Modernization of Meteorological Services at Nigerian Meteorological Agency

NiMet
Nigerian Meteorological Agency

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DG/CEO NiMet & Permanent Representative of Nigeria with WMO

In this Presentation…

NiMet: At a glance

Critical Services in Aviation & Non-Aviation Sectors for Sustainable Development

Key Innovation & Partnership Initiatives for Effective Service Delivery

Conclusion

NiMet at a Glance

Our Vision

To be a World Class provider of Weather and Climate services for safety and sustainable national socio-economic development

Our Mission

To observe Nigerian Weather and Climate and provide Meteorological, Hydrological and Oceanographic services in support of National needs and international obligations

Our Core Mandate

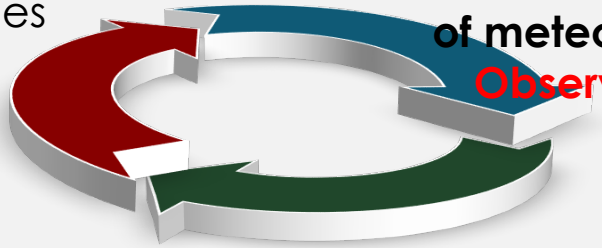
Observing, analyzing, timely and accurate reporting of weather and climate information for socio-economic development and safety of lives and property

STRUCTURE

The Nigerian Meteorological Agency is a Parastatal of the **Federal Ministry of Aviation**, with the statutory responsibility of providing meteorological services for all sectors of the Nigerian economy

LEGAL ESTABLISHMENT

The mandate of the Agency as stipulated in **Part III of NiMet Establishment Act 2003 is "to advise Government on all aspects of meteorology"** **Meteorological Observation started since 1887**



CORE ACTIVITIES

In pursuance of this mandate, the core activities of NiMet include **observation, analysis and reporting accurately**, the weather and climate conditions of the country at all times.

Functions Of The Agency

".....the Agency shall prescribe the climatic requirement for all sectoral activities including aviation, defence, finance, agriculture, construction works, environment, industries, marine, natural disaster and relief management, water resources, power and steel, transport, science and technology...."
NiMet Establishment Act 2003, Part III, Sec. 7(2).

Details of the functions of the Agency as stipulated in the NiMet Establishment Act are given below. Also indicated below are the sector of the economy where such functions apply

FUNCTION	SECTORS OF APPLICATION IN THE ECONOMY
• Advise the Federal Government on all aspects of meteorology.	Construction, Tourism, Defence, Sports, Insurance, etc
• Project, prepare and interpret Government policy in the field of meteorology.	Construction, Tourism, Defence, Sports, Insurance, etc
• Issue weather forecasts for the safe operation of the aircrafts, ocean going vessels and oil rigs.	Aviation, Marine, Oil & Gas
• Promote the service of the meteorology, in agricultural, drought and desertification activities.	Agriculture, Environment

Functions Of The Agency II

FUNCTION	SECTORS OF APPLICATION IN THE ECONOMY
• Provide meteorological services in operational hydrology and water resource activities.	Water Resources
• Provide weather services in marine, environmental pollution and bio-meteorology for climatic and human health activities.	Marine, Environment, Agriculture, Health
• Subject to regulation by the Nigerian Communications Commission, provide and operate telecommunications systems for meteorological purposes only.	Telecommunications, Satellites, Environment
• Proffer advice to the federal and state Government on seismological activities.	
• Collect, process and disseminate all meteorological data and information within and outside Nigeria.	Construction, Tourism, Defence, Sports, Insurance, etc
• Keep in safe custody all meteorological records in the National Meteorological Archive.	ICT, Construction, Tourism, Defence, Sports, Insurance, etc
• Ensure uniform standards of observation of all meteorological phenomena in Nigeria.	Regulatory, Construction, Tourism, Defence, Sports, Insurance, etc

Functions Of The Agency III

FUNCTION	SECTORS OF APPLICATION IN THE ECONOMY
• Ensure the international standards and practice in meteorological operations are maintained.	Regulatory, Construction, Tourism, Defence, Sports, Insurance, etc
• Train, conduct and undertake research particularly in the field of tropical, agricultural, hydro and marine meteorology and other related areas of meteorology.	Agriculture, Water Resources, Marine, Construction, Tourism, Defence, Sports, Insurance, etc
• Train, conduct and undertake research particularly in the field of tropical, agricultural, hydro and marine meteorology and other related areas of meteorology.	Agriculture, Water Resources, Marine, Construction, Tourism, Defence, Sports, Insurance, etc
• Provide consultancy services to the public on meteorology.	Construction, Tourism, Defence, Sports, Insurance, etc
• Monitor meteorological components of environmental pollution and ozone concentration.	Environment, Health
• Calibrate, develop and fabricate meteorological conventional equipment for export and Internal use.	Aviation, Oil & Gas, Construction, Environment
• Be the sole authority to approve and establish meteorological stations for the meteorological observations.	Regulatory, Construction, Tourism, Defence, Sports, Insurance, etc
• Carry out other activities as are necessary and expedient to the full discharge of any of its functions under or pursuant to this Act.	

Operational Structure: For Effective Service Delivery

- Corporate Headquarters in Abuja located at the National Weather Forecasting & Climate Research Centre Abuja
- National Weather Forecasting & Climate Research Centre, Abuja
- Fabrication workshop at NiMet Complex, Oshodi.
- WMO Regional Training Centre, Oshodi Lagos
- 6 Zonal offices (Enugu, Ibadan, Kaduna, Kano, Maiduguri and Port Harcourt)
- 1 Central Forecast Office, Abuja
- 4 Independent Forecast Offices (Abuja, Ikeja, Kano and Port Harcourt)
- 54 Synoptic Stations spread all over Nigeria
- Instrument Calibration Laboratory, Abuja

Operational Structure II

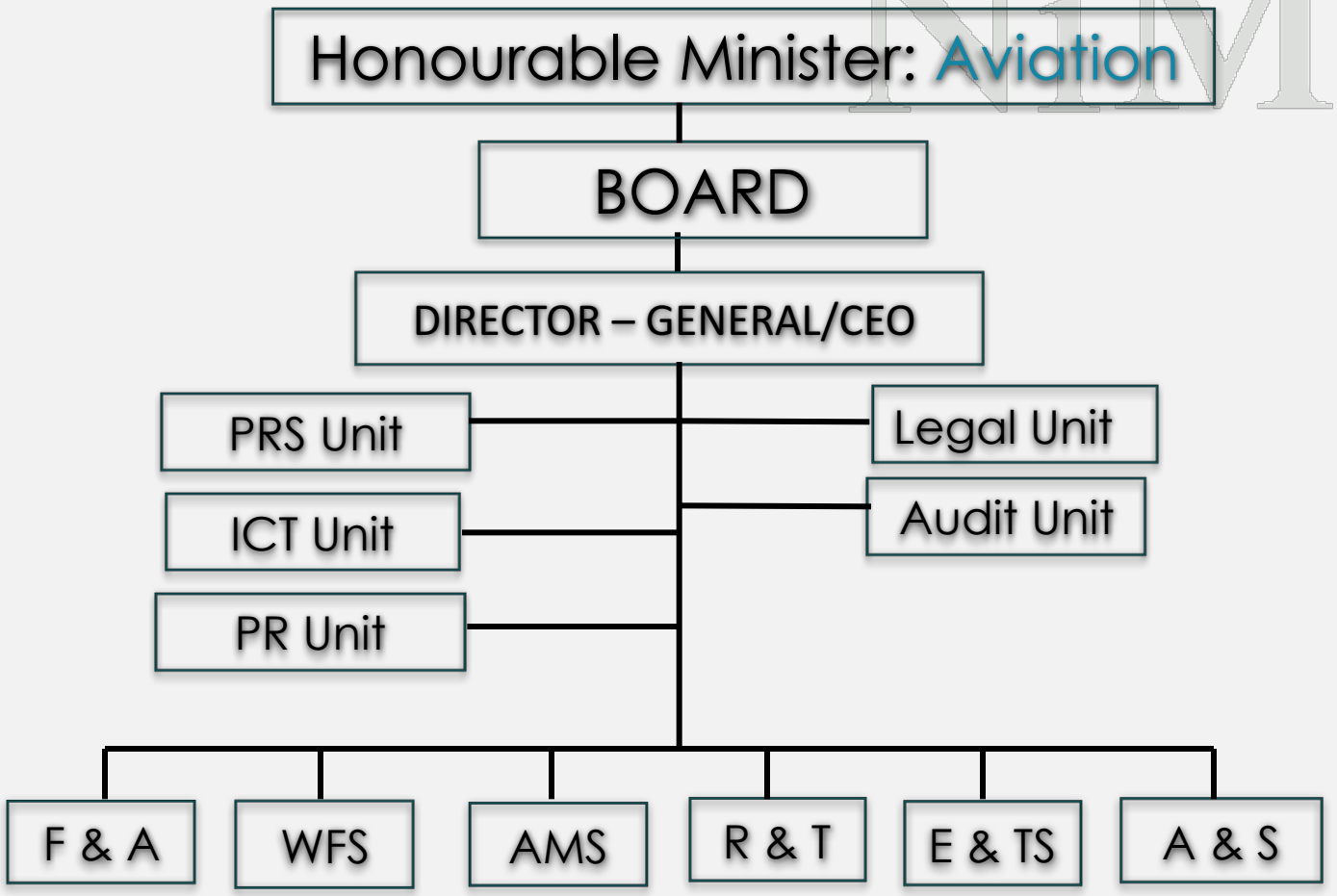
- 1 Agro-meteorological Experimental Farm (Oshodi, Lagos).
- 8 Upper Air Stations (Abuja, Enugu, Lagos, Kano and Maiduguri, Jos, Calabar and Yola).
- 30 Automatic Weather Stations (Received additional 37 by TAHMO)
- 12 Marine Stations, Calabar, Eket, Niomr & Koko (operational). Eastmole, Aiyetoro, Warri, Onne, PH Wharf, Apapa, Bonny, Forcados.
- 6 Radar stations (Abuja, Port Harcourt [Operational], Yola, Maiduguri, Kano & Lagos
- 4 Air Quality and Ozone monitoring station (Abuja, Lagos, Enugu, Kano)

