



## CREWS PROJECT PROGRESS REPORT (July - December 2021)

<b>1. Project title</b>	Strengthening Operational Forecasting & Early Warning Systems in the South-West Indian Ocean	<b>2. Project reference</b> <a href="#">CREWS/RProj07/South West Indian Ocean</a>
<b>3. Implementing Partners involved in the project</b>	WMO (lead) World Bank UNDRR	<b>4. Regional/National Partners involved in the project</b> Regional: IOC Commission, RSMC La Réunion, RTC and RSMC Pretoria, SWCEM (BoM & JAXA), EUMETSAT National: meteorological, hydrological, civil protection and DRR services from Comoros, Madagascar, Mauritius, Seychelles and Mozambique
<b>5. Project Duration/Timeframe</b>	Q3 2020 – Q2 2025	<b>6. Total Funding Approved by Steering Committee (in US dollars), including fees</b> 4,000,000
<b>7. Reporting focal point(s)</b>	Jean-Baptiste Migraine – <a href="mailto:jbmigraine@wmo.int">jbmigraine@wmo.int</a> Luca Rossi - <a href="mailto:rossil@un.org">rossil@un.org</a> Roberto Schiano Lomoriello - <a href="mailto:roberto.schianolomoriello@un.org">roberto.schianolomoriello@un.org</a> Stefanie Dannenmann-Di Palma – <a href="mailto:dannenmann@un.org">dannenmann@un.org</a> Keren Carla Charles – <a href="mailto:kcharles1@worldbank.org">kcharles1@worldbank.org</a> Nicholas James Callender - <a href="mailto:ncallender@worldbank.org">ncallender@worldbank.org</a> Lizardo Narvaez Marulanda – <a href="mailto:lnarvaez@worldbank.org">lnarvaez@worldbank.org</a> Xavier Agostinho Chavana - <a href="mailto:xchavana@worldbank.org">xchavana@worldbank.org</a>	
<b>8. Project overview</b>	<b>Please include objectives, key project deliverables, leveraging, contextual information/statistics, significant events during the reporting period in <u>bullet points</u>. (max 250 words)</b>	



	<p>The overall project objective is to enhance the adaptive capacity and climate resilience of communities and economic sectors in five countries of the SWIO region. This will involve strengthening multi-hazard and impact-based early warning systems through: (i) improving the regional cooperation frameworks for forecasting of climate and weather, including seasonal and sub-seasonal outlooks, tropical cyclones, storm surges, other severe weather events, flooding and climate extremes; and (ii) supporting dissemination, emergency planning and response capacities in each of the beneficiary countries.</p> <p>This project will create synergies, and leverage resources (about 100 million USD in total) from several initiatives in the region such as the WB-funded Mozambique Disaster Risk Management and Resilience Program (96 million USD, <a href="#">P166437</a>), the WB-funded AFD-WB DRM program with Cat-DDO in Madagascar (50 million USD, <a href="#">P167941</a>), the EU-funded Intra-ACP Climate Services Programme (6 million EUR through AFD, <a href="#">ClimSA</a>), the EU-funded 11th EDF Resilience building and Disaster Response Management in the Indian Ocean (pipeline), WMO Severe Weather Forecasting Programme, WMO RA I Tropical Cyclone Committee, French Development Agency's (AFD) Building Resilience through Strengthened Meteorological, Hydrological and Climate Services in the Indian Ocean Commission Member Countries (68 million USD, <a href="#">Hydromet Project</a>).</p>
<p><b>9. Progress summary</b></p>	<p><b>What has been achieved <u>during this reporting period</u>? – Please list <u>in bullet points</u> the most significant and tangible outcomes? (Highlight at least 1 key achievement that can be elaborated in the 2021 Annual Report). (max 250 words)</b></p> <p>REGIONAL :</p> <ul style="list-style-type: none"> <li>• <a href="#">IA with Météo France</a> (RSMC La Réunion) signed 8 July 2021 to provide support to the National Meteorological and Hydrological Services (NMHSs) of the beneficiary countries for optimal use of long-range forecasting, climate monitoring and tropical cyclone forecasting. RSMC La Réunion already organized 2 tropical cyclone outlooks mini-forum to share cyclone climatology with NMHSs and humanitarian users; extended its high-resolution forecasting (AROME) domain to Seychelles, and prepared for issuance of probabilistic coastal inundation advisories.</li> </ul>



