KEY HIGHLIGHTS

- In the wake of widespread flooding\(^1\) across the country, affecting over 900,000 people, the overall impact on crop and livestock production is significant, with some States like Northern Bahr el Ghazal, Jonglei, Warrap and Upper Nile adversely affected.
- FAO forecasts show that about 74,157 hectares of cultivated land has been damaged with an estimated loss of 72,611 tonnes\(^2\) of grain in the flood-affected areas. This is approximately a 15.1 percent loss in production in the affected areas with expected consequences on food security of the vulnerable population. Large-scale farms in the Aweil Rice Scheme, Tonchol and Ayai areas have been completely flooded since early June, making this year’s planting operations impossible and resulting in no harvests for these areas.
- The Livestock Sector has been impacted with an estimated 3 million livestock heads affected: (i) widespread livestock mortality - reaching as high as 80 percent in some households; (ii) a threefold increase in livestock diseases alerts - Rift Valley Fever [RVF], East Coast Fever [ECF], trypanosomiasis, Anthrax, Haemorrhagic Septicaemia, intestinal worms; (iii) and limited availability of forage as pastures are submerged. These will see a significant decrease in livestock productivity and milk production.
- Nevertheless, as water recedes, soil moisture conditions will improve and offer the opportunity for flood recession farming to enhance agricultural production, specifically with vegetable seeds, that would simultaneously enhance nutrition status.

SOURCES OF FLOOD WATERS AND TIME OF OCCURRENCE

The table below provides a summary of the main States affected by flooding, the periods when the flooding took place, and the source of the flood waters.

<table>
<thead>
<tr>
<th>State</th>
<th>Source of flood water</th>
<th>Time of flooding (June – Oct 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Bahr el Ghazal</td>
<td>Excess rainfall and overflow of rivers</td>
<td>July to October</td>
</tr>
<tr>
<td></td>
<td>Overflowing of Lol River</td>
<td>September to October</td>
</tr>
<tr>
<td>Upper Nile</td>
<td>Excess rainfall and flood water from Ethiopian Highland (Sobat/Baro River and Khoryabus River)</td>
<td>July to October</td>
</tr>
<tr>
<td>Eastern Equatoria</td>
<td>Excess rainfall and overflow of Kiniete River coming from the Imotong Mountains</td>
<td>July to October</td>
</tr>
<tr>
<td>Unity</td>
<td>Excess rainfall</td>
<td>June</td>
</tr>
<tr>
<td>Central Equatoria</td>
<td>Overflow of Nile River</td>
<td>July</td>
</tr>
</tbody>
</table>

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\(^1\) Flooding is full coverage or submerging of land with a large amount of water

\(^2\) This estimate represents gross crop production loss.
Figure 1 – Map of flood-related cereal production losses
(Mapped areas are the most affected Payams and production loss numbers are aggregated at State level)
Table 1 - Preliminary estimates of crop losses and affected livestock due to flooding between June and October 2019.

<table>
<thead>
<tr>
<th>States Affected (No. of counties affected)</th>
<th>2019 Estimated Gross Cereal Production (tons)</th>
<th>2019 Estimated Cereal Area Damaged (Ha)</th>
<th>2019 Estimated Cereal Production Loss (tons)</th>
<th>2019 Cereal Production Loss (%)</th>
<th>2019 Estimated Heads of Livestock Affected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Bahr El Ghazal (5)</td>
<td>168,101</td>
<td>19,802</td>
<td>21,183</td>
<td>12.6</td>
<td>7.5</td>
</tr>
<tr>
<td>Eastern Equatoria (2)</td>
<td>24,485</td>
<td>5,936</td>
<td>5,629</td>
<td>23.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Lakes (3)</td>
<td>48,709</td>
<td>4,783</td>
<td>4,871</td>
<td>10.0</td>
<td>10</td>
</tr>
<tr>
<td>Jonglei (11)</td>
<td>49,553</td>
<td>9,078</td>
<td>7,910</td>
<td>16.0</td>
<td>25</td>
</tr>
<tr>
<td>Warrap (6 + Abyei)</td>
<td>37,296</td>
<td>24,921</td>
<td>25,302</td>
<td>18.4</td>
<td>10</td>
</tr>
<tr>
<td>Upper Nile (6)</td>
<td>34,804</td>
<td>7,623</td>
<td>5,998</td>
<td>17.2</td>
<td>15</td>
</tr>
<tr>
<td>Central Equatoria (1)</td>
<td>13,859</td>
<td>1,540</td>
<td>1,386</td>
<td>10.0</td>
<td>10</td>
</tr>
<tr>
<td>Unity (2)</td>
<td>3,313</td>
<td>473</td>
<td>331</td>
<td>10.0</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>480,120</strong></td>
<td><strong>74,157</strong></td>
<td><strong>72,611</strong></td>
<td><strong>15.1</strong></td>
<td><strong>11.4</strong></td>
</tr>
</tbody>
</table>

