CREWS CLIMATE RISK & EARLY WARNING SYSTEMS

Analytical Paper to guide the development of Operational Procedures on CREWS Programming in Fragile, Conflict and Violence (FCV) settings

Author: Catalina Jaime

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This analytical paper commissioned by the UNDRR-WMO Center of Excellence, in support of the CREWS initiative, aims to guide the development of Operational Procedures on CREWS programming in FCVs. The analysis focuses on identifying gaps and opportunities based on screening crucial CREWS documents and interviews with key stakeholders, accompanied by tactical and strategic recommendations for the existing operational procedures and other documents. It also provides a detailed description of key thematic areas that CREWS could consider for the design of their next 2026-2030 strategy with topics such as climate security, protection of hydrometeorological infrastructure, Early Warning Systems (EWS) for conflict and other situations of violence, etc. At the end, a roadmap for the development of the CREWS Programming Operational Procedures in FCV contexts is proposed.

The Climate Risk & Early Warning Systems (CREWS) Initiative funds life-saving climate action.

We help the world's poorest and most vulnerable countries build early warning systems against hazards such as floods and drought.

Our goal is for the poorest and most climate vulnerable people to be able to protect their lives and livelihoods in the face of climate danger. We can do this by ensuring timely, accurate forecasting and early warning reaches every person for necessary action.

We work with and benefit from the expertise and leadership of governments along with the collective experience of our implementing partners – the World Meteorological Organization (WMO), the World Bank Group/Global Facility for Disaster Risk Reduction and Recovery (GFDRR), and the UN Office for Disaster Risk Reduction (UNDRR).

Our support for Least Developed Countries and Small Island Developing States is through a pooled Trust Fund – with contributions from Member States. In 2023, there were 12 CREWS Members.

Our growing membership and financial support testify to the relevance, urgency and value of our work.

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KEY MESSAGES

CREWS FCV INTEGRATION IN OPERATIONS REQUIRES THE FOLLOWING:

- Build on the current political and strategic momentum of expanding climate action in FCV settings to leverage funding, partnerships, and knowledge to achieve CREWS expected results by 2030.
- Update all existing CREWS operational procedures and other relevant documents to include FCV considerations and create dedicated FCV operational procedures.
- Enhance FCV awareness internally at the CREWS secretariat, steering committee level, and Implementing Partners. Promote a better understanding of challenges in EWS support in FCV contexts, including need for augmented surveillance of programmatic risk and adjustment in operating models to mitigate risk with Implementing Partners and Country Partners.
- Support EWS academic research, given the significant gaps in FCV settings.
- Engage strategically in emerging topics, expanding attention to and investment in EWS in the context of climate security, conflict prediction, the role of non-state armed groups in climate action, the potential role of EWS to contribute to national peace dialogue in FCV settings, etc.
- Lead the way to enhance the protection of hydrometeorological infrastructure in FCV settings.

DESIGN OF CREWS FCV OPERATIONAL PROCEDURES:

- Reconsider the approach to formulation of pipeline countries, including concrete targets to reach FCV countries per year.
- Integrate FCV sensitivity analysis and/or screening criteria into project design and implementation.
- Enhance FCV scenario planning into the CREWS risk management approach.
- In line with CREWS's people-centered approach, ensure the selection of countries and project activities starts with understanding the risks of FCV-affected populations and to what extent EWS can support risk reduction and effective disaster response, while contributing to efforts and pathways to conflict resolution.
- Provide directions to guide IPs on the course of action in case of FCV-related challenges, disruptions and suspension of programming.
- Encourage joint programming among IPs in FCV settings, as each has a critical role in contributing their expertise while including critical partners that can deliver an FCV-sensitive, people-centred approach to EWS.

CONTENT

BACKGROUND

By 2030, nearly 60% of the world's extreme poor will reside in countries affected by FCV. Violent conflict has spiked dramatically since 2010 in several regions, and the fragility landscape is becoming more complex. The world has seen a series of setbacks to stability in regions across the world: from Asia and Africa to Latin America and the Caribbean, and more recently in Eastern Europe and the MENA region. Fragility is intertwined with other global challenges like climate change, pandemics, and food insecurity: 15 of the top 25 countries most vulnerable to climate-related impacts are FCV countries. Over the past two decades, significant strides have been made in improving Early Warning System (EWS) policies, strategies, and practices. While these advancements have saved countless lives, crucial policy, science, and practice gaps must be addressed to fully institutionalise EWS in Fragile, Conflict, and Violence (FCV)- affected settings. [1–3] In recent years, attention has turned to the need to ensure that countries and territories affected by FCV can reduce the risks of disasters[4] and within that, can implement and sustainably maintain Early Warning Systems and Anticipatory Action (AA) investments[5].

There has been a noticeable shift in focus towards protecting people living in complex conditions through EWS. This shift is a response to the recognition that climate change, combined with other complex risk drivers, poses a high likelihood of social, health, economic, infrastructure and other impacts in FCV settings due to heightened vulnerabilities, low resilience to (recurrent) shocks, and shortfalls in governance[6–8].

There has been a significant change at the policy level, particularly since adoption by UN member states of the Sendai Framework for Disaster Risk Reduction. FCV dynamics have also as a significant consideration during the midterm review of the Sendai Framework conducted in 2023.

1. FRAGILITY, CONFLICT AND VIOLENCE DISAGGREGATED TYPOLOGY

As FCV represent a broad spectrum of contexts, this analytical paper uses the disaggregated typology proposed by the Coalition for Climate Action in Conflict and Fragile Settings, which is inspired by terminology already used by the World Bank and the International Committee of the Red Cross. Table 1 describes the four types of contexts and their respective constraints for operations[9]. Please note that this paper follows the official World Bank FCV definition, which is the one used officially by CREWS; however, for practical use, we applied these four typologies to allow a more detailed analysis as described in Annex 1 and other sections of the report:

Terminology and Constraints by the Coalition for Climate Action in Conflict and Fragile Settings	
Institutional fragility – IF	This includes often post-conflict contexts and countries or territories with high levels of violence. The World Bank (Nd) describes countries with high institutional and social fragility as those "facing deep institutional crises, that have very poor transparency and government accountability, or that have weak institutional capacity."[10] **Constraints:** In situations of high institutional fragility, the consistent implementation of plans, laws and policies to build resilience, protect the environment and strengthen adaptation to current and future risks tends to be hampered by financial and capacity constraints, as well as by competing and changing priorities. Government services may be under-resourced and concentrated in urban settings, leaving out large portions of the population.
Contested territories – CT	Contested territories' can be defined as situations where a state opposes the claims of the de facto authority or that of one or several armed groups to a part of its internationally recognised territory, often—but not constantly—engaging them militarily to reassert its control. **Constraints:** Challenges to designing and implementing adequate responses in conflict settings tend to be exacerbated in territories under non-state armed groups' complete or fluid control. The lack of governmental presence and services, significant access challenges, rapidly changing security situations and even more stringent restrictive measures that reduce the potential for funding result in a tendency to exclude territories that are not under the control of the government for anything beyond an emergency response. The maintenance of essential services tends to be limited; the economy tends to be severely disrupted, and data gaps tend to be particularly important – even if a meteorological station remains operational, it often stops transmitting data.
High-intensity conflict – HI	The World Bank defines high-intensity conflict as widespread and intense violence across many parts of the country, measured by the absolute and relative number of deaths. **Constraints:** The challenges in high-intensity conflict are severe. Humanitarian access is significantly reduced, critical infrastructure and services are extensively destroyed, and development activities are commonly halted. Action is often limited to emergency relief to ensure people's survival. Areas near the front line, usually receiving displaced people, are typically insecure and unstable but allow for a greater depth of action.

Terminology and Constraints by the Coalition for Climate Action in Conflict and Fragile Settings	
Protracted conflict – PC	Protracted conflicts are characterised by their longevity and intractability. They may be episodic, with variations in the intensity of the violence over time and space. They are often marked by fragmentation and mutation, involving the rise of new armed groups and the splintering of armed forces. **Constraints:** Prolonged conflicts worsen the limitations of institutions in fragile situations. They also have negative impacts on the environment, essential services, economy, and access to affected areas. This leads to weakened governmental presence and limited development efforts. As a result, areas affected by conflict experience greater suffering, including displacement, injuries, and disrupted services. Although violence may be localized, long-lasting conflicts weaken governance and institutions, diverting the government's focus towards restoring security at the expense of other priorities. This contributes to a lack of reliable historical data, making longer-term planning and projections challenging. Additionally, the weakness of institutions, limited absorption capacity, and restrictive measures hinder access to adequate finance.

Table 1: Fragility, Conflict and Violence disaggregated typology

To provide a more detailed tool for CREWS to develop its FCV Operational Procedures, Annex 1 provides a comprehensive and disaggregated list of constraints and ideas across the value chain of EWS (see diagram 1). This exhaustive compilation builds on the WMO-UNDRR Center of Excellence Handbook on EWS in FCV settings, the GFDRR report on EWS in FCV settings[1], the Red Cross Red Crescent Disaster Risk Reduction (DRR) Practitioner Handbook "Navigating Fragility, Conflict, and Violence to Strengthen Community Resilience (*forthcoming*), and the Anticipation Hub/CGIAR - Anticipatory Action in Conflict tool kit (*forthcoming*), as well as other academic literature, grey literature, and expert knowledge. Annex 1 could be used to identify specific solutions that CREWS partners can support to enhance EWS in FCV contexts.

