

**Climate Services for Increased Resilience in the Sahel**  
**Revised Draft of Final Evaluation Report**

*Mannava Sivakumar*  
*Senior Consultant, WMO*

14 August 2018

World Meteorological Organization  
Geneva, Switzerland

## Table of Contents

Executive Summary .....	3
Acronyms.....	5
1. Background and project description.....	6
Need for climate services in Niger.....	6
Need for climate services in Senegal.....	7
Need for climate services in Burkina Faso.....	7
The Project on Climate Services for Increased Resilience in the Sahel .....	7
2. Purpose of Evaluation.....	9
Scope .....	10
3. Evaluation of the project.....	10
Project progress and effectiveness .....	10
Relevance and strategic fit .....	30
Validity of intervention design .....	31
Gender mainstreaming .....	32
Efficiency of resource use .....	36
Sustainability of the intervention .....	36
Effectiveness of management arrangements .....	38
Capacity building and institutionalization .....	38
4. Conclusions and recommendations .....	41
References .....	43
Annexes .....	44

## Executive Summary

Ref.: 13864/2019-1.0 CLW/GFCS

Many African countries are extremely vulnerable to droughts, floods and other extreme events caused by natural climate variability. They face even greater risks in the future as human-induced climate change increasingly alters the weather and climate patterns that societies have come to depend on. The provision of more and better climate services will allow user communities in different sectors to cope with these problems. The project on “Climate Services for Increased Resilience in the Sahel”, which was developed by the Global Framework for Climate Services (GFCS) Office in WMO, was implemented from June 2016 to August 2018 with the 1 Million US Dollar funding provided by the United States Agency for International Development (USAID). The project covers three countries i.e., Burkina Faso, Niger and Senegal and has a specific stream to support the African Centre for Meteorological Applications for Development (ACMAD) as a Regional Climate Centre (RCC) to enable it to support technically the three beneficiary countries.

The main aim of the project is to enable the society to better manage the risks and exploit opportunities arising from climate variability and change, especially for those that are most vulnerable to climate-related hazards. The project is implemented at the regional and national levels. At the regional level, the project focused its work on the capacity development of ACMAD to better serve the NMHSs in the region, including enhancement of climate services uptake and use through more effective communication strategy. At the national level, the project implemented interventions to support the capacity development of NMHSs in Burkina Faso, Niger and Senegal to better serve the user communities in their countries and to assist in establishment of Frameworks for Climate Services as coordination mechanisms at the institutional level.

For the effective delivery of climate services in Niger, the official launching of the National Framework for Climate Services (NFCS), with the signature of the decree, was held in Niamey on May 31, 2017. In Niger, 5 thematic Groupes de Travail Pluridisciplinaires (GTPs) have been established for each climate sensitive sector (agriculture, disaster risk reduction, water, health, transportation/infrastructure/energy). In Senegal, the NFCS was endorsed in April 2016 in Dakar and a GTP was established with the participation of experts from different departments. In April 2016 the final validation workshop of Burkina’s National Action Plan on Climate Services was held which outlined the key priority activities to implement between now and 2020 for the successful co-production, communication, delivery and use at large scale of operational climate services in Burkina Faso. The GTPs in Burkina Faso are currently functional.

The evaluation of the project is conducted to assess the extent to which the project objectives have been addressed and establish how far the regional and national institutions have achieved the planned outcomes. The evaluation clarifies as to what extent the project strategy has proven efficient and effective and whether it is likely to have a sustainable impact. To undertake the evaluation of the project, a mission was undertaken to Niger from 3 to 6 July 2018 and to Senegal from 7 to 10 July 2018.

During the mission to Niger and Senegal a number of meetings were held and a report on these meetings was prepared which is attached to this report.

A description of the evaluation of the project is presented in section 3 in which the following main aspects of evaluation have been addressed:

1. Project progress and effectiveness
2. Relevance and strategic fit
3. Validity of intervention design
4. Gender mainstreaming
5. Efficiency of resource use
6. Sustainability of the intervention
7. Effectiveness of management arrangements
8. Capacity building and institutionalization

The project document prepared in September 2016, outlined three major outcomes: the first one at the regional level, the second one at the national level and the third one to enhance cooperation at the regional level. ANAM in Burkina Faso implemented only activity C.3 under Outcome 2 of the project. ACMAD, DMN and ANACIM were quite flexible in adapting the project strategies and developed useful tools and approaches to respond to the important priorities at the regional and national levels respectively. Under each of the outcomes, a number of activities were presented for implementation at the regional and national levels. The response of ACMAD, DMN and ANACIM in implementing these important activities was quite relevant and the project addressed effectively the capacity gaps and institutional limitations to provide improved climate services at the regional and national levels. One of the major factors influencing the achievement of the project objectives is the efficient role played by DMN in Niger and ANACIM in Senegal in actively involving the different departments and agencies in their countries in the NFCS and the production of different bulletins to inform the various communities.

The conclusions and recommendations are presented at the end of this document. The main recommendation covers the aspect that the provision of improved climate services for increased resilience in the Sahel does require more time such as another five years so that the communities in the different regions in the three countries can better familiarize with the management of risks and coping with the climate-related hazards. In order to increase the likelihood of sustainability, it will be useful to implement a second phase of the project for another five years, from 2019 to 2023, in these three countries. The next recommendation is that the national agencies should be encouraged to take prompt actions in issuing early warning messages and in using appropriate information and communication technology strategies to diffuse the information to the different user communities in real time and also obtain regular feedback from the user communities on the information provided to them. It is recommended that, should a next phase of this project be implemented, steps be taken to recruit the technical staff needed to promote better climate services. Further development of the observing capabilities in the three countries should be made to better deliver climate and related services, meeting the needs and requirements of the user communities. It is recommended that Niger, Senegal and Burkina Faso take appropriate steps to develop the appropriate products based on the technical manuals issued by ACMAD and post them on their websites to provide useful information to the user communities in different sectors in their countries. On the technical side, one of major gaps is the lack of use of dynamic climate models both at the national level and also at the regional level in ACMAD. The use of dynamic climate models should be implemented in the next phase of this project.

-----

## Acronyms

ACMAD	African Centre of Meteorological Application for Development
AGRHYMET	Regional Centre for Training and Application in Agrometeorology and Operational Hydrology
ANACIM	National Agency for Civil Aviation and Meteorology of Senegal
ASECNA	Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar/ Agency for Airial Navigation Safety in Africa and Madagascar
AWS	Automatic Weather Station
CC/SAP	Coordination Cell of the Early Warning Systems
CLW	Climate and Water Department
CNSC	Cadre National de Services Climatiques
CMT	Climate Monitoring Tools
CST	Comité scientifique
DGPRES	General Directorate for the Planification and Management of Water Resources
DMN	National Directorate for Meteorology
DSRE	Directorate of Surveillance and Response to the Epidemics
EVIAM	Survey of the food insecurity vulnerability of the households
FAO	Food and Agriculture Organization of the United Nations
GFCs	Global Framework for Climate Services
GTPs	Groupes de Travail Pluridisciplinaires
IPCC	Intergovernmental Panel on Climate Change
ICPAC	IGAD Climate Prediction and Applications Center
MOU	Memorandum of Understanding
NAPA	National Adaptation Programme of Action
NAPs	National Action Plans
NCFs	National Climate Forums
NCOFs	National Climate Outlook Forums
NFCS	National Framework for Climate Services
NMHS	National Meteorological and Hydrological Services
NOAA	National Oceanic and Atmospheric Administration
NRC	Norwegian Refugee Council
PDIPC	Development of Climatic Information and Perspective
PWS	Public Weather Service
RCC	Regional Climate Center
ToT	Training of Trainers
UIPs	User interface platforms
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISDR	United Nations International Strategy for Disaster Reduction
USAID	United States Agency for the International Development
WFP	World Food Programme
WHO	World Health Organization
WMO	World Meteorological Organization

## 1. Background and Project Description

Many African countries are extremely vulnerable to droughts, floods and other extreme events caused by natural climate variability. They face even greater risks in the future as human-induced climate change increasingly alters the weather and climate patterns that societies have come to depend on. According to the Intergovernmental Panel on Climate Change (IPCC, 2013), the Sahel will experience higher average temperatures over the course of the 21<sup>st</sup> century and changes in rainfall patterns. These trends will affect the frequency and severity of floods, droughts, desertification, sand and dust storms, desert locust plagues and water shortages.

The Global Framework for Climate Services (GFCS) is a global partnership of governments and United Nations and international agencies that produce and use climate information and services. The World Meteorological Organization (WMO) is leading the initiative in collaboration with the UN International Strategy for Disaster Reduction (UNISDR), the World Health Organization (WHO), the World Food Programme (WFP), the Food and Agriculture Organization (FAO) of the UN, the UN Educational, Scientific and Cultural Organization (UNESCO), the UN Development Programme (UNDP), and others. GFCS strives to help reducing human and economic losses to weather and climate extremes, mitigate the impacts of climate-related diseases, inform farming decisions, improve food security, and strengthen the management of vital water resources in the Sahel.

The provision of more and better climate services will allow disaster risk managers to prepare more effectively for droughts and heavy precipitation; empower farmers to fine-tune their farming and marketing strategies based on seasonal climate forecasts; assist public health services to target vaccine and other prevention campaigns to limit climate-related disease outbreaks such as malaria and meningitis; and help improve the management of water resources.

The “Climate Services for Increased Resilience in the Sahel” project, which was developed by the GFCS Office in WMO, is being implemented from June 2016 to August 2018 with the 1 Million US Dollar funding provided by the United States Agency for International Development (USAID). The project covers three countries i.e., Niger, Senegal and Burkina Faso (a short description of the three countries is shown in Annex I) and has a specific stream to support the African Centre for Meteorological Applications for Development (ACMAD) as a Regional Climate Centre (RCC) to enable it to support technically the three beneficiary countries.

### **1.1 Need for climate services in Niger**

In Niger the main climate risks are droughts, torrential rains, which are often accompanied by high winds, flooding (often due to intensive rain causing flash floods), sandstorms and/or dust, high temperature / heat waves, harmful insects (locust invasion) and bush fires. Of these, the major risks in terms of frequency and the magnitude of impacts remain droughts and floods. There has also been an increase of heat waves in recent years. From 1976 to 2010 the maximum temperature increased by 1.7 ° C and the minimum temperature by 2.4° C (N'Diaye et al. 2017). The most affected sectors by such climate change are agriculture, livestock, forestry, water resources, health, transportation, fishing and wildlife.

### **1.2 Need for climate services in Senegal**

According to the report developed by the National Agency of Civil Aviation and Meteorology of Senegal (ANACIM), there is a continued increase in average temperatures for the entire territory of 1.1 to 1.8 ° C with higher temperatures in the South East area than the Northern and Central areas, and a decrease in the rainfall. The report also indicates increased weather extremes in the future.

Climate change has become a reality, and its effects on the different sectors of the national economy are a major issue for the development of the country. It is manifested by an exacerbation of the climate variability and extreme weather events. For sustainable development of the sectors, it is necessary to incorporate climate change projections in their planning. Thus, various initiatives have been developed to further understand the implications of climate variability.

