

Situation Analysis Preliminary Report

Floods in Khartoum, Sudan

August 2016

Prepared by
UNITAR-UNOSAT



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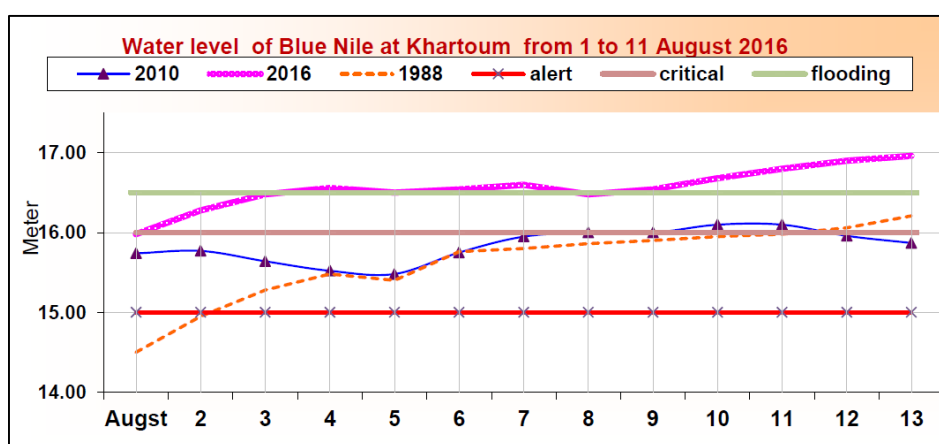
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Situation Overview

The current rainy season in Sudan, which started in early June and is expected to continue until November this year, has resulted in torrential rains that heavily impacted several parts of the country, causing about 114 deaths and affecting more than 161,700 people. 14,700 houses were destroyed and another 10,800 damaged nationwide ([UN OCHA, 14 Aug 2016](#)).

According to the UN Office for the Coordination of Humanitarian Affairs (UN OCHA), floods are common in Sudan during the rainy season. The predominant types of floods are localised floods caused by exceptionally heavy rains (flash floods), and widespread floods caused predominantly by overflow of the Nile and its tributaries, as well as the Gash river. Though flash floods are generally short in duration, these events can cause major damage to villages, urban and agricultural areas located in catchment and drainage zones.

In the State of Khartoum, rainfall accumulation over the past days resulted in flooding of the Nile river and its two major tributaries, the White and the Blue Nile.



Water level of the Blue Nile river detected in Khartoum from 1 to 11 August 2016 – from the Flood Watch Update of 13 August 2016, prepared by the Humanitarian Aid Commission and the Ministry of Social Welfare of Sudan.

UNITAR-UNOSAT on behalf of UN OCHA activated the International Charter on Space and Major Disasters on 08 August 2016 to assist with satellite based impact assessment covering the flood affected areas. Priority Areas of Interest (AOIs) for satellite imagery acquisition have been selected based on information about the situation on the ground received from UN OCHA in Sudan and from the Government of Sudan.

The present situation analysis report exposes the possible flood water and saturated/wet soils in the State of Khartoum, and the potential impact over agricultural areas.