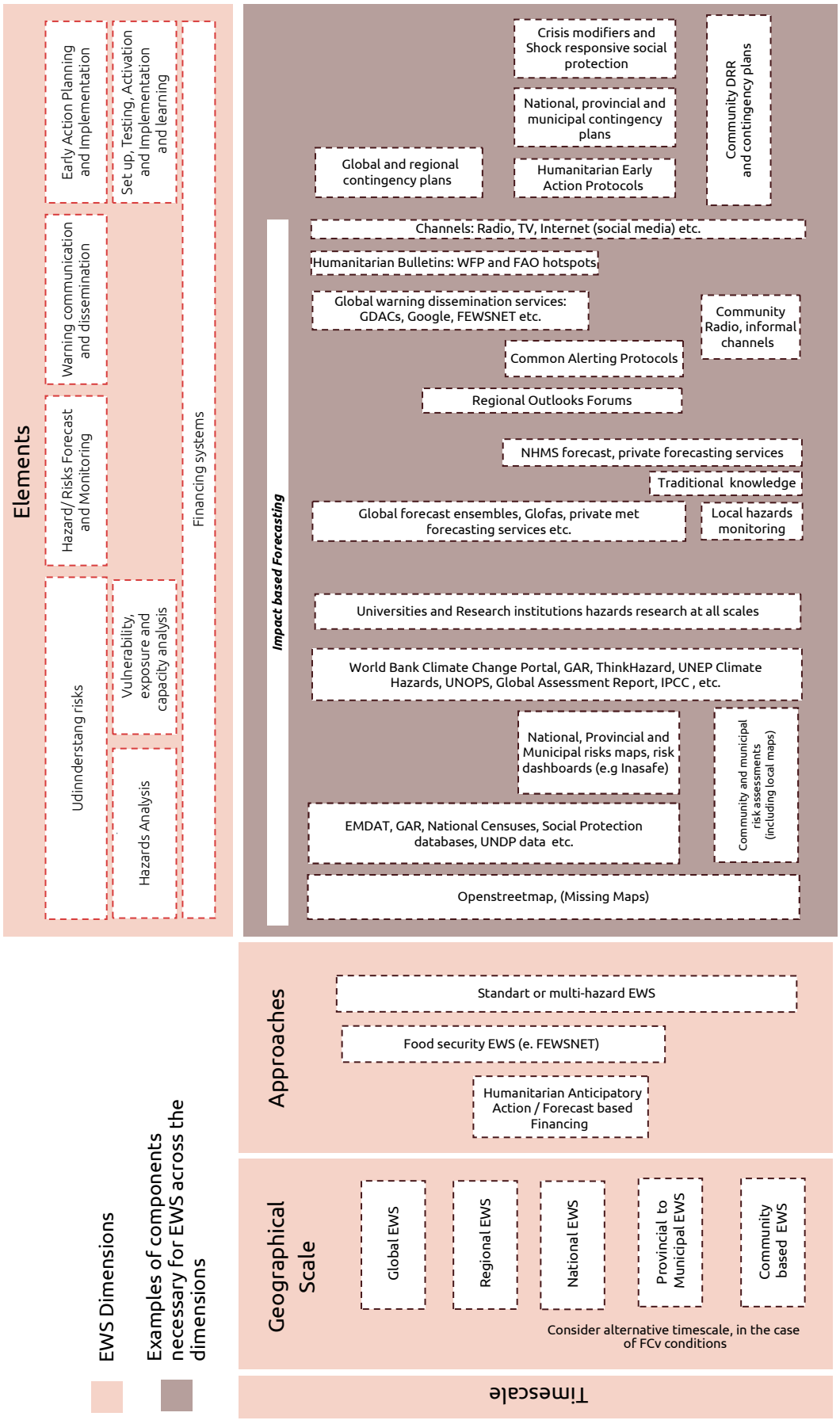


Diagram 1: Expanded EWS value chain (Jaime et al. 2024 forthcoming)

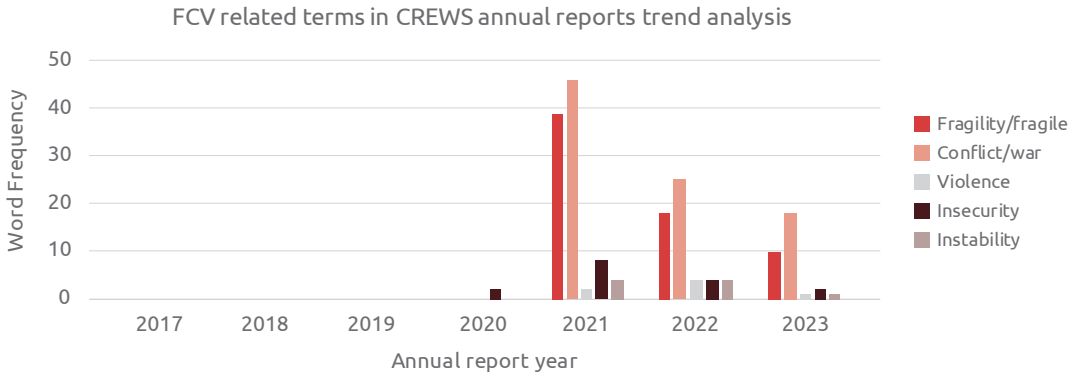
2. CREWS ENGAGEMENT IN FCV SETTINGS: REVIEW OF EXISTING CREWS PORTFOLIO

ANALYSIS OF CREWS ANNUAL REPORTS WITH AN FCV LENS

The following section describes relevant findings from CREWS annual reports (2017-2023) and interviews with implementing partners[1]. It shows progress in integrating FCV conditions into programmatic processes, as well as gaps and opportunities for future CREWS programming.

2.1 PROGRESS

CREWS has supported projects in FCV settings since its establishment. In the 2021 annual report, the CREWS Secretariat recognised the importance of reflecting on the complexities that FCV conditions posed to its projects; special attention was placed on adding a typology of conflict for each country and describing the FCV situation. This trend has continued (see graphic 1); for example, the 2023 annual report includes a dedicated section on the impact of conflict in Sudan and the relevant role that CREWS has played in helping to maintain essential forecasting services amidst a complex crisis. CREWS growing description of FCV in their annual reports seems to be a result of an increasing political ambition in enhancing climate action in FCV settings, combined with an ever-increasing programmatic effort of implementing partners to support FCV-affected countries.

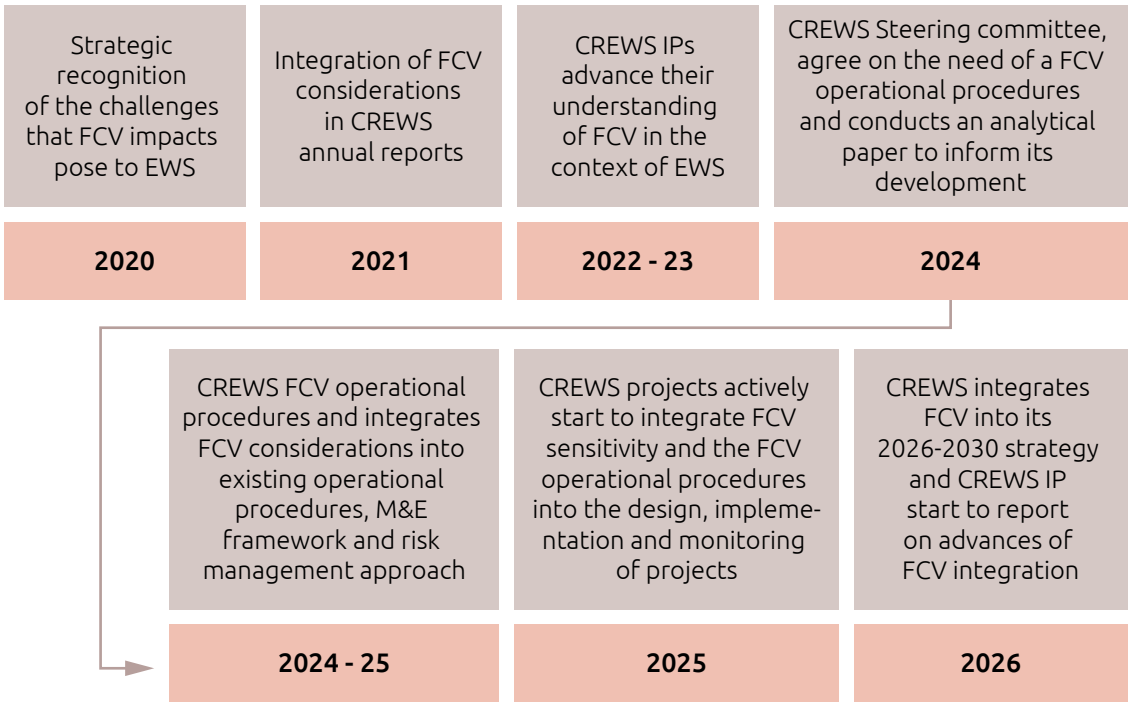


Graphic 1: FCV related terms in CREWS annual reports (2017 to 2023)

- CREWS efforts to rescue hydrometeorological data in FCV settings and share it globally are significant actions. Continuing doing this, global forecast models would be able to provide even better information in areas with limited national weather and climate services 10.
- CREWS recognises the importance of fluidity and adaptability in implementing activities vis-à-vis changing security and complex political conditions. Some examples outlined below show how CREWS could modify its plans under these circumstances.
- Despite several challenges faced by FCV countries supported by CREWS, the reports highlight some vital policy and law improvements achieved.
- Special attention has been given to improving EWS evaluations, contributing to monitoring the Sendai Framework for Disaster Risk Reduction (DRR) and the Early Warning for All (EW4A) initiative.

1 IPs: UNDRR and WMO interviewed (6 people) and CREWS Chair and FCDO (3 people).

- From 2021, CREWS reports acknowledged the complex nature of multiple, compounding and cascading crises affecting the capacity for EWS delivery by national actors.
- CREWS played a crucial role in increasing funds for EWS in FCV settings[2]
- CREWS has achieved key milestones for FCV consideration into operations (see graphic 2).



Graphic 2: Evolution of FCV consideration in CREWS since 2020 towards 2030

2.2 GAPS AND OPPORTUNITIES

- By analysing the reports through an FCV lens, CREWS reports show a gap of investment in sub-elements of the EWS value chain (see diagram 1), as outlined in Table 1. Most reported projects and examples of CREWS-funded projects focus on advancing risk analysis by crucial actors such as National Disaster Management Agencies (NDMAs) (e.g. multi-hazard risk mapping), enhancement of hazard detection, monitoring, forecast production and forecast communication by National Hydrological and Meterological Services (NMHS) (e.g. hydrometeorological capacity building at all levels, hydro met infrastructure with a focus on particular hazards such as floods, droughts and tropical cyclones etc), as well as warning dissemination to end users (e.g. in the agricultural and disaster risks management sectors). See Table 1 for details on EWS in FCV context gaps.
- EWS research and partnerships with academic and research institutions are not reflected in the annual reports (see this recent study that shows evidence of gaps in EWS research in conflict settings[11]).
- Although key informants acknowledge the adaptability and fluidity of CREWS activities, there is a need for pre-designing detailed FCV scenario planning before a project starts (this can adapt the climate storyline approach integrating FCV scenarios). The expenditure rate of CREWS projects could improve in FCV settings by anticipating FCV-related capacity constraints and having contingency plans, crisis modifiers and pre-determined actions to inform decisions before, during and after a complex situation.

2 It is important to explore further the ratio of funds transferred by IPs to national governments for EWS, vs. how much they retain for delivery of support/technical services? And the ratio between IPs?

- The CREWS Accelerated Support Window (ASW) has the opportunity to enable FCV and context analysis research to inform CREWS design projects (see section 3.4).
- CREWS IPs could enhance coherence and collaboration in practice when they all work in the same FCV country. Linking their CREWS projects with their broader interventions, and those of other actors in the country.
- Based on CREWS reports, this paper suggests that further investment and attention are needed for EWS in FCV settings across these elements and sub-elements of the EWS value chain (see Table 2 and Annex 1).

EWS pillars	CREWS EWS Investment opportunities
Disaster Risk Knowledge	Advance complex risk analysis integrating multiple FCV considerations. In FCV, where multiple risks collide simultaneously, it is essential to enhance the capacity to understand and monitor risk fluctuation. This would be a key for impact-based forecasting and early action planning.
	Increase and improve multi-hazard exposure and vulnerability data for EWS, focusing on granularity, quality, and maintenance (updated data and systems). Concentrate on territories with extreme risk data gaps. This could be seen as a daunting process. However, partnerships with key actors already advancing on vulnerability and exposure data in the FCV contexts are a key opportunity. (e.g., International Displacement Monitoring Centre – IDMC, initiatives such as CRAF'd, and OpenStreetMap[12].
	Expanding support to research organisations as a temporary custodian of risk data in FCV settings where government circumstances make direct support to them difficult. IPs can explore partnerships with these actors as part of the EWS process. (See table 1 for more details)
Detection, observations, monitoring, analysis and forecasting of hazards	Protecting hydro-met infrastructure from damage and decay due to FCV conditions (see section 4.2 for more details).
	Enhancing hazard analysis of heatwaves, dust storms and other hazards under-researched in FCV settings[11].
	Strengthen the business continuity of NHMS in highly volatile contexts. Although WMO launched in 2024 a BCG, there is a need to reinforce the support for FCV-related crisis[13]
Warning dissemination and communication	Ensure FCV sensitivity in warning message design and selection of dissemination channels such as community radios (see Annex 5).
	Protecting telecommunications infrastructure from damage and decay because of FCV conditions[3].

