



Highlights

- **This year's widespread flooding¹ and waterlogging² across the country is expected to result in impacts that are similar or worse than those of last year.** The overall impact assessment on crop production is yet to be done, but an assessment was done for Jonglei state, which is more affected by the flooding.
- Way above-average rainfall and overflowing of the Nile River and its tributaries in June/July negatively affected growing crops and livestock, and caused displacement of communities, in nine counties of Jonglei State where the impact assessment was undertaken.
- These **earlier than normal, above-average rains** caused, and continue to cause in some areas, displacement of human population and damage to crops and livestock.
- **The floods** found the crops at different stages of growth and **will likely result in lower yields, particularly for those crops found at vegetative stage**, compared to those at maturity stage and with a higher tolerance to waterlogging.
- According to the assessment done in August in Jonglei State, about **45 percent of the total cereal area was damaged by floods in the nine flood-affected counties.**
- While harvesting of crops is expected to start in September, the **production loss due to flood damage is estimated at 26 892 Ha of cultivated land which translates to an estimated loss of 11 916 tonnes of cereals³** in the nine flood-affected counties, with anticipated negative impacts on the food security situation of the affected population.
- **About 72 percent of the livestock population in the four counties of Twic East, Duk, Bor South and Canal Pigi were affected by the floods.** An estimated 6 000 heads of cattle, 36 150 goats and 5 400 sheep are reported to have died in June and July due to the floods, representing 4.8 percent of the affected livestock population in the four counties (Table 3⁴).
- **Flooding has created conditions conducive for outbreak of animal diseases** such as Rift Valley fever, pneumonia, foot rot, increased worm burden, anthrax, black quarter, trypanosomiasis, hemorrhagic septicemia among others. Pastures have also been inundated increasing the risk of animal deaths due to starvation.
- This year's **flooding has spread beyond the traditionally flood-prone areas in Jonglei**, and the resultant displacement of communities and damages to crops and livestock are much higher than the previous years.

Flooding in Jonglei

Jonglei is one of the states affected by floods in South Sudan mainly due to excessive rains, runoff from surrounding highlands and overflow of major rivers, such as River Nile. In general, floods started around late May and continued up to date, displacing a large number of people and causing damage to crops and grazing lands, thus affecting livestock too. This year, nine out of 11 counties of Jonglei have been affected by floods, especially those areas along the Nile River. As at August 2020, the severely affected counties are Twic East, Pibor, Pochalla and Ayod, while Urur, Nyirol, Bor South, Duk

1 Flooding is full coverage or submerging of land with a large amount of water.

2 Waterlogging is full saturation of the soil profile with water.

3 This is 25% of estimated State production based on 2019 CFSAM figures.

4 These preliminary results are expected to change as we go until the harvest time, which is anticipated, from September/October.

and Canal Pigi were mildly affected (Figure-1). As the flood intensified, farmers were forced to move to higher grounds and abandon their crops and villages, which were submerged in flood waters. Crops planted on higher grounds were not affected by the floods and performed better. The extent of flooding and the damage caused is higher than last year, which was also a high rainfall year.