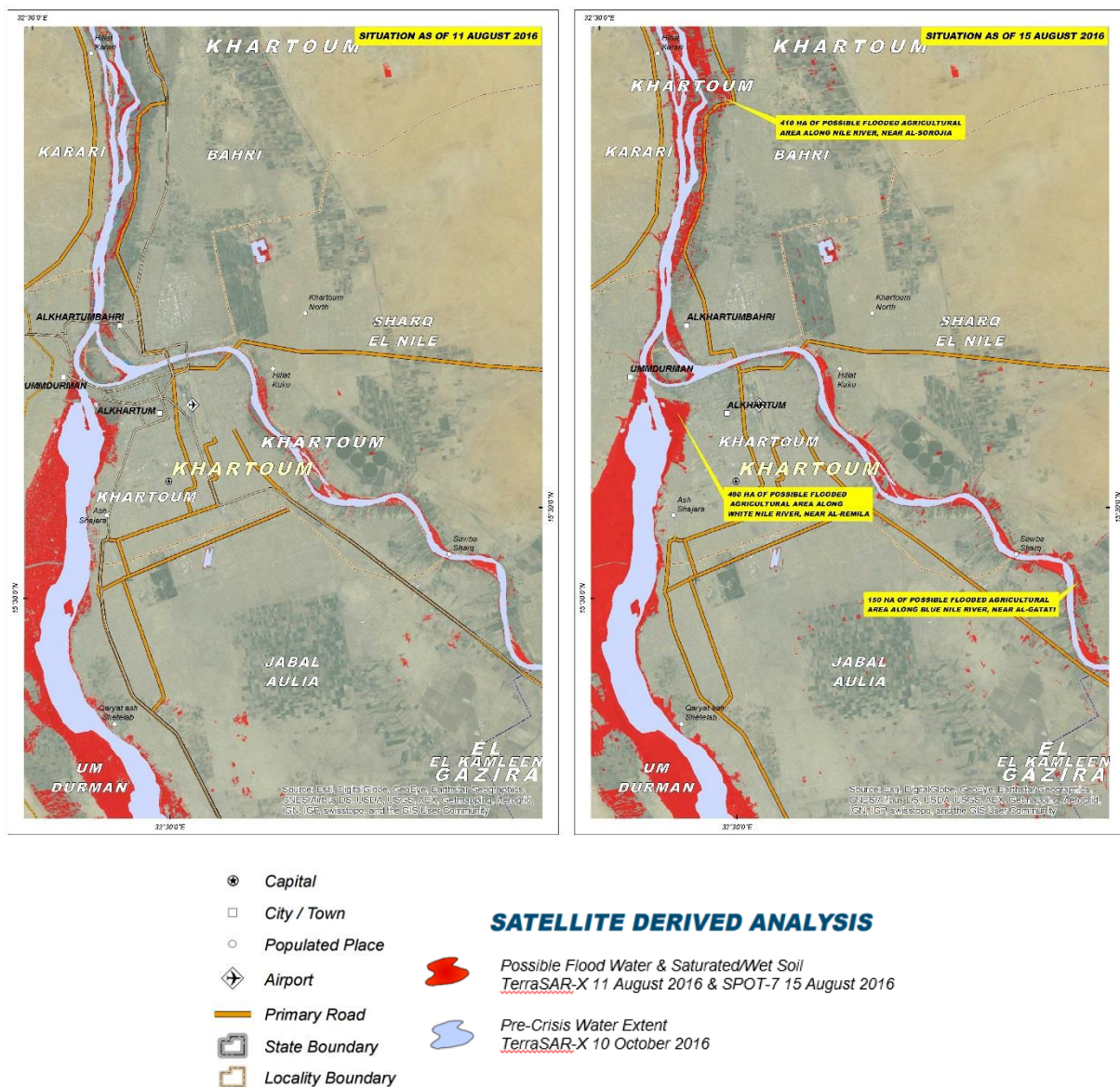
Preliminary flood analysis was conducted by comparing the post-crisis satellite imagery with available pre-crisis imagery. All the completed, current and future mapping activities done by UNITAR-UNOSAT as well as other satellite mapping groups can be viewed through [GDACS/SMCS](#).

All the maps and products of UNOSAT are available at: <https://www.unitar.org/unosat/maps/SDN>

Possible Flood Water & Saturated Soil Over Khartoum Area

The analysis carried out by UNITAR-UNOSAT shows a total satellite detected water expansion of ~ 15,000 hectares (over the analysed area), corresponding to ~ 0.7% of the total area of the State of Khartoum. The post-crisis images were acquired from TerraSAR-X (Radar) at 3m resolution on 11 August 2016 and SPOT-7 (Optical) at 1.5m resolution on 15 August 2016 and water expansion computed based on the difference from pre-crisis image acquired from TerraSAR-X on 10 October 2009. The total area analysed was approximately 290,000 hectares of land, comprising of seven different districts in the State of Khartoum.

UNITAR-UNOSAT analysis shows an expansion of possible flood water and saturated soil over areas particularly located on the right bank of the Blue and White Nile as well as in the Nile river downstream.



This map illustrates satellite-detected possible flood water & saturated soil over Khartoum City in Sudan, Khartoum State, extracted from SPOT-7 imagery on 15 August 2016 and TerraSAR-X imagery on 11 August 2016.

