Flood Finder Chad 2017

Bulletin N°9

27 September. 2017

This bulletin provides static maps showing the variation of accumulated rainfall and anomaly during the period 20 to 26 September and forecast rainfall and anomaly during 27 September to 03 October in Chari and Logone river basin.

Flood alert system within Flood Finder is operational (partially), based on the observed water level data. Hydrological forecasting is calibrated and operational at 'Bongor' and 'Lai', other locations i.e. N'DJamena, Moundou and Sarh are still in calibration.

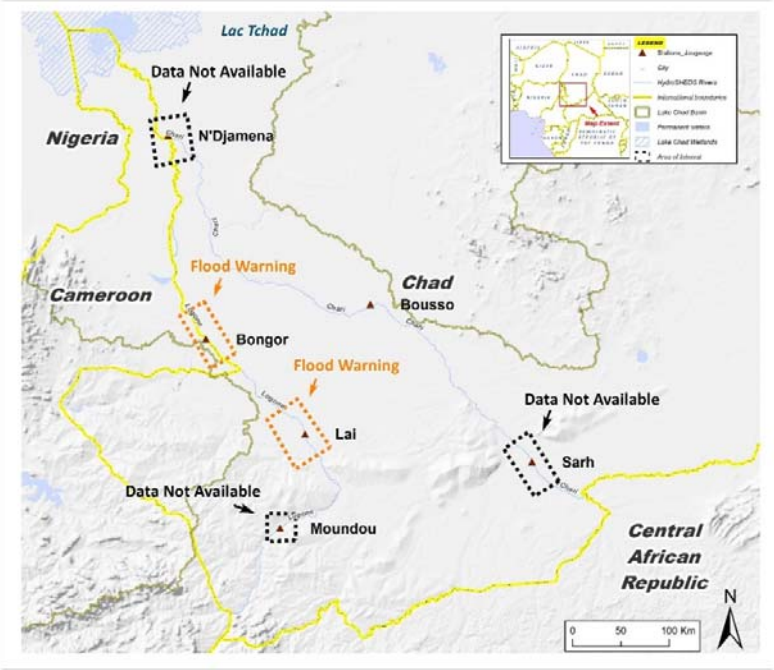
Based on the flood warning, rapid mapping team @ UNOSAT has programmed and acquired RADARSAT-2 satellite SAR image on 25 September near Lai and flood inundation was mapped and exposure of population, agriculture and road network was assessed and presented in this bulletin.

As observed from the forecasted water levels,

Flood Alert at Bongor and Lai is 'Flood Warning'

Keeping in view of the increasing water levels forecast at Bongor and Lai, we are closely monitoring the situation for any escalation in the flood extent during the coming week also, if necessary.

