COUNTRY HYDROMET DIAGNOSTICS

Informing policy and investment decisions for high-quality weather forecasts, early warning systems, and climate information in developing countries.

January 2025

Niger Republic Peer Review Report

Reviewing Agency: Nigerian Meteorological Agency (NiMet)

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AFRICAN DEVELOPMENT BANK GROUP

SOFF Systematic Observations Financing Facility

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Le Représentant Permanent du Niger
auprès de l'O.M.M.

The findings, interpretations and conclusions expressed are those of the named authors alone and do not necessarily reflect those of the agencies involved. Authorisation for the release of this report has been received from the Nigerian Meteorological Agency (NiMet) and the Directorate of National Meteorology (DNM), Niger, as of July 2024.

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Acknowledgements

The authors wish to acknowledge the tremendous support received from the United Nations Systematic Observations Financing Facility (SOFF) for providing the funding, which drove the processes that led to this important document. The World Meteorological Organization (WMO) headquarters in Geneva as well as the Regional Office for North, Central and West Africa for providing the technical guidance and the necessary documents.

Our deepest appreciation to the Permanent Representative of Niger with WMO, Mr Gaptia Lawan Katiellou, his SOFF Team and the entire staff of the Directorate of National Meteorology (DNM), for their cooperation in supplying documents and information used in this publication and willingness to attend numerous online meetings that were held. Also, for facilitating the safe entry of our team into Niger for the in-country visit, providing support for the team's assessment visits to various stations across the country and organising a stakeholders' engagement workshop. We also wish to appreciate all the stakeholders (the Ministry of Transport, the Ministry of Health, the Ministry of Agriculture/Food Security, the Ministry of Environment, Hydrology, the Ministry of Water Resources, the Ministry of Energy, the Disaster Risk Management Agency, ASECNA, AANN, ACMAD, AGRHYMET, etc.) for their invaluable contributions to the success of our in-country visit and active participation at the stakeholders' engagement workshop.

A special gratitude goes to the SOFF Team in Nigeria with whom we have worked tirelessly in putting together this document and other deliverables during the SOFF process for Niger. Finally, appreciation goes to the African Development Bank (AfDB) for supporting the process and their willingness to work as the Implementing Entity for the investment phase.

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Executive Summary

Like many Least Developed Countries (LDC), Niger has had its share of political upheavals and economic challenges in recent years. However, the case of Niger is peculiar. A huge part of the country is covered by the Sahara Desert, giving it particularly harsh weather and climate known to very few other countries across the globe. Though agriculture and animal husbandry are the mainstay of the nation's economy, a changing climate associated with increasing frequency of droughts and extreme temperatures, has adversely affected food production and other economic activities in the sectors including their value chains.

The government of Niger understands the importance of accurate and reliable weather information and climate and thus has been investing in the sector. Government investments through the Ministries of Agriculture, Environment and Water Resources account for a significant proportion of the network of meteorological observations under the Directorate of National Meteorology (DNM). The DNM is the sole meteorological authority in Niger, empowered by Decree No. 2023-080/P/CNSP/MTEQ of September 9, 2023 - Organisation of the Ministry of Transport and Equipment - ORDER N°0012/METQ/SG/SGA/DL OF FEB 12, 2024. Other private and developmental partners such as ASECNA and its local subsidiary; AANN are involved in meteorological operations in the countries, specifically, aeronautical meteorology.

Despite the government's support, the DNM is faced with some challenges, particularly in manpower and capacity development. The number of staff at the DNM is not sufficient enough to close the operational gaps in a large country like Niger. This can be attributed to the lack of enough government resources to recruit more qualified staff and provide them with the necessary resources to do their job. This lack of resources has also affected the frequencies at which instrument maintenance is carried out at stations outside Niamey and its environs.

In its efforts to effectively provide and deliver weather and climate services to the people of Niger, the DNM has entered into partnerships with other government and non-governmental institutions, at the national and international levels. These collaborative partnerships have greatly contributed towards the dissemination of weather and climate information to urban and rural communities. The partnerships have also contributed to the rapid growth in the network of observation stations across the country. It should be noted that the majority of the stations are located in the southern parts of the country, while the central and northern parts are not well covered. Furthermore, the partnership has provided the DNM with forecasting infrastructure such as PUMA 2015 and MESA 2015 Workstations to visualise outputs from ARPEGE, and ECMWF models, as well as access to models including UKMO, ARPEGE, ECMWF, Windy (ICON, GFS), MISVA and Meteo France (RDT).

The DNM's capacity to produce and disseminate weather and climate information and services has continued to improve in recent years. A functional website, a TV studio and various social media platforms are all channels deployed by the Directorate to aid in reaching all parts of the country with weather forecasts and climate information.

There are many positives to be drawn from the assessment of the hydrometeorological value chain in Niger and the DNM in particular, however, staff strength and capacity development in key areas of modern meteorology such as NWP remains inadequate for the Directorate. Challenges with transmitting observation data to NWP Global Centres remain a concern within the Directorate.

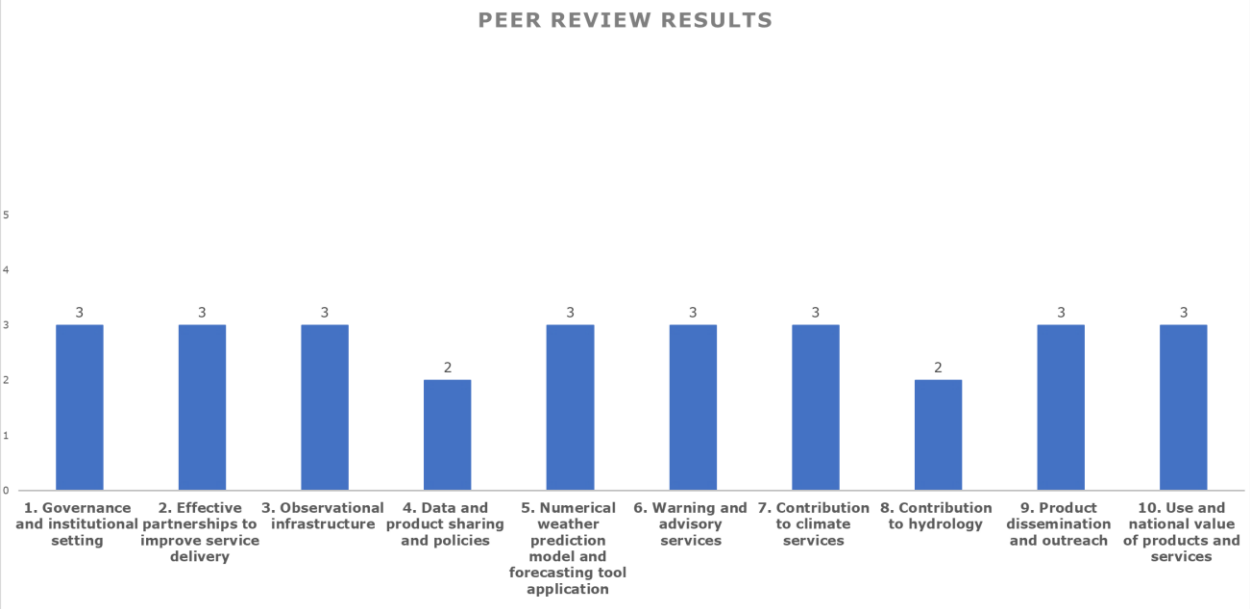
Evaluations of the ten (10) CHD elements show that elements 1, 2, 3, 5, 6, 7, 9 and 10 are ranked level 3 respectively, as the DNM still lacks adequate funding and skilled manpower to effectively carry out all its operational mandates. Furthermore, elements 4 and 8 are ranked level 2 respectively, majorly due to the inability of the DNM to meet

GBON data transmission requirements and the lack of a Standard Operating Procedure (SOP) between the DNM and the Directorate of National Hydrology (DNH).

Recommendations:

1. Improved budgetary allocations for operations purposes and an increase in the number of qualified staff are highly recommended.
2. Accelerate efforts towards making DNM a parastatal of government.
3. Deployment of qualified and trained staff to stations, to ensure quality control of data before transmission.
4. The establishment of more stations across the vast central and northern parts of the country is also recommended.
5. ICT application for coding AWS observation data into Synop is highly recommended.
6. Deployment of WIS2.0 is highly recommended.
7. Training on data assimilation and further capacity development on NWP is needed by the DNM.
8. Additional computing capacity and more qualified staff will be required if NWP is to become a full unit of the Directorate and further improve on the basis that has been laid now.
9. Improvement of the Directorate's facilities for TV weather presentations as well as further training for weather presenters and graphic designers.
10. There is a need for improvement in the aspect of co-creation and co-production of products.
11. Build on the existing informal relationship between DNM and the National Directorate of Hydrology (NDH) to develop products and services tailored for hydrology.
12. Capacity development within the DNM to be able to carry out some level of hydrometeorological assessment and analysis.
13. The DNM should carry out more outreach and awareness activities and create a platform for routine survey and feedback mechanisms.

Summary of assessment rating for CHD elements



Element	Maturity level score
1. Governance and institutional setting	3
2. Effective partnerships to improve service delivery	3
3. Observational infrastructure	3
4. Data and product sharing and policies	2
5. Numerical weather prediction model and forecasting tool application	3
6. Warning and advisory services	3
7. Contribution to climate services	3
8. Contribution to hydrology	2
9. Product dissemination and outreach	3
10. Use and national value of products and services	3

Chapter 1: General information

Introduction

Niger Republic is a landlocked West African country located between 11°37′ and 23°23′ north latitude and between 00°10′ and 16°00′ east longitude, with an area of 1,267,000 square kilometres (km^2). Niger shares borders with Algeria and Libya in the north, Chad in the east, Nigeria and Benin in the south, and Burkina Faso and Mali in the west. Most of the country (three-fourths) is covered by the Sahara Desert. The terrain is predominantly desert plains and sand dunes. There are also large plains in the south and hills in the north. In the extreme south, there is a tropical climate near the edges of the Niger River Basin. Lake Chad at the southeastern corner of the country is shared between Niger, Nigeria, Chad, and Cameroon. Niger's southern part lies within the Sahelian climate zone, with Sudan savannah vegetation. The vegetation cover is sparse, and nomadic agriculture is predominant.