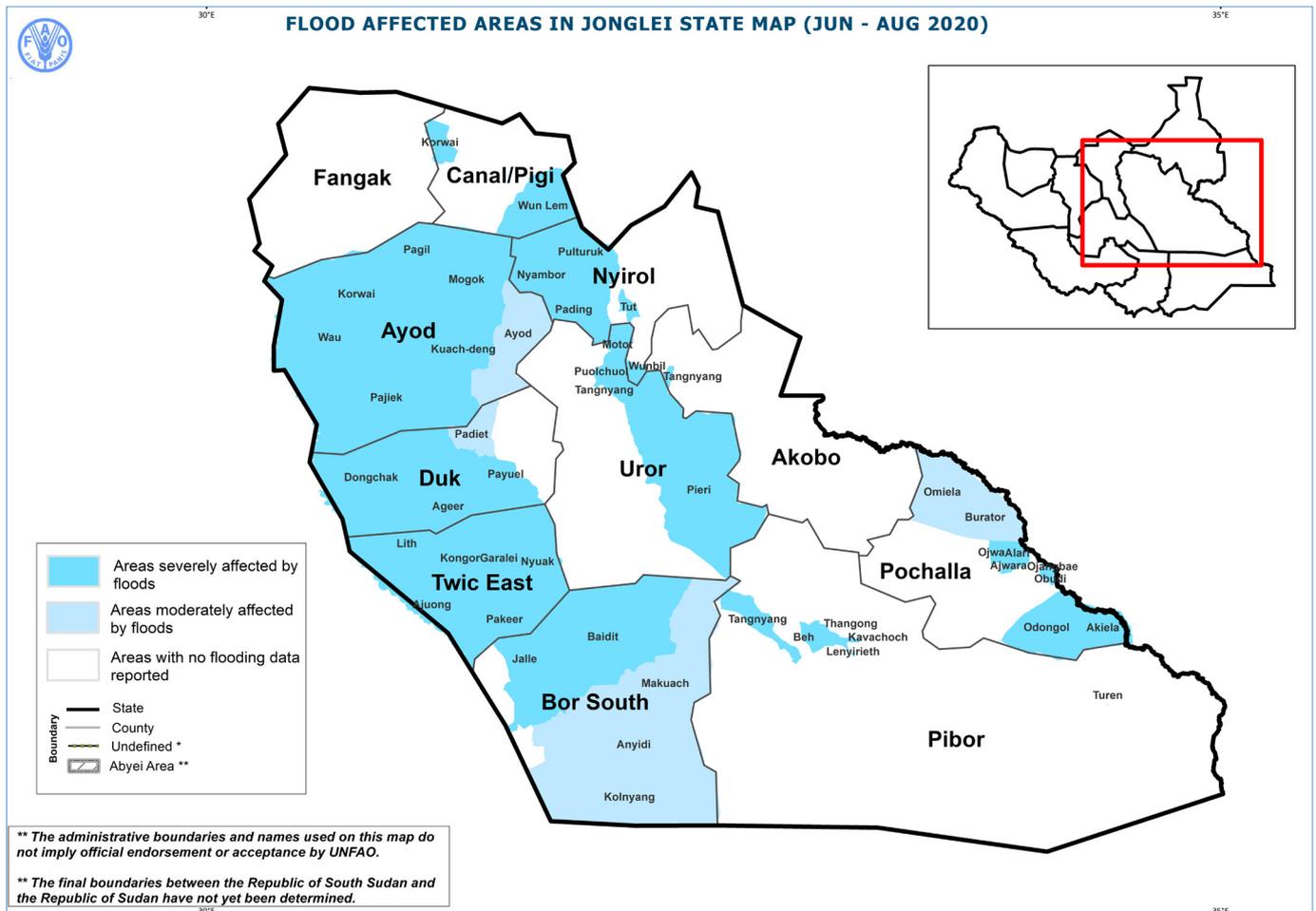


Figure 1: Map showing flood affected areas in Jonglei State, between June and August 2020

Sources of flood waters and time of occurrence

County	Source of flood water	Time of flooding
Duk	Excessive rainfall and overflow of River Nile	June – July and ongoing
Pochalla	Overflow of Oboth, Aburon, and Akobo rivers	July to date
Twic East	Excessive rains from May to August and overflow of the River Nile	June to date
Ayod	From surrounding rivers, excessive rains and River Nile bursting its banks	Late July and ongoing
Pibor	Excessive rains and overflow of Pibor River	Late July to date
Uror	Excessive rains	In July to date
Nyiror	Excessive rains	In July to date
Bor	Excessive rains and overflow of River Nile	June and ongoing
Canal Pigi	Excessive rain and over flow of water from the swampy areas of southern Jonglei to northern part of Jonglei through the canal, and other tributaries of Nile River	Mid-July to August

Table 1: Sources of flood water and time of occurrence in Jonglei State

Impact of floods on crops

In South Sudan, flood is caused by excessive rainfall and river discharge. Flash floods also occur because of unexpected rainfall, excessive river flow. Rains which started in May over most of the State intensified in June, resulting in seasonal accumulation of rainwater, as well as overflow of the Nile and other rivers. The combination of the heavy rainfall and overflow of rivers resulted in serious flooding, which is higher than the previous year, in most counties of Jonglei State. As a flood prone area, floods are normally expected in August and continue up to September. However, the current flooding started earlier than normal, causing damage to crops at different stages of development. In areas severely affected by floods like Twic East (e.g. 53% damage), crops were in their late vegetative growth stages and therefore suffered from severe waterlogging, which caused stunting of sorghum crops and yellowing of leaves - an indication of crop failure. Early planted maize was at tussling stage and may not survive the impact of floods as well. Maize is less tolerant to waterlogging than sorghum. As a result of early arrival of floods, this year's crop production in most of the affected counties is seriously affected and production prospects will be lower than the past three or more years. Counties which reported heavy crop damages are highly dependent on livestock for their livelihoods.