3 Consider CAP, digital connectivity mapping by ITU, and working through civil society in FCV settings for warning communications.

EWS pillars	CREWS EWS Investment opportunities
Preparedness to respond	FCV-sensitive early action planning, building on retrospective disaster analysis and robust context analysis.
	Co-producing Early Actions across various actors in the Humanitarian, Development, Peace and Climate (HDPC) nexus. In practical terms, this includes that all EWS investments of CREWS projects supporting NHMS should be connected to the trigger mechanisms for Anticipatory Action planning, such as the one supported by the Central Emergency Relief Fund (CERF) managed by the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA), the similar fund DREF, by the International Federation of the Red Cross Red Crescent (IFRC) and the Start Fund/ Start Ready of the Start Network. The AA processes can be enablers of connections between HDPC partners.
	Detailed scenario planning for all possible events in FCV settings (e.g., Coup d'etat, election violence, the sudden escalation of insecurity, civil unrest, protracted conflict with high levels of violence fluctuation, community tensions, etc.). Scenario planning can be done in different ways. For the situations described before, a combination of decision tree and foresight accompanied by a screening checklist could be used in the scenario planning process.

Table 2: Enhancing the EWS value chain in FCV settings

In addition to the responsibility that the CREWS Secretariat has in integrating FCV considerations into the CREWS strategic and tactical process, CREWS implementing partners (IPs) have a critical role to play, as indicated in the M&E operational procedures. IPs are responsible for applying their risk management policies and practices to mitigate risk in their projects. However, as described in Table 3 (not public), there are still FCV-related gaps that need to be addressed by the IPs to ensure that CREWS' expected results are achieved in FCV contexts.

The table 3 below (not public) uses a risk colour code to show to what extent the lack of these levels of FCV integration represents risks to achieving CREWS results. This analysis needs to be expanded further in the next phase of the CREWS FCV operational procedures development to reflect, in more detail, IPs' FCV integration progress.

These are some recommendations highlighted in the interviews conducted with IPs:

- IP staff designing and implementing CREWS projects need capacity building to deal with FCV situations and ensure accountability and delivery.
- In the case of WMO, CREWS projects depend on the needs identified by NHMS. When critical FCV situations emerge, WMO is subject to NHMS priorities.
- SOFF and CREWS' strategic cooperation is needed to safeguard hydro met investments and protect historical hydro met data in times of crisis.
- There is potential to advance further the use of remote sensing and Artificial

Intelligence (AI) in territories with very limited forecasting and risk analysis.

- IPs highlight the need for flexibility in CREWS processes during FCV crises.

2.3 KEY QUESTIONS CREWS REPORTS RAISE FROM AN FCV PERSPECTIVE

The questions below emerged from the screening of CREWS reports. Section 4 includes recommendations related to these topics. It is recommended that these questions be included in the development process of the FCV operational procedures (see section 5).

1. To what extent are the hydrometeorological stations supported by CREWS projects protected from potential damage and decay due to FCV conditions? To keep them functioning, are there contingency plans for different instability and security scenarios to ensure their maintenance?
2. To what extent do risk analyses supported by CREWS projects integrate compound and cascading risk analysis in the design of EWS? In FCV settings, the co-occurrence of multiple hazards (natural, biological, technological) and cascading effects, such as food insecurity, are critical drivers of disaster impacts and could be a threat multiplier for tensions.
3. Is mental health due to conflict considered during the design of EWS, particularly warning communication and dissemination plans and the early action process?
4. Do CREWS projects target people in situations of forced displacement?
5. Do CREWS projects include an analysis of how conflict dynamics might impact warning communication, dissemination, and early action?
6. Do the CREWS projects reach isolated, difficult-to-access areas where FCV-affected vulnerable populations live? (see Annex 3)
7. Given the policy moment to increase climate funds in FCV contexts, with processes such as the COP28 Climate, Relief, Recovery and Peace declaration, to what extent are CREWS projects ready to reach at-scale[4] FCV settings with an FCV-sensitive approach?
8. To what extent do the CREWS secretariat and IPs collaborate and coordinate with peace and security actors in implementing CREWS projects in conflict-affected contexts as part of the ambitions for HDP nexus programming agreed upon at the 2015 World Humanitarian Summit?[14]

4 In this report, scale in the context of EWS in FCV refers to 1. Expand EWS to additional geographical areas, to all at risks areas in a country 2. Move from small community-based EWS interventions to CBEW that reach all at-risk areas. 3. Expand the hydro-met observation network to areas in a country with poor coverage (see section 4).

3. REVIEW OF EXISTING CREWS OPERATIONAL PROCEDURES IN THE CONTEXT OF FCV SETTINGS

The section below presents action points based on the gaps identified during the screening process of CREWS operational procedures and other documents. These are strategic, tactical, and specific recommendations for integrating FCV into existing CREWS documentation, planning for the 2026-2030 strategy, and general CREWS ways of working in FCV settings. The numbering of each document was kept to facilitate the CREWS team's review process, only sections relevant to FCV considerations are listed). A phased approach is highly recommended when/if the recommendations provided are implemented.

3.1 CREWS OPERATIONAL PROCEDURES NOTE NO.1 - PROGRAMMING AND PROJECT DEVELOPMENT

CREWS Programming Principles

- Include an FCV-sensitive principle. Proposed text: "CREWS recognises the complexities and dynamic fluctuations of risks faced by Fragile, Conflict and Violence-affected countries; therefore, CREWS projects integrate an FCV sensitive approach to promote adaptability, flexibility and sustainability in times of crisis".
- Principle of coherence and coordination: CREWS implementing partners have the opportunity to strengthen tactical alliances with humanitarian actors in FCV-affected countries given their long-term engagement, context and institutional knowledge, particularly in protracted conflicts, contested territories and high-intensity conflicts. Coherence and coordination with humanitarian programming are especially relevant given the growing Anticipatory Action focus. CREWS secretariat could play an enabler role for HDP and climate nexus actors to move beyond traditional coordination (meetings) to establishing protocols for sharing activities status, information, funding opportunities, etc. One critical outcome of meaningful coherence and coordination is the lack of duplication of efforts and funds, which is unfortunately common in the EWS space.

Table 3 describes the likelihood of applying CREWS principles in FCV settings. This analysis is based on the author's expert knowledge. It is recommended that this table be used for the next steps of the FCV operational procedures development, and it should be updated based on discussions with the CREWS secretariat and relevant stakeholders.

FCV typology Principles	Institutional Fragility	Protracted Conflict	Contested Territories	High-Intensity Conflict
Country ownership				
Targeting lifesaving needs				
People-centered early warnings				
Gender-sensitive				
Leveraging resources				
Integrated and inclusive programming				
Coherence and coordination				

Table 3: CREWS principles application in FCV settings

Roles and Responsibilities

Implementing Partners:

- Lead and assist relevant stakeholders in the design of the projects and implementation (add, integrating FCV sensible programming)

Steps and Timelines for CREWS Project Development and Approval

CREWS Project and Pipeline Countries

- Mapping of LDCs and SIDS status and needs should include FCV analysis at different timescales (e.g., during project implementation and in the long term); this could be done in partnership with specialist institutions such as the International Crisis Group, which could support the CREWS secretariat with foresight processes for country-level FCV risk analysis. Note: the UN has foresight and risk analysis products for most FCV, including the UN Common Country Assessment
- CREWS has the opportunity to enhance its selection process of pipeline countries, making it more participatory with IPs and other actors. Barriers such as risk aversion and political complexities that might influence the decision to exclude certain FCV countries require evaluation with a different lens, especially from a people's needs and risk perspective, as often countries that might be excluded for political reasons have higher EWS need (see section 4.1)

CREWS Investment Plan

- Given the biennial review of the Investment Plan and the Programming Framework, explore the possibilities for ad-hoc revisions that might be necessary due to fluctuations in contexts (including safety and security).

CREWS Project Development Process

- See below Annex 1 and 2 recommendations, specific to Note No. 1.

Schematic Presentation of CREWS Project Development

- Include “FCV risks” in this box: Joint and continuous mapping of priority countries, needs and FCV risks.

Project Template

- See Annex 2 recommendations specific to Note No. 1.

Project Implementation

- If an FCV-sensitive principle is added to Note No. 1 in section 7, it is recommended to modify paragraph 19, proposed text: CREWS Projects are implemented and administered following CREWS principles and the guidelines of the Implementing Partners.
- In section 21, based on past experiences, evaluate whether changing conflict dynamics fit into the time it takes for approvals by the steering committee. The new FCV operational procedures should include specific activities and examples of scenarios to ensure smooth changes of project plans due to conflict intensity, violence, and political changes with security implications.

Partner Engagement

- Relevant stakeholders in FCV settings should include non-traditional EWS actors, such as peace and protection actors (e.g., international crisis group, ICRC, Danish Refugee Council, Norwegian Refugee Council, etc.), and governmental institutions, such as the Ministries of Defence, Armed Forces and the police. Critical actors are those ones that can reach areas with difficult access, often faith-based organisations, the ICRC and RCRC National Societies, as well as the private sector (telecommunications, infrastructure and mineral extraction; however, a conflict sensitivity analysis must be conducted before engagement, such actors).

No. 1 - ANNEX 1: Criteria for Mapping of Early Warning Systems Status and Needs in SIDS and LDCs

Paragraph 2: “The mapping addresses an identified need by Development Partners”. In FCV settings, EWS needs must be identified by actors in the Humanitarian, Development, Peace and Climate (HDPC) nexus.

Criteria mapped: Proposed amendments and additions

1. Exposure to risk and institutional capacity for early warning

- Include a capacity assessment of other actors implementing EWS in the HDPC nexus. This capacity assessment could be available through existing processes conducted by actors implementing anticipatory action (see Anticipation Hub feasibility study resources); if nothing is available, such assessment could be conducted as a collaborative process between CREWS IPs.
- New: Consideration of EWS research gaps. A 2024 peer-reviewed paper demonstrates the EWS research gaps in conflict-affected contexts.
- New: FCV context analysis, including FCV risks affecting programme/project implementation.

2. Level of priority given to early warning systems by countries

- Requests for support by country: in some FCV contexts, non-governmental institutions play a vital role in EWS as they might have the capacity for large-scale EWS support. In exceptional circumstances, would CREWS be able to support projects even when the government has not requested support?

3. Potential for leveraging additional resources and aligning programmes

- For example, consider including the Complex Risk Analytics Fund (CRAF’d) as this directly contributes to the enhancement of EWS.

No. 1 ANNEX 2: Template for CREWS Project Presentation Note to the Steering Committee

- Initial state of play - project rationale:
  - — Include the current state of EWS research
  - — Include challenges associated with implementing in FCV settings
- Project viability and sustainability
  - — Include FCV risks affecting programme/project design, implementation and M&E based on the FCV typology presented in this paper.
  - — Include worst-case scenarios in which project implementation could undergo radical changes due to high levels of violence, lack of access at all levels, institutional collapse, etc.
  - — Include FCV risk mitigation measures, including for the worst-case scenarios, as described in point b and based on the proposed FCV typology.