### **1.3 Need for climate services in Burkina Faso**

Climate trend studies indicate an increase in average temperature of 0.8 °C by 2025 and 1.7 °C by 2050. For precipitation, the studies indicate a decrease in rainfall of 3.4% by 2025 and 7.3% by 2050. According to these projections, in 2050, there is an expected decrease in annual volume of water flowing into all the major rivers of the country. As a landlocked country in sub-Saharan Africa Burkina Faso is essentially reliant on agriculture, and the country has been considerably affected by the adverse impacts of climate change over the last 20 years.

An analysis of climate parameters by Burkina Faso's National Adaptation Program for Action (NAPA) shows that major risk related to climate variability in Burkina Faso are, among others, droughts, floods, strong winds, cyclones and seasonal heat or cold waves. The augmented frequency and intensity of droughts and floods combined with high temperature are increasingly having a negative effect on sectors such as agriculture, livestock, water management, but also on health, energy, infrastructure and the environment as a whole. There is a fundamental need for climate services to safeguard people's lives, in addition to increasing economic efficiency and social stability.

### **1.4 The Project on Climate Services for Increased Resilience in the Sahel**

The project on “Climate Services for Increased Resilience in the Sahel” aims to enable society to better manage the risks and exploit opportunities arising from climate variability and change, especially for those that are most vulnerable to climate-related hazards. The project is working at two levels: regional and national levels.

The project is implemented by the African Centre of Meteorological Applications for Development (ACMAD), and the National Meteorological and Hydrological Services (NMHSs) of Niger, Senegal and Burkina Faso. It also has the following collaborating partners – Norwegian Refugee Council (NRC), National Oceanic and Atmospheric Administration (NOAA), the Centre Regional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle (AGRHYMET) and sectoral agencies.

At the regional level, the project focuses its work on the capacity development of ACMAD to better serve the NMHSs in the region, including enhancement of climate services uptake and use through more effective communication strategy.

At the national level, the project implemented interventions to support the capacity development of NMHSs in Burkina Faso, Niger and Senegal to better serve the user communities in their countries and to assist in establishment of National Frameworks for Climate Services as coordination mechanisms for climate services at the institutional level.

The project was commenced in June 2016 and will end in August 2018. Following are the detailed activities that were designed to address the three expected outcomes of the project, which are described below:

**Outcome 1:** Better regional support through the enhanced development, delivery and use of tailored climate information products at the regional level for climate-sensitive sectors.

***Component 1: Regional level:***

A. Capacity development targeting ACMAD to enhance its role as a WMO RCC to better serve NMHSs in the region

- A.1 Deployment of experts at ACMAD (by NRC)
- A.2 Support to and of provision of technical tools for analysis and prediction of climate
- A.3 Training of ACMAD staff by NRC deployments to ensure the production of better quality products by ACMAD

B. Enhancement of climate services uptake and use

- B.1 Development of training manual (for NMHSs staff on how to use regional products)
- B.2 Improvement of ACMAD website and creation of web-platform for data sharing and products dissemination (GIS based) including development of a more effective communication strategy

**Outcome 2: Increased resilience through enhanced decision making processes at the national level through integration of climate information into decision making in climate sensitive sectors.**

***Component 2: National level:***

C. Capacity development targeting NMHSs in selected countries to better serve users

- C.1 Deployment of mentor experts at NMHSs (by NRC)
- C.2 Establishment of baselines based on capacity assessments at national level
- C.3 Capacity development including training to enhance NMHS capacity in data management and rescue; climate diagnostics, monitoring and forecasting; product development including calibrating and tailoring
- C.4 Improvement of data management, rescue and information dissemination in pilot countries
- C.5 Media training

D. Institutional capacity enhancement

- D.1 Mapping of key stakeholders and institutions (providers and users)
- D.2 Establishment of partnerships at national level to support implementation
- D.3 Development/Finalization of national plans of action in pilot countries



D.4 Institutional capacity development, including through the establishment and operationalization of frameworks for climate services at national level as the institutional coordination mechanisms to ensure that the entire value chain for the production and application of climate services are addressed in a systematic manner with the involvement of all stakeholders

E. Rehabilitation of observation networks in pilot countries

E.1. Needs assessment for observation networks enhancement to define the design, number of stations and location

E.2 Rehabilitation of observation networks in pilot countries (and pilot testing of 3D printing stations designed and tested by USAID and NOAA)

F. User interface and service delivery

F.1 Establishment of users-providers engagement mechanisms through National Climate Outlook Forums (NCOFs), National Climate Forums (NCFs)

F.2 Integration of climate services into decision making processes in climate-sensitive sectors

F.3 Pilot projects to demonstrate the value of climate services in climate-sensitive sectors

**Outcome 3:** Enhanced cooperation in the region for the development and use of climate products and services

***Component 3: Knowledge sharing and capacity development at regional level***

G. Monitoring and evaluation and Collection of lessons learnt from the project

H. Development of guidelines and training tools

I. Training of Trainers (ToT) of AMCAD staff to facilitate South-South cooperation and knowledge exchange with other countries and regions

**2. Purpose of Evaluation**

The project evaluation is conducted to provide an opportunity for the WMO and its development partners to assess the appropriateness of design as it relates to the WMO’s strategic priorities, regional and national policy frameworks, and consider the effectiveness, efficiency and sustainability of project outcomes.

The evaluation of the project is being conducted to assess the extent to which the project objectives have been addressed and establish how far the regional and national institutions have achieved the planned outcomes. The evaluation will clarify as to what extent the project strategy has proven efficient and effective and whether it is likely to have a sustainable impact.

Knowledge and information obtained from the evaluation will be used to inform the design of future similar activities.

Clients and users of the evaluation are

- WMO Climate and Water Department (CLW)/GFCS
- Representatives of governments and NMHSs in the region and countries covered
- USAID as the funding entity

- Other regional and country stakeholders (ACMAD, NMHSs of Niger, Senegal and Burkina Faso)

## **2.1 Scope**

The evaluation includes all the activities undertaken by the project during the project period from June 2016 to August 2018. Two of the three target countries ie., Niger and Senegal covered all the activities under Outcome 2 described in section 1.4 above. Burkina Faso addressed only activity C.3 under Outcome 2.

The evaluation includes all stages of the project, including initial project design, work planning, implementation monitoring and reporting. The evaluation also refers to the progress reports submitted to the donor, particularly the achieved outcomes and how lessons learned and recommendations were progressively followed up to attain desired results. The evaluation also looks at actual implementation mechanisms in line with initially planned implementation mechanisms, from the institutional set-up to the implementation plan and budget expenditures. How the strategies and approaches have progressed, changed or evolved over the two-year implementation period shall be examined to draw lessons from project experience.

Gender equality is an important cross cutting element of the WMO. The evaluation will look particularly at how gender equality concerns were integrated throughout its methodology, strategies/approaches, data and all deliverables.

The evaluation verifies good practices, if any, impacts and lessons learnt from the implementation of the project. At the end of the evaluation, a set of practical recommendations for possible immediate adoption/application are made available and could be further integrated into future WMO projects. The evaluation shall identify approaches and/or activities that have proven to be particularly innovative, unique or otherwise valuable that can be referred to with regard to capacity building, knowledge sharing, decision-making and sustainable mechanisms for climate services.

## **3. Evaluation of the Project**

To undertake the evaluation of the project, a mission was undertaken to Niger from 3 to 6 July 2018 and to Senegal from 7 to 10 July. Before this mission, interviews with the concerned staff in the WMO lead department and collaborating departments were conducted. During this mission, a number of meetings were held (Annexes II and III). A report on the interviews and meetings that were held was prepared, which is attached herewith.

The evaluation of the project is presented under the following main aspects:

1. Project progress and effectiveness
2. Relevance and strategic fit
3. Validity of intervention design
4. Gender mainstreaming
5. Efficiency of resource use
6. Sustainability of the intervention
7. Effectiveness of management arrangements
8. Capacity building and institutionalization

### 3.1. Project progress and effectiveness

As described earlier under section 1.4, the project has a regional as well as a national component in Niger, Senegal and Burkina Faso. The regional component supports RCC Africa hosted by ACMAD and promotes consistent and integrated efforts across agencies and countries in the Sahel in order to avoid duplication and to optimize resources. At the same time, the regional component is complemented by national initiatives that seek to develop nationally-tailored, climate-smart solutions to meet national needs. At the national level, the project is composed of activities which support the development and effective use of climate services in decision making processes in key economic sectors to address the needs identified through the national consultations.

#### 3.1.1 Extent to which the project attained its objectives

The attainment of the project objectives is described below with reference to different activities that were outlined in the project document under each of the three Outcomes. As Outcomes 1 and 3 were focusing on the region, the attainment of the objectives under these two outcomes is described first. This is followed by the activities undertaken at the national level under Outcome 2.

Outcomes 1 and 3 were undertaken at the regional level by ACMAD, through the organization of three workshops/meetings from May 2017 to May 2018 (Table 1) and by releasing 20 publications/reports (Table 2). The activities under these two outcomes are described below under Table 2.

**Table 1. Workshops/meetings organized by ACMAD under Project Outcomes and Activities**

No.	Workshop/meeting	Venue/Dates	Project Outcome	Component/Activity
1	GFCS International Climate Training Workshop	Niamey, 17-21 July 2017	1	A.3
2	Reunion Regionale de Concertation Technique sur la Securite Alimentaire et Alerte Precoce aux Pays du Sahel et de l'Afrique de l'Ouest	Bamako, 27-29 November 2017	1	B.2
3	Atelier Régional de Formation des Formateurs sur l'établissement et la mise en oeuvre des Cadres Nationaux pour les Services Climatiques au Sahel	Niamey, 13-15 February 2018	3	I

**Table 2. Publications/reports issued by ACMAD under Project Outcomes and Activities**

No.	Publication/report	Date published	Project Outcome	Component/Activity
1	Report of the Strategic Meeting discussing the Roles & Activities of ACMAD and AGRHYMET to support GFCS Implementation in the ECOWAS sub-region	February 20, 2018	1	A.2
2	Memorandum of Understanding (MOU) between ACMAD and AGRHYMET	May 08, 2017	1	A.2
3	Communication Strategy and Implementation Plan	August 18, 2017	1	B.2
4	A Quick Guide to generate the State of Climate	December 07, 2017	1	B.1
5	A Summary Report on Automation of Selected Climate Products at ACMAD	May 21, 2018	1	B.1
6	Drought Monitoring Training Manual	December 18, 2017	1	B.1
7	Geoserver Technical Design for Data Exchange	April 16 , 2018	1	B.2
8	Procedure for generation of annual precipitation in percent of average (see the Drought Monitoring Training Manual)	December 07, 2017	1	B.1
9	Procedure for generation of Standardized Precipitation Index (SPI) (see Drought Monitoring Training Manual)	December 07, 2017	1	B.1
10	Procedure for precipitation trend analysis (see seasonal forecast guide or technical note Niger output H)	April 26, 2018	1	B.1
11	Procedure for Lake Level (part of Drought Monitoring Training Manual)	December 07, 2017	1	B.1
12	Technical Note on Seasonal Climate Forecast for JJA-JAS 2017 over Niger ( a series of additional notes each month for the duration of the project are available)	July 19, 2018	1	A.2
13	The State of Climate in Africa: 2017	March 28, 2018	1	A.2
14	Final Report GFCS International Climate Training Workshop	October 25, 2017	1	A.3

