COUNTRY HYDROMET DIAGNOSTICS

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

April, 2025

Burkina Faso Peer Review Report

Reviewing Agency: Agencia Estatal de Meteorología - AEMet

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Authorisation for release of this report has been received from AEMet, NiMet and Burkina Faso as of April 2025.

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List of Acronym

ACMAD	African Centre of Meteorological Applications for Development
AEMet	Agencia Estatal de Meteorología
AfDB	African Development Bank
AGRYHMET	Agrometeorology and Operational Hydrology
ANAM	Agence Nationale de la Météorologie
AWS	Automatic Weather Stations
CAP	Common Alerting Protocol
CDMS	Clinical data management system
CDSF	Capacity Development Support Facility
CHD	Country Hydromet Diagnostics
CIS	Climate Information System
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DWD	Deutscher Wetterdienst
ECMWF	European Centre for Medium-Range Weather Forecasts
EPA	Environmental Protection Agency
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EW4All	Early Warning for All
EWS	Early Warning System
GBON	Global Basic Observing Network
GCF	Green Climate Fund
GEF	Global Environment Facility
GFS	Global Forecast System
GTS	Global Telecommunication System
HYDROMET	Hydrometeorological
ICAO	International Civil Aviation Organization
ICT	Information and Communications Technology
LDC	Least Developed Countries
LDCF	Least Developed Countries Fund
METAGRI	Meteorological Assistance for Agrometeorological Services
MoT	Ministry of Transport
NAP	National Adaptation Plan
NAPA	National Adaptation Program of Action
NASA	National Aeronautics and Space Administration
NCEP	National Centre for Environmental Prediction
NDMA	National Disaster Management Authority
NiMet	Nigerian Meteorological Agency
NMHSs	National Meteorological and Hydrological Services
NVE	Networked Virtual Environment
PRESAGG	Regional Climate Outlook Forum for the Gulf of Guinea Countries
PUMA	Preparation for the Use of Meteosat Second Generation in Africa
PWS	Personal Web Space
QMS	Quality Management System
RCC	Rail Control Centre
RCOF	Regional Climate Outlook Forum
RSMC	Regional Specialized Meteorological Centre
SIDS	Small Island Developing States
SOFF	Systematic Observations Financing Facility
SOP	Standard Operating Procedure
SWFDP	Severe Weather Forecasting Development Project
UK MET	United Kingdom Meteorological Office
UNDP	United Nations Development Programme
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System
WMO	World Meteorological Organization

Executive Summary

The SOFF Project was initiated to strengthen climate adaptation and resilient development through data collection, processing and availability that will improve weather forecasts, early warning systems and climate information services. The Agencia Estatal de Meteorología (AEMet) and Nigerian Meteorological Agency (NiMet) signed an agreement with the World Meteorological Organization (WMO) to provide SOFF Peer Advisory Services to Burkina Faso. A Country HydroMet Diagnostics (CHD) is required as one of the deliverables under this agreement and was developed during the readiness phase. The initiative helps Small Island Developing States (SIDS) and Least Developed Countries (LDC) enhance their hydrometeorological observation network, data collecting, processing, and sharing by providing financial and technical support.

CHD is designed to provide a high-level strategic assessment of National Meteorological and Hydrological Services (NMHS), their operating environment, and their contribution to high-quality weather, climate, hydrological and environmental services, and warnings. It aims to assist developing countries in making informed policy and investment decisions for high-quality weather forecasts, early warning systems, and climate information.

A team of experts from the Agencia Estatal de Meteorología (AEMet) and Nigerian Meteorological Agency (NiMet) have engaged their counterpart from the Agence Nationale de la Météorologie (ANAM) in a series of online meetings and exchanged communication through various platforms (Email, WhatsApp, etc.) in the last four (4) months. The aim was to enable the Agencies gather information on the status of weather and climate services value chain. These series of engagements culminated in an in-country trip to Burkina Faso by both teams from AEMet and NiMet, to conduct an on-the-spot assessment and verification. To get input from everyone involved in the value chain of weather and climate information in Burkina Faso, a stakeholder's engagement was also conducted.

Most baseline information was retrieved from WMO documents directly or indirectly linked to Burkina Faso and other documents obtained from the in-country visit.

Some of the observations and recommendations contained in the report are as follows:

- ANAM should develop an action and implementation plan on organizational strengthening, strategic and operational planning; and introduce Quality Management System (QMS) to other services (non-AeroMet) as well as develop a formalized platform to engage their users in the co-design of products and services. ANAM should also develop Standard Operating Procedures (SPO) for an effective observation network.

- While ANAM aims for an increase of the number of automatic stations in their observation network, there is also a need for increases in personnel to cover the entire hydrometeorological value chain. ANAM should also develop targeted capacity building for climate products and services.

- ANAM should formalise and strengthen the existing collaboration/ partnership with other institutions (Government and Private) such as Disaster Management Agency for effective climate early warning service delivery, and to attract international climate and development finance partners.

- Although ANAM has a High Performing Computer (HPC), they are not running any model or producing any NWP products. ANAM should improve on the internal ability and capability to run and maintain a forecasting model of its own; put necessary infrastructure for Multi-Hazard Early Warning System (MHEWS); and fasttrack the implementation of CAP.

- Establish a formal relationship and mechanism for the exchange of data and products with the Hydrological community. And improve on the existing channels of communications to reach the wider user community, including the marginalized and indigenous people, with a feedback mechanism from stakeholders to improve on their service delivery.