27 Sep to 03 Oct 2017: Flood alert system is operational (partial)

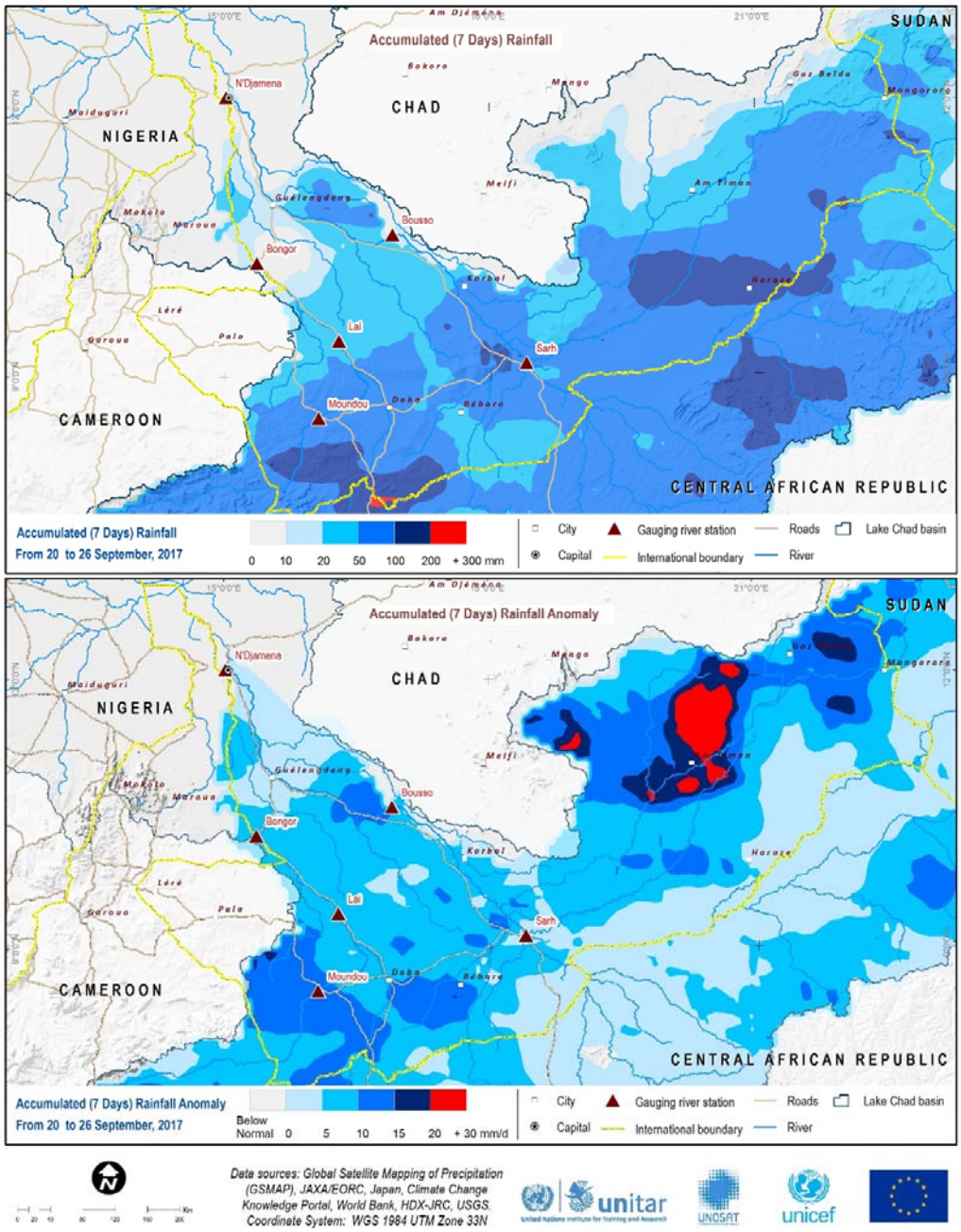


Alert Level:

- **Severe Flood Warning**: Expect serious flood and imminent danger to life and property.
- **Flood Warning**: Expect flooding that will cause disruption.
- **Flood Watch**: Possibility of some flooding.
- **No Warning**: No flood warning is in force.

Accumulated Rainfall Analysis (20 to 26 September, 2017)

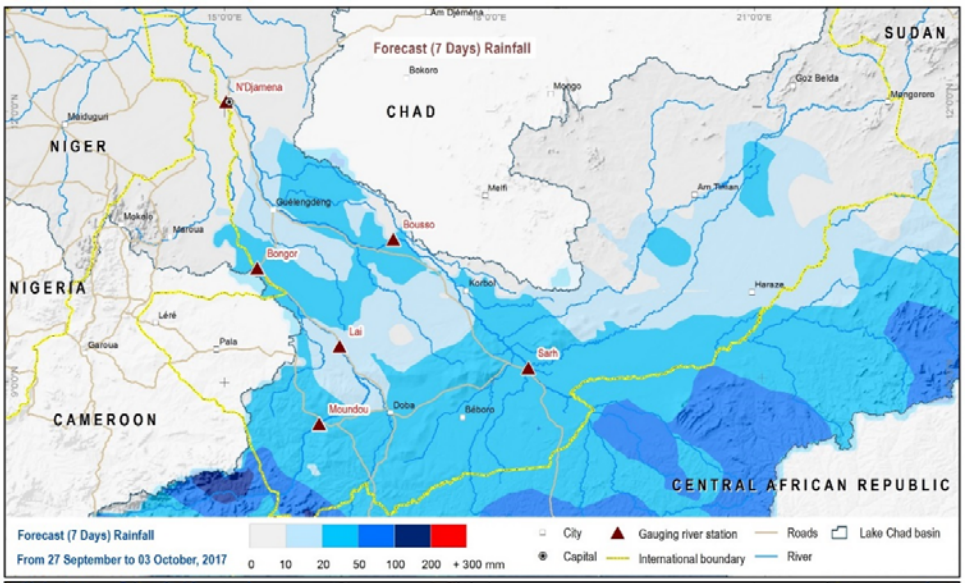
The maps below shows 1) the spatial distribution of the accumulated rainfall between 20 to 26 September over the Chari/Logone Basin, and 2) the spatial distribution of rainfall anomalies during the same period. The anomaly is shown in millimeters per day (mm/d). A value of 10 mm/d would indicate that the average daily rainfall in a given week has exceeded normal rainfall by 10mm.