No.	Publication/report	Date published	Project Outcome	Component/Activity
15	Rapport de la Réunion Régionale de Concertation Technique sur la Sécurité Alimentaire et Alerte Precoce aux Pays du Sahel et de l'Afrique de l'Ouest	December 19, 2017	3	I
16	Project Progress Report (July to December 2017) – Annex IV of Request for payment of the second installment	January 12 2018	3	I
17	Rapport Final Atelier Régional de Formation des Formateurs sur l'établissement et la mise en oeuvre des Cadres Nationaux pour les Services Climatiques au Sahel	March 20, 2018	3	I
18	Status Report on Climsoft Database Application	February 19, 2018	1	A.2
19	Climate and Health Bulletin: Meningitis Vigilance Zones	Issue 1: 20-26 Dec 2017; Issue 2: 27 Dec-2 Jan 2018; Issue 3: 3-9 Jan 2018; Issue 4: 16-23 Jan 2018; Issue 5: 24-30 Jan 2018; Issue 6: 31 Jan-6 Feb 2018 Issue: 7: 06-13 Feb 2018 Issue 8: 20-27 Feb 2018 Issue 9: 06-13 Mar 2018 Issue 10: 13-20 Mar 2018 Issue 11: 27 arch-03 April 2018 Issue 12: 3-10 April 2018 Issue 13: 17-25 April 2018	1	A.2
20	Guide for service development planning for implementation of NFCS	March 27, 2018	1	A.3

**Outcome 1: Better regional support through the enhanced development, delivery and use of tailored climate information products at the regional level for climate-sensitive sectors**

*Component 1: Regional level*

*A. Capacity Development:*

As per activity A.1 on the deployment of experts at ACMAD by NRC, an NRC expert, Dr. Bob Alex Ogwang, was deployed in ACMAD for a period of 11 months, running from 6 February to 31 December 2017. Given his good performance, his contract was renewed for 2018. The NRC deployee at UNDP office in Niger, Dr. Daouda Yahaya, contributed as trainer in the training workshop on the establishment of National Framework for Climate Services (NFCS) from 13 to 15 February 2018.

The activity A.2 on the support to and of provision of technical tools for analysis and prediction of climate was well addressed by ACMAD. As can be seen from Table 2 on the publications/reports issued by ACMAD, 6 publications/reports were issued addressing the activity A.2. One of the important publications issued by ACMAD were the Bulletins on Meningitis which were produced in the 2017 dry season (Item 19, Table 2). The climate-health working group in Niger then started producing the climate-health bulletins from Niger. The NRC deployee was introduced to ACMAD's on operational seasonal forecasting and generation of a climate service for a period of three and half months. In May 2017, he demonstrated operational capacity to produce technical notes which support monthly climate summary, forecast discussions or briefings. Since September 2017, a monthly technical note and bulletin were produced to provide technical guidance to NMHSs on climate services.

To address the activity A.3 on the training of ACMAD staff by NRC deployments to ensure the production of better quality products by ACMAD, an International Training Workshop on Climate Services (Item 1, Table 1) was organized from 17 to 21 July 2017 in the ACMAD premises in Niamey. As shown under item 14 in Table 2, a final report on this training workshop was issued on 25 October 2017. In addition, a guide for service development planning for implementation of NFCS was issued on 27 March 2018 (item 20 in Table 2).

*B. Enhancement of climate services uptake and use*

For the enhancement of climate services uptake and use, under activity B.1 on the development of training manual (for NMHSs staff on how to use regional products), based on the existing drought monitoring training materials developed by ACMAD for continental level products generation, as shown under item 6 in Table 2, an operational drought monitoring training manual was developed which included drought classification, drought monitoring methods, tools and products applicable in a typical Sahelian African climate for drought monitoring. The training material for the generation of technical note at the national level is also available. As shown in Table 2, a total of 7 publications and reports were issued by ACMAD under the activity B.1. ACMAD is currently not working on the use of regional dynamic climate models. The IGAD Climate Prediction and Applications Center (ICPAC) in East Africa is using these dynamic climate models to

generate forecasts. WMO suggested that the number of recommendations developed at the Global RCOF Review conducted in September 2017 be implemented.

To address the activity B.2 on the improvement of ACMAD website and creation of web-platform for data sharing and products dissemination (GIS based) including development of a more effective communication strategy, a workshop was organized by ACMAD addressing the subject of enhancement of climate services uptake and use (Item 2, Table 1). Regarding the ACMAD website, a new prototype has been developed which provides information on the different subjects such as categories, reports and products so that the user can download them. This new website will be online by middle of August 2018.

Three data rescue experts (one supervisor and 2 technicians) have continued scanning of WMO/DARE microfiches at ACMAD. A status report on Climsoft database application (item Number 18 in Table 2) was prepared highlighting the lack of a module to manage rescued data including scanned images and related data key entry interface.

The database management and web expert continued the development of the data rescue module for Climsoft. The module was successfully tested and is available as a new function in Climsoft for use by NMHSs. In the process toward an integrated hydromet database useful for different institutions, a status report was prepared on database management applications available at ACMAD, AGRHYMET, NBA and the National Meteorological Service of Niger. The hard and software architecture for data management in these institutions were analyzed. An interface (including a Geo Server) to facilitate data exchanges between partner organizations in Niger was designed. As shown under item 7 in Table 2, a design report containing the functions and technical specifications of the interface with database, applications (geoserver with data exchange, maps and graphs services) and web interface (http server) is made available.

### **Outcome 3: Enhanced cooperation in the region for the development and use of climate products and services**

#### *Component 3: Knowledge sharing and capacity development at the regional level*

##### *G. Monitoring and evaluation and Collection of lessons learnt from the project*

In the activity G on monitoring and evaluation and collection of lessons learnt from the project, the ACMAD leadership offered unwavering support (eg., technical guidance and supervision, sharing and training on methods, tools and climate products generation) to the project. In ACMAD, a team of climate experts usually discuss the Continental Technical Note which provides at the end of each month a summary on the weather and climate in Africa for the past one to three months as well as long range forecasts for the coming three months. This Continental Technical Note has been adopted for Niger, Senegal and Burkina Faso.

##### *H. Development of guidelines and training tools*

Under activity H on the development of guidelines and training tools, the important publications issued by ACMAD were the Bulletins on Meningitis which were produced in the 2017 dry season (Item 19, Table 2). The climate-health working group in Niger then

started producing the climate-health bulletins from Niger. ACMAD also issued the technical manuals such as the Drought Monitoring Technical Manual in this project.

*A. Training of Trainers (ToT) of AMCAD staff to facilitate South-South cooperation and knowledge exchange with other countries and regions*

The activity I on the training of trainers (ToT) of AMCAD staff to facilitate South-South cooperation and knowledge exchange with other countries and regions, was addressed by ACMAD by organizing a Regional Training Workshop for trainers on the establishment and implementation of NFCS in the Sahel in February 2018 (Item 3, Table 1). ACMAD also arranged for the diffusion of three publications on the subject of training of trainers (Items 15 to 17, Table 2).

**Outcome 2: Increased resilience through enhanced decision making processes at the national level through integration of climate information into decision making in climate sensitive sectors.**

*Component 2: National level*

The National Directorate for Meteorology in Niger (DMN) is responsible for development of climate services products in Niger. They provide daily weather information and climate predictions. To improve the user-provider coordination needed for the effective delivery of climate services, the official launching of the National Framework for Climate Services was held in Niamey on May 31, 2017, with 127 participants from government institutions, national parliamentarians, cooperation agencies and UN agencies, civil society, the private sector, farmers' organizations etc. Contextual User interface platforms (UiPs) have been defined to begin operational delivery of user-tailored climate services in Niger in the form of expanded *Groupes de Travail Pluridisciplinaires* (GTPs). In Niger, 5 thematic GTPs have been established for each climate sensitive sector (agriculture, disaster risk reduction, water, health, and transportation/infrastructure/energy). Each thematic GTP has identified a lead member to coordinate the task and defined their terms of reference. Three out of five thematic groups have met already and started their work.

DMN organized eighteen workshops/meetings as part of the project from May 2017 to May 2018 (Table 3). DMN also issued 30 publications/reports so far in the project (Table 4).



**Table 3. Workshops/meetings organized by Niger under Project Outcomes and Activities**

No.	Workshop/meeting	Venue/Dates	Project Outcome	Component/Activity
1	Atelier national de lancement officiel des activités du Cadre National des Services Climatologiques au Niger	Niamey, 31 May 2017	2	D.2
2	First Session of the Steering Committee of the National Framework for Climate Services (NFCS) of Niger	Niamey, 18 July 2017	2	D.4
3	2ème réunion des points focaux sectoriels pour la mise en oeuvre du Cadre National des Services Climatologiques au Niger	19 September 2017	2	D.4
4	Premier réunion du groupe thématique climat-santé	4 December 2017	2	F.1
5	Deuxieme réunion du groupe thématique climat-santé	27 December 2017	2	F.1
6	Atelier de validation de l'étude sur le développement d'une stratégie de communication des services climatiques	16 January 2018	2	C.5
7	Troisieme réunion du groupe thématique climat-santé	17 January 2018	2	F.1
8	Atelier d'information et de sensibilisation des producteurs maraicheres sur les services climatiques dans le cadre du developpement d'un systeme d'alerte precoce au site maraichers de Niamey commune V, communes rurales de Birni NGaouré et Bonkougou	16-18 February 2018	2	F.1
9	Quatrième réunion du groupe thématique climat-santé	21 February 2018	2	F.1
10	Forums regionaux de mobilisation des acteurs du le Cadre National pour les Services Climatologiques (CNSC) du Niger	Dosso, 27 February 2018 Maradi 1 March 2018	2	D.2
11	Atelier d'information sur les services climatiques à l'intention des animateurs des radios communautaires	7 March 2018	2	C.5

No.	Workshop/meeting	Venue/Dates	Project Outcome	Component/Activity
12	Seminaires itinerants sur le temps, le climat et l'agriculture, destines aux producteurs ruraux des localites de Torodi, Namaro, Tessa et Koygolo	13-19 March 2018	2	F.2
13	Atelier de formation des relais maraichers pour la diffusion des informations agroclimatiques au niveau des communes de Bonkougou, Birni NGaoure et Niamey V	4-6 April 2018	2	F.2
14	Atelier national de sensibilisation sur l'importance de l'information agrométéorologique à l'intention des vulgarisateurs de l'agriculture	6 April 2018	2	C.4
15	Reunion de Task Force Services Climatiques au Niger	11 April 2018	2	F.1
16	Cinquième réunion du groupe thématique climat-santé	11 April 2018	2	F.1
17	Forum national sur la restitution des résultats des prévisions agro-hydro-climatiques saisonnières 2018 en Afrique Soudano-sahélienne	10 May 2018	2	F.1
18	Sixième réunion du groupe thématique climat-santé	23 May 2018	2	F.1

