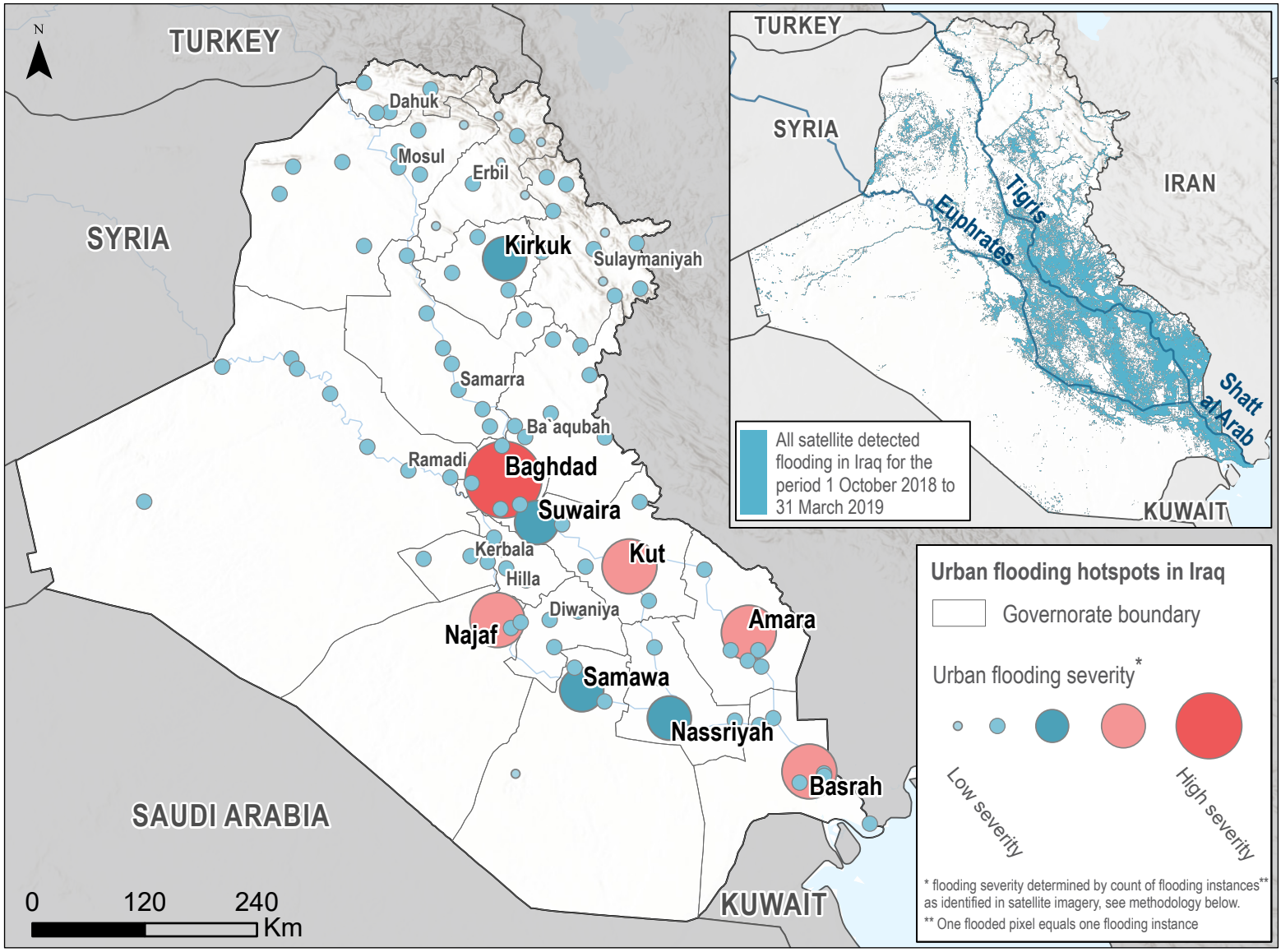
WASH Cluster
Water Sanitation Hygiene

Flood hotspots in Iraq (October 2018-March 2019)

October 2020

Background

Floods in Iraq have always caused significant loss of life and property[1]. The rising levels of the Euphrates and Tigris rivers were the main causes of flooding until Iraq started using natural depressions to divert the excess water from the urban areas in the 1950s[1]. This approach significantly improved the situation and no significant flood was reported until the early years of the last decade. Lately, floods were reported in different cities around Iraq with 2019 experiencing the most severe flooding since then[2]. Therefore, to support the Iraq Water, Sanitation, and Hygiene (WASH) cluster in identifying and targeting flood-prone areas where mitigation measures may be needed, REACH Iraq conducted a cumulative flood occurrence analysis of the floods during the 2018/19 winter season to identify flood hotspots throughout Iraq.



Methodology

The flood hotspots in Iraq were identified in two steps. During the first step, the cumulative flood occurrence for the whole of Iraq was extracted for the period 01/10/2018 - 31/03/2019 by the United Nations Institute for Training and Research Operational Satellite Applications Programme (UNITAR - UNOSAT) using Sentinel-1 Radar images. Post processing steps undertaken by REACH Iraq included the masking of permanent water bodies utilizing the Global Surface Water dataset from the Joint Research Center (JRC)[3] of the European Commission. Additionally, the Height Above the Nearest Drainage[4] dataset was used to mask out any misclassification caused by the terrain. The second step was taken to identify flooding in urban/developed areas. For this, REACH Iraq first created a 10km buffer zone around Iraq's major cities to define their boundaries. Then, to ensure up-to-date urban classification, the Urban Land-Use feature of the Open StreetMap layer was manually modified by identifying previously-unidentified urban areas on the ArcGIS World Imagery base-map and appending the Open StreetMap Layer. Next, the modified layer was clipped according to the previously set buffer zone. After this, the cleaned flooding dataset was intersected with the urban areas created to calculate urban flooding severity by adding the number of raster pixels reported as water (flood) per each urban-land-use of the major cities. This allowed the identification of cities with higher number of reported pixels of flood as flood hotspots of Iraq, which could then be visualized according to their urban flooding severity on the map above.

UNOSAT

[1] Abdullah, Mukhalad, et al. (2019). Water Resources Projects in Iraq, Reservoirs in The Natural Depressions.
[2] iDMC, Social Inquiry, and NRC. (2020). THEMATIC SERIES No matter of choice: Displacement in a changing climate
[3] Pekel, Jean-François, et al. (2016). High-resolution mapping of global surface water and its long-term changes.
[4] Nobre, A. D., et al. (2011). Height Above the Nearest Drainage – a hydrologically relevant new terrain model.

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