



CREWS PROJECT PROGRESS REPORT

(July – December 2021)

1. Project title	Seamless operational forecast systems and technical assistance for capacity building in west Africa (CREWS West Africa)	2. Project reference CREWS/RProj/02/West Africa CREWS/RProj/03/AdditionalFinancing/West Africa
3. Implementing Partners involved in the project	World Meteorological Organization (Lead) World Bank	4. Regional/National Partners involved in the project Agrhymet Regional Center (RTC, future RCC, FFGS regional centre, FANFAR regional centre) ANACIM Senegal (RSMC Severe Weather and FFGS regional centre) AEMET and BSC Spain (RC SDS-WAS) IRI (survey on sub-seasonal forecasting) UoR (TAMSAT) KNMI (WA-CA&D) HRC (WA-FFGS)Sierra Leone Meteorological Services National Water Resources Management Agency (Sierra Leone)
5. Project Duration/Timeframe (from year – to year)	January 2018 – December 2022	6. Total Funding Approved by Steering Committee (in US dollars), including fees 5,300,000 USD
7. Reporting focal point(s) from Implementing Partners	Jean-Baptiste Migraine – jbmigraine@wmo.int Makoto Suwa - msuwa@worldbank.org	



8. Project overview

Project objective: to strengthen regional entities to engage with national hydrometeorological agencies in the region to improve risk information and early warning services at national level

The project develops capacities within existing institutions in line with their mandates : (i) RTC and future RCC Niamey ([AGRHYMET](#)) for food security and [regional climate services](#); (ii) RSMC Dakar ([ANACIM](#)) for [severe weather forecasting](#) and [WIGOS](#) coordination; (iii) Casablanca GISC ([DGM Morocco](#)) for information and data exchange; (iv) NMHSs for optimal utilization of new regional capacities including [flash flood guidance](#).

Beneficiaries are the 19 Members of [PRESASS](#) and [PRESAGG](#): Benin, Burkina Faso, Cameroon, Central African Republic, Cap Verde, Chad, Côte d'Ivoire, the Gambia, Ghana, Guinea Bissau, Guinea, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo.

The project complements national CREWS projects in Burkina Faso, Chad, Mali, Niger and Togo, and also contributes to demonstrate the feasibility of developing capacities for urban flood forecasting in Sierra Leone. While provision of meteorological, hydrological, climate and early warning services is clearly a national responsibility, a number of support functions can be best performed at regional scale, with economies of scale and enhanced quality of services resulting for specialized regional cooperation, including for cascading approaches for numerical weather prediction (under the leadership of Dakar as regional specialised meteorological center), flash flood guidance (building upon enhanced numerical weather prediction capabilities and AGRHYMET training capabilities), climate watch and climate analysis (building upon ACMAD and later AGRHYMET as regional climate centers), training of meteorological and hydrological staff (with EAMAC and AGRHYMET, both in Niamey), etc.

The World Bank is currently preparing hydromet and early warning investments in West Africa under the West Africa Food System Resilience Program – FSRP – ([P172769](#)), through which the project outcomes and impacts will be scaled up in Burkina Faso, Mali, Niger, Togo and with the Agrhymet Regional Center during Phase 1, and Chad, Ghana and Sierra Leone for Phase 2; and under the Resilient Urban Sierra Leone Project ([P168608](#)). In addition, the CREWS supported the implementation of hydromet activities under the Freetown Emergency Recovery Project (P166075), which has recently been completed.

Overall, the project has leveraged 56 million USD (IDA 41 million (Phase 1 of FSRP) /IDA 2 million (SL)/ACP-EU 5million / ACP-EU 8 million).