Staffing and Capacity Development Program

- About 1600 Staff Strength (>60% professional and <40% support staff)
- Annual Training of Meteorological Technicians at RTC Lagos
- More than 200 Meteorologists sponsored for MSc Degrees(last 3 yrs)
- 3 Staff finished PhD and 4 Ongoing (within and outside Nigeria)
- In 2017 alone , NiMet sponsored more than 50 staff to attend Regional & International Workshops, conferences and scientific Symposia
- AGRHYMET & ACMAD donated PUMA instrument & carried out IN HOUSE training of 20 Staff on CLIDATA and other Applications

Synoptic Stations Network

Organizational Structure



NiMet: Corporate Headquarters, Abuja- Nigeria

Funding Source

- **Airline Ticket Sales (5% of 10%)**
- **Overpass Charges (5%)**
- **Landing Charges (10% of…)**
- **Internally Generated Revenue** :
- Charges for tailor made services (companies & organizations)
- data cost recovery (researchers)
- **Aggressive Revenue Plan for Mobile Weather Services :**

for over 100 million subscribers

NiMet

Key Innovation & Partnership Initiatives for Effective service delivery

Technology

Collecting, **analyzing** and **extracting** qualitative and quantitative Weather data and information to provide a robust evidence base is critical. Part of this process is the use of modern equipment and state of the art technology

Structure

The new face of NiMet…

NiMet Headquarters, Abuja

Port Harcourt Zonal Office

Key Innovations & Initiatives: **Structure**

The new face of NiMet…

WMO RTC: Admin Block & Lecture Rooms

Principal's Office

Key Innovations & Initiatives: **Structure**

The new face of NiMet…

Laboratory facility

Radar Shelter

Key Innovations & Initiatives: **Structure**

Lecture Hall

Public Weather Forecasting Studio

Key Innovations & Initiatives: **Structure**

Research Library

E- Library

Key Innovations & Initiatives: **Structure**

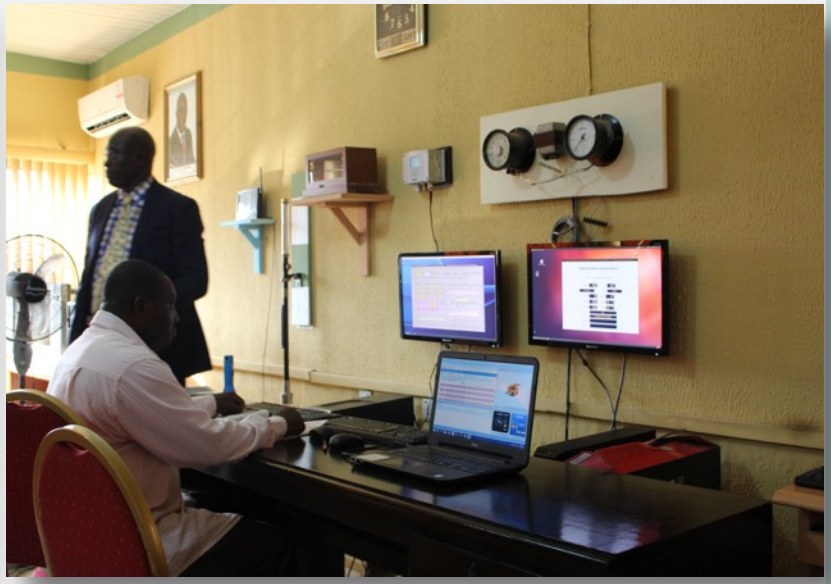
The new face of NiMet…

Student's Hostel

Conference Hall

Structure

Training School Synoptic laboratory

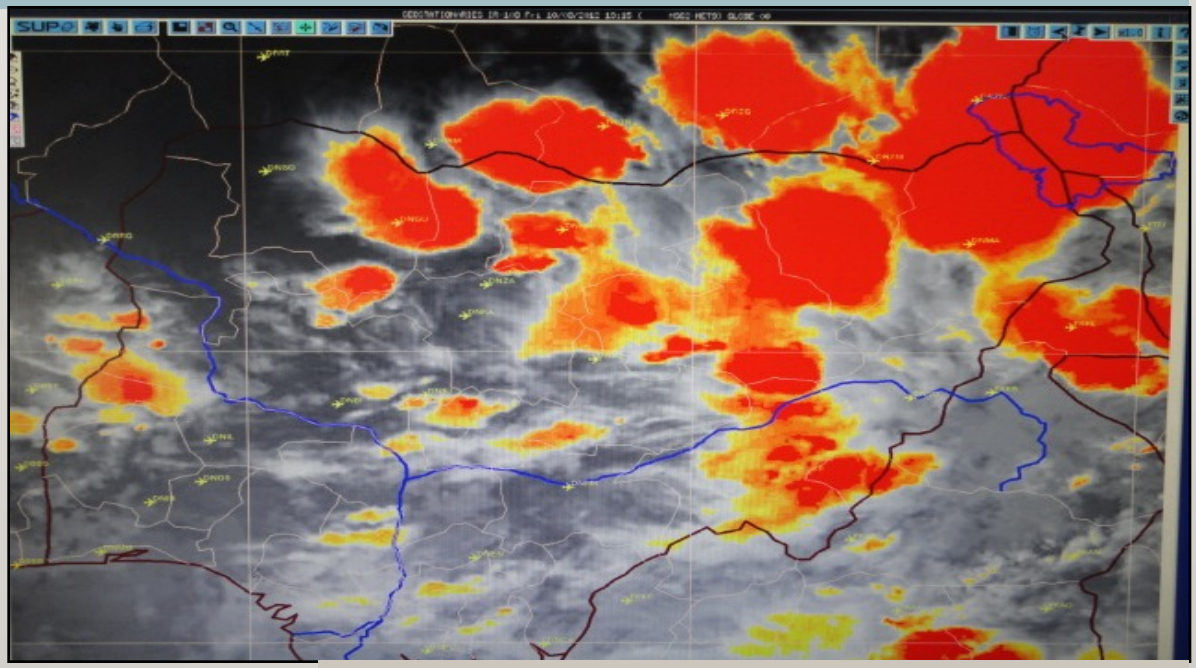


Key Innovations & Initiatives: **Technology**

To improve the capacity to track hazardous weather system, provide early warning system to pilots and the general public and provide accurate and timely weather forecast we procured and installed **6 Doppler Weather Radar**

SPACE BASED OBSERVATION

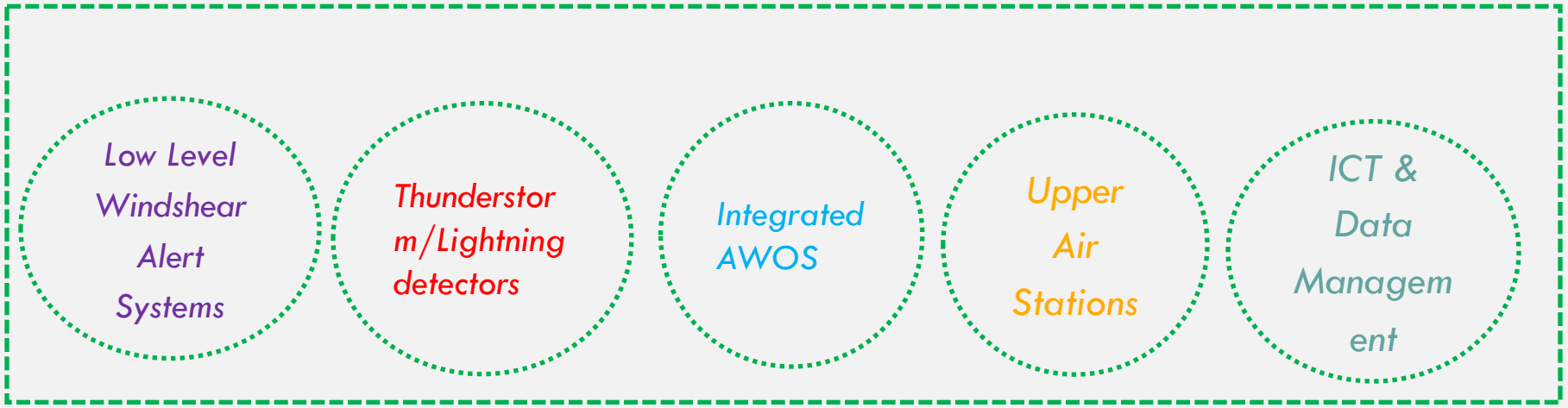
The Nigerian Meteorological Agency (NiMet) is equipped with EUMETSAT ground receivers at the main forecast offices.