More than 700 kilometres separate the southernmost border and the sea (Gulf of Guinea). The climate is mostly hot and dry, with much of the country in the semi-arid Sahel belt, and the north reaching into the Sahara Desert. Rainfall is highly variable throughout the year, both in terms of regional distribution and frequency. The rainy season is short and lasts for only three months (July - September), with total rainfall amounts ranging from 150mm to 600mm per year in the Sudan savannah; maximum temperatures are mostly high (45°C in the shade in April–May).

The population of Niger was estimated at 23 million (World Bank, 2021), with an average population growth rate of 4 per cent per year, which is one of the highest in the world. The population is concentrated in the southern part of the country, largely due to the pattern of increasing aridity from south to north. The population of the Niger is more concentrated in the Southern parts of the country than in the North. The unequal population distribution imposes considerable pressure on the arable land in the southwestern part of the country (*Hassane Yayé, et al*., 2013). Niger is in the low human development category, ranking 187 out of 188, and is a member of the Least Developed Countries (LDC) Group. The country is heavily reliant on agriculture and livestock breeding, which account for 40% of its Gross Domestic Product (GDP) and provide livelihoods for most of its inhabitants (MAH/GC, 2019; World Bank, 2020). Approximately 80% of the population lives in rural areas (MAH/GC, 2019).

Figure 1: Geographical location of Niger Republic

CHD methodology

As part of SOFF assessment for Niger, the Nigerian Meteorological Agency (NiMet) agreed to carry out a comprehensive assessment of the critical elements of the hydro-meteorological value chain, using the Country HydroMet Diagnostics (CHD). To fulfil this agreement, NiMet embarked on data gathering from Niger through a series of online meetings and review of documents from WMO and other international organisations.

In addition to the Country Information on the WMO Community Platform available in the database, a structured questionnaire was adopted based on the indicators of the CHD. This was combined with feedback from virtual meetings with critical staff members of Directorate of National Meteorology (DNM). The Climate Services Checklist, WMO Early Warnings for All Rapid Assessment Report and the WMO Country Mission Report on Needs Assessment were also intensively reviewed.

To further assess and authenticate the accuracy of the information gathered from the above sources, an in-country visit was also conducted by the Nigerian Meteorological Agency (NiMet). During the visit, meetings were held with critical stakeholders in the Ministry of Transport, Community leaders/secretaries, Agricultural extension workers and Airport management. A stakeholders' engagement workshop was conducted, bringing together all those involved in the weather and climate services value chain in the country, including the Ministry of Transport, ASECNA, ACMAD, Ministry of Water Resources, Ministry of Agriculture, Ministry of Environment, Ministry of Energy, Disaster Risk Management and NGOs/CSOs.

This report is presented along the ten most critical elements of the hydro-meteorological value with an indication of their respective maturity level informing where additional focus and support is needed (based on the assessment of the indicators) and some recommendations offered to aid uplifting maturity level.

Country Status

In Niger Republic, the practice of meteorology (weather and climate) is overseen by the Directorate of National Meteorology (DNM), under the supervision of the Ministry of Transport. The Directorate with the government's support has worked very hard over the years to improve the country's weather monitoring and disaster preparedness capabilities. The DNM has in the recent past received support in the form of equipment donation and manpower training, funded by international partners including the WMO. These initiatives are usually targeted at enhancing the country's ability to respond to weather-related disasters and improving public safety and disaster management.

Despite these efforts, Niger still faces significant meteorological challenges, particularly due to climate change. Frequent extreme weather conditions such as heavy rainfall, droughts, and floods have become common occurrences in recent decades. Humanitarian challenges occasioned by political instability have also brought about increased food insecurity across the country.

As the impact of climate change and extreme weather events are projected to intensify over the coming years and decades, it has become increasingly important that the DNM is strengthened and positioned to provide adequate climate services for all sectors of the Nigerien economy. Presently, the DNM is faced with challenges in the form of insufficient funding from the government, inadequate skilled manpower, and dilapidating infrastructure, among others.

Key service needs and natural hazards vulnerabilities

Like many countries around the world and West Africa in particular, Niger is exposed and vulnerable to a range of hydrometeorological, environmental, biological, and societal hazards. The impact of climate change has increased the country's vulnerability to rising temperatures, flooding, severe thunderstorms, altered rainfall patterns, as well as increased frequency and intensity of extreme weather events. Climate change has had significant effects on Niger. In a study on West African agriculture and Climate Change, *Hassane Yayé, et al (2013)*, reported that there have been severe food crises (once every three years on average) due mainly to unfavourable climatic conditions.

A report of the National Adaptation Plan process in focus (2019): Lessons from Niger indicated that climate change risks will become more significant and impact all sectors of the country in the coming years/decades. The report in part stated that the *"projected climate-related risks include recurrent droughts, increasingly erratic rainfalls and floods, violent sandstorms and destructive invasions by locusts. Insufficient drinking water supplies are under increasing pressure from the depletion of ponds and natural lakes, the reduced flow of the Niger River and sedimentation of surface water sources. A decline in the livestock and crop sectors would lead to drastic impacts on the economy of Niger, potentially leading to widespread food insecurity, an exacerbation of rural to urban migration, and an upsurge in diseases such as malaria, meningitis and measles."* (http://globalsupportprogramme.org/nap-gsp).

While one-third of the country's surface area (which is home to 40% of the population) is subject to flooding, the eastern part of the country suffers from limited rainfall (GFDRR, 2019). The uneven distribution of water resources makes Niger particularly at risk of droughts, which affect up to 4 million people a year across the country (GFDRR, 2019). Predominantly occurring in Niger's southwestern regions, floods affect approximately 100,000 people annually. The areas mostly affected by hydrometeorological hazards are Tillabéri (in the west) and Dogondoutchi (in the south) (MAH/GC, 2019). Niger is highly vulnerable to the adverse effects of climate change. Temperature rises, increasing variability in annual rainfall in the Sahel and increase in the magnitude of extreme weather events are all concerns for the country's development and food security.

Climate change has had significant effects on the development of the country. Since 1967 there have been several food crises (one every three years on average) due mainly to unfavourable climatic conditions, resulting in a drastic reduction in living standards.

To address this, the Directorate of National Meteorology (DNM) must be empowered with the adequate instruments and human skills to efficiently monitor the weather and climate of Niger, as well as improve its Early Warnings Systems and Alerts, develop the skills and capacity to produce Impact-Based Forecasts. Forecasts of impending storms and areas of likely high impacts will enable Disaster Risk Reduction (DRR) agencies to adequately prepare and respond in line with the global call for Early Action in building resilient societies.

Chapter 2: Country Hydromet Diagnostics

Element 1: Governance and institutional setting

1.1 Existence of Act or Policy describing the NMHS legal mandates and its scope

Hydrometeorological operations are carried out by two separate entities in Niger, with the Directorate of National Meteorology (DNM) responsible for meteorological practices and the Department of Hydrological Services charged with carrying out activities relating to hydrology. The DNM is a central service of the Administration of the Ministry of Transport of Niger, responsible for the design and implementation of the National Meteorology Policy in Niger. It was created by Decree No. 62-056/MTP of March 1, 1962, and its present legal empowerment is derived from Decree No. 2023-080/P/CNSP/MTEQ of September 9, 2023 - Organisation of the Ministry of Transport and Equipment - ORDER N°0012/METQ/SG/SGA/DL OF FEB 12, 2024.

The Decree among other things empowers the DNM to carry out the following functions:

- Collect, record, control, process, validate, store and secure meteorological data while ensuring their integrity;
- Establish weather observation networks, in accordance with the standards of the World Meteorological Organization (WMO);
- Ensure the exchange of meteorological data and information between the different member countries of the World Meteorological Organization (WMO) and the Agency for Air Navigation Safety in Africa and Madagascar (ASECNA);
- Develop and disseminate weather forecasts for the needs of users and aeronautical safety;
- Create awareness and inform the general public about behaviour and changes in the atmosphere;
- Give warnings of impending extreme weather phenomena likely to cause damage to people and their properties;
- Ensure the safety of people and property through the provision of accurate meteorological forecasts and information;
- Identify and meet the needs of users in all development sectors (agriculture, livestock, water resources, forestry, energy, transport, health, wildlife, fishing, commerce, industry, tourism, public works, etc.) and assist with meteorological, climatological and agrometeorological data;
- Participate in studies and research on climate change and its impacts on vulnerable socio-economic sectors;
- Contribute to the implementation of the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol (KP), the Protocol on the Protection of the Ozone Layer and the Biodiversity and Desertification Conventions;
- Contribute to actions to raise awareness and integrate climate change into socio-economic development policies and strategies;
- Contribute to the implementation of the World Climate Research Program (WCRP).

These functions and responsibilities assigned by law to the DNM are performed through different units/divisions. The Directorate is comprised of five Divisions listed below and contained in the organogram:

- Meteorological Observation Networks Division, DROM (two (2) services);
- Meteorological Forecasting Division, DPM (two (2) services);
- Meteorological Applications Division, DAM (three (3) services)
- Climate Change and Development Division, DCC/D (two (2) services);
- Administrative and Financial Affairs Division DAAF, (two (2) services).

