up to August in some areas severely affected first season maize and sorghum crops at flowering and maturing stage. Furthermore, harvesting time of the first season cereal crops and planting of the second season crops were delayed due to inadequate moisture. Figure A2-2 shows the severe dry spells across all the counties of Central Equatoria. The vegetation conditions in most areas were above- average up to the end of June, subsequently declining to below-average levels.

Weeds, pests and diseases have remained at mild levels, with the exception of FAW, which has infested maize fields, with unknown magnitude of damage. However, the most common pests reported are stalk-borers (attacking sorghum and maize), local birds, termites, grasshoppers and rodents and weeds. *Striga* weed is noted to be of concern to farmers in areas dominated by mono-cropping of sorghum, with no rotation, especially in Terekeka County.

Production

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

Like that of last year, crop production was severely constrained by severe insecurity resulting in large-scale displacement of the farming population. The total area cultivated by farmers in 2018 has decreased for the second consecutive year, declining by 5.6 percent from the already very low area of the previous year, and the gross production for 2018 is estimated at 61 141 tonnes, about 22 percent down from the previous year. As a result, the net cereal deficit is forecast to increase in 2019 to about 92 000 tonnes from about 74 000

tonnes in 2018. If all second year crops (cassava) are harvested, around 72 300 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 9 100 tonnes of gross dry matter (unshelled).

Livestock movement in Central Equatoria is seasonally practiced by pastoralists from Terekeka 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 lower than last year, due to the below-average and erratically distributed rains. The PET BCS for goats was 3, while that of cattle was 2-3. There were no reports of disease outbreaks, except the normal appearance of endemic diseases including CCP, FMD, PPR, CBPP, mange, fowl pox, and internal and external parasites.

Eastern Equatoria

The Task Force teams undertook five short missions (two at planting time and three at harvest time) to Eastern Equatoria. The two planting assessment missions took place simultaneously between May 28 and June 2018, with the first team covering Lopa/Lafon, Ikwoto and Magwi counties and the Pageri Area, and the second team assessing the Greater Kapoeta region (Kapoeta South, Kapoeta East, Kapoeta North and Budi counties). In Lopa/Lafon, Ikwoto, Magwi and Pageri (a largely bimodal area), the first and second season harvest assessments were carried out from 15 to 23 August and 16 to 23 November 2018, respectively, while the harvest assessment in the Greater Kapoeta region (a unimodal rainfall area) was carried out from 18 to 26 September 2018. Overall, the missions conducted 299 interviews/case studies (278 farmers and 21 key informants), compared to 121 case studies (114 farmers and seven key informants) conducted in 2017.

Growing conditions

Combined rainfall estimates and vegetation index graphs for six locations selected across Eastern Equatoria State (Budi, Ikotos, Lafon, Torit, Kapoeta North and East) are shown in Figure A2-3. In all six counties, remote sensing data indicates erratic rainfall and below-average vegetation conditions during most of the growing season. At the beginning of the season, up to the third dekad of June, the rainfall was average over several cropping areas, at least, resulting in above-average vegetation conditions throughout Eastern Equatoria State. Subsequently, dry spells from the first dekad of July up to end of August 2018, severely affected germinating crops and necessitated repeated replanting. The amount and distribution of rainfall continued to be poor and unfavourable up to the end of the season, resulting in low yields for second season crops in bimodal rainfall areas. The performance of the 2018 rainy season was particularly poor in the Kapoeta area due to 6-8 weeks of prolonged dry spells in July and August, with only few days of intermittent showers, which resulted in low yields of sorghum crops, harvested in September 2018. Farmers confirmed that the performance of the rainy season was worse than last year.

The seeds used are mostly local/own 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 late onset. Sorghum is the main cereal, with *Lonyang* and *Lodoka* the preferred landraces. Despite the preference of most farmers to these local landraces, some farmers that exhausted their seeds due to repeated replanting, sown the improved sorghum variety called *Sesso*, which performed better than the local landraces. Maize (Longi-5) growing is more prominent in Magwi and parts of Torit counties. Farmers in maize growing areas reported that the damage caused by FAW was comparatively more serious on late planted maize crops. Of the 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 oxen ploughing, hand-digging is the normal method of cultivation, with labour provided by the family in most areas. No use of fertilizers, sprays and manure is reported this year.

The main pests reported during the season were FAW, grasshopper, sorghum smut, *Striga* weed, local birds, sorghum bug, Parthenium (Congress weed), stalk borers, aphids, cassava mosaic virus and wild rats. FAW caused mild damage on maize in Budi, Magwi, Ikotos, Torit, and Lopa/Lafon counties, and it had minimal impact on sorghum crops. Damage levels of grasshoppers and infestation levels of Parthenium weed were high this year, especially in Kapoeta, while the damage by other pests and diseases were generally mild. Weeding was undertaken, on average, two times per season for most crops.

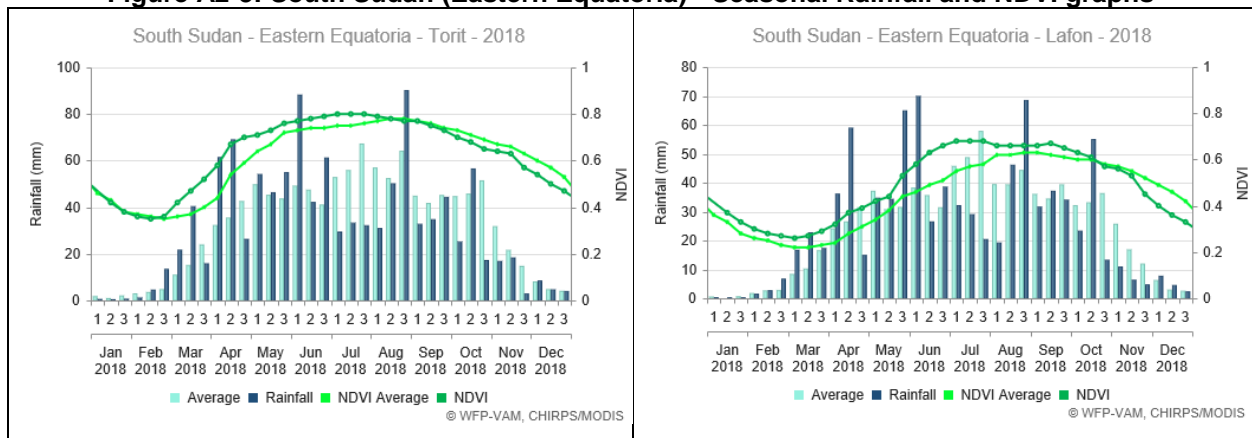
Production

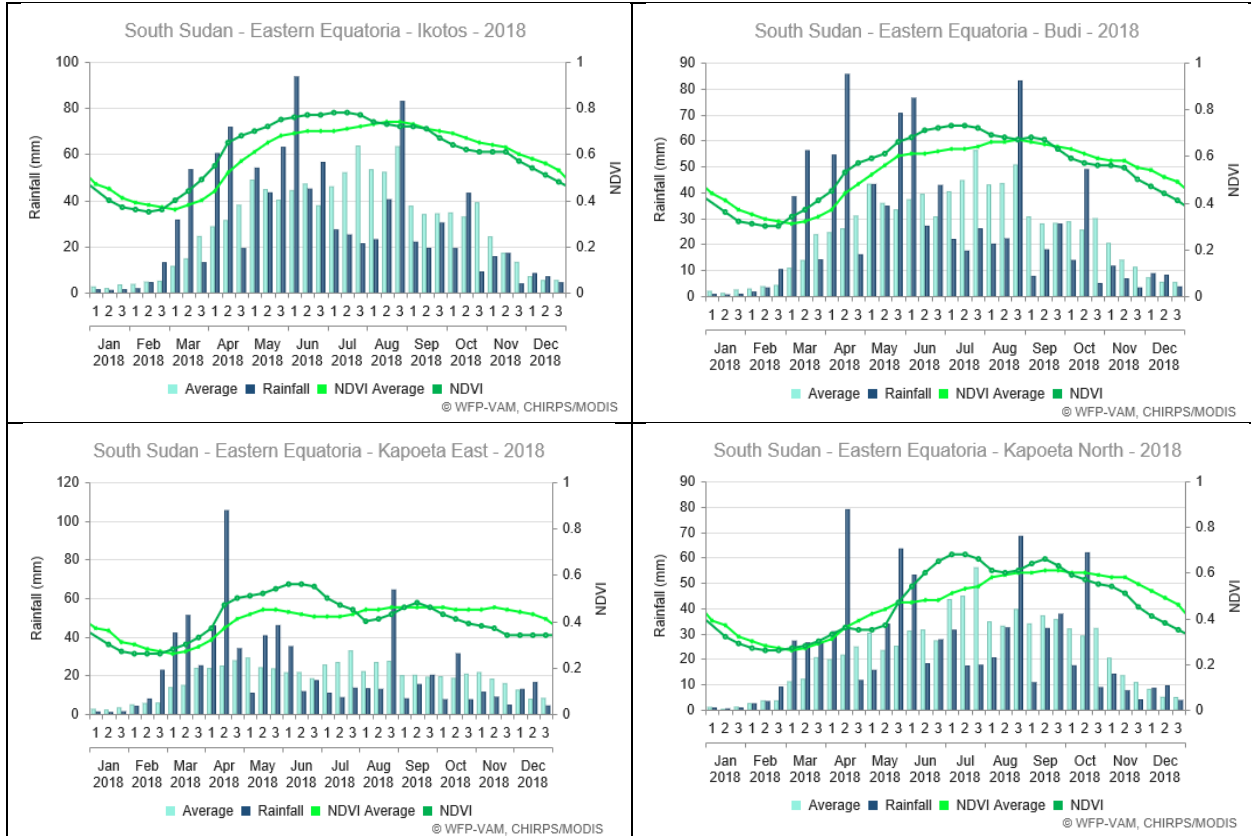
Production estimates have been performed on the basis of the case studies, CCMC reports (based on crop sampling) and time series data. A decline in crop performance compared to the previous year f was reported from assessment teams and CCMCs in both seasons. Consequently, gross cereal production is estimated at 113 701 tonnes from all cereal harvests, 3 percent down from the already low levels of the previous season. The 2019 deficit is forecast at about 37 000 tonnes, about 25 percent up from 2018.