9. Progress summary

- **Partnership Agreements:** [HRC](#), [KNMI](#), [UK Reading University](#), [IRI](#), [RSMC Dakar](#), [Météo-France](#), [INRAE](#), [AEMET](#), [BSC](#), [DGM Morocco](#) are progressing well.
- **Trainings for the 5 countries:** Use of rainfall estimates for agrometeorology (TAMSAT, 5 countries, Nov 2021); use of crop calendars for the production of agrometeorological bulletins (see [manual](#), 26-Jul and 11-Oct);
- **Tools:** **(i)** AGRHYMET installed the catalog of extreme events and the climate watch service (including the CM SAF satellite- and GPCC-based monitoring products for West Africa) on its Linux server; **(ii)** Météo France updated its MISVA website to assist forecasters with anticipation of extreme weather events based upon sub seasonal forecasting; **(iii)** HRC connected the WAFFGS prototype to the WIS and to the DWD ICON (13 km resolution) numerical weather prediction model; **(iv)** a novel method of deriving spatially and temporally contiguous daily rainfall estimates and associated uncertainty estimates, which are consistent with both rain gauge measurements and satellite-based rainfall estimates, has been finalized by University of Reading (UoR) with TAMSAT. A historical (1983-2018) version of this dataset is now being created for West Africa and will be shared with each NMHS, before being operationalized in early 2022.
- **Capacity assessment** of hydromet services, the **alternative options for investment approach** as well as the **Concept of Operations** have been developed and finalized for Sierra Leone. **Strategic dialogue** is on-going in Sierra Leone to support the integrated design of hydromet investments envisioned under 2 investment projects based on the assessment and investment options;
- The phase 1 of the regional **Food System Resilience Program** was approved by the WB board in November 2021, with a substantive hydromet component to support the agriculture and food security sector in West Africa as well as in Burkina Faso, Mali, Niger and Togo. The phase 2 that includes Ghana, Sierra Leone and Chad is expected to be approved by the end of FY22



10. Project Performance

Interpretation of color coding		
High		Good progress; on track in most or all aspects of delivery
Medium		Moderate progress or on track in some aspects of delivery
Low		Less than moderate or poor progress. Not on track in critical areas of its delivery. Requires remedial attention

	Rate of expenditure	Rate of delivery	Alignment of Objectives
Coding			
Narrative	<p>From WMO side: \$2,105,723 (52% of total)</p> <p>From WB side: Regional: \$121,794 (26.8% of total) Sierra Leone \$100,092 (13.8% of total)</p>	Some activities have been delayed, in relation with COVID and the empowering of regional centers to take over more responsibilities. The progress is satisfactory with some delays.	Project remains strongly aligned to the initial objectives



11. Risk Management Status

Risk Status	<p>Risks remain moderate, as identified at the proposal stage, and have evolved in relation with:</p> <ul style="list-style-type: none"> - the undergoing enlargement of AGRHYMET mandate to take over the Regional Climate Center function from ACMAD in the near future; - the growing number of partners involved (IRI, HRC, KNMI, AEMET, BSC, DGM Morocco, ANACIM, Météo-France), thus requiring additional coordination efforts among partners; - Chad and Togo joining as CREWS beneficiary countries since July 2019, resulting in a need to expand the coverage of regional services to additional countries, in a situation of uncertainty related to the access of Chad and Togo to investment financing for early warning; <p>Travel restriction due to the ongoing Pandemic situation would inevitably slow down some of the activities.</p>
Measures to address	<p>The risks are being addressed with :</p> <ul style="list-style-type: none"> - additional consultations with regional centres; - transfer of knowledge to regional centres; - frontloading activities that can be implemented remotely. <p>Due consideration is given not to compromise the quality of outputs in reprioritizing activities.</p>

12. Contributions to CREWS Output(s)

(use number for activities and products and % for project component completion)

11.1 National Output(s)

CREWS Output(s) 1: National Meteorological and Hydrological Services service delivery improved, including the development of long-term service delivery strategies and development plans

State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for reporting period	Progress by December 2021



