



ISSN: 1995 – 1132

**CRFM Technical & Advisory Document Series
Number 2018 / 01**

**REPORT OF THE REGIONAL INTER-AGENCY
STRATEGIC MEETING ON FISHERIES EARLY
WARNING AND EMERGENCY RESPONSE
SYSTEM (FEWER)**

08 March 2018,
St. Vincent and the Grenadines

**CRFM Secretariat
2018**



CRFM Technical & Advisory Document - Number 2018 / 01

Report of the Regional Inter-Agency Strategic Meeting on Fisheries Early Warning and Emergency Response System (FEWER).

08 March 2018, St. Vincent and the Grenadines

For further information and to download this report please visit us at:

www.crfm.int

www.youtube.com/TheCRFM

www.facebook.com/CarFisheries

www.twitter.com/CaribFisheries

**CRFM Secretariat,
Belize**

This document has been produced by the Caribbean Regional Fisheries Mechanism (CRFM) with financial assistance from the Marine sub-component of the Investment Plan for the Caribbean Regional Track of the Pilot Program for Climate Resilience - Funded by the Inter-American Development Bank (IDB).

CRFM TECHNICAL & ADVISORY DOCUMENT – Number 2018 / 01

Report of the Regional Inter-Agency Strategic Meeting on Fisheries Early Warning and Emergency Response System (FEWER).

08 March 2018, St. Vincent and the Grenadines

Publication of deliverables under Investment Plan for the Caribbean Regional Track of the Pilot Program for Climate Resilience (PPCR) [TC No.: ATN/SX-14969-RG]

This publication was generated under the Investment Plan for the Caribbean Regional Track of the Pilot Program for Climate Resilience (PPCR). This publication was made possible through the leadership of University of the West Indies through the Mona Office of Research and Innovation (MORI) with technical support from co-implementing partner, the Caribbean Regional Fisheries Mechanism (CRFM) and funding support from the Climate Investment Funds through the Inter-American Development Bank.

This work is published under the responsibility of MORI for the Caribbean Investment Plan for the PPCR. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the member countries of the PPCR, its lead agency, the Climate Investment Funds, or the Inter-American Development Bank (IDB).

Please cite this publication as:

Correct Citation:

CRFM. 2018. Report of the Regional Inter-Agency Strategic Meeting on Fisheries Early Warning and Emergency Response System (FEWER). 08 March 2018, St. Vincent and the Grenadines. *CRFM Technical & Advisory Document*, No. 2018/ 01. 26p.

ISSN: 1995-1132

ISBN: 978-976-8257-80-2

Links to the publications may be found on line at: www.crfm.int

© PPCR 2018

PPCR encourages the use, reproduction and dissemination of content in this information product. Except where otherwise indicated, content may be copied, downloaded and printed for private study, research and teaching purposes, or for use in non-commercial products or services, on condition that relevant recognition of PPCR as the source and copyright holder is attributed and that PPCR's endorsement of users' views, products or services is not implied in any way.

Published by the Caribbean Regional Fisheries Mechanism Secretariat,
Belize and St. Vincent and the Grenadines.

ACRONYMS AND ABBREVIATIONS

CANTO	Caribbean Association of National Telecommunication Organizations
CAP	Common Alerting Protocol
CCA	Climate Change Adaptation
CCCFP	Caribbean Community Common Fisheries Policy
CCDRM	Canada Caribbean Disaster Risk Management
CDEMA	Caribbean Disaster Emergency Management Agency
CIMH	Caribbean Institute for Meteorology and Hydrology
CIRP	Caribbean ICT Research Programme
CNFO	Caribbean Network of Fisherfolk Organizations
CREWS	Climate Risk Early Warning Systems
CRIS	Caribbean Risk Information System
CRFM	Caribbean Regional Fisheries Mechanism
DED	Deputy Executive Director
DRM	Disaster Risk Management
FEWER	Fisher Early Warning and Emergency Response System
IDB	International Development Bank
LEK	Local Ecological Knowledge
M&E	Monitoring and Evaluation
MOU	Memorandum of Understanding
NOAA	National Oceanic and Atmospheric Administration
PMU	Project Management Unit
PPCR	Pilot Programme for Climate Resilience
SAR	Search and Rescue
SRS	Software Requirements Specifications
TAC	Technical Advisory Committee
UNDP	United Nations Development Programme
UWI	University of the West Indies
WMO	World Meteorological Organization

CONTENTS

INTRODUCTION	1
1. CALL TO ORDER AND PRAYER	1
2. REVIEW AND ADOPTION OF AGENDA	1
3. CONSIDERATION OF FEWER SUSTAINABILITY VISION AND STRATEGY	1
4. CONSIDERATION OF PLAN OF ACTION.....	6
5. WAY FORWARD.....	7
6. ADJOURNMENT	8
APPENDIX 1: PARTICIPANTS' LIST	9
APPENDIX 2: AGENDA	10
APPENDIX 3: LIST OF MEMBERS OF THE EARLY WARNING SYSTEM CONSORTIUM	11
APPENDIX 4: PRESENTATION – FISHERIES EARLY WARNING & EMERGENCY RESPONSE (FEWER) SUSTAINABILITY VISION & STRATEGY.....	12
APPENDIX 5: PRESENTATION – FEWER OPERATIONAL MATTERS	20

INTRODUCTION

The Regional Inter-Agency Strategic Meeting on Fisher Early Warning and Emergency Response System (FEWER) was held on 08 March 2018 in Kingstown, St. Vincent and the Grenadines. The aim of the meeting was to devise a suitable arrangement for long-term sustainability of FEWER, currently being developed by the CRFM under the auspices of the IDB-funded *Investment Plan for the Caribbean Regional Track of the Pilot Program for Climate Resilience* (PPCR project). The meeting was attended by representatives from the PPCR Project Management Unit, CDEMA, CIMH, CNFO, ICT4Fisheries Consortium (Consulting Firm contracted by the PPCR to develop FEWER), and the CRFM Secretariat. The CRFM Secretariat's Deputy Executive Director (DED) served as the Meeting Chairperson. The full list of participants is given at Appendix 1.

1. CALL TO ORDER AND PRAYER

The meeting was called to order at 8:50 a.m. and a prayer was offered by the DED.

2. REVIEW AND ADOPTION OF AGENDA

The DED welcomed all and drew the meeting's attention to the draft agenda and enquired as to whether there were any amendments. It was suggested that Vision and Strategy be discussed as one item followed by the Plan of Action. This suggestion was accepted. The amended agenda that was adopted is given at Appendix 2.

3. CONSIDERATION OF FEWER SUSTAINABILITY VISION AND STRATEGY

Dr. Kim Mallalieu, ICT4Fisheries Consortium, made a presentation on a proposed FEWER Sustainability Vision and Strategy.

Summary of Discussion:

Vision

The difference between weather and climate was highlighted. The Meeting noted that the Caribbean was fairly well adapted to the standard climate (business as usual) but the risks associated with events influenced by climate change and variability were the ones for which adaptation measures were needed. There were many hydro-meteorological hazards and other hazards like tsunamis in the coastal environment that could play a critical role. Mechanical weathering and erosion of coral reefs, as well as other factors such as the Sargassum seaweed could impact coastal area safety, the structure of the coast and fisheries and the fish stocks.

