



NIGERIAN HYDROLOGICAL SERVICES AGENCY'S EFFORTS TOWARDS FLOOD MITIGATION

By
HADIZA AMINU TUKUR
NIGERIAN HYDROLOGICAL SERVICES AGENCY (NIHSA)

Presentation Outline

- ✓ About the Agency.
- ✓ Nigeria Drainage Basin.
- ✓ Types of Data Collected by the Agency.
- ✓ Activities of the Agency in relation to flood management in Nigeria.
- ✓ Transboundary Flood Flow Into Nigeria
- ✓ The impact of 2020 transboundary flood in Nigeria
- ✓ Challenges
- ✓ Conclusion

ABOUT THE AGENCY

OUR MANDATE

To provide the services required for assessment of the Nation's surface and ground water resources in terms of quantity, quality, distribution and availability, in time and space; for efficient and sustainable management of water resources.



**NIGERIA HYDROLOGICAL
SERVICES AGENCY (NIHSA)**
FEDERAL MINISTRY OF WATER RESOURCES
Water Resources Data for Sustainable Development



FUNCTIONS OF THE AGENCY

The agency
operates and
maintains
hydrological
stations
nationwide

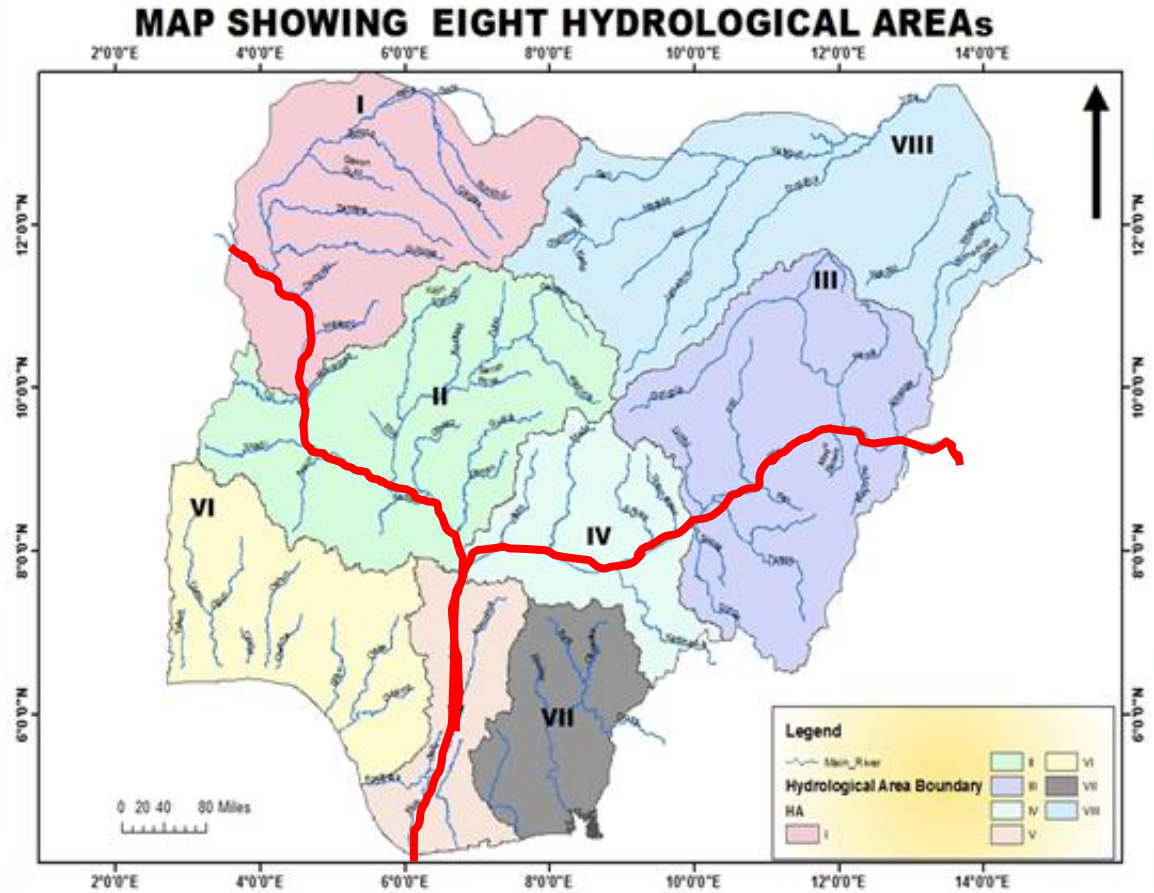
The agency
issues flood
and drought
monitoring and
forecasting

The agency
provides
information on
the status and
trend of water
resources

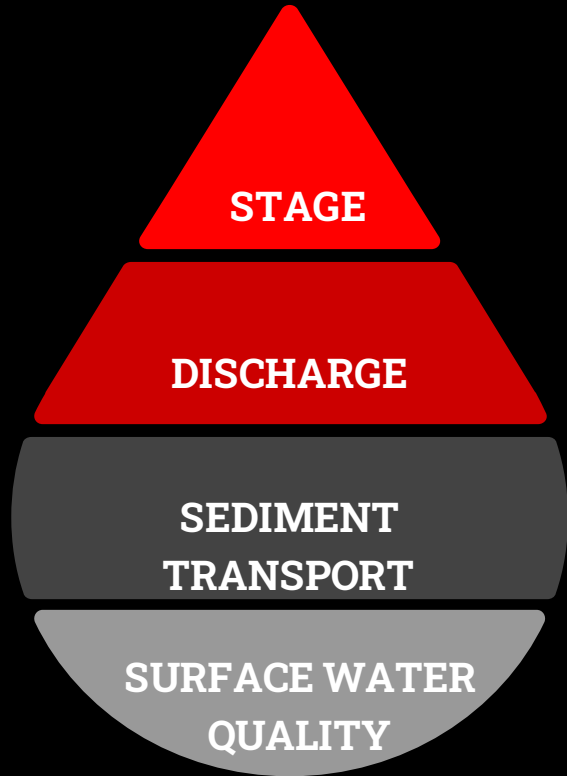
Ground water
exploration.