Figure 2: Flooded crops in Pochalla (August 2020)

In most of the affected areas, sorghum is the staple crop of the communities, and maize is a minor crop mostly grown around homesteads. However, maize is an important crop that fills the hunger gap until the long growing sorghum is harvested in early October. Therefore, the areas affected by early floods, especially when the maize crops were at vegetative stage are expected to go through the lean season without any respite from green maize harvest. On the other hand, in areas where the maize crop has already reached maturity stage, the impact of floods has been lower, despite the reduction of yield and spoilage of seeds caused by high humidity leading to fungal damage and rotting of the seeds. Although the sorghum crops that reached booting stage may survive the impact of flooding/ waterlogging, the productivity will be reduced due to the falling of the plants/stalks in the flood waters, and washing away of some fields planted closer to the river banks.

With the continuation of floods, it may take longer for the displaced communities to return to their homes, especially in severely affected counties. In the meantime, the submerged crops will fall in the flood waters or be washed away by water, hence making it difficult to salvage the remaining maize and sorghum crops planted in the low-lying areas and around homesteads.

In areas such as Nyirol County where planting of late sorghum is a common practice, this has not been possible to do this year because of the continued flooding. Since the floods are expected to recede around late September and October, planting of late sorghum is not feasible. Hence, the production from late sorghum can only be expected from crops planted on higher grounds, which may not be sufficient for the concerned communities.

In areas such as Pochalla where maize is the staple crop, the floods appeared at maturity stage causing yield reductions, rather than complete loss of the crop, while sorghum and other crops such as cassava are likely to be destroyed by the floods.

Opportunity for replanting of lost fields was only possible in areas such as Bor South, where flooding occurred earlier in

the season due to the excessive rainfall and river overflow in May. The displacement is not only due to the floods, but also the insecurity that prevailed in most of the highland areas. The insecurity in some areas of Pibor due to cattle rustling has disrupted essential cultural practices like weeding due to displacement of the farming communities. Consequently, the combined effect of floods and insecurity in Pibor will plunge the County into a serious food insecurity situation that requires continuous food assistance and distribution of inputs to support quick recovery of the agriculture sector.

County	Cereal area		Expected cereal production (tons), as per CFSAM 2019	Level of damage on cereals as @ August 2020				Cereal production loss (tons)	
	Cereal area - as per CFSAM 2019 (ha)	Total cereal area damaged (ha)		Completely damaged (100%), ha	Seriously damaged (75%), ha	Medium damage (50%), ha	Low damage (25%), ha	Tons	Percent
Pibor	8 512	5 107	8 512	-	2 554	1 788	766	3 000	35%
Uror	9 656	2 897	5 311	-	869	1 738	290	876	17%
Nyirol	4 455	1 916	2 673	-	766	958	192	661	25%
Akobo	6 426	-	6 426	-	-	-	-	-	-
Twic East	5 880	4 822	3 528	723	2 170	1 205	723	1 880	53%
Duk	2 758	1 462	1 931	-	804	439	219	614	32%
Bor South	11 445	4 578	8 584	-	1 145	1 373	2 060	1 545	18%
Fangak	1 491	-	1 044	-	-	-	-	-	-
Ayod	1 078	776	862	-	233	466	78	342	40%
Canal Pigi	865	476	606	-	214	190	71	191	32%
Pochalla	6 941	4 859	7 635	-	1 458	2 429	972	2 806	37%
Total	59 507	26 892	47 111	723	10 212	10 586	5 371	11 916	25.3%
		45%		3%	38%	39%	20%		

Table 2: Details of flood affected areas, damage on cereal and estimated loss of production in Jonglei - August 2020 (Calculation based on CFSAM 2019 data)

Based on CFSAM 2019 figures of area and production, about 26 892 hectares (45 percent) of the total cereal area in the State has been damaged by floods. While harvesting of main crops is expected to start in September/October, the estimated loss of production from the affected counties is 11 916 tons of cereals, which is 25 percent of the expected production from the whole State and 30 percent of the expected production from the nine flood affected counties (Table 2).

Impact of floods on livestock

Floods have impacted livestock in several ways, including increased disease outbreaks and alerts, and vulnerability to starvation-related deaths. There were reported livestock losses due to disease outbreaks and shortage of feed. Cases of diseases such as pneumonia, foot rot, increased worm burden, anthrax, black quarter, trypanosomiasis, hemorrhagic septicemia among others. Flooding also increases the risk of an outbreak of Rift Valley fever, a zoonotic disease. In the flooded areas, pastures are in short supply as most of the grazing and shrublands were submerged in water, resulting in movement to higher ground where competition for settlement by the displaced communities and their livestock. An estimated 47 500 animals have died due to the impact of floods in the four counties of Twic East, Duk, Bor South and Canal Pigi (Table 3).