- [IA with South Africa Weather Service \(SAWS\)](#) (RSMC Pretoria + RTC) signed on 6 Sept 2021. The objective of the IA is to strengthen the existing Severe Weather Forecasting Programme (SWFP) to improve lead-time, accuracy, reliability and dissemination of forecasts and warning advisories for high-impact events by SAWS, and training and equipping forecasters with appropriate tools.
- Definition of indicators for EWS effectiveness: Seychelles and Mauritius have participated in the expert group. A training package is being developed on custom indicators on Target G of the Sendai Framework for DRR.
- The project was discussed during the two regional events the World Tsunami Awareness Day and the Africa Regional Platform for DRR and will be introduced to national counterparts and the IOC together with the project “Building Resilience and Improving Institutional Capacity in Indian Ocean Island States for Disaster Risk Reduction” (funded by the European Union) aiming at supporting National Disaster Management Agencies (NDMAs).

#### NATIONAL :

- Detailed diagnostic and development of investment recommendations for NMHSs (with 3 consultants) is ongoing (see [ToR](#)); a draft is ready for [Seychelles](#) and similar diagnostic reports will be developed in Comoros, Madagascar and Mauritius in 2022. The outputs will directly inform the AFD Hydromet project, the design of the proposed resilience project in Madagascar and the implementation of the resilience project in Comoros.
- An emergency preparedness and response training program for the Disaster Risk Management Division in Seychelles was prepared.
- In Mozambique,
  - the CREWS project is directly informing the Mozambique Disaster Risk Management and Resilience Program (P166437).
  - Through consultations with DNGRH, ARA-Norte and INGD (Direcção Nacional de Gestão de Recursos Hídrico; Instituto Nacional de Gestão e Redução do Risco de Desastres; Administração Regional de Águas do Norte), the CREWS project is developing terms of reference (TORs) for a consultancy to produce technical



	<p>recommendations to support the development and implementation of flood models for Cabo Delgado’s rivers Messalo &amp; Megaruma.</p> <ul style="list-style-type: none"> <li>○ The CREWS project is also providing technical assistance to support the development of Memorandum of Understanding (MOU) to strengthen the capacity of INAM in the production of state-of-the-art precipitation forecasts based on Numerical Weather Prediction output by SAWS (South African Weather Service).</li> <li>○ The project is supporting technical assistance to collect lessons learned on performance of EW Systems in the Buzi, Pungue and Save river basins during cyclone Idai.</li> <li>○ All of these activities will contribute to strengthening the impact of EWS in Mozambique under the current DRM program and inform future Bank engagements in the country.</li> </ul>
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### 10. Project Performance

Interpretation of color coding		
	<b>High</b>	Good progress; on track in most or all aspects of delivery
	<b>Medium</b>	Moderate progress or on track in some aspects of delivery
	<b>Low</b>	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			



<b>Narrative</b>	Used of funds as of 31 Dec 2021: WMO - US\$596,649 (34%) WB – US\$0.2 million (12%) UNDRR – US\$0 (0%)	During the period July – Dec 2021, the rate of delivery is satisfactory. The project is still delayed overall in relation with COVID and with the late start of the IOC-led <a href="#">Hydromet project</a> .	The activities remain well aligned with the objective of the project.
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### 11. Risk Management Status

<b>Risk Status</b>	<p>What is the current risk status as compared to what was identified in the project proposal?</p> <p>The current risk rating for the overall project remains at Medium, as indicated in the proposal. Some of the key contributing factors to the risk are political/institutional, human resources and capacity, technology etc.</p>
<b>Measures to address</b>	<p>What mitigation measures have been developed to address the risk status?</p> <p>Political/Institutional: WMO will provide guidance to IOC to support the accreditation of WMO regional centers; In addition, through the Project Steering Committee, participation of all relevant national and regional institutions will be ensured.</p> <p>Human Resources/Capacity: The project will support the equivalent of 2 full time staff spread between headquarters and regional/national offices of the project partners and establish partnership agreements with the more developed NMHSs in the region.</p> <p>Technology: To address the issue of technology, the project will provide for specific design with a focus on localized solutions.</p>

### 12. Contributions to CREWS Output(s)



## 11.1 Overall Outputs

State Project Output(s) in this section	Overall Project Target	Progress by June 2021	Target for reporting period	Progress by December 2021
Monitoring and forecasting of climate and weather, including seasonal and subseasonal outlooks, tropical cyclones, storm surges, other severe weather events, flooding and climate extremes are improved	4 regional centers are accredited to support the 5 LDCs and SIDS	2 (La Réunion, Pretoria)	2	2
	4 hazards for which forecasting and warning capacity is available in all 5 countries	2 (tropical cyclone, drought)	2	2
Warning dissemination, emergency planning and response capacities are improved	20% increase in # of people living in areas covered by forecasts and warnings for select hazards	0%	0%	0%
	2 LDCs and SIDS have risk information available to feed the early warning systems	0	0	0
	3 of LDCs and SIDS communicating warnings through common alerting protocol (CAP)	1 (Madagascar)	1	1