**Table 4. Publications/reports issued by Niger under Project Outcomes and Activities**

No.	Publication/report	Date published	Project Outcome	Component/Activity
1	Plan de mise en oeuvre du cadre national pour les services climatologiques du Niger	January 2016	2	
2	Arrete portant creation, missions, organisation et fonctionnement du Cadre National des Services Climatologiques au Niger	16 May 2017	2	D.2
3	Rapport de l'Atelier National de lancement officiel des activités du Cadre National des Services Climatologiques au Niger	31 May 2017	2	D.2
4	Rapport de synthese de la formation de quatre chefs CSI et sept agents de case de sante de la commune de Bonkougou dans le cadre du Developpement d'un systeme d'information et d'alertes precoces de la meningite	April 2018	2	F.1
5	Rapport d'evaluation des capacites nationales pour la reduction des risques de catastrophes au Niger	July and December 2016	2	
6	Rapport technique formation sur CLIDATA Direction de la Meteorologie Nationale, Niamey	December 2017	2	F.1
7	Rapport financier partiel pour le period du mai au novembre 2017	12 December 2017	2	
8	Rapport de la 2ème réunion des points focaux sectoriels pour la mise en oeuvre du Cadre National des Services Climatologiques au Niger		2	F.1
9	Rapport de synthèse de la premier réunion du groupe thématique climat-santé	February 2017	2	F.1
10	Rapport de synthèse de la deuxieme réunion du groupe thématique climat-santé	27 December 2017	2	F.1

No.	Publication/report	Date published	Project Outcome	Component/Activity
11	Rapport de l'Atelier de validation de l'étude sur le développement d'une stratégie de communication des services climatiques	12 January 2018	2	F.3
12	Rapport de synthèse de la troisième réunion du groupe thématique climat-santé	30 January 2018	2	F.1
13	Rapport de synthèse de la quatrième réunion du groupe thématique climat-santé	15 February 2018	2	F.1
14	Termes de référence de la Task Force sur les Services Climatiques au Niger	28 February 2018	2	F.1
15	Assessment of Observing Capabilities of Niger	January 2018	2	E.1
16	Compte Rendu Atelier d'information et de sensibilisation des producteurs maraichers sur les services climatiques dans le cadre du développement d'un système d'alerte précoce au site maraichers de Niamey commune V, communes rurales de Birni NGaouré et Bonkougou	22 February 2018	2	F.2
17	Rapport Forums régionaux de mobilisation des acteurs du le Cadre National pour les Services Climatiques (CNSC) du Niger	March 2018	2	D.2
18	Rapport de l'Atelier d'information sur les services climatiques à l'intention des animateurs des radios communautaires	April 2018	2	C.5
19	Compte Rendu Seminaires itinérants sur le temps, le climat et l'agriculture, destinés aux producteurs ruraux des localités de Torodi, Namaro, Tessa et Koygolo	22 March 2018	2	F.2
20	Rapport financier partiel pour la période de novembre 2017 au 28 mars 2018	30 March 2018	2	

No.	Publication/report	Date published	Project Outcome	Component/Activity
21	Compte Rendu Atelier de formation des relais maraichers pour la diffusion des informations agroclimatiques au niveau des communes de Bonkougou, Birni NGaoure et Niamey V	9 April 2018	2	F.3
22	Rapport de synthèse de la cinquieme réunion du groupe thématique climat-santé	12 April 2018	2	F.1
23	Calendrier révisé des activités de la composante nationale Niger du projet «Des services climatologiques pour une résilience accrue dans le Sahel»	July 2017	2	
24	Rapport du Forum national sur la restitution des résultats des prévisions agro-hydro-climatiques saisonnières 2018 en Afrique Soudano-sahélienne.	6 June 2018	2	F.1
25	Rapport de synthèse de la sixieme réunion du groupe thématique climat-santé	May 2018	2	F.1
26	Synthese sur la mise en œuvre d'un systeme d'alerte precoce par SMS des services climatiques pour les producteurs maraichers des communes rurales de Bonkougou, Birni NGaoure et Niamey 5 au Niger	April 2018	2	F.2
27	Bulletin de veille climat-santé au Niger	Dec 2017; No.1 (Jan 2018); No.2 (Fev 2018); No.3 (1-15 Fev 2018).	2	F.1
28	Bulletin climat ressources en eau.	19 March 2018	2	F.1
29	Rapport de l'Atelier national de sensibilisation sur l'importance de l'information agrométéorologique à l'intention des vulgarisateurs de l'agriculture	6 April 2018	2	C.4

No.	Publication/report	Date published	Project Outcome	Component/Activity
30	Bulletin speciale previsions saisonnières et services climatiques pour les producteurs ruraux	Vol.1/Issue 1; May 2018	2	F.1

The National Agency for Civil Aviation and Meteorology of Senegal (ANACIM) is the main provider of meteorological data information and services in Senegal. The institution is responsible for the observation and monitoring of weather and climate variables, data archiving, production of weather and climate products at different scales and research and development within the field. The National Action Plan for Climate Services developed as part of the NFCS of Senegal was endorsed in April 2016 in Dakar, before the country's national authorities and government representatives from across all of the country's climate-sensitive sectors. Senegal's National Action Plan on Climate Services has been developed through a process of consultation and stakeholder engagement, ensuring participation of all national stakeholders with a role in the national chain for climate services as well as alignment with national adaptation priorities and policies. In particular, there is a focus on climate services to aid the following five priority areas of action of the Global Framework for Climate Services: Agriculture and Food Security; Disaster Risk Reduction; Water Resources Management; Health; and Energy. National stakeholders in Senegal identified an additional climate-sensitive sector of Tourism which has been added as a priority user sector for climate services delivery. The Senegal action plan was endorsed by the government on 19 May 2016. Two end-users platforms have been established: the National Climate Outlook Forum (NCOF) and the Multidisciplinary Working Group (GTP) enlarged. The NCOF brought together sectoral representatives to discuss the annual seasonal forecast for the country and their implications at the sectoral level in order to make appropriate recommendations. The GTP is a Multidisciplinary Working Group on the monitoring of the agricultural season for early warning purposes. It has been enlarged to the health sector, journalists and communities. Two additional GTP on health and DRR were established.

ANACIM organized six workshops/meetings from May 2017 to May 2018 (Table 5). ANACIM also issued 30 publications/reports so far in the project (Table 6).

**Table 5. Workshops/meetings organized by Senegal under Project Outcomes and Activities**

No.	Workshop/meeting	Venue/Dates	Project Outcome	Component/Activity
1	Atelier de diffusion et de partage de la prévision saisonnière des précipitations au Sénégal	15 June 2017	2	F.1
2	Atelier de validation de la stratégie de communication pour le cadre national de services climatiques (CNSC)	6 February 2018	2	C.5
3	L'atelier de renforcement de capacités des journalistes communicants pour une meilleure diffusion de l'information climatique au Sénégal	8 and 9 February 2018	2	C.5
4	Première réunion du comité scientifique (CST) du Cadre National des Services Climatique (CNSC)	14 May 2018	2	F.2
5	Deuxième réunion du comité scientifique (CST) du Cadre National des Services Climatique (CNSC)	29 May 2018	2	F.2
6	L'Atelier national de validation du plan stratégique de la météorologie	1 June 2018	2	D.4

**Table 6. Publications/reports issued by Senegal under Project Outcomes and Activities**

No.	Publication/report	Date published	Project Outcome	Component/Activity
1	Plan d'actions du Sénégal (2016-2020) pour la mise en place du Cadre National pour les Services Climatologiques (CNSC)	Mai 2016	2	D.3
2	Baseline Capacities for the Co-Production, Communication and Use of Climate Services at National Level in Senegal.		2	C.2
3	Copy de Analyse Synthétique enquêtes Sénégal			
4	Rapport de l'Atelier de diffusion et de partage de la prévision saisonnière des précipitation au Sénégal.	Juin 2017	2	F.1
5	Compte rendu de l'Atelier de formation de NOAA pour le Projet USAID Sahel: CPC Climate Monitoring Tools (CMT) et QGIS	30 juillet 2017	2	C.3

No.	Publication/report	Date published	Project Outcome	Component/Activity
6	Stratégie de communication pour le cadre national de services climatiques (CNSC)	Février 2018	2	C.5
7	Statement of Income and Expenditure (October 2017)			
8	Assessment of Observing Capabilities of Senegal	January 2018	2	E.1
9	Portail web pour les services climatiques: Cahier des charges	February 2018	2	C.4
10	Rapport de l'atelier de renforcement de capacités des journalistes communicants pour une meilleure diffusion de l'information climatique au Sénégal	Février 2018	2	C.5
11	Copy of Budget (April 2018).			
12	Rapport de formation des administrateurs (Awa Toure Diop) sur CLIDATA (3-13 April 2018) in Ostrava, Czech Republic		2	C.3
13	Compte Rendu de la première réunion du comité scientifique (CST) du Cadre National des Services Climatique (CNSC)	14 May 2018	2	F.2
14	Compte Rendu de la deuxième réunion du comité scientifique (CST) du Cadre National des Services Climatique (CNSC)	29 May 2018	2	F.2
15	Compte rendu de la formation (Mouhamadou Moustapha Kamara) sur le logiciel Eccode d'ECMWF.		2	C.3
16	Draft Preliminary Recommendations with MBour.			
17	First Project Progress Report			
18	Second Project Progress Report			

The National Meteorological Agency of Burkina Faso (ANAM) initially drafted the National Action Plan on Climate Services of Burkina Faso as it is the main provider of climate services in Burkina Faso. ANAM provides daily information on the minimum and maximum temperature of the current and next day, the quantity of rainfall (mm) and the state of visibility in different geographical regions. In addition, they aid in development of forecasting bulletins for the agricultural sector. The GTPs for the climate services are coordinated by the ANAM and consists of technicians from DGM, the General Directorate for Prediction of Rural Economy (DGPER), the General Directorate on Water Resources (DGRE), and the Famine Early Warning System Network (FEWS-net).

ANAM organized one workshop ie., the Final Validation Workshop of Burkina Faso National Action Plan on Climate Services on 14 and 15 April 2016. ANAM issued 7 publications/reports (Table 7).



**Table 7. Publications/reports issued by Burkina Faso under Project Outcomes and Activities**

No.	Publication/report	Date published	Project Outcome	Component/Activity
1	National Framework on Climate Services of Burkina Faso (15 April 2016)	15 April 2016	2	D.3
2	Report on ANAM participation (Dr. Ulrich Jacques Diasso and Dr. Michel P. Nikiema) in the NCAR training on the use of WRF model in data assimilation, Washington and Denver, USA (8 to 13 July 2017)	July 2017	2	C.3
3	Receipts for Summer WRF Basic and DA Tutorials for Ulrich Jacques Diasso and Pinghouinnde Michel Nikiema (17 to 26 July 2017)	July 2017	2	C.3
4	Financial Statement on the Training on Modelling and Assimilation of the Numerical Weather Forecasts in USA (8 to 31 July 2017).	August 2017	2	C.3
5	Progress Report, Burkina Faso	October 2017	2	
6	Statement of Income and Expenditure	4 January 2018	2	
7	Emerging Priorities for Climate Services in Burkina Faso (Synthesis Report submitted to USAID).		2	

A brief description of the different activities carried out in Niger, Senegal and Burkina Faso under Outcome 2 is presented below:

### *C. Capacity Development targeting NMHSs in selected countries to better serve users*

As per activity C.1 on the deployment of mentor experts at NMHSs by NRC, since the beginning of the project in Niger, the expert recruited and deployed by the NRC was in place. The expert supported the implementation of the project as well as the NFCS in general. The expert is hosted by UNDP in Niamey but works closely with the Met Service and all key stakeholders involved in the NFCS. In Senegal, the deployment of the expert from NRC was effective since January 2017 and the expert supported and facilitated the organization of the first NCOF in Senegal and also supported the GTP on the monitoring of the agricultural season for early warning purposes.