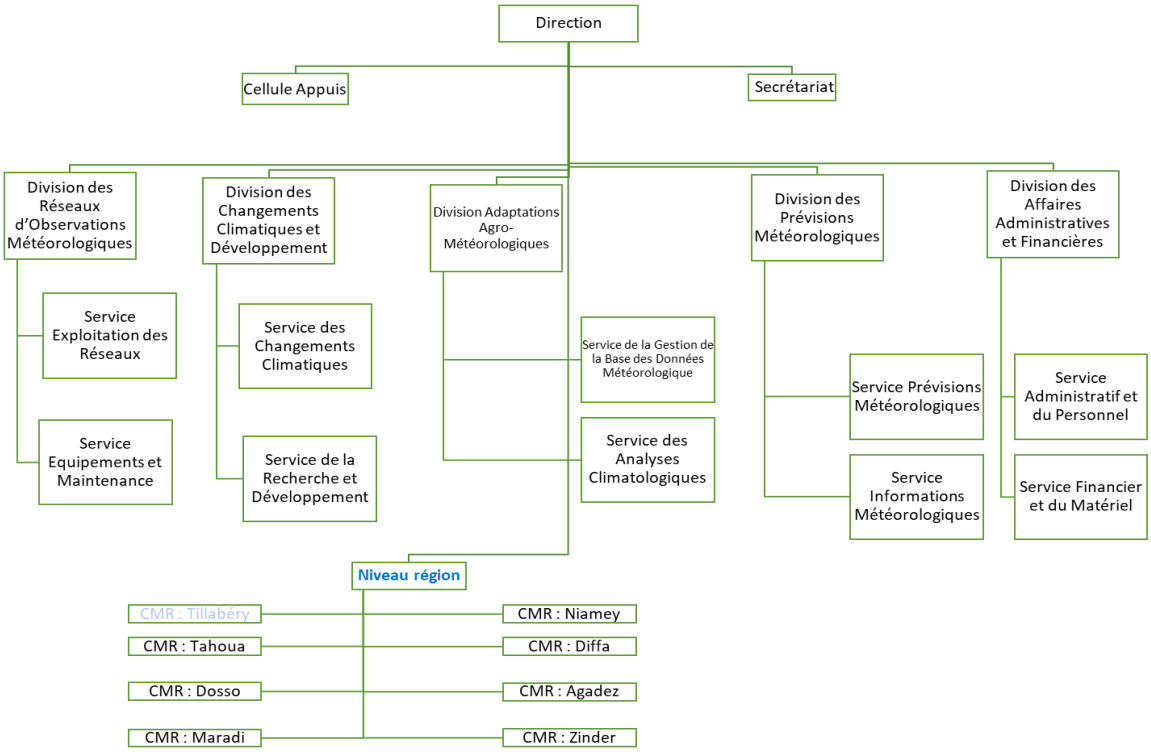


Figure 2: Organogram of DNM

1.2 Existence of Strategic, Operational and Risk Management plans and their reporting as part of oversight and management.

DNM has set the following strategic priorities over the next years:

- The establishment and operationalisation of 8 Meteorological centres across the 8 regions in Niger – Tillaberry, Tahoua, Dosso, Maradi, Niamey, Diffa, Agadez and Zinder
- Finalize the modernisation of ICT infrastructure for the DNM
- Transformation from the National Directorate of Meteorology into a National Meteorological Agency, with the mobilisation of sufficient resources for its operations.

- Implementation of a five-year strategic plan focused on the Agency (after the transformation), as developed by a Nigerien consultant in conjunction with the management of DNM.
- Operationalize the Numerical Weather Prediction (NWP) through the installation of the WRF Model on DNM servers, for applications to all weather and climate research and development areas in the country.

1.3 Government budget allocation consistently covers the needs of the NMHS in terms of its national, regional, and global responsibilities and based, among others, on cost-benefit analysis of the service. Evidence of sufficient staffing to cover core functions

As of 2024, the total annual budget for DNM stood at USD 1,893,403.82. This budget covers the salaries of the employees (amounting to 62% of the available funds), the operational costs (28%), investments (10%) and others (0%). The revenue sources for the DNM consist solely of aeronautical fees (93.11%) and meteorological services (6.89%).

1.4 Proportion of staff (availability of in-house, seconded, contracted- out) with adequate training in relevant disciplines, including scientific, technical, and information and communication technologies (ICT). Institutional and policy arrangements in-country to support training needs of NMHS.

The DNM has a staff strength of 135 personnel, working in the different divisions of the Directorate. They include Management Staff (23), Meteorologists (19), Meteorological Technicians (Observers) (62), Technicians (Engineers) (20), and Others/Administrative Staff (34). About 17.7% of the total staff strength of DNM are females.

However, considering the size of the country and the peculiar nature of weather and climate-related challenges facing it due to its proximity to the Sahara Desert and the adverse effects of a changing climate, this number of staff is not adequate to provide 24/7 monitoring of the atmosphere for the country. Funding challenges imply the government alone cannot recruit additional staff to provide the needed manpower, especially in climate services.

Niger plays host to both AGRHYMET (a Regional Climate Centre for West Africa) and the African Centre of Meteorological Application for Development (ACMAD - a Continental Climate Centre) that provide support and training to personnel of the DNM. There was a training plan developed a few years ago but has expired since 2022 without execution, majorly due to lack of funds. No new plan has been developed since then. Staff are trained as opportunities arise. The WMO has also been contributing towards the training and re-training of personnel through the award of Fellowship to different institutions including the RTC, Oshodi, Lagos, Nigeria.

Category of Staff	Numbers
Management Staff	23
Meteorologist	19
Meteorological Technician	39
Hydrologist	-
Technician (Engineers)	20
Climate Services	-
Researcher	-
Other	34
Total Staff number M: F	111:24

Table 1: DNM staff category (May 2024)

1.5 Experience and track record in implementing internationally funded hydromet projects as well as research and development projects in general.

In the recent past, the DNM has built a good track record in implementing internationally funded hydrometeorological projects. Available records indicate that the Directorate has working partnerships with international organisations aimed towards improving the weather and climate products and services value chain in Niger. The list of completed and ongoing projects which involve the DNM is as follows:

- World Bank (WB) and World Meteorological Organization (WMO) through the Climate Early Warning System (CREWS) Niger - Strengthening national warning capacities, with a focus on rainwater and river flooding (2016 – 2019)
- World Food Programme (WFP) - Design and implementation of climate services for climate change adaptation, aimed at (1) Strengthening the network of meteorological observations, (2) Capacity building on the use of the SPIEA rain gauge (3) Raising awareness on seasonal forecasting results, variability and climate change, (4) Development and Dissemination of Agrometeorological Products (5) Revitalization of the National Framework for Climate Services (NFCS) through the production of thematic bulletins (2020 -2024)
- World Bank – PIDUREM and CREWS project aimed at strengthening national capacities for warning of rainwater and river flooding (2023 – 2027)
- African Development Bank (AfDB) - Climate Information and Foresight Development Project (CDIP) aimed towards strengthening the capacity of the DNM in Observation and Data Processing Infrastructures (2014 – 2020)
- Ministry of Agriculture - Support Project for Climate-Sensitive Agriculture (PASEC) tailored for strengthening the meteorological observation network.
- IBIMET, DNM and DIST (with support from Italian Cooperation Agency (AICS)) - Adaptation to Climate Change, Disaster Reduction and Agricultural Development for Food Security (ANADIA) 1 and 2 - (1st phase: 3 years (2013 to 2015), 2nd phase: 3 years (2017 to 2020))

Summary score, recommendations, and comments for Element 1

In summary, presently, the DNM derives its legal and regulatory mandate from a decree, enacted in 2023. Though there are clear objectives and strategic priorities for DNM, it is not a full Agency of its own. Staff strength is not enough to provide adequate

and effective weather and climate services for the country. The Directorate has collaborated with local and international partners in implementing many hydrometeorological projects in recent years. Thus, this element is accessed to be at ***Level Three - Moderately well-mandated, managed and resourced and clear plans for, and sufficient capacity to address operational gaps.*** Please note that DNM has clear and formalised mandates to provide meteorological services, but the capacity to address the operational gap is insufficient.

Recommendations:

1. Efforts should be made to increase the number of staff at DNM.
2. Increased budgetary allocation for the operations of DNM is highly recommended.
3. Accelerate efforts towards becoming a parastatal of government.

Element 2: Effective partnerships to improve service delivery

2.1. Effective partnerships for service delivery in place with other government institutions.

The DNM has over the years built several partnerships at the national level, both with government institutions and the private sector including NGOs and CSOs. This includes the Ministry of Transport, the Ministry of Health, the Ministry of Agriculture/Food Security, the Ministry of Environment, Hydrology, the Ministry of Water Resources, the Ministry of Energy and the Disaster Risk Management Agency.

There is also an existing collaboration with Kandadji Dam Agency, with an agreement for a period of 3 years (2023-2025). Under the agreement, DNM is to provide a specific climatological product based on the need to fight against climate-related hazards.

The Directorate has been leveraging on these partnerships for the dissemination of its products and services. It has also been a platform for the installation of AWSs across many rural communities, especially, the collaboration with the Ministry of Agriculture.

2.2. Effective partnerships in place at the national and international level with the private sector, research centres and academia, including joint research and innovation projects.

The DNM is committed to developing beneficial partnerships at both national and international levels, which includes private sector entities, academic institutions, and research centres. These collaborations are aimed at fostering innovation and advancing meteorological research and services in the country.

The Ministry of Agriculture and the National Institute of Agronomic Research of Niger (INRAN) has partnered with the Directorate of National Meteorology (DNM) in a project to install rain gauges at the village level and share agro-meteorological information about agricultural production and gardening sites. The project has installed more than 100 rain gauges in 80 villages and provides farmers with relevant information and advice on the planting date and the amount of useful rain to sow. The DNM as part of this project also trained two farmers in each project site to read rain gauges and gave them reporting sheets and mobile numbers for the transmission of rainfall data.

The DNM also has a training arrangement with the African Centre of Meteorological Application for Development (ACMAD) on human capacity development. The Directorate recently received training from ACMAD, specifically in developing a Weather Research and Forecasting (WRF) Model. DNM has operationalised the use of this model to produce weather forecasting and atmospheric simulations, in-house.