NIGERIA DRAINAGE BASIN AND HYDROLOGICAL AREAS

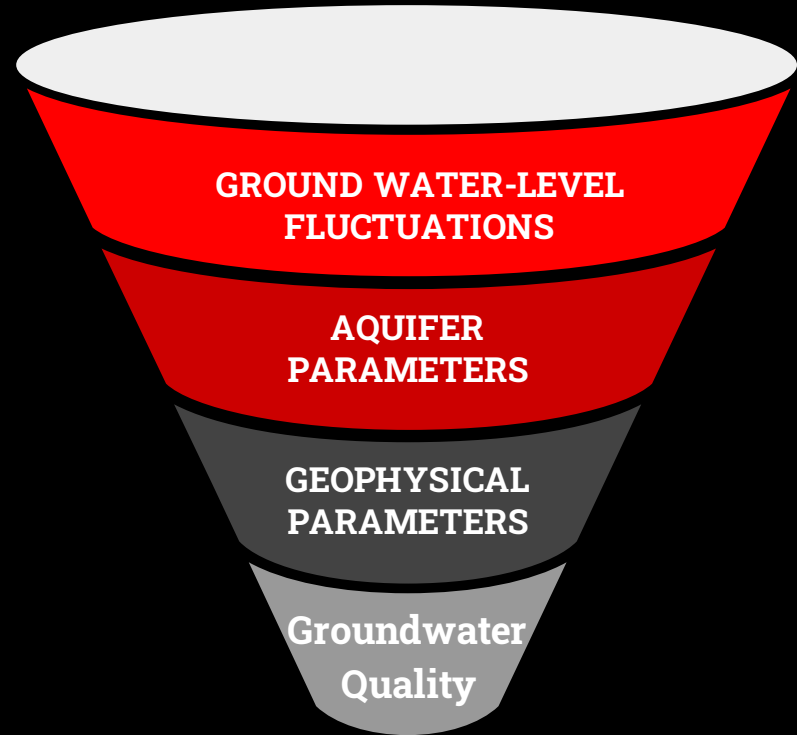
- Nigeria is drained by numerous rivers and streams.
- The principal and the longest ones are the Rivers Niger and Benue.
- The Nigeria drainage system have been divided into Eight (8) Hydrological Areas (HAs) based on the drainage patterns.
- The HAs are being used for evaluation and assessment of the nation's vast water resources potentials.



WHAT TYPE OF DATA DOES THE AGENCY **COLLECT**?