EUMETSAT Satellite Image Over Nigeria

Other Key Innovations & Initiatives:
Technology

- Procurement and installation of meteorological equipment for air navigation safety & other Services



Technology

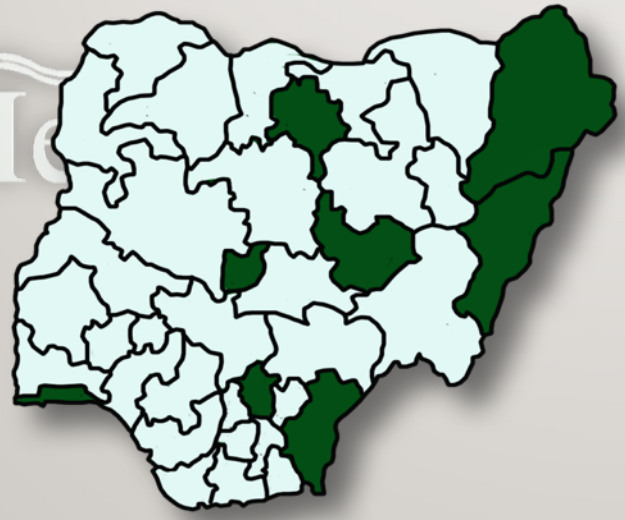
Installation of Low Level Windshear Alert System (LLWAS) at Lagos, Kano, Port Harcourt and Calabar & Other Airports

The Low Level Windshear Alert System (LLWAS) measures wind speed and direction at remote sensor station sites situated around an airport and can generate warnings when wind shear or micro-bust conditions are detected

The LLWAS assists pilots during critical times when they must determine whether to attempt to land or take off in hazardous weather conditions

UPPER AIR WEATHER MEASUREMENTS

The Nigerian Meteorological Agency (NiMet) presently operates a network of eight upper air stations across the country. These are located at Abuja, Calabar, Enugu, Jos, Kano, Lagos, Maiduguri and Yola



UPPER AIR WEATHER MEASUREMENTS

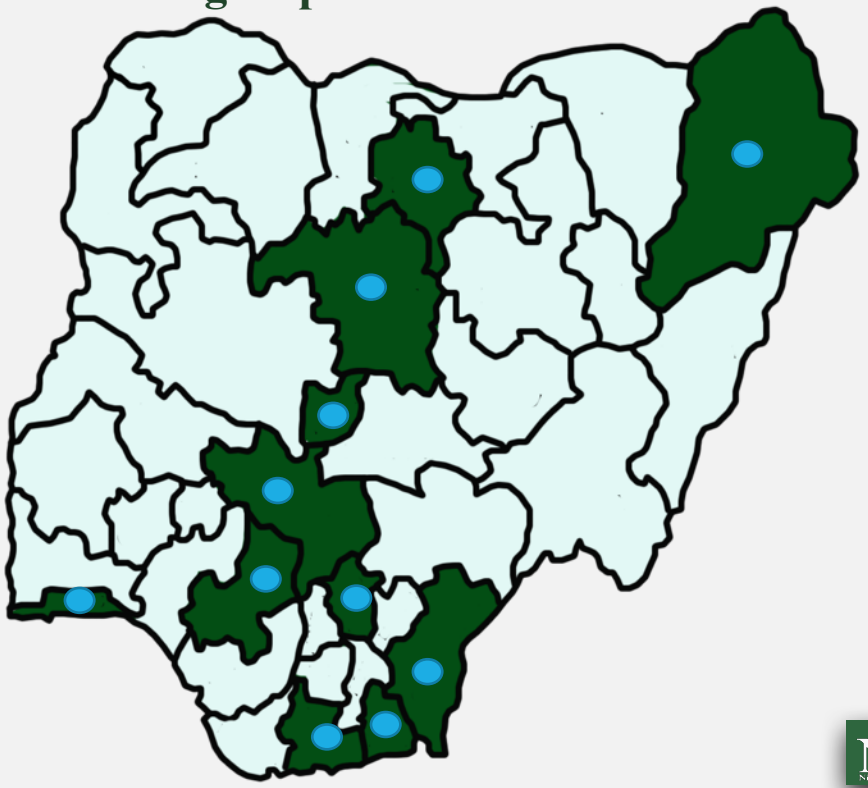
Upper Air Sounding (or Observation) is used for measuring weather parameters at different altitudes in the atmosphere. It uses a set of sensors, known as radiosonde, attached to a hydrogen-filled balloon and released into the atmosphere

Technology

Installation of Low Level Windshear Alert System (LLWAS) at 11 locations

Procured & installed LLWAS in the following airports:

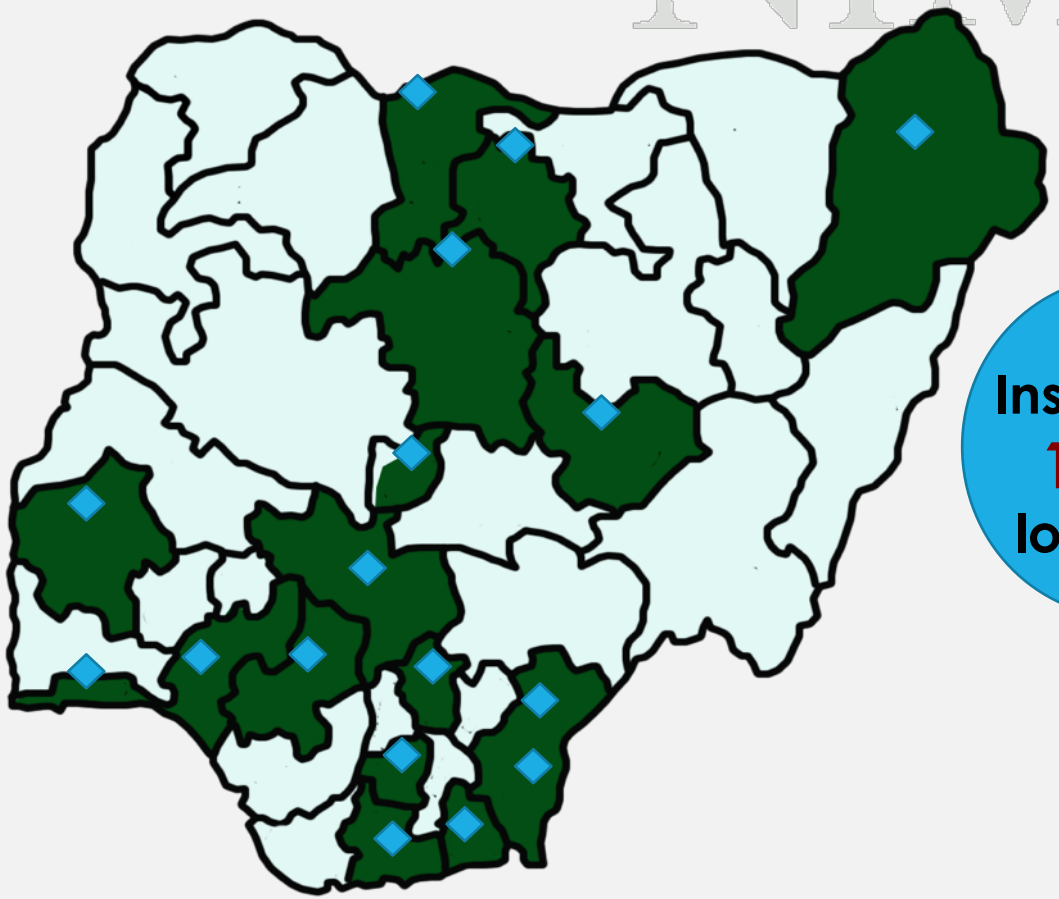
- Abuja
- Calabar
- Enugu
- Kaduna
- Sokoto
- Kano
- Lagos
- Lokoja
- Ilorin
- Benin
- Port Harcourt



Technology

The Thunderstorm and Lightning detector device detects electrical discharges associated with lightning within a 200 nautical mile radius of the system. Have acquired 8 more LDS under UBIMET Partnership

Abuja
Akure
Benin
Calabar
Enugu
Ibadan
Kano
Katsina
Lagos
Lokoja
Maid.
Obudu
Owerri
P/H
Uyo
Yola
Zaria