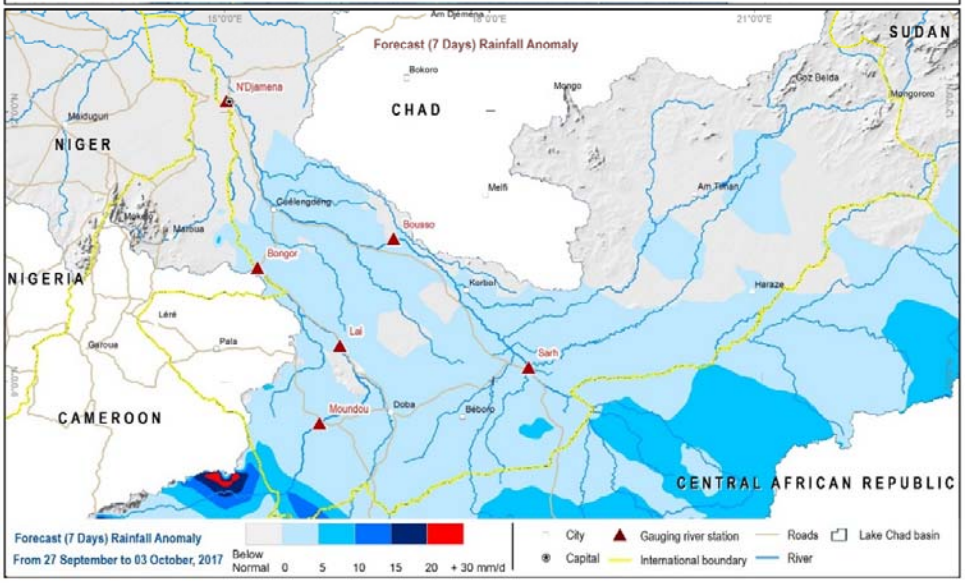


The accumulated rainfall of 100 to 200 mm has occurred near Haraze city in Eastern part of Chad basin upstream of Sarh city and also upstream of Moundou city. Rainfall of 50 to 100 mm has occurred in the upstream area of Sarh and Moundou cities. Remaining area received rainfall of 10 to 50 mm upstream of Guelengdeng city. which is more than 20 mm/day above normal rainfall. Rainfall of 10 to 50 mm received near Am Timan city is very high anomaly upto +30 mm/day. In other areas, the anomaly varies upto 15 mm/day.

Forecast Rainfall Analysis (27 September to 03 October, 2017)

The maps below shows 1) the spatial distribution of the forecast rainfall between 27 Sep. to 03 Oct. over the Chari/Logone Basin, and 2) the spatial distribution of forecast rainfall anomalies during the same period. The anomaly is shown in millimeters per day (mm/d). A value of 10 mm/d would indicate that the average daily rainfall in a given week has exceeded normal rainfall by 10mm.





During the next 7 days, predominantly 50 to 100 mm rainfall is expected to occur in upper reaches of Chad basin outside international boundary of Chad, which is an anomaly of 5 to 10 mm/day of normal rainfall. However, about 20 to 50 mm rainfall is also expected to occur in West and Central parts of the basin, which is an anomaly of upto 5 mm/day of normal rainfall. Remaining areas no rainfall is expected to occur.