SURFACE WATER DATA



GROUND WATER DATA

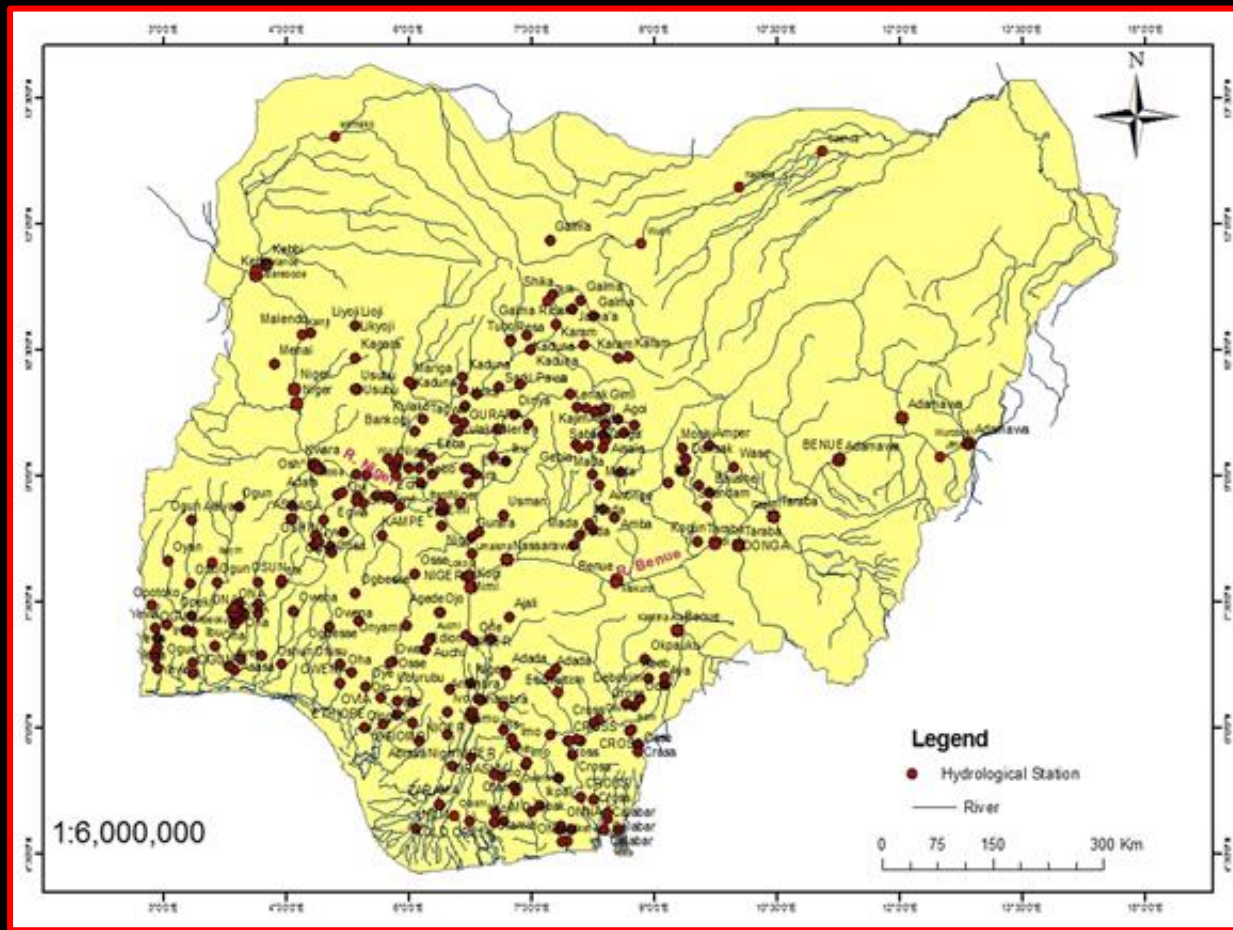
GEOGRAPHICAL SPREAD OF NIHSA HYDROLOGICAL STATIONS

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**HYDROMETRIC
RIVER GAUGING
STATIONS**

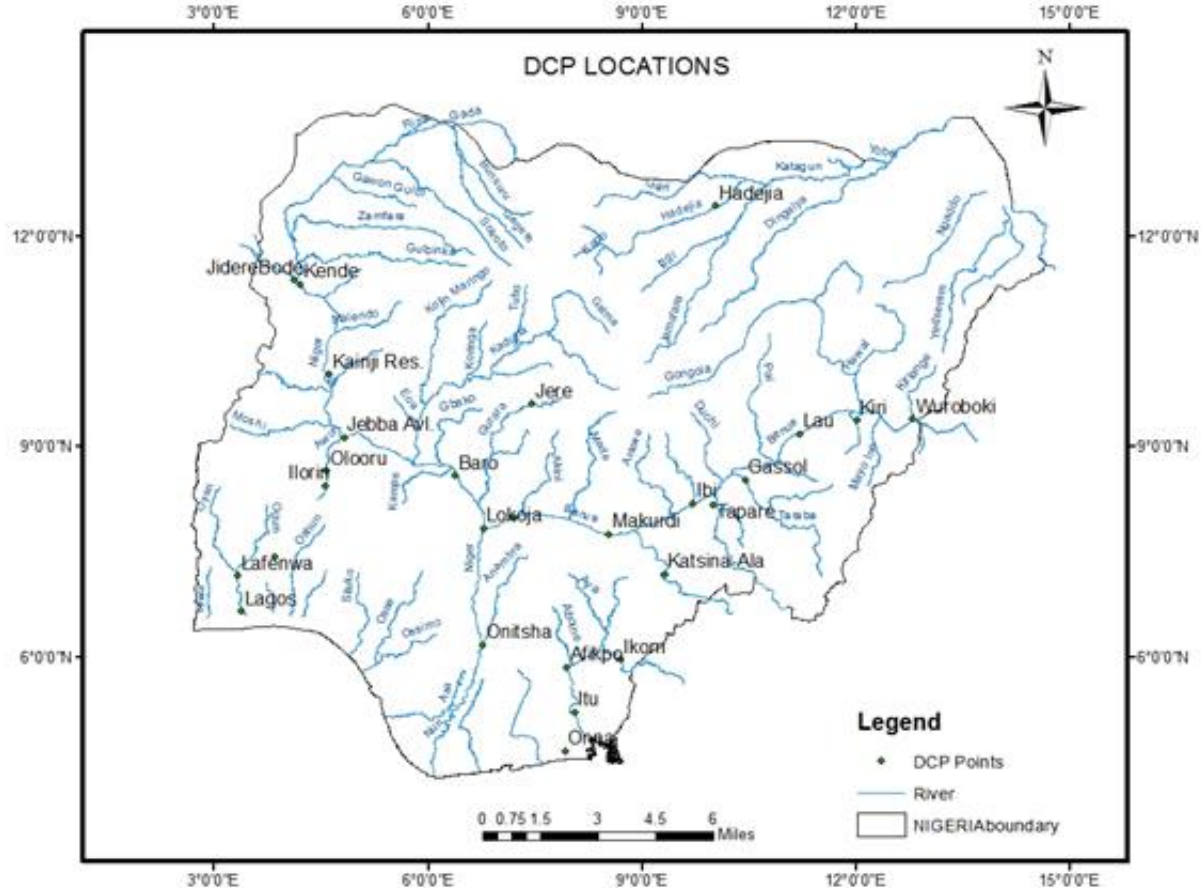
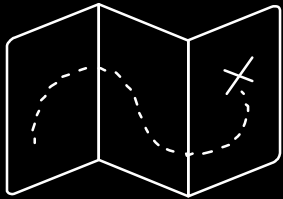
**WORLD
METEOROLOGICAL
ORGANISATION
(WMO)
RECOMMENDED
STANDARD**