New/Enhance weather and early warning information products	System design of integrated system for Multihazard warning system	Assessment reports of the SLMET and NDMA completed and reviewed by key Stakeholders.	Incorporation of the findings of the assessment reports in the design of activities and modalities of implementation.	Agreement was reached on the appropriate modality for implementation of activities based on the findings in the reports
Enhanced weather and climate information products and services	Customised early warning system product design.	Draft concept of operations prepared with options analysis for the development of capacity at the SLMET/ NWRMA.	Identification of the immediate and longer term needs of SLMet/NWRMA to respond to the desired outcomes reflected in the CONOPS	The CONOPS is being completed.
<p>Additional information: briefly indicate, with concrete examples, the contributions to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). Please list in bullet points.</p> <p>SOLUTION-ORIENTED - CREWS West Africa in Sierra Leone has developed a few key analytics to support SLMet and NWRMA to make key strategic decisions on their investment program to develop a flood early warning system for Freetown. The project has developed the Concept of Operations (CONOPS) and based on the CONOPS, a preferred investment option was identified for short-term improvement of weather and flash flood forecasting services. A detailed assessment of observations, data processing, ICT and forecasting, dissemination infrastructure equipment, and staff capacity was also performed to inform the IPF, which this CREWS project is leveraging. TORs have been developed for engagement of the forecasting services provider; Technical Specifications are being developed to procure high priority hardware and software; training plan will be developed for short and long-term capacity building of staff. The consultant to support SLMet and NWRMA to co-develop forecasting and warning services and provide on-the-job training is expected to get on board within the next month.</p>				



CREWS Output(s) 2: Risk Information to guide early warning systems and climate and weather service developed and accessible

State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for the reporting period	Progress by December 2021
Detailed design and establishment of urban flash flood warning services.	Development of capacity of the NDMA, SLMET and NWRMA to forecast, monitor and manage severe events.	<p>Contracts for the rehabilitation of 1 site and the establishment of 2 sites was finalized.</p> <p>Groundworks for 2 new sites in progress.</p> <p>12 stations are currently outstanding for completion by the NWRMA.</p>	Completed installation of SLMET and NWRMA sites	<p>SLMET: Equipment delivered to site. Awaiting travel of OEM to site to complete installation</p> <p>NWRMA: 4 stations have been installed, 8 stations are outstanding.</p>

Additional information: briefly indicate, with concrete examples, the contributions to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). Please list in bullet points.

UNIQUE - The CREWS project has provided critical technical advisory services to advance the above mentioned tasks. Both SLMet and NWRMA are still in the early stage of expanding observation network, and making these few stations operational would lay the solid foundation for then for the future expansion of their monitoring capability, which will support the development of warning systems envisioned by the beneficiaries.



11.2 Regional Output(s) (for Regional Projects)

CREWS Regional Output(s): Institutional and human capacities at Regional WMO and Intergovernmental organizations to provide regional climate and weather services to LDCs and SIDS increased

State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for the reporting period	Progress by December 2021
<p>Service delivery strategy, the concept of operations and business model for AGRHYMET</p>	<p>Development of SDS, CONOPS and business Model</p>	<p>A basic concept note for the business development was developed and discussed with Agrhymet.</p>	<p>Set the concrete steps to develop sustainable business models that take into account PPE</p>	<p>Public-Private Engagement workshop (Under one sky) was organized in November 2021 in the context of FSRP.</p> <p>CREWS is co-financing analytical study “Digital climate information and agriculture advisory services” with Food System Resilience Facility (TA program attached to FSRP), which will</p>

				inform the development of sustainable business models for providing climate services for agriculture and food security sectors
<p>1. Proposal for a data and metadata exchange collaboration framework outlining stations to be included in the regional dataset, including recommendations for incorporating missing or new stations into the WMO WIGOS and WIS systems (OSCAR/Surface, WDQMS, GTS and WIS/GISCs) and forward looking plan for establishing a regional WIGOS center - A regional workshop on data collection, management, exchange was organized in July 2020. As a follow-up, an Agreement was signed with DGM Morocco in March 2021 to provide support to all West African NMHSs.</p>	100%	50%	70%	70%
<p>2. West Africa Climate Assessment & Dataset (WACA&D) system open to use for NMHSs and regional institutions, with supporting training at regional level and tools materials in French and English - A local version of the tool is available, hosted in KNMI (see presentation). A cloud-version of the website using DRUPAL was developed in collaboration with the ClimaSA project. The basic system used for WACA&D is now consistent with the implementations in preparation for 6 additional Regional Climate Centres.</p>	100%	90%	95%	A full re-design of the WACA&D website is prepared for use in the cloud, integrating the CREWS-effort with the ClimaSA developments