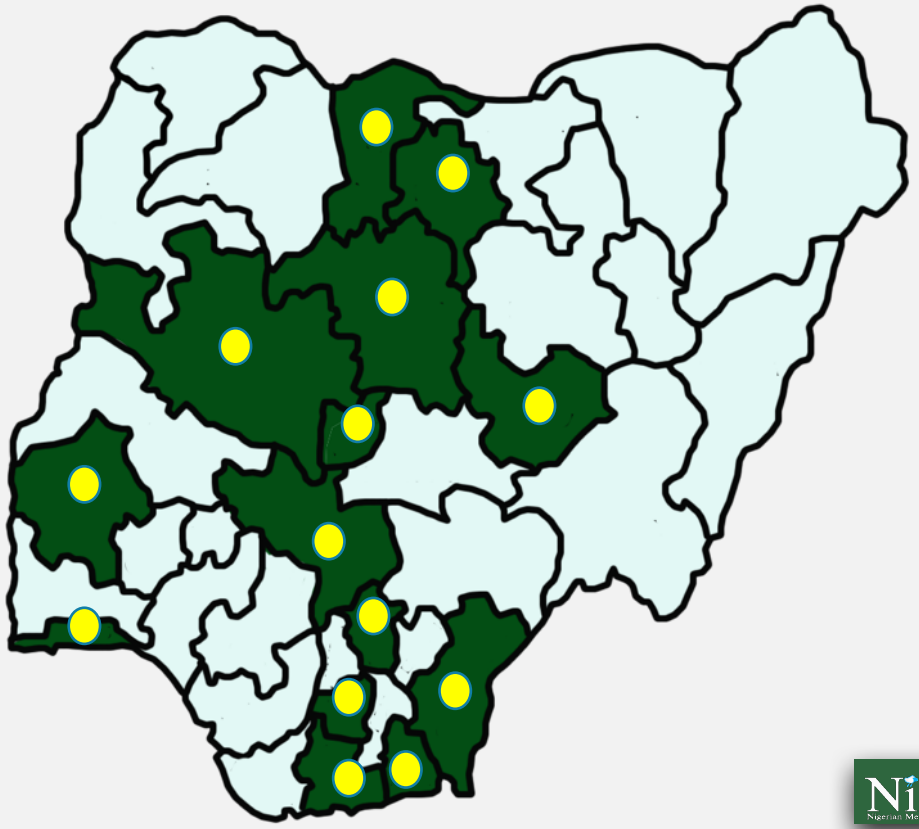
Installed in 17 + 8 locations

Key Innovations & Initiatives: **Technology**

Integrated AWODS installed in 14 locations

It measures cloud height, cloud base, runway horizontal visibility, wind speed, wind direction, temperature, pressure, precipitation, humidity, radiation, thunder and lightening

Abuja
Calabar
Enugu
Owerri
Ibadan
Kano
Katsina
Lagos
Lokoja
Minna
Zaria
Port Harcourt
Kaduna
Ikeja



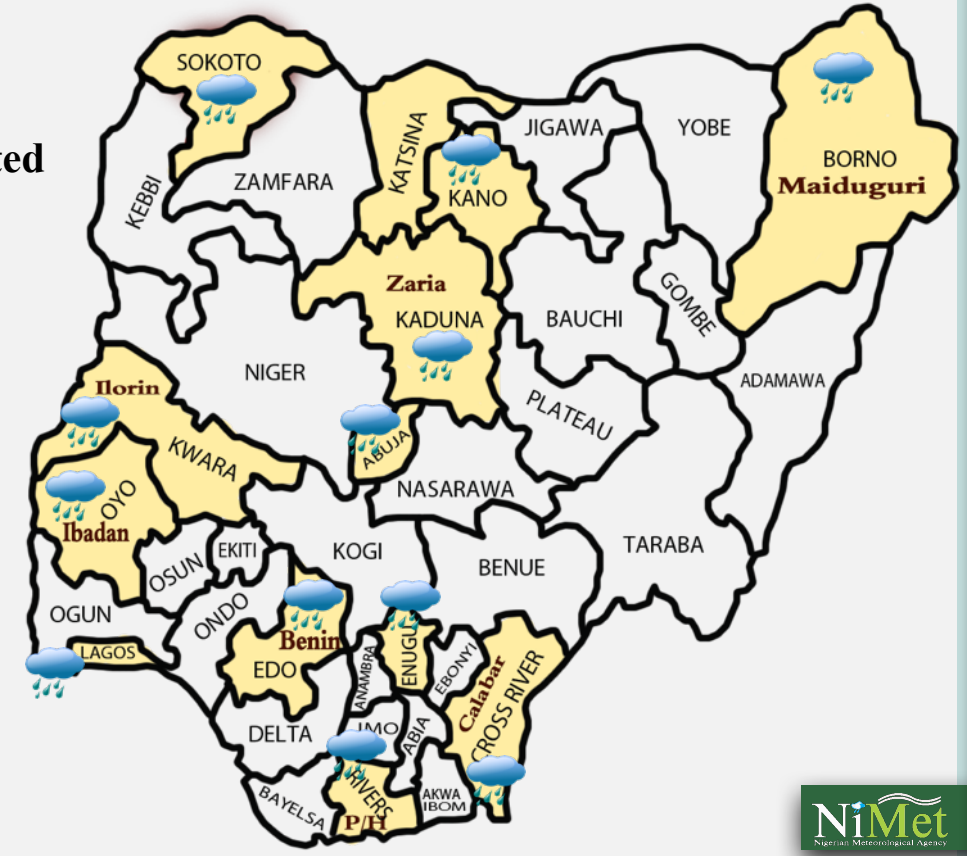
Key Innovations & Initiatives: **Technology**

The Integrated Aviation Weather Observing and Display System (AWODS) is an integrated system with field instruments of superior accuracy and reliability

These systems have been installed in

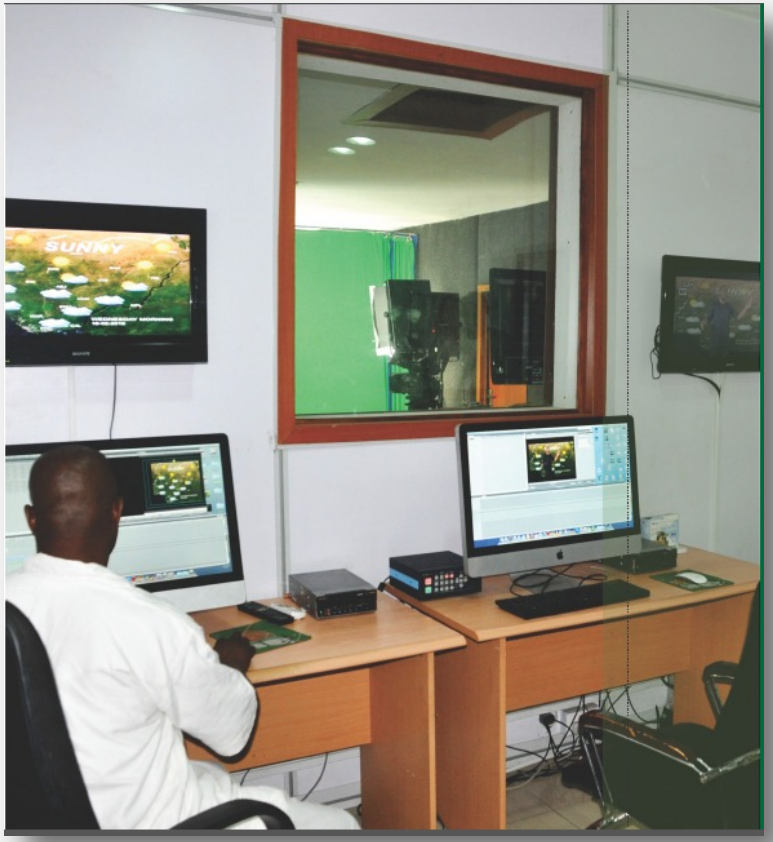
18

airports



Public Weather Services

Presently we Provide daily Weather Forecasting Services to Liberia & Sierra Leone under our Technical Assistance Program