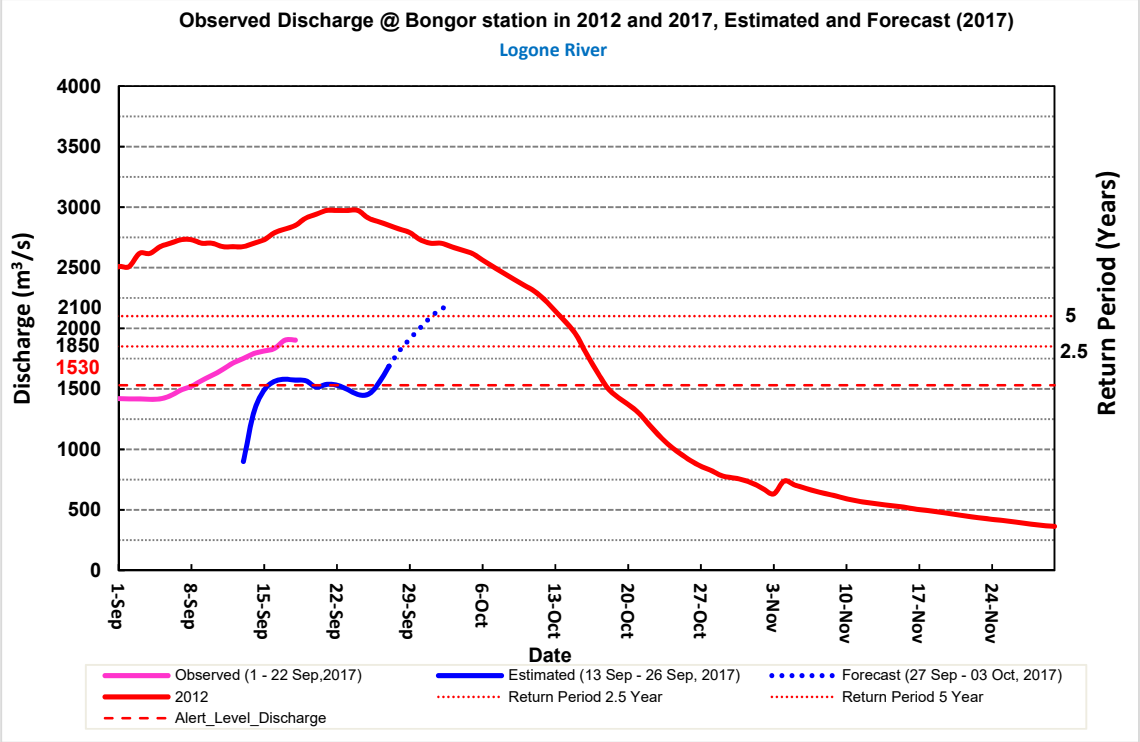
Flood Alert on Logone river @ Bongor: Flood Warning

Based on the hydrological forecast on 27 Sep., estimated average discharge during 20 to 26 Sep. is 1504 m^3/s, when compared with the observed average discharge of 1975 m^3/s on 22 September. Average forecast discharge during 27 Sep. to 03 Oct. is 1980 m^3/s, which is almost same as the observed discharge on 22 September. Forecast discharge is expected to increase continuously upto 2194 m^3/s (forecasted water level of 430 cm) by 03 Oct., which is 30 cm above the alert level of 400 cm.

In view of this, in the coming week, the Flood alert for Bongor is **Flood Warning**.