To address the activity C.2 on the establishment of baselines based on capacity assessments at national level, a capacity assessment has been carried out evaluating the climate services in Niger based on 20 indicators. In total, the twenty indicators were evaluated and informed to provide the state of the country's capacity for co-production, communication and use of climate services. In Senegal, based on the capacity assessment undertaken at national level, baselines have been established and as shown under item 2 in Table 6, a report on the Baseline Capacities for the Co-Production, Communication and Use of Climate Services at National Level in Senegal was published.

A good progress was made in addressing the activity C.3 on the capacity development including training to enhance NMHS capacity in data management and rescue; climate diagnostics, monitoring and forecasting; product development including calibrating and tailoring. The training took place from 17 to 21 July 2017 in Niamey at ACMAD and was mainly focused on Geographical Information Systems (GIS), particularly on Quantum GIS (QGIS) open source software, as well as on the Climate Monitoring Tool (CMT) tool developed by NOAA, for monitoring drought (flood). It brought together some twenty-two meteorological service participants from Burkina Faso, Niger and Senegal as well as those from ACMAD, AGRHYMET and ABN regional centers. The training focused on long-range forecasting, downscaling, data management and adaptation to climate applications in different sectors, e.g., climate applications to the health sector. The participants appreciated the introduction to QGIS and CMT training, but suggested that in the future, such trainings should be organized for at least two weeks to give participants enough time for better training. This training led by NOAA experts, allowed the Senegal met service to put in place the necessary foundations for the generation of climate products in Senegal. Indeed, the CMT tool has been calibrated for Senegal and was used to offer services in the field of agriculture, flood risk management, etc. As shown under item 5, Table 6, in Senegal a report on the training workshop covering the CMT and QGIS tools was published. Also a report of the training of Mr Mohamadou Moustapha Kamara of Senegal Met Service on the software Eccode of ECMWF was published (item 15, Table 6). Also in Senegal, as shown under item 12 in Table 6, a report on the training of directors (Awa Toure Diop) on CLIDATA (3-13 April 2018) in Ostrava, Czech Republic was published. Two staff members ie., Dr. Ulrich Jacques Diasso and Dr. Michel P. Nikiema from the National Meteorological Agency of Burkina Faso (ANAM) attended a one-week training related to Gridded Spectral Interpolation methods at NOAA- Maryland and a two-week training on the WRF model and on the module of WRF Data Assimilation at NCAR-Boulder. Under the activity C.3, the procurement of a High Performance Cluster (HPC) for ANAM, Burkina Faso is being completed through WMO and the specifications document has benefitted from the technical advice of experts from the German and Japanese NMHSs as well as from WMO.

To address the activity C.4 on the improvement of data management, rescue and information dissemination in pilot countries, in Niger, a National Awareness Workshop on the importance of agrometeorological information for agricultural extension workers was organized as can be seen under item 14 in Table 3 and a report on the workshop was published (item 29, Table 4). In Senegal, a national communication strategy has been developed: ToRs have been elaborated, recruitment process finalized, and the first and second drafts are made available. The development identified the users, communication channels and messengers for services provided by the NFCS.

Under activity C.5 entitled Media Training, in Niger a national consultant was recruited who worked closely with a meteorological officer and the expert from the GFCS regional coordination to conduct this study. After the documentary review, the consultant met some communication services, the focal points of the priority sectors and several other partners to exchange with them, take into account their points of view and suggestions. This communication strategy, consistent with the regional one developed by ACMAD, was validated on Tuesday 16th January 2018 during a workshop that brought together the main parties of the NFCS (Item 6, Table 3). In Niger, a Climate Services information Workshop for the community radio facilitators (Item 11, Table 3) was organized, the

report on which was published (Item 18, Table 4). In Senegal also, two workshops: a Communication strategy Validation Workshop for the NFCS (Item 2, Table 5) and a Capacity building workshop of communicating journalists for better dissemination of climate information in Senegal (Item 3, Table 5) were organized. Reports on these two workshops held in Senegal were published (Items 6 and 10, Table 6).

#### *D. Institutional capacity enhancement*

For the activity D.1 on mapping of key stakeholders and institutions (providers and users), an EXCEL matrix was developed and shared with the main actors to provide information on their interventions in the field of climate services for the period 2016 - 2020. A total of 17 stakeholders provided information and returned the table of mapping which made it possible to identify a total of 37 ongoing projects in the country related to climate services. Among the GFCS's five priority sectors, those receiving the most investment from partners are: Agriculture (31%), Disaster Risk Reduction (DRR-29%), Water Resources (20%), Health (12%) and Energy (8%). In Senegal, the mapping has been completed and key stakeholders have been identified in the sectors covered by the national action plan.

Under the activity D.2 on the establishment of partnerships at national level to support implementation, a decree creating five thematic groups of the GTI-C (depending on the 5 priority areas of the GFCS) in the NFCS in Niger was signed on 8 May 2017. The official launching of the NFCS was held in Niamey on 31 May, 2017 (Item 1, Table 3), with 127 participants from government institutions, national parliamentarians, cooperation agencies and UN agencies, civil society, the private sector, farmers' organizations, etc. A report on this workshop was published and distributed (Item 3, Table 4). An excellent progress was made by the Climate-Health thematic group, led by the Epidemics Surveillance and Response Department, as the group developed the bulletin on meningitis in relation to the weather conditions and six issues of this bulletin were already widely disseminated to the stakeholders. Two forums were organized in Dosso on 27 February 2018 and in Maradi on 1 March 2018 (Item 10, Table 3) for the mobilization of the actors in the NFCS in Niger and a report on these forums was published (Item 17, Table 4). In Senegal, two end-users platforms have been established: the National Climate Outlook Forum (NCOF) and the Multidisciplinary Working Group (GTP). The NCOF brought together sectoral representatives to discuss the annual seasonal forecast for the country and their implications at the sectoral level in order to make appropriate recommendations. The GTP was established bringing together the Met service, ministries in charge of Hydrology, Agriculture, Food security, Markets, etc., Fifteen GTP meetings were held during the rainy season at the frequency of a meeting every 10 days, between June and October and every meeting was followed by the production of a bulletin largely shared with national and local stakeholders, through the Met service network (see link: <http://www.anacim.sn/meteorologie/produits-du-gtp/>).

The activity D.3 on the development/finalization of national action plans in pilot countries, was completed through the establishment of the Action Plan for the implementation of the NFCS in Burkina Faso, Niger and Senegal. A report on this national action plan in Senegal was published and distributed (Item 1, Table 6).

Under the activity D.4 entitled institutional capacity development, including through the establishment and operationalization of frameworks for climate services at national level,

in Niger, the first meeting of the Steering Committee of the NFCS in Niger took place Tuesday, July 18, 2017 (Item 2, Table 3). The second meeting of the sectoral focal points to implement the NFCS took place on 19 September 2017 (Item 3, Table 3). In Senegal, the formulation of the 5-year Meteorological service strategic plan has been completed and a national workshop for the validation of this strategic plan was organized on 1 June 2018 (Item 6, Table 5).

#### *E. Rehabilitation of observation networks in pilot countries*

To address the activity E.1 on the needs assessment for observation networks enhancement to define the design, number of stations and location, a WMO / Project Information System Observation and Observer Mission, WIGOS Project Office department visited Niger from 2 to 04 May 2017 to support the DMN in this evaluation. At the end of this mission, an inventory of Niger's observation network was made and action proposals were formulated for an effective rehabilitation of this network. A report on the assessment of the observing capabilities in Niger was issued in January 2018 (Item 15, Table 4). Similarly, a WMO mission was organized to make an assessment of the capabilities of the observation network in Senegal. The assessment of the observing system and network identified the gaps and formulated recommendations for further development of the observing capabilities to better deliver climate and related services, meeting the needs and requirements of users. A report on the observing capabilities in Senegal was issued in January 2018 (Item 8, Table 6). A training event on OSCAR/Surface was also delivered to the local staff, for checking/updating and inserting WIGOS metadata.

Under the activity E.2 on the rehabilitation of observation networks in pilot countries (and pilot testing of 3D printing stations designed and tested by USAID and NOAA), discussion was held between Senegal and NCAR, NOAA. One 3D AWS was sent to Senegal.

#### *F. User interface and service delivery*

The activity F.1 entitled establishment of users-providers engagement mechanisms through National Climate Outlook Forums (NCOFs) and National Climate Forums (NCFs) was effectively addressed in Niger through the organization of nine workshops/meetings (Table 3). Working sessions between the focal points of the key priority areas are normally held as well as meetings within the different working groups. The user interface and service delivery was effectively addressed by issuing 14 publications/reports in Niger (Table 4). As mentioned earlier, the Climate-Health thematic group, led by the Epidemics Surveillance and Response Department, met several times and issued six issues of the bulletin on meningitis in relation to the weather conditions (Item 27, Table 4). Senegal held its first National Climate Outlook Forum which brought together around 60 sectoral representatives to discuss the 2017 seasonal forecast for the country (Item 1, Table 5) and a report on the workshop was published (Item 4, Table 6). The GTP in Senegal met every 10 days bringing together the Met service, ministries in charge of Hydrology, Agriculture, Food security, Markets, etc. During the meeting, presentations are made on the status of the raining season and 10 days forecasts are provided. The GTP has been enlarged to the health sector, journalists and communities. Recommendations have been made to set up two additional GTP on health and DRR.

In the activity F.2 on the integration of climate services into decision making processes in climate-sensitive sectors, good progress is made in Niger through the organization of

roving seminars on agriculture to the rural communities in Torodi, Namaro, Tessa et Koygolo (Item 12, Table 3) and one training workshop on climate services and early warning systems to the communities in Bonkougou, Birni NGaoure et Niamey V (Item 1, Table 3). Reports were prepared on these roving seminars (Item 19, Table 4) and the training workshop (Item 16, Table 4). A synthesis report on the issue of early warning systems through SMSs to the communities in Bonkougou, Birni NGaoure et Niamey V was issued in April 2018 (Item 26, Table 4). In Senegal, the training and consolidation of Scientific and Technical Committee for climate products (for the sectors) and for sectorial applications as well as training for sectors on climate services was implemented. Two meetings of the Scientific Committee of NFCS in Senegal were held in May 2018 (Items 4 and 5 in Table 5) and the reports on these two meetings were published (Items 13 and 14 in Table 6).

In the activity F.3 on the pilot projects to demonstrate the value of climate services in climate-sensitive sectors, in Niger a mission of WMO was organized at the end of January 2018 to define the different contours of this important activity and thus allow it to be operationalized immediately. It was agreed that it will focus first on the agriculture and/or health sector and on a few pilot villages so as to carry it out more effectively with close monitoring, a mechanism for managing lessons learned for ability to rapidly expand to other areas when results are conclusive. In Niger, a report of the workshop on the validation of the study on the development of communication strategies in climate services was issued in January 2018 (Item 11, Table 4). Also, a report of the workshop on the diffusion of agroclimatic information to the communities in Bonkougou, Birni NGaoure and Niamey V was issued in April 2018 (Item 21, Table 4).