3.2 CREWS OPERATIONAL PROCEDURES NOTE NO. 2 - MONITORING AND EVALUATION

Annex 2 – Reporting Timelines for CREWS Implementing Partners and Secretariat: Consider officially including in this procedure one ad-hoc reporting period in cases when programming is severely affected (e.g. coup de état and severe cases of violence).

Table 4 describes the constraints and recommendations of CREWS core programme indicators in FCV settings (excluding the gender indicator as this analysis does not prose changes for it). Followed by additional recommendations for the CREWS Complete Results Framework.

Constraints in the FCV context	Recommendations
Programme indicators: # of people living in areas covered by hazard forecasts and warnings for a given hazard.	
NHMS service hazards forecast capacity is limited due to a lack of resources, limited human resources, including a brain drain of qualified staff, and a lack of hydrometeorological observations, particularly in areas with difficult access due to security, where often hydrometeorological stations are limited, are damaged due to direct impact of conflict or decay. People affected by conflict living in difficult areas to access are often left behind of early warning and early action.	CREWS investments in conflict areas where hydromet infrastructure could be impacted directly or indirectly are protected under International Humanitarian Law, as they are critical civilian infrastructure (see section 4.2). In the absence of national hazard forecasts in conflict-affected areas, global forecast models are an important source of forecasts to cover this gap. CREWS projects could support NHMS in integrating global models into their national forecast processes. Enhancing communication and dissemination of warnings from such models is an opportunity to achieve CREWS programme indicators. People displaced by conflict or other causes are extremely exposed to natural hazards. CREWS could scale up its support of EWS for this population. Similarly, deploying geo-observation tools in cases where ground-observations on hazards, demographics, displacement, etc, is not feasible can be a quick-win and/or viable stand-in measure for EWS[12].
Programme indicators: # of LDCs and SIDS that have generated risk information to enhance the early warning system	

Constraints in the FCV context	Recommendations
Risk data access, quality, granularity and regular updates are significant challenges in FCV settings. In this context, where there are vast numbers of operations by many actors, there is a trend to duplicate risks in data generation and analysis. Yet, the fundamental challenges mentioned before are prevalent. Government institutions often lack the resources and technical expertise to generate and/or maintain risk information; hence, they depend on external actors for risk analysis. Risk data related to conflict impacts is often not considered in disaster risk datasets[5], which is a missed opportunity. In the FCV context, understanding how FCV conditions exacerbate vulnerabilities and exposure can make risk analysis more accurate and useful for impact-based warning development and early action planning.	CREWS can play a key role in ensuring donor coherence when funding risk data collection, enhancement, and risk analysis processes (for example, the creation of risk dashboards and maps). CREWS projects can strengthen the capacity of academic institutions, in coordination with Government agencies in FCV settings, to play a strategic and tactical role in the sustainable and long-term production of risk data and risk analysis. CREWS can request IPs to integrate FCV-related risk information into EWS-related risk analysis processes. For example, data related to people with mental health due to conflict should be considered as critical vulnerability information for the set up of an EWS, as often mental health jeopardises the capacity of a person to act upon a natural hazard forecast.
Programme indicators: # of at-risk people accessing early warning systems and services through their preferred channels	
Channels of warning dissemination in FCV areas, especially HI and CT, tend to be weak. In some contexts, there is limited Internet and mobile network access, and not all at-risk people have mobile phones. Community leaders, often faith-based, such as churches, mosques, etc., are respected sources of information, especially in areas where trust is low due to tension between conflicting parties. Yet this communication channel is fragile, and warning dissemination can be jeopardised rapidly in changing contexts. There is limited research on the challenges and opportunities of warning communication and dissemination in conflict contexts.	During the design stage of CREWS projects, it is recommended that IPs conduct robust assessments of communication channels that include historical analysis and a future-looking scenario planning that presents potential future disruptions to warning communication and dissemination, as well as mitigation measures. CREWS projects can promote the protection of telecommunication infrastructure, which is essential for early warnings in complex territories (See the IHL section below). Strengthening the warning communication and dissemination process with critical local actors is essential. CREWS projects can pay special attention to ensuring such actors have the training, equipment, tools, and well-defined processes to ensure that at-risk people receive warnings in a timely manner, even in the most complex contexts.

Table 4: CREWS core programme indicators with an FCV lens

5 UNDRR's promotes loss and damage accounting which includes societal risks such as conflict. However, governments often choose not to report on loss and damage from conflict.

3.3 CREWS OPERATIONAL PROCEDURES NOTE NO. 3 - GENDER-SENSITIVE PROGRAMMING

This section proposed FCV considerations as part of the four EWS elements:

- Understanding risk:
  - Political factors are critical in the creation of risks; from an FCV perspective, changes in political dynamics that lead to tensions, including conflict and violence, have the potential to exacerbate gender-related vulnerabilities.
  - Gender-based violence (GBV) should also be analysed in the context of disaster risks and EWS, noting that violent conflict affects men and women differently. While men make up the majority of combatants during conflict and are more likely to die from the direct effects of violence, women also face a continuum of insecurity before, during, and after conflict. Sexual and gender-based violence tends to be higher in conflict and post-conflict settings, and women are often excluded from early warning messaging and, therefore, miss opportunities for preventative or preparedness action to avoid or minimize loss and damage from hazardous events.
  - In some FCV settings, LGBTQ+ communities tend to be discriminated against and suffer direct and indirect violence. This, in turn, exacerbates vulnerabilities and exposure, which could lead to higher disaster impacts in this minority population.
- Observing and monitoring climate risk

In FCV settings, women and children often take on the responsibilities of forecast and risk monitoring in the absence of men, for example, when they are called to serve in the armed forces, join non-state armed groups (NSAG) or in contexts where fatalities of men are high due to conflict and violence.

- Communicating and disseminating alerts and climate information
  - In contexts of protracted conflict, high-intensity conflict, and contested territories, it is possible that the majority of the population consists of women, children, and the elderly (see Annex 3). When telecommunication infrastructure is compromised due to attacks or lack of maintenance, these population groups can be left behind without access to warnings.
- Responding to warnings and climate information:
  - Early action planning requires the participation of diverse population groups, and it is crucial to support the participation of women, girls, and the LGBTQ+ community in an FCV-sensitive way.
  - Contingency planning at all levels, from national to community level, must include scenarios in which conflict and violence exacerbate gender-related vulnerabilities, leading to higher disaster risks. For example, a sudden escalation of conflict could lead to men being recruited, leaving women and girls responsible for all duties, including disaster evacuation (particular attention should also be given to pregnant women, who in the absence of health services in conflict settings are at highest risks). If, during peace times, women do not participate in simulation exercises, evacuation processes can likely fail.

The Implementing Partners could include these FCV considerations:

- When conducting a gender analysis in the design and implementation of CREWS-supported projects, include gender-based violence considerations as a result of past and present FCV dynamics.
- When working with women's groups and conducting women-only workshops, ensure a conflict sensitivity analysis before activity implementation to understand and minimise conflict risks.

3.4 CREWS OPERATIONAL PROCEDURES NOTE NO. 4 - ACCELERATED SUPPORT WINDOW

- Eligibility and Funding Prioritization Criteria:
  - c. include FCV sensitive if a principle is added
  - j. Prioritisation will be given to actions that:
  - iv. Include target integration of FCV sensitivity
- Action Development and Approval Stages
  - Stage one: submission of Action Presentation Note. In the same way, it is recommended to update the project template for larger projects, and it is crucial that at this stage, partner countries and IPs identify potential FCV considerations and scenarios that could jeopardise and severely delay implementation and delivery (consider this to adapt Annex 1- Template for CREWS Action Presentation Note).
- Risk Management
  - 27. To maintain all OP with standard terminology, include FCV instead of only fragile.
  - 28. Although it is practical for CREWS to demand that IPs apply their own risk management systems, this analysis recommends that this procedure is enhanced; IPs primarily focus on adapting to already materialised FCV challenges but do not fully anticipate and plan from the design phase a robust FCV risk analysis/ scenario planning and mitigation measures. Therefore, it is recommended that CREWS request a stronger FCV programming focus for its IPs.

3.5 CREWS OPERATIONAL PROCEDURES NOTE NO. 5 - PEOPLE-CENTERED RISK-INFORMED EWS

In contexts of high-intensity conflict and where the state does not have control of territories (contested territories), people-centred approaches are incredibly challenging, as access is limited and interventions of all types could exacerbate existing conflicts if not done in a conflict-sensitive way. For CREWS IP and sub- grantees to ensure a people-centered approach, it is essential to 1. conduct rigorous and regular context analysis and 2. ensure collaboration with actors at the local level. Local leaders play a crucial role in understanding conflict risks, community tensions, power dynamics, people's access to information, as well as the capacity to deliver early action.

In FCV settings, special attention should be put on co-creating EWS with displaced populations living in camps, irregular settlements and peri-urban areas in high-risk locations, people with physical and mental disabilities due to direct or indirect FCV causes, people in remote areas with difficult to access with the presence of armed groups, people impacted by gender-based violence, people's whose livelihood and access to essential services are very limited. A more exhaustive list is found among other vulnerable populations facing the impacts of FCV (See Annex 3 – a detailed list of population groups).

The following sub-section analyses and recommends actions for the FCV inclusion in this Operational Procedures.

Rationale and Background

- Consider including " CREWS projects design and implementation follows an FCV-sensitive approach, to ensure adaptability, flexibility and sustainability in the event of contexts specific challenges that can jeopardise CREWS funded operations".
- Impact-based forecasting (IbF) in FCV settings requires special attention to the legacy of past political, conflict, and violent events. Understanding how these factors exacerbate risks is often an oversight when setting up IbF[6]. Conducting forensic investigations of disasters is a helpful approach for understanding how the impacts of fragility, conflict, and violence exacerbate disaster risks and for building impact tables that NHMS and NDMOs can use for IbF.
- 7. Consider acknowledging in this section that in most CREWS-supported countries, even low-intensity hazard events can have devastating consequences for the most vulnerable population, whose vulnerabilities have often been exacerbated due to FCV conditions.
- In the "People" description section, consider adding "people affected by armed conflict and violence"

Operationalising People-Centered Risk-Informed Early Warning Systems in CREWS

- 16. Context analysis and FCV sensitivity analysis are essential to ensure that people at risk do not suffer negative repercussions due to EWS interventions. For example, community EWS planning in territories with the presence of Non-State Armed Groups (NSAG) of different ideologies or backgrounds could put people in danger due to a lack of trust, misunderstanding of the objectives of the EWS process, etc. At the same time, if an EWS process at the community level is implemented with a sound understanding of context dynamics and it is FCV sensitive, it could be a conduit for dialogue among different parties to a conflict as it can be of interest for everyone to have a functional EWS.
- 17. See 4.2 Partner engagement recommendation.
- 19. End users of EWS, whose lives and livelihoods have been affected by conditions of fragility, for example, countries in post-conflict or ongoing conflict situations, including forcibly displaced populations, as well as people affected by gang violence, represent a part of the most vulnerable population where implementing a people-centred approach is very complex. Hence, co-production with strategic partners with characteristics like knowledge of the context, access to complex territories, and trust by communities and parties to a conflict is essential for effective EWS. It is recommended that IP map the critical actors with these characteristics and establish opportunities for collaboration.
- 20. Tools such as OpenStreetMap, which offer one of the most extensive data sets of exposure and, at some level, vulnerability information, are crucial in FCV settings where data is limited. OSM is a people-centered process by design and has the potential to be scaled up in the FCV context to enhance risk data by the people at risk themselves.
- 21. It is suggested to add FCV sensitivity to this section, as follows: "Understand and integrate local and traditional knowledge, risk perceptions, context analysis and FCV sensitivity on an ongoing basis during the implementation phase"
- 22. As indicated in point 22, resource allocation should also include resources in case of changes in context dynamics that might jeopardise people-centered processes; for example, in some contexts, workshops planned in a particular area might not be possible due to security. Hence, the project might incur higher costs.