The DNM has a good partnership and working relationship with meteorological services within West Africa and recently had a study visit to the Nigerian Meteorological Agency (NiMet). The DNM is an active member of the African Ministerial Conference on Meteorology (AMCOMET) and regularly participates in the Regional Climate Outlook Forum (RCOF), which underscores the Directorate's dedication to regional meteorological cooperation and advancement.

Additionally, the DNM recently signed two partnership agreements with the following partners:

i. The World Food Program for the period from 2020 to 2024. This agreement consists of assistance for the Design and implementation of Climate Services for adaptation to climate change.

ii. The FSRP program (West Africa Food System Resilience Program). The agreement covers the following activities:

- Identification of suppliers of agrometeorological information;
- Capacity building of listed suppliers;
- Identification of critical periods and validation of agrometeorological parameters in the municipalities of intervention.

2.3. Effective partnerships in place with international climate and development finance partners.

The DNM has partnered with the Climate Risk and Early Warning Systems (CREWS) in a project to improve the density of the observation network in Niger. This project included rehabilitating climate stations, creating eight regional centres for hazard observation, installing automatic stations, training forecasters and meteorologists, and recruiting new staff. As part of the CREWS project and the Adaptive Social Protection Project (ASPIRE), DNM technicians and staff members were trained in the use of various databases.

The DNM has also collaborated with various international partners in the execution of the following projects:

- The Climate Early Warning System (CREWS) Niger: Strengthening national warning capacities, with a focus on rainwater and river flooding.
- World Food Programme (WFP): aimed at
  i. Strengthening the network of meteorological observations,
  ii. Capacity building on the use of the SPIEA rain gauge
  iii. Raising awareness on seasonal forecasting results, variability and climate change,
  iv. Development and Dissemination of Agrometeorological Products
  v. Revitalization of the National Framework for Climate Services (NFCS) through the production of thematic bulletins.
- World Bank – PIDUREM and CREWS project: aimed at strengthening national capacities for warning of rainwater and river flooding.
- African Development Bank (AfDB) - Climate Information and Foresight Development Project (CDIP) aimed to strengthen the DNM's capacity in Observation and Data Processing Infrastructures.
- Ministry of Agriculture - Support Project for Climate-Sensitive Agriculture (PASEC) tailored for strengthening the meteorological observation network.
- IBIMET, DNM and DIST (with support from Italian Cooperation Agency (AICS)) - Adaptation to Climate Change, Disaster Reduction and Agricultural Development for Food Security (ANADIA).

2.4. New or enhanced products, services or dissemination techniques or new uses or applications of existing products and services that culminated from these relationships.

The DNM strives to reach more people across the country with its products and services through various means, partnerships and innovations including:

- DNM Website: A centralised portal for the public to access weather updates and climate information.
- Dissemination of weather forecasts through the use of WhatsApp groups, where stakeholders and community leaders have access to real-time weather updates.
- Television-based Information Dissemination: Supported by Niger Broadcasting Services, this platform has contributed to ensuring that weather forecasts and climate information reaches a wider audience.
- A partnership agreement with UNDP, set up to share risk information, raise awareness and provide weather alerts via SMS, radio and television.
- The establishment of a network of over 50 radio stations to broadcast weather information and seasonal forecasts and explain the implications for key livelihoods.
- Dissemination of pre-recorded communications, text messages and WhatsApp voice messages in local languages targeted rural populations.

These methods have enhanced DNM's ability and capacity to disseminate critical weather and climate information effectively.

Summary score, recommendations, and comments for Element 2

The DNM has effective partners with inter-governmental, national and international organisations aimed at improving weather and climate service delivery. These partnerships have contributed to the provision of observational and forecasting infrastructure as well as the training of personnel. Products and services are disseminated via various platforms such as TV, Radio, social media, etc. Thus, this element is ranked as ***Level Three: Moderately effective partnerships but generally regarded as the weaker partner in such relationships, having little say in relevant financing initiatives.***

Recommendations:

1. If the DNM achieves the status of an Agency, this element will be further improved. Such status is expected to come with more authority, legal framework, financing and capacity development, thus enabling the DMN to become more visible and relevant.

Element 3: Observational infrastructure

3.1. Average horizontal resolution in km of both synoptic surface and upper-air observations, including compliance with the Global Basic Observing Network (GBON) regulations.

The DNM has 24 conventional (manual) observation stations and 105 automatic stations in its network of observation stations. 15 of the conventional synoptic stations have been delegated to the AANN and ASECNA. Additionally, the Directorate has 2 conventional agro-meteorological stations, 7 classic climatological stations and 2000 rainfall stations There are currently 2 upper air stations operated by ASECNA. About 89% of these stations are automatic weather stations.

The majority of the 24 manual stations make 3-hourly observations, however, only one (1) of them that ASECNA operates is transmitting regularly and can be considered fully GBON-compliant. 14 other stations are transmitting to Global NWP Centres, but frequencies are not regular enough for GBON station requirements. Because these stations are not automatically connected to the GTS, data are sent from the stations to the DNM collation centre in Niamey, which in turn forwards it to ASECNA for transfer of the data through the GTS to make them available in the WDQMS.

Note that majority of the stations are located in the southern parts of the country, with a good spread from west to east. However, the central and northern parts of the country which include the Sahara Desert account for the vast expanse of the landmass of Niger with very few stations. The harsh weather, security challenges and human habitation in these areas have made the installation of stations difficult. **The Management of DNM is determined to put more stations in these locations especially in the north-east axis, to help monitor locust movement.**

3.2. Additional observations used for nowcasting and specialised purposes.

The DNM has two (2) Satellite receiving stations - PUMA 2015 and MESA-2015 in its operations. Observations and model data from these satellites are combined with the in-situ observations from the country's existing network of stations to provide forecasts and specialised products and services. Other sources of observation and satellite data for DNM include Meteo-Sat, EUMETSAT and many other web-based products.

DNM produces daily weather forecasts from its operations headquarters in Niamey, however, there is an ongoing project aimed at establishing forecast offices across the 8 regions of the country. Other products and services from DNM include short-, medium-, and long-term forecasts as well as specialised and seasonal forecasts, Agro-hydro-meteorological and agro-pastoral season/early warning.

3.3. Standard Operating Practices in place for the deployment, maintenance, calibrations and quality assurance of the observational network.

Presently, the DNM in part can carry out the deployment, maintenance, calibrations and quality assurance of the observational network. The Directorate has an instrumentation and ICT unit dedicated to the installation and maintenance of its equipment, with the ASECNA providing additional support on some parameters, especially in the calibration of instruments.

There are ongoing plans to fully develop the in-house capacity of the Directorate to carry out all these operations on its own and regularly. Like other units of the Directorate, this unit is also affected by an inadequate number of personnel to carry out regular

maintenance of its observation network across such a huge country. The availability of funds for travelling and fuelling vehicles to out-stations is also a challenge. Therefore, the maintenance of stations outside Niamey and its environs is not carried out with the needed frequency. However, the stations under ASECNA and AANN are well maintained, with regular cleaning on a monthly basis or when the need arises and full maintenance every 6 months or as necessary.

Apart from the ASECNA and AANN manned stations, the majority of the stations under DNM do not have observers to carry out quality control on the data generated. Thus, quality control and assurances may be lacking in data from such stations.

3.4 Implementation of sustainable newer approaches to observations.

To cater for the weather and climate forecast and data needs of different communities in the country, the DNM in partnership with the Ministry of Agriculture has been installing AWS across farming and pastoral settlements. These stations are then handed over to the Secretary of the community, to ensure their security and minor maintenance such as cleaning dust off the instrument and cutting grasses around the enclosures.

This method has led to a rapid increase in the number of stations under DNM and also increased the density of observation data in Niger. The challenge is that over the central and northern parts of the country, where populated areas are sparse, it becomes difficult to install and maintain observation stations.

3.5. Percentage of the surface observations that depend on automatic techniques.

89% of the stations under the operations of DNM are automatic weather stations. However, the stations have not been automated to transmit directly to GTS. Data from 15 of these stations that are under ASECNA and AANN are transmitted to Global NWP Centres, with only 1 of them fully GBON-compliant - i.e. over 80% of data are transmitted every 24 hours.

Summary score, recommendations, and comments for Element 3

In summary, the DNM has 24 conventional (manual) observation stations and 105 automatic stations in its network of observation stations, mainly in the southern parts. Most stations make 3-hourly observations, but only one is GBON-compliant. The basic infrastructure for observation already exists in most of the stations, the only thing missing is the ICT infrastructure to enable coding to synop and transmitting to a GTS centre. The DNM operates satellite receiving stations and produces daily weather forecasts. However, the DNM faces challenges in maintaining the network due to insufficient personnel and funding. The DNM and Agriculture have installed Automatic Weather Stations (AWS) in farming and pastoral settlements, increasing the number and density of observation data. This is mostly due to security issues and harsh weather in these areas. Given the above, this element is assessed to be ***at Level Three - Moderate network with some gaps with respect to WMO regulations and guidance and with some data quality issues.***

Recommendations:

1. Deployment of qualified and trained staff to these stations, to ensure quality control of data before transmission will contribute to the uplifting of this element.
2. The establishment of more stations across the vast central and northern parts of the country is also recommended, where security permits.

3. ICT applications for coding AWS observation data into Synop are also highly recommended.
4. Deployment of WIS2.0 is highly recommended.

Element 4: Data and product sharing and policies

4.1. Percentage of GBON compliance – for how many prescribed surface and upper-air stations are observations exchanged internationally. Usage of regional WIGOS centres.

Currently, Niger has 15 stations under ASECNA and AANN that are operational, recording all the prescribed parameters for international data exchange and transmitting to Global NWP Centre. The percentage of daily data transmission from these stations varies, with only one of them sending 80% or above of their data to the global NWP centres. 14 of them transmit about 30% of their daily data.