FEWER's focus was mainly weather, not climate, neither climate change nor climate variability. FEWER's short-term (weather) focus was acknowledged, noting that the eight (8) modules were built recognizing the possibility of progressive development of the application suite. The Meeting appreciated that culturally, engagement on the issue of using ICT in support of climate-based resilience was a longer-term undertaking.

The integration of local ecological knowledge (LEK) was agreed to be important as it made the outputs more useful. However, there were drawbacks to this, as habits of weather forecasting were often based on perceptions and not scientific data. People typically remembered events but not non-events and did not often recollect frequency. This distinction was highlighted, as climate was about the frequency as well as intensity of events, and focused on long-term trends.

In terms of realizing the FEWER vision, the enabling environment (national and regional inter- and intra-sector FEWER integration) and the expectation at the fisher level (i.e. fisher integrating FEWER in daily routine), the Meeting agreed on the necessity of incorporation of FEWER into the relevant instruments and mandates of the various coordinating agencies, and on the need for specific mention of networking/integrated management arrangements to govern the process of early warning and emergency response for the fisheries sector. While there were eight modules and a long-term vision for FEWER, the Meeting considered what would be a sensible first step until FEWER gains momentum in terms of its adoption and usage.

Strategy

Information was provided in relation to CAP and the recent CAP Installation Meeting held in Saint Lucia. If CAP would be used with FEWER, it was important to pay attention to developments in CAP and how these developments would be managed both at the country and regional levels.

Regarding CRFM's proposed role, the following were noted:

- The inclusion of FEWER in CRFM's protocols and instruments was a logical and reasonable expectation, bearing in mind CRFM's investment in FEWER. Some specific actions in terms of services expected of CRFM have been included, but there was a heavy emphasis on the inclusion of FEWER into instruments.
- The next PPCR activity under the Marine Sub-component was the updating of DRM/CCA Strategy and Action Plan and so FEWER could easily be incorporated in these updated documents. The CRFM could promote inclusion of FEWER into the model national DRM plan. This would encourage inclusion of FEWER when the model was customized by individual countries. A more important challenge was getting the national DRM plans approved and implemented, as plans were often developed but remained in draft.
- The necessity to include and promote FEWER in all relevant initiatives, documents and activities was re-emphasized. A Monitoring and Evaluation Committee should be established to ensure that standards of FEWER were met and, once the quality assurance matters were satisfied, CRFM would be obliged to promote FEWER on an ongoing basis.
- CRFM would also be expected to facilitate stakeholder engagement activities for promoting FEWER.

In relation to CDEMA's proposed role, the following were indicated:

- In general there was agreement with the approach proposed because it supported CDEMA's principles for sectoral engagement i.e. the sector provides the leadership, and the coordinating unit supports the efforts.
- Regarding the availability of funding for FEWER from the Canada Caribbean Disaster Risk Management (CCDRM) fund, no additional calls were being accepted, but there were alternate options to advance the work on FEWER. Also, there was space as it related to the discussion on search and rescue on the maritime site.
- In relation to the CANTO MOU, CDEMA, in principle, had no problem including the communication requirement under FEWER, as the document was in its embryonic stages. It was agreed that CDEMA would share the language, which would speak to supporting the FEWER requirements, with ICT4Fisheries Consortium for review.
- The inclusion of FEWER in National DRM plans was an important point to be flagged during the scheduled presentation at the CDEMA TAC Meeting, as well as the placement of the conversation around FEWER in the national disaster planning landscape. Overall National DRM plans will be developed which will be implemented by the national disaster agencies, but there would also be sectoral plans. Fisheries was generally included under the agriculture umbrella in principle, but in reality was sometimes left out at in the actual treatment at the national level.

This should be tabled for the TAC meeting to get feedback from countries on how it may be addressed.

- As FEWER was user driven, there was need for a deliberate strategy to encourage fisherfolk engagement to ensure that the application was really meeting the needs fishers had identified.
- CDEMA has been following up on the recommendations of the 2016 report prepared by Jeremy Collymore and in July 2017 launched a Regional Early Warning Systems Consortium (list of member is given in Appendix 3) intended to provide the function for the Alliance recommended. To date, the Group has convened one meeting. Efforts were being made to organize additional resources to resume that conversation as there were a number of current initiatives looking at integrated early warning systems including the CREWS (Climate Risk Early Warning Systems) initiative. The CREWS is a collaborative intervention financed by the World Bank and the World Meteorological Organization (WMO) and some consultancies should start soon to establish a baseline on the status of early warning systems in the region. CREWS had an emphasis on hydro-meteorology, but there was flexibility to look at other things.

It was pointed out that ICT4Fisheries Consortium's future involvement with FEWER would be restricted to technical support. The Meeting noted that the engagement of stakeholders was part of the mandate of the agencies represented at the meeting, and these agencies had projects and programmes to promote this level of integration of fishers. CRFM has been working with the CNFO, in this regard and, despite challenges, continue to encourage the CNFO to engage fishers at the local level. It was also noted that the requirements specifications for the design of the FEWER components came out of extensive consultations with fishers.

With regard to CIMH's proposed role, the following were expressed:

- Concerning advice on NOAA products, this advice would be provided by the meteorology group, who would be in touch with CRFM/ICT4Fisheries. Traditionally, Meteorological Services have had mandates for aviation meteorology which was very different from marine meteorology. For marine meteorology services the region relied on NOAA (National Oceanic and Atmospheric Administration of the US). The provision of marine meteorological services was however a part of the CIMH's vision and CIMH intends to roll out such a program in the future.
- Production of a 3 hour companion message for the wave model, if deemed necessary by CRFM, would require some further discussion, as it was unclear if this was a role better suited to National Meteorological Services. Technically, providing such a message was not a difficult thing to do, as this type of data was already being collected. This was a recommendation that could be made to CIMH by CRFM.
- The critical assessment FEWER thresholds, parameters and sources would have to be done by the National Meteorological Service and CIMH could guide the process. However, since marine forecasting was outside National Meteorological Services' legal mandate, they may not yet have the capability. This was also true for CIMH.
- Concerning a programme of assessment that could recommend adjustments to the hydro-meteorological components of FEWER, CIMH had already reviewed the software requirements specifications (SRS) document and had identified gaps between the dashboard and the SRS document. The SRS document contained many more items for which it was unclear who would provide the required information e.g. coastal flash flood alert. Another item was the FEWER white caps alert, which is a combined hazard of wind and waves. This type of information was not yet being collected and included in services offered, although it was not technically a difficult thing to do. Given the FEWER focus on disaster management, the 'strange current alerts' should not be included as such an alert may present increased fishing opportunities to fishers but did not contribute to disaster management. The CIMH noted that it would provide a comprehensive review of the SRS document and the dashboard.

- Given that CAP was a national-level initiative, CIMH was not best placed to include and promote FEWER in all relevant CAP initiatives, documentation and activities. Back-up servers for CAP were currently hosted outside the region. Since CAP was a national initiative, countries would have national servers. CDEMA were in discussions with UNDP about the hosting of, at least, the (regional) back-up server.

In addition to CRFM, CIMH and CDEMA would also need to think about their own instruments that will give commitment to FEWER. It was recommended that whenever and wherever FEWER was included in an instrument, it should be accompanied by a specifications of performance and monitoring mechanism to ensure that FEWER standards were met.