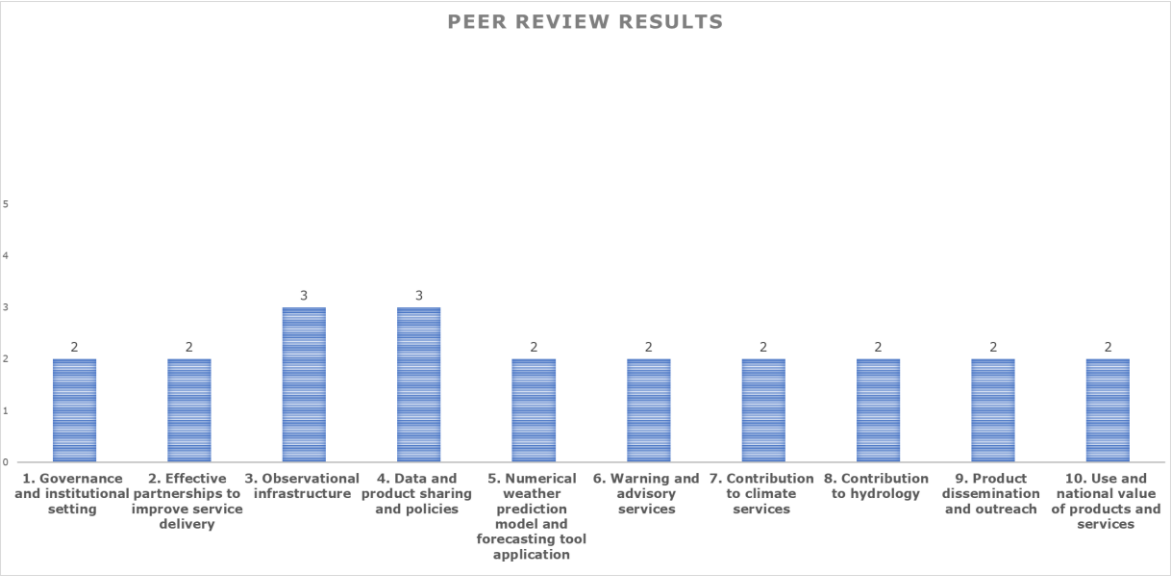


Figure 1: Peer Review Results of the Ten (10) CHD Elements

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

Table 1: Peer Review Results of the Ten (10) CHD Elements

Chapter 1: General information

Introduction

CHD in Perspective

Global threats and challenges related to climate change and the impact of extreme weather and climate events are rising, and demand to provide high-quality weather, climate, hydrological, and related environmental information services - referred to as HYDROMET - is rapidly increasing. Despite the urgency and substantial investments in strengthening developing country HydroMet capacity, difficult challenges remain in monitoring and tracking performance of public meteorological services in an easy understandable and coherent manner.

Countries in the African region have never been more vulnerable to climate change impacts than at present, forcing them to continually adjust national development programmes at considerable costs. Most countries or sub-regions are increasingly prone to floods, droughts, heatwaves, and storms resulting in food shortages. Water for economic activity, drinking and livestock is becoming increasingly scarce. There has been a resurgence of weather and climate-sensitive diseases in some countries and an increase in the geographic spread of epidemics like malaria and cholera. These changes are happening against the backdrop of increasing population on the continent and global changing climate.

The SOFF Project was initiated to strengthen climate adaptation and resilient development through data collection, processing and availability that will improve weather forecasts, Early Warning Systems and climate information services. The Agencia Estatal de Meteorología (AEMet), supported by Nigerian Meteorological Agency (NiMet), signed an agreement with the World Meteorological Organization (WMO) to provide SOFF Peer Advisory Services to Burkina Faso. As part of the deliverables under this agreement a Country HydroMet Diagnostics (CHD) is to be developed during the readiness phase.

The Country HydroMet Diagnostics (CHD) responds to the need for a standardized, integrated, and operational tool and approach for diagnosing National Meteorological Services, their operating environment, their observation infrastructure, and their contribution to high-quality weather, climate, hydrological, and environmental information services and warnings. The Diagnostics is an umbrella tool that draws on and adds value to existing WMO assessment material by synthesizing existing approaches and data into an easily interpretable form, validating the information provided by WMO Members through a peer review process, and obtaining missing information.

The Diagnostics assessment therefore aims at informing policy and investment decision-making, in particular guiding investments of the members of the Alliance for HydroMet Development. The Alliance brings together major development and climate finance partners behind a joint commitment to strengthen developing country hydrometeorological capacities. Through the Diagnostics, developing countries are expected to benefit from better targeted and aligned financial and technical support.

The Country HydroMet Diagnostics is based on the ten most critical elements of the HydroMet value cycle, grouped under four categories – Enablers, Observation and data processing system, Services, Product production and dissemination, and user and stakeholder interaction. For each value cycle element, a limited number of standardized indicators are used, and each indicator uses explicitly defined data sources. The Assessment of these critical elements of the National Meteorological Service should lead to their maturity level. Please note that Level 5 is the highest attainable maturity level in this CHD assessment.

The CHD draws as much as possible on primary data (self-reported and other sources of quantitative data), but to inform the peer review, AEMet and NiMet used additional data, in particular, data from country-level stakeholders' engagement and third-party surveys. The WMO Needs Assessment Mission Report to Burkina Faso, WMO Early Warning for All Rapid Assessment Report, HydroMet Gap Report, and previous CHD report among others provided baseline data.

Geography of Burkina Faso

Burkina Faso is a landlocked country in West Africa with an area of 274,200 km2 (105,900 sq mi), mostly between latitudes 9° and 15°N (a small area is north of 15°), and longitudes 6°W and 3°E, bordered by Mali to the northwest, Niger to the northeast, Benin to the southeast, Togo and Ghana to the south, and the Ivory Coast to the southwest.

Burkina Faso has a tropical climate with two seasons: a long dry season (November to June), and a rainy season (July to October). Annual average rainfall varies from about 1000 millimetres (40 in.) in the south to less than 250 millimetres (10 in.) in the north and northeast, where hot desert winds accentuate the dryness of the region. The cooler season, November to February, is pleasantly warm and dry (but dusty), with cool evenings. March-June can be very hot. In July-September, the rains bring a 3-month cooler and greener humid season.

As of 2021, the country had an estimated population of 20,321,378. Previously called Republic of Upper Volta (1958–1984), it was renamed Burkina Faso by President Thomas Sankara. Its citizens are known as Burkinabè, and its capital and largest city is Ouagadougou. (See fig. 1).

Figure 2: Geographical Location of Burkina Faso

CHD Methodology

To conduct the assessment of the critical elements of the hydro-meteorological value chain, the Agencia Estatal de Meteorología (AEMet) and Nigerian Meteorological Agency (NiMet) agreed to assist in this CHD. In addition to the Country Information on the WMO Community Platform available in the database, a structured questionnaire and interview were adopted based on the indicators of the CHD. This was combined with feedbacks from virtual meetings with critical staff members of the Agence Nationale de la Météorologie (ANAM). The Climate Services Checklist as well as the WMO Mission Report on Needs Assessment were also carefully reviewed.

An in-country visit was also conducted by both the AEMet and NiMet Teams. During the visit, meetings were held with critical stakeholders in the Ministry of Transport and ASCENA at the airports. A stakeholders' engagement workshop was conducted for consultations during this assignment, bringing together all those involved in the weather and climate services value chain in Burkina Faso.

This report is presented along the ten (10) most critical elements of the hydro-meteorological value cycles 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 high-level recommendations offered to aid increase the maturity levels.

Country Status and Justification

Burkina Faso is among the poorest countries in the world, ranked 183 out of 189 countries in the 2017 Human Development Index. With nearly no major industry apart from mining, the country's economic activity relies heavily on subsistence agriculture and livestock production. A vast majority of the population lives below the poverty line. The country's high population growth has led to rising demand for food and increasing pressure on the land, as the scarcity of arable land and water limits domestic food production.