## 11.2 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 June 2021	Target for reporting period	Progress by December 2021
1.1 - Countries have received advisory services for optimal use of investments resources at national level	600 days of advisory services have been provided to Comoros, Madagascar, Mauritius, Seychelles	0 days	100 days	100 days
	250 days of advisory services have been provided to Mozambique	0 days	66 days	66 days
1.2 - The service delivery capacity of NMHSs is increasing	average level of service from the 5 NMHSs enhances by 1 level (from 1 – basic, to 4 – Advanced)	0	0	0
<p>CONTRIBUTION TO CREWS VALUE PROPOSITION: PROMOTE COHERENCE - Programming considers existing projects and other international partner initiatives to ensure value-added to the national context and needs.</p> <ul style="list-style-type: none"> <li>- WMO hired a strategic planning expert (Yvette Ramos, see <a href="#">ToR</a>) to support the development of national frameworks and strategic planning instruments in all 5 countries with a coherent approach.</li> <li>- WB hired a senior hydromet/EWS expert (Joao de Lima Rego) to help Mozambique improve their EWS. TORs were developed to hire two additional consultants to conduct training on early warning information flow and dissemination. WB staff has also been providing support.</li> </ul>				



**CREWS National Output 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 June 2021	Target for reporting period	Progress by December 2021
2.1 - Developing a risk and flood impact modeling platform to guide EWS in INGC Mozambique	5 EW stakeholders are contributing risk information at national level in Mozambique	0	0	0
2.2 - Developing risk information to guide EWS in Comoros, Madagascar, Mauritius, Seychelles	5 EW stakeholders are contributing risk information at national level in each IOC LDC & SIDS	0	0	0
<p>CONTRIBUTION TO CREWS VALUE PROPOSITION: SOLUTION-ORIENTED - Good and innovative practices are applied and shared continuously across national and regional projects.</p> <p>In Seychelles, the World Bank is supporting the revision of the hydromet and DRM policies to strengthen the link between forecasting and early action. Several working meetings were held and a revised policy text is in preparation.</p> <p>In Mozambique, the team is contracting a firm to better inform flooding forecasting in the two river basins in the province of Cabo Delgado.</p>				

**CREWS National Output 3: Information and Communication Technology, including common alerting protocol, strengthened**

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





3.1 - Provision of detailed guidance for common alerting protocol implementation in the 5 countries	5 countries in which NMHSs are trained on dissemination of forecasts and warning advisories using CAP format	0	0	0
3.2 - Dissemination systems in Mozambique	# people reached by SMS warnings	0	0	0
<p><b>CONTRIBUTION TO CREWS VALUE PROPOSITION: SOLUTION-ORIENTED</b> - Good and innovative practices are applied and shared continuously across national and regional projects.</p> <p>In Mozambique, the strategy has been developed, which will identify the number of people that will be reached by the EWS communication system. The WB has provided feedback on the system and expect that it would be operational by the end of 2022.</p> <p>In Comoros, Madagascar, Mauritius and Seychelles, the WB has conducted a diagnostic of the information communication systems and developed recommendations for how they could be strengthened. In Seychelles, the team has developed a training program at the political, technical and community level to be implemented in 2022.</p>				

**CREWS National Output 4: Preparedness and response plans with operational procedures that outline early warning dissemination processes developed and accessible**

State Project Output(s) in this section	Overall Project Target	Progress by June 2021	Target for reporting period	Progress by December 2021
4.1 - Advising INGC, INAM, and DNGRH on the development and implementation of integrated early warning systems in Mozambique	# EW stakeholders contributing in warning issuance decision process at national level in Mozambique	2 (DRM, meteo)	3	3



4.2 - Advising Comoros, Madagascar, Mauritius, Seychelles on the development and implementation of integrated early warning systems	4 EW stakeholders are contributing in warning issuance decision process at national level in each IOC LDC & SIDS	2 (DRM, meteo)	2	2
CONTRIBUTION TO CREWS VALUE PROPOSITION: UNIQUE - A financing mechanism that builds sustained institutional capacity driven by countries and supported by the expertise and specialist networks of its partners.				