The meeting expressed concern about FEWER's heavy reliance on CAP, as the status of CAP servers in the four individual countries was not well known, not well-performing, or non-operational. Moreover, as CAP was not immediately operational, the Meeting enquired about the standards currently used. It was explained that CAP was not fully used in most islands maybe because the required skills were not available. Anguilla and Montserrat were the best examples of the use of CAP in the region. UNDP had begun rolling out CAP again, but it was unclear what the skill-set in the maintenance of CAP servers was in the region at this time. CAP was not well entrenched. The standard currently being used was SMS, but many of the standards for alerts to be generated were determined at the national and even community level. There was no precise regional standard. Only the *Alerts* component used CAP, but even the *Alerts* were not CAP reliant, hence FEWER could exist without CAP. However, CAP is a global standard. As such, if there is to be an early warning framework developed for the Caribbean, it would necessarily include CAP because of the multi end-user device capabilities for constant messaging.

As there were components within the dashboard that were not CAP reliant, and in view of the current challenges with the CAP servers, the meeting considered that the short-term focus should be on mainstreaming FEWER within the fisher community with those components of the dashboard that do not rely on CAP.

The Meeting noted that it was not always clear in the SRS document if there were specific roles for the meteorological services. CIMH could elucidate and discuss the roles of the meteorological community with the national meteorological services but the operational decisions were entirely up to the countries. For example, more frequent updates on tides and waves were desirable, but the decision to increase the frequency of updates was entirely up to the local meteorological services. If the meteorological service was unable to handle the request to provide additional information, then CIMH could assist. The meeting appreciated that for CIMH as well as other regional organizations, the role was an advisory one only.

Given the changing patterns in climate, the Meeting enquired about increasing the frequency of information provided on tides (once or twice per day). As tides could be calculated for periods well into the future, a forecaster was not required.

The Meeting considered ways to make FEWER more compelling and competitive, and hence capacity of FEWER to engage fishers and to support regular use. The Meeting noted that the use of five of the modules – Alerts, Emergency Contacts, Emergency Procedures, Damage Reporting and Missing Persons would generally only be triggered by an event. This left three components, Weather, Messaging and LEK, which may be immediately useful and special to fishers. At present, the use of Whatsapp was advocated instead of FEWER Messaging, and LEK would require time to gain traction. Hence Weather was the component most likely to attract fishers, which made the collaboration with the meteorological services and CIMH critical. The Weather module must offer the fisher some important information/update to which he does not already have access.

Still on the issue of relevance for fishers and thereby promoting regular use, the Meeting was reminded that in Saint Lucia, language could be a barrier as many boat owners/captains spoke Creole and may not be able to utilize FEWER. It may be necessary to try to identify a young fisher, who could understand FEWER, who would be able to introduce this to other fishers, boat owners/captains, possibly through the cooperatives. Notwithstanding this challenge, the Meeting concluded that the Weather module was the entry point to promoting the use of the application.

The limited range of cell phones was another issue of concern. The communications options available to fishers all had limitations. In the case of cell phones and VHF, the on-land infrastructure support was limited and this limited the distance from shore at which they were operational. While the range with satellite was broader, satellite was extremely expensive because of recurring monthly payments even when not used. There was also the additional responsibility of charging the satellite phone regularly, even if not used for several months.

Fishers would generally listen to the weather before leaving shore, but would usually not get any further updates for the day. Many fishers would take cellphones to sea; if they could get weather updates at sea through use of an application (FEWER) that would be a big advantage for all parties. At this point, the Meeting learned that a dichotomy existed for provision of weather information. There were big companies that provided continuous coverage of weather, and were very good at communication although they may not rely on the best science or local knowledge. In contrast, the local meteorological services had access to better science, and better local knowledge in order to provide more accurate information, but usually did not know how to make it seem relevant, or deliver it at the right moment in time. In this regard, the Meeting acknowledged that if FEWER weather was tuned well in terms of time, frequency and content, then that would give it a competitive advantage over the big companies.

In concluding on this point, it was acknowledged that *Weather* was the module that would most likely attract fishers, particularly if the updates were frequent, timely and the content reliable (from reputable sources). In terms of the timing, frequency and content to be included in the Weather module, there was need to examine what the fishers ideally wanted and what the meteorological services could provide and to arrive at a workable compromise.

It was also recommended that CRFM/FEWER become part of all CAP initiatives, and also CRFM/FEWER should become an active member of the Early Warning Consortium, (embodiment of the Caribbean Early Warning Alliance) and also participate, if possible, in the CREWS project.

Based on the discussions, the following two-pronged Vision statement and accompanying bi-faceted Strategy were agreed to:

Vision: *Fishers integrate FEWER into daily routine.*
Strategy: *Make FEWER (Weather) compelling and competitive and support regular use and engagement of limited set (Weather)*

Vision: *Key sectors integrate FEWER into routine operations, through inter- and intra-sector integration to create a collaborative enabling environment*
Strategy: *Embed FEWER into regional CAP development cycle; and harmonize efforts and share a common vision through participation in the Early Warning System Consortium*

The Meeting agreed that relevant slides would be amended to capture the agreed changes in relation to FEWER Sustainability Vision and Strategy. The revised presentation is given at Appendix 4.

4. CONSIDERATION OF PLAN OF ACTION

In terms of the Plan of Action, the Chairperson observed that there was insufficient time to develop a Plan of Action in the strictest sense. However, several specific tasks had already been identified, which essentially helped to define the individual roles of each of the partner organizations (CDEMA, CIMH, and CRFM) as FEWER Regional administrators. All but one of the tasks had been discussed and agreed against the discussion of the Vision and Strategy.

The Meeting identified that an inter-agency MOU would be desirable, and agreed to draft a MOU following this meeting for the intra-sector integration with regard to FEWER. Following some further discussions, as well as a presentation by Dr. Mallalieu titled, FEWER Operational Matters (presentation is given at Appendix 5), the list of actions was reaffirmed, and is given in Table1.

Table 1: Agreed Vision, Strategy and Actions List

Vision	Strategy	Actions List
Fisher integrate FEWER into daily routine (tool of the trade).	Making FEWER (Weather) compelling and competitive; and supporting regular use and engagement of limited set (Weather)	<ul style="list-style-type: none"> ▪ Provide advice on NOAA monitoring products (competitive) (CIMH/Met. Office/ CRFM/CNFO) ▪ Strengthen marine forecasting capabilities in the region (compelling) (CIMH) ▪ Produce 3-hour companion message per coast for wave model (competitive) (CIMH/Met. Office/ CRFM/CNFO) ▪ Critically assess FEWER thresholds, parameters and sources (competitive & compelling) (CIMH) ▪ Recommend adjustments to the hydro-meteorological components of FEWER (compelling) (CIMH) ▪ Specify performance targets for hydro-met components of FEWER (compelling) (CIMH) ▪ Once CIMH targets met, endorse FEWER's hydro-met features for fitness for purpose. (compelling) (CIMH) ▪ Implement products within FEWER (Developers) ▪ FEWER promotion and stakeholder engagement (CRFM) ▪ Arrange participatory M&E by existing body of DM or Fisheries Authority e.g. extension of the Fisheries Advisory Committee (All partner agencies, led by CRFM)
Key sectors integrate FEWER into routine operations, through inter- and intra-sector integration to create a collaborative enabling environment	Embed FEWER into regional CAP development cycle; and harmonize efforts and share a common vision through participation in the Early Warning Consortium	<ul style="list-style-type: none"> ▪ Include and promote FEWER in all relevant initiatives, including CAP, documentation and activities (CDEMA/CRFM/CIMH) ▪ Take on Regional Administrator role (CRFM / CDEMA/CIMH) ▪ FEWER to present role of DMA at CDEMA TAC meeting 24 April, Bdos (CDEMA, ICT4Fisheries Consortium, CRFM) ▪ Host FEWER infrastructure (maintenance and administration of FEWER