The contribution of cassava to households’ food consumption at State level is significant, with an estimated 59 000 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 6 400 tonnes of gross dry matter (unshelled).

Livestock condition is generally below-average, especially in Kapoeta area, with a PET BCS of 2-3 for cattle, 3-4 for shoats and camels, while the BCS around Budi is 3-4 for cattle and 4 shoats. Numbers are reported to have decreased in Kapoeta area due to inadequate availability of pasture and water caused by prolonged dry spells, which resulted in reduced birth rates. The invasion of grazing lands by *Parthenium* weed contributed to reduce the efficiency of animal feed intake. Although there were no reports of animal disease outbreaks, a normal occurrence of endemic diseases including BQ, Anthrax, CBPP, FMD, HS, sheep and goat pox, PPR, NCD and internal and external parasites was reported. Despite the improvement of security situations, cases of cattle rustling and thefts have resumed after two years without incidents.

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





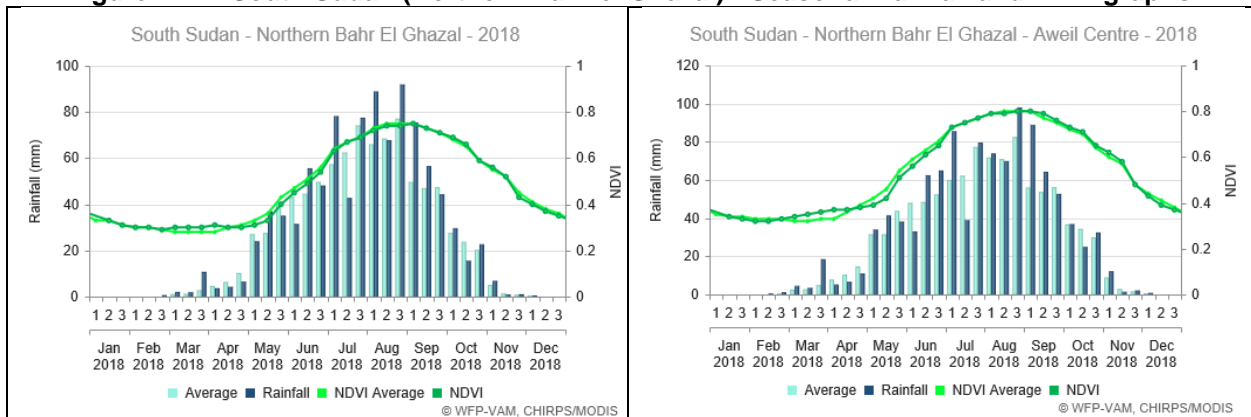
Source: WFP/VAM, 2018.

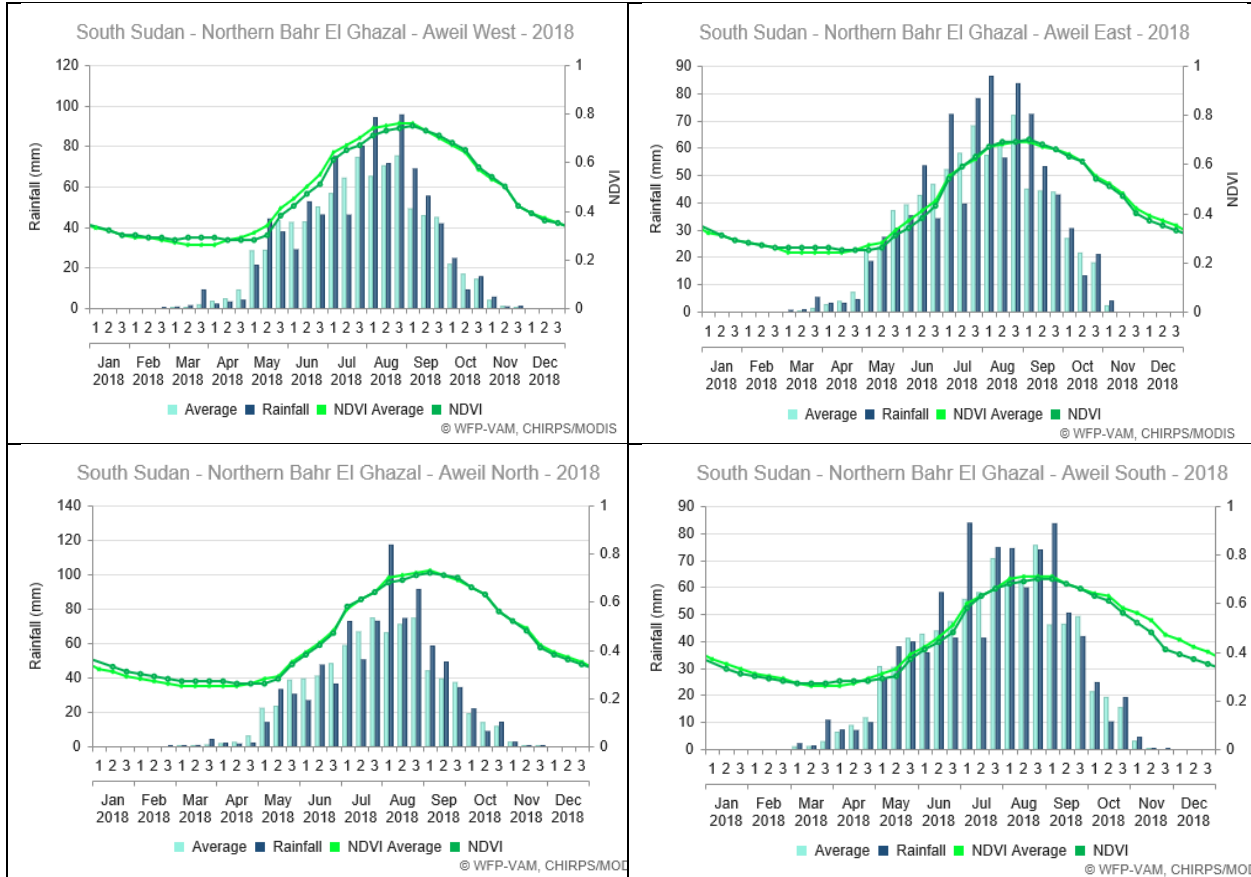
GREATER BAHR EL GHAZAL

Northern Bahr el Ghazal

The Task Force teams undertook a planting assessment in July and a harvest assessment Mission in October with members of the State Ministry of Agriculture and the respective CCMC members. The joint activities comprised 164 case studies, consisting of 160 farmers interviews and four key informant interviews with some short walking transects and crop sampling in all the five counties.

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





Source: WFP/VAM, 2018.

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 reflect a late onset of the rains followed by 2-3 weeks dry spells in June and July. The early season dry spells caused stunting and wilting of seedlings and poor plant population densities, necessitating gap-filling and replanting of sorghum seeds. Flash floods occurred in August due to the overflow of rivers in parts of Aweil West, Aweil East and Aweil South, affecting crops in some low-lying areas. However, unlike 2017, there was no flooding caused by rains, as the rainfall amounts received in 2018 were lower than in 2017. Subsequently, improved rains in August and September 2018 benefited crop development.

No constraints to access to land are reported in in the State in both near and far fields. Smallholders mostly 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 increase farm size. The daily hire rate for a donkey was SSP 3 500-5 000. Throughout the state, family labour is mostly used, with some communal labour hired where food and drinks are served. The Aweil Rice Scheme has 13 tractors, with only seven of them functioning, while five tractors are not functional due to the lack of spare parts. There are 23 tractors in Ton Chol commercial farms, with only five tractors functional. Access to tractor-hire by smallholders is minimal due to high costs.

Sorghum is by far the most preferred cereal throughout the State. Seed sources are noted to be 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, i.e. *Wad Ahmed*, *Gaddam el Hammam* and *Afargadamek*. Local groundnuts and

sesame seeds were planted at the same time as the early sorghum. In addition, small areas around homesteads were planted with local maize for early green consumption.

Regarding soil fertility maintenance, the most common methods way of maintaining soil fertility include shifting farming locations and grazing over farmland by local and transhumant herds on contractual basis.

The common pests include *Striga* (parasitic weed), FAW, grasshoppers, millipedes, stalk borer, sorghum midge (*nyai*), local birds, monkeys, pseudo sorghum (a weed locally known as *Abar*), and uncontrolled livestock, all with mild to moderate damage on crops. Fall Armyworm was reported in all the five counties with moderate damage on maize and sorghum crops. Pests and diseases have remained at mild levels. One of the challenges faced by farmers are grass weeds. However, weeding is normally undertaken only once per season for sorghum and two to three times for groundnut. As confirmed by CCMC's and Task Force teams' *Striga* weed is still one of the main concerns to small-scale farmers in the over-used areas with no livestock and no means of land shifting to improve soil fertility.

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. The estimates for the mechanized sector have been provided by the Aweil Rice State and mechanized farmers in Ton Chol. In 2018, the cereal area harvested from the traditional small sector is estimated at 157 131 hectares, 3 percent up from 2017. The gross cereal production has been estimated at 168 100 tonnes, about 4 percent up from the previous year. The 2019 cereal deficit, estimated at about 25 000 tonnes, is expected to remain substantially unchanged from the previous year.