Increasingly frequent and severe climate extremes involving variability in rainfall, rising temperatures, droughts, and flooding have exacerbated food insecurity and water resources shortage across Burkina Faso. This situation has been compounded by the deteriorating security situation in the country, which no longer only affects the population in North-western and North-eastern border zones with Mali and Niger, but since November 2018, insecurity has extended to Northern, North-Central and Eastern regions of the country.

These has caused infrastructure, human capacity and financial gaps for the country. Most of the climate, weather and water services have significantly diminished. Hence, this has created a huge necessity for investment in the country in order to rehabilitate the existing network of stations and set up new ones to close all gaps in the delivery of weather, climate and water-related services.

The improvement of observation infrastructure in Burkina Faso will also contribute to quality and quantity of weather data in Global Forecasting Centres. A successful application of weather and climate services depends on a functional meteorological value chain.

Agence Nationale de la Météorologie (ANAM) does not have the financial capacity to pay additional personnel and is not willing to invest in manual observing stations requiring

physical presence of staff. Hence, their desire is to process and maintain automatic network of stations.

Key Service Needs and Natural Hazards Vulnerability

Burkina Faso is the 20th most vulnerable country to climate change and the 35th least ready in the world, said Richard Munang, the Africa regional climate change coordinator for the United Nations Environmental Program. More than one-third of Burkina Faso's land is degraded, with degradation expanding at a rate of 360,000 hectares (890,000 acres) a year. In Burkina Faso there were more than two million severely food insecure people in mid-2020 - from more than 680,000 at the same time in 2019.

Burkina Faso is highly exposed to extreme weather and climate change impacts, most notably floods, droughts, strong winds and high variability in the duration of the rainy and dry seasons. All of these impacts have made it difficult to manage natural resource-based productive sectors including agriculture, fisheries, and forestry. They have also compounded the difficulty of planning for food security, health epidemics and water resource management, particularly dam and hydropower operations.

Burkina Faso has in recent years been gripped by escalating cases of extreme weather events such as the floods that swept across the southwestern parts of the country, cutting off the villages from the city of Bobo Dioulasso, 70km (44 miles) away, as reported by Aljazeera, September 2020. The flood left hundreds of civilians dead and forced almost a million out of their homes.

In view of the foregoing, accurate weather and climate information is critical to the sustenance of the socio-economic life of Burkinabè. In the coming years, climate change is predicted to aggravate the weather situation in this country, leading to increasing cases of severe thunderstorms, windstorms, flooding, etc. However, ANAM does not have the capacity to adequately monitor, observe and forecast these extreme weather events. To address these, there is an urgent need for investments in weather and climate observation infrastructure as well as the development of human capacity for ANAM.

Chapter 2: Country HydroMet Diagnostics

Element 1: Governance and Institutional Setting

In Burkina Faso, hydro-meteorological services are provided by two Services: Meteorological Services are being provided by Agence Nationale de la Météorologie (ANAM) while Hydrological Services, by the Burkina Faso Hydrological Service. However, this CHD assessment focuses on the Agence Nationale de la Météorologie (ANAM). The ANAM is currently domiciled within the Ministry of Transport.

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

At present, ANAM and its operations has been transformed into an Agency of Government backed by a Decree - Décret N°2016-1157/PRES/PM/MTMUSR/MINEFID.

The functions/responsibilities of the Agence Nationale de la Météorologie (ANAM) in its present format include but are not limited to the following:

1. "Continue to improve the coverage of the national territory by our network of weather stations and its modernization to ensure the continuous availability of quality climate data.
2. Ensure a National Weather Watch 24 hours a day, allowing uninterrupted monitoring of the entire territory with the issuance of weather bulletins and alerts on sensitive and / or dangerous weather phenomena for the benefit of populations through all available communication channels.
3. Provide government and decision-makers with reliable weather and climate information that is as accurate as possible to inform decision-making.
4. Contribute effectively to the protection of lives and property by actively participating in early warning systems on multi-hazard risks.
5. Contribute significantly to sustainable development by acquiring capacities to provide on-demand services for the benefit of all climate-sensitive socio-economic sectors, including Buildings and Public Works, Energy, Mining, Transport, Tourism and Leisure, etc."

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

ANAM has strategic, operational and risk management plans. at the time of the assessment, anam generates data and performs functions in relation to their mandate but lacks the operational environment to apply their skills fully as they work only in Synoptic offices.

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).

Annual salaries budget of the ANAM personnel comes from the Government via the Ministry of Transport, as the ANAM does not generate any revenue on its own. Also, the revenue has been decreasing over the years. A small percentage of ASECNA revenue is paid to the Ministry of Transport, from which ANAM get its budgetary allocations. As a result, ANAM is ill-equipped to meet its obligations, especially regarding the provision of early warnings

for current weather, climate and water threats and future climate- and water-related impacts. These capacity deficits have negative impacts on their contributions to national socio-economic development. ANAM's budget for the past five (5) is as shown in the table below:

Years	2020	2021	2022	2023	2024
ANAM Budget ($ USA)	4 285 095	4 080 721	3 553 994	5 084 718	5 773 624
Salaries (%)	41.95%	34.54%	45.39%	35.81%	31.63%
Investments (%)	31.26%	59.27%	39.17%	47.51%	53.07%
Operations ($ USA)	60 949	434 691	1 091 340	639 631	710 732
Operations (%)	1.4%	10.65%	30.71%	12.58%	12.31%

Table 2: ANAM's Budget in the Past Five (5) Years

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.

Despite inadequate funds, the ANAM consists of the following category of staff: Meteorologists, Meteorological Technicians, Climate Services and Others. All these categories of staff have benefited from one form of training or the other. However, they still require additional training for capacity development (details in Table 2).

Note that there is currently no framework for the assessment of staff competency.

Table 3: Staff list at National Meteorological Agency (ANAM)

Staff Categories	Value (self-reported)
Management	5
Meteorologist	16
Meteorological Technician	14
Hydrologist	0
Hydrological Technician	0
Climate Services	8
Researcher	4
Other	20
Total Staff number Male (Male): Female (F)	63 (M= 51, F=12)

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

The ANAM in recent years has benefited and participated in the implementation of some internationally funded HydroMet projects, such as Hydromet, Climate Risk Early Warning Systems (CREWS), Flood and Drought Management and Early Warning for Climate Change Adaptation in the Volta Basin (VFDM), Building Resilience and Adaptation to Climate Disasters (BRACED) and Intra-ACP Climate Services and Related Applications (ClimSA) projects.

Summary Score, Recommendations, and Comments for Element 1

ANAM was transformed into an Agency of Government by decree and in principle, has strategic, operational and risk management plans. However, there is limited funding as its annual salaries budget comes from the Government via the Ministry of Transport and ANAM does not generate any revenue on its own.