**Note:** Differences in percent of area damaged by flooding and percent of production losses are due to the difference in yields for the affected areas. The 15.1 percent loss is from the affected States only. Yield estimates are based on 2018 CFSAM analysis. Livestock numbers are estimated heads of livestock affected by the floods.

Medium and short cycle sorghum had already been harvested in Northern Bahr el Ghazal, Eastern Equatoria, Warrap and Jonglei by the time of the second flood in October.

However, excessive rains will increase post-harvest losses due to difficulties in transporting produce to storage areas, most of which are in higher areas that are served by poor road networks. Furthermore, losses will also be attributed to lack of improved storage facilities and damp/humid conditions associated with the long-wet season, likely to result in improper drying, fungal damage and quick deterioration of the quality of the harvested crops.

Regarding the livestock, the increase in the priority of disease alerts from many locations across the country and more conducive environmental conditions for the outbreak of zoonotic diseases (affecting both humans and animals) as mentioned RVF, leptospirosis, etc. Subsequently, limited availability of forage as pastures is submerged, and significant decrease in livestock productivity and milk production.

**RECOMMENDATIONS**

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.

**Short term interventions:**

a) Crop and Livestock Assessments and/or Surveys to be conducted to assess disaster/floods in affected areas.

b) Urgent provision of fishing kits, to exploit the abundance of fish in flooded areas that can contribute to the food and nutrition security of the population.

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3 These are livestock that have been forced to migrate, are lacking feed, affected by disease, and in some extreme cases deaths.
c) Provision of various types of vegetable seeds, cow peas and planting materials (e.g. sweet potato cuttings) to take advantage of receding flood waters.

d) Provide technical support on coordination meetings and facilitate logistical support to the offices of the State Director General of Agriculture, Livestock and Fisheries in the affected states and counties to provide advisory services.

Medium term interventions:

a) Cash voucher interventions to support access to agricultural inputs as well as nutrition-based purchases in areas with functioning markets.

b) Support multiplication and distribution of planting materials of vegetables and root and tuber crops, such as, sweet potatoes, and cassava cuttings.

c) In coordination with local Departments of Agriculture, implement livestock destocking to minimize livestock losses.

d) Support local authorities in the implementation of contingency plans and strategies related to land and water management as flood mitigation measures.
ANNEX I

JONGLEI

All the 11 counties of Jonglei have been affected by floods. The most severely affected counties are Uror, Pibor, Duk and Twic East, with the damage on the remaining counties being mild. Floods started in late June to July when crops were at the vegetative growth stage (of 3-5 leaf stage). Farmers moved to higher grounds abandoning their crops, which were left growing under extremely wet conditions. Crops planted on higher ground performed better due to good drainage of the sloped lands. Crops were harvested in September, with an estimated loss of 7,910 tonnes of cereals due to flood damage – in the flood-affected areas of the State. Additionally, solar livestock vaccine cold chains network have been affected by flooding, for example, Pibor County.