Regarding mechanized farms, the Aweil rice scheme is expected to produce 588 tonnes of rice from a total area of 490 hectares. In addition, mechanized farmers using the rice basins located between Udham and Aweil for growing sorghum are expected to produce 1 176 tonnes from 1 680 hectares, while mechanized farmers in Ton Chol in Aweil East are expected to produce 288 tonnes of sorghum from 720 hectares. Unlike last year, there are no ratoon crops in these areas due to inadequate rainfall.

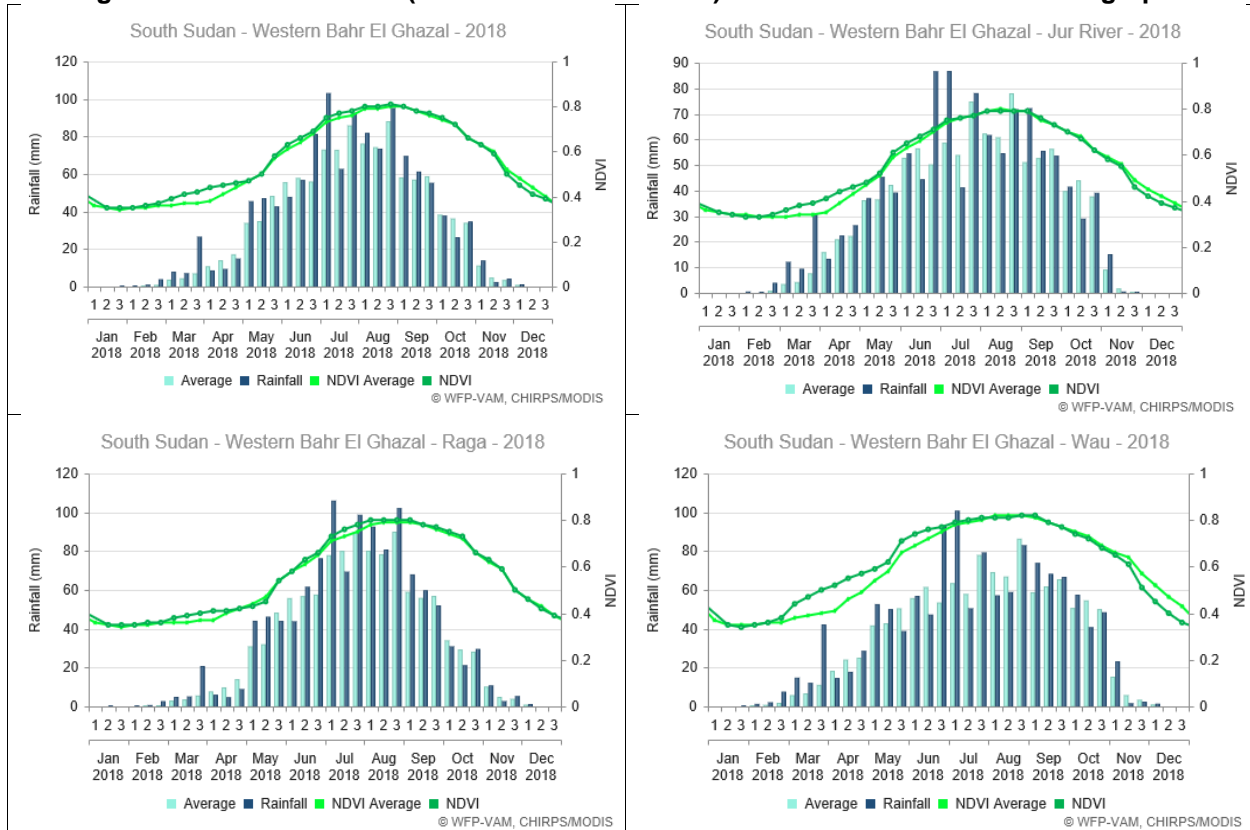
The ecology of Northern Bahr el Ghazal State does not support the widespread growth of cassava, which may be found only in isolated plots in Aweil Centre. CCMCs and Taskforce teams have reported an estimated 1 000 hectares of cassava, mostly intercropped with groundnuts, which make a substantial contribution to the households' food economies, and may augment the harvest by an estimated 9 900 tonnes of unshelled product. In addition, there are unknown numbers of commercial groundnut farms cultivated under *nafeer* and tractor-hire schemes that are not accounted for in this estimate. Therefore, the actual contribution of groundnuts to the State's production is probably higher.

All the counties have large numbers of livestock. However, the number is reported to be declining due to high mortality rate caused by diseases and inadequate pasture and water availability due to poor rains. As a result, cattle body condition is generally poor with a PET BCS of 3, while that of shoats is better with BCS of 4, as reported d by the Task Force teams. Despite the widespread presence of endemic diseases, there were no reports of disease outbreaks this year. The most commonly reported diseases include BQ, CBPP, FMD, PPR, CCP, HS, mange, fowl fox, and internal and external parasites.

Western Bahr el Ghazal

The Task Force teams undertook a planting assessment Mission from 2 to 11 July (Jur River and Raja counties) and a harvest assessment Mission from 23 to 28 September 2018, with only parts of these counties visited due to insecurity. Overall, 183 interviews were made, including 176 farmer case studies and seven key informant interviews. The case studies at planting and harvest time were 117 and 59, respectively.

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



Source: WFP/VAM, 2018.

Growing conditions

Combined rainfall estimates and vegetation index graphs for the whole State and three counties (Raga, Jur River and Wau) are shown in Figure A2-5. Remote sensing data indicate a timely onset of seasonal rains around April/May and average to above average vegetation conditions in most areas. However, 3-4 week dry spells in May and June necessitated replanting and gap filling of fields where young seedlings were lost. This has also caused some delays in planting of sorghum, poor pod formation of groundnuts and late harvesting of sorghum in some of the visited areas. The rainfall performance improved in all counties in the second half of the season, with average to near-average vegetation conditions. In general, the farmers' case studies and CCMC reports indicate that growing conditions were less favourable than last year. As a result, the yields of cereals (maize and sorghum) were lower than last year, while the performance of groundnuts was average.

Hand cultivation and oxen ploughing are the main cultivation practices in the state. The unit price of hoe and *maloda* increased from about SSP 300 in 2017 to SSP 600 in 2018. Family and communal labour (*nafeer*) are usually the means of weeding and harvesting. In Jur River county, the cost of agricultural labour is SSP 4 000 per feddan (0.42 hectare), on average. Hire rate for oxen is about SSP 6 000 per feddan. Sorghum is by far the preferred cereal and seed sources are noted to be only local/own seeds carried over from the previous harvest. Several farmers did not plant the traditional long-cycle landraces of *Mabior* or *Ulala* sorghum, since it is subject to destruction by transhumant livestock that are returning home before the crop is harvested. Therefore, the production from these traditional long-cycle landraces of sorghum is expected to decrease. Progressive farmers and those living close to pastoralists have started to substitute the long-cycle sorghum with improved short-cycle varieties that include *Sesso 2*, *Gadam el Hamam* and *Luana* and *Bene*. These varieties are harvested together with groundnuts and, therefore, escape the destruction by early returning livestock. In addition, the continuous insecurity in these areas has also induced farmers to plant short-cycle improved sorghum varieties.

Fall Armyworm was reported in several areas causing mild damage on maize and sorghum crops. Other endemic pests and diseases reported during the 2018 season were millipedes, termites, rosette virus, *Striga*, local birds, caterpillars, rats, squirrels, foxes, aphids, grasshoppers and various types of weeds. However, the impact of pests on crops was within the normal range. FAW caused reductions in yields; however, there is no quantitative information available on infested area and crop losses. There were also cases of monkeys and roaming shoats causing mild damage on crops.

Production

The gross production of cereals is estimated at 39 346 tonnes, 3.7 percent down from 2017, mainly due to a reduction in yields caused by erratic rains. The 2019 cereal deficit, is forecast at about 32 300 tonnes, about 12 percent up from 2018.

Cassava grows in Wau and Raja counties and covers an estimated 11 percent of the total crop area in the state. The two-year system of production is most common. Yields in 2018 are estimated at an average level of 11 tonnes/hectare by the Task Force-led teams. The contribution of cassava to food consumption in the State is estimated at 32 000 tonnes of cereal equivalent (gross dry matter). Groundnuts, at household level, will possibly add an estimated 7 900 tonnes of unshelled product.

Livestock are currently far from homesteads and are expected to return home around November and December 2018 in areas of the State including Marial Bai area where substantial number of livestock are located.

The indigenous households of Western Bahr el Ghazal State are not large-scale livestock owners. Livestock body conditions were reported at PET BCS of 3-4 for shoats and 2-3 for cattle, indicating that cattle were more affected than shoats by the poor pasture conditions. There were no reports of disease outbreaks on livestock, but endemic diseases including diarrhoea and skin diseases continue to persist. Small ruminants, particularly shoats, are owned by most farmers and kept to graze around homesteads, but prevented from intruding into crop fields.

Warrap (including Abyei)

The Task Force teams undertook a planting assessment Mission between 3 and 10 July and a harvest assessment Mission between 14 and 25 September to assess the output of the main harvest in the State, with a total of 148 case studies. The harvest time assessment was based on 75 case studies, with 72 farmers interviews and three key informant interviews. The counties visited include Abyei, Twic, Gogrial West and Tonj South for the planting assessment and Gogrial West, Twic, Agok (Abyei) and Tonj South counties for the harvest assessment.