Based on the above assessment using the tools of the CHD, the Governance and Institutional setting element of the hydro-met value cycle has been set to **Maturity Level 2 - Effort ongoing to formalize mandate, introduce improved governance, management processes and address resource challenges**

To raise this level, ANAM should develop action and implementation plans on organizational strengthening, strategic and operational planning and setting up of Quality Management System in a process-driven structure. While ANAM targets an increase in the number of automatic stations in its network, there is still a need for increases in personnel to cover the entire hydrometeorological value chain. Improved funding of ANAM's operations is highly recommended.

Element 2: Effective Partnerships to Improve Service Delivery.

There is no specific legislation restricting the provision of hydrometeorological information and services to the NMHS alone in Burkina Faso.

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

There are some partnerships with other Government institutions but without formal agreement. This results in a lack of coordination across the institutions producing HydroMet information with those that require products, services, and their applications. This requires the ANAM to facilitate consultations to find and develop a national mechanism to coordinate the use of weather, climate, and water information. For effective partnership, there is need for more collaboration and partnership for efficient service delivery.

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.

ANAM currently participates in regional programs such as Regional Climate Outlook Forum (RCOF), anchored by ACMAD and AGRHYMET; and also, ClimSA supports training, and capacity building at AGRHYMET and ACMAD. There is an informal relationship between ANAM and a few research institutes but there is no evident joint research or existing collaborations projects.

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

There is no effective partnership in place with international climate and development finance partners.

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.

ANAM presently does not have an operational forecasting system to develop a new or enhanced variety of products and services that could meet the need of partners/users. Although efforts were ongoing to ensure that ANAM has a Central Forecast Office for the country.

Summary Score, Recommendations, and Comments for Element 2

There is no existing formal framework for institutional partnership (Government and Private). The ANAM participates in national and international technical programs but does not have any relationship with international finance partners. Presently, ANAM does not have operational forecasting system to develop a new or enhanced variety of products and services that could meet the need of partners/users.

In view of the foregoing, it is believed that the maturity level of ANAM in Effective partnerships to improve service delivery is at **Level 2 - Limited partnerships and mostly excluded from relevant finance opportunities.**

To raise this level up, it is recommended that ANAM should:

- Strengthen the existing collaborations with formal agreements.

- Participate in research centres and academia, including joint research and innovation projects.
- Implement a partnership/co-operation arrangement with the Disaster Management Agency for effective climate early warning service delivery.
- There is need for repositioning ANAM to attract international climate and development finance partners.

Element 3: Observational Infrastructure

There are 22 Automatic Weather Observing Stations (AWS) in Burkina Faso belonging to ANAM. However, ASECNA, a third-party institution responsible for Aeronautical Weather Services provision in the country, has an observational structure consisting of 10 ground stations, but just 2 are manned (Ouagadougou and Bobo Dioulasso). Also in their structure are 2 Upper-Air stations, of which 1 is functional (Bobo Dioulasso) with only the wind parameter being received by GRAW, while the other one at Ouagadougou is completely down. The ANAM itself has not started the implementation of a Quality Management System.

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 10 functional ground-based observation stations and 2 Upper-Air stations (1 operational, not transmitting internationally) in Burkina Faso belong to ASECNA. These 10 land stations are registered with the GBON and are currently transmitting data to WDQMS and are already in compliance with GBON regulations in terms of data exchange. ANAM has an additional 22 AWS that are not registered nor transmitting. The stations under ASECNA are located around airports and airfields with fewer security challenges and as such can carry out their operations. Information from WDQMS shows that these stations transmit hourly data to various NWP data centres across the globe.

3.2. Additional observations used for nowcasting and specialized purposes.

There is Satellite Receiving System for nowcasting and specialized products (PUMA & MESA). There are also internet facilities. However, there are no additional observations used for nowcasting and specialized purposes, as ANAM does not issue nowcasting.

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

The ANAM has no existing Standard Operating Procedure for either deployment or maintenance, quality assurance or calibration of the equipment. Calibration and maintenance are done by ASECNA on the station under them. Our visit to their store during the in-country assessment revealed that they have both the human capacity and the resources to carry out maintenance and calibration of meteorological equipment. However, ANAM itself has no such capacity at present.

3.4 Implementation of sustainable newer approaches to observations.

ANAM is currently implementing newer approaches to observations (automated and digital instruments) in line with WMO guidelines and recommended practices.

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

The ANAM network of observation is about 80 percent automatic stations, presently operational and are transmitting data to the GTS via Niamey – Dakar to Morocco (GISC). There is no National WIGOS Implementation Plan adopted/approved.

Summary score, recommendations, and comments for Element 3

ANAM has 10 functional ground-based observation stations: 2 Upper-Air stations and 22 AWS. The 10 stations are registered with the GBON and are in compliance with GBON

regulation in terms of data exchange. However, no SOP and National WIGOS Implementation Plan are in place.

In view of the above, the Maturity level of the observational infrastructure at ANAM is assessed to be **Level 3 - Moderate network with some gaps with respect to WMO regulations and guidance and with some data quality issues,** due to the number of observation stations.

To raise this level up, it is recommended that ANAM should:

- Development of a strategic master plan for effective observation particularly on Upper-Air will help lift the maturity level.
- Implementation of transmission and data exchange through WIS.
- Development of a Strategic Plan and Standard Operating Procedure for an effective observation network.

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.

ASECNA, a third-party organization, has 10 functional ground-based observation stations and 2 Upper Air stations (1 operational, not transmitting internationally), and ANAM has 22 AWS in its operations. 80 per cent of ground-based stations comply with GBON and are transmitting data internationally, but none of the Upper-Air stations are GBON compliant. The AWSs are not registered and currently do not transmit data to the WDQMS.

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

There is an existing formal policy and practice for free and open sharing of observational data in the country. For example, ANAM shared data locally with ASECNA using a system named COROBOR. They both exchanged data for the same purpose of generating weather forecasts and other climate services. Though there is a separate body responsible for hydrological services in Burkina Faso, there is such data sharing synergy with ANAM, and they promised to improve collaboration among organizations and other agencies in meteorological and climatological value chains.