6 It is important to recognize that investment in IbF in FCV settings requires a long-term process. Currently, many NMHS in FCV settings are limited to traditional hazard forecast services and warnings and are not yet in the process of developing IbF.

Recommendations for methods and indicators to measure the success of people-centred risk-informed early warning systems.

- Proposed additional recommendations integrating an FCV lens:
  - In FCV settings, establish strategic alliances with national or subregional academic/research institutions during the design and initial stages of CREWS projects. These institutions could have better access and knowledge of complex territories to conduct M&E activities. For example, in a contested territory where NSAG have control, a regional academic institution is more likely to be able to conduct surveys with the population than other actors. FCV sensitivity analysis should be conducted before minimising risks.
  - IPs can integrate retrospective, forensic investigation of disasters into their M&E processes to more robustly inform the design of EWS in complex territories, following already existing methodologies (See the Honduras tropical storm Eta and Iota forensic analysis that integrates an analysis of the impacts of violence concerning disaster risks).
  - A key to successful early action is clearly understanding the risks that can be reduced in a given context in the time window between a warning and a shock. In FCV settings, early action prioritisation must consider 1. Who is more likely to be impacted based on historical trends, what risks could be immediately reduced, and what actions would enable such reduction of those risks to avoid or minimise loss and damage? 2. What safety, security, political and logistical barriers exist under different scenarios that could jeopardise the implementation of actions? 3. Are early actions FCV sensitive? Could any early action exacerbate tensions at the local level? 4. Who are the critical trusted actors by parties to a conflict who could play a key role in warning communication and early action? 5. To what extent could early warning and action enhance community cohesion, dialogue and peacebuilding in FCV settings?

3.6 CREWS OPERATIONAL PROCEDURES NOTE NO. 6 - PRIVATE SECTOR ENGAGEMENT

- 2. Definitions: Private sector engagement should not be limited to the ones with experience and/or expertise in EWS. For example, in FCV settings, transport companies with no EWS experience could be strategic allies that enable early action.
- 4. Guiding principles: in the FCV Operational procedures, it is recommended to add this additional principle: "DO NO HARM[15] – CREWS implementing partners will assess any "do no harm" concerns before engaging with the private sector"
- 6. Operationalisation
  - iii. Initial consultations: At this stage, it is recommended that potential private sector partners be evaluated with an FCV sensitivity lens. For example, 1. It is crucial to understand if the potential private sector partner has links to any non-state armed group or other parties to a conflict and if that represents a political and/or security concern. 2. Could any relationship with this private sector partner jeopardise the safety and security of EWS end users or any other stakeholder involved in the EWS value chain?
- The role of private sector media in FCV contexts: CREWS IPs and sub-grantees should consider strategic partnership with local radio stations in FCV contexts, as they are often the most reliable channel of communication (see Annex 5 for examples of local private radios in FCV countries)

3.7 CREWS RISK MANAGEMENT APPROACH

- 5. Any changes to the risk context: See recommendation in section 4.1 CREWS Operational Procedures Note No1 Programming and Project Development Annex 2.
- 6. In FCV settings, security, access and capacity of implementation can change rapidly, for example due to sudden escalation of conflict. Therefore, a six-month period to update on project risk contexts might not be sufficient to make necessary, timely strategic decisions.

Overall, this CREWS Risk Management Approach document is recommended to explicitly mention safeguarding concerning fragility, conflict and violence impacts. CREWS projects have experienced challenges in implementation due to the escalation of conflict, complex political changes (e.g., coup d'etat), and exacerbated violence situations. Additionally, in the new FCV operational procedures, a safeguarding section should be included following recommendations already described in this analytical paper.

4. CONTEXT-SPECIFIC STRATEGIES TO ENHANCE THE EFFECTIVENESS OF CREWS OPERATIONS IN FCV FOR CONSIDERATION IN PROJECT DESIGN

4.1 BEYOND LDCS AND SIDS: CREWS PIPELINE COUNTRIES PRIORITISATION

This section offers direct recommendations for CREWS new strategy

The CREWS 2026-2030 strategy is an opportunity to expand CREWS coverage to FCV settings, which are not recognised under the LCD and SIDS categories. Regions such as the Middle East are highly vulnerable to the impacts of Climate Change due to their high levels of FCV related vulnerability and exposure. Yet, CREWS is only supporting one country in the Middle East (Yemen).

Countries affected by recent conflict, those not historically classified as LDCs (pre-conflict), are currently suffering extreme social, economic, environmental and political vulnerability. However, under the criteria of classification of LDC[16], they are not eligible for CREWS support. LDC selection takes a historical perspective in the classification, based on long-term structural criteria rather than recent crisis. Yet, in cases like Syria, which was not considered an LCD before 2011, currently, after more than a decade of protracted, high-intensity conflict with contested territories, the economic and social indicators are similar or even lower than other LDCs. This fact raises a critical red flag for CREWS to reconsider its criteria for selecting countries eligible for EWS investment support. The change in the political environments and the growing interest of donors in supporting FCV contexts offer CREWS an opportunity to take a bold approach to more consistent and long-term support of FCV countries.

Additionally, this analytical paper argues that from a climate security perspective (see section 4.3), it is critical to support FCV settings to minimise the exacerbation of future disaster risks, that if not managed, could act as threat multipliers, increasing grievances, tensions, insecurity, and political volatility.

4.2 PROTECTION OF CREWS HYDROMETEOROLOGICAL INFRASTRUCTURE INVESTMENTS

This section offers direct guidance and ideas for CREWS secretariat to engage, however it isa also intended to inform a wider set of actors, including IPs, as well as protection relation organizations.

It is essential that hydrometeorological infrastructure is safeguarded in FCV settings for the protection of the population. Direct or indirect consequences of FCV conditions can impact CREWS investments in infrastructure[7].

Table 5 describes the type of hydrometeorological infrastructure that can be affected and the negative impacts these assets can endure under four types of FCV settings. This is followed by recommendations for CREWS to enhance its role in protecting and safeguarding its investments[8]. It is important to mention that in FCV settings, especially those affected by protracted conflicts, infrastructure is very limited compared to safe, non-conflict-affected territories.

7 Note that CREWS only invests on small scale procurement, which of course is equally important to be protected and safeguarded when conflict arise. The investments referred in this section are the ones procured by the IPs.

8 Disasters occurring in FCV contexts can also directly damage or destroy hydromet infrastructure, and in FCV contexts, the wherewithal to rebuild/repair them can be a challenge (lack of access, finance, absence of local installers, procurement into country, insecurity, etc.)

Hydrometeorological Infrastructure*	Institutional Fragility potential impacts
Weather Stations: Equipped with instruments to measure temperature, humidity, wind speed, and direction, atmospheric pressure, and precipitation. **Rain Gauges:** Devices that measure the amount of rainfall over a specific period. **Hydrological Stations:** Facilities that monitor water levels, flow rates, and quality in rivers, lakes, and reservoirs. **Radar Systems:** Used for detecting and tracking weather patterns, particularly precipitation. **Doppler Radar:** Specialized radar used to measure the velocity of precipitation, helping to predict severe weather events like tornadoes. **Buoys:** Floating devices equipped with sensors to measure sea surface temperature, wave height, and other oceanographic data. **Automated Weather Observing Systems (AWOS):** Systems that provide real-time weather data at airports. **Climate Monitoring Networks:** Networks of stations and sensors dedicated to long-term monitoring of climate variables. **River Gauging Stations:** Measure the flow and discharge of rivers, critical for managing water resources and flood forecasting.	1. Not maintained due to lack of financial resources by the NHMS, as well as limited human resource capacity able to reach all territories in a country where infrastructure is located. 2. In some contexts vandalism and pillage can render the infrastructure inoperable. 3. In some context, there are not enough resources for the wide range of hydro met infrastructure, therefore it is limited to few options. 4. These governmental infrastructure is often not prioritized compared to other critical infrastructure such as roads, dams, health centers etc. 5. Regular power failures that cause interruptions of power supply, common in these contexts, could also have an impact in the damage and decay of AWOS or other equipment that requires electricity. 6. The private sector (hydro met) tend to install their own hydro met infrastructure, offering services to business, often their capacities are higher than the NHMS, yet such infrastructure tends to be located in areas of economic interest and not necessarily where the most vulnerable people live, however there are exceptions for example in the cases of territories with petroleum and mining extraction. 7. Some hydro met Infrastructure in fragile contexts is located at the airports or military facilities, hence it tends to be protected.

Contested Territories potential impacts	High Intensity conflict potential impacts	Protracted conflict potential impacts
1. Often infrastructure is non-existent due to access restrictions by NSAG to government personnel, for example NHMS staff . 2. If it exist, maintenance is limited due to security concerns making it more challenging to both access and replace necessary parts due to potential damage and/or looting, creating logistics concerns also due to NSAG presence. 3. Hydro met infrastructure in contested territories is not well knows by parties to a conflict, making it vulnerable to attacks, pillage etc. (Note: some of the impacts described in IF can be applicable to CT)	1. Direct or collateral damage due to bombs, missiles, landmines etc. (There is no evidence that weather stations are directly targeted by parties to a conflict), informal evidence suggest that in some contexts they are cases of damage, more research is needed to understand this. 2. Due to lack of access and other priorities, infrastructure is neglected and as a result damaged over time. 3. EWS investments are on hold during high intensity conflict, due to high levels of risks, therefore hydro met infrastructure installation and maintenance is stopped. (Note: some of the impacts described in IF can be applicable to HI)	1. In addition to the impacts mentioned in IF contexts, hydro met infrastructure in contexts of protracted conflict are often not installed in all parts of a country, they are limited to areas with easy access and less security concerns. 2. Infrastructure can be also damage directly and indirectly by acts of war, as described in High intensity contexts. 3. Military forces tend to have their own hydro met infrastructure and EWS capacity, however this resource is not shared with other actors and communities. (More research is needed to understand at what extent military forces collaborate with NHMS on weather forecast). 4. In PC sudden changes in governance (new governments, coup d'etat etc), can have serious implications in the capacity of the NHMS to deliver services, linked to the impacts mentioned in IF contexts. 5. Some hydro met Infrastructure in fragile contexts is located at the airports or military facilities, hence it tends to be protected.

Table 5: Potential impacts on hydrometeorological infrastructure in FCV settings (forthcoming, Jaime et al., 2025)

THE ROLE OF INTERNATIONAL HUMANITARIAN LAW IN THE PROTECTION OF HYDROMETEOROLOGICAL INFRASTRUCTURE

Hydrometeorological infrastructure is increasingly becoming more and more relevant under our changing climate; predicting hazards in the short/medium term and advancing climate modelling for future climate projections are critical for society's well-being. In this context, it is also essential to consider the strategic protection of this infrastructure from a climate security perspective. Applying an International Humanitarian Law (IHL) lens, Hydrometeorological infrastructure is considered a civilian objects. Hence, it should be respected and protected in situations of armed conflict. Even during high-intensity conflict, this infrastructure should continue performing its function. For this, it should not be attacked or endure indirect damage. Recording observations (see type of infrastructure) and maintenance should be possible under the necessary safety and security protocols.

