Flood Update and Trend Analysis at Belet Weyne, Shabelle River

FSC Meeting 31 August 2020

Peris Muchiri – Hydro-Meteorologist
• Current floods along the Shabelle are due to unusual heavy rains in the upper parts of the Ethiopian highlands

• This has led to increased river levels inside Somalia consequently causing floods

• River level at Belet Weyne is at 7.85m which is 0.4below the bankful level. There is **High Risk** of flooding in the area

• In Jowhar, Balcad and Afgooye the river levels declined slightly in the last week but are still significantly above normal at this time of the year
• Moderate to heavy rains will continue in the Ethiopian highlands during the forecast period.

• Light rains are also foreseen in the coastal areas of Lower Shabelle and Lower Juba regions.

• The second week from now will have significant reduction of rains.

• Little or no rains is other regions in the coming two weeks.
• Following the heavy rain in the Shabelle River basin in Ethiopia, river levels continued to rise.

• Some parts of the town are currently inundated due to overbank spillage.

• About 2,100 ha of agricultural land has been submerged as seen from satellite images.

• About 31 villages have been affected and evacuation has begun in the worst affected areas.

• FAO-SWALIM has sent over 200 SMS flood alert messages to elders, community leaders and members of the communities likely to be affected by floods, including Belet Weyne.
BELET WEYNE | Flood Extent (2016 to 2020)

Gu 2016
Total flooded area: 13,098 ha

Gu 2018
Total flooded area: 40,690 ha

Deyr 2019
Total flooded area: 43,428 ha

Gu 2020
Total flooded area: 22,577 ha

FSC meeting – 31st August 2020
## BELET WEYNE DISTRICT | Flood impact on agriculture and population (2016 to 2020)

### Land Cover Class

<table>
<thead>
<tr>
<th>Land Cover Class</th>
<th>Gu 2016 (ha)</th>
<th>Gu 2018 (ha)</th>
<th>Deyr 2019 (ha)</th>
<th>Gu 2020 (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigated Agriculture</td>
<td>6,794</td>
<td>24,735</td>
<td>27,410</td>
<td>11,885</td>
</tr>
<tr>
<td>Rainfed Agriculture</td>
<td>337</td>
<td>705</td>
<td>652</td>
<td>94</td>
</tr>
<tr>
<td>Built Up Areas</td>
<td>22</td>
<td>237</td>
<td>1,076</td>
<td>194</td>
</tr>
<tr>
<td>Natural Veg &amp; Bare Areas</td>
<td>5,944</td>
<td>15,013</td>
<td>14,290</td>
<td>10,404</td>
</tr>
<tr>
<td><strong>Total Flooded Area</strong></td>
<td><strong>13,098</strong></td>
<td><strong>40,690</strong></td>
<td><strong>43,428</strong></td>
<td><strong>22,577</strong></td>
</tr>
<tr>
<td><strong>Affected Villages</strong></td>
<td><strong>47</strong></td>
<td><strong>100</strong></td>
<td><strong>101</strong></td>
<td><strong>67</strong></td>
</tr>
</tbody>
</table>

### Season

<table>
<thead>
<tr>
<th>Season</th>
<th>Number of Persons affected</th>
<th>Number of Persons displaced</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gu 2018</strong></td>
<td>122,580</td>
<td>122,580</td>
</tr>
<tr>
<td><strong>Deyr 2019</strong></td>
<td>240,000</td>
<td>213,108</td>
</tr>
<tr>
<td><strong>Gu 2020</strong></td>
<td>240,000</td>
<td>240,000</td>
</tr>
</tbody>
</table>

*Source: UNOCHA*
• There has been an increase in the frequency of floods at Belet Weyne in the last 5 years.
• **Worst floods:** Gu 2005; Deyr 2006; Gu 2010; Deyr 2014; Gu 2016; Gu 2018; Deyr 2019, Gu 2020 and Hagaa 2020
• The Gu season has had more flood events in terms of frequency and magnitude.
An increasing trend in river discharge is observed at Belet Weyne.

The pre-war era has had fewer flood events compared to the post-war era.

In the last 20 years, the high-risk flood level has been surpassed more frequently especially in the last five years.
Trend analysis of rainfall in Belet Weyne for the last 20 years (2001 to April 2020) shows an increase in annual rainfall amounts over the years.

This can be contributed to Climate change among other reasons - more research needs to be conducted to support the same. The pattern is also observed in the Ethiopian highlands which contributes more than 80% river level inside Somalia.
The river level at Jowhar remained high since May 2020.

A similar trend has been observed in Balcad and the lower reaches of the river.

Flooding in Jowhar district has been caused by open river breakages in several parts.

About **88,900 ha** of cropland has been inundated while 129 villages have been affected in Jowhar.

62 villages in Balcad and 72 in Afgooye have been affected by the current floods.

A total of 29,500 ha of agricultural land in Balcad is currently flooded and 11,300 ha in Afgooye.
Comparison of areas affected by floods in May 2015 and January 2016, showing a drastic reduction of flooded areas deriving from those portions of the embankments fixed with mitigation interventions.