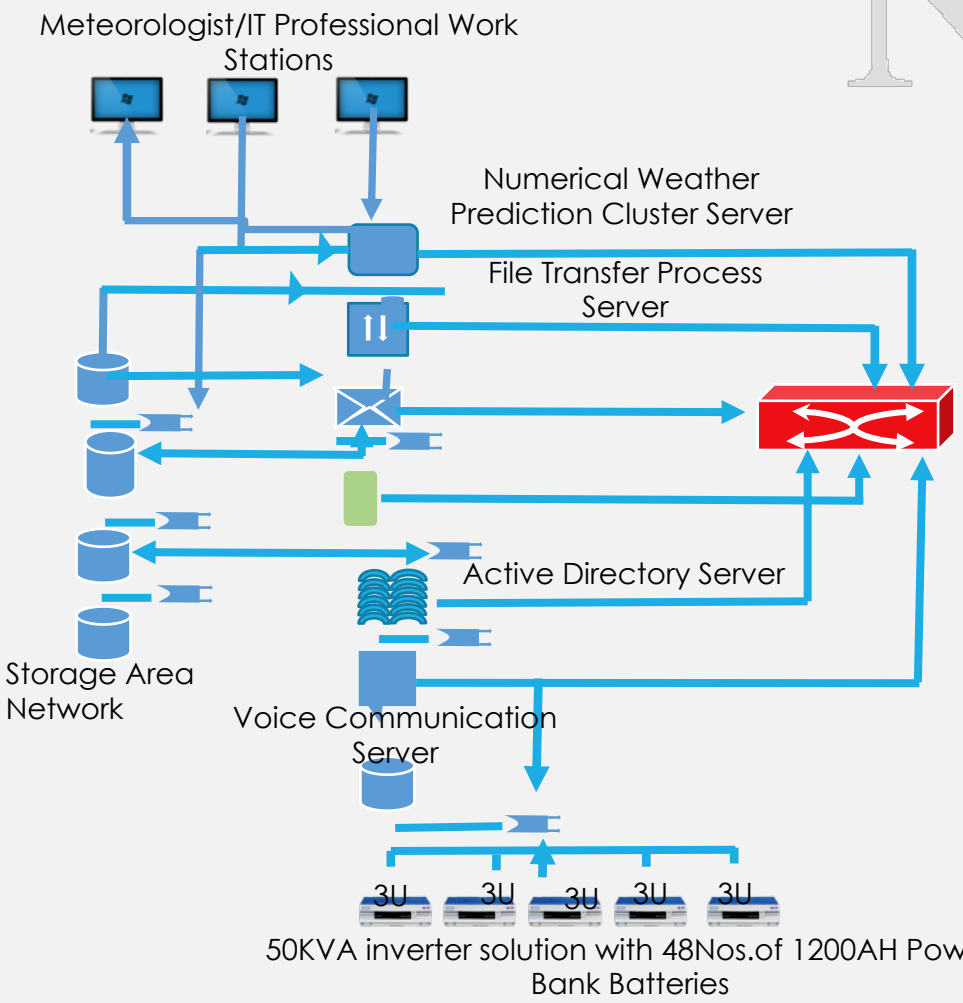


Key Innovations & Initiatives: **Technology**

Data Centre

The Data Management, Information and Communication Technology (ICT) Unit designed to enhance data collection, processing, storage and application for product generation in the different areas of meteorology

Key Innovations & Initiatives: **Technology**

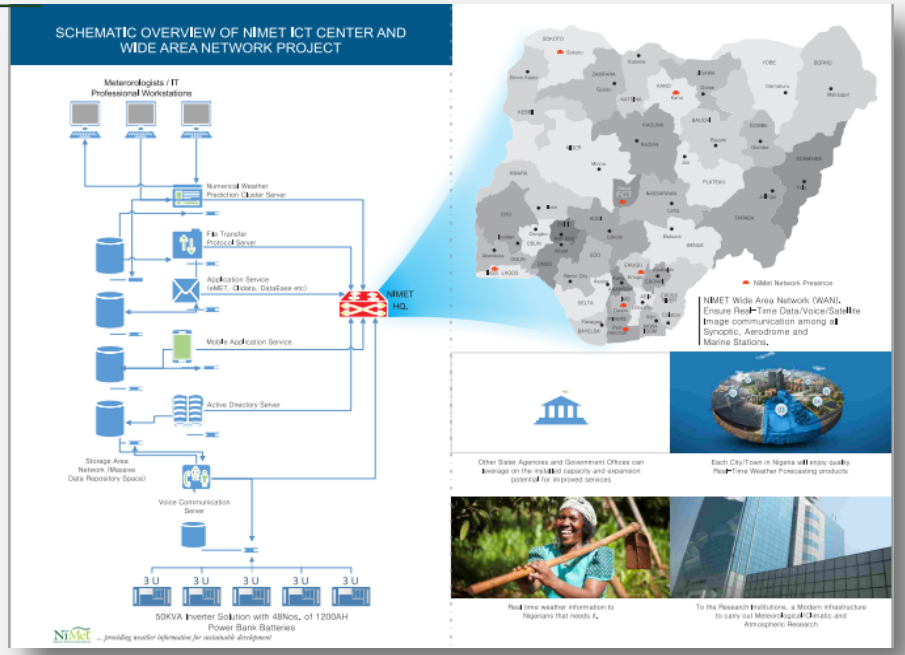


Schematic Overview of NiMet ICT/ Data Infrastructure

Key Innovations & Initiatives: **Technology**

Data Management Infrastructure

The Data Management Center receives real time numerical and satellite data for processing, archiving and dissemination to various end users



Instrument Calibration Workshop

Pressure Chamber

Barograph : One of the calibrated instruments

Wind tunnel

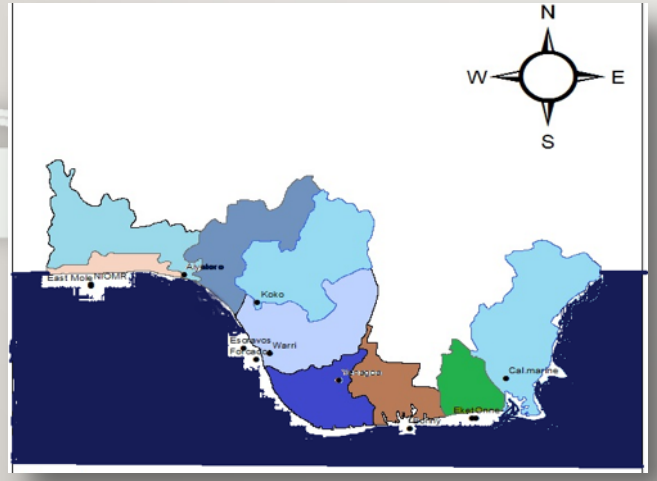
Calibration of Observation Instruments

Radiation Calibration

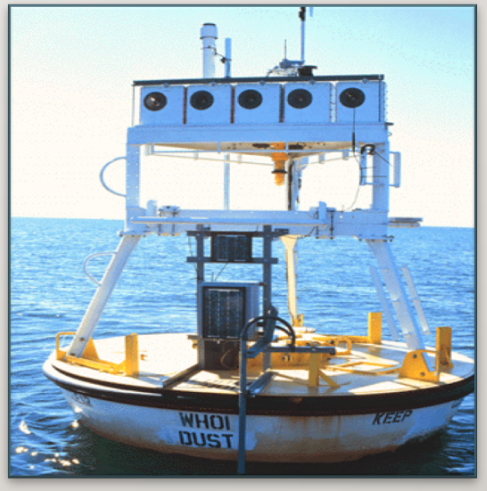
Temperature & Humidity

MARINE OBSERVATION

NiMet also has a data buoy anchored off Lagos coast. Hourly marine weather data obtained from these stations are built into the production of daily marine forecasts



NiMet's Coastal Land Stations



Marine Weather Buoy

Key Innovations & Initiatives: **Process**

NiMet has complied with best practices by certifying its aeronautical meteorological services : ISO 9001:2015 certified (the first African Country to have achieved that)

There is on-going training on quality management system, Competency Assessment and commitment to ensure attitude and orientation change

NiMet is remodeling the fabrication and calibration laboratory in readiness for ISO : 17025 certification

Certech Registration Inc.

CERTECH

Certificate of Registration

Environmental Management System - ISO 9001:2015

This is to certify that:

Nigerian Meteorological Agency

The Weather and Climate Research Center, Bill Clinton Road, Abuja Airport, Nigeria

Has earned certificate number: 17/20082

The Nigerian Meteorological Agency quality management system conforms to the requirements of ISO 9001:2015 for the following scope:

The provision of meteorological services to the aviation industry

Signed for and on behalf of Certech Registration Inc.