Growing Conditions

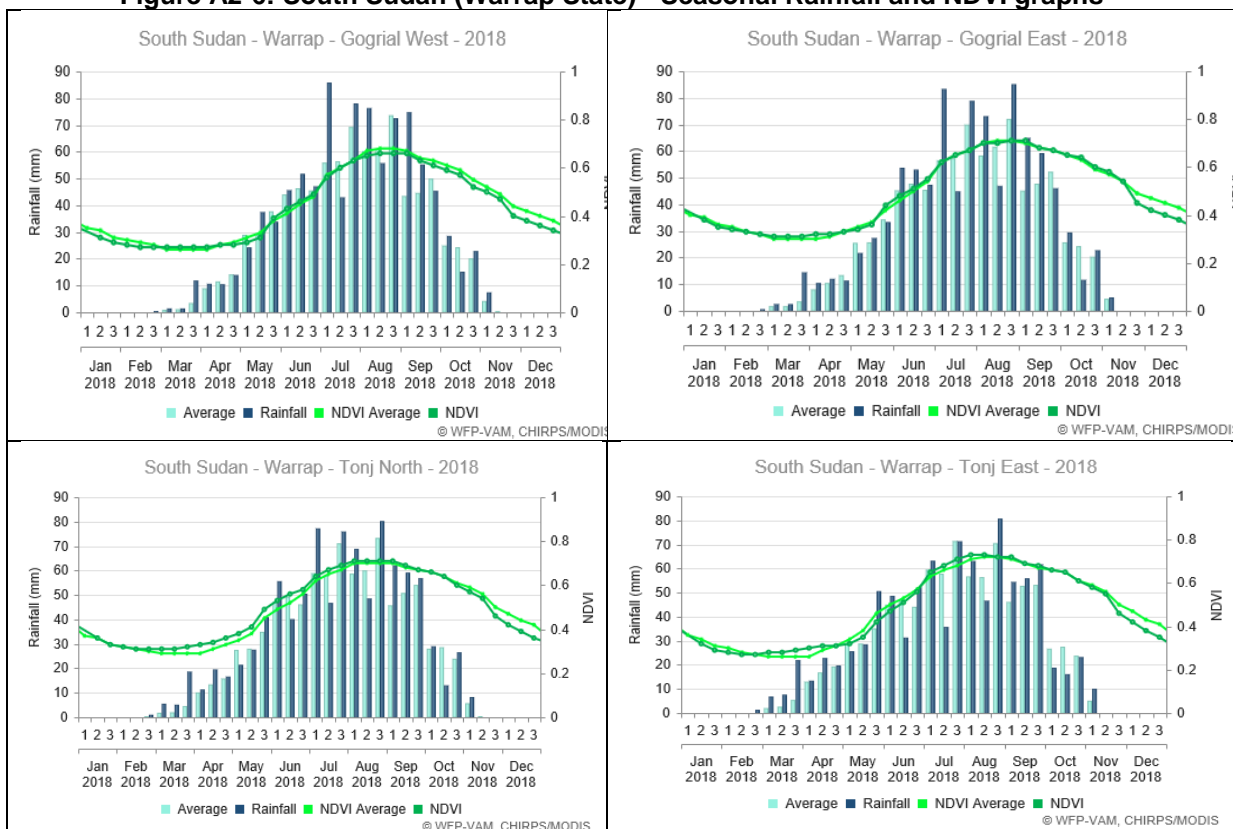
Combined rainfall estimates and vegetation index graphs for six locations selected across Warrap State (Gogrial West, Gogrial East; Twic, Tonj North, Tonj East and Tonj South) are shown in Figure A2-6. In most cropping areas, remote sensing data and information from the field indicate a timely onset of seasonal rains, and average precipitations amounts received. On the other hand, the rainfall distribution was erratic, with 2-3 week long dry spells in June in most of the counties, which severely affected crop establishment and development and necessitated replanting. Reports from the Task Force Team and CCMC indicated that the rainfall performance in most cropping areas was generally inadequate for growing crops due to the erratic distribution, despite near-average amounts. By contrast, well above-average rains in northern parts of the state including Agok (Abyei), resulted in flooding/waterlogging in July and August. The waterlogging around Abyei has hindered agricultural activities including weeding and caused a reduction in sorghum yields. Unlike last year, there were no floods in other parts of the state, and this has resulted in a decreased availability of pasture for animals.

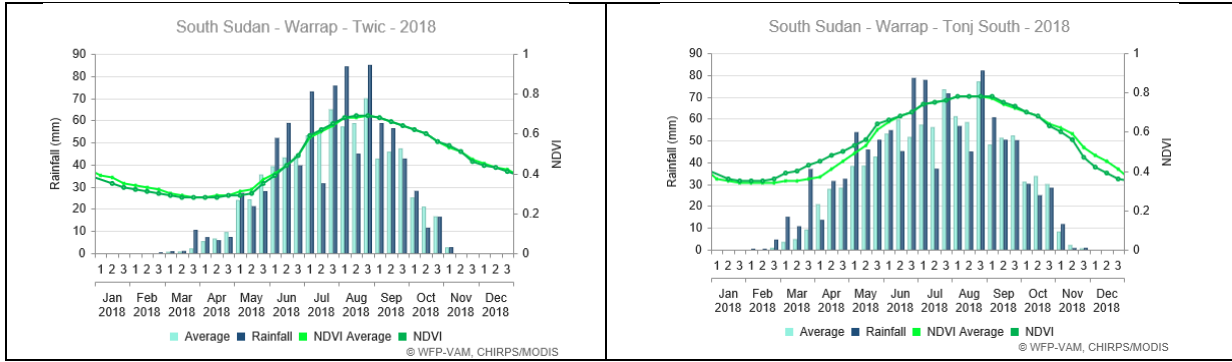
An increase in the use of tractors and ox-ploughs was observed. The majority of farmers use hand tools, but the use of ox-ploughs is increasing in Tonj South, Tonj North, Gogrial and Twic counties. In Tonj South County there are 24 tractors, but only four of them are operational. The hire rate for GOSS tractors is SSP 7 000 per feddan, compared to SSP 4 000-4 500 per feddan last year. The hire rate for ox-ploughs was SSP 5 000-5 500 per day, while last year it was SSP 3 000-3 500 per day. The hire rate of private tractors was SSP 15 000 including fuel. In Twic, there are 14 GOSS operating tractors of out of 20, while there are additional 10 private tractors, all of which are functional. There are also 99 ox-ploughs provided by NRC. The tractor hire rate was SSP 17 000 per feddan including fuel, compared to SSP 4 500 per feddan last year. This is due to high increase of fuel price to about SSP 13 000 for a 20 litre jerry can, from just SSP 3 000 in the previous year. The hire rate for ox-plough was SSP 8 000 per feddan. However, there was no major change in the total area cultivated to crops this year despite the increase in input prices.

The main crops grown in the State include sorghum, groundnuts, maize and sesame. 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 small areas planted with local maize.

The main pests reported during the season include *Striga*, local birds, wild foxes, millipedes, FAW, stem borer, squirrels, sorghum midge and black ants, among others. There was a FAW infestation on maize and sorghum crops, with damage levels ranging from mild to average. However, maize is usually grown as a garden crop, for green consumption, and it's not a major crop in the State. Other usual pests were in the normal range. However, an expansion of *Striga* weed and sorghum midge was noted in most sorghum fields, causing average damage.

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





Source: WFP/VAM, 2018.

Production

Cereal production estimates have been performed only for sorghum. The cereal area has been estimated at 156 965 hectares, similar to the previous year. The gross cereal production in Warrap State (including Abyei) is estimated at 160 753 tonnes, 9.9 percent down from 2017, as yields were affected by the early season dry spells, and declined by more than 10 percent compared to the previous year. Notably, in Abyei, despite an increase in harvested area by about 3 percent, the gross production decreased by about 16 percent from 2017, as cereal yields, affected by dry spells in June and by waterlogging in July/August, declined by about 18 percent.