482

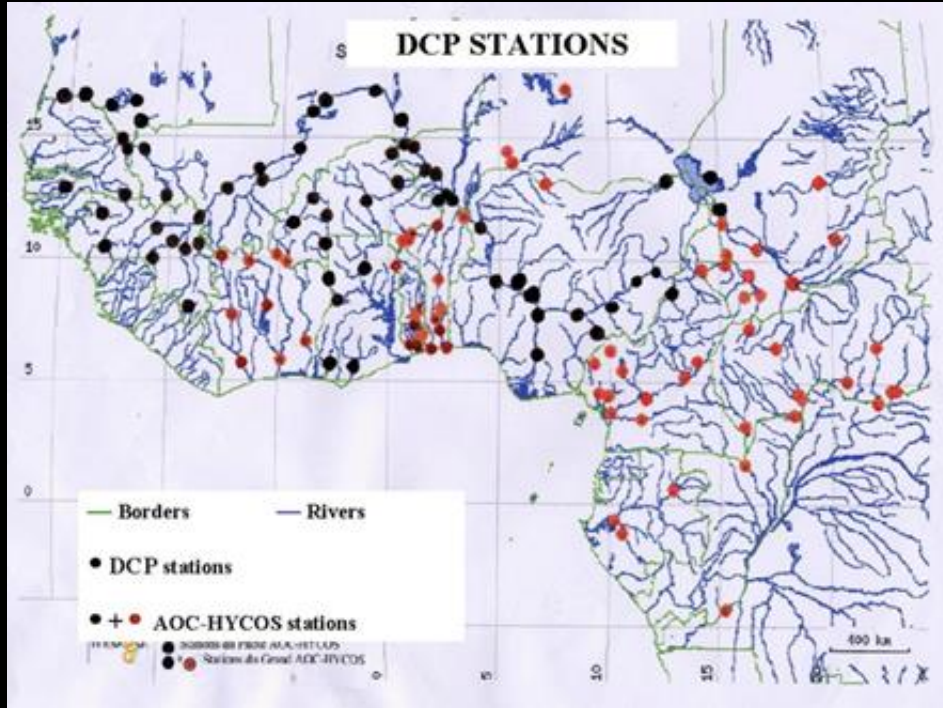


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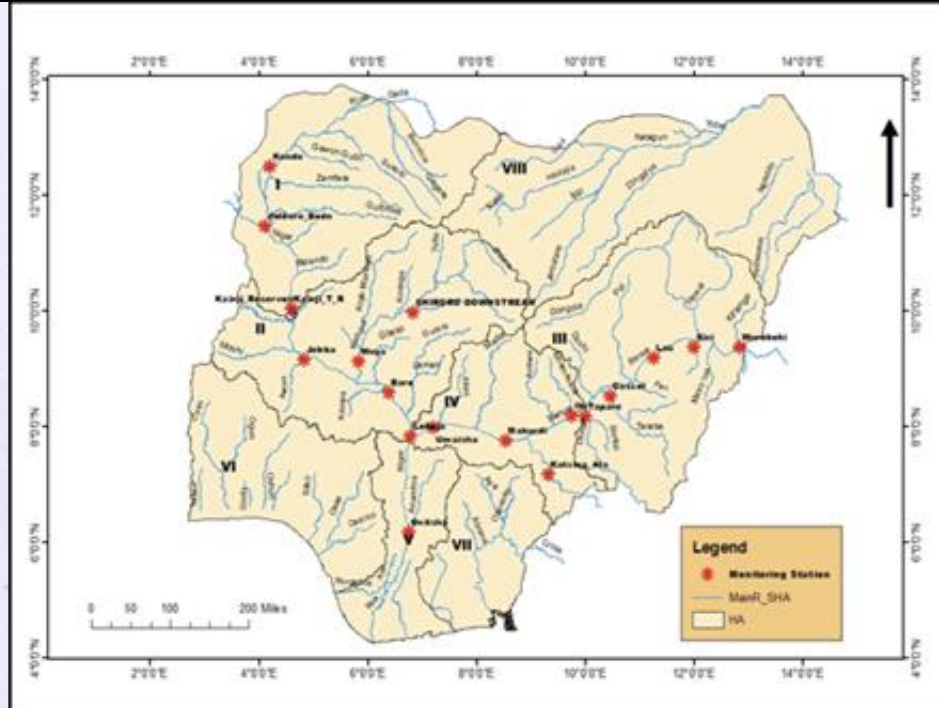
TELEMETRY DATA COLLECTION PLATFORM STATIONS (DCPs)



DATA COLLECTION PLATFORMS STATIONS ACROSS WEST AFRICA INSTALLED BY NBA



65 DCP STATION IN WEST AFRICA



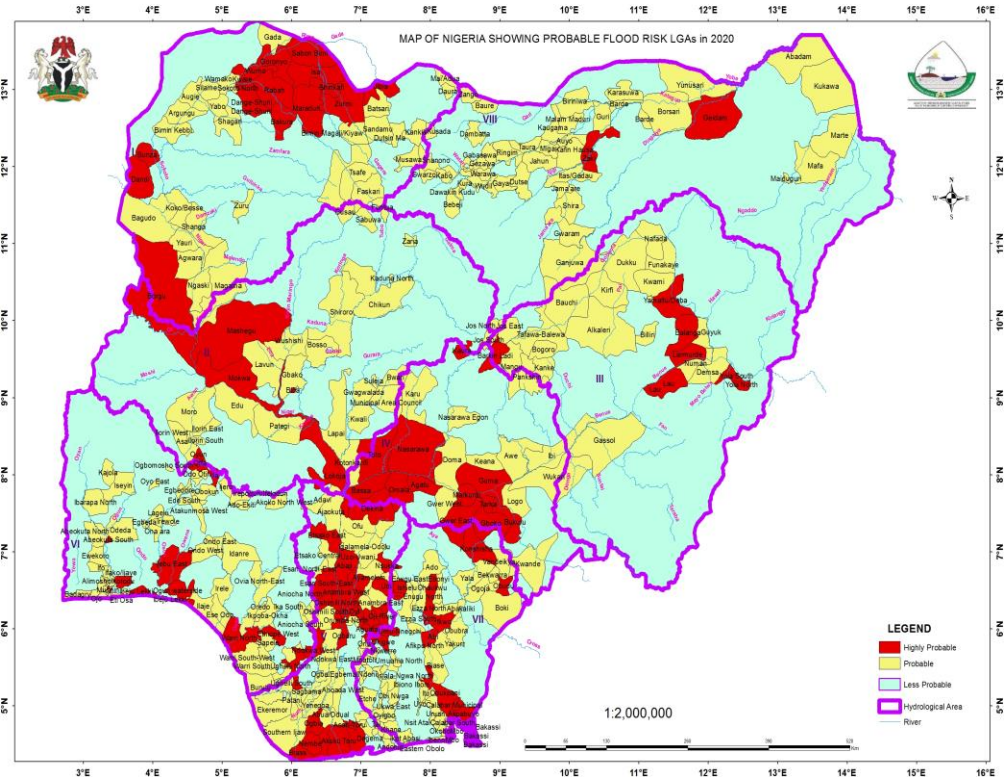
18 DCP STATION IN NIGERIA

ACTIVITIES OF THE AGENCY IN RELATION TO FLOOD MANAGEMENT IN **NIGERIA**

ANNUAL FLOOD OUTLOOK (AFO)