Flood Inundation expected to increase

Date of Forecast	Estimated Average Discharge (m^3/s) past 7 days	Alert level	Forecast Average Discharge (m^3/s) for next 7 Days	Discharge Trend
27/09/2017	1504	**Flood Warning**	1980	Overall increase in flow by 24 %



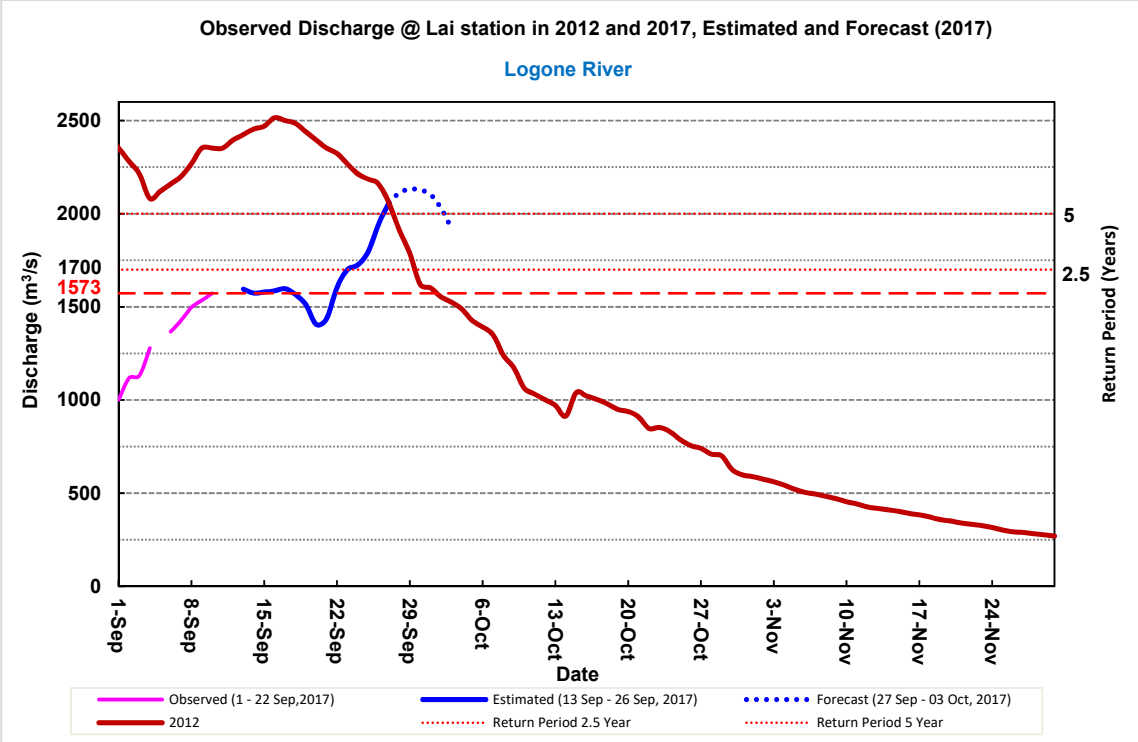
Flood Alert on Logone river @ Lai: Flood Warning

Based on the hydrological forecast on 27 Sep., estimated average discharge during 20 to 26 Sep. is 1659 m^3/s, when compared with the observed discharge of 1641 m^3/s on 22 September. Average forecast discharge during 27 Sep. to 03 Oct. is 2069 m^3/s, which is about 26% more than the observed discharge of 1641 m^3/s on 22 September. Forecast discharge is expected to increase upto 2132 m^3/s (forecasted water level of 555 cm) till 29 Sep. and then decrease upto 1922 m^3/s (forecasted water level of 540 cm) on 03 Oct., which is 46 cm above the alert level of 494 cm.

In view of this, in the coming week, the Flood alert for Bongor is **Flood Warning**.

Flood Inundation expected to increase

Date of Forecast	Estimated Average Discharge (m^3/s) past 7 days	Alert level	Forecast Average Discharge (m^3/s) for next 7 Days	Discharge Trend
27/09/2017	1659	**Flood Warning**	2069	Overall increase in flow by 20 %