County	Total cattle population	Number of cattle affected	Number of cattle died	Total goats population	Number of goats affected	Number of goats died	Total sheep population	Number of sheep affected	Number of sheep died	Total number of livestock affected	Total number of livestock died
Twic East	62 700	59 565	1 881	93 500	88 825	23 375	15 200	14 440	760	162 830	26 016
Duk	51 400	23 130	514	31 200	16 536	312	15 300	7 497	153	47 163	979
Bor South	125 400	106 590	1 254	264 800	185 360	10 592	228 500	137 100	3 428	429 050	15 274
Canal Pigi	47 000	38 070	2 350	31 200	21 528	1 872	15 200	12 768	1 064	72 366	5 286
Total	286 500	227 340	5 999	420 700	312 249	36 151	274 200	171 805	5 405	711 409	47 555
Percent		79.4%	2.1%		74.2%	8.6%		62.7%	3.1%	72.5%	4.8%

Note: The figures presented in the table above were at the beginning of the floods. An increase in the numbers is expected as the floods continue.

Table 3: Jonglei - Impact of floods on livestock



Figure 3: Impact of floods on livestock – Bor South and Twic East counties (August 2020)

Reccomendations

In addition to the emergency food assistance by the responsible agencies and NGOs, the following agricultural interventions are required to improve food security of the vulnerable households in the affected areas.

- Provision of technical support to the County Agriculture Offices and the State Director General of Agriculture, Livestock and Fisheries to provide advisory services, coordinate meetings and facilitate logistical support.
- Distribution of various types of vegetable seeds (especially of early maturing varieties), provide support on supplementary irrigation using pumps, and give hand tools (for gardening) including watering cans and fishing kits for affected households.
- FAO to launch a vaccination and treatment campaign, and a livestock feed supplementation program where necessary.
- Needs for destocking in areas affected, using slaughter destocking. Meat can be used to supplement WFP intervention as source of protein
- Provisions of animal health services in areas where livestock migrated to and those left behind
- Acceleration of stock feeding programme and provision of concentrate feeds.
- Support the relocation of at-risk populations to higher grounds, and provision of food and other materials to assist them settle as they wait for the flood waters to recede.

ANNEX

County	Seriously affected Payams/Areas	Moderately affected Payams/Areas
Duk	Payuel, Ageer and Dongchak	Padiet
Twic East	Paker, Ajuong, Nyuak, Kongor, and Lith	Garalei
Pibor	Kavachoch, Bee, Lenyirieth, Tangnyang, Turen and Napul	Luakongole and Gumuruk
Ayod	Pajiek, Kuacdeng, Ayod town, Padek, Wau, Mongok, Korwai, and Pagil	Highland areas within the 8 Payams especially Eastern canal and Ayod town
Uror	Pieri, Pulchol, Motot and Tearam	Highland areas within the Payams
Nyirol	Pultruk, Nyambor, Pading, Tut, Thol, Wunbil and Dengdor	Lankien and highland areas
Pochalla	Akiela, Pochalla, Adongo	Burator, Omiela
Bor South	Jalle and Baidid	Anyidi, Makuac and Kolnyang
Canal Pigi	Pigi, Khorwac and Wunlem	Khorflus

Table 4: Extent of flood damage in the affected Counties and Payams in Jonglei State

Methodology

In order to determine the level of damage and estimate production losses, semi-structured questionnaires were used to collect field data at County and Payam levels in the flood affected areas of Jonglei State. Data collection was conducted by focal points in FAO's field offices, the County Crop Monitoring Committee (CCMC) members, County Agriculture Officers and the State Ministry of Agriculture and Livestock (MoAL) officers.

The collected quantitative and qualitative data was crosschecked against reports from NGOs, FSL Cluster members and the State RRC office reports. Satellite-based remote sensed rainfall anomalies were used to verify the extent of rainfall in each county compared to last year and the long-term average. All of this information was triangulated and used to determine the level of damage on planted areas, yield reductions per unit area and total production (tonnes) losses in each County.

The 2019 CFSAM area and yield levels of cereals were used as a benchmark to estimate the losses due to floods. The impact on livestock and the death of animals was based on reports from the field-based FAO livestock information monitors, the State MoAL officers and County Agriculture Officers.

Contact

Mr. Meshack Malo
FAO Representative

FAO South Sudan
Juba, South Sudan
FAO-South-Sudan@fao.org

Food and Agriculture Organization
of the United Nations
www.fao.org