Yet, in practical terms, this infrastructure is not on the radar of institutions and people focused on the awareness, application and study of IHL. This represents an opportunity for CREWS and other partners to:

- Engage in strategic discussions with organisations such as the ICRC, the International Institute of Humanitarian Law, the Norwegian Refugee Council, the International Criminal Court, and others to identify avenues of cooperation to create resources and strategic and tactical plans to educate conflict parties, NHMS, other EWS actors, and civilians on IHL[9].
- Collaborate with relevant stakeholders to identify and map vulnerable hydrometeorological infrastructure in FCV settings, especially those in conflict. This would provide valuable information to conflict parties and other relevant actors on the essential nature of such infrastructure and the need to protect it.
- Encourage, through collaboration with IHL actors, that parties to a conflict take measures to minimise the risk of damage or destruction of hydrometeorological infrastructure, as mentioned above.

PROGRAMMATIC RECOMMENDATIONS FOR CREWS PROJECTS

During project design:

- Comprehensive risk analysis indicating to what extent CREWS infrastructure investments could be affected (see Table 5) and under which scenarios.
- Strategic thinking about where infrastructure should be placed due to the prevalence/likelihood of conflict.
- Designing mitigation measures to reduce risks of damage and decay due to the impacts mentioned in Table 5.
- Identify strategic partnerships with actors that could support the protection and safeguarding of hydrometeorological infrastructure under the different scenarios.
- Along with climate-related stress testing, FCV stress testing[10] should also be integrated into a sample of infrastructure investment.
- Align strategically with the Systematic Observations Financing Facility (SOFF) on how to jointly safeguarding infrastructure investments in times of crisis.

9 Note: A key role for CREWS in relation to IHL could be on increasing awareness of the entities of CREWS, rather than engaging directly on the topic.

10 FCV Stress Testing refers to the process of evaluating individual projects to identify if activities and the expected outcomes are robust enough to resist the impacts experienced in FCV settings (see Table 1)

During project implementation:

- Establish partnerships with the identified actors in the design phase and define protection and safeguarding protocols[11]. Partners could include local private companies, civil society organisations, military forces, the ICRC (or other IHL-related humanitarians), and others. The selection of partners must follow a strict FCV sensitivity analysis.
- Set aside financial recourses (e.g. crisis modifier) to enable adaptable programming to safeguard infrastructure. For example, in exceptional cases, reaching specific infrastructure for reparations or critical maintenance might require helicopters to transport specialised staff. When possible, a cost-benefit analysis of potential increases in the budget due to FCV conditions is recommended to identify the economic viability).
- Identify to what extent infrastructure could be uninstalled and stored temporally in case of high-intensity conflict and high likelihood of damage.
- Update FCV contingency plans regularly to ensure NHMS staff and partners can anticipate and react promptly to any FCV situation, following the established protocols.

4.3 EWS IN THE CONTEXT OF CLIMATE SECURITY

This section is intended to offer ideas to CREWS secretariat, it has a policy focus that could be also used by IPs and other actors working on EWS.

Climate change does not directly cause conflict. The increase in fragility conditions, conflict dynamics and levels of violence are due to a multitude of political, cultural, economic, and social factors that affect society in a multifaceted way. In a warming world, such factors can be influenced differently, some becoming treat multipliers that can contribute to a change in FCV conditions. Structural risk reduction strategies and practices at all levels, from DRR Governance to community DRR enhancements, can be crucial contributors to reducing the risk of disasters, directly influencing FCV conditions[17–20]. With this perfective, EWS can play a crucial role in minimising the risks that can exacerbate FCV dynamics.

In recent years, climate security discussions have been predominantly led by Ministries of Defence, focusing on the greening of the military and the geopolitical implications of climate change, such as scenarios of new transport routes in the Arctic and the drastic changes this can make in the world[21]. In July 2024, NATO established a Center of Excellence on Climate Security, focusing primarily on supporting NATO member countries to prepare for the future implications of Climate Change. In parallel, the UN Security Council's permanent and non-permanent members, such as the United States, Germany, and Switzerland, have championed climate discussions exploring future security challenges under a changing climate. More recently, the selection of Somalia and Pakistan as non-permanent members will likely influence the Security Council discussions on climate security from an adaptation perspective[12]. Given the Early Warning for All (EW4A) agenda of the UN Secretary-General, it might be the case that both political agendas converge at a certain point.

The field of environmental peacebuilding has also tackled the challenges of a changing climate concerning security and instability, especially looking at the linkages between environmental degradation and conflict, with an essential role for water in this discussion[22]. Meanwhile, in the field of EWS, climate security is a nascent topic. With this perspective, this analytical paper argues that it is crucial for CREWS and its implementing partners to recognise that the emerging field of climate security is an important one to engage by:

- Recognising that EWS can significantly contribute to the reduction of preconditions of FCV. (Intended for CREWS secretariat and IPs)
- Understand that the processes applied in the design, implementation, and sustainability of EWS

11 During the design of the CREWS Operational Procedures, it is recommended that a safeguarding protocol for CREWS-supported assets be developed.

12 Based on expert knowledge from the author.

are unique in enhancing social and political cohesion at all levels. (*Intended for IPs and other actors in the EWS/AA space*)

- Exploring opportunities for collaboration with actors such as the NATO Center of Excellence, the Climate and Security Advisory Group (CSAG), the Stockholm International Peace Research Institute (SIPRI) and other emerging Climate Security actors, including the military, who can play a crucial role in EWS. (*Intended for CREWS secretariat*)

4.4 CREWS' ATTENTION TO DISPLACED POPULATIONS

This section is intended to highlight attention to the need of more attention to displaced population in the EWS process. CREWS can play a political and strategic role by funding EWS for displaced population, while IPs have the role to design interventions tailored to this population group in collaboration with the respective governments and non-governmental partners.

Forcibly displaced populations, internally or refugees, have often been absent from EWS planning. However, communities in situations of displacement and humanitarian actors have advanced in the dissemination of warning messages in some contexts; overall, EWS and humanitarian Anticipatory Action processes are not tailored to displaced populations. Yet, natural hazards often severely impact people living in camps or other at-risk locations, given the high levels of vulnerability. Fortunately, the political and practical recognition of the need to enhance EWS has grown, especially as humanitarians who often support these populations recognise that it is essential to have a system that allows communities to anticipate already very complex crises. The Anticipation Hub developed a working paper on this topic, highlighting the challenges and opportunities to anticipate disasters in these contexts[23]. For CREWS, increasing its focus on reaching out to displaced populations in collaboration with programmes such as WISER MENA[24], which focuses on climate and weather services for Internally Displaced Population (IDPs), is a crucial opportunity to achieve its expected 2030 results. In addition to enhancing access to forecast warnings, there is a crucial need to improve vulnerability and exposure data, especially open source such as OpenStreetMap[25]. It is also essential to integrate systems that can track people's mobility within the EWS process, as this is essential for a functional EWS in these contexts; for example, in Honduras in 2020, during tropical storms Eta and Iota, the migrant and violence related displaced population were left behind EWS, this was a wake-up call to make efforts to change the way EWS support these populations[26–28].

4.5 PREDICTION OF CONFLICT AND OTHER SITUATIONS OF VIOLENCE

This section is intended for CREWS to evaluate in relation to their priority thematic areas.

The CREWS complete results framework is the only document screened for this analytical paper that refers to man-made hazards. As described in the Sendai Framework for DRR, societal hazards also refer to conflict and violence, including terrorism, armed conflict and other forms of violence[29]. It is recommended for CREWS to clarify if these hazards apply to the context of CREWS projects, as this can open a critical strategic discussion related to:

- Need to consider new IPs specialised in conflict-related EWS.
- Funding for conflict EWS projects. Although EWS for conflict and other violent situations are not new, attention has grown to this area in recent years and is also related to the growing focus on climate security. Suppose this is a direction CREWS is interested in including in its new strategy, it is recommended to collaborate with actors such as the Peace Research Institute Oslo (PRIO), the Uppsala Conflict Data Programme (UCDP), the Conflict Prevention and Early Warning Network (CEWARN), the Early Warning Project of the U.S Holocaust Memorial Museum and Dartmouth College, among others.
- Humanitarian organisations are exploring the possibilities of expanding Anticipatory Action approaches to conflict prediction, focusing on anticipating the humanitarian impacts of conflict. Although this is a nascent topic, it is of high interest to organisations such as OCHA, FAO, and Start Network, among others. The Anticipation Hub's Anticipatory Action in Conflict working

group includes this topic in its focus areas. A key question for CREWS is whether interest is in supporting and advancing these humanitarian efforts.

- Increasing attention is given to developing methodologies and establishing EWS for compound crises. In FCV settings, this means integrating natural hazards and conflict monitoring as a single or coherent EWS. More research and support are needed to advance this emerging priority of EWS.

4.6 EWS ROLE IN SOCIAL COHESION IN FCV CONTEXTS

This section is intended to offer ideas to CREWS secretariat for their new strategy and future funding priorities in FCV contexts, and importantly to support IPs integration of this topic in their programming.

As EWS continue expanding in FCV settings, there is an opportunity to explore from a research and practical perspective to what extent EWS processes could positively impact enhancing and preserving social cohesion, particularly those activities involving dialogue among different stakeholders, including parties to a conflict. Social cohesion refers to the strength of relationships and the sense of solidarity among community[30]. It involves mutual trust, shared value and a sense of belonging, which helps maintain social stability and promote cooperation and support in a community. Research has shown how social cohesion variables such as social capital, sense of community, social participation, and place attachment are crucial in the context of recovery and post-conflict[31]. At the same time, evidence shows that in the wake of conflict, activities to enhance social cohesion require considering aspects across race, ethnicity, gender, class and generation, which are essential for building sustainable peace[32].

The environmental peacebuilding[13] community and research institutions such as the Overseas Development Institute (ODI) have highlighted the critical role of Disaster Risk Reduction as a channel for social cohesion. In the context of EWS, this is a thematic area that is nascent and not documented. However, there is evidence that development interventions in post-disaster and post-conflict contexts have enhanced social cohesion. Could this be the same for EWS processes? This analytical paper argues that CREWS investment could be essential for strengthening social cohesion in FCV contexts by designing project activities that integrate learnings from other developmental social cohesion experiences. This point is connected to the arguments described in the Climate Security section of this paper.

CREWS investments could support social cohesion by:

- Integrating learnings from social cohesion processes in development interventions into EWS projects. This will require the production of guidance, training of IPs, and more generalised awareness raising by the CREWS Secretariat, IPs and others to begin to exercise this expertise in EWS projects. IPs tend to be attuned to natural actor dynamics more so than broader social cohesion dynamics.
- Ensuring CREWS projects in FCV settings include actors who are experts in social cohesion and peacebuilding to inform EWS programming. Secretariat could bring in these experts to undertake specific analyses and support broader advocacy work through seminars, network meetings, community of practice on contributions of EWS to pathways to peace/social cohesion.

13 https://www.environmentalpeacebuilding.org/

4.7 GCF GROWING FOCUS ON FCV SETTINGS AND ITS POTENTIAL FOR EWS

This section is intended to provide ideas to CREWS secretariat, as this is a key strategic topic.