		<p>infrastructure) within the CRIS infrastructure (CDEMA)</p> <ul style="list-style-type: none"> ▪ Include requirements for FEWER in MOU with CANTO (CDEMA) ▪ Consider TOR for institutional role as FEWER Regional Administrator (CDEMA, CIMH, CRFM, CNFO) ▪ Consider TOR for, and host, FEWER after incubation period (CDEMA) ▪ Integrated Search and Rescue (SAR) Programme (CDEMA). ▪ Endorse and support a 1-year incubation cycle for FEWER (All agencies, led by UWI CIRP) ▪ Endorse Proposal for FEWER communication resilience (CRFM). ▪ Clarify what actions/tasks CDEMA should undertake from now through the end of the 3-month incubation period to facilitate handover (CRFM/ ICT4Fisheries) ▪ Take on Regional Administration role (All agencies). ▪ Arrange participatory M&E by existing body of DM or Fisheries Authority, e.g. extension of the Fishery Advisory Committee (All agencies, led by CRFM) ▪ Include FEWER in the <i>Regional protocol to integrate CCA and DRM in fisheries and aquaculture into CCCFP</i> (CRFM) ▪ Include FEWER in the DRM/CCA Strategy & Action Plan and promote inclusion of FEWER in the National DRM Plans (CRFM and CDEMA) ▪ Participate the Early Warning Consortium (CDEMA, CRFM/UWI CIRP) ▪ Participate in the CREWS project (CDEMA, CRFM) ▪ MOUs among the agencies (CRFM/ CDEMA/CIMH/CNFO)
--	--	--

5. WAY FORWARD

The Meeting identified and agreed on the following next steps:

- CRFM will prepare a report of this meeting.
- CRFM will prepare for participation in the upcoming CDEMA TAC Meeting, 16 April 2018.
- CRFM will prepare correspondence to the different agencies, advising of the meeting and sharing the meeting report.
- CRFM will draft TORs for agency roles and share with CIMH, CDEMA, etc., to guide the development of the inter-agency MOU.
- Regarding equipment/software services, requirements, etc., these should be identified and the PMU should be advised of any specific requirements of CDEMA, the agency proposed to host the FEWER infrastructure. In this way, CDEMA would bear HR costs only. The PMU representative undertook to see what was possible under the project.

6. ADJOURNMENT

The Chairperson and the meeting participants all expressed appreciation to the PPCR Programme Management Unit for convening the Strategic Meeting, which has provided important exchanges on FEWER and ideas for sustaining the action. Appreciation was also expressed for the interesting and useful deliverables produced by the ICT4Fisheries Consortium, and the progress made on the project to date was acknowledged. The Chairperson recognized the inputs of CIMH, CDEMA and CNFO, and also thanked Ms. Gail Hoad of the PMU for communication support and Ms. Pam Gibson of the CRFM Secretariat for serving as the Meeting rapporteur. The Chairperson ended by thanking all the participants for their valuable contributions and for making the meeting a successful one.

The meeting adjourned at 1:40 p.m.

Appendix 1: Participants' List

	PARTICIPANTS' NAMES & DESIGNATION	ADDRESS	Contact Email
1	Ms. Elizabeth Riley Deputy Director (Electronic participation)	Caribbean Disaster Emergency Management Agency (CDEMA) Resilience Way, Lower Estate, St. Michael, Barbados Tel.: (246) 434-4880	elizabeth.riley@cdema.org
2	Mr. Oronde Lambert Information and Communications Technology Manager	Caribbean Disaster Emergency Management Agency (CDEMA) Resilience Way, Lower Estate, St. Michael, Barbados Tel.: (246) 434-4880	oronde.lambert@cdema.org
3	Dr. Cedric Van Meerbeeck Climatologist	Caribbean Institute for Meteorology and Hydrology (CIMH) Husbands, St. James, Barbados Tel.: (246) 425-1362 / 5	cmeerbeeck@cimh.edu.bb
4	Mr. Horace Walters CNFO	Sans Souci, Castries, Saint Lucia Tel.: (758) 718-6229	horacedwalters@gmail.com
5	Dr. Kim I. Mallalieu Senior Lecturer	Department of Electrical & Computer Engineering The University of the West Indies St. Augustine, Trinidad & Tobago	Kim.Mallalieu@sta.uwi.edu
6	Mr. Ainsley Henry Program Manager	Program Management Unit – Investment Plan for the Caribbean Regional Track PPCR Mona Office for Research and Innovation Ground Floor, Electronics Building, Physics Department UWI Mona Campus, Kingston 7, Jamaica	ainsley.henry@uwimona.edu.jm
7	Ms. Gail Hoad	Program Management Unit – Investment Plan for the Caribbean Regional Track PPCR Mona Office for Research and Innovation Ground Floor, Electronics Building, Physics Department UWI Mona Campus, Kingston 7, Jamaica	ghoad@yahoo.com
8	Dr. Susan Singh-Renton Deputy Executive Director	CRFM Secretariat Top Floor, Coreá's Building Halifax Street, Kingstown, St. Vincent and the Grenadines Tel.: (784) 457-3474	susan.singrenton@crfm.net
9	Ms. Pamela Gibsom Administrative Secretary (Rapporteur)	CRFM Secretariat Top Floor, Coreá's Building Halifax Street, Kingstown, St. Vincent and the Grenadines Tel.: (784) 457-3474	crfmsvg@crfm.int

Appendix 2: Agenda



Investment Plan for the Caribbean Regional Track of the Pilot Program for Climate Resilience (IPCR) Component 4, Sub-Component ii - Marine

Regional Inter-Agency Strategic Meeting on FEWER

Meeting Agenda

Date: 8 March 2018; Time: 8:30 a.m. – 12:30 p.m

**Location: CRFM Secretariat, Conference Room,
Kingstown, St. Vincent and the Grenadines**

1. Opening
2. Review and adoption of agenda
3. Consideration of FEWER Sustainability Vision and Strategy
4. Consideration of Plan of Action
5. Way forward
6. Adjournment

Appendix 3: List of Members of the Early Warning System Consortium

1. CCCCC [Caribbean Community Climate Change Centre]
2. CARISEC [Caribbean Community Secretariat]
3. CDEMA [Caribbean Disaster Emergency Management Agency]
4. CIMH [Caribbean Institute for Meteorology and Hydrology]
5. CARPHA [The Caribbean Public Health Agency]
6. CTU [Caribbean Telecommunications Union]
7. ICG/Caribe [Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions]
8. NEMO SVG [National Emergency Management Organization, St. Vincent & the Grenadines]
9. ODPEM Jamaica [Office of Disaster Preparedness and Emergency Management, Jamaica]
10. National Meteorological Services Jamaica
11. SRC [Siesmic Research Centre, UWI]
12. University of Guyana
13. Climate Studies Group, UWI
14. Disaster Risk Reduction Centre, UWI

Observers:

1. IFRC [International Federation of Red Cross]
2. UNDP [United Nations Development Programme]

Appendix 4: Presentation – Fisheries Early Warning & Emergency Response (FEWER) Sustainability Vision & Strategy



Fisheries Early Warning & Emergency Response (FEWER) Sustainability Vision & Strategy