The stations that are wholly owned by the DNM are not transmitting but are measuring the prescribed parameters that are needed for international data exchange. DNM has selected some stations to be upgraded to meet GBON requirements and other sites that are suitable for the installation of new stations under the SOFF initiative.

Like the surface stations, ASECNA and AANN operations two upper-air observations at Niamey and Agadaz. The one in Niamey is fully functional and carries out four observations per day (two ascents and two wind profiles). The DNM has designated four other stations for upgrade and new installations of upper air stations.

4.2. A formal policy and practice for the free and open sharing of observational data.

Observation data from SIAP + MICROS AWS are currently stored and archived in a cloud by the equipment manufacturers. The DNM has unrestricted access to this data via FTP. The DNM is using CLIMSOFT, a Climate Data Management System (CDMS) for data archiving, however, a real-time data transmission system for Automatic Weather Stations is not working at the moment. Historical data from manned weather stations are also being imported into CLIMSOFT by the climate services unit of the Directorate.

4.3. Main data and products received from external sources in a national, regional and global context, such as model and satellite data.

The DNM has two (2) Satellite receiving stations - PUMA 2015 and MESA2015 in its operations. Other sources of observation and satellite data for DNM include Meteo-Sat, EUMETSAT, ECMWF, SDS-WAS (Barcelona Dust Regional Centre), Windy and many other web-based products.

Summary score, recommendations, and comments for Element 4

Niger has 15 operational stations under ASECNA and AANN, recording parameters for international observation exchange and transmitting to WDQMS. Only three send 80% or more data, while 12 transmit 30%. DNM owns these stations, which are not transmitting but measuring parameters. Two upper-air observations are operating in Niamey and Zinder, with work ongoing to improve the station in Zinder.

The DNM uses CLIMSOFT, a Climate Data Management System, to store and archive observation data from SIAP + MICROS AWS, but is currently unable to transmit real-time data from Automatic Weather Stations. In view of the above, element 4 has been assessed to be at ***Level Two - A limited amount of GBON-compliant data is shared internationally. The existing data sharing policies or practices or the existing infrastructure severely hamper two-way data sharing.***

Recommendations:

1. The full automation of the AWS to code messages in SYNOP format.
2. Deployment of WIS2.0 into the operations of DNM.

Element 5: Numerical model and forecasting tool application

5.1. Model and remote sensed products form the primary source for products across the different forecasting timescales.

The DNM uses observational data, numerical weather prediction (NWP) models and satellite imagery, from several meteorological centres for its forecasting activities. A PUMA 2015 and MESA 2015 Workstations are deployed to visualise outputs from ARPEGE, UKMET, and ECMWF models for different parameters and at different levels of the atmosphere. These facilities are available at the forecast office in Niamey. The availability of these products to DNM has greatly contributed to and improved the Directorate's capacity to provide forecasts at various timescales.

5.2. a) Models run internally (and sustainably), b) Data assimilation and verification performed, c) appropriateness of horizontal and vertical resolution.

The DNM uses a combination of regional and global NWP models, such as the NWP from the WMO Regional and Global Centres with a resolution ranging from 14km to 4km horizontal resolution. Internally, the WRF model is simulated by the DNM at a horizontal resolution of 7km, with a model run once a day.

Data assimilation and forecast verification are not yet part of the daily routine of the Directorate, due largely to a lack of capacity to carry out this.

5.3. Probabilistic forecasts produced and, if so, based on ensemble predictions.

Yes. The DNM uses products from different model centres across the globe for its probabilistic forecast. These models include UKMO, ARPEGE, ECMWF, Windy (ICON, GFS), MISVA and Meteo France (RDT).

Summary score, recommendations, and comments for Element 5

The DNM is gradually building its capacity to independently carry out model simulations and they have access to adequate external model products. These model products are being used in the daily operations of the Directorate. These methods improve the Directorate's capacity to provide forecasts. The array of products and services from the DNM include short-, medium and long-range forecasts. Based on the above, the element 5 assessments reflect a score of ***Level three: Prediction based mostly on model guidance from external and limited internal sources (without data assimilation) and remoted sensed products in the form of maps, figures and digital data and cover nowcasting, short and medium forecast time ranges.***

Recommendations:

1. Training on data assimilation and further capacity development on NWP in general.
2. Deployment of more computing capacity for the Directorate, to allow for a smoother model simulation and reduce the run time.

Element 6: Warning and advisory services

6.1. Warning and alert service cover 24/7.

There is an existing procedure for issuing alerts by the DNM. An alert is generated and issued by the Directorate in the event of extreme weather events and updated if the events persist. These products and services are disseminated to the public via digital platforms like emails, WhatsApp, and the Common Alerting Protocol (CAP), ensuring the public receives critical weather information quickly, and that such information is circulated as widely as possible.

The DNM has basic facilities and the capacity to deliver year-round early warning services, especially for agriculture and public weather services. Currently, the public weather unit of the Directorate operates from Mondays to Fridays, excluding Saturdays and Sundays. In this regard, there is room for improvement, including the setting up of a 24/7 staffed emergency-focused weather room.

However, due to a recent government decision probably related to the security aspect in some parts of the country, some of these channels of dissemination have been put on hold or are providing only skeletal information to the public, temporally. Efforts are in progress to restore full services on all platforms soonest.

6.2. Hydrometeorological hazards for which forecasting and warning capacity is available and whether feedback and lessons learned are included to improve warnings.

DNM issues warnings and alerts for a wide range of weather-related hazards, including windstorms, floods, extreme temperatures, extreme rainfall, thunderstorms, droughts, dust storms, dust haze and dry spells. Additionally, the climate services unit of the Directorate conducts impact analyses and is in the process of implementing Multi-hazard Early Warning systems to enhance preparedness and response.

6.3. Common alerting procedures in place based on impact-based services and scenarios taking hazard, exposure and vulnerability information into account and with registered alerting authorities.

Weather warnings, such as heavy rains, strong winds, and heat waves, are issued and disseminated by the DNM via email, website, mobile phone, TV, radio, WhatsApp and other social media channels. DNM warnings also include some recommendations for action in the event of hazards, however, the Directorate does not yet have sufficient human and computing resources to provide fully impact-based forecasts and warnings.

Some DNM staff have been trained in the Common Alerting Protocol (CAP) Standard. To that effect, the Directorate has a focal person within its Public Weather Service section. There is an ongoing internal effort to enhance the usage of CAP and onboard relevant partners and stakeholders. CAP is coordinated through the Public Weather Service (PWS).

Summary score, recommendations, and comments for Element 6

The DNM issues alerts for extreme weather events, disseminating them via digital platforms like emails, websites, WhatsApp and other social media platforms. They have basic facilities for 24/7 early warning services, particularly for agriculture and public weather. The Directorate also issues weather-related hazard warnings and alerts, conducts impact analyses and implements a limited Multi-hazard Early Warning system to enhance preparedness and response. However, the Directorate lacks resources for a fully impact-based forecasts band due to the recent suspension of 24/7 dissemination of information

on some platforms. This element is ranked ***Level three: Weather-related warning service with modest public reach and informal engagement with relevant institutions, including disaster management agencies.***

Recommendations:

1. There is a need for additional staff training on the implementation of weather warnings and alerts.
2. Improvement of the Directorate's facilities for TV weather presentations.
3. Training of weather presenters and graphic designers.
4. Efforts must be intensified towards restoring weather and climate information dissemination on platforms available to the DNM.

Element 7: Contribution to Climate Services

7.1. Where relevant, contribution to climate services according to the established capacity for the provision of climate services.

The DNM has a wide range of products and services, targeting different sectors of the socio-economy of the country. These products and services are prepared and disseminated on different timescales ranging from daily, weekly, monthly, and seasonally. All these products are available at the Directorate website: https://www.meteo-niger.org/

However, in June 2024, the DNM received a notification to stop broadcasting weather information through the National Radio and Television Service (RTN) as well as the use of its website, which constitutes parts of its main channels of dissemination. Nevertheless, the General Directorate of civil protection in Niger which has the national mandate of issuing alerts on natural hazards, is still regularly using the DMN's hydrometeorological forecasts and warnings for dissemination to the public. All channels of dissemination will be restored soon.

DNM has developed specific climatological products for main sectors like Agriculture/food security, Health, Energy, Water resources and risk management. These products are based on the country's need to fight against climate-related hazards. There is a working group in the Directorate that meets every month with the stakeholders from different sectors related to weather and climate, to take stock of the month and give a forecast for the coming month.