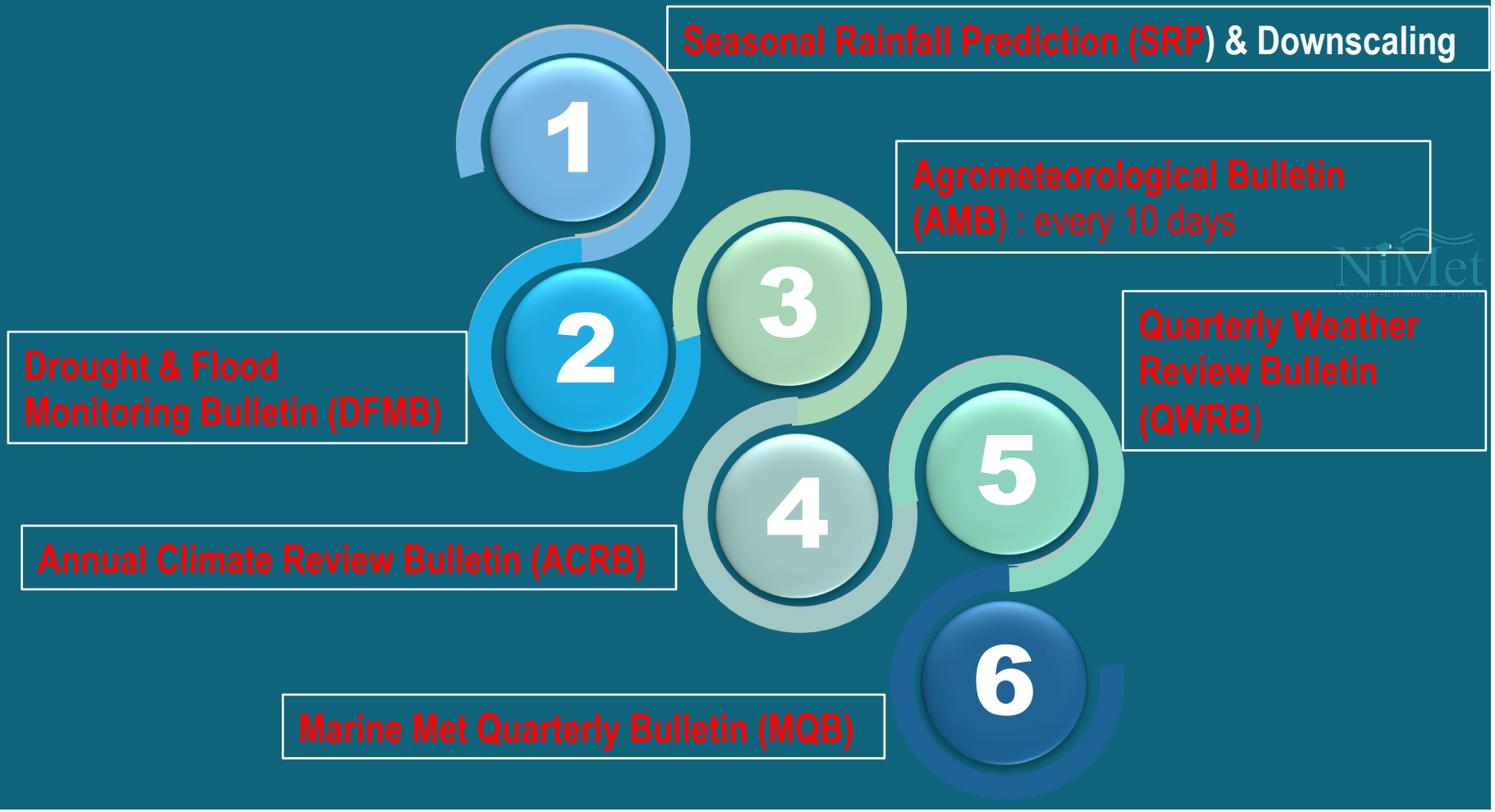
Director

Certificate originally granted on: May 16, 2017
Last scope change: N/A
Expiry date: May 5, 2020

File number: ON0310Q
See page 2 for all locations covered under this certification

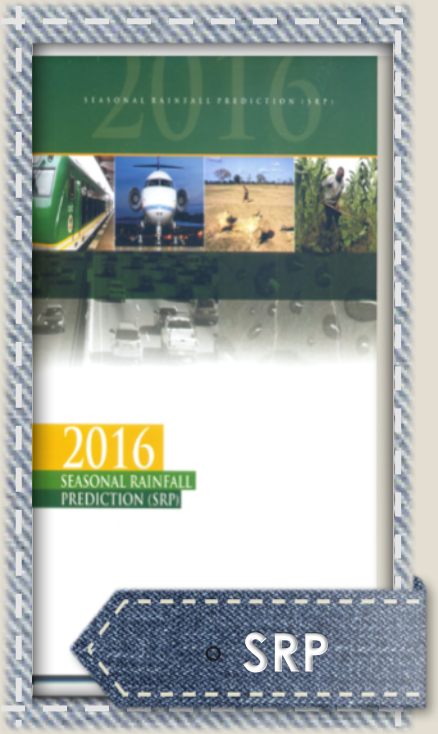
Page 1 of 2

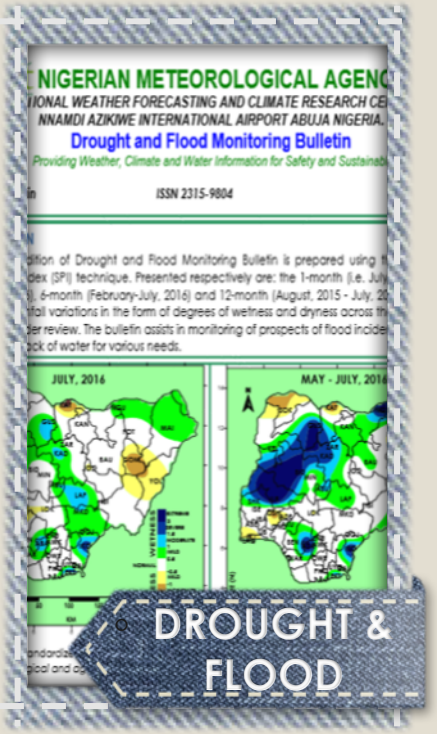
PRODUCT & SERVICES :the Agency also provides a range of **early warning** climate services and products that are designed for **adaptation** and **mitigation** to climate change and variability in Nigeria



Summary of Products and Services to Public

All can be accessed on www.nimet.gov.ng





TECHNICAL PARTNERSHIP FOR IMPROVED SERVICE DELIVERY

TECHNICAL SUPPORT TO SISTER COUNTRIES

a) RTC NIGERIA TRAIN PERSONELL FROM ENG SPEAKING W/AFRICA

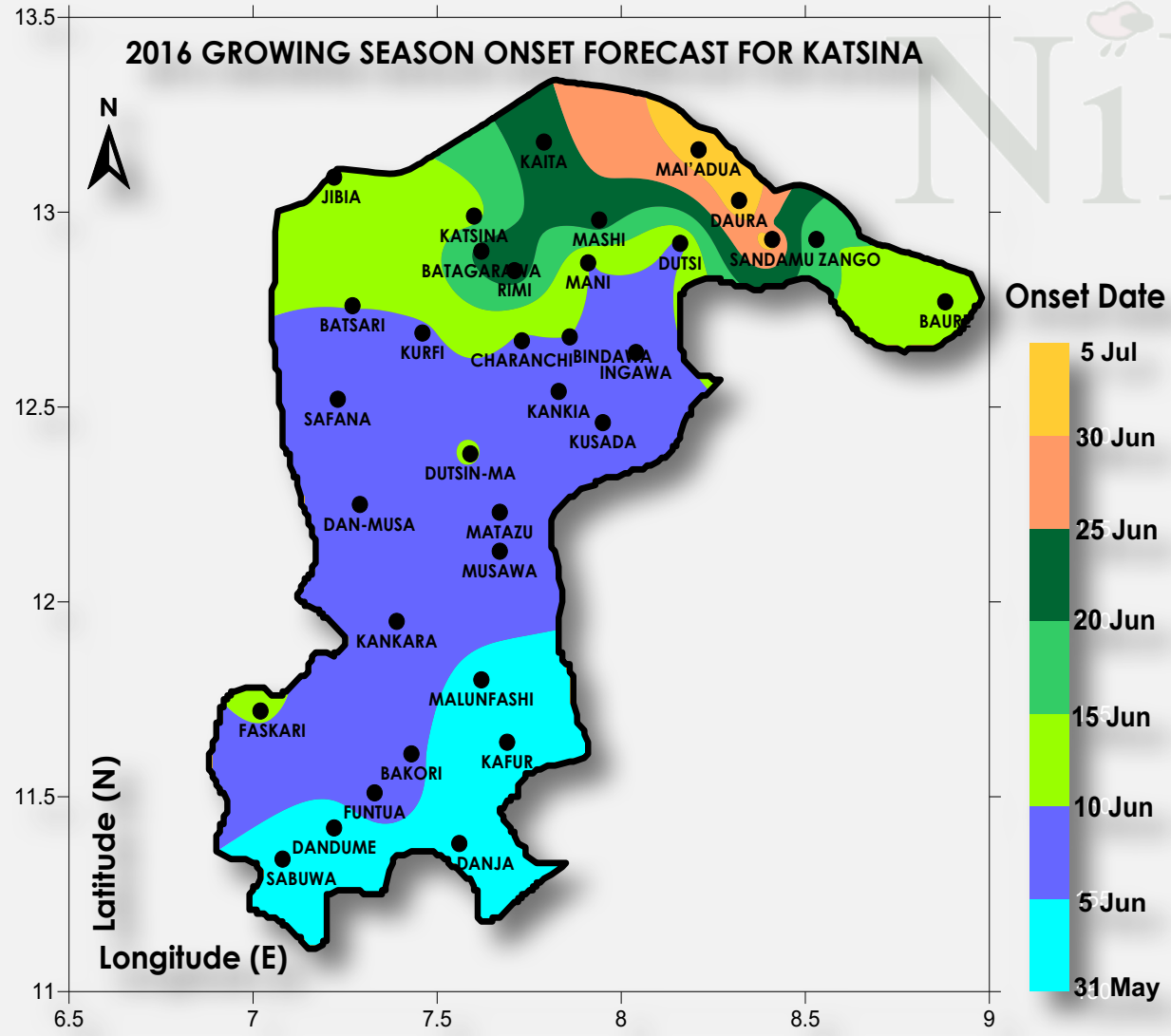
b) PROVISION OF DAILY WEATHER FORECASTING SERVICES: LIBERIA & SIERRA LEONE

c) STUDY VISIT BY STAFF OF BENIN REPUBLIC MET DEPARTMENT (DUE 4TH DECEMBER, 2017)

d) TRAINING OF 20 NMHs STAFF AT GAMBIA (DUE JAN 2018)

e) NiMet TO PARTICIPATE IN THE WMO POST DISASTER ASSESMENT SURVEY IN SIERA LEAONE (9TH -13TH DECEMBER, 2017)