ICT4Fisheries Consortium
8 March 2018



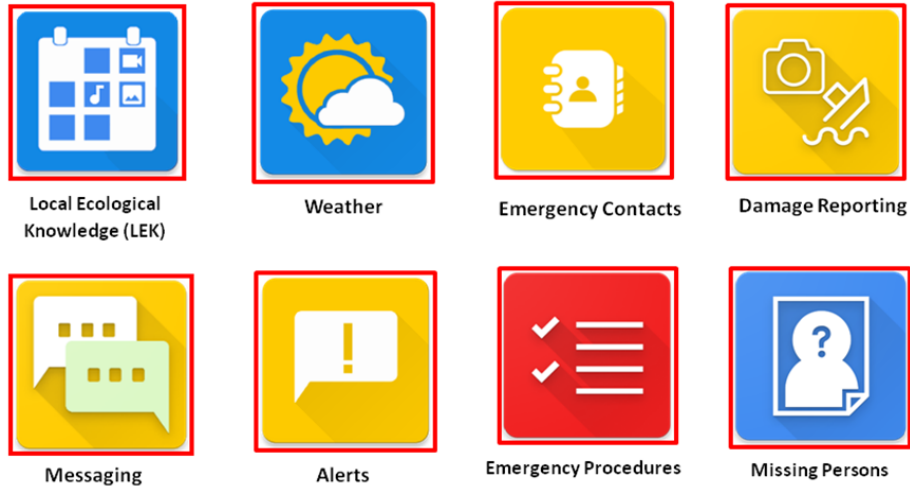
FEWER

Provides specific risk-reducing capabilities that:

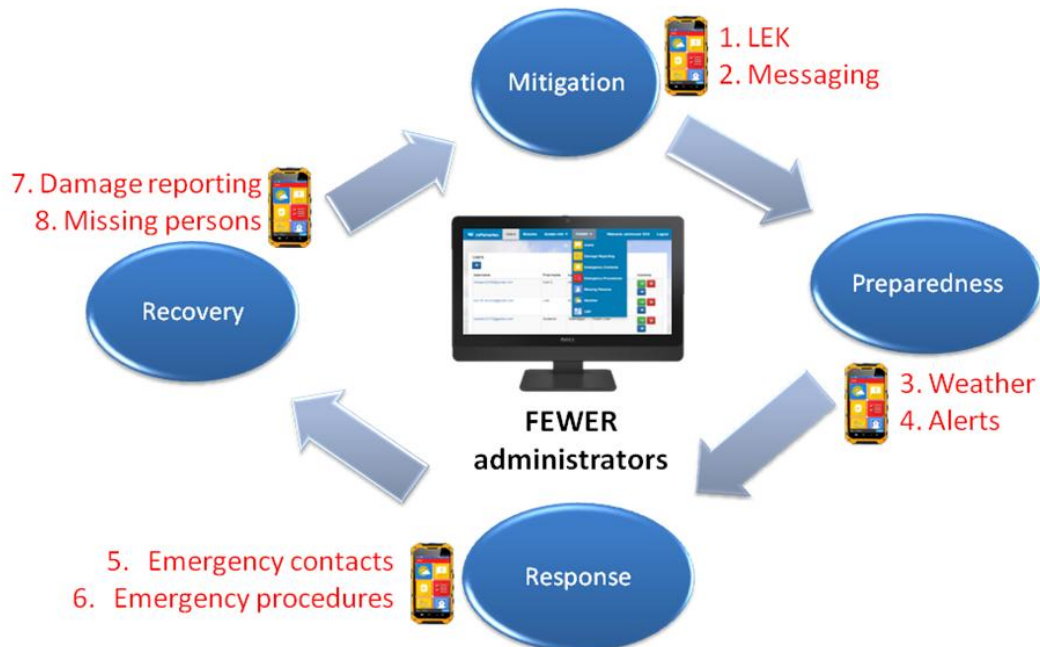
- small-scale fishers access through the mobile phone
- key agencies manage through a web-based admin dashboard