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

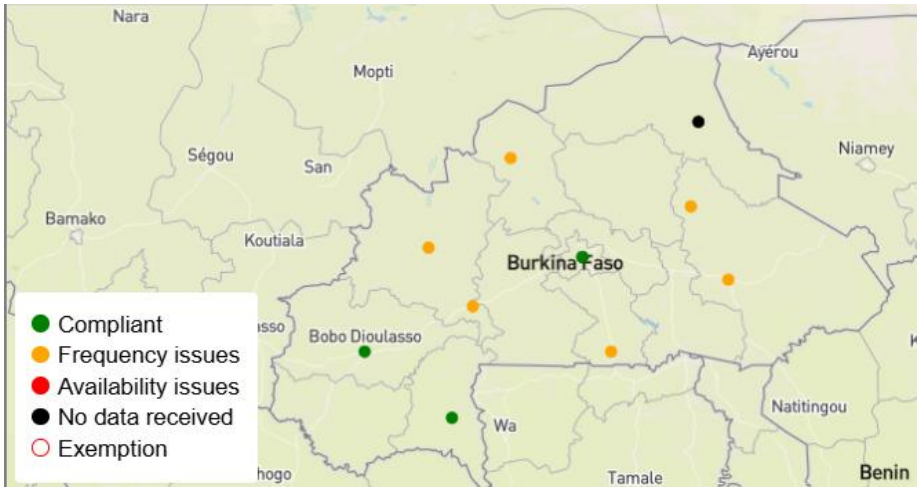
Through GTS (Satcom Direct Reception (i.e. DVB, HRIT, etc); ANAM can receive information from other countries.

ANAM has access to external data and products sources such as regional (including Annual Regional Climate Outlook Forum (RCOF) organized by AGRHYMET, forecast products from RSMC Dakar, Senegal etc), global models (ECMWF, UKMet Office, Meteo France, etc.), and satellite data (via PUMA workstation belonging to ASECNA).

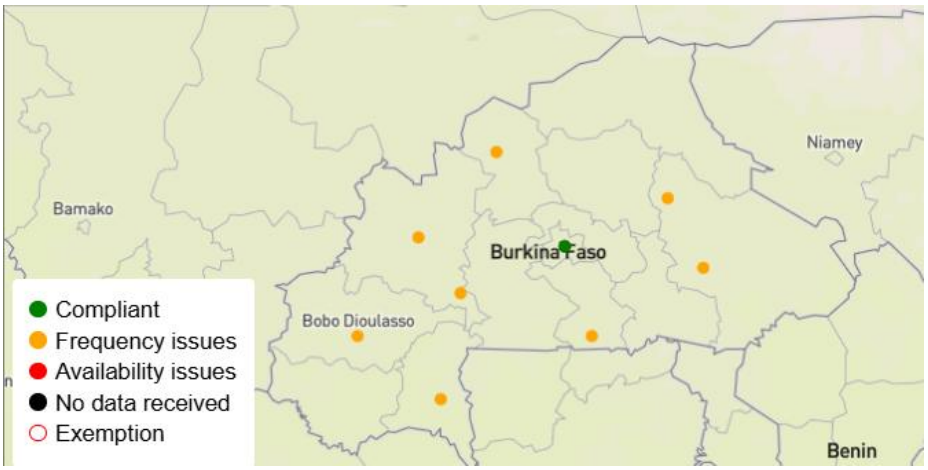
Summary score, recommendations, and comments for Element 4

At the time of the assessment, the GBON compliance percentage clearly shows partial fulfilment of the GBON standard density target of seven stations with 42%, 15% and 57% compliance as at first quarter 2024, fourth quarter 2024 and fist quarter 2025 (figures 3a, b and c respectively). The improvement recorded in 2025 was based on a recent intervention of the WMO through the installation of WIS2.0 box which raised the number of transmitting stations and level of compliance (figures 3c and 4). However, erratic power supply remains a challenge to achieving full compliance for these stations.

(A)



(B)



(C)

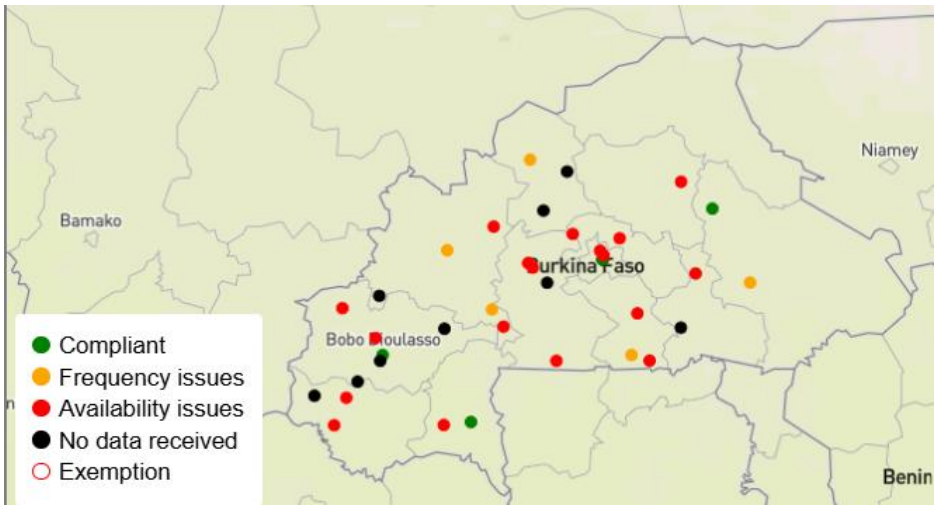


Figure 3: GBON-compliance Status as of 2024 first quarter (A), (B) 2024 fourth quarter and 2025 first quarter (C)

Source: (https://gbon-compliance.wmo.int/country/map/BFA/standard/GBON/2025/Q1)