### CREWS National Output 5: Knowledge products and awareness programmes on early warnings developed

State Project Output(s) in this section	Overall Project Target	Progress by June 2021	Target for reporting period	Progress by December 2021
5.1 - Diagnostic and recommendations on multi-hazard early warning operational procedures	# countries with MHEWS diagnostic	0	1	1
<p>CONTRIBUTION TO CREWS VALUE PROPOSITION: PEOPLE-CENTERED - Local organizations are listened to and engaged so that investments are driven by the needs of end-users.</p> <p>The diagnostic started in Q3 2021 by 4 consultants selected for this mission, along these <a href="#">Terms of Reference</a> : Rose Alabaster (water governance), Alice Soares (meteorology and marine), Yvette Ramos (institutional development), Joao de Lima Rego (opportunities for investments). The assessments are taking user requirements (some expressed in national frameworks for climate services) as a starting point to recommend investments in NMHSs, risk assessment, telecommunications and emergency response.</p>				



### 11.3 Regional Output(s)

<b>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</b>				
State Project Output(s) in this section	Overall Project Target	Progress by June 2021	Target for reporting period	Progress by December 2021
SWIO-COF is established according to WMO standards (with support from Intra-ACP Climate Services and AFD Hydromet Grants)	5 countries have access to enhanced regional climate services	0	0	0
Regional WIGOS centers are established according to WMO standards (with funding from the countries)	2 RWC guidance notes are developed (East Africa & SADC)	0	0	0
Regional calibration center is working according to WMO standards (with support from AFD Hydromet Grants)	1 regional calibration guidance notes developed	0	0	0
SAWS capacities to support NMHSs with severe weather forecasting guidance is enhanced	Pretoria RSMC severe weather reaches 20 years of operation	16	16	16
TCC and TC RMSC are supported to provide guidance about tropical cyclone, coastal inundation and storm surge forecasting	4 twinning arrangements ensure provision of guidance from developed NMHSs to developing NMHSs	2	2	2
WMO proposes a detailed road map with regards to flood forecasting (urban, coastal, riverine) for each country	4 countries with access to flood forecasting guidance	0	0	0



The 4 countries have established regular consultation and Sendai Framework Target G common custom indicators	4 countries trained on Sendai Framework Target G custom indicators	0	0	0
<p>CONTRIBUTION TO CREWS VALUE PROPOSITION: MULTIPLIER- Country portfolios promote a favorable environment for, and leveraging of, effective additional financing.</p> <p>The project operated in synergy, and leverages resources (about 100 million USD in total) from several initiatives in the region such as the WB-funded Mozambique Disaster Risk Management and Resilience Program (96 million USD, <a href="#">P166437</a>), the WB-funded AFD-WB DRM program with Cat-DDO in Madagascar (50 million USD, <a href="#">P167941</a>), the EU-funded Intra-ACP Climate Services Programme (6 million EUR through AFD, <a href="#">ClimSA</a>), the EU-funded 11th EDF Resilience building and Disaster Response Management in the Indian Ocean (pipeline), WMO Severe Weather Forecasting Programme, WMO RA I Tropical Cyclone Committee, French Development Agency's (AFD) Building Resilience through Strengthened Meteorological, Hydrological and Climate Services in the Indian Ocean Commission Member Countries (68 million USD, <a href="#">Hydromet Project</a>).</p>				

### 13. Visibility products

*Insert or copy any links to press releases, videos or communication items and/or social media links produced during the reporting period only*



**Supporting regional cooperation to strengthen  
seamless operational forecasting and multi  
hazard early warning systems at national level in  
the South-West Indian Ocean  
(CREWS SWIO)**