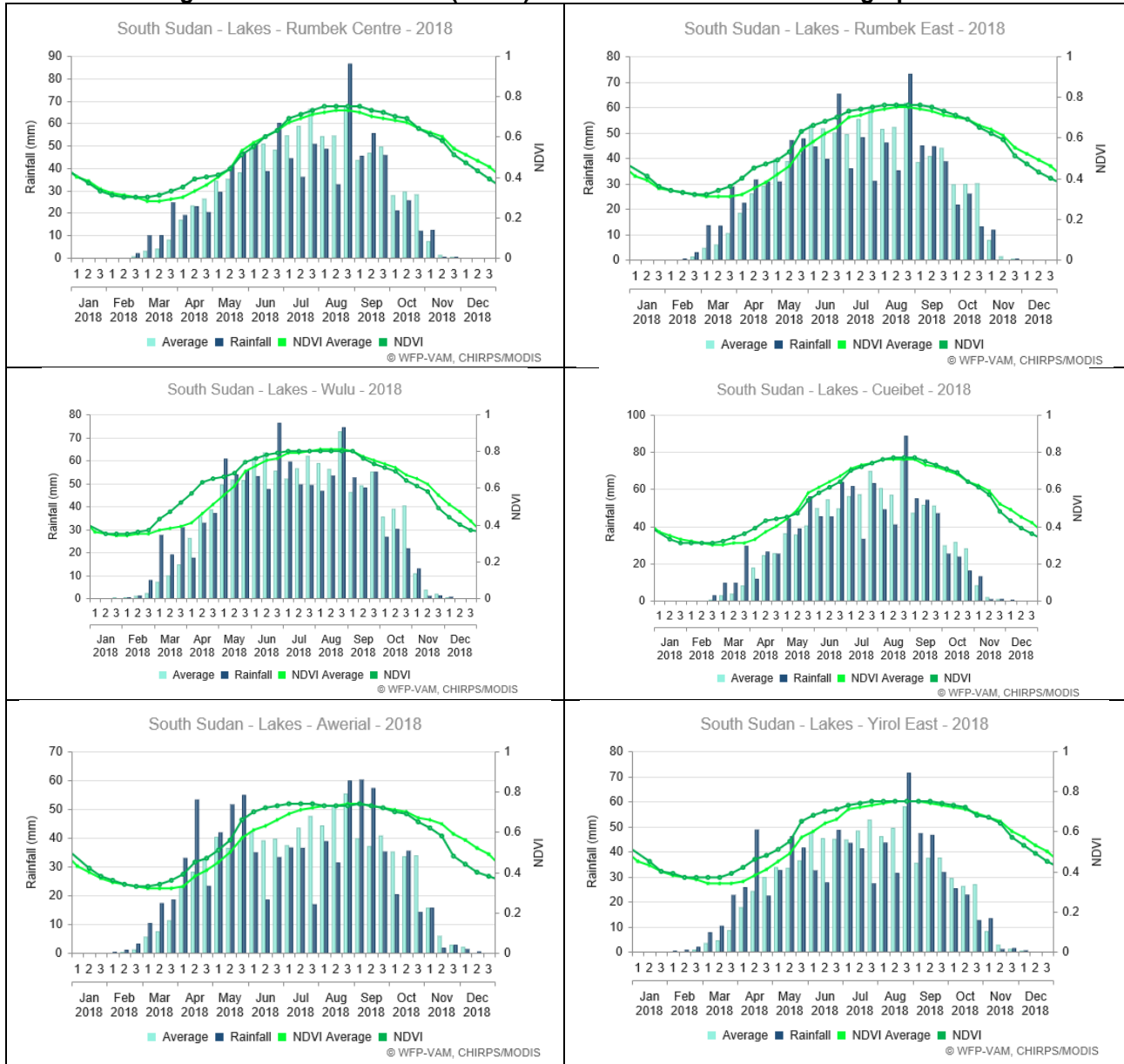
The agro-ecology of Warrap State does not support the widespread growth of cassava, which is cultivated only around the edges of the fields and pathways. Groundnuts, however, make a more substantial contribution to the local diet, and may add an estimated 11 100 tonnes of unshelled product to the households' food consumption.

There are large numbers of cattle and shoats in Warrap State. Cattle are largely transhumant, usually moving to grazing areas and water points around December and January. However, this year, cattle movement is expected to take place around November (earlier than normal) due to the inadequate rainfall and absence of floods, which would have favoured pasture development around the main grazing areas. The PET BCS was 3-4 for cattle and 4 for shoats. There were no outbreaks of livestock diseases, but only the normal endemic diseases including FMD, PPR, CBPP, CBP, SH, diarrhoea, and internal and external parasites.

Lakes

The Task Force teams undertook planting and harvest assessment missions in Lakes in July and September, respectively, performing 87 case studies. The harvest-time activities included 54 case studies (three key informant interviews and 51 farmer interviews) and walking transects with crop sampling, allowing yields to be predicted objectively in spot locations. In most of the visited areas, access to land was unimpeded, except in few insecure areas of the State.

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



Source: WFP/VAM, 2018.

Growing conditions

Combined rainfall estimates and vegetation index graphs for six locations selected across Lakes State (Rumbek Centre, Rumbek East, Cuiet, Wulu, Awerial and Yirol East) are shown in Figure A2-7. Seasonal rains started in April and May over most areas, followed by 2-3 weeks of dry spells in June. Farmers and Task Force teams have reported that rainfall amounts were below average to average, with the June dry spells affecting the performance of crops in several parts of the State. In Yirol East and Cuiet counties, crops were particularly affected by prolonged dry spells, while Yirol West and Wulu counties received average rains.

Use of ox-ploughs across the State has increased compared to previous years. The SMOA has reported that majority of the farmers in Yirol West and Cuiet counties use oxen, while most of the farmers in Wulu County use hand tools, with only few using oxen. There are also significant numbers of ox-ploughs in

Rumbek. Farmers' groups were reported to possess 60 tractors, but only 23 were functional. The hire rate of ox-ploughs was about SSP 4 000-4 500 per feddan, compared to SSP 2 500 per feddan of last year. Tractor hire rate ranged from SSP 3 500 to 5 000 across the State.

The majority of seeds in the State are local seeds of long, medium and early maturing sorghum. Other crops include groundnut, cassava, sesame, green gram and cowpeas, which are mostly intercropped with main crops. The main sources of seeds are mostly from own savings or purchased from markets. Planting was done at different times depending on the onset of rains and types of crops. In 2018, sorghum and sesame were planted in June, while groundnut was planted in May. Long-maturing sorghum was planted together with groundnuts and pearl millet in June, while green gram and short-maturing sorghum were planted in July. Weeding of all crops was performed twice in Wulu County, but just once in all other parts of the State. Groundnuts and early sorghum were harvested in August/September, while medium-maturing sorghum was harvested from October to November. Harvesting of long-maturing sorghum takes place from December 2018 to January 2019.

The main pest and diseases reported in the season were local birds, millipedes, FAW, stalk borers, sorghum head smut (fungal disease), sorghum cinch bug, grasshoppers and roaming livestock, all with mild to average damage. However, no control measures were undertaken for any of these pests. Monkeys and porcupines have destroyed sorghum and groundnuts seriously in some areas, especially in Wulu and Cueibet counties. As also confirmed during transect walks of Task Force teams, most of the visited farmers complained about the seriousness of *Striga* weed infestations on sorghum.

There is no application of fertilizers in the state, except 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

Production estimates for 2018 have been performed for sorghum on the basis of time series data adjusted with evidence from crop sampling, PET scores and case studies. The 2018 gross cereal production is estimated at 144 495 tonnes, 2.9 percent up from 2017, mainly reflecting a 3.3 percent increase in harvested area. The groundnut output is estimated at 33 468 tonnes of unshelled product, 26 percent up from 2017, mainly due to an improved methodology of the assessment, which has been conducted at county level this 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 2018, cassava production is estimated at 115 200 tonnes of fresh tubers, corresponding to 33 800 tonnes of cereal equivalent.

In Lakes State, the 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. In general, livestock condition was average this year. Water and pasture conditions were normal, except in few areas where shortages were reported due to insufficient rains. PET livestock body condition score in most of the state, as reported by Task Force teams, was 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 are no reported cases of disease outbreaks, except the normal presence of endemic diseases. The common livestock diseases reported in the state were Rift valley Fever, Anthrax, HHS, BQ, PPR, CCPP, CBPP, NCD and external and intestinal parasites. Rift valley fever was mainly reported in Yirol East.

GREATER UPPER NILE

Upper Nile

The Task Force teams undertook a harvest assessment Mission in November visiting Renk and Melut counties. The total number of case studies performed during the missions was 18, with 16 farmer interviews and two key informant interviews. Upper Nile State is the State with the largest semi-mechanized schemes

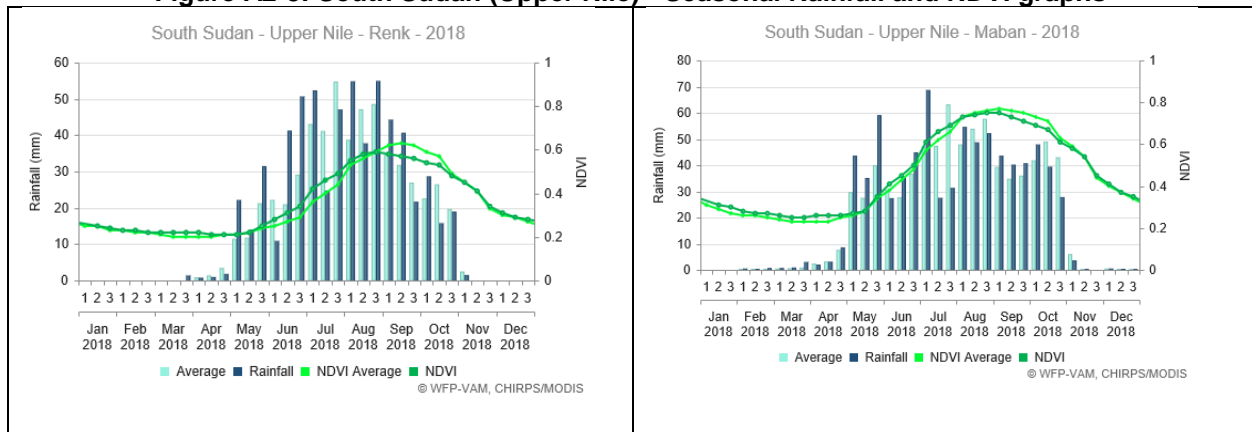
in the Country. In all areas visited by the Task Force teams, access to land was unimpeded and an expansion of commercial farming was noted, with increasing areas under cultivation both in the mechanized and in the traditional (small holder and emerging farmer) sectors. However, land entitlement for commercial farmers has become more complicated, with the involvement of both the community and government on land management. This has sometimes created disputes over land ownership, since the same plot could be allocated to two or more farmers, thus disrupting agricultural activities.