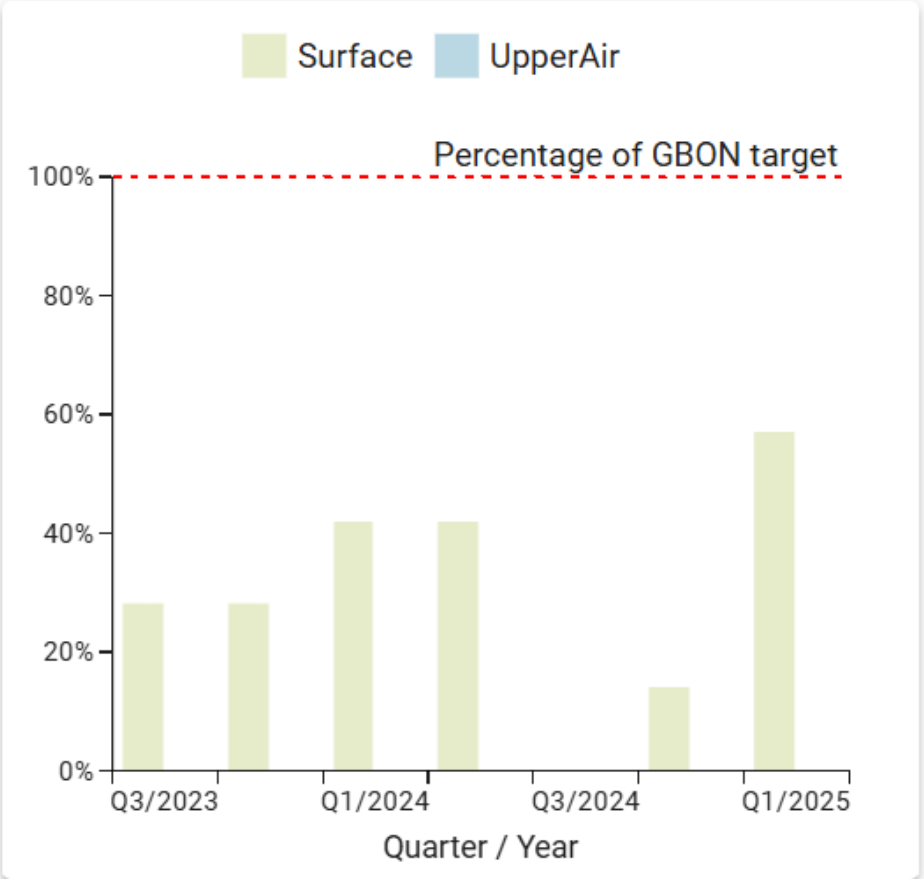


Figure 4: Evolution GBON compliance for surface and upper-air stations

Source: (https://gbon-compliance.wmo.int/country/map/BFA/standard/GBON/2025/Q1)

As such, the maturity level of the Data and Products Sharing and Policies is, therefore, assessed and put at **Level 3 - Partial GBON data sharing compliance with regards to either surface or upper-air data. A data policy in place that promotes the free and open use of data for research, as well as the in-house use of external data**.

To further improve the maturity level, concerted efforts should be geared towards

- resuscitating the Upper-Air stations,
- a stable power supply and
- internet for the WIS2.0 box and transmitting stations.

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.

ANAM has an HPC that could run an NWP model but presently does not have the human capacity to carry out such operations. They are also not making any forecasts yet though work is advanced on what is hoped to become an operational forecast soon. The Agency also have access to global models such as ECMWF, UKMet, MeteoFrance, however, such Numerical Models products and forecasting tools available to them are not fully utilised. Aviation-related weather services including Terminal Aerodrome Forecasts (TAF) are produced by ASECNA.

Forecasting services are being carried out by ASCENA, specifically for the airports.

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

The ANAM has the infrastructural and human capacity internally to run and maintain a forecasting model of its own, but the Agency is currently not running any model.

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

Since there is no fully operational forecast office at ANAM, probabilistic ensemble predictions at any timescale are not being produced.

Summary Score, Recommendations, and Comments for Element 5

Although ANAM has a High-Performance Computer (HPC), they are not running any model or producing any NWP products.

The maturity level for this critical element is assessed at **Level 2 - Basic use of external model output and remotely sensed products in the form of maps and figures, covering only a limited forecast time range.**

To raise this level, it is recommended that ANAM should:

- Deploy resources to make the best use of the currently available operational global NWP model data/products to deliver impact-based benefit to local customers and the public
- Strive to develop capability to run and maintain a forecasting model of its own or adapting an existing regional nwp model with possibility of exploring data assimilation for improved accuracy and performance.
- ANAM are also encouraged to identify and utilize collaborative routes to engage with partners to build a shared understanding of local forecast requirements and model strengths/weaknesses, and to share high-quality observations/information for improving operational quality of forecast products.

Element 6: Warning and advisory services

6.1. Warning and alert service covers 24/7.

Interviews and interactions during our in-country visit indicated that ANAM issues warnings (none was sighted during our visit) when there is a need to alert the public of impending extreme weather events. However, their ability to do this consistently is impaired by a lack of human capacity to do that. Thus, there is a need for more training on Multi-Hazards Early Warning Systems for staff of the Agency. Also, the operational PUMA workstation is dedicated to ASECNA for aeronautical operations only, and that has left ANAM with no tools for continuous monitoring of a developing weather system.

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

The ANAM is providing forecasting services and warning alerts for flooding, drought, dry spells, severe thunderstorms, heatwaves, coastal flooding, sea level rise, tropical storms and so on. NMHS is using the Voltalarm platform to build a bulletin on flood/ drought and send it to the population via WhatsApp. The Voltalarm platform was made under the VFDM project.

In 2023, the WMO and GWP-AO fund, under the Volta Flood and Drought Management (VFDM) project, the Volta Basin Authority built a platform called MyDewetra for impact-based flood and drought monitoring and forecasting over only the Volta area. The platform is based more on flooding than drought. In addition, the national section of the Volta does not cover the whole country. Furthermore, some phenomena such as strong wind, lightning strikes and heat waves are not considered.

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.

Implementation of the Common Alerting Protocol (CAP) is in progress.

Summary score, recommendations, and comments for Element 6

ANAM provides warning services, but not multi-hazards in nature. Also, ANAM provides forecasts for flooding, drought, dry spell, severe thunderstorms, heatwave, coastal flooding, sea level rise, tropical storms and so on. However, the implementation of CAP is in progress.

This component is assessed as Maturity **Level 2 - Basic warning service is in place and operational, but with limited public reach and lacking integration with other relevant institutions and services**.

To raise this level, it is recommended that:

- ANAM should develop the necessary infrastructure for a Multi-Hazard Early Warning System (MHEWS).
- Fast-track the implementation of CAP.

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 capacity of ANAM regarding the provision and application of hydrometeorological information, its monitoring and evaluation for socio-economic benefits, and feedback mechanism in support of climate services delivery are still at a basic level. Climate services and products are generated on a skeletal basis. There is an office building meant for that purpose and staff who could carry out this function on a more regular basis if/when adequate training is provided.

The Agency provide the following products and services: daily, weekly, decadal and monthly bulletins; early warning on thunderstorms, squall lines, and dust storms; heat wave bulletins; seasonal prediction bulletins; specific studies for public institutions; climate data; farmers support with a special bulletin and flood and drought impact-based bulletin in collaboration with Water Resources Agency.

The above services are provided by ANAM as public services (free of charge). The Agency does this through an established good partnerships with:

- Water Resources Agency;
- Ministry of Transport, Agriculture, Environment, Health;
- NGO;
- International Institutions like WFP, UNDP, and FAO;
- End-users through MoU with community radio.

A Data management service is provided under the Department of Climatology. The main database system is CLIDATA built by ATACO. CLIMSOFT are also deployed but in synoptic stations. In 2015 and 2016, as part of the WMO-funded WACA-DARE project, ANAM was able to digitize most of the climatological documents that were still in paper form. thereafter, the Agency built an Excel format for the documents, which enables it to import data directly into DBMS. Recently, through the HYDROMET project, the Agency is getting new servers and the latest version of CLIDATA as well as training.

On the other hand, data generated by ASECNA at stations under their operations are archived in soft and hard (climatological forms) copies.

Summary Score, Recommendations, and Comments for Element 7

The ANAM building which is to house the Forecasting and Early Warning Centre is nearing completion. When completed, the operationalization of HPC will further aid the contribution of ANAM to climate services.