- 9100 ha less agricultural land affected by floods
- **USD 6.7 million** in crops saved (Based on: USD 293/tonne of maize grain; 2.5 tonne/ha yield)
## FLOODS FINANCIAL IMPACT | Belet Weyne and Jalalaqsi

### Belet Weyne

<table>
<thead>
<tr>
<th>Season</th>
<th>Flooded Agric. (ha)</th>
<th>Yield (t)*</th>
<th>Loss** (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gu 2020</td>
<td>11,978</td>
<td>29,945</td>
<td>8,773,885</td>
</tr>
<tr>
<td>Deyr 2019</td>
<td>28,062</td>
<td>70,155</td>
<td>20,555,415</td>
</tr>
<tr>
<td>Gu 2018</td>
<td>25,441</td>
<td>63,603</td>
<td>18,635,533</td>
</tr>
<tr>
<td>Gu 2016</td>
<td>7,131</td>
<td>17,828</td>
<td>5,223,458</td>
</tr>
</tbody>
</table>

* = the assumption is a yield of 2.5 t/ha  
** = the assumption is a crop value of 293 USD/t

### Jalalaqsi

<table>
<thead>
<tr>
<th>Season</th>
<th>Flooded Agric. (ha)</th>
<th>Yield (t)*</th>
<th>Loss** (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deyr 2019</td>
<td>3,801</td>
<td>9,503</td>
<td>2,784,233</td>
</tr>
<tr>
<td>Deyr 2018</td>
<td>548</td>
<td>1,370</td>
<td>401,410</td>
</tr>
<tr>
<td>Gu 2018</td>
<td>6,104</td>
<td>15,260</td>
<td>4,471,180</td>
</tr>
<tr>
<td>Gu 2016</td>
<td>1,868</td>
<td>4,670</td>
<td>1,368,310</td>
</tr>
<tr>
<td>Gu 2015</td>
<td>493</td>
<td>1,233</td>
<td>361,123</td>
</tr>
<tr>
<td>Deyr 2013</td>
<td>457</td>
<td>1,143</td>
<td>334,753</td>
</tr>
</tbody>
</table>

* = the assumption is a yield of 2.5 t/ha  
** = the assumption is a crop value of 293 USD/t

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### Maps

**Belet Weyne**  
- **Gu 2020:**  
- **Deyr 2019:**

**Jalalaqsi**  
- **Deyr 2013:**

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*Note: Images and maps illustrate flood-prone areas and affected villages.*
CONCLUSION

• Current ongoing floods affected estimated 132,000 ha of agricultural land and 294 villages in Belet Weyne, Jowhar, Balcad and Afgooye
• A positive trend in flood frequency is observed in Belet Weyne, especially in the last 5 years.
• The severity of the floods has also gone up with time.
• Gu season is most vulnerable, as more floods occurred during this time
• A positive trend of annual rainfall amounts has also been observed. This can be lined to climate change, but subject to further analysis
• A new analysis of the status of Shabelle and Juba river was finalized by SWALIM, and the River Breakages dataset will be shortly released for Deyr 2020 flood preparedness purpose.
• .....(financial impact)
Assessment scope: 60 broken river banks along the Shabelle river identified and assessed for rehabilitation in Hirshabelle State.

HSS Govt with FAO support to:

- mobilise Ministries at state and federal levels to provide engineers
- mobilise of communities at regional, district and village level;
- Identify scope of works at priority open river banks (measurements, pictures, sketches & GPS coordinates)
- Undertake community & local government consultation in Belet Weyne, Bulo Burte, Jalalaqsi Jowhar, Madahray & Balcad districts
- Reports with scope of works for each site for design & tendering
Embankment closure and strengthening (2020)

Scope of Works:

60 broken river banks along the Shabelle river for rehabilitation in Hirshabelle State:

- 144 sites identified by SWALIM
- 62 sites prioritised by HSS Govt
- 16 local contractors short listed
- contract award for 8 sites underway
- contract award for 54 sites pending
- HSS Govt supervision of site works
- FAO technical assistance to HSS Govt

<table>
<thead>
<tr>
<th>District</th>
<th># of Sites</th>
<th>Meters (linear)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balcad</td>
<td>3</td>
<td>1,330</td>
</tr>
<tr>
<td>Mahadaay</td>
<td>5</td>
<td>1,539</td>
</tr>
<tr>
<td>Jowhar</td>
<td>8</td>
<td>1,098</td>
</tr>
<tr>
<td>Jalalaqsi</td>
<td>13</td>
<td>725</td>
</tr>
<tr>
<td>Bulo Burte</td>
<td>11</td>
<td>170</td>
</tr>
<tr>
<td>Belet Weyne</td>
<td>22</td>
<td>4,009</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62</strong></td>
<td><strong>8,871</strong></td>
</tr>
</tbody>
</table>
Assessment of long term flood prevention requirements for Beled Weyne:

- Satellite analysis of topography (FAO)
- Historical review of flood events and trends (FAO & HSS govt)
- Ground assessment and drone survey of Beled Weyne town (upstream & settlement area) (HSS govt & FAO)
- River bed profiling for dredging (FAO & HSS govt)
- Design options developed for flood mitigation options (FAO & HSS Govt)

Design options:

- Vegetated gabion walls with CfW (up to 10 km)
- River dredging in Beled Weyne town
- Rehabilitate existing flood diversion canals in town
- Upstream diversion by extended irrigation canals
- Works to commence in Jan 2021