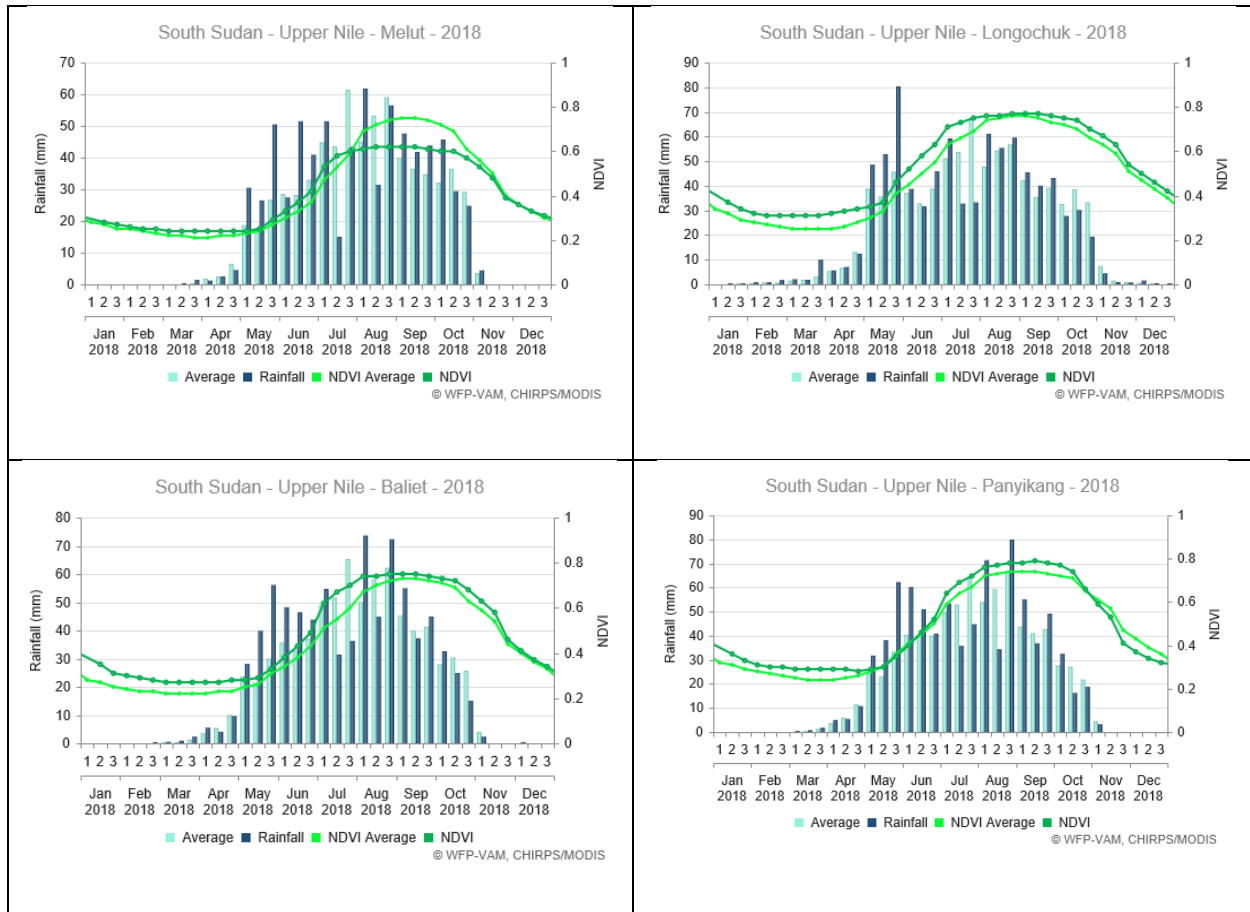
Growing conditions

Combined rainfall estimates and vegetation index graphs for six locations selected across Upper Nile State (Renk, Maban, Melut, Longochuk, Baliyet and Panyikang) are shown in Figure A2-8. In most locations, remote sensing data and information indicate a favourable start of the season, with average to above-average vegetation conditions up to mid-season, except in Melut, where rainfall amounts and vegetation conditions were below-average. Subsequently, prolonged dry spells in July and an early cessation of seasonal rains in October, severely affected sorghum at flowering and grain formation stages.

In Melut, below average rains early in the season and four weeks of prolonged dry spells in July seriously damaged maize, millet and groundnuts, necessitating replanting of maize seeds with the resumption of rainfall in early August. Another prolonged dry spell towards the end of the season seriously affected sorghum yields, while sesame was not affected by the dry spells and performed better due its shorter cycle. Area planted with sorghum decreased as most commercial farmers shifted to sesame, due to its high economic returns, as sesame is currently sold to Sudanese traders at high prices. In addition, sesame is less vulnerable to dry conditions due to its short cycle, being ready for harvest as early as July and August, while sorghum must remain in the fields until November and 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.

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





Source: WFP/VAM, 2018.

Rainfall was below-average and poorly distributed, also in Malakal, where prolonged dry spells throughout July severely affected crops. In addition, Fall Armyworm had a more severe effect on maize this year compared to last year. As a result, lower yields of most crops are expected in 2018 compared to 2017. On the other hand, according to the Ministry of Agriculture, harvested area in Malakal slightly increased compared to last year, as some security improvements allowed farmers to move to far fields to expand plantings. Farmers were also motivated by the seed distributions, and by the high grain prices prevailing on local markets.

The Task Force-led missions visited farmers in major farming centres of Renk and Melut. The State Director of Agriculture reported an increase in the total planted area in the mechanized sector despite shortage of credit services, high fuel prices and shortages of spare parts. As confirmed by the assessment team, the areas cultivated to sorghum has decreased, while the area under sesame increased compared to last year.

Since 2016, some improvements in the support of commercial farmers through the provision of new tractors and fuel have contributed to the cultivation of more land over the past three years. In 2018, the number of functional tractors in commercial farming areas of Upper Nile was 395 (280 in Renk and 115 in Melut). The Agricultural Bank of South Sudan provided 500 barrels of diesel to commercial farmers this year, each farm receiving two barrels on loan at the cost of SSP 50 000. The payment is then made after the harvest in the form of maize or sesame according to the prevailing wholesale price. Tractor hire rate this year is about SSP 400 000 for three months (without disc plough) and SSP 250 000 for three months for the disc ploughs, while the 2017 rates for three months were SSP 250 000 each, for a tractor and disc plough, respectively. Labour is available, but expensive, at about SSP 120 000-150 000 for weeding a block (120 feddans). Two tractor operators are normally employed to run a tractor in two shifts at SSP 20 000-30 000 per month per operator, and two assistant operators, each receiving up to SSP 15 000 per month. 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 the 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. However, some commercial farmers have sprayed herbicides to control weeds and pesticides for the control of sesame pests. All the sprayers and chemicals were smuggled from neighbouring states of the Sudan.

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

FAW infestation was reported in Renk and Maban Counties on maize and sorghum crops, causing average and serious damage, on sorghum and maize, respectively. Other common pests reported during the season were local birds, rats, stalk borers, grasshoppers, aphids and *Striga* weed, all with mild level of damage. In the semi-mechanized farming areas, there were no reports of major outbreaks of pests and diseases, except the increased expansion of *Striga* weed causing a moderate damage on sorghum crop. The only control measure practiced by farmers to control *Striga* is through mechanical removal and sometimes by crop rotation. There are no reports of *QQU* threats in Upper Nile State this year.

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

Upper Nile State is a relatively minor livestock-producing area. Pasture and water availability in 2018 was normal, but lower than last year in areas affected by the prolonged dry spells. The PET BSC for cattle was 3-4, while that of shoats was 4. There were no reports of livestock disease outbreaks, unusual movement or cattle rustling during the year. However, there were endemic diseases, mainly FMD, BQ, CBPP, CCPP, Anthrax, PPR, HS, Newcastle Disease (ND) and internal and external parasites, all with minimal effect on livestock body conditions.

Production

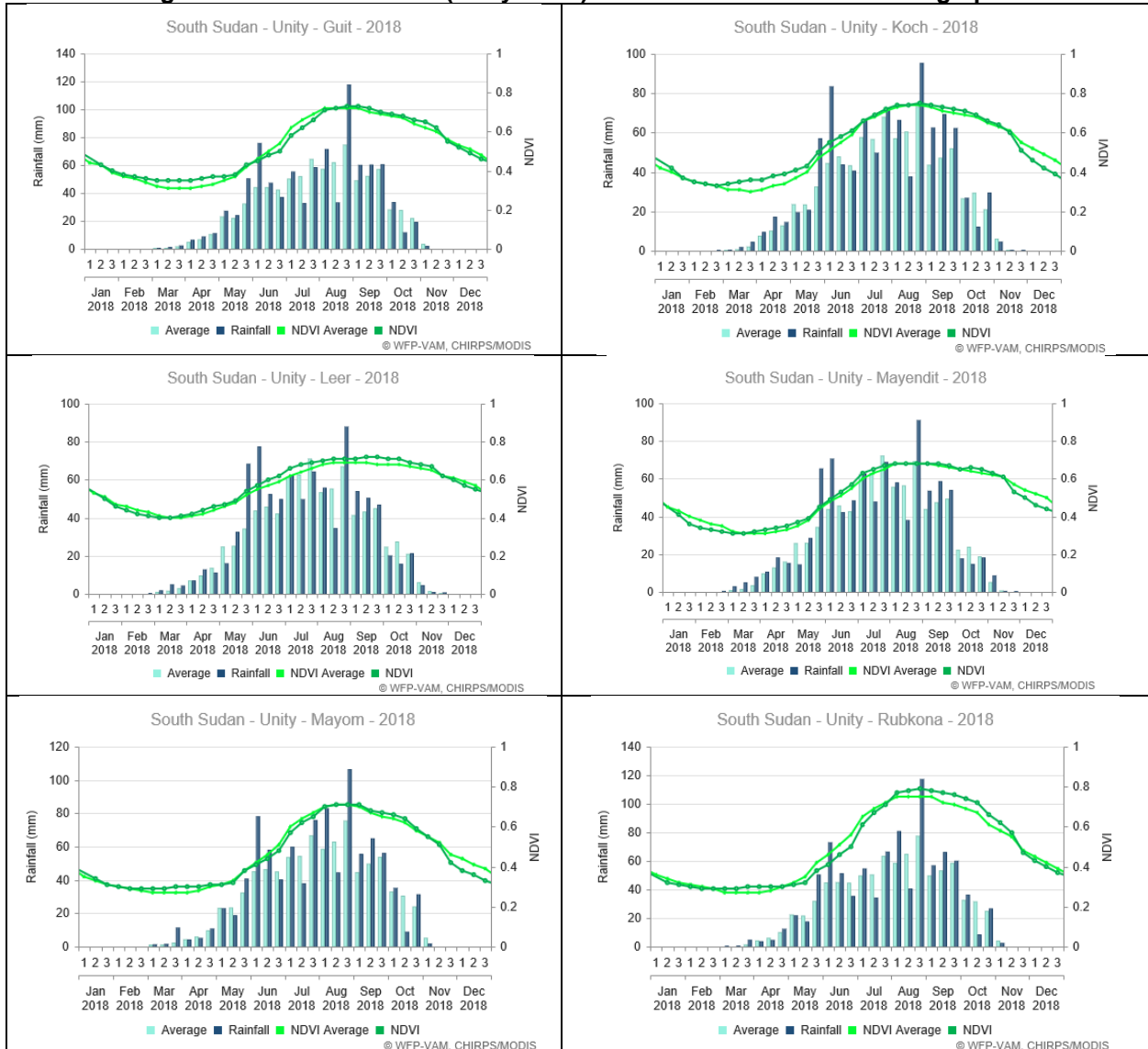
Gross production in Upper Nile State is estimated at 39 526 tonnes of mixed cereals, 9.33 percent down from 2017, mainly due to the combined effect of a decline in planted area and in yields in Melut and Renk counties, respectively caused by the shifting to sesame and by the poor performance of seasonal rains.