Partnership with KTSG on SRP Downscaling



e-Seasonal Rainfall Prediction For Farmers in Katsina State

NiMet SRP KATSINA

Rainfall Data

Select L.G.A

Bakori

ok

Crop Data

Rainfall Information

BAKORI

Change L.G.A

ONSET
4-Jun
END
25-Oct
LENGTH
143
ANNUAL(mm)
1007

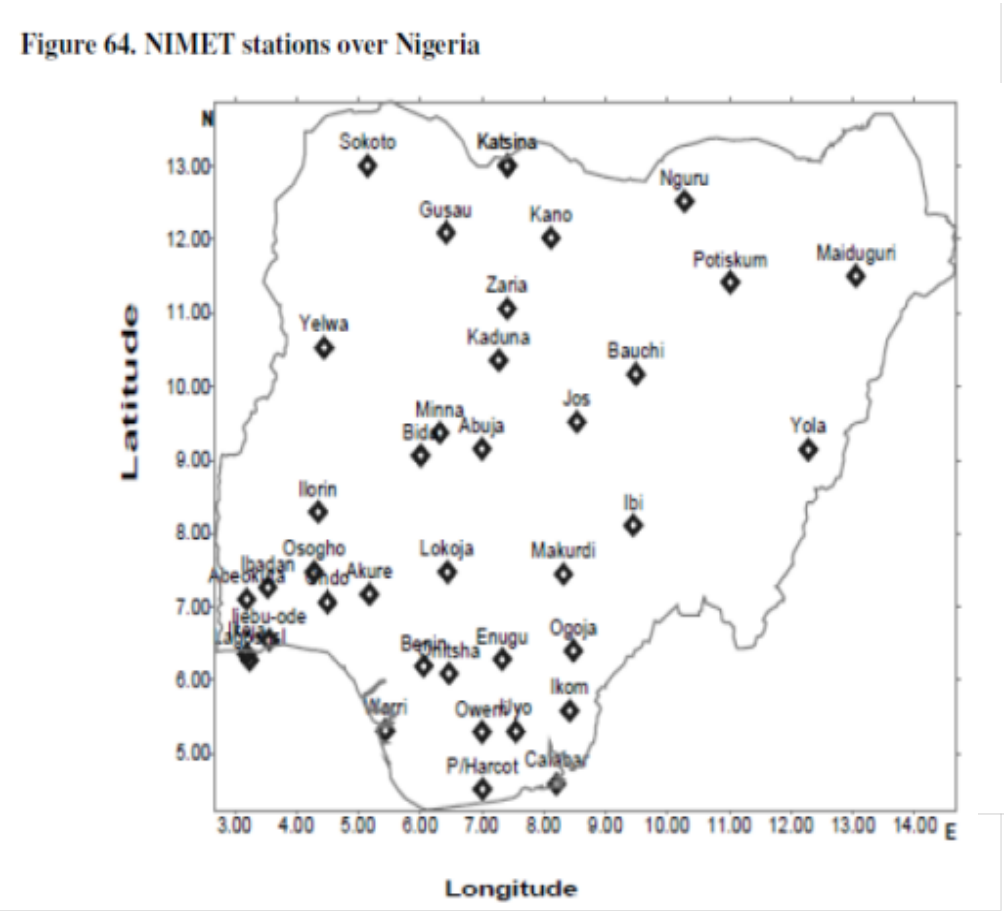
NiMet/TAHMO PARTNERSHIP

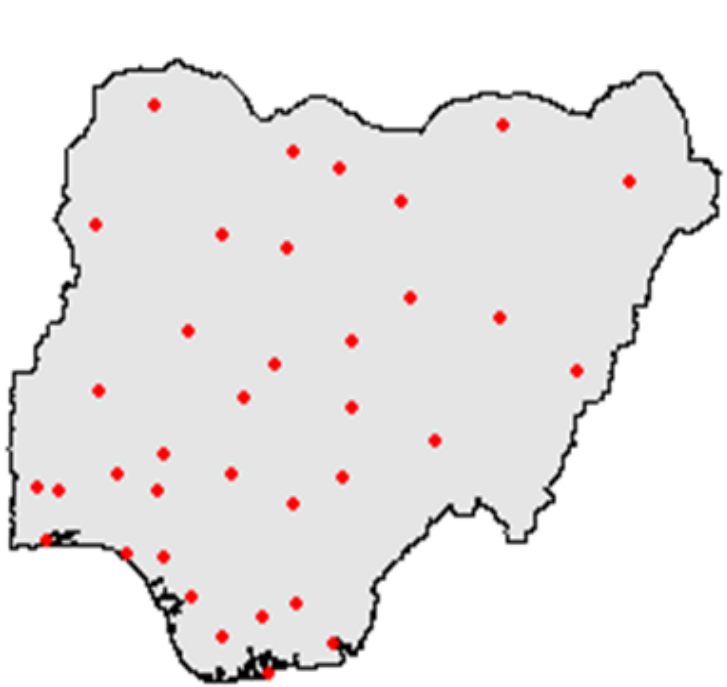
NiMet, recently signed an MoU with a Dutch Consortium- TAHMO for the installation of a robust network of 1000 AWOS in Nigeria for hydro-meteorological monitoring. **Under this partnership, the Agency, on 8th October, 2017 received 37 Units at no cost to the Nigerian Government. These Units are being immediately installed across the country(34 in universities) to significantly increase the density of NiMet's observatories and quality of services.**

Densification of Observation Network

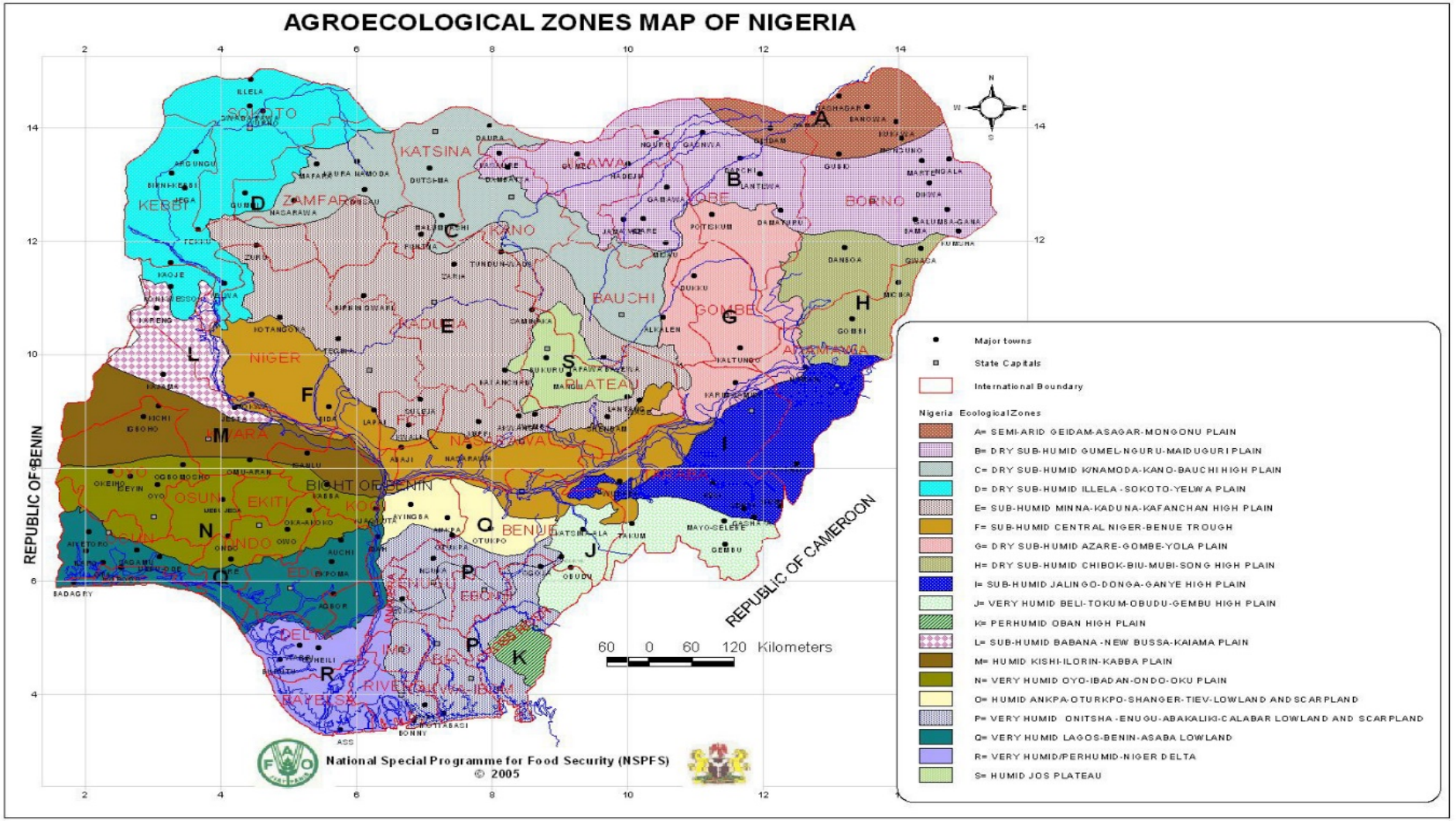
NiMet stations **(left).** Acquired from TAHMO **(right)**