FEWER Modules



FEWER in the Disaster Management Cycle

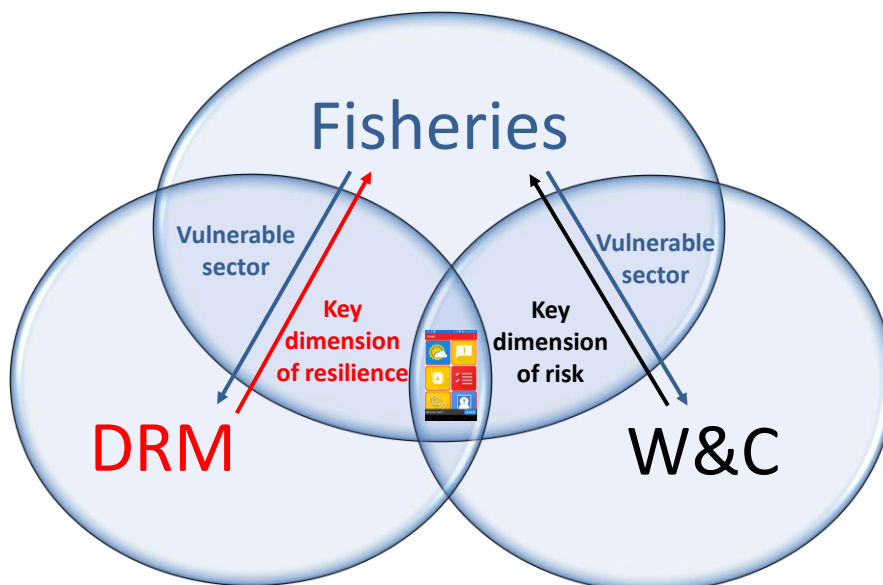


Vision: Fisher Integrates into Daily Routine



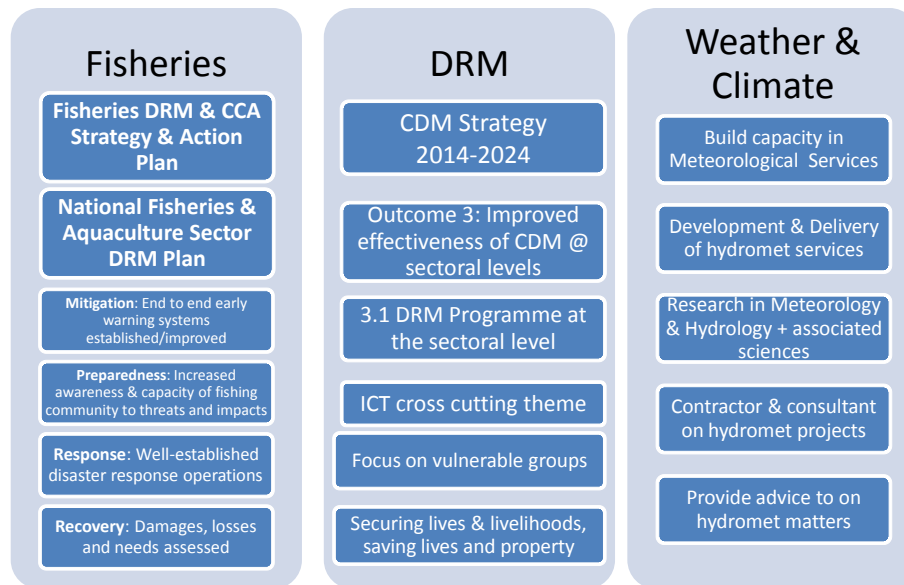
Tool of the Trade

Enabling Environment

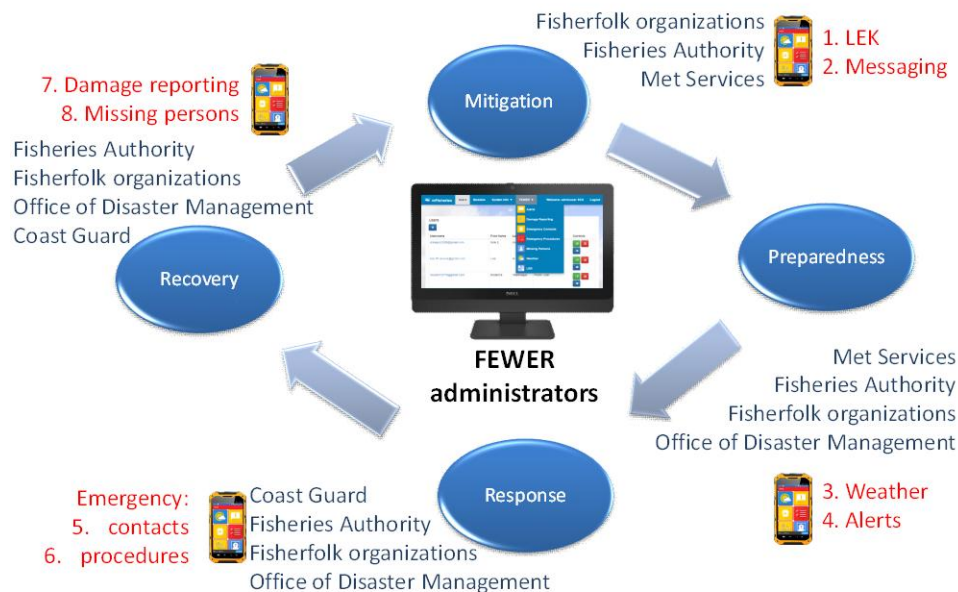


DRM = Disaster Risk Management; W & C = Weather and Climate (incl change & variability)

Vision: Inter- & intra-sector FEWER Integration



Vision: National Level Integration



CAP SLU

- SLU NEMO and Met Office last week hosted a CAP installation meeting
- Fisheries SLU invited to participate on account of FEWER
- FEWER's Mikkel demonstrated alert creation, templates and resulting XML content
- Eliot Christian, the consultant from Climate Risk Early Warning Systems (CREWS):
 - Has a CAP editor that he made available to SLU and will make available to FEWER
 - Invited FEWER to contribute to CAP Alert Hub RSS feeds: (<http://Alert-Hub.org>)
- We can be added to <http://Alert-Hub.org> even though not the national alerting body
- Like a chain of trust, we can provide information and links on Met Office and NEMO/DMA's sites
- Eliot also provided advice on CAP XML:
 - Web tag - if empty, do not add to CAP alert XML tag as it will be processed as a link and it would not link to anything
 - Alert area it is the union of selected areas
 - Alert area is stated using the points in a counter-clockwise format (in array) of the bounded area

CAP SLU

- Applications: Cap.Cap, FEWER, Red Cross
- Agencies that are on board and need to be on board: NEMO, GITS, GIS (info dissemination unit), Met Office, Fisheries
- Harmonisation of different systems is necessary as each has its own features according to target user
- Currently CAP server running on secondary link but should move to GISL data centre to use primary link with better Internet comms infrastructure
- Back up comms Broadband Global Area Network (BGAN) once they get data via satellite ... needs paid up SATCOM service subscription
- Sample suggestions:
 - Integrate 2-way radios into CAP system for resilience
 - Engage telecoms (providers & regulators) for increased support for CAP including Cell Broadcasts – increase reach of CAP
 - Engage policy makers over broadcasting to allow emergency msg interrupts
 - TV broadcast interrupting @ policy and operational levels
 - Public sensitisations from NEMO (increase understanding to improve effectiveness of msgs sent)
 - Use standards so that no one is confused about type of alert and response actions required
 - EW regulation is in draft for more than 4 years, so an evaluation of this may be able to add to it.



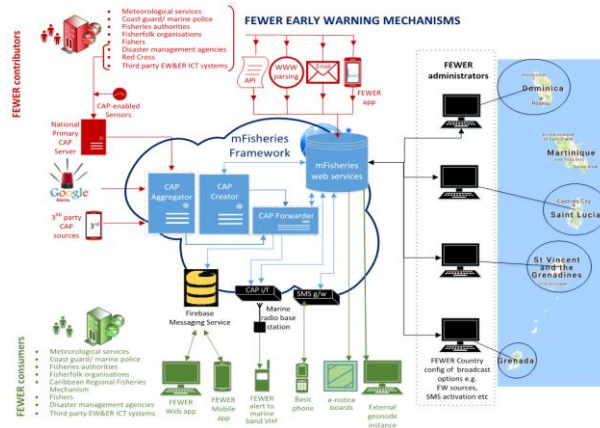
Sustainability Strategy

Fisher:

1. Make Weather module competitive & compelling: the go to point for fishers
2. Support engagement & regular use of Weather module

Enabling environment:

1. Harmonize EW efforts within a Caribbean Alliance
2. Embed FEWER in national & regional CAP development cycle



Strategy (Regional): CIMH & FEWER

- Provide advice on NOAA monitoring products
- Strengthen marine forecasting capabilities in region particularly wrt the marine environment and those who interact with it
- Produce a 3-hour companion message per coast for the wave model for Dominica, Grenada, Saint Lucia & St. Vincent
- Critically assess FEWER thresholds, parameters and sources
- On the basis of a programme of assessment, recommend adjustments to the hydromet components of FEWER
- Specify performance targets for hydromet components of FEWER
- Once CIMH targets met, endorse FEWER's hydromet features for fitness for purpose
- Include & promote FEWER in all relevant initiatives, instruments, documentation & activities (including those related to CAP)
- Consider TOR & take on the role of FEWER Regional Admin

Strategy (Regional): CDEMA & FEWER

Advance FEWER programmatically through institutional arrangements:

- FEWER to present role of DMA @ CDEMA TAC meeting 16 April, Bdos
- Locate in CRIS (Caribbean Risk Info System) #3. *Support for ER+*
- Include requirements for FEWER in MOU with CANTO
- Include & promote FEWER in all relevant CAP initiatives, documentation & activities including “Business and Community Resiliency in the face of Natural Disasters”, April 24th in St. Vincent
- Consider TOR for institutional role as FEWER Regional Admin
- Take on the role of FEWER Regional Admin
- Consider TOR for, and host, FEWER after incubation period
- *Integrated Search & Rescue (SAR) Programme?*
- *The Canada Caribbean Disaster Risk Management Fund (CCDRMF)?*