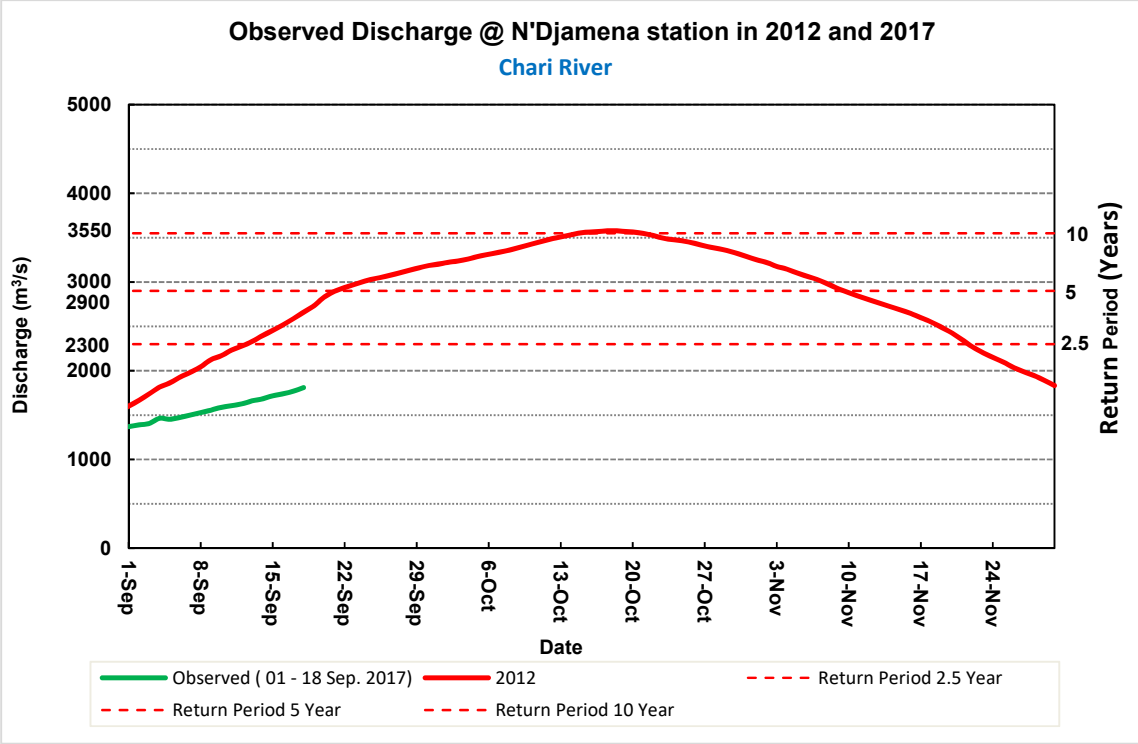


Flood Alert on Chari river @ N'Djamena: No Warning

Based on the observed data, average discharge during 13 to 18 Sep. is 1730 m^3/s. The alert level discharge is about 3453 m3/s. The current discharge is about 50% lower than the alert level discharge, so no danger of floods in N'Djamena.

Calibration and validation of the hydrological forecast model is still in progress. Hydrograph indicating the observed discharge data in 2012 (most recent past flood) and 2017 is shown in the figure below.