Potential Impact on Agricultural and Urban Areas within the State of Khartoum

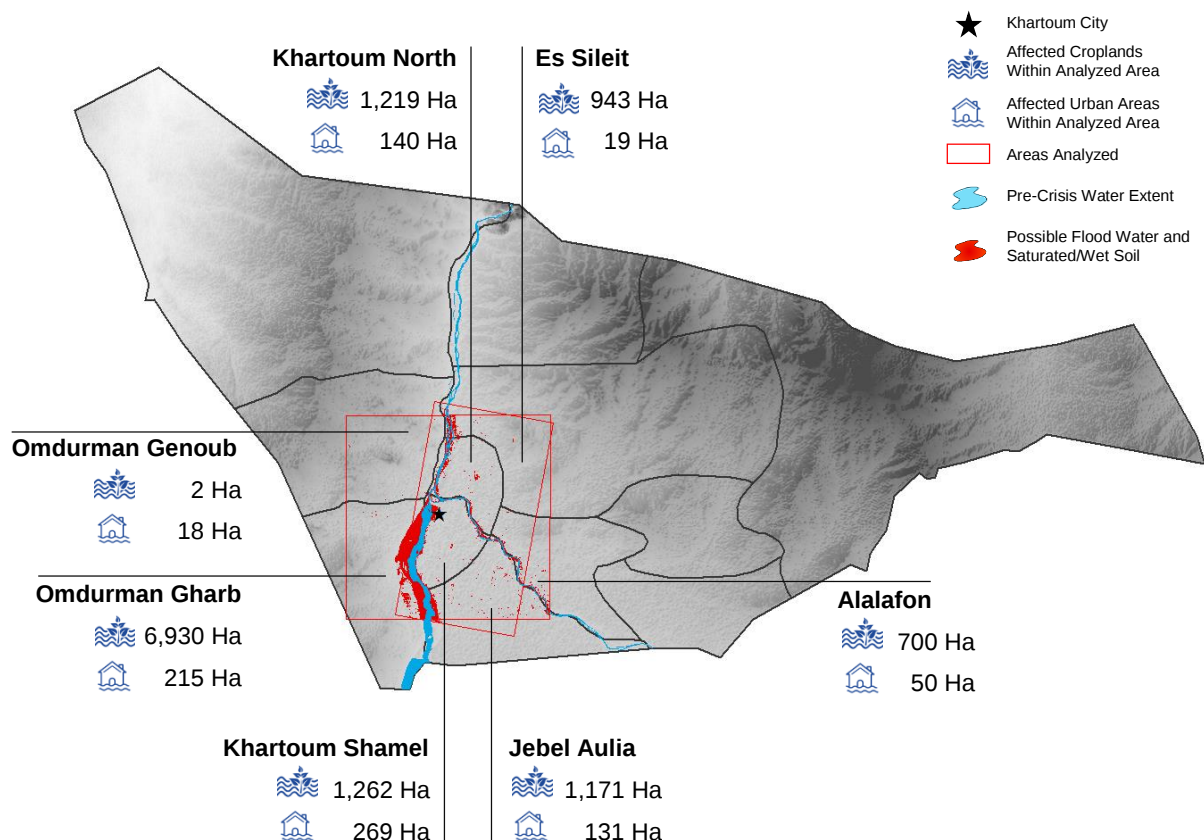
Satellite derived analysis using the post-crisis water extent and land cover classification obtained from the Ministry of Agriculture and Irrigation of Sudan, shows approximately 12,200 hectares of affected agricultural areas and 839 hectares of potentially affected urban areas within seven districts around the city of Khartoum. According to the analysis, the district with the most affected agricultural areas is *Omdurman Gharb* and the one with the most affected urban areas is *Khartoum Shamel*.

The image below depicts the potentially affected agricultural land as well as urban areas, within the satellite derived analysis for the State of Khartoum.

Estimate of Affected Croplands and Urban Areas within Satellite Derived Analysis

Total Affected Agricultural Area: 12,226 Hectares

Total Affected Urban Area: 839 Hectares



DISCLAIMER

The analysis does not cover the entire area of each administrative division, hence the total affected hectareage depicts only the extent of the analysis, as shown in the map above. The land cover used in this analysis is from 2011 and the analysis might not accurately portray the current extents of agricultural and urban areas. It is also important to note that the analysis has been conducted using RADAR and Optical imagery and thus may not accurately estimate the water extent. The analysis has not been verified in the field yet; please send your comments to unosat@unitar.org.

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