As the Green Climate Fund increases its support to FCV settings, demonstrated by the recent developments in Somalia[14], where GCF will invest 100 million USD in climate action. The strategic partnership between CREWS and GCF33 offers a significant opportunity for CREWS to increase its reach and delivery in FCV settings. As described in section 4.1, CREWS's new strategy is an opportunity to define its strategic priorities for FCV settings, which can be done in collaboration with GFC.

This momentum also aligns with the GFC's growing support for development and humanitarian actors to help governments design and implement EWS. See Annex 6 for a detailed list of GCF EWS-funded projects describing LDCs and FCV-affected countries. Under the leadership of the respective governments[15] GFC and CREWS could support FCV-sensitive and well-coordinated projects jointly, in partnership with implementing partners, to avoid duplication of efforts and investments. Ensuring strategic investments are part of broader climate adaptation and risk reduction investments that would contribute to social cohesion and peacebuilding.

4.8 ADDITIONAL CONTEXT-SPECIFIC TOPICS RELEVANT TO CREWS

This section is intended to offer ideas to CREWS secretariat for new funding priorities, and it can be used to influence donor and other organizations in the EWS space.

Several topics deserve more analysis and attention for the set up of effective EWS in FCV settings; this analytical paper recommends CREWS further analysis of:

- Levering remittances in FCV settings to enhance EWS.
- Post-conflict reconstruction as a crucial opportunity for EWS.
- Non-State Armed Groups (NSAG) role in Early Warning Systems.
- Potential of expansion of Artificial Intelligence advances by Global North NHMS (including ECMWF) to FCV contexts.
- Inclusion of displaced populations in EWS.

14 https://www.greenclimate.fund/news/green-climate-fund-and-somalia-accelerated-usd-100-million-investment-partnership

15 It is important to note that under specific guidelines, the World Bank may limit its ability to work directly with Governments where governance issues exist. For example, as demonstrated in recent years in Afghanistan, Syria, Venezuela, Myanmar, Yemen, South Sudan, Niger, Mali, Haiti and Ethiopia (it is recommended to review this information with the CREWS- WB implementing team)

5. RECOMMENDATIONS ON STEPS TO DEVELOP OPERATIONAL PROCEDURES ON CREWS PROGRAMMING IN FCVS

5.1 ROAD MAP

This analytical paper, along with the document prepared for the 19th Steering Committee, sets the foundations for the design of the FVC operations procedures. **This section recommends steps to achieve the Steering committee's request to the CREWS Secretariat.**

- Conduct interviews with country partners in at least 10 FCV countries to identify the root causes of EWS failures in each country and the priority investments needed to enhance FCV-sensitive EWS (See proposed questions in section 2.3). This should include discussion with experts involved in developing the EW4All Roadmaps in FCV countries.
- Send a survey to country project managers and coordinators from the three IP organisations in all FCV countries supported by CREWS (countries included in Figure 2[34]). This survey will provide robust evidence and concrete examples of project cancellations, 'drops', and modifications in the FCV context of the last years.
- Conduct interviews with universities and research institutions of at least 5 FCV contexts to identify research priorities.
- Conduct a sample of 3 or 4 forensic investigations of disasters in FCV settings to inform priority areas of programme development and investments. If possible, it would be ideal to conduct such a process for all CREWS-supported FCV countries (e.g. Retrospective analysis of the 2018-2020 humanitarian food and water crisis in Western Province, Zambia)
- At a more strategic level, CREWS could enable global, regional, and country partners to engage in round-table workshops to advance the exchange of lessons and a way forward for coordination and coherence in EWS in FCV settings. This analytical paper, the new GFDRR report on EWS in FCV settings, and the UNDRR-WMO Center of Excellence handbook on EWS in FCV offers the right evidence-based approach to creating meaningful space for discussion, collaboration, and action planning. Results from this could contribute to developing a detailed Annex of activities for the FCV Operation Procedures that CREWS could fund.
- Develop the operational procedures in close collaboration with GFDRR, Disaster-FCV Nexus Global Program and WMO-UNDRR Center of Excellence team.
- Conduct a short FCV sensitivity training for CREWS secretariat staff (and other WMO staff) tailored to CREWS programming.

5.2 PROPOSED OUTLINE

This is a sample of an outline informed by other CREWS operational procedures, integrating unique FCV-relevant elements.

CREWS FRAGILITY, CONFLICT AND VIOLENCE-AFFECTED SETTINGS OPERATIONAL PROCEDURES

Intro text

- Describe what FCV is, the terminology, and the typology to be used by CREWS. Building on already existing literature used in this paper.

Rationale and background

- Decision by the Steering Committee on why this procedure is necessary, building on the 19th Steering Committee FCV document.
- Describe global, ongoing processes, such as the COP28 Climate, Relief, Recovery, Peace Declaration, the Sendai framework mid-term review of FCV considerations, the Coalition for Climate Action in Fragile and Conflict contexts, the Anticipation Hub, AA in conflict practitioners group.
- Describe to what extent CREWS plans to enhance operations in FCV settings align with other partners' FCV plans, such as the GCF and the Global Environmental Facility (GRF).
- Include important actors, mentioning the role of the HDP nexus in EWS in FCV contexts.
- Include a short description of lessons from previous CREWS projects in FCV.
- Finalize with a short description of the plans to integrate FCV in the new 2026-2030 CREWS strategy.

FCV programming in CREWS projects

- Draw from the recommendation provided in this analytical paper and the activities described in the road map (section 5.1). Describe approaches that CREWS might adopt, such as:
  - FCV sensitivity, including do no harm principles.
  - Safeguarding of CREWS investments, including the potential role of IHL.
  - Enhanced FCV scenario planning and FCV stress testing for projects.
  - Flexible, adaptable planning
  - Joint strategic and tactical planning with HDP and climate nexus partners.
  - Reinforcing inclusive and people-centered approaches with people affected by FCV for the design and implementation of projects.
  - Long-term EWS capacity building of local actors, especially those that can operate in difficult-to-access places.

Roles and Responsibilities

- A standard description is presented in other operational procedures, including specific responsibilities to ensure the strategic design and implementation of FCV programming recommendations given in the previous section.

Measuring the success of CREWS in FCV settings

- Draw from M&E recommendations provided in the analytical paper and discussion with CREWS Implementing Partners.

Recommended Annexes

Annex 1 – CREWS priority activities to be funded in FCV settings. Building in table 1 of this analytical paper.

Annex 2 – Examples of scenarios and contingency planning to be used by CREWS IPs during the design and implementation of projects. This could build on the climate storyline approach but with an FCV focus.

Annex 3 – List of FCV policies and strategies of CREWS implementing partners.

ANNEX 1 – DETAILED ANALYSIS OF FCV IMPLICATIONS IN THE EWS VALUE CHAIN (CLICK HERE TO SEE DETAILS IN EXCEL DOCUMENT)[16]

EWS/EW4A Pillars →		Disaster Risk Knowledge	
EWS disaggregated Value chain elements →		Vulnerability, exposure and historical disaster impact analysis	
FCV typology ↓	**Examples of project activities funded by CREWS → FCV Constrains** ↓	**Enhance, create and update vulnerability and exposure (V&E) and disaster impacts data (e.g. HH surveys, V&E baselines, social protection datasets, displacement data etc)**	**National, Provincial and Municipal risk assessments, maps, risk dashboards (e.g. multi-hazards risk maps, NDMA disaster risk platforms such as Inasafe etc)**
Institutional fragility	In situations of high institutional fragility, the consistent implementation of plans, laws, and policies to build resilience, protect the environment and strengthen adaptation to current and future risks tends to be hampered by financial and capacity constraints, as well as by competing and changing priorities. Government services may be under-resourced and concentrated in urban settings, leaving out large portions of the population	1. Census data needs to be open-sourced and often updated. 2. Social protection data is growing in these contexts, yet it is often focused on a particular subset of the at-risk population, so it only captures some vulnerable groups. 3. Social protection might be very limited in contested territories due to the lack of presence of government institutions.	1. NDMAs are often under resourced to produce regular risk analysis/maps 3. Rural risk analysis are often incomplete and/or not updated. 3. Risk analysis is often dependent of external actors and not totally owned by Government Institutions.
Contested territories	Challenges to designing and implementing adequate responses in conflict settings tend to be exacerbated in territories under the complete or fluid control of non-state armed groups. The lack of governmental presence and services, significant access challenges, rapidly changing security situations and even more stringent restrictive measures that reduce the potential for funding result in a tendency to exclude territories outside the government's control for anything beyond an emergency response. The maintenance of essential services tends to be limited; the economy tends to be severely disrupted, and data gaps tend to be particularly important – even if a meteorological station remains operational, it often stops transmitting data.	1. Minimal data, often nonexistent, usually exist from pre-conflict times when territories were not yet under the domain of NSAG. 2. Field data collection is minimal; access depends on NSAG decisions, interest and their approach to controlling territory and populations. 3. Tracking displacement in this context is pivotal.	1. There is limited disaster risk mapping in conflict-affected areas, primarily because it is often not the priority. NSAGs might not be interested or need to have the necessary DRR knowledge to prioritise this. This lack of interest and knowledge leads to insufficient data collection, risk assessment, and ineffective risk communication. 2. Modern risk dashboards often need more granular information about contested territories. 3. Lack of dialogues with NSAGs about DRR, CCA and EWS, as interactions with NSAGs are focused on peace and other critical access topics (such as health education)

16 By the author: This table is part of chapter 14 by Jaime et al. 2025 in UCL's book: Fearnley, C.F. and I. Kelman (2025). Creating Effective Warnings for All: Multiple perspective on the state of the art. London, Ubiquity Press.

Disaster Risk Knowledge					
Vulnerability, exposure and historical disaster impact analysis		**Past, current and future hazards Analysis**			
Community risk assessments (including local maps)	**Open source data (e.g. OpenStreetMap)**	**World Bank Climate Change Portal, ThinkHazard, UNEP Climate Hazards, UNOPS, Global Assessment Report, IPCC**	**Universities and Research institutions risk research data at all scales**	**NHMS hazards analysis/research**	**Forensic investigation of disasters / retrospective studies**
	1. It depends on donor funding and the existence of local OSM chapters. However, OSM data is growing due to recent large-scale programmes in fragile countries.	1. They are open source and available online, yet some actors at the country level might not be aware of them.	1. Limited collaboration between HDPC nexus actors and national academic institutions in the context of EWS, particularly between social science and climate science.	1. Advancing, especially for floods, droughts, and tropical storms. Gaps in other hazards, particularly in long-term climate change impact analysis for different sectors.	1. Very limited analysis.
1. Very limited, as described in the risk mapping section. 2. Humanitarian and development organisations' engagement at the local level can pose risks for the population itself if it is not done in a conflict-sensitive way. 3. Community gatherings, if possible, often have the presence of NSAGs.	1. only OSM data created using satellite images is often available in contested territories; however, that data is often incomplete and only partially valid for EWS. 2. There needs to be more knowledge of OSM by NSAG and communities in contested territories.	1. Useful for national level risk assessment and in some cases lower admin scale, yet these data sources do not offer granular information in contested territories.	1. Researchers are either not allowed to enter contested territories or need the safety and security protocols in their universities or research institutions to ensure their protection. 2. EWS research in contested territories needs to be expanded as it is minimal.	1. Very limited, as described in the risk mapping section. 2. Due to high-security risk, NDMAs and NHMS government staff are often not allowed to enter contested territories.	1. Very limited due to lack of interest and awareness from funding agencies about their relevance for EWS. 2. Field research is often not possible; hence, research is limited to remote.