### ***3.1.2 Major factors influencing the achievement of the project objectives***

As can be seen from the section 3.1.1 above on the way in which the different project activities have been addressed, one of the major factors influencing the achievement of the project objectives is the efficient role played by DMN in Niger and ANACIM in Senegal in actively involving the different departments and agencies in their countries in the NFCS and the production of different bulletins to inform the various communities. ACMAD also played an active role as a regional actor in assisting DMN, ANACIM and ANAM.

### ***3.1.3 Challenges faced by the project in achieving the expected outcomes and how they are addressed***

Initially, DMN, ANACIM and ANAM had to convince the different technical partners/ministry partners (agriculture, livestock, water, civil protection, disaster management, health, energy, transport, infrastructure) to join them in co-producing climate services. Another challenge is the large-scale communication of climate services through the active involvement of public press, radio and TV. Finally, the vulnerable communities had to be informed about the importance of using climate services and products while making their operational decisions. DMN and ANACIM effectively addressed these challenges through the organization of various workshops/meetings and the production and diffusion of different publications and reports.

### ***3.1.4 Extent of project contribution to improving behaviour change in terms of uptake and use of climate services for decision making and increased resilience***

As the project progressed in Niger, participation of experts from different departments in the 5 thematic GTPs which were established for the different climate sensitive sectors ie., agriculture,

disaster risk reduction, water, health, transportation/infrastructure/energy certainly improved the views of the different departments for the uptake and use of climate services for decision making in different sectors and for improving the resilience. Similarly, organization of regular meetings of the GTP in Senegal and Burkina Faso also promoted improved decision making and increased resilience.

### **3.2 Relevance and strategic fit**

#### ***3.2.1 Continued relevance and responsiveness of the project in addressing capacity gaps and institutional limitations of climate services in the region and at country levels***

As described under the section 3.1 above, under each of the outcomes, a number of activities were presented for implementation at the regional and national levels. The responses of ACMAD, DMN and ANACIM in implementing these important activities were quite relevant and the project addressed effectively the capacity gaps and institutional limitations provide improved climate services at the regional and national levels.

#### ***3.2.2 Flexibility and adaptation of project strategies, tools and approaches the regional and national contexts to ensure appropriateness and respond to the changing situations and varying capacities in the countries***

ACMAD, DMN and ANACIM were quite flexible in adapting the project strategies and developed useful tools and approaches to respond to the important priorities at the regional and national levels respectively. The first workshop organized by ACMAD (Item 1, Table 1) addressed the subject of capacity development targeting ACMAD to enhance its role as a WMO RCC to better serve NMHSs in the region and the second workshop (Item 2, Table 1) addressed the subject of enhancement of climate services uptake and use. The third workshop organized by ACMAD (Item 3, Table 1) addressed the subject of knowledge sharing and capacity development at the regional level. The 20 publications/reports that were issued by ACMAD (Table 2) helped the countries to effectively respond to the priorities in the countries and provide good climate services.

DMN and ANACIM also effectively addressed the challenges in the provision of improved climate services through the organization of various workshops/meetings (Tables 3 and 5) and the production and diffusion of different publications and reports (Tables 4 and 6). The organization of the regular meetings of GTP in Niger, Senegal and Burkina Faso promoted improved decision making and increased resilience.

#### ***3.2.3 Strategic nature of the project and its dependence on WMO comparative advantages***

The project strategies were addressed through some important meetings and through the development of the appropriate National Action Plans in the three countries. The project kicked off with a two-day meeting in August 2016 in Dakar, Senegal bringing together representatives from Niger, Senegal and ACMAD, and experts from WMO and the National Oceanic and Atmospheric Administration (NOAA). The group discussed the way forward for the project to develop the capabilities of ACMAD as a Regional Climate Center (RCC) to better support the NMHSs in the Sahel, and enhance capacities in Niger, Senegal and Burkina Faso to maximize the use of, and benefits from, weather and climate products delivered by ACMAD and other centres.

The National Action Plans in the three countries were developed through a consultative process and endorsed by governments and partners. Niger had its action plan endorsed by the government on 22-23 December 2015 and Burkina and Senegal action plans were endorsed in 11-12 April and 19 May 2016, respectively.

The project aligns with the following WMO priorities: Disaster Risk Reduction, Global Framework for Climate Services, WMO Integrated Global Observing System, and Capacity Development. The guidance to ACMAD, DMN and ANACIM from WMO staff from the GFCS office, Agricultural Meteorology, World Climate Applications and Services Division, World Climate Data Management Programme, Global Observing Systems, Public Weather Services and the WMO Regional Office in West Africa ensured that the project implementing agencies received appropriate advice from WMO.

### ***3.2.4 Appropriateness of project strategies and interventions for the promotion of increased resilience in the Sahel region***

The countries in the Sahelian region are extremely vulnerable to droughts, floods and other extreme events caused by natural climate variability. They face even greater risks in the future as human-induced climate change increasingly alters the weather and climate patterns that societies have come to depend on. The provision of more and better climate services will allow disaster risk managers to prepare more effectively for droughts and heavy precipitation; empower farmers to fine-tune their farming and marketing strategies based on seasonal climate forecasts; assist public health services to target vaccine and other prevention campaigns to limit climate-related disease outbreaks such as malaria and meningitis; and help improve the management of water resources.

In November 2015, the GFCS Office together with NRC performed an assessment of the capacities for effective climate services in the Sahel, looking both at regional capacities within ACMAD and at national level within National Meteorological and Hydrological Services (NMHSs).

The gaps and needs in national and regional capacities for effective climate services in the Sahel were identified and several capacity development actions. This led to the development of the project document with several activities addressing the promotion of effective climate services in the region with appropriate strategies to promote the resilience in the Sahel region. The project implementation over the past two years in the three countries showed improved resilience in some of the regions where the communities were effectively involved with their participation in the training workshops and with diffusion of improved products and information.

## **3.3 Validity of intervention design**

### ***3.3.1 Validity and consistence of the design and the logical framework of the project and adjustments during the implementation of the project***

The project logical framework which was presented in the project document prepared in September 2016 is quite effective as the chain of results, indicators, means of verification and assumptions were addressed for each of the three expected outcomes of the project. As the project progressed, a proposal was made at the end of July 2017 to the USAID to change the completion date of the project from December 2017 to May 2018. USAID agreed with this proposal. In April 2018, a second proposal was made to change the completion date of the

project from May 2018 to August 2018. USAID agreed with this second proposal and the project is currently continuing till the end of August 2018.

### ***3.3.2 Identification of risks and key assumptions in the project and mitigation strategy in the project***

In the project document, a number of risks were identified which include political/institutional risks, financial/resources risks, human resources/capacity risks, and social/environmental risks. The risk impacts and probability of occurrence were also presented. One of the major risks is the lack of appropriate number of technical staff in ACMAD, DMN, ANACIM and ANAM. Possible mitigation measures were presented for each of the risks identified so that ACMAD, DMN, ANACIM and ANAM can take appropriate actions as and when needed.

### ***3.3.3 Consultation process and identification of problems and strategies during the project design stage***

During the project design stage, a two-day meeting was held in August 2016 in Dakar, Senegal bringing together representatives from Niger, Senegal and ACMAD, and experts from WMO and the National Oceanic and Atmospheric Administration (NOAA). The group discussed the way forward for the project to develop the capabilities of ACMAD as a Regional Climate Center (RCC) to better support the NMHSs in the Sahel, and enhance capacities in Niger, Senegal and Burkina Faso to maximize the use of, and benefits from, weather and climate products delivered by ACMAD and other centres. This led to the development of the project document with several activities addressing the promotion of effective climate services in the region with appropriate strategies to promote the resilience in the Sahel region

### ***3.3.5 Adjustments if any on the project design during the course of project implementation***

No adjustments were made in the project design during the course of the project implementation.

## **3.4. Gender Mainstreaming:**

In West Africa, gender balance is an important issue since the number of working women in the technical areas of different ministries and agencies is far less compared to men. One of the main reasons for this matter is that the net school attendance rate for girls is less eg., in Niger it is only about 50% during 2011-2014. The literacy rate for girls in Niger is only 15% which is far below sub-Saharan Africa's 2015 average of 69%.

There are many obstacles and risk factors in gender dimension which include the following: strong individual and institutional resistance to gender initiatives; deep-rooted cultural issues and traditions; general under-representation of women in the public sphere; illiteracy, etc.

To assess the gender balance in the project, the number of men and women who participated in the different workshops/meetings organized by ACMAD, DMN and ANACIM are shown in the Tables 7, 8 and 9 below.



**Table 7. Participants in Workshops/meetings organized by ACMAD**

No.	Workshop/meeting	Venue/Dates	Total number of participants	Number of Men	Number of Women
1	GFCS International Climate Training Workshop	Niamey, 17-21 July 2017	29	25	4
2	Reunion Regionale de Concertation Technique sur la Securite Alimentaire et Alerte Precoce aux Pays du Sahel et de l'Afrique de l'Ouest	Bamako, 27-29 November 2017	Managed by CILSS		
3	Atelier Régional de Formation des Formateurs sur l'établissement et la mise en oeuvre des Cadres Nationaux pour les Services Climatiques au Sahel	Niamey, 13-15 February 2018	19	17	2

The data in the Table 7 above show that the number of women who participated in the workshops organized by ACMAD is very low. One of the reasons as explained in the beginning of this section is that the number of women working in the technical departments in Niger, Senegal and Burkina Faso is low. This is the reason why in Tables 8 and 9 below, which present the data for the participants in different workshops organized in Niger and Senegal, the number of women who participated in these workshops is very low.