Strategy (Regional): CRFM & FEWER

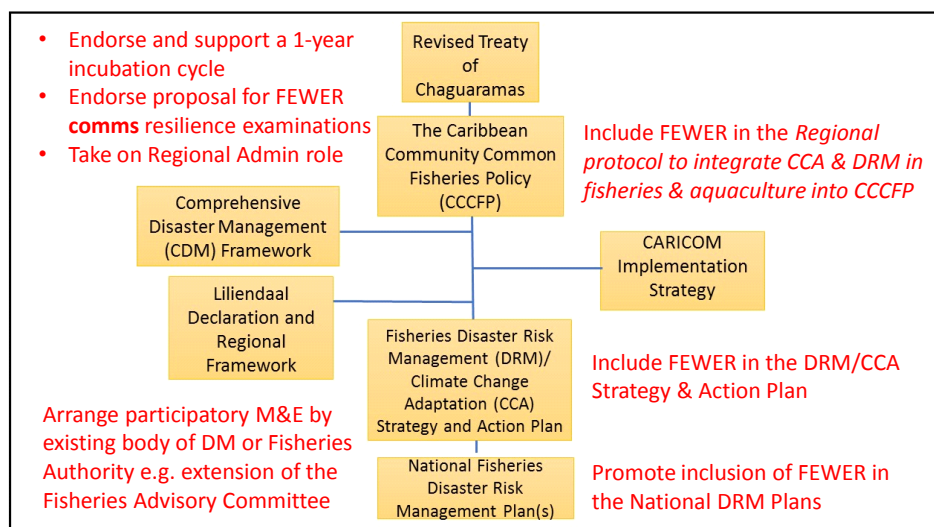


Diagram (not red font) source: MODEL DISASTER PREPAREDNESS AND RISK MANAGEMENT PLAN for the Fisheries and Aquaculture Sector of CRFM Member States. CRFM 2018. Not yet published.

EWS IN THE CARIBBEAN: A DESK REVIEW

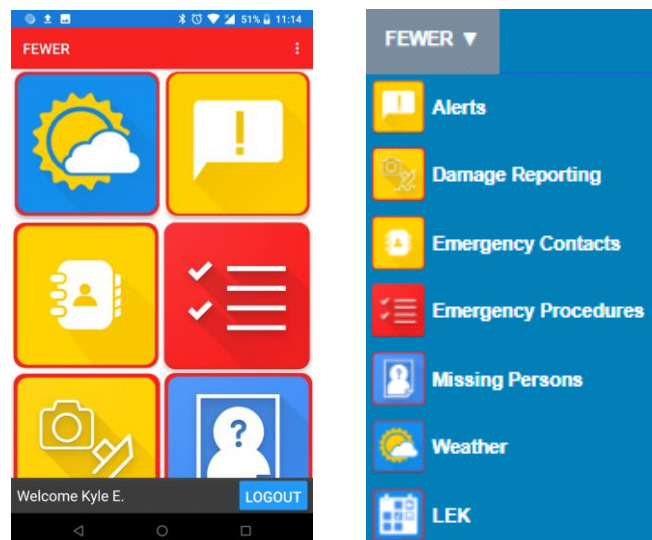
A successful EWS has to meet several requirements including the use of appropriate technology and knowhow, clear responsibility of the parties, effective decision making support mechanisms, functioning communications systems and supporting preparedness instruments including evacuation planning and response structures.

Recommendation: harmonize efforts and share a common EW Vision for the Caribbean through a **Caribbean Early Warning Alliance**:

- Address Gaps in Early Warning Communications ✓
- Accelerate Efforts to engage all stakeholders in the EWS Triangle ✓
(communities, authorities & agencies, and scientific & technical institutions)
- Establish a Strategic Vision for EWS development *
- Revisit and Strengthen the Governance Framework of EWS *
- Prioritize EWS Investments *
- Work towards the Consolidation of National Integrated Multihazard EWS *
- Formulate a strategy for integrating CEWS within CDM KM infrastructure *

*Jeremy Collymore. February 2016. DIPECHO Caribbean Project.
IFRC Contract # CLM947960*

Thank you!!



Appendix 5: Presentation – FEWER Operational Matters



FEWER Operational Matters



ICT4Fisheries Consortium
8 March 2018

Bits

- National MOUs
- Hosting

FEWER MOU

Parties – eg GND

1. CRFM Secretariat	5. National Fisherfolk Organisation (NFO)
2. Fisheries Division	6. National Telecommunications Regulatory Commission (NTRC)
3. Coast Guard	7. National Disaster Management Agency (NaDMA)
4. Meteorological Services	8. Red Cross Society

Aim and scope

- To collaborate to sustain FEWER development, implementation and administration in order to reduce risks to fishers associated with climate change and variability
- To integrate FEWER into existing national DRM and ER frameworks.

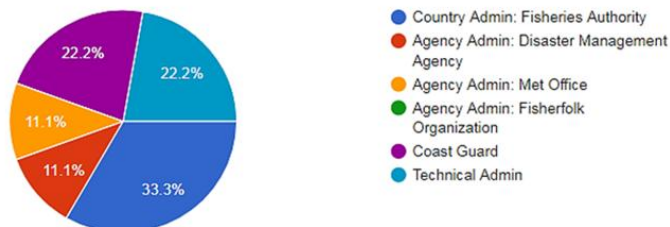
MOU Annexes

1. Work Plans: specific responsibilities to be set out in a bi-annual work plans approved by the fisheries and DM authorities and agreed by all parties
2. Focal Points: Each party to communicate electronically with the CRFM Secretariat, and keep up to date, contact info for the main focal point and at least one alternate

M & E

Participatory monitoring and evaluation through an existing body of the fisheries or disaster management authority, such as an extension of the Fisheries Advisory Committee

FEWER Admin Exceptions on MOU Terms - GND



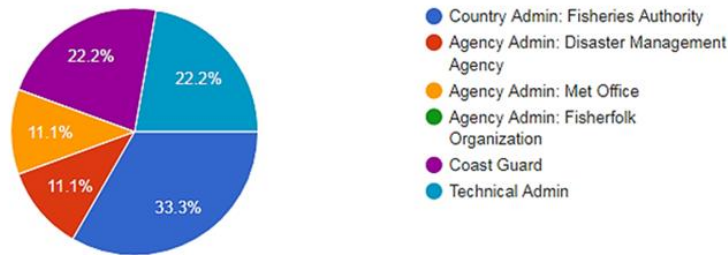
Country Admins: Fisheries Authorities

1. Moderate FEWER alerts before broadcasting (1/3)
2. Promote integration of FEWER into EAF, CCA and DRM (1/3)
3. Support FEWER fisheries extension and training of fishers (1/3)
4. Identify relevant sources on risks and ensure they are configured in FEWER (1/3)
5. Provide situational learning that ties use of FEWER to its context and related tools for inclusion in FEWER training materials (1/3)
6. Include in training, situational learning that ties FEWER to context and tools (3/3)

Agency Admin: Met Office

1. Store historic events for later FEWER (1/1)
2. retrieval to preserve institutional memory (1/1)
3. Moderate alerts generated by FEWER mobile before broadcasting outside of communities (1/1)
4. Improve the inputs to EWS from automated marine sensors (1/1)
5. Provide training in climate service interpretation for fishers (1/1)
6. Provide situational content to include in FEWER training (1/1)

FEWER Admin Exceptions on MOU Terms - GND



Agency Admin: Disaster Management Agency

1. Provide data and information for inclusion into FEWER (1/1)
2. Provide situational content to include in FEWER training (1/1)
3. Conduct training and exercises to test FEWER functionality (1/1)
4. Provide inputs into FEWER deployment, operation and updates (1/1)
5. Store historic events for later FEWER retrieval to preserve institutional memory (1/1)
6. Specify how value of risk knowledge can be increased by and for small-scale fishers (1/1)
7. Include FEWER zero-rated emergency and relief messaging in negotiations with telcos (1/1)
8. Lead FEWER development and adaptation within national MHEWS integrating with CAP (1/1)
9. Provide chunked emergency preparation and response procedures to include in FEWER (1/1)