- The aim of AFO is to present probable flood scenarios in a given year and to sensitise Nigerians on flood management towards disaster reduction for sustainable socio economic development.
- The models used for the flood prediction includes **Geospatial Stream Flow Model (GEOSFM)** and **Soil Water Assessment Tool (SWAT)**.
- These models utilise hydrological and hydrogeological data, rainfall data, topographical data, soil and water balance index as well as Digital Elevation Model (DEM)

2020 ANNUAL FLOOD OUTLOOK (AFO)



SENSITISATION

NHISA embarks on sensitisation exercise immediately after the flood forecast is issued out in order to provide necessary information to the general public on the imminent threat of flooding in their community.

The agency also collaborates with other government agencies and media outfits for easy information dissemination

The Agency also embark on road shows and NHISA collaborates with community leaders in the sensitisation efforts.



2019 Annual Flood Outlook Presentation by the Honourable
Your Company Name Minister for Water Resources Engr Adamu

AUTOMATIC WEATHER OBSERVATION STATION

The Agency established 18 Automatic Weather Stations in the 8 HAs of the country for;

- Flood and drought monitoring
- To monitor the effects of climate change on water resources
- To complement the Nigerian Meteorological Agency (NiMet) Stations

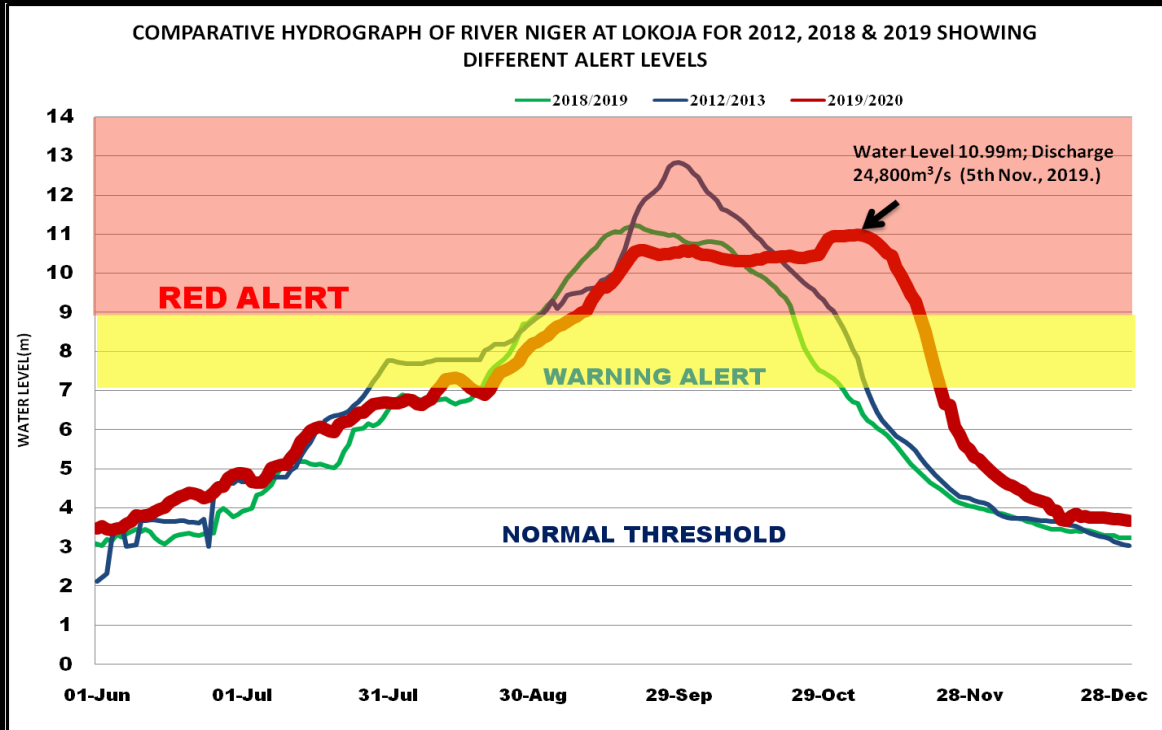


FLOOD EARLY WARNING SYSTEM

NHISA Flood Early Warning System is based on the regular collection of Surface Water data to Monitor Flooding event along the river channels.

Example:

- The 2019/2020 Hydrological Year began in June 2019 with resultant increase in water level and discharge across the river channels in the country.
- Water Level (WL) downstream the confluence of rivers Niger and Benue at Lokoja (Kogi State), steadily rose from a minimum of 4.89m corresponding to a discharge of 6,638m³/s on the 1st July 2019 to a maximum of 10.99m corresponding to a discharge of 24,800m³/s on 5th November 2019



Comparative Hydrographs of river Niger downstream the Confluence in Lokoja.