The maturity level is assessed at **Level 2 - Basic Capacity for Climate Services Provision.**

In addition to the timely completion and setting-up of the operations, it is highly encouraged that ANAM develop targeted capacity building for climate products and services.

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 ANAM is yet to establish a coordination and formal mechanism for the exchange of data and products with the Hydrological community. Products like quantitative precipitation estimate and forecast are not produced due to a lack of strong collaboration with hydrological institutions.

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

There is no existing Standard Operating Procedure (SOP) in place yet for the exchange of information between ANAM and Burkina Faso Hydrological Agency. Also, no common database to hold and exchange information between these departments. Efforts are in progress to improve the relationship between ANAM and the Hydrological Agency.

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

There is a formal hydrological data sharing agreement between Agencies.

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

ANAM and the Hydrological community are working on joint project cooperation, such as Integrating Flood and Drought Management and Early Warning for Climate Change Adaptation in the Volta Basin (VFDM) project (ABV), SAP-IC projects, HydroMet and SLAPIS projects.

Summary Score, Recommendations, and Comments for Element 8

The ANAM is yet to establish a coordination and formal mechanism for the exchange of data and products with the Hydrological community, however, there is a formal agreement with the Hydrological Agency. There is no existing Standard Operating Procedure (SOP) in place yet, but there are joint projects cooperation with other Agencies.

Considering the above, the **maturity level** has been assessed as **Level 2 - Meteorological input in hydrology and water resource management happens on an ad hoc basis and or during times of disaster.**

To raise this Maturity Level, it is recommended that ANAM should:

- Develop Standard Operating Procedure (SOP) for Hydrological Services.
- Establish a formal mechanism for the exchange of data and products with the Hydrological community.
- Formalise the relationship with the national Hydrological Agency.

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?).

ANAM uses web applications (that was developed for them by a third-party vendor), television, radio, social media, workshops, outreaches, etc., to disseminate its products and services. The Agency also uses third parties (including local radio and TV stations) to disseminate warnings and other forecast information. However, since these warnings are not well structured, their frequencies are irregular. Such warnings can be seen on their website at https://www.meteoburkina.bf/

9.2. Education and awareness initiatives in place.

Yes. ANAM organizes meetings/workshops with all stakeholders in the weather and climate value chain. They have previously conducted this type of workshop once every year, but there is a plan to increase the frequency, to enable the Agency to get better feedback from their stakeholders and the public.

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

None in place yet.

Summary Score, Recommendations, and Comments for Element 9

ANAN has communication channels through Web Applications (Third-party), Television, Radio, social media, workshops and outreaches. However, there are no special measures in place to reach the marginalized and indigenous communities.

In view of the above, the maturity level is assessed at **Level 2 - Traditional communication channels and a basic dedicated website is used to disseminate forecasts and basic information.**

To uplift the Maturity Level of this critical element, there is a need to improve the existing channels of communication to reach the wider user community and also develop in-house capacity for weather and climate information dissemination. Email and social media platforms should also become part of ANAM's channels of communication.

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.

There is a national committee/platform composed of ministries, agencies and other stakeholders that coordinates Disaster Risk Reduction activities at the national to sub-national levels. ANAM's role includes issuing weather and climate-related warnings and alerts to the public. Ideally, the Agency would generate forecasts and send them out to the committee via established channels such as email. However, due to the lack of human capacity and inadequacy in operational tools, ANAM has not been effective in its role.

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

The ANAM has no formal process for conducting feedback surveys and does not have a stakeholder platform for co-designing services with users.

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

ANAM implements QMS with certification in ISO 9001 for Aeronautical Services. However, the implementation of QMS for the provision of meteorological, hydrological and climate warning services is in progress.

10.4 Summary Score, Recommendations, and Comments for Element 10

While noting that AeroMet services are provided by ASECNA, there is QMS in place for Aeronautical Services. However, there is need for ANAM to introduce QMS to other services as well as develop a formalized platform to engage their users in co-design of products and services.

The maturity level of this critical element is assessed as **Level 2 - Service development draws on informal stakeholder input and feedback.**

To uplift this maturity level:

- ANAM should establish a feedback mechanism with stakeholders to improve on their service delivery.
- Implement QMS in other services.

Annex 1 Summary of the Assessment and key Recommendations to increase the Maturity Levels

Maturity level	Element of the Value Cycle	Key Recommendations to lift the Maturity level
2	Governance and Institutional Setting	• Develop action and implementation plan on organizational strengthening, strategic and operational planning. • Setting up of Quality Management System in a process driven structure. • Need for increase in personnel to cover entire hydrometeorological value chain.
2	Effective Partnerships to Improve Service Delivery	• Strengthen the existing collaboration with formal agreement. • Participate in research centres and academia, including joint research and innovation projects. • Implement partnership/co-operation arrangement with the Disaster Management Agency for effective climate early warning service delivery. • There is a need for repositioning ANAM to attract international climate and development finance partners.
3	Observational Infrastructure	• Development of a strategic master plan for effective observation, particularly on Upper-Air, will help lift the maturity level. • Implementation of transmission and data exchange through WIS. • Development of a Strategic Plan and Standard Operating Procedure for an effective observation network.
3	Data and Products Sharing and Policies	Concerted efforts should be geared towards • resuscitating the Upper-Air stations, • a stable power supply and • internet for the WIS2.0 box and transmitting stations.
2	Numerical Model and Forecasting Tool Application	• Deploy resources to make the best use of the currently available operational global NWP model data/products to deliver impact-based benefit to local customers and the public

		• Strive to develop capability to run and maintain a forecasting model of its own or adapting an existing regional nwp model with possibility of exploring data assimilation for improved accuracy and performance. • ANAM are also encouraged to identify and utilize collaborative routes to engage with partners to build a shared understanding of local forecast requirements and model strengths/weaknesses, and to share high-quality observations/information for improving operational quality of forecast products.
2	Warning and Advisory Services	• ANAM should develop the necessary infrastructure for the Multi-Hazard Early Warning System (MHEWS). • Fast-track the implementation of CAP.
2	Contribution to Climate Services	▪ Timely completion and setting up of the operations. ▪ Encouraged ANAM to develop targeted capacity building for climate products and services.
2	Contribution to Hydrology	• Develop Standard Operating Procedure (SOP) for Hydrological Services. • Establish a formal mechanism for the exchange of data and products with the Hydrological community. • Formalise the relationship with the Hydrological Agency.
2	Product Dissemination and Outreach	▪ Improve on the existing channels of communications to reach the wider user community, including the marginalized and indigenous people.
2	Use and National Value of Products and Services	• ANAM should establish a feedback mechanism from stakeholders to improve on its service delivery. • Implement QMS in other services.