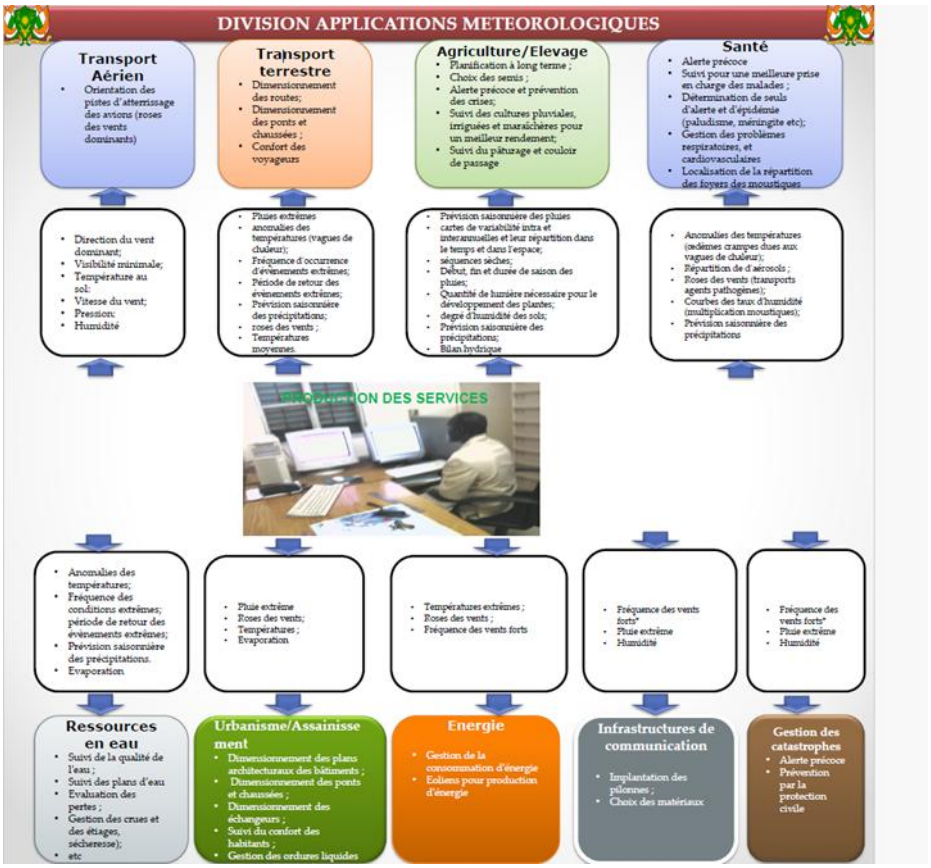


Figure 3: Sectors covered by Climate Services from DNM

These products and services are usually translated into local languages and disseminated on local radio stations. Stakeholders in the weather and climate value chain are

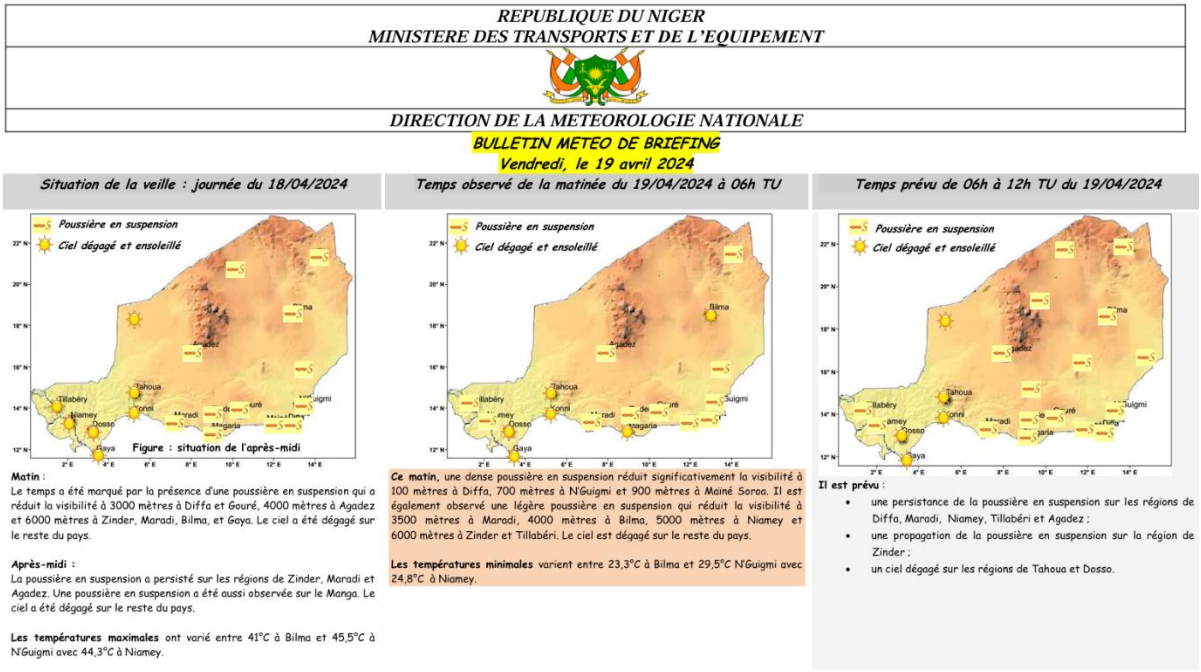
communicated via email. The Directorate has also created a WhatsApp group where farmers, community leaders and relevant stakeholders get weather and climate information in real-time.

Apart from the products and services provided for public use as part of its mandate, the DNM can also produce tailored-made climate products and services on request from individuals, companies and government agencies.

The DNM is also collaborating with international partners in projects, to improve the delivery of climate services. An example of such is the ANADIA project. At the national level, ANADIA aims to improve the understanding of climate risks and impacts on agricultural production systems with a particular focus on flash floods and droughts, to strengthen climate change adaptation and disaster risk reduction plans. At the regional/local levels, the project aims to promote the adoption of disaster risk reduction and climate adaptation into local development planning, through the implementation of a novel concept called the Village Climate Risk Reduction Plans (VCRs).

Some samples of products and services delivered by DNM as part of its contribution to national development are as follows:

i. **Daily Weather Forecast:** A daily weather briefing is issued at 7:00 am every day.



REPUBLIQUE DU NIGER
MINISTERE DES TRANSPORTS ET DE L'EQUIPEMENT

DIRECTION DE LA METEOROLOGIE NATIONALE

BULLETIN METEO DE BRIEFING
Vendredi, le 19 avril 2024

Situation de la veille : journée du 18/04/2024

Poussière en suspension
Ciel dégagé et ensoleillé

Figure : situation de l'après-midi

Matin :
Le temps a été marqué par la présence d'une poussière en suspension qui a réduit la visibilité à 3000 mètres à Diffa et Gouré, 4000 mètres à Agadez et 6000 mètres à Zinder, Maradi, Bilma, et Gaya. Le ciel a été dégagé sur le reste du pays.

Après-midi :
La poussière en suspension a persisté sur les régions de Zinder, Maradi et Agadez. Une poussière en suspension a été aussi observée sur le Manga. Le ciel a été dégagé sur le reste du pays.

Les températures maximales ont varié entre 41°C à Bilma et 45,5°C à N'Guigmi avec 44,3°C à Niamey.

Temps observé de la matinée du 19/04/2024 à 06h TU

Poussière en suspension
Ciel dégagé et ensoleillé

Ce matin, une dense poussière en suspension réduit significativement la visibilité à 100 mètres à Diffa, 700 mètres à N'Guigmi et 900 mètres à Mainé Soroa. Il est également observé une légère poussière en suspension qui réduit la visibilité à 3500 mètres à Maradi, 4000 mètres à Bilma, 5000 mètres à Niamey et 6000 mètres à Zinder et Tillabéri. Le ciel est dégagé sur le reste du pays.

Les températures minimales varient entre 23,3°C à Bilma et 29,5°C N'Guigmi avec 24,8°C à Niamey.

Temps prévu de 06h à 12h TU du 19/04/2024

Poussière en suspension
Ciel dégagé et ensoleillé

Il est prévu :
- une persistance de la poussière en suspension sur les régions de Diffa, Maradi, Niamey, Tillabéri et Agadez ;
- une propagation de la poussière en suspension sur la région de Zinder ;
- un ciel dégagé sur les régions de Tahoua et Dosso.

Figure 4: A sample of the daily weather bulletin produced and issued by DNM

ii. **Weekly Weather Update:** The DNM also produces forecasts of the meteorological situation in the country for periods of a week. This product is designed to allow users to plan their projects for the week. Forecasters at DNM follow up on these forecasts, issuing updates where and when necessary, according to the development of weather.

iii. **Monthly Climate Bulletin:** This bulletin reflects the evolution of key parameters (rainfall, wind, temperature, insolation, humidity, evaporation, etc) of the climate compared to normal and reference values to regularly understand the evolution of the climate over Niger.


LA MARCHE DE NOTRE CLIMAT

Bulletin N°03

MARS 2026

SOMMAIRE

SYNTHESE

Le mois de mars 2024 a été marqué par une hausse des températures maximales journalières qui ont varié entre 32.6 °C à Zinder et 45.5 °C à Tillabéri. Ces valeurs de températures sont globalement en hausse par rapport à l'année passée et à la normale 1991-2020 au niveau de la majorité des stations. Quant à l'humidité relative moyenne mensuelle, elle a varié entre 10% à Agadez et 29% à Maradi. Concernant le vent moyen mensuel, il a oscillé entre 16 m/s à Tillabéri et 4,5 m/s à Agadez. Pour ce qui est de la durée d'insolation moyenne, elle a varié entre 7.4 heures à Tillabéri et 10.9 heures à Agadez. S'agissant des extrêmes des températures maximales, l'ensemble des stations ont enregistré des jours où la température maximale journalière a atteint ou dépassé le seuil de 40°C. Ces jours de fortes chaleurs ont varié entre 16 jours (Zinder, Agadez) et 27 jours (Tillabéri, Niamey). Les records absolus des températures maximales ont été observés au niveau des stations de Tillabéri (45.5°C) et de Niamey (45.2°C). Aussi, il est important de souligner que l'ensemble des stations ont battu leur record par rapport à l'année passée.

NB: Les données utilisées sont uniquement celles de ces huit (8) stations synoptiques des huit (8) chefs-lieux de régions

1. Variation des températures maximales au niveau des huit (8) régions du Niger

1.1 Région d'Agadez

Au cours du mois de mars 2024, la station d'Agadez a enregistré des températures maximales journalières variant entre 32.7 °C et 42.7°C respectivement le 18 et 31 de ce mois.

Comparées à la normale 1991-2020, ces températures sont globalement en hausse avec des baisses observées du 17 au 21 du mois.

Par rapport à l'année passée, elles sont aussi en hausse à l'exception des périodes allant du 01 au 06 et du 17 au 21 du mois.

La température maximale moyenne mensuelle est de 38.5 °C (figure 1).

Figure 1: Variation journalière des températures maximales du mois de mars 2026 vs 2025 et normale 1991- 2020 à Agadez; Source: DCCD/DMN/Niger

Figure 5: A sample of monthly climate information issued by DNM

iv. **Seasonal Climate Forecast:** DNM has over the years developed the capacity to downscale the Seasonal Forecasting in West Africa (PRESAO) issued by AGRHYMET and ACMAD during the annual Regional Climate Outlook Forum for West Africa and the Sahel. The seasonal forecast is generally produced in April/May and updated in June, allowing stakeholders and farmers to make strategic choices from the start of the season based on the expected rainfall behaviour of the season.