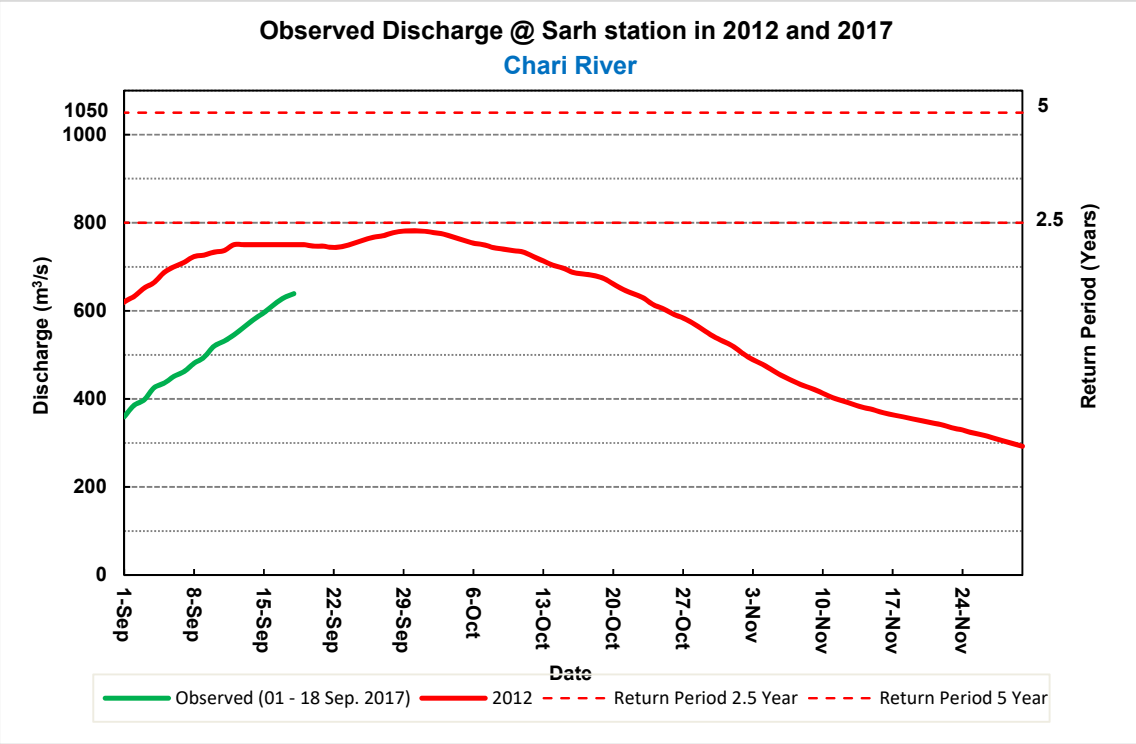
In view of this, **No flood inundation expected over N'Djamena**



Flood Alert on Chari river @ Sarh: No Warning

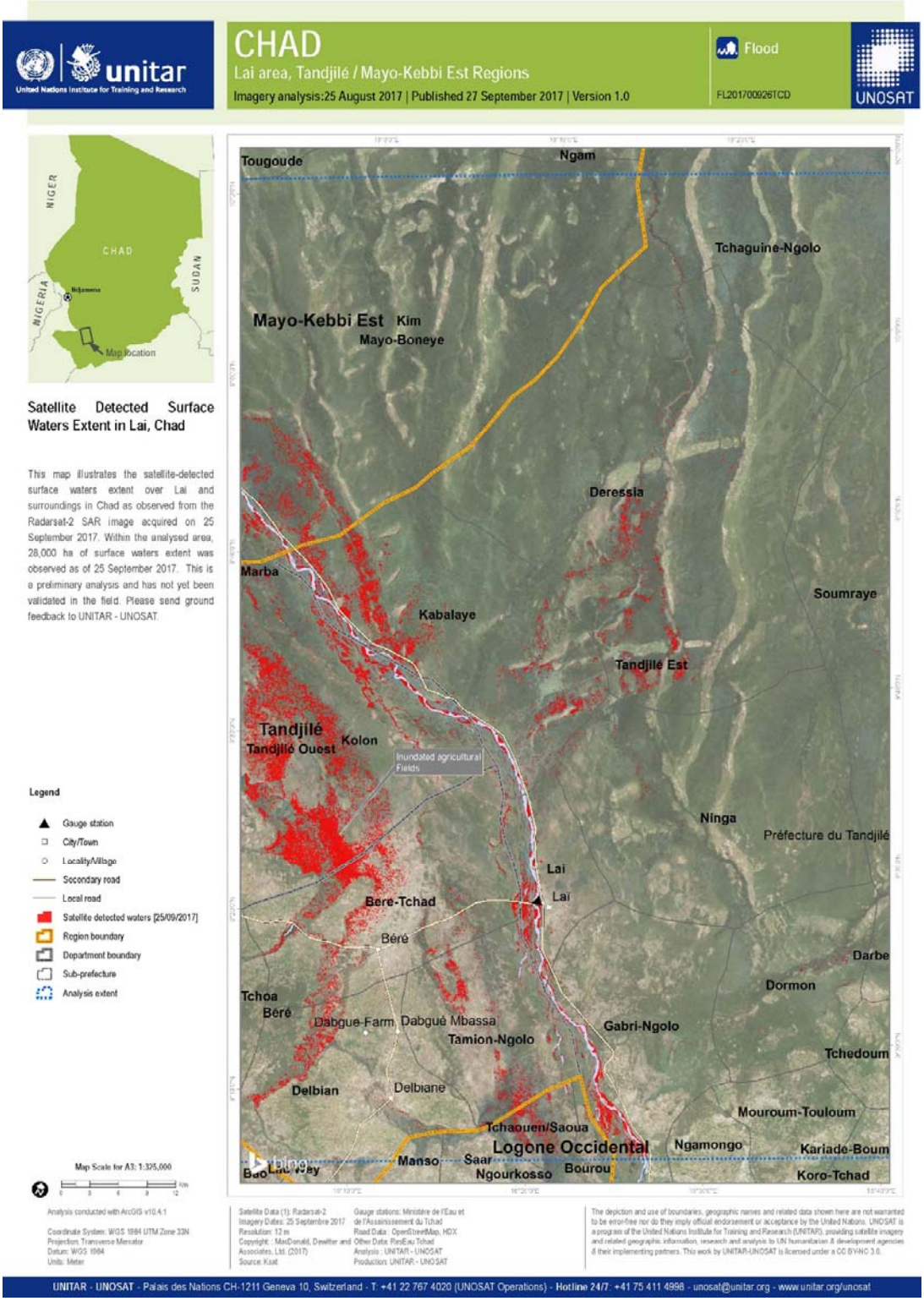
Based on the observed data, average discharge during 13 to 18 Sep. is 604 m^3/s. Calibration and validation of the hydrological forecast model is still in progress. Hydrograph indicating the observed discharge data in 2012 (most recent past flood) and 2017 is shown in the figure below.