Annex 2 Consultations (including experts and stakeholder consultations)

i. Virtual meeting with SOFF Secretariat and the ANAM on the commencement of the process.

ii. Virtual meetings between AEMet and NiMet with the ANAM team for information and data gathering.

iii. Physical meeting/workshop with relevant stakeholders

iv. Consultations with relevant units/sections of ANAM for their input in the CHD report.

v. Consultation with relevant units of ASECNA

vi. Assessment of facilities and instruments at ground stations and Upper-Air stations

Annex 3 Urgent needs reported.

i. A concerted efforts should be geared towards resuscitating the Upper-Air stations.

ii. Implementation of transmission and data exchange through WIS.

iii. Implement partnership/co-operation arrangement with the Disaster Management Agency for effective climate early warning service delivery.

iv. ANAM should develop the necessary infrastructure for Multi-Hazard Early Warning System (MHEWS).

v. Improve on the existing channels of communications to reach the wider user community including the marginalized and indigenous people.

vi. Immediate training on products and services development for the technical staff is highly recommended.

Annex 4 Information supplied through WMO.

Most baseline information was retrieved from WMO documents directly or indirectly linked to Burkina Faso.

- WMO Monitoring System Data
- WMO EW4All Rapid Assessment for Pillar-2
- WMO Hydrology Survey
- Data from Checklist for Climate Services Implementation

Annex 5 List of materials used.

i. GBON station data collection template.
ii. CHD_EW4All_Data Inventory and Review Sheet
iii. CHD-questionnaire
iv. Data from country-level stakeholders' engagement
v. The WMO Needs Assessment Mission Report to Burkina Faso
vi. WMO Early Warning for All Rapid Assessment Report
vii. HydroMet Gap Report 2021
viii. WMO Community member website
ix. Documentary: Country HydroMet Diagnostics Road-testing video

Annex 6 List of stations.

Station name	Station type (S/UA)	NMHS / 3rd party station	Power Supply	GBON variable measured						Staff, Trained operators
				SLP	T	H	W	P	SD	
Bobo-Dioulasso	S, manual	International Asecna	YES	YES, digital	YES, manual	YES, manual	YES, digital, no max	YES, manual	N/A	International Asecna
Bogandé	S, manual	National ASECNA	YES, no relay generator	YES, digital	YES, digital	YES, calculated from digital	YES, manuel, no max	YES, manual	N/A	National ASECNA
Boromo	S, manual	National ASECNA	YES, no relay generator	YES, digital	YES, digital	YES, calculated from digital	YES, manuel no max	YES, manual	N/A	National ASECNA
Dédougou	S, manual	National ASECNA	YES, no relay generator	YES, digital	YES, digital	YES, calculated from digital	YES, digital, no max	YES, manual	N/A	National ASECNA
Dori	S, manual	National ASECNA	YES, no relay generator	YES, digital	YES, digital	YES, calculated from digital	YES, manuel, no max	YES, manual	N/A	National ASECNA
Fada N'Gourma	S, manual	National ASECNA	YES, no relay generator	YES, digital	YES, digital	YES, calculated from digital	YES, digital, no max	YES, manual	N/A	National ASECNA
Gaoua	S, manual	National ASECNA	YES, no relay generator	YES, digital	YES, digital	YES, calculated from digital	YES, digital, no max	YES, manual	N/A	National ASECNA
Ouagadougou-aéroport	S, manual	International Asecna	YES	YES, digital	YES, manual	YES, manual	YES, digital	YES, manual	N/A	International Asecna
Ouahigouya	S, manual	National ASECNA	YES, no relay generator	YES, digital	YES, digital	YES, calculated from digital	YES, digital, no max	YES, manual	N/A	National ASECNA
Pô	S, manual	National ASECNA	YES, no relay generator	YES, digital	YES, digital	YES, calculated from digital	YES, digital, no max	YES, manual	N/A	National ASECNA

Diapaga	Synoptique, auto	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto	Yes, auto	Yes, auto & manuel	N/A	ANAM
Diebougou	Agro, auto & manual	ANAM	Solar, Sector	Yes, auto	Yes, auto & Manuel	Yes, auto & Manuel	Yes, auto 2m	Yes, auto & manuel	N/A	ANAM
Djibo	Agro, auto & manual	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto & Manuel	Yes, auto 2m	Yes, auto & manuel	N/A	ANAM
Kaya	Climato, manual	ANAM	Solar, Sector		YES, manual	Yes, Manual	No	Yes, auto & manuel	N/A	ANAM
Koudougou	Synop auto, rain manual	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto	Yes, auto	Yes, auto & manuel	N/A	ANAM
Leo	Agro auto, rain manual	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto	Yes, auto 2m	Yes, auto & manuel	N/A	ANAM
Tenkodogo	Agro auto, rain manual	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto	Yes, auto 2m	Yes, auto & manuel	N/A	ANAM
Yako	Synop auto,	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto & Manuel	Yes, auto	Yes, auto & manuel	N/A	ANAM

Yako	Synop auto, climato manual	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto & Manuel	Yes, auto	Yes, auto & manuel	N/A	ANAM
Tougan	Agro auto	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto	Yes, auto 2m	Yes, auto	N/A	ANAM
Manga	Synop auto, climato manual	ANAM	Solar, Sector	Yes, auto	Yes, auto & Manuel	Yes, auto & Manuel	Yes, auto	Yes, auto & manuel	N/A	ANAM
Pama	Synop auto, rain manual	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto	Yes, auto	Yes, auto & manuel	N/A	ANAM
Markoye	auto PTH, rain manual	ANAM	Solar, Sector	No	Yes, auto	Yes, auto	No	Yes, auto & manuel	N/A	ANAM
Gayeri	Agro auto	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto	Yes, auto 2m	Yes, auto	N/A	ANAM
Mangodara	auto PTH, rain manual	ANAM	Solar, Sector	NO	Yes, auto	Yes, auto	No	Yes, auto & manuel	N/A	ANAM
Kouka	Agro auto, rain manual	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto	Yes, auto 2m	Yes, auto & manuel	N/A	ANAM
Zorgho	Agro auto, rain manual	ANAM	Solar, Sector	Yes, auto	Yes, auto	Yes, auto	Yes, auto 2m	Yes, auto & manuel	N/A	ANAM
Djibasso	PTH auto	ANAM	Solar, Sector	No	Yes, auto	Yes, auto	No	Yes, auto	N/A	ANAM

Annex 7 Pictures.

Meeting with the PR of Burkina Faso

Stakeholders' Engagement: Participants at the end of the event

A cross-section of participants at the Stakeholders' Engagement

On-the-spot assessment of the station at Bobo Dioulasso Airport

On-the-spot assessment of the station at Bobo Dioulasso Airport

Stakeholders' Engagement