For the mechanized sector, the Task Force teams estimated a gross production of 54 000 tonnes of sorghum in the mechanized farms in all locations, which is 28 percent lower than the 2017 estimate.

Unity

No Task Force Team Missions were conducted in the State mainly due to insecurity, which severely constrained/limited movement of field workers to cropping areas. However, the Task Force team has taken advantage of using the yield data collected by the Monitoring and Evaluation (M&E) Team of FAO. The FAO Crop Assessment/Monitoring Team trained staff of the M&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 2018. In addition, the CFSAM team used phone communication to obtain information on yields, which was 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. The data from this source was then cross-checked and triangulated with information provided by a team of local extension workers from selected areas of Unity State that were invited to participate in the final CFSAM analysis workshop, which took place from 3 to 13 December in Juba.

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



Source: WFP/VAM, 2018.

Growing conditions

Combined rainfall estimates and vegetation graphs for six locations selected across Unity State (Guit, Koch, Leer, Mayendit, Mayom and Rubkona counties) are shown in Figure A2-9. Remote sensing data and information indicate a timely onset of seasonal rains in April in most cropping areas, which benefited planting activities, except in Guit and Koch counties where rainfall was below-average. Protracted insecurity in Mayendit and Guit has seriously hindered farmers’ access to land. Dry spells occurred in July in some pocket areas of Koch, Guit and Rubkona, damaged crops and necessitated replanting of maize.

Regarding pests, although the presence of FAW and stalk borer was reported, the damage caused by these pests was reportedly mild. There are no reports of serious pest damages, except from the usual pests and weeds, with mild to average damage on crops.

CFSAM production estimates are, therefore, conservatively put at 11 873 tonnes of mixed cereals comprising early maize and sorghum harvests, which is similar to the previous year. The harvested area has been estimated at 16 956 hectares, 3.7 percent down from 2017.

Jonglei

Access to information from Jonglei State has again been constrained by insecurity. Five short missions, three planting assessment and two harvest assessments were completed in July, August and September. The planting assessments were carried out in Bor South, Akobo and Pochalla counties, while the harvest assessments took place in Twic East and Pochalla counties. The Task Force-led teams carried out 115 case studies, covering 102 farmer interviews and 13 key informant interviews. The teams conducted short walking transects during the harvest assessment missions. More families were noted to be farming around homesteads due to fear of insecurity in the far fields, resulting in reduced farm sizes. In areas including Bor South, there are limited opportunities to expand cultivated land in nearby residential areas, and cultivation of far fields is also limited by lack of energy (due to food insecurity), fear of destruction by wild animals, lack of resources and fear of theft.

Growing conditions

Combined rainfall estimates and vegetation index graphs for six locations selected across Jonglei State (Akobo, Fangak, Nyirol, Pibor, Twic East and Bor South) are shown in Figure A2-10. According to remote sensing data and information, seasonal rains had a timely onset in May across the State. This was also confirmed by the Task Force Team, CCMCs and phone communications from inaccessible areas. Subsequently, prolonged dry spells from mid- May up to the end of July necessitated replanting and gap filling of sorghum fields two to three times. According to interviewed farmers, the severity of the dry spells and the damage caused on crops around Bor South, Twic East and Duk counties was more serious than last year. On the other hand, excessive rains resulted in floods in Bor South County in May/June and in Twic East County in September.

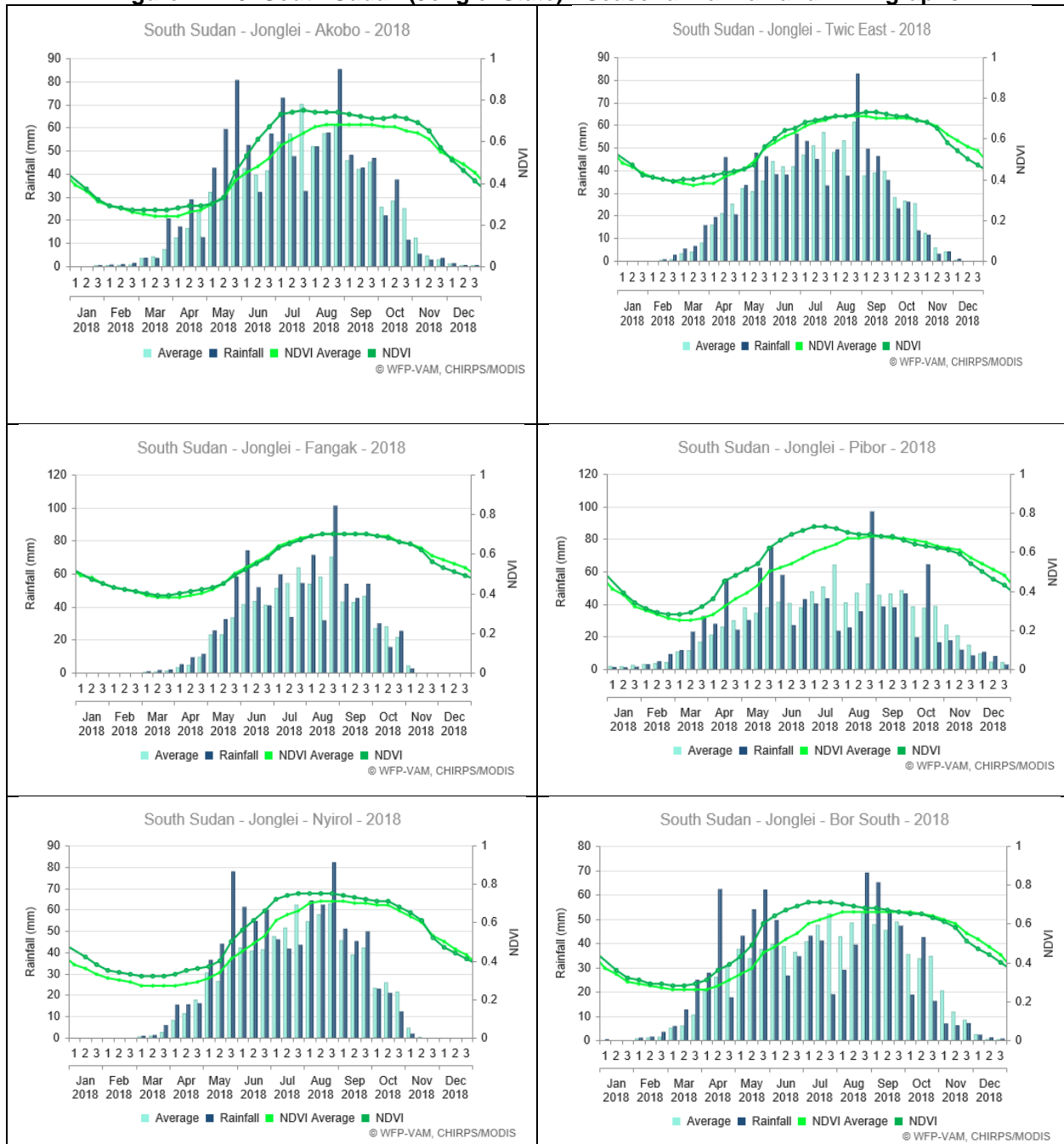
In Pochalla, where there are areas with two seasons, rains had a timely onset in early April. The Task Force Team reported that precipitations during the first rainy season were below average, with a four-week dry spell in June affecting yields. The team also reported that precipitations during the second rainy season were average. Second season maize crops in the northern Payams of the County were affected by flooding (river floods) in October, caused by heavy rains in the Ethiopian Highlands.

Persisting insecurity continued to constrain access to land, and the average cultivated area per household did not show improvements (0.6 hectares per household) compared to 2017. Hand-digging is the normal method of cultivation, accomplished by family or labour-sharing groups. No tractors and very little animal traction use were noted during the assessments, especially in Akobo County. Although ratooning of sorghum was practiced in some areas, this is generally not accounted for due the late harvesting time. The Task Force Team reported that crop pest and disease levels were mild, with principal problems being local birds, ants, stem borers, wild animals, squirrels, millipedes and guinea fowls. In addition, FAW has caused mild to serious damage to the maize crops in Bor South, Pibor, and Pochalla, Twic East, Duk, Bor South and Akobo counties.