				for Regional Climate Centres. (95%)
4. <i>West Africa hydro-met and Climate Extreme database (WACE), involving a standard typology of high-impact event types and the assignment of a Universal Unique Identifier (UUID), with supporting training and guidance materials in French and English</i> - The database was created and transferred to AGRHYMET in May 2021. Single events can be reported with an online interface (see progress report).	100%	100%	100%	100%
5. <i>Climate Watch Service (with automatic update)</i> - Visualized CM products are included in the demonstrator application. Monitoring products are available in the form of climate watch advisory drafts. The user can decide which products to include. Additionally, ERA5T reanalysis data can be included on day 5 for the previous month. TAMSAT and river discharges from GloFAS are also selectable (see progress report).	100%	100%	100%	100%
6. <i>West Africa Severe Weather Forecasting System online, in line with SWFDP guidebook, with RSMC Dakar Training Desk and supporting training and guidance materials in French and English</i> – Based on the review of forecasters' use and expectations with regards to SWFP and MISVA , a draft user manual was developed and made available online at https://misva.aeris-data.fr/debuter-avec-misva .	100%	75%	85%	85%

<p>7. <i>West Africa Flash Flood Guidance System online, with supporting training and guidance materials in French and English</i> - During the reporting period, HRC continued the implementation of the West Africa FFGS (WAFFGS) with Step 1 and Step 2 trainings provided to AGRHYMET, RSMC Dakar, Burkina Faso, Mali and Niger. HRC connected as WIS user to fetch observations from countries, established a link to ICON NWP from DWD and the H03B satellite precipitation product from EUMETSAT (see progress report).</p>	100%	60%	70%	70%
<p>8. <i>Flood forecasting feasibility studies in West Africa.</i> This in order to propose an operational methodology for flash flood forecasting, and options for urban flood at pilot areas. INRAE and IRD analyzed surveys and interviews and explored use of EFAS -GlofaS and CHMI - FFG to deepen knowledge about the operational use of their systems.</p>	100 %	40%	50%	50%
<p>9. <i>Development of CREWS West Africa Community of Practice.</i> The matrix on synergies between CREWS and related projects was further updated to ensure optimal use of funding available for severe weather (CREWS, CDSF), climate (ACP-EU, CREWS), civil protection and food security.</p>	100%	30%	30%	30%
<p>10. <i>Recommendations and technical specifications for the development pilot services on early warnings for agricultural severe drought in West Africa.</i> In the framework of the Implementation Agreement signed with UK Reading University in Feb 2020, a training workshop on “Satellite rainfall estimation and validation for Africa” was organized with the 5 countries in Nov 2021 (see report).</p>	100%	90%	90%	90%



<p>11. Recommendations related to dissemination of seasonal and monthly prediction products and services in West Africa. Python tools for subseasonal forecasting have been developed by IRI and tested for West Africa, based on the S2S and SubX model forecast databases and IRI tools. Guidance has been provided by IRI for the April-May RCOFs (PRESASS and PRESAGG). See report.</p>	100%	100%	100%	100%
<p>12. Service delivery strategy, the concept of operations and business model for AGRHYMET. A consultant has developed a draft.</p>	100%	80%	100%	100%

Additional information: briefly indicate, with concrete examples, the contributions to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). Please list in bullet points.

Gender Responsive - The project considers gender equality in itself a key development objective, with direct demonstrated impacts in terms of increasing productivity, improving the impact of development for future generations, and making institutions more representative. To this end, the project promotes approaches aimed at eliminating the differences between men and women in accessing economic opportunities and in productivity, as well as to help give women a stronger voice within society. In Sierra Leone, the user needs assessment will fully take into account the gender aspect. In addition, the WB investment projects informed by CREWS West Africa are developing a gender action plan to consider the gender aspects in all relevant activities.