**Table 8. Participants in Workshops/meetings organized by Niger**

No.	Workshop/meeting	Venue/Dates	Total number of participants	Number of Men	Number of Women
1	Atelier national de lancement officiel des activités du Cadre National des Services Climatologiques au Niger	Niamey, 31 May 2017	135	113	22
2	First Session of the Steering Committee of the National Framework for Climate Services (NFCS) of Niger	Niamey, 18 July 2017	20	16	4
3	2ème réunion des points focaux sectoriels pour la mise en oeuvre du Cadre National des Services Climatiques au Niger	19 September 2017	18	15	3

No.	Workshop/meeting	Venue/Dates	Total number of participants	Number of Men	Number of Women
4	Premier réunion du groupe thématique climat-santé	4 December 2017	9	8	1
5	Deuxieme réunion du groupe thématique climat-santé	27 December 2017			
6	Atelier de validation de l'étude sur le développement d'une stratégie de communication des services climatiques	16 January 2018	14	12	2
7	Troisieme réunion du groupe thématique climat-santé	17 January 2018	9	7	2
8	Atelier d'information et de sensibilisation des producteurs maraicheres sur les services climatiques dans le cadre du developpement d'un systeme d'alerte precoce au site maraichers de Niamey commune V, communes rurales de Birni NGaouré et Bonkougou	16-18 February 2018	98	65	33
9	Quatrième réunion du groupe thématique climat-santé	21 February 2018	8	5	3
10	Forums regionaux de mobilisation des acteurs du le Cadre National pour les Services Climatiques (CNSC) du Niger	Dosso, 27 February 2018 Maradi 1 March 2018	160	135	25
11	Atelier d'information sur les services climatiques à l'intention des animateurs des radios communautaires	7 March 2018	54	45	9
12	Seminaires itinerants sur le temps, le climat et l'agriculture, destines aux producteurs ruraux des localites de Torodi, Namaro, Tessa et Koygolo	13-19 March 2018	162	123	39
13	Atelier de formation des relais maraichers pour la diffusion des informations agroclimatiques au niveau des communes de Bonkougou, Birni NGaoure et Niamey V	4-6 April 2018	94	49	45

No.	Workshop/meeting	Venue/Dates	Total number of participants	Number of Men	Number of Women
14	Atelier national de sensibilisation sur l'importance de l'information agrométéorologique à l'intention des vulgarisateurs de l'agriculture	6 April 2018	30	27	3
15	Reunion de Task Force Services Climatiques au Niger	11 April 2018	19	11	8
16	Cinquième réunion du groupe thématique climat-santé	11 April 2018	9	8	1
17	Forum national sur la restitution des résultats des prévisions agro-hydro-climatiques saisonnières 2018 en Afrique Soudano-sahélienne	10 May 2018	201	162	39
18	Sixième réunion du groupe thématique climat-santé	23 May 2018	8	7	1

**Table 9. Participants in Workshops/meetings organized by Senegal**

No.	Workshop/meeting	Venue/Dates	Total number of participants	Number of Men	Number of women
1	Atelier de diffusion et de partage de la prévision saisonnière des précipitations au Sénégal	15 June 2017	75	60	15
2	Atelier de validation de la stratégie de communication pour le cadre national de services climatiques (CNCS)	6 February 2018	25	19	6
3	L'atelier de renforcement de capacités des journalistes communicants pour une meilleure diffusion de l'information climatique au Sénégal	8 et 9 February 2018	42	30	12
4	Première réunion du comité scientifique (CST) du Cadre National des Services Climatique (CNCS)	14 May 2018	9	5	2
5	Deuxième réunion du comité scientifique (CST) du Cadre National des Services Climatique (CNCS)	29 May 2018	14	12	2

No.	Workshop/meeting	Venue/Dates	Total number of participants	Number of Men	Number of Women
6	L'Atelier national de validation du plan stratégique de la météorologie	1 June 2018	45	33	12
7	Première réunion du Comité de Pilotage	22 June 2018	19	14	5

As can be seen from the data presented in the three tables above, ACMAD, DMN and ANACIM could not directly address the issue of gender dimensions since the national governments have to take a number of appropriate actions to encourage women to complete higher education and join the different ministries and agencies.

### 3.5 Efficiency of resource use :

A full project document was prepared and submitted to USAID in September 2016. In this document, budget allocation was made for the different activities to be carried out under the three expected outcomes in Niger, Senegal and Burkina Faso, which was approved by USAID on 7 November 2016.

WMO has a project monitoring system in place. Accordingly, DMN submitted two financial reports: the first covering the period May to November 2017; and the second one covering the period November 2017 to 28 March 2018. Both the reports showed the amount of money spent for different activities and showed at the end of each of the reports the funds still available. Similarly, ANACIM submitted a financial report in October 2017. Apparently, the funds allocated were sufficient to undertake the different planned activities in the project.

### 3.6. Sustainability of the intervention

#### ***3.6.1 Conducivity of policy environment in the region and the countries to increasing resilience to climate impacts due to the project's interventions and support on capacity development, knowledge sharing and strengthening of institutions***

For the effective delivery of climate services in Niger, the official launching of the NFCS was held in Niamey on May 31, 2017, with 127 participants from government institutions, national parliamentarians, cooperation agencies and UN agencies, civil society, the private sector, farmers' organizations etc. Contextual User interface platforms (UiPs) have been defined to begin operational delivery of user-tailored climate services in Niger in the form of five GTPs. The activities of these five GTPs helped share the knowledge and strengthen the institutions.

In Senegal, the NFCS was endorsed in April 2016 in Dakar, before the country's national authorities and government representatives from across all of the country's climate-sensitive sectors. Senegal's National Action Plan on Climate Services has been developed through a process of consultation and stakeholder engagement, ensuring participation of all national stakeholders with a role in the national chain for climate services as well as alignment with national adaptation priorities and policies. The Senegal action plan was endorsed by the government on 19 May 2016. GTP activities in Senegal also helped share the knowledge and strengthen the institutions.

### **3.6.2. Available evidence of better management of risks and taking consideration of opportunities made available from climate variability and change**

The publications and reports issued by ACMAD (Table 2), DMN (Table 4), and ANACIM (Table 6) to the different communities did cover the issue of better management of risks.

### **3.6.3. Good practices and tools for promoting the use of climate data and services in policy-making from the project**

Some of the publications and reports from ACMAD (Table 2) show how good practices and tools could help promote the use of climate data and services in policy-making.

### **3.6.4 Evidence of better understanding of user communities and key stakeholders of climate services at the national level**

DMN organized nine workshops/meetings on user interface and service delivery and one roving seminar and one training workshop on the integration of climate services into decision making processes in climate-sensitive sectors in different regions in Niger (Table 3). DMN also issued three publications/reports to demonstrate the value of climate services in climate-sensitive sectors in Niger (Table 4). The flyers issued by DMN provided maps of expected rainfall in different regions in Niger and the advice on the strategies that need to be followed given the seasonal forecast of rainfall.

ANACIM addressed the subject of user interface and service delivery through the organization of three workshops in Senegal (Table 5). The issue of bulletins following the 15 GTP meetings held during the rainy season provided the user communities important weather and climate information for operational decision making.

### **3.6.5 Follow-up actions required to continue the momentum of the project**

The activities under three outcomes in the project were implemented in the three countries for a short period from June 2016 to August 2018. The provision of improved climate services for increased resilience in the Sahel does require more time such as another five years so that the communities in the different regions in the three countries can better manage the risks and cope with the climate-related hazards.

### **3.6.6 Remaining gaps/needs in the project countries and at regional level**

One of the major gaps in the project is the lack of adequate technical staff at the national level in DMN, ANACIM and ANAM and at the regional level in ACMAD. On the generation of the maps developed by ACMAD (Item 8, Table 2), DMN did not take appropriate action since they have limited number of staff. ACMAD needs at least another 7 technical experts to provide better assistance to all the NMHSs in Africa.

Another important gap is regarding effective calibration and maintenance of the meteorological network in Niger. The break in electricity supply in DMN in Niamey is also causing problems with the regular access to Internet.

The meteorological network of ANACIM has only 9 Automatic Weather Stations (AWSs) currently. In Burkina Faso, Senegal and Niger there are other projects which are supporting the observing networks such as CREWS, World Bank, UNDP and others. It is essential to review

the progress in the observation networks in the three countries and ensure that they are adequate for the provision of improved weather and climate information.

ACMAD issued the technical manuals such as the Drought Monitoring Technical Manual in this project, but the Disaster Risk Reduction Committee in the project did not take steps to use the data from Niger to develop the indices described in the manual and post them on their website.

On the technical side, one of major gaps is the lack of use of dynamic climate models both at the national level and also at the regional level in ACMAD.

### **3.7 Effectiveness of management arrangements**

#### ***3.7.1 Quality and frequency of operational work planning and risk management***

Currently the operational work planning for the delivery of the climate services is going well in Niger through the regular meetings of the five GTPs and the issue of bulletins to serve the user communities. Similarly, in Senegal the 15 GTP meetings held during the rainy season provided the user communities important weather and climate information for operational decision making. At the Regional level, ACMAD issued several publications and reports (Table 2) which provided assistance to the national agencies in the analysis of data and development of appropriate products for use by the different communities.

#### ***3.7.2 Factors contributing to the pace of project implementation and lessons learnt to ensure effective project management***

The activity undertaken by the GFCS Office before the start of the project eg., the assessment in November 2015, with the NRC, of the capacities for effective climate services in the Sahel, looking both at regional capacities within ACMAD and at national level within National Meteorological and Hydrological Services (NMHSs) was quite useful in developing the project document. The development of the Project Logical Framework in the project document contributed effectively to the pace of the project implementation.

In order to ensure effective project management, one of the lessons learnt is to encourage the national agencies to take prompt actions in issuing early warning systems and in using appropriate information and communication technology strategies to diffuse the information to the different user communities in real time. Also, it is important for the national agencies to obtain regular feedback from the user communities on the information provided to them.

### **3.8 Capacity building and institutionalisation:**

#### ***3.8.1 Project engagement with the regional and country level partners during project implementation and to sustain project interventions***

Over the project implementation from July 2016 to August 2018, several regional and country level partners were actively engaged through the regular meetings of the GTP and in the different workshops and meetings organized by ACMAD, DMN and ANACIM (Tables 1,3 and 5). These activities helped sustain the project interventions as originally planned.

#### ***3.8.2 Types of capacity building activities have been more and less effective and lessons that can be derived from these experiences***

The most effective capacity building activities in the project were carried out by ACMAD through the organization of workshops/meetings and diffusion of publications and reports. ACMAD organized a GFCS International Climate Training Workshop in July 2017 (Item 1, Table 1) so that ACMAD staff can be better trained to enhance the role of ACMAD as a WMO RCC to better serve NMHSs in the region. Also, ACMAD organized a Regional Workshop on the training of trainers in February 2018 for the establishment of the different cadres in the NFCS in the Sahel. In addition, ACMAD published and diffused three publications on the issue of training of trainers (Items 15 to 17, Table 2).

DMN organized two workshops (Items 2 and 3, Table 3) addressing institutional capacity development through the establishment and operationalization of NFCS to ensure that the entire value chain for the production and application of climate services are addressed in a systematic manner with the active involvement of all stakeholders. DMN also issued three publications on the institutional capacity development (Items 3 and 17, Table 4). ANACIM organized a national workshop on the validation of the strategic plan for meteorology addressed the subject of institutional capacity enhancement (Item 6, Table 5).

The lessons that can be derived from the organization of these capacity building activities carried out by ACMAD, DMN and ANACIM are that they can develop a better understanding of climate services and develop products that can be diffused to the different communities for operational decisions in different sectors.

### ***3.8.3 Likelihood of project outcomes going to be sustainable and the actions needed to increase the likelihood of sustainability***

The three countries in which the project was implemented ie., Niger, Senegal and Burkina Faso are extremely vulnerable to droughts, floods and other extreme events caused by natural climate variability. They face even greater risks in the future as human-induced climate change increasingly alters the weather and climate patterns that societies have come to depend on. The provision of more and better climate services in these three countries will allow disaster risk managers to prepare more effectively for droughts and heavy precipitation; empower farmers to fine-tune their farming and marketing strategies based on seasonal climate forecasts; assist public health services to target vaccine and other prevention campaigns to limit climate-related disease outbreaks such as malaria and meningitis; and help improve the management of water resources. Hence the project outcomes are going to improve the sustainability in these three countries.

In order to increase the likelihood of sustainability, it will be useful to implement a second phase of the project for another five years in these three countries.