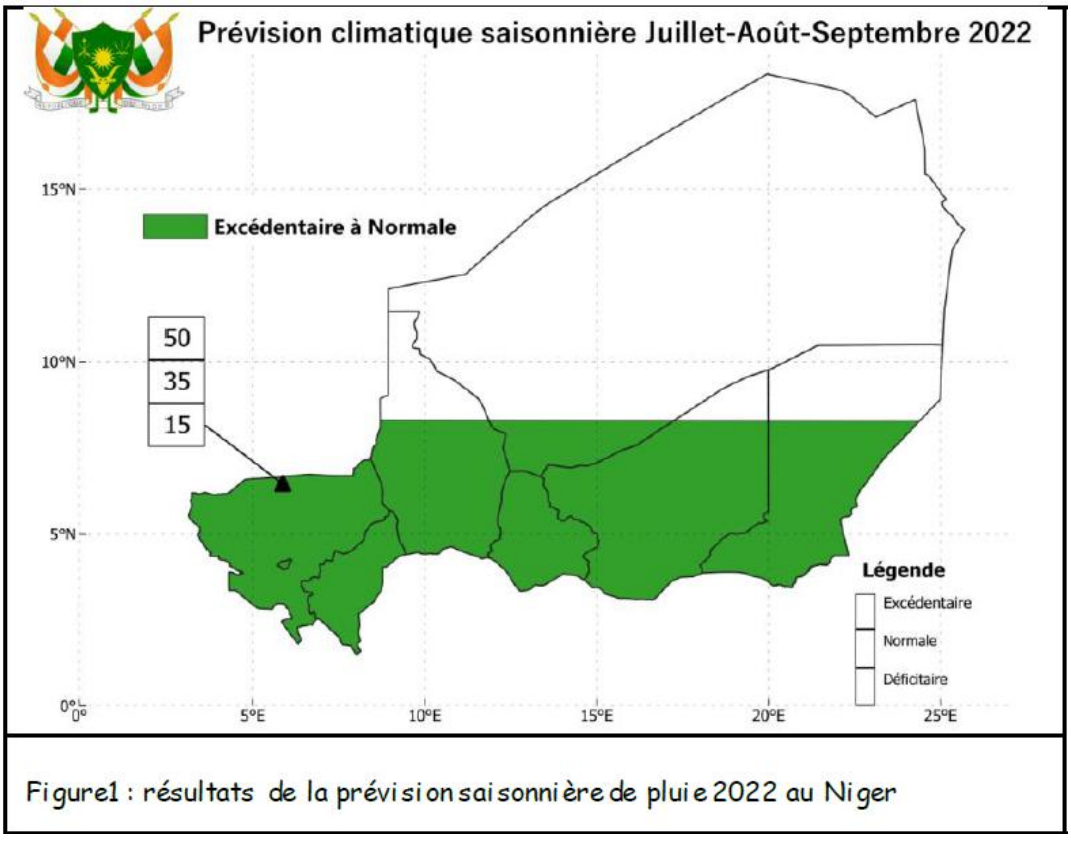


Figure 6: A downscaled seasonal climate forecast issued by DNM

Summary score, recommendations, and comments for Element 7

The National Directorate of Meteorology (DNM) offers cross-sectorial climate services targeting various socio-economic sectors in Niger, such as agriculture, health, energy, water resources, and risk management. These services are disseminated on different timescales (daily, weekly, monthly, and seasonally) and are accessible on the Directorate website, email, WhatsApp, etc. DNM also provides some customized climate services upon request and collaborates with international partners on projects like ANADIA. However, due to the current inability of the National Directorate to fully publish and disseminate its products and services in real-time and through various platforms, this element is assessed to be at ***Level Three: Essential Capacity for Climate Services Provision.***

Recommendations:

1. Additional staff strength and improved working condition is needed in this aspect.
2. There is a need for improvement in the co-creation and co-production of products.

Element 8: Contribution to hydrology

8.1. Where relevant, standard products such as quantitative precipitation estimation and forecasts are produced on a routine basis according to the requirements of the hydrological community.

The climate of Niger is mostly hot and dry, with most parts of the country in the semi-arid Sahel belt, and the north reaching into the Sahara Desert. Rainfall is highly variable throughout the year, both in terms of regional distribution and frequency. The rainy season is short and lasts for only three months (July – September). Despite this, the country is heavily reliant on rain-fed agriculture and livestock breeding.

Hydrology and water resources management are therefore of great importance to Niger though they are not domiciled in the same department. DNM and the National Directorate of Hydrology work in collaboration whereby DNM provides weather forecast bulletin.

8.2. SOPs in place to formalize the relation between Met Service and Hydrology Agency, showing evidence that the whole value chain is addressed.

None.

8.3. Data sharing agreements (between local and national agencies, and across international borders as required) on hydrological data in place or under development.

None.

8.4 Joint projects/initiatives with the hydrological community designed to build hydrometeorological cooperation.

A joint project between the DNM and their hydrological counterparts has led to the production of a monthly bulletin under the National Frameworks for Climate Services. This was done under the project: Adaptation to Climate Change, Disaster Prevention and Agricultural Development for Food Safety (ANADIA). It is a product of a collaboration between the Institute of BioEconomy (IBE) and DNM. The project which was launched in 2012 is being co-financed by the Italian Agency for Development Cooperation and is now in its second phase (ANADIA 2.0).

Summary score, recommendations, and comments for Element 8

The DNM contribution to hydrology in Niger is below average and there is no formal arrangement for product development and data sharing between the two Directorates. Therefore, this element is rated ***Level Two - Meteorological input in hydrology and water resource management happens on an ad hoc basis and or during times of disaster.***

Recommendations:

1. There is an urgent need to formalise the relationship between DNM and the Hydrological Authority and put Standard Operating Procedures (SOPs) in place.
2. Build on the existing informal relationship to develop products and services tailored for hydrology.
3. Capacity development within the DNM to be able to carry out some level of hydrometeorological assessment and analysis.

Element 9: Product dissemination and outreach

9.1. Channels used for user-centred communication and ability to support those channels (for example, does the NMHS operate its own television, video or audio production facilities? Does it effectively use cutting-edge techniques?).

The DNM has a comprehensive website with daily weather forecasts and warnings for Niger. There is also a small TV studio where daily weather forecasts are recorded in-house. However, some of the pieces of equipment are outdated. Generally, the studio needs expansion and upgrade of the existing equipment for better video and audio quality. Weather forecasts and warnings are available to the public on the website, broadcast on television, radio and by email.

Products and services are also disseminated through various social media and electronic platforms including Facebook, Instagram, Email, YouTube, Twitter (X), and WhatsApp.

However, the temporary suspension of the DNM from dissemination of products and services over these platforms and channels has greatly impaired its ability to reach some of the country and the target audience.

9.2. Education and awareness initiatives in place.

The Climate Services unit of the Directorate organises workshops in conjunction with the Ministry of Agriculture, NGO and CSO for rural farmers. These workshops are aimed to downscale seasonal forecasts and provide weather and climate information in local languages for better understanding.

9.3. Special measures in place to reach marginalized communities and indigenous people.

The Directorate created a WhatsApp platform for NGOs and CSOs working in hard-to-reach communities. Weather and climate forecasts are posted on this platform, where members are encouraged to help in further disseminating the information. The Directorate also employ the services of community-based FM radio stations to reach these communities.

Summary score, recommendations, and comments for Element 9

The Directorate of National Meteorology (DNM) in Niger uses a website, an in-house TV studio, and social media platforms like Facebook, Instagram, YouTube, Twitter (X), and WhatsApp for user-centred communication. Despite outdated studio equipment, DNM effectively disseminates weather information via TV, radio, and email. They conduct workshops with the Ministry of Agriculture and NGOs/CSOs to educate rural farmers in local languages and use WhatsApp and community-based FM radio stations to reach marginalized communities. However, as the Directorate is currently unable to disseminate its products and services over some of the principal platforms and channels available to them, element 9 is rated ***Level Three - A moderately effective communication and dissemination strategy and practices are in place, based only on in- house capabilities and supported by user-friendly website.***

Recommendations:

1. There is a need to increase the number and frequency of outreaches carried out by the Directorate to cover more communities.

Element 10: Use and national value of products and services

10.1. Formalized platform to engage with users in order to co-design improved services.

At the national level, there is a multi-sector consultative platform to foster regular cooperative dialogue among stakeholders in Niger. The committee consists of the following ministries and departments: Agriculture/Food Security, Environment, Water Resources, Energy, Transport, Disaster Risk Management etc. The DNM as part of the committee, is responsible for all activities regarding the early warning system, risk forecast and management. Contributions from committee members are considered and, where necessary, implemented in the development of new products and services, and the improvement of existing ones.

The DNM has also implemented similar approaches with project partners and host communities at regional levels. It is expected that the planned takeoff of regional forecast offices across the country will further add to the ability of DNM to co-design its products and services with more stakeholders and partners.

10.2. Independent user satisfaction surveys are conducted, and the results used to inform service improvement.

Independent user satisfaction surveys are conducted partially by the DMN. Such surveys have only been done in collaboration with some projects, usually in the municipalities where the projects are sited but not at the national level.

10.3. Quality management processes that satisfy key user needs and support continuous improvement.

In the aviation sector, Aeronautical Meteorological Stations (AMS) are operated with local routine observations made at aerodromes and reported as METAR (Meteorological Aerodrome Report) or SPECI (Aerodrome Special Meteorological Report) and the forecast offices provide Terminal Aerodrome Forecasts (TAF). These services are not provided by the DNM, rather, it is covered by ASECNA and they have implemented an integrated Quality Management System (QMS) for AeroMet services.