Multiplier - The project mobilizes specific expertise to guide investments such as AfDB SAWIDRA, EU Climate Services (8 million EUR) and WB Food System Resilience Program (P172769), which covers Burkina Faso, Mali, Niger and Togo in addition to the Agrhymet Regional Center in its first phase, and Chad, Ghana and Sierra Leone in its second phase[Overall program budget for phase 1: 486 million USD, budget for hydromet activities TBD]. It also supports a component to strengthen emergency management including early warning systems under the Resilient Urban Sierra Leone Project (P168608).

People-centered - The project mobilizes expertise to support AGRHYMET, working directly with countries’ multidisciplinary working groups to track food security and nutrition from the community to the regional levels. User engagement is an important aspect of the design of the CREWS West Africa project. While the current global pandemic has made it challenging to conduct on-the-ground consultation, the project incorporates users’ perspective through, for example, the development of service delivery strategy.

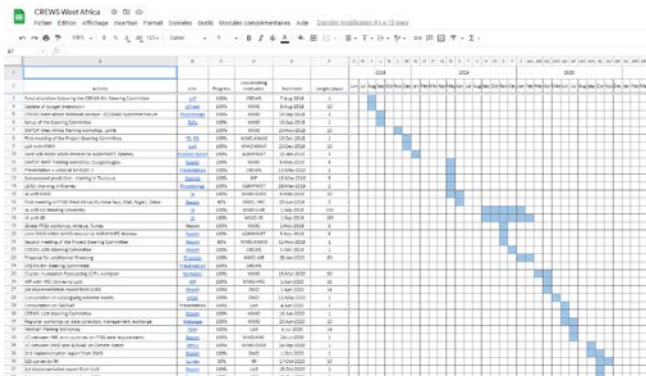


Promote Coherence - The project integrates expertise from regional and global centers such as Dakar RSMC, Niamey RTCs, Niamey RCCs, Météo-France, DWD, KNMI, ECMWF, UK Reading, HRC, and coordinates frequently with multilateral and bilateral development partners in the sub-region. The major ones are participating in the Steering Committee meetings. Coordination with international partners active in the hydromet domain in West Africa is key to ensuring effective use of funds and sustainability. WMO and WB are actively coordinating with those partners through bi-lateral meetings and workshops to understand their on-going and planned activities and inform them about our plan to seek complementarity and avoid duplication.

Solution-oriented - The project makes available information from global and regional centers to national meteorological and hydrological services. Cascading forecasting is substantially improving the lead time and accuracy of forecasts and warnings. Public private engagement is an integral part of strategic dialogue with governments in the region to ensure innovative business models and solutions are duly considered in considering different options.

Unique - The seamless approach to early warning supported by the project is unique, possible in relation with the multiplier effect and coherence. The project leverages the economies of scale by promoting regional collaboration, and contributes to the development of cost-effective hydromet system regionally. Such an approach will also provide cross-learning opportunities for countries in the region and facilitate a peer-to-peer support system. On-going work with Agrhymet Regional Center on the development of a business model will directly inform more sustainable operation.

13. Visibility products



[Project management spreadsheet](#)



[Project presentation](#)

Regional training workshop on data collection, management, exchange and quality monitoring in West and Central Africa

START DATE
23 June 2020

END DATE
02 July 2020

LOCATION
Virtual Meeting

ACTIVITY AREAS (1)

Climate Data and Monitoring

Documents

- Invitation letter [English] [Français]
- Agenda [English] [Français]
- Concept notes [English] [Français]
- Registration [English] [Français]
- Participants list

Presentations & Recording of the sessions

23 June 2020

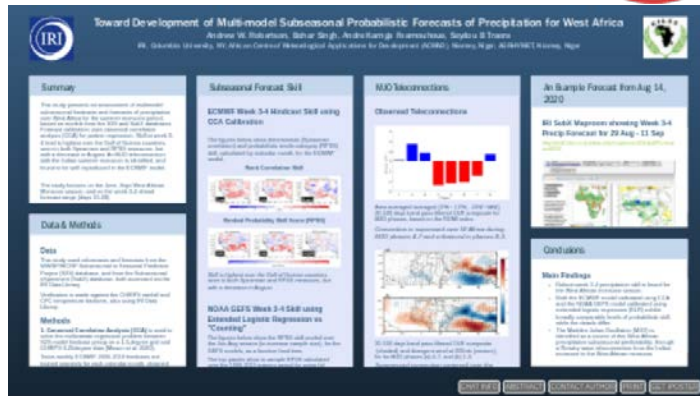
Chair – Mr Ousmane Ndiaye (ANACIM)