Coast Guard

1. Provide telecommunications infrastructure for marine VHF (1/2)

Next Steps

1. ICT4Fisheries Consortium revises draft national FEWER MOUs with fresh eyes and an examination of the exceptions recorded in the post-training admin exercises
2. CRFM reviews and passes to heads of national agencies:
 - a. original MOU
 - b. response summaries from post-training exercise
 - c. revised MOU with changes tracked
 - d. clean version of revised MOU
3. 3-week deadline for submission of comments and revisions
4. At cutoff, current versions deemed working final set of FEWER admin TOR
5. Scan for opportunities to incorporate FEWER admin TOR into overarching MOUs
6. Develop TOR for Regional Admins

FEWER Operational Resources - Hosting

Software Requirements:

- **Linux Operating System (CentOS):** FEWER utilizes functions and capabilities provided by the Linux Operating System, most notably, scheduling and logging.
- **HTTP Server (Apache):** Handles the requests made by the FEWER web app for administrators and the FEWER mobile app for fishers
- **Database Management Systems (MySQL):** Stores and archives all information generated by FEWER admins and fishers
- **Web systems middleware applications:** Provides the tools and software infrastructure for the development of FEWER-specific features.

Bandwidth Requirements (500 simultaneous requests):

- Connection Speed: Minimum 30Mbps, Recommended 50 Mbps
- Secondary internet connection: Alternative provider, recommended quarter of primary connection bandwidth (i.e. 12 – 15Mbps)

FEWER Operational Resources – Hardware config

	In-house primary – cloud backup	Cloud primary (HAA) – in house backup	In-house only	Cloud-only
Control	Partial	Partial	Full	Little
Ownership	Full	Partial	Full	Little
Cost Effect	Large Up-front & medium long-term	Small up-front & long-term commitment to external tools	Minimum	Small up-front & long-term commitment to external tools
Effort	Hard	Hard	Medium	Low

HAA = High Availability Architecture

FEWER Operational Resources – Server Services

	Digital Ocean	Host Papa	AWS
Component	USD/yr	USD/yr	USD/yr
Application Server	480	1800	408
Database Server	480		408
Load Balancer	240	0	600
Backup/storage	120	0	120
SSL	80	80	80
Domain	25	25	25
Total	1425	1905	1641

HAA = High Availability Architecture

FEWER Operational Resources - Technical

	Description / Purpose	Particulars	Yearly Cost (USD)
Hosting Server	Store code & resources (images, video & files) generated by web & mobile + CAP tools	Same server can host FEWER and CAP tools needed to generate FEWER alerts & forward national alerts	<u>240</u> (unmanaged) - <u>750</u> (with services)
Domain Name	The name (URL) that users enter via the browser to access FEWER dashboards and public interface	Unique name needed for FEWER and CAP. Latter can be sub-domained eg https://cap.fewer.fish	<u>25</u>
SSL Certificate	Provides security (encryption) for communication between FEWER web & mobile apps. Use https	If CAP tools sub-domained, SSL cert' to cover sub-domains is required. If not, certificate for each name is required	<u>80</u> Cost depend on domain config
S/w Service Subscription (Firebase)	Enables the real-time communication between mobile and web apps for services such as Alerts, Messaging and Delivery confirmation.	The Firebase service has a free and paid tier. Payment is only required when service utilizes more than allocated free quota .	300
S/w Service Subscription (Twilio)	Enables a 3 rd Party SMS service for sending notification of CAP alerts to feature phones	<u>Cost</u> includes acquisition of a number and a specified number of messages per month.	312 for 1 SMS msg to 200 fishers per month at \$0.13 per message
API (Open Weather)	Provides current and forecasted readings in weather module.	Free if number of requests is under 60 per minute	480
API (World Tides)	Provides current and forecasted tide readings in weather module	Free if number of requests is under 600 per month	60
<i>Upper Total (per country unless consolidated)</i>			US\$2000

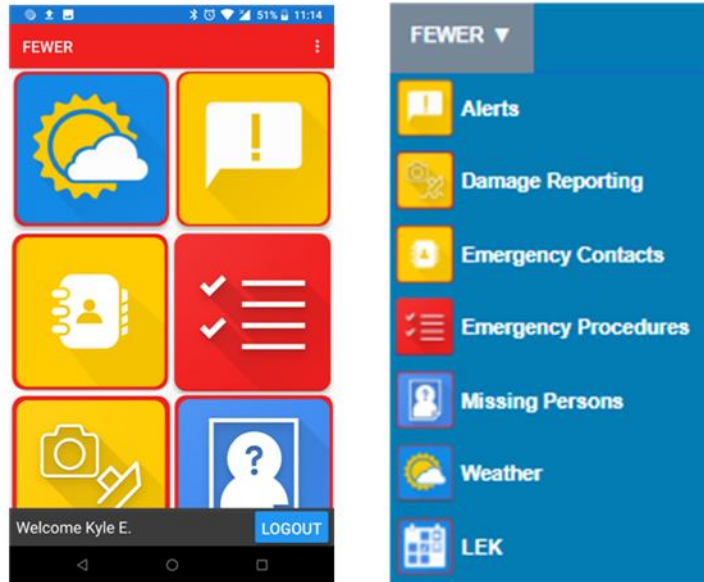
Related FEWER Resources

	Per Country Resources	
	HR	FEWER Resources
3rd Party hosting	Technical admin (to subscribe)	Admin Manual
3rd Party Software Services	Technical admin (to subscribe)	
Optional API services	Technical admin (to subscribe)	Admin Manual
Training	Fisheries Division, Coast Guard Service and NEMO trainers as well as FEWER users: <ul style="list-style-type: none"> Public Coast Guard Service Agency Admin Country Admin Technical Admin 	User Manual
		User Manual
		User Manual
		User Manual
		User & Admin Manuals
Optional Connectivity	Technical Administrator (to configure)	Admin Manual
Reconfiguration of Externally sourced data	Technical Admin (to program)	<ul style="list-style-type: none"> Admin Manual Modified structure of data or access to data

FEWER Operational Resources - HR

- 1. Education:** A first degree in Computer Science, Computer and Electrical Engineering Degrees
- 2. Experience:** familiar with development, configuration, operating and maintenance of enterprise *software* and *hardware* systems. Software systems include the Linux Operating System (CentOS), Database Management Systems (MySQL), HTTP Servers (Apache) and web-systems middleware applications. Hardware systems include the configuration of private-public (hybrid) cloud infrastructure, resource redundancy and high availability architectures.
- 3. Man-hours:** 8 hours per week for regular maintenance

Thank you!!



The CRFM is an inter-governmental organization whose mission is to “Promote and facilitate the responsible utilization of the region’s fisheries and other aquatic resources for the economic and social benefits of the current and future population of the region”. The CRFM consists of three bodies – the Ministerial Council, the Caribbean Fisheries Forum and the CRFM Secretariat. CRFM members are Anguilla, Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago and the Turks and Caicos Islands.

CRFM

Headquarters

secretariat@crfm.int

Tel: (501) 223-4443 - Fax: (501) 223-4446
Belize City - Belize

Eastern Caribbean Office

crfmsvg@crfm.int

Tel: (784) 457-3474 - Fax: (784) 457-3475
Kingstown - St. Vincent & the Grenadines

www.crfm.int

www.youtube.com/TheCRFM

www.facebook.com/CarFisheries

www.twitter.com/CaribFisheries