In view of this, **No flood inundation expected over Sahr**



Satellite Based Near Real-Time Flood Inundation Analysis @ Lai

Based on the flood warning of 20 September, rapid mapping team @ UNOSAT has programmed and acquired RADARSAT-2 satellite SAR image on 25 September and flood inundation occurred near Lai was mapped and shown in figure below and exposure of population, agriculture and road network was assessed and presented.



Flood Impact Analysis:

Date of Satellite Data	Flood Inundation Area (within the satellite coverage)	Number and names of Villages affected in Tandjiile region	Number of Population Exposed	Road Length exposed	Agriculture area exposed:
25/09/2017	280 Km^2	5 • Nfjaoubla, • Ferrik Mbabourou • Dere Keimdi • Besme 2 • Misser	2908	25.75 Km	134.87 Km^2

Note:

- Population exposed assessed using the 'estimated population' attribute data of village map the Common Operational Datasets (COD) available for Humanitarian Assistance.
- Road length assessed using the COD.
- Agriculture area exposed is assessed using the Global Land Cover Dataset published by National Geomatics Centre of China May, 2014).

Data sources:

- Accumulated rainfall is from Global Satellite Mapping of Precipitation (GSMAP) of JAXA/EORC, Japan.
  More details are available at http://sharaku.eorc.jaxa.jp/GSMaP_crest/
- Accumulated rainfall anomaly is calculated using the normal rainfall data of climate change knowledge portal of World Bank. More details are available at http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisCCode=TCD
- Forecast Rainfall is from Global Forecasting System of NOAA, USA.
  More details are available at
  https://www.ncdc.noaa.gov/data-access/model-data/model-datasets/global-forcast-system-gfs
- Forecast Rainfall Anomaly is calculated using the normal rainfall data of climate change knowledge portal of World Bank. More details are available at http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisCCode=TCD

Disclaimer:
This is a preliminary analysis based on forecasting models and satellite based observations and has not yet been validated in the field. It is important to note that there are limitations in these data sources, and flood warnings included in this report should be treated with caution.

The depiction and use of boundaries, geographic names and related data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations.

Please send ground feedback to UNITAR – UNOSAT.

This flood bulletin has been produced by UNITAR-UNOSAT with the collaboration of:

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  (Field data)
- *CIMA Research Foundation*
  (Hydrological forecast)
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