- 8h00 (UTC) - Opening (Max Dilley & Polizang Shi)
- 8h15 (UTC) - ANACIM, RSMC (Sadiou Ba)
- Recording English - French
- 8h30 (UTC) - ACMAD (Leon Razafindrako&Ali Abani)
- Recording English - French
- 9h00 (UTC) - GISC Casablanca (Hassan Haddouch)

[Regional training workshop on data collection, management, exchange and quality monitoring \(June-July 2020\)](#)



[Video message from RSMC Dakar](#)



[Poster prepared by IRI, ACMAD and AGRHYMET](#)

14. Supporting documents

- [Project proposal](#) approved by CREWS Steering Committee (Aug 2018)
- [Additional financing](#) approved by CREWS Steering Committee (Feb 2020)
- Mapping of initiatives relevant for Hydromet, urban development and coastal risk management in [Sierra Leone](#)
- Mapping of initiatives relevant for Hydromet and early warning in [West Africa](#)
- Report of the consultation on the [9 elements of the CREWS West Africa project](#) (Sep 2018)
- Setup of a [CREWS West Africa Community of Practice](#) (Sep 2018)
- Training on interpretation of numerical weather prediction products (Lomé Oct 2018, Ouagadougou [May 2019](#))
- Training on [crop modelling with SARRA model](#) (Ouagadougou, Nov 2018)
- Training on [agricultural land data assimilation](#) (LDAS, Niamey, May 2020)
- Training on agricultural statistical risk assessment with [crop calendars](#) (Ouagadougou, Feb 2020)
- [Regional workshop on data collection, management, exchange](#) (July 2020)
- [TAMSAT Training Workshop](#) (July 2020)
- [SWFDP WA](#) Implementation Plan (Sept 2017)
- [FFGS WA](#) - Report of the Technical Planning Meeting (June 2019)
- [CIFI WA](#) - Proposed workplan
- [MISVA](#) - Terms of reference
- [Terms of reference](#) of the CREWS West Africa Steering Committee
- [Report](#) of the first session of the CREWS West Africa Steering Committee (19 Dec 2018)



- [Draft report](#) of the second session of the CREWS West Africa Steering Committee (12 Nov 2019)
- [Report](#) of the joint KNMI-DWD-WMO mission to AGRHYMET (Nov 2019)
- Partnership agreement with [KNMI](#) - sub-regional climate dataset WACA&D (report)
- Partnership agreement with [DWD](#) - cataloguing of extreme events and climate watch service ([report Oct 2020](#))
- Partnership agreement with [Météo France](#) - MISVA ([report Dec 2020](#))
- Partnership agreement with [UoR](#) - improving use of TAMSAT ([report Oct 2020](#))
- Partnership agreement with [IRI](#) - forecasting subseasonal timescales in PRESASS and PRESAGG ([report Oct 2020](#))
- Partnership agreement with [HRC](#) - flash flood guidance system in Burkina Faso, Mali, Niger ([report Dec 2020](#))
- Partnership agreement with [ANACIM \(RSMC Dakar\)](#) - strengthening SWFP

15. Project History

a. Highlight key achievements since project started in bullet points, include all visibility and supporting documents other than those from the last 12 months

- *support to the Agrhyment Regional Center to finalize the project design of the Climate information/EWS component of the IDA financed Food System Resilience Program;*
- *Concept of operations of the NMHS in Sierra Leone;*
- *Development of guidance related to flood forecasting.*
- *NMS from Burkina Faso, Mali, Niger, Chad and Togo tested the database for cataloguing of extreme events.*
- *Capacity assessment of hydromet services; (ii) integrated design of hydromet investments envisioned under 2 investment projects.*
- *Preparation of the regional Food System Resilience Program, which has a substantive hydromet component to support the agriculture and food security sector in West Africa .*
- *Public Private engagement dialogue to be held in early December.*