FLOOD EARLY WARNING SYSTEM

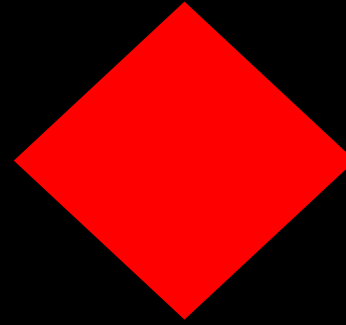
- NISHA has established Flood Early Warning Systems in four (4) locations along the major rivers in Nigeria namely:
- Jiderebode, Kebbi State entry point of River Niger
- Wurobokki entry point of River Benue
- Lokoja the confluence of Rivers Niger and Benue
- Makurdi Benue State



**FLOOD EARLY WARNING SYSTEM At MAKURDI
RIVER BENUE**

HYDROLOGICAL MODELLING CENTRE

The Agency established Hydrological modelling centre to predict and simulate flood occurrence in the country



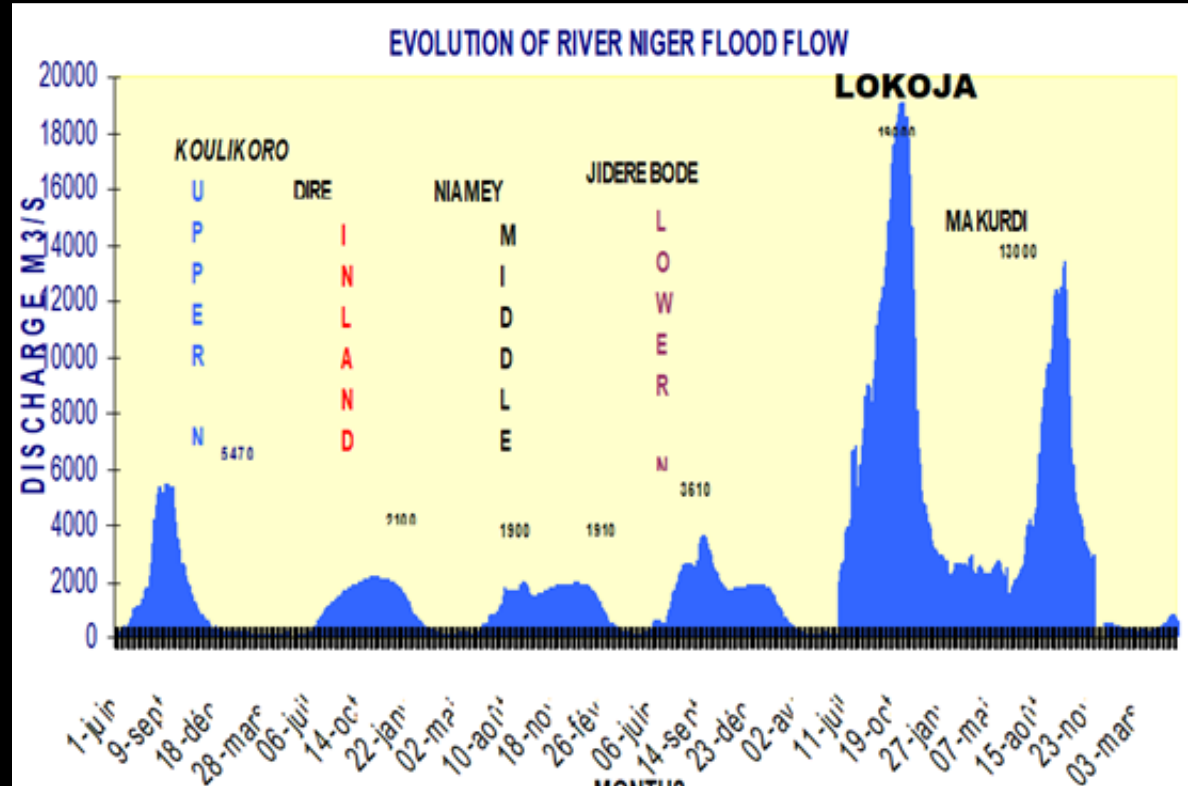
MONITORING OF TRANSBOUNDRY FLOOD FLOW INTO NIGERIA

A TYPICAL FLOOD SCENERIO ALONG THE RIVER NIGER

- The transboundary flood flow into nigeria during the 2020/21 consist of flows from river niger coming from guinea and river benue coming cameroon and chad.

Two types of flood events along River Niger:

- 1. White Flood (Rainy Season)
- 2. Black Flood (Dry Season)