UPPER NILE

Six out of twelve counties were affected by floods in Upper Nile, with Maban County being the most affected this year. Although the rainfall started late – towards the end of May – and planting started in June, the intensity of rainfall increased when crops were at the early vegetative stage resulting in waterlogging and flooding of crop fields. This caused damage to crops in July/August, especially within and around Bunj town in Maban where about 70 percent of maize crops and 20 percent of sorghum crops suffered serious damage from waterlogging – all this happening when the crops were at the vegetative stage. Most crops were at the vegetative stage in July, while the planting of short-cycle sorghum continued up to the beginning of August. Flooding occurred twice in Maban, at vegetative stage in July, and at harvest/maturity stage of the crops in September/October. The second, more intensive round of flooding in September/October was due to excessive rainfall in the Ethiopian Highlands. The solar livestock vaccine cold chain network was also affected in Maban County, plus increased alerts of haemorrhagic septicaemia were received from the State.

The total loss of cereals production for the flood-affected areas in Upper Nile is estimated at 5,998 tonnes, reflecting a 17.2 percent drop in production compared to last year for the affected areas.

UNITY

In Unity State, Mayendit and Mayom are the most affected counties due to flooding. The estimated loss of production for the two counties is 331 tonnes, which amounts to a 10 percent loss compared to last year.

WARRAP

All the six counties of Warrap, and the Abyei Administration Area, have been affected by floods, resulting in an estimated loss of 25,302 tonnes of cereals – thus putting the flood-affected areas of Warrap at 18.4 percent less production compared to last year. Flood damage was already visible in July and has continued up to date, with excessive rainfall being the main cause of flooding. Most of the flooded sorghum fields were seriously infested with weeds, with the heads of sorghum (panicles) reported to be smaller. Groundnut pods were also found to be rotten in the affected fields in areas like Tonj North County. Sesame—which does not tolerate waterlogging—failed totally in the Counties affected by severe flooding, especially in Abyei and Twic. Harvesting of crops started in September and extended into October.

In Abyei alone, the damage on production caused by flooding is estimated at 1,191 tonnes, equal to a drop of 17 percent compared to last year. Flooding started in late July and continued up to October. The source of flooding was heavy rainfall and the overflowing of Kiir River.

Flooding has also affected ratooning of sorghum crops because of rotting of the stalks and the roots—hence no significant ratoon crops are expected this year. Under normal conditions, ratoon crops provide better production than the main crops during the flood free seasons. Additionally, storage facilities have been compromised by the
floods, with the wooden racks of granaries becoming waterlogged, unstable and collapsing under the weight of harvests – leading to more losses of harvested cereals.

The increased moist conditions have contributed to further losses due to inadequate drying of grains, even as poor road infrastructure delays the transportation of harvested crops from the farms to their storage locations. Access to markets, especially the border market of Amieth, has been disrupted since July 2019 due to muddy roads and bridge destruction; the resultant delays are compromising the quality of the harvests as they continue being exposed to unfavourable storage conditions. Also, reports of outbreaks of haemorrhagic septicaemia and anthrax in cattle have been recorded, including cases of abortions in cattle, which could be linked to leptospirosis.

**Lakes**

Out of eight counties, only three have been severely affected by floods, namely Rumbek North, Awerial and Cueibet. The long cycle sorghum has so far been tolerant, whereas the short cycle sorghum was harvested in September and October. An estimated 4 500 Feddans of groundnuts in Rumbek North were destroyed, resulting in a loss of about 8 032 tonnes of fresh (unshelled) groundnuts. Some other crops like pumpkin, okra and cowpeas were also affected by flooding and waterlogging. In Rumbek North, floods were caused by heavy rains in June, while in September, they were caused by the water coming from Panyijiar County of Unity State – a situation that persists up to date.

Consequently, production in the three flood-affected areas of Lakes is expected to be 10 percent lower than last year – equal to an estimated 4 871 tonnes of cereals. However, production in the rest of the counties is expected to be better than last year despite the overall flood-driven decline in cereal production. Most recently the last outbreak of Rift Valley Fever was in Lakes State.