Production

Cereal production in Jonglei State is estimated at 49 552 tonnes, 9.9 percent higher than 2017, from a harvested area of 56 537 hectares, 6.6 percent higher than last year. Cassava production is observed in Pochalla 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. As a result, an estimated 1 100 tonnes of cereal equivalent, which is higher than 2017 is estimated to contribute to the households' food intake at State level. This year, the CCMCs and Task Force teams were able to estimate production of groundnut, which is grown to a smaller extent in eight of the 11 counties in the State. As a result, a production of 1 260 tonnes of unshelled product is estimated.

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



Source: WFP/VAM, 2018.

Livestock management in Jonglei State is based on the transhumance system. Pasture and water availability were reported to be normal in most areas of the State. As a result, the PET BCS was reported to be 3 for cattle and 4 for shoats during the season. There were no reports of diseases outbreaks this year, except the normal occurrence of endemic diseases including CCP, FMD, BQ, PPR, CBPP, mange, New Castle Disease, fowl pox, and internal and external parasites. In Pochalla, livestock management is sedentary and livestock numbers are small. PET BSC was reported to be 3 for cattle and 3-4 for shoats. However, backyard poultry production is common in Pochalla County, with almost every household practicing it with small animal numbers.

Annex 3

South Sudan - CCMC - Training provided by FAO, March-October 2018

| Place of training | Number of trainees | | | NGOs/UN Agencies | Dates of training (2018) |
|-----------------------------|--------------------|-----------|------------|---|--------------------------|
| | Male | Female | Total | | |
| Abyei | 21 | 2 | 23 | 3 UN (IMO, FAO, WFP) 6 NGOs | 15-18 March |
| Yambio (Western Equatoria) | 29 | 9 | 38 | - | 22-25 March |
| Kapoeta (Eastern Equatoria) | 19 | 1 | 20 | - | 18-21 April |
| Torit (Eastern Equatoria) | 25 | 1 | 26 | - | |
| Abyei (Refresher) | 23 | 0 | 23 | 1 each from FAO and IMO, 2 each from Save the Children, ADRA and GOAL | 25-28 October |
| Akobo | 8 | 0 | 8 | 3 staff of the Akobo County Agriculture Office and five NGOs | 23-26 October |
| Total | 125 | 13 | 138 | | |

Source: FAO South Sudan.

South Sudan - Planting and harvest assessment missions and case studies in 2018

| State | Type of assessment | Date of assessments (2018) | Counties visited | Number of case studies | | |
|-------------------------|--|----------------------------|--|------------------------|----------------|-------|
| | | | | Farmers | Key informants | Total |
| Western Equatoria | First season planting in Western Equatoria | 16-30 May | Yambio, Nzara | 30 | 4 | 34 |
| | First season planting in Western Equatoria | 29 May-4 June | Mundri East, Mundri West | 30 | 2 | 32 |
| | First harvest assessment in Western Equatoria | 17-27 August | Yambio, Nzara, Tambura | 62 | 3 | 65 |
| | First harvest in Western Equatoria | 25-31 August | Mundri West, Mundri East | 11 | 4 | 15 |
| | Second harvest Western Equatoria | 17-24 November | Maridi, Tambura, Ibba, Nzara | 37 | 2 | 39 |
| | Second harvest in Western Equatoria | 17-24 November | Mundri West and Mvolo | 8 | 5 | 13 |
| Central Equatoria | First season planting Central Equatoria | 17-24 May | Yei | 48 | 11 | 59 |
| | " | 17-19 May | Terekeka (state) | 16 | - | 16 |
| | " | 20-27 May | Juba (Jubek state) | 62 | - | 62 |
| | First harvest in Central Equatoria | August 16-3 September | Yei, Lainya, Terekeka, Juba | 102 | 5 | 107 |
| | Second harvest in Central Equatoria | 20-27 November | Yei, Lainya | 33 | 3 | 36 |
| Eastern Equatoria | Planting in Eastern Equatoria | May 28-11 June | Torit, Lopa/Lafon, Ikwoto, Magwi, Pageri Area | 78 | 8 | 86 |
| | Planting in Eastern Equatoria | May 28-11 June | Kapoeta South, Kapoeta East, Kapoeta North, Budi | 52 | 5 | 57 |
| | First harvest assessment in Eastern Equatoria | 15-23 August | Torit Lopa/Lafon Ikwoto, Magwi, Pagari AA | 27 | 4 | 31 |
| | Harvest assessment in Eastern Equatoria | 18-26 September | Kapoeta South, Kapoeta East, Kapoeta North, Budi | 77 | 1 | 78 |
| | Second harvest assessment in Eastern Equatoria | 16-23 November | Ikwoto, Torit, Magwi, Pager Area | 44 | 3 | 47 |
| Northern Bahr el Ghazal | Planting assessment in Northern Bahr el Ghazal | 2-12 July | Aweil West, Aweil East, Aweil South, Aweil Centre, Aweil North | 109 | 2 | 111 |
| | Harvest assessment Northern Bahr el Ghazal | 9-18 October | Aweil West, Aweil East, Aweil South, Aweil Centre | 51 | 2 | 53 |
| Warrap | Planting assessment in Warrap | 3-10 July | Abyei, Twic, Gogrial West, Tonj South | 67 | 6 | 73 |
| | Harvest assessment in Warrap | 14-25 September | Gogrial West, Twic, Agok (Abyei), Tonj South | 72 | 3 | 75 |

| State | Type of assessment | Date of assessments (2018) | Counties visited | Number of case studies | | |
|------------------------|--|----------------------------|--|------------------------|----------------|--------------|
| | | | | Farmers | Key informants | Total |
| Lakes | Planting assessment in Lakes | 2-11 July | Rumbek North, Awerial, Wulu, Yirol West, Cueibet | 30 | 3 | 33 |
| | Harvest assessment in Lakes | 18-28 September | Yirol West, Cueibet, Wulu | 51 | 3 | 54 |
| Western Bahr el Ghazal | Planting assessment Western Bahr el Ghazal | 2-11 July | Jur River, Raja | 117 | 4 | 121 |
| | Harvest assessment Western Bahr el Ghazal | 23-28 September | Jur River | 59 | 3 | 62 |
| Jonglei | Planting assessment in Jonglei | 1-8 August | Bor South | 34 | 1 | 35 |
| | Planting assessment in Jonglei | 26 July-01 August | Akobo | 12 | 3 | 15 |
| | Planting assessment in Jonglei | 31 July-7 August | Pochalla | 20 | 2 | 22 |
| | Harvest assessment in Twic East | 18-25 September | Twic East | 22 | 4 | 26 |
| | Harvest assessment in Bor | 26 September-2 October | Bor South | 14 | 3 | 17 |
| Upper Nile | Harvest assessment in Renk and Melut | 6-13 November | Renk, Melut | 16 | 2 | 18 |
| Total | | | | 1 391 | 101 | 1 492 |

Source: FAO South Sudan.

South Sudan – Number of Established CCMCs, 2016-2018

| State | As of December 2018 | Remark |
|-------------------------|----------------------------|---|
| Northern Bahr el Ghazal | 5 | |
| Lakes | 7 | |
| Western Bahr el Ghazal | 3 | |
| Warrap | 11 | Includes 5 CCMCs in the new counties of Abyei State |
| Eastern Equatoria | 9 | Includes Pageri Area |
| Central Equatoria | 6 | Includes new counties in Jubek State |
| Jonglei | 3 | |
| Western Equatoria | 8 | |
| Upper Nile | 2 | |
| Total | 54 | |

Source: FAO South Sudan.

Annex 6

South Sudan – Tentative estimates of crop area, 2018 (percent)

| State | Sorghum | Maize | Rice | Finger millet | Pearl millet | Ground-nuts | Cassava | Beans | Sesame | Other crops | All crops |
|-------------------|-------------|-------------|------------|---------------|--------------|-------------|------------|------------|------------|-------------|------------|
| Central Equatoria | 24.7 | 18.3 | 1.0 | 1.0 | 0.9 | 25.4 | 11.6 | 2.7 | 3.6 | 10.7 | 100 |
| Eastern Equatoria | 49.8 | 18.9 | | 1.1 | 1.1 | 6.0 | 11.3 | 1.4 | 2.6 | 7.7 | 100 |
| Jonglei | 73.4 | 17.1 | | | | 3.5 | 0.6 | | 0.6 | 4.8 | 100 |
| Lakes | 33.7 | 5.3 | | 1.1 | 5.9 | 27.5 | 3.5 | | 8.2 | 14.7 | 100 |
| N. Bahr el Ghazal | 58.3 | 4.0 | 0.7 | | 2.2 | 22.7 | 0.4 | | 11.7 | 0.0 | 100 |
| Unity | 45 | 34 | | | 5 | 5 | | | 3 | 8 | 100 |
| Upper Nile | 50 | 4 | | | 6 | 8 | | | 20 | 12 | 100 |
| W. Bahr el Ghazal | 36.7 | 2.9 | | 1.2 | 1.2 | 37.2 | 11.1 | 1.6 | 7.0 | 1.1 | 100 |
| Warrap | 57.5 | 7.2 | | | 2.7 | 19.1 | | | 7.7 | 5.6 | 100 |
| Western Equatoria | 12.4 | 27.9 | 5.8 | 5.7 | 0.2 | 13.9 | 17.4 | 2.6 | 5.1 | 8.9 | 100 |
| Total | 42.2 | 11.7 | 1.0 | 1.3 | 2.6 | 19.3 | 6.0 | 0.8 | 7.5 | 7.6 | 100 |

Note: Other crops include sunflower, okra, green gram, cowpeas, yam and sweet potatoes, among others.

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