THE IMPACT OF 2020 TRANSBOUNDARY FLOOD IN NIGERIA

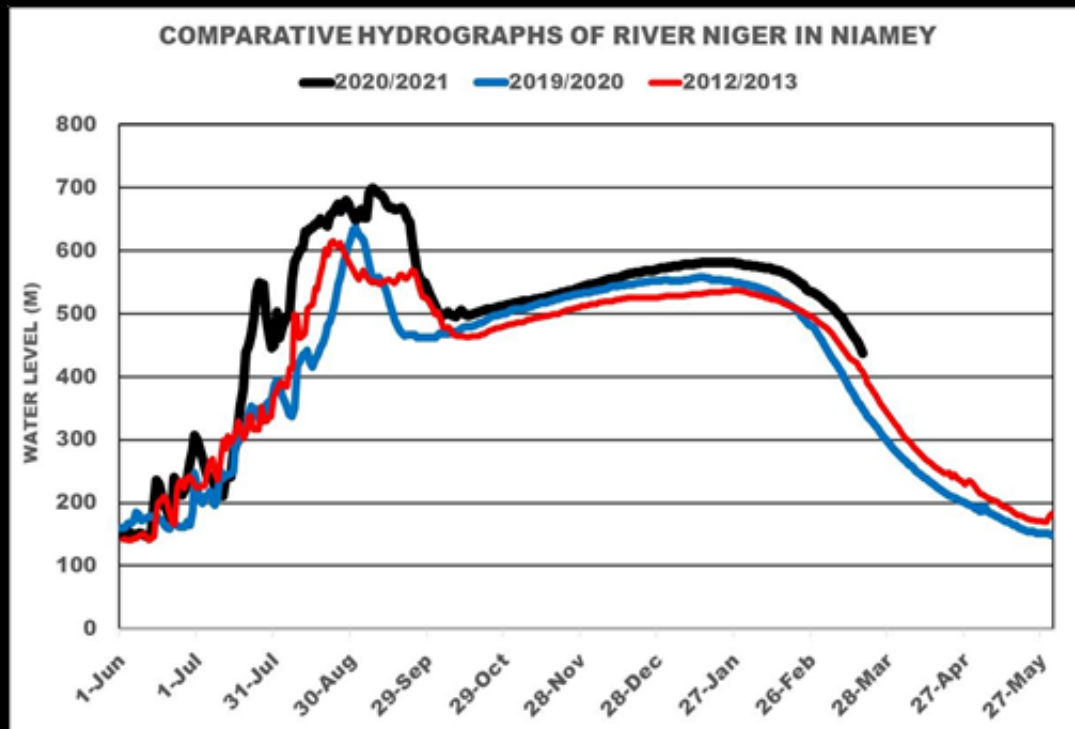
A TYPICAL FLOOD SCENERIO ALONG THE RIVER NIGER (CONT'D)

- In 2020, the white and black flood flows were exceptionally high as shown in the hydrograph.

- The comparative hydrograph of river niger in niamey show that the 2020/21 hydrological year was the highest flood flow when compared with those in 2019/20 and 2012/13 as shown in figure 2.

- A maximum water level of 699cm corresponding to the discharge of 3,398m³/s was recorded on the 8th of September 2020.

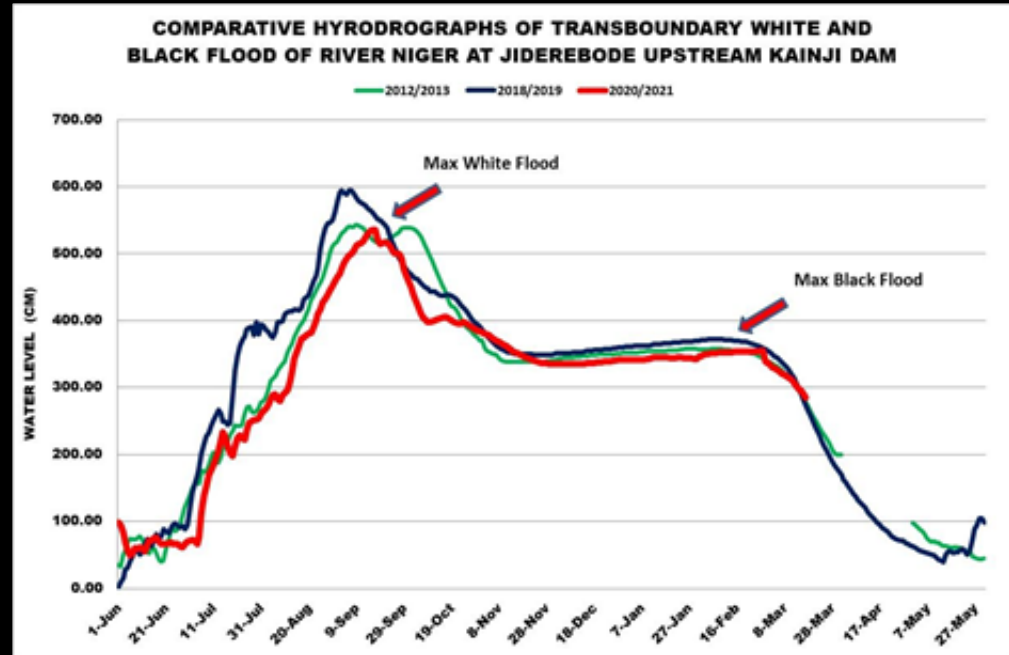
- The black flood also has a maximum water level of 581cm corresponding to discharge of 2,136m³/s recorded on 25th Janaury 20201



OCCURRENCE OF 2020 TRANSBOUNDARY FLOOD IN NIAMEY

A TYPICAL FLOOD SCENERIO ALONG THE RIVER NIGER (CONT'D)

- The comparative hydrographs of river Niger at Jiderebode showed that 2020/2021 hydrological year flood flow was lower than those in 2012/2013 and 2019/2020 as shown in Figure 3.
- A maximum WL of 536 cm corresponding to discharge of 5,389 m³/s was recorded on the 12th September, 2020 during the white flood flow.
- The Transboundary Black Flood flow also had a maximum WL of 355cm corresponding to a discharge of 1,682 m³/s which was recorded on the 27th February 2021