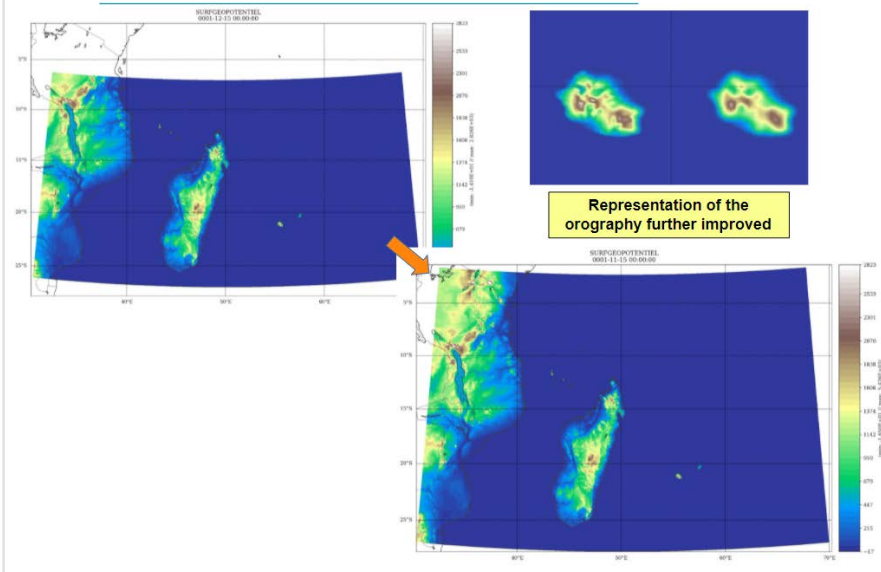


Updated 23 July 2021

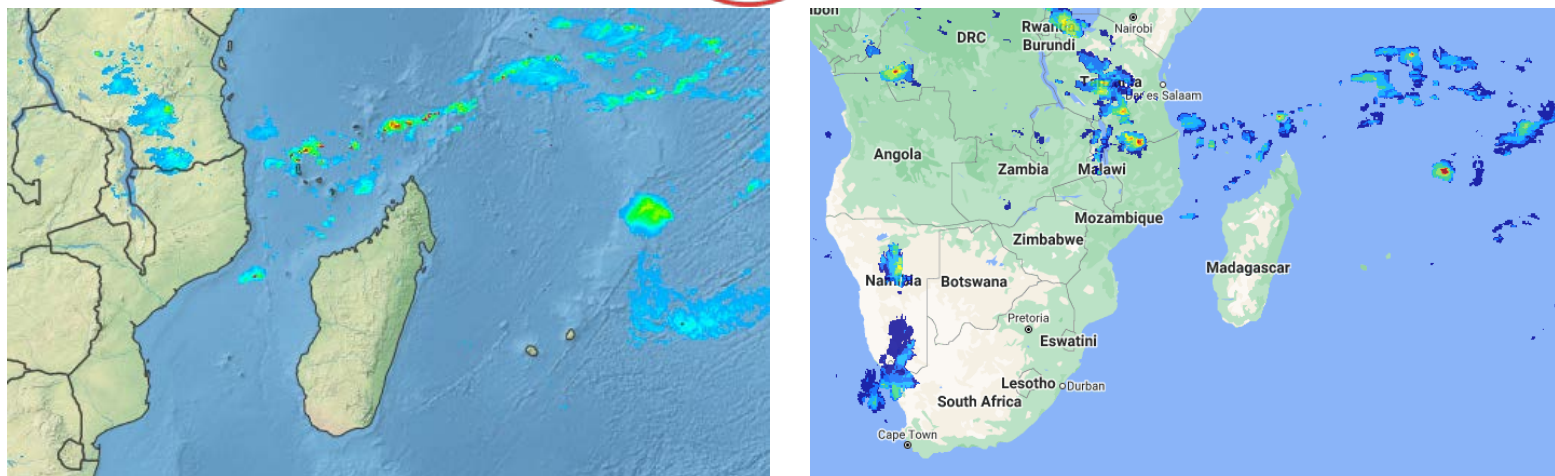


[Project presentation](#)

## Arome Indian Ocean horizontal domain



[RSMC La Réunion presentation – expansion of the open access AROME high-resolution model, now covering Seychelles](#)



EUMETSAT (left) and JAXA (right) – collaboration to ensure optimal use of rainfall space-based products (EUMETSAT MPE and JAXA GSMaP) for Severe Weather Forecasting programme (SWFP) and Space-based Weather and Climate Extremes Monitoring (SWCEP) over SWIO

## 14. Supporting documents

*List and annex to the report any documents providing details on project activities such as reports of training sessions, assessment reports, online solutions and tools, manuals, summaries of high-level discussions etc.*

Implementing Arrangement with RSMC La Réunion	<a href="#">IA ; Work plan</a>
Implementing Arrangement with RSMC Pretoria	<a href="#">IA ; Work plan</a>
Consultancy (SSA contract) with Alice Soares (meteorology, marine)	<a href="#">ToRs</a>
Consultancy (SSA contract) with Rose Osindealabaster (hydrology)	<a href="#">ToRs</a>
Consultancy (SSA contract) with Yvette Ramos (institutional strengthening)	<a href="#">ToRs</a>



Training on use of R-Instat for analysis of climate datasets	<a href="#">Training report</a>
Inception report for the MHEWS Diagnostic	<a href="#">Inception report</a>

## 15. Project History

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