The DNM is yet to implement QMS in any of the other sectors under its direct influence.

Summary score, recommendations, and comments for Element 10

There is a multi-sector consultative platform to foster regular cooperative dialogue among stakeholders at the national level and a partially conducted survey. QMS only cover Aeronautical Meteorological Services, which is provided by ASECNA. This element is ranked ***Level Three - Services development draws on regular dialogue with major stakeholders.***

Recommendations:

1. Implementation of QMS is highly recommended.
2. There is a need to carry out routine independent surveys and put in place a mechanism for regular feedback.

Annex 1 Consultations (including experts and stakeholder consultations)

i. Staff of Directorate of National Meteorology (DNM), Niger
ii. Ministry of transport
iii. Agricultural extension workers
iv. Ministry of Water Resources
v. Ministry of Environment
vi. Ministry of Energy
vii. Ministry of Agriculture and Food Security
viii. Disaster Risk Management
ix. Community leaders/secretaries
x. ASECNA
xi. AANN
xii. ACMAD
xiii. AGRHYMET

Annex 2 Urgent needs reported

1. There is an urgent need to increase the number of staff at DNM, as the current capacity is inadequate to effectively monitor the weather and climate over the entire country.
2. The present budgetary allocation is not sufficient to provide regular maintenance of equipment, especially for stations outside Niamey.
3. Accelerate efforts towards making DNM a full parastatal of government, to allow for more operational autonomy.
4. Deployment of qualified and trained staff to observation stations, to ensure quality control of data before transmission is a matter of necessity.
5. Establishing more stations across the vast central and northern parts of the country will greatly contribute towards the government's efforts to mitigate the impact of climate change.
6. ICT applications for coding AWS observation data into Synop are also highly recommended.
7. The deployment of WIS2.0 to DNM should be given urgent consideration.
8. The full automation of the AWS to code messages in synoptic format.

9. Deployment of more computing capacity for the Directorate, training on data assimilation and further capacity development on NWP is highly recommended.
10. Improvement of the Directorate's facilities for TV weather presentations as well as training of weather presenters and graphic designers.
11. There is an urgent need to formalise the relationship between DNM and the Hydrological Authority and put Standard Operating Procedures (SOPs) in place.

Annex 3 Information supplied through WMO

Most baseline information was retrieved from previous WMO documents directly or indirectly linked to Niger. These include the Early Warning Rapid Assessment report and Results from the Global Gap Analysis. Other documents from the WMO includes the following:

- WMO Community Platform
- WMO Early Warnings for All Rapid Assessment Report
- Data from Checklist for Climate Services Implementation

Annex 4 List of materials used

- National Adaptation Plan process in focus: Lessons from Niger
- Disaster Risk Reduction in West Africa and the Sahelian Region: A Review of Progress
- Climate Change Adaptation in Africa: UNDP Synthesis of Experiences and Recommendations
- USAID: Climate Risk Profile West Africa
- West Africa Agriculture and Climate Change: A Comprehensive Analysis
- REAP Country Case Study: Niger
- Feedback on CHD questionnaire
- GBON station data collection template
- Station Checklist developed for Niger
- Data from country-level stakeholders' engagement

Annex 5 List of Acronyms

AANN	Administration Des Activites Aeronautiques Nationales Du Niger
ACMAD	African Centre of Meteorological Application for Development
AfDB	African Development Bank
AGRHYMET	Centre Régional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle (Regional Climate Centre for West Africa)
AMCOMET	African Ministerial Conference on Meteorology
AMS	Aeronautical Meteorological Stations
ANADIA	Adaptation to Climate Change, Disaster Prevention and Agricultural Development for Food Safety
ASECNA	Agency for Air Navigation Safety in Africa and Madagascar
ASPIRE	Adaptive Social Protection Project
AWS	Automatic Weather System
CAP	Common Alerting Protocol
CDIP	Climate Information and Foresight Development Project
CDMS	Climate Data Management System
CHD	Country Hydromet Diagnostics
CREWS	Climate Risk and Early Warning Systems
CSO	Civil Society Organisation
DAAF,	Administrative and Financial Affairs Division
DAM	Meteorological Applications Division
DCC/D	Climate Change and Development Division
DNH	Directorate of National Hydrology
DNM	Directorate of National Meteorology
DPM	Meteorological Forecasting Division
DROM	Meteorological Observation Networks Division
DRR	Disaster Risks Reduction
ECMWF	European Centre for Medium-Range Weather Forecasts
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
FSRP	Food System Resilience Program

FTP	File Transfer Protocol
GBON	Global Basic Observation Network
GDP	Gross Domestic Product
GFS	Global Forecast System
GTS	Global Telecommunication System
ICON	ICOsahedral Non-hydrostatic modelling framework
ICT	Information and Communication Technology
INRAN	National Institute of Agronomic Research of Niger
KP	Kyoto Protocol
LDC	Least Developing Countries
MESA	Monitoring for Environment and Security in Africa
METAR	Meteorological Aerodrome Report
NFCS	National Framework for Climate Services
NGO	Non-Governmental Organisation
NiMet	Nigerian Meteorological Agency
NWP	Numerical weather Prediction
PUMA	Preparation for the Use of Meteosat Second Generation in Africa
PWS	Public Weather Services
QMS	Quality Management System
RCOF	Regional Climate Outlook Forum
RDT	Rapidly Developing Thunderstorm
SDS-WAS	Sand and Dust Storm Warning Advisory and Assessment System
SOFF	Systematic Observation Financing Facility
SOP	Standard Operating Procedure
SPECI	Aerodrome Special Meteorological Report
TAF	Terminal Aerodrome Forecast
TV	Television
UKMO	United Kingdom Meteorological Office
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
VCR	Village Climate Risk Reduction Plans

WB	World Bank
WCRP	World Climate Research Programme
WDQMS	WIGOS Data Quality Monitoring System
WFP	World Food Programme
WIS	WMO Information System
WMO	World Meteorological Organisation
WRF	Weather Research and Forecasting

Annex 6 Pictures

Dignitaries at the Opening of Stakeholders's Engagement Workshop

Group Photo of NiMet Team with Dignitaries and Other Participants at the Workshop

A Cross-Section of Participants During the Workshop

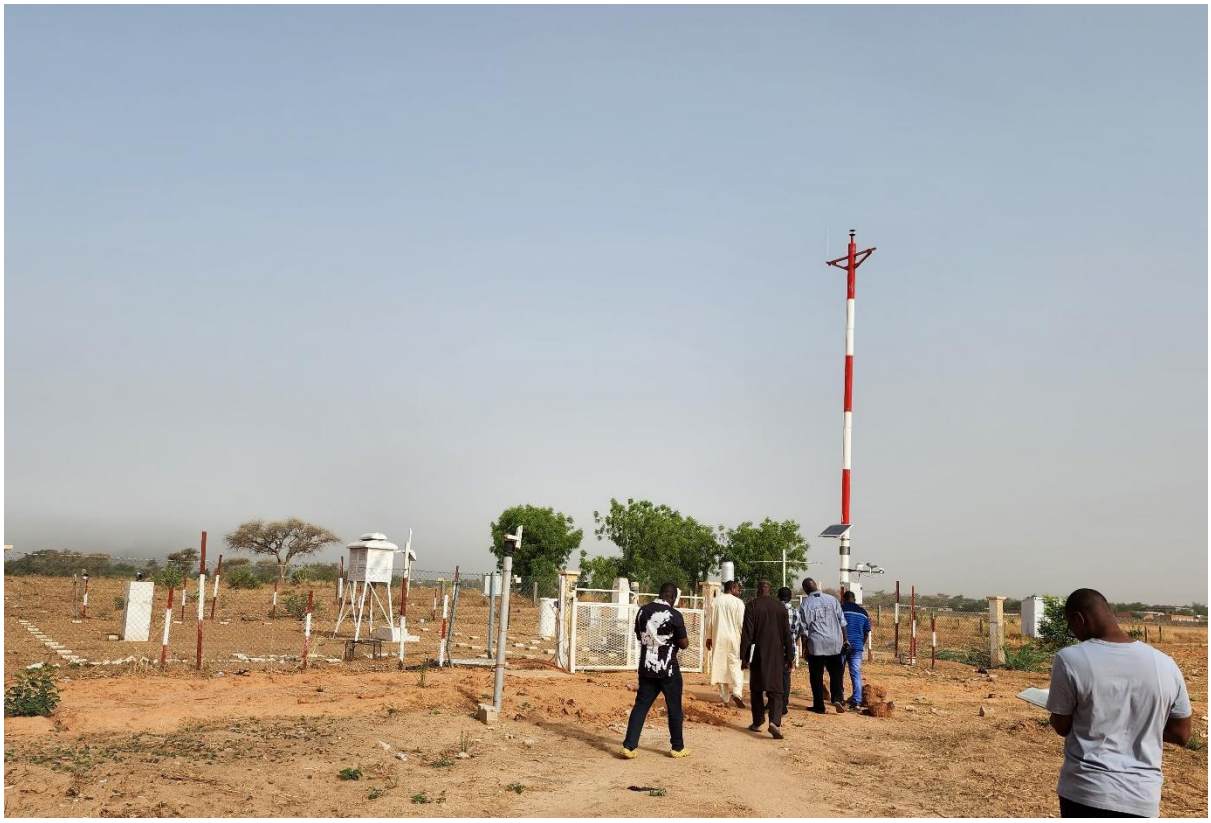
A Staff Member Provides an Explanation to the Team During a Visit to One of ASECNA's Facilities In Niamey

During an Assessment Visit to Niamey International Airport's Forecast Office

NiMet's Team and Staff of DNM During a Working/Interactive Meeting

The PR of Niger Provides Insight During the Meeting

During a Visit to the DNM Central Forecast Office, in Niamey



During a Visit to A Station, in Maradi

State of One of the Stations as seen in Tessoua