Figure 64. NIMET stations over Nigeria





Observation network to now cover all 19 Agro-ecological Zones in the Country



NiMet/UBIMET Partnership

During the last Africa Hydromet Forum in Addis Ababa, 12th-15th September, 2017 NiMet signed an MoU With an Austrian Partner- UBIMET, with the core aim to establish a long-term commercial partnership between the Parties for the purposes to enhance and tailor the quantity and quality of weather services and products for end-customers in Nigeria and NiMet's areas of responsibility. As part of this collaboration, UBIMET is currently installing 8 Lightning Detection System across the country to help monitor and issue EWS for extreme weather events.

NiMet/USAID MARKETS II

In recognition of the need to step-down SRP vital information to grass root end users in the country, NiMet in collaboration with MARKETS II, a USAID funded project, organized an EA training of trainers across the country as part of the Agency's mandate to contribute to the Federal Government Agenda on reviving Agriculture for maximizing output and achieving food security and robust economic development The SRP step down workshops took place in 18 States during the 2017 Growing Season.

NiMet/BATNf Collaboration to Support Small Holder Farmers

NiMet/WASCAL Collaboration

NiMet, in October, 2017 signed an MoU with the West African Service Centre on Climate Change Adaptive Land Use-WASCAL to increase observation stations density as well as developing refined tailor made weather/climate services in the country. Fallout of this noble collaboration, WASCAL has donated 10 number AWOS-Automatic Weather Stations which are to be integrated in the NiMet's existing observatories for improved services

NiMet/KUKUA Partnership

The overall spirit and objective of the MoU was to reach an agreement that brings mutual commercial benefit to both Kukua and NiMet. In addition, this Agreement brings benefit to Nigeria as a whole through both economies and societies. In pursuance of this collaboration the parties agree on the following Key Principles:

a) Kukua and NiMet will collaborate for the enhancement of weather information across Nigeria.

b) Automatic Weather Stations will be installed at telecom tower sites and maintained under the responsibility of Kukua and NiMet.

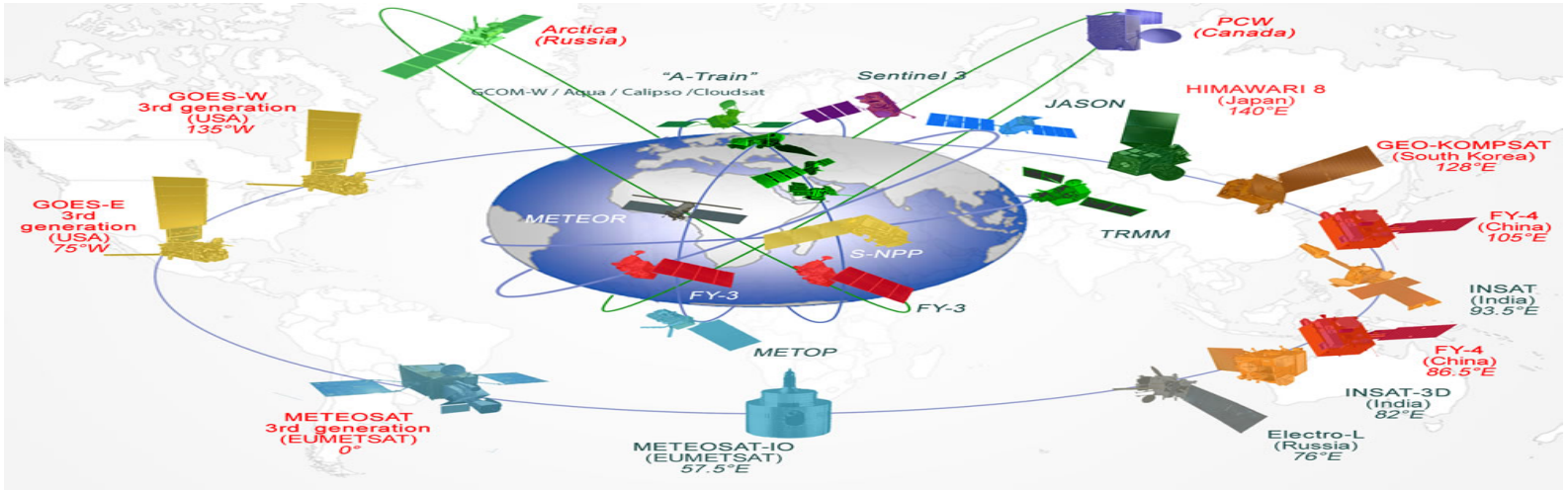
c) NiMet will be a designated provider of ISO Standard Certifications regarding instrument precision and data

NiMet to Participate in the UK GCRF African Swift 4 Year Project

The GCRF African SWIFT program of research and capacity building will improve African weather forecasting capability on hourly and seasonal timescales, and build a sustainable research infrastructure that will continue to make improvements into the future.

The landmark project brings together five UK partners (National Centre for Atmospheric Science, University of Leeds, University of Reading, Centre for Ecology and Hydrology, UK Met Office), ten African partners (ACMAD, ICPAC, ANACIM, UCAD, GMet, KNUST, NiMet, FUTA, KMet and University of Nairobi), and as an advisory partner, the UN World Meteorological Organization (WMO).

Participation in the SAWIDRA Project



SAWIDRA-ACMAD project addresses satellite and weather information for disasters resilience in Africa. It aims at reducing risks of weather related hazards through improved capacities of specialized national and regional climate centers (RCCs) to meet the needs of DRM agencies and socio-economic sectors for effective use of weather and climate services and community-focused and real-time early warning systems (EWS). **NiMet is the Focal Point for Nigeria**

Collaboration with 34 Universities

Despite the current giant stride to increase the number of observation stations across the country, due to the vast landmass of Nigeria, the number of these stations are grossly inadequate to address the challenges of climate variability and change. In light of the aforementioned, NiMet is collaborating with the 34 Universities to install and maintain standard weather observation stations across the length and breadth of the country. The data to be co-generated and co-shared for research and development in the Country.

Collaboration with other Partners

- ✓ **INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE (IITA) :** Climate Smart Agricultural Practices
- ✓ **IFAD-CASP PROJECT ON CLIMATE SMART AGRICULTURE**
- ✓ **FARMERS ASSOCIATIONS ACROSS THE COUNTRY**
- ✓ **FEDERAL MINISTRY OF AGRICULTURE**
- ✓ **INSTITUTE OF AGRICULCURAL RESEARCH, ABU ZARIA**
- ✓ **AGRIC INSURANCE ORGANIZATIONS & COMPANIES**
- ✓ **Other CBOs/NGOs interested in Weather/Climate Services**

NiMet Data Rescue Initiatives

The Nigerian Meteorological Agency (NiMet) have commenced the process of rescuing and digitizing its weather observational data stored in paper form. The data records spans for over a hundred years in some stations. The National archive is located in Lagos (former headquarters of NiMet) and to some extent, is in relatively good condition. Unfortunately, many archives are in poor condition and not well organized and managed. The Nigeria Meteorological Agency has the responsibilities of securing this endangered national resource and is therefore looking for the best data rescue and digitization methods, including the most modern equipment that will be most effective and efficient to adopt in this rescue project. A WMO

Conclusion

NiMet evolved from colonial public service department which started in 1887 to a modern day, technology driven weather service provider

Although NiMet is a parastatal under the Federal Ministry of Transportation(Aviation), the services provided by the Agency cut across other critical sectors of the economy such as Agriculture, Water Resources, Environment, Transport, Health, Defence, Tourism, Marine etc

NiMet has witnessed massive infrastructural investment resulting to seamless service, accurate forecasting and real time reportage of weather information

Conclusion II

NiMet is driving towards a new paradigm of sustainability through partnerships for the purpose of increasing the Agency's IGR and reducing dependence on Government funding

NiMet is ready to partner with Organizations such as UNDP and other NMHs to share experience innovations : technology, structure, process and user communication strategies

NiMet has complied with best practices by certifying its aeronautical meteorological services : ISO 9001:2015 certified and is remodeling the fabrication and calibration laboratory in readiness for ISO 17025 certification

Thank You

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