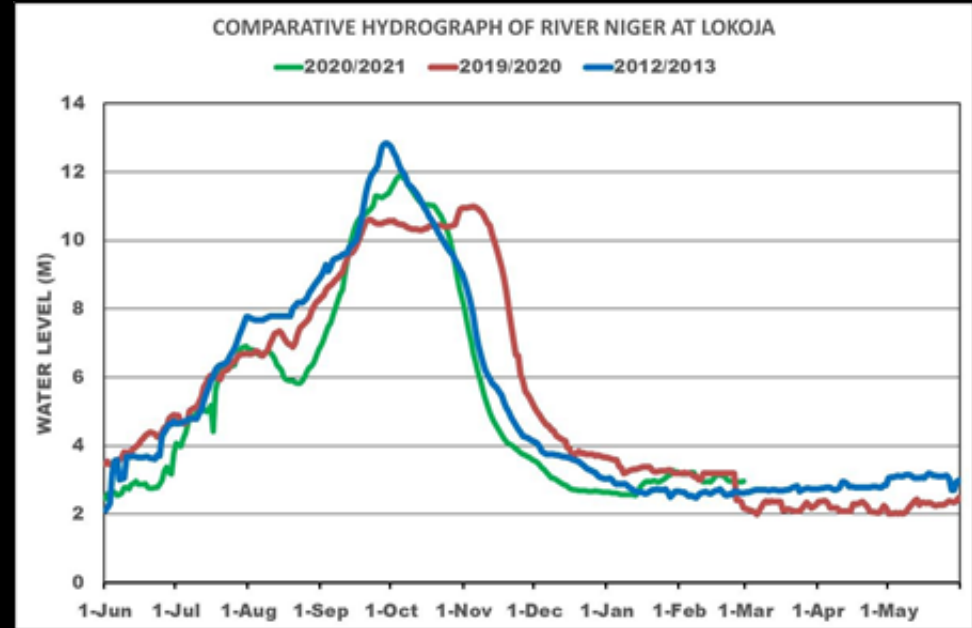


RIVER NIGER FLOOD FLOW INTO NIGERIA IN 2020 at jiddere bode, Kebbi state, upstream kainji

A TYPICAL FLOOD SCENERIO ALONG THE RIVER NIGER (CONT'D)

- The comparative Hydrographs of River Niger at Lokoja in 2020/2021 hydrological year was lower than those recorded in 2019/2020 and 2012/2013 as shown in Figure 5.

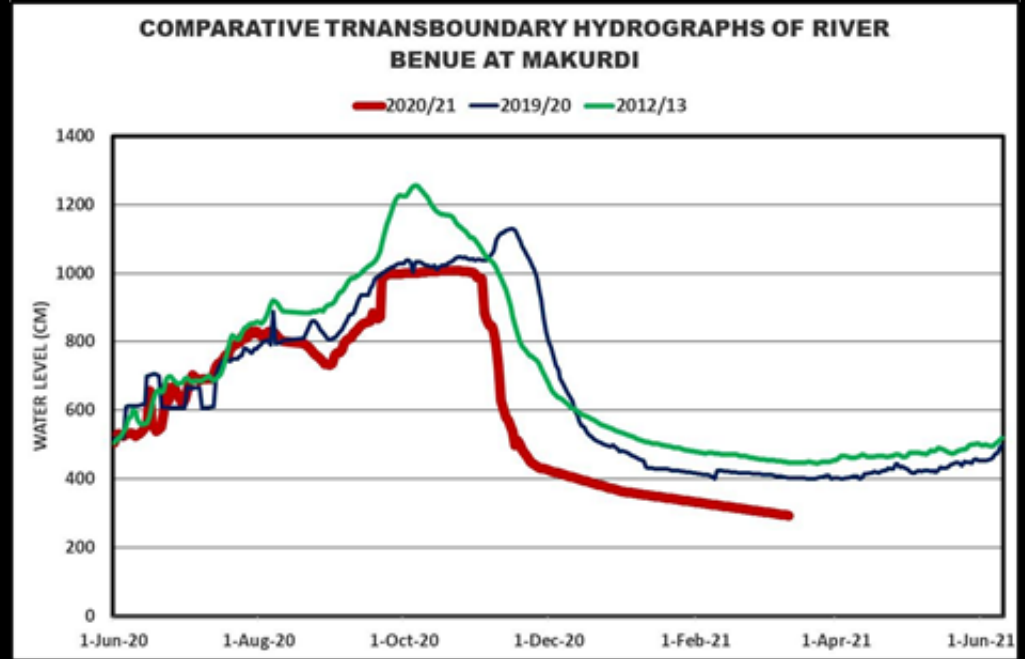
- The rivers Niger and Benue flood flow at the confluence in Lokoja, Kogi State, during the 2020/2021 hydrological year, showed a maximum WL of 11.89m corresponding to a discharge of about 23,459 m³/s that was recorded on 5th October 2020



RIVERS NIGER & BENUE FLOW AT LOKOJA IN 2020

A TYPICAL FLOOD SCENERIO ALONG THE RIVER NIGER (CONT'D)

- From the comparative hydrographs of river Benue at Makurdi the 2020/2021 hydrological year had flood flow lower than those recorded in 2019/2020 and 2012/2013 as shown in Figure 4.
- The transboundary flood flow of river Benue at Makurdi, Benue State had a maximum WL of 10.08m corresponding to a discharge of about 9,405 m³/s that was recorded on 1st October, 2020.
- minimum WL of 8.03m corresponding to a discharge of 5,529m³/s recorded on 31st October, 2020.
- the mean WL was 9.75m corresponding to a discharge of 8,766m³/s



RIVER BENUE FLOOD SITUATION AT MAKURDI IN 2020

COLLABORATION WITH OTHER AGENCIES

NATIONAL LEVEL:

- NiMeT, NEMA, NARSDA, OSGOF.

REGIONAL LEVEL:

- Niger Basin Authority (Nba), Lake Chad Basin Commission (Lcbc). River Basin development authority (RBDA)

INTERVENTION:

- New Map, Triming, Fanfar.

CHALLENGES

- ❖ Inadequate use of satellite technology
- ❖ Inadequate training and manpower development
- ❖ Inadequate funding.

Recommendation

There is need for more synergy and collaboration with space based institutions and use of space technology to help provide the following:

- To compare and check the performance of our models and validate our predictions.
- Capacity building on satellite base applications
- Continuous stakeholders engagement and networking of UN-Spider partners .

How to reach us

- The Agency also has a website and social media platforms through which information can be shared with the general public and other stakeholders.
- NIHSA website www.nihsa.gov.ng
- Facebook: www.facebook.com/nihsa
- Twitter: [@nihsa.ng](https://twitter.com/nihsa.ng)