**Northern Bahr el Ghazal (NBEG)**

Northern Bahr el Ghazal (NBeG) is one of the States most affected by flooding this year, following two rounds of flooding in June and September/October. The heavy rains, which started in the first week of June, affected planting operations and damaged planted crops at seedling stage. Weed infestation was high in most of the flooded/waterlogged fields due to difficulties in accessing the fields to weed the crops. About 22 Payams from the five counties were affected by the floods. The second round of flooding occurred in October, which is the time of harvest, and caused difficulties in harvesting and transporting crops. The community took urgent measures to harvest the crops from the affected fields and move it to higher grounds in October. However, there are still serious storage and grain quality problems due to the usage of poor storage facilities and increased humidity. The long cycle sorghum will be harvested around January 2020.

An estimated 21,181 tonnes of cereal production (grain) are likely to be lost due to floods, which is 12.6 percent less compared to last year. The groundnut growing areas of Aweil Centre and Aweil East have been productive in NBeG.

In addition to the effect on smallholder farming, the severe floods have affected the mechanized farms including the Aweil Rice Scheme, Ton-chol and Ayai. Consequently, all the mechanized farming areas were unable to plant any crops this season, resulting in no production. Comparatively, last year, more than 2,000 tonnes of cereals (rice and sorghum) was produced from the three mechanized farms. Further reports were recorded outbreaks of haemorrhagic septicaemia in cattle.

**Western Bahr el Ghazal (WBEG)**

There have been no serious damage caused by flooding reported in Western Bahr el Ghazal (WBeG) during the current cropping season.
CENTRAL EQUATORIA

Excess rainfall and flooding was experienced in Juba County, particularly in Gondokoro and Mangala, while the situation in the other six Payams was mostly waterlogging. Part of the populations in the two Payams live in the inlands of the River Nile and were forced to move to the mainland, outside the River Nile, to perform their second season farming.

Production in Central Equatoria is expected to be better than last year in all the counties. The impact of waterlogging and flooding was not significant. As a result, an estimated 1,386 tonnes of cereal production was likely lost due to flood damage in the affected areas, amounting to a 10 percent reduction in production in these areas compared to last year. There was a spike in cases of East Coast Fever, reported by local pastoralists.

EASTERN EQUATORIA

Lopa/Lafon and Torit are the most affected counties in Eastern Equatoria by floods that were caused by the overflowing of Kiniete River that comes from the Imotong Mountains. The floods started in July and became serious in October 2019. More than 9,000 crop fields of small farmers were affected with an estimated 25 to 50 percent crop damage. According to the State Ministry of Agriculture, an estimated 19,838 Feddans of crops, mainly sorghum, were affected. Flooding started in July when crops were at flowering and maturity stages. The situation in Torit is more of waterlogging than flooding, unlike in Lafon where fields were completely covered with water and crops submerged partially or completely — depending on the growth stage at the time of flooding. The first season crops in Torit were harvested with flooding problems, while the long cycle crops of Torit were subjected to flooding and waterlogging. There were no reports of serious flooding this year in Kapoeta, however, the harvesting of matured crops, especially sorghum, was conducted under excessive rainfall in September. This led to an increased risk of post-harvest losses of crops.

WESTERN EQUATORIA

There was above average rainfall in many areas of the State, but with minimum damage on crops. However, the excess rains have affected some crops like rice and millet that are at harvest stage in October 2019. The heavy rains caused the falling of standing crops which resulted in the germination of unharvested crops (within the panicles of rice and heads of millet). The other problem encountered as a result of the heavy rainfall is difficulty in drying of the harvested grain. Sesame that was harvested and kept in the drying racks was affected by dampness and humidity resulting in rotting of the un-threshed seeds while still in their capsules. The areas most affected are Yambio, Ezo, Tambura, Nzara and Ibba. However, the overall negative impact of the above average rainfall in Western Equatoria is minimal, and the negative effects are due to waterlogging rather than flooding. In general, the above average rainfall has been beneficial to growing crops in most places in the Western Equatoria this year. Furthermore, reports of severe outbreaks of East Coast Fever among livestock with mortalities of up to 80 percent. Diagnosis was confirmed at the newly established (with support from FAO and the Government of Japan) Central Veterinary Diagnostic Laboratory in Juba.