### ***3.8.4 Potential good practices, especially regarding models of interventions that can be applied further, shared and replicated***

The potential good practices in the project are the endorsement of the NFCS by the national government authorities; the active involvement of the different partners in the regular meetings of the GTP; the production and diffusion of useful bulletins for different communities; the organization of workshops and meetings for the local communities in different regions in the countries to improve their understanding of the climate services; and the active involvement of the media in diffusing the information to the communities on a regular basis. The case studies and the lessons learnt and the good practices are going to be documented to facilitate their sharing in the coming years.

### ***3.8.5 Potential for upscaling in the region and/or applying the good practices and lessons learnt acquired through the project in other regions***

As was described in the section above on the outcomes, the implementing agencies of the project ie., ACMAD, DMN and ANACIM demonstrated active interest in addressing the three main outcomes of the project through effective activities and there is considerable potential for upscaling these activities in the region as we move forward in the coming years. ANAM in Burkina Faso addressed only the activity C.3. The good practices and lessons learnt which were described under the different items above, can be implemented in the other regions in Africa.



## Conclusions and Recommendations

The project on “Climate Services for Increased Resilience in the Sahel” made a good progress during the project duration from June 2016 to August 2018 as ACMAD, DMN, ANACIM and ANAM effectively addressed the challenges in the provision of improved climate services in Niger, Senegal and Burkina Faso through the organization of various workshops/meetings and the production and diffusion of different publications and reports. The organization of the regular meetings of GTP in Niger and Senegal promoted improved decision making and increased resilience. Good progress was made in the capacity development including training to enhance NMHS capacity in data management and rescue; climate diagnostics, monitoring and forecasting; product development including calibrating and tailoring.

Following are the recommendations to enhance the provision of effective climate services:

- 1) The activities under three outcomes in the project were implemented in the three countries for a short period from June 2016 to August 2018. The provision of improved climate services for increased resilience in the Sahel does require more time such as another five years so that the communities in the different regions in the three countries can better familiarize with the management of risks and coping with the climate-related hazards. In order to increase the likelihood of sustainability, it will be useful to implement a second phase of the project for another five years, from 2019 to 2023, in these three countries.
- 2) The national agencies should be encouraged to take prompt actions in issuing early warning messages and in using appropriate information and communication technology strategies to diffuse the information to the different user communities in real time. Also, it is important for the national agencies to obtain regular feedback from the user communities on the information provided to them.
- 3) One of the major gaps in the project is the lack of adequate technical staff at the national level in DMN, ANACIM and ANAM and at the regional level in ACMAD. It is recommended that, should a next phase of this project be implemented, steps be taken to recruit the technical staff needed to promote better climate services. In the long run, governments in the three countries should take appropriate measures to improve the number of the technical staff in the NMHSs.
- 4) Another important gap is regarding effective calibration and maintenance of the meteorological network in Niger. The break in electricity supply in DMN in Niamey is also causing problems with the regular access to Internet. Urgent steps should be taken to resolve these problems.
- 5) The recommendations made after the assessment of the observing system and network and identification of the gaps should be implemented in the next phase of this project for further development of the observing capabilities to better deliver climate and related services, meeting the needs and requirements.

- 6) The meteorological network of ANACIM has only 9 Automatic Weather Stations (AWSs) currently and there is a need to increase the AWS network in Senegal for the provision of improved weather and climate information.
- 7) ACMAD issued the technical manuals such as the Drought Monitoring Technical Manual in this project, but the Disaster Risk Reduction Committee of Niger in the project did not take steps to use the data from Niger to develop the indices described in the manual and post them on their website. It is recommended that Niger, Senegal and Burkina Faso take appropriate steps to develop the indices and post them on their websites to provide useful information to the user communities in different sectors in their countries.
- 8) On the technical side, one of major gaps is the lack of use of dynamic climate models both at the national level and also at the regional level in ACMAD. The use of dynamic climate models should be implemented in the next phase of this project.

-----

## References

IPCC. 2013. Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

N'Diaye Aissatou, Adamou Rabani, Gueye Moussa and Diedhiou Arona. 2017. Global warming and heat waves in West Africa: Impacts on electricity consumption in Dakar (Senegal) and Niamey (Niger). International Journal of Energy and Environmental Science 2:16-26.

## Annex I

### Short description of the three countries in which the project is implemented

#### **Niger :**

Niger has an area of 1,267,000 km<sup>2</sup>, and is situated with the Saharan desert to the north and Sub-Saharan Africa to the south. About 75% of the country is covered by desert. The country borders to Libya and Algeria to the north, Benin and Nigeria to the south, Chad to the east and Burkina Faso to the west. The country has a long dry season (October to April) and a shorter rainy season (May to September), and the annual rainfall varies from 100 – 800 mm. The rainfall is characterized by high variability within the year, but also from year to year, rainfall is also highly variable at a spatial scale. The economy is dominated by activities within the primary sector, mainly agriculture and livestock, which accounted for 45.2% of GDP in 2010, although only 12% of the Niger's surface area is potentially cultivable.

#### **Senegal :**

Senegal is located in western Africa on the Atlantic Coast, and borders to the ocean in the West, Mauritania in the North-East, Mali to the East and Guinea and Guinea-Bissau to the South. Gambia is bounded by Senegal with a narrow Atlantic coast line.

The country is mainly dominated by tropical climate, but the northern part lies in the sub-tropical and semi-arid belt of the Sahel. Senegal's wet season is from July to September. There is a strong north-south gradient in total rainfall received during the rainy season, more than 200 mm per month in the south, and less than 100mm per month in the very north. Rainfall in the country is characterized by a high variability of inter-seasonal and inter-annual occurrence. The warmer season is from April to June; with the hottest regions have averages temperatures of up to 35°C, whilst the cooler coastal regions lie between 25 to 28°C. During the cooler season from November to March temperatures are normally below 25 °C in the coastal regions and below 30 °C in the Western region.

#### **Burkina Faso :**

Burkina Faso is a landlocked country in the heart of West Africa, covering an area of 274,200 Km<sup>2</sup>. It borders to the north and west to Mali, to the south to the Ivory Coast, Ghana, Togo, and Benin and to the east the Republic of Niger. Burkina's climate is dominantly dry tropical alternating between a short rainy season and a long dry season, and the country is subject to strong seasonal and annual variations. Burkina Faso has three climatic zones: In the north, the Sahelian Zone with average annual rainfall of less than 600 mm; in the Centre, the north Sudanian zone with average annual rainfall between 600 and 900 mm; and in the South, the south Sudanian zone with average annual rainfall more than 900 mm. Burkina Faso's economy is based on agriculture and agricultural staple food production is mainly rainfed.

## Annex II



Ref.: 13864/2019-1.0 CLW/GFCS

### PROGRAMME DE LA MISSION D'ÉVALUATION DU PROJET "LES SERVICES CLIMATIQUES POUR UNE RÉSILIENCE ACCRUE AU SAHEL" NIGER, DU 04 AU 06 JUILLET 2018

<b>JOUR 1 : MERCREDI 4 JUILLET 2018</b>		
<b>HEURE</b>	<b>AGENCES/INSTITUTIONS</b>	<b>LIEU</b>
08H30 – 13H00	Reunion de briefing Consultant avec DMN et les points focaux de CNSC	DMN
<b>13H30 – 14H30 : PAUSE DEJEUNER</b>		
14H45 – 15H30	AGRHYMET	AGRHYMET
15H30 – 18H00	ACMAD	ACMAD
<b>JOUR 2 : JEUDI 5 JUILLET 2018</b>		
08H30 – 10H30	Visite & échanges avec communauté bénéficiaire	Arrond. Communale de Niamey V
11H00 - 12H00	Cellule de coordination du Système d'Alerte Précoce (SAP)	SAP
12H00 – 12H30	Haute Commissariat a l'Initiative 3N	HC3N
12H30 – 13H30	Direction Générale de l'Agriculture/AGRIC	DGA
<b>13H30 – 14H30 : PAUSE DEJEUNER</b>		
14H30 – 16H45	DMN	DMN
<b>JOUR 3 : VENDREDI 6 JUILLET 2018</b>		
09H00 – 10H15	Charge du Communication, Minist. du Transports	DMN
10H30 – 11H00	Groupe Thématique Climat Santé	DSRE
11H15 – 11H45	Direction Médias Communautaires	MIN. COMM
11H45 – 13H00	Session du Debriefing avec DMN	DMN
14H30 – 17H00	ACMAD	ACMAD
<b>FIN DE MISSION</b>		

Liste  
Insti  
tuti  
ons/  
Orga  
nisa  
tion  
s à  
renc  
ontr  
er

1.  
inst  
ère  
des  
Tran  
spor  
ts  
(Tut  
elle  
de la  
Mét  
éoro  
logie  
) :  
Mini  
stre  
et

M

Directeur de Cabinet

2. Direction de la Météorologie Nationale (DMN)
3. Direction Hydrologie/Point focal Ressources en EAU
4. Direction Générale de l'Agriculture/ Point focal Agriculture
5. Direction de la Surveillance et de la Riposte aux épidémies (DSRE) /Point focal SANTE
6. Cellule de coordination du Système d'Alerte Précoce (SAP)/ point focal RRC
7. AGRHYMET
8. ACMAD
9. Groupe Thématique Climat Santé
10. Une communauté bénéficiaire (exemple : *marâchers de Niamey commune V*)
11. Direction des Radios Communautaires

## Annex III



Ref.: 13864/2019-1.0 CLW/GFCS

---

**PROGRAMME DE LA MISSION D’EVALUATION DU PROJET “LES SERVICES CLIMATIQUES POUR UNE RESILIENCE ACCRUE AU SAHEL” DAKAR, SENEGAL, 09 AU 10 JUILLET 2018**

---

<b>JOUR 1 : LUNDI 9 JUILLET 2018</b>		
<b>HEURE</b>	<b>AGENCES/INSTITUTIONS</b>	<b>LIEU</b>
	Reunion de Briefing entre le Consultant et la Direction de l’Exploitation de la Meteorologie, ANACIM	ANACIM
	Direction Generale de la Planification et de la Gestion des Ressources en Eau	DGPRE
	Direction de l’Elevage	DIREL
<b>13H30 – 14H30 : PAUSE DEJEUNER</b>		
	Direction Generale de la Peche Maritime	DPM
	Direction de l’Energie	ANER
	Direction Generale de la Sante	DGS
	Direction de la Protection Civile	DPC
<b>JOUR 2 : MARDI 10 JUILLET 2018</b>		
08H30 – 10H30	Secrétariat Exécutif du Conseil National à la Sécurité Alimentaire	SECNSA
11H00 - 12H00	Direction de l’Agriculture	DA
12H00 – 13H00	Visite & échanges avec communauté bénéficiaire	QUAI DE PECHE DE YOFF
<b>13H00 – 14H00 : PAUSE DEJEUNER</b>		
14H30 – 15H30	Reunion de Briefing entre le Consultant et la Directeur General, ANACIM	ANACIM
15H45 – 16H45		MIN. TRANSP.
17H00 – 18H00	Reunion de Briefing entre le Consultant et la Direction de l’Exploitation de la Meteorologie, ANACIM	ANACIM
<b>RETOUR A 23 :00</b>		
	<b>FIN DE MISSION</b>	