High-intensity conflict	Constraints in protracted conflict are exacerbated in high-intensity conflict, with severely reduced humanitarian access, significant destruction of critical infrastructure and services, and development activities commonly brought to a halt. Action is often limited to emergency relief to ensure people's survival. Areas near the front line, usually receiving displaced people, are typically insecure and unstable but allow for a greater depth of action.	1. V&E data can become irrelevant, as conflict escalation can change and radically worsen V&E conditions. 2. As emergency relief is often the only possible activity, relief operations might be the only way to access new V&E data relevant to preparing for potential near-term natural hazards. 3. Forcibly displaced population data is relevant for EWS in this context.	1. Depending on the duration of the high-intensity conflict, hazard risk maps can be updated. In high-intensity conflicts of extended duration (more than six months), humanitarian organization tend to use hazard risk maps to anticipate natural hazards (for example, in the ongoing Russia-Ukraine conflict, hazard maps are used by ICRC for the reconstruction of facilities)
Protracted conflict	Protracted conflicts exacerbate constraints that characterise situations of institutional fragility. In addition, conflicts frequently harm the environment on which people rely to survive, disrupt and destroy essential services and the economy, and reduce access to the most affected parts of the territory, which leads to a weak governmental presence and a limited presence of development actors (ICRC 2020a). This can result in poorly served areas where people more acutely feel the effects of conflict – from displacement to death, injury and disrupted essential services. Even though violence may be localised, the long-term consequences of these conflicts tend to affect the whole of a country by weakening governance and institutions and mobilising the government's efforts towards restoring security at the expense of other priorities. This notably contributes to a scarcity of reliable historical data that challenges longer-term planning, projections and models. Access to adequate finance is limited by the weakness of institutions, reduced absorption capacity, and restrictive measures (such as sanction regimes or financing modalities).	1. Very limited V&E and disaster impact data at the government level. 2. Often due to long term humanitarian and peace operations, V&E data is produced and store by those actors. 3. Due to violence in localised areas, it is challenging to do data collection at the local level, especially in the most volatile environments.	1. Risk maps and dashboards might be available for parts of the country, especially the most stable ones. 2. in some of these contexts, there are efforts to advance disaster risk knowledge due to the long-term presence of humanitarian actors collaborating with the Government. Yet, it is not the priority, and more effort is needed.

1. It is very challenging to conduct natural hazards-related risk assessments during periods of high-intensity conflict. 2. Community risk assessment pre-conflict might not be relevant during high-intensity conflict, as V&E can change radically.	1. Field mapping is often impossible, yet OSM data from satellite images is valuable. 2. OSM can be a beneficial source of information during high-intensity conflict, as updated satellite images can be used to map in OSM to provide a clear picture of infrastructure destroyed or damaged.	1. Same as described in the V&E data section.	1. The potential impact of high-intensity conflict on natural hazard research is a pressing concern, as universities and research institutions in affected areas might suffer direct or collateral damage, putting research on hold. 2. Pre-conflict natural hazard research becomes valuable in this context, especially when the high-intensity conflict lasts months, and populations will likely experience natural hazard impacts.	1. Natural hazards analysis tends to stop during high-intensity conflict. For example, NDMA hazard mapping initiatives can be repurposed for conflict-related analysis.	1. Not a priority during high-intensity conflict
1. scattered risk analysis at the community level, often supported by civil society, not as part of large-scale Governmental plans. 2. As V&E fluctuates constantly in these contexts, keeping community risk assessment updated is complex. 3. Community level activities might be jeopardise due to lack of trust, and intercommunal grievances, however at the same time, in some contexts, protracted conflict has strengthened the cooperation at the community level	1. More OSM data is needed in conflict contexts. 2. A priority for mapping related to EWS includes territories with displaced populations and critical infrastructure	1. Open source and available online, yet for some actors at the country level, there might be no awareness about them	1. National universities often need more funding and support for DRR-related research and EWS. 2. International research institutions (global north) are risk-averse and tend not to prioritise conflict contexts for research.	1. NHMS research capacity is often limited due to funding and human resources. Yet, sometimes, in partnership with other NHMS/donors, they can advance hazard research to improve forecast services. 2. Hazards exacerbated by Climate Change, such as heatwaves, are under-researched.	1. Limited research on retrospective disasters and its connections with impacts of conflict and violence.

EWS/EW4A Pillars →		Detection, observations, monitoring, analysis and forecasting of hazards	
EWS disaggregated Value chain elements →		Forecasting & monitoring	
FCV typology ↓	Examples of project activities funded by CREWS → FCV Constrains ↓	Global forecast	Private meteorological forecast
Institutional fragility	In situations of high institutional fragility, the consistent implementation of plans, laws, and policies to build resilience, protect the environment and strengthen adaptation to current and future risks tends to be hampered by financial and capacity constraints, as well as by competing and changing priorities. Government services may be under-resourced and concentrated in urban settings, leaving out large portions of the population	1. NHMS in some fragile countries can access global forecasts in collaboration with partner NHMS.	1. Private met companies have started to offer services to other companies in fragile countries.
Contested territories	Challenges to designing and implementing adequate responses in conflict settings tend to be exacerbated in territories under the complete or fluid control of non-state armed groups. The lack of governmental presence and services, significant access challenges, rapidly changing security situations and even more stringent restrictive measures that reduce the potential for funding result in a tendency to exclude territories outside the government's control for anything beyond an emergency response. The maintenance of essential services tends to be limited; the economy tends to be severely disrupted, and data gaps tend to be particularly important – even if a meteorological station remains operational, it often stops transmitting data.	1. NHMS can access global forecasts to provide warnings in contested territories. Yet NSAGs and communities might not be aware of the applicability and use of forecast information.	1. Private met services very rarely have infrastructure in contested territories. 2. In some cases, private companies are in contested territories (extractive industries, agriculture/ agribusiness, security and private military, telecommunications, etc.). Hence, private met services provide them with services.
High-intensity conflict	Constraints in protracted conflict are exacerbated in high-intensity conflict, with severely reduced humanitarian access, significant destruction of critical infrastructure and services, and development activities commonly brought to a halt. Action is often limited to emergency relief to ensure people's survival. Areas near the front line, usually receiving displaced people, are typically insecure and unstable but allow for a greater depth of action.	1. Due to the likely lack of service delivery by NHMS, global forecasts become extremely relevant during high-intensity conflict. International met service partners could be vital in supporting forecasts for an NHMS experiencing high-intensity conflict.	1. Private met service companies might continue delivering services to the private sector in the affected country through their operation centres abroad. 2. Private hydro met infrastructure can also be destroyed and damaged.
Protracted conflict	Protracted conflicts exacerbate constraints that characterise situations of institutional fragility. In addition, conflicts frequently harm the environment on which people rely to survive, disrupt and destroy essential services and the economy, and reduce access to the most affected parts of the territory, which leads to a weak governmental presence and a limited presence of development actors (ICRC 2020a). This can result in poorly served areas where people more acutely feel the effects of conflict – from displacement to death, injury and disrupted essential services. Even though violence may be localised, the long-term consequences of these conflicts tend to affect the whole of a country by weakening governance and institutions and mobilising the government's efforts towards restoring security at the expense of other priorities. This notably contributes to a scarcity of reliable historical data that challenges longer-term planning, projections and models. Access to adequate finance is limited by the weakness of institutions, reduced absorption capacity, and restrictive measures (such as sanction regimes or financing modalities).	1. There is evidence how historically global forecast ha predicted extreme weather event in countries with protracted conflict, this is an opportunity for EWEA. 2. However as weather observations are limited in protracted conflict, models are not totally reliable.	1. Private sector Met services are limited to requests from private companies. Given context volatility, there is more risk aversion to support protracted conflict contexts.

Detection, observations, monitoring, analysis and forecasting of hazards				
Forecasting & monitoring				
NHMS forecast	**Hydro met infrastructure**	**Local hazards monitoring / hydro met stations monitoring**	**Traditional knowledge**	**Regional Climate Outlooks Forums**
1. Over the last years, progress has been made in enhancing capacity of NHMS in fragile contexts. 2. Brain drain is common, diminishing NHMS's human resources and capacities. 3. Calibration and calibration equipment could be supported by the regional centre.	1. Investments are increasing, yet there needs to be protocols for safeguarding. 2. infrastructure in remote areas are exposed to vandalism. 3. Due to the lack of NHMS resources, maintenance is often limited.	1. Community-led hazard monitoring is scattered, often supported by development and humanitarian actors. 2. Often, in partnership with local actors, such as schools or Red Cross Red Crescent branches, observation recording is possible, yet it needs to be at scale.	1. There is some progress in the recognition of the importance of integration of local knowledge into more sophisticated EWS, however, there are still significative gaps on understanding how to best connect both knowledge.	1. NHMS from fragile countries participate regularly in regional outlook forums. 2. Information for the forums is partially disseminated to critical actors.
1. There are no protocols of forecast communication (even informally) between NHMS and NSAGs to protect the populations. 2. Some private companies operating in contested territories might use the NHMS forecast.	1. Very limited often there is infrastructure from pre-conflict times, yet it is damaged and decayed due to lack of maintenance	1. Very limited, as described in community risk assessments	1. Without formal EWS, traditional communities rely on traditional knowledge to anticipate hazards. Yet, this is unreliable due to multiple factors, including climate change.	1. Similar to fragile contexts, national representatives do this activity.
1. NHMS might be requested to focus (or extend) their services to military purposes. 2. NHMS are likely not to continue functioning if the conflict is in the areas where they operate (for example, a capital city). 3. Hydromet infrastructure can be directly or indirectly damaged.	1. Hidromet infrastructure will likely be impacted directly or indirectly during high-intensity conflict. 2. Automated Weather Observing Systems (AWOS are likely the only infrastructure that would continue transmitting data if not compromised.	1. Data collection/ observations may not be possible due to safety and security concerns for data collectors. 2. Due to movement restrictions, local monitoring of hazards, such as river levels, might not be possible.	1. Due to the high level of casualties, it is possible that members of a community who hold traditional knowledge are either killed, wounded or forcibly displaced. 2. Force displacement of populations also limit the capacity of populations to use traditional knowledge as it is likely they a re relocated to areas they do not know.	1. NHMS are likely not to be able to engage during times of high-intensity conflict (for example, the Palestinian Met Service and the Sudan Met Service were not able to attend the respective COFs during the period of high-intensity conflict in 2023-2024).
1. NHMS services are often limited to a specific sector. Services are offered to the aviation industry, the military. 2. Public forecast services depend on support provided by WMO and partner NHMS. 3. The growing internet of AA in conflict setting is an opportunity for collaboration between humanitarians and NHMS	1. Pre-conflict infrastructure can be damaged and not functional. 2. Hydro met infrastructure during protracted conflict is limited , especially in areas that experience volatility.	1. In some protracted conflicts with high levels of UXO, monitoring of hazards, for example, in river banks, might put the population at risk of explosions.	1. Some evidence shows crucial traditional knowledge that is important to understand risk and reduce risks. https://storymaps.arcgis.com/stories/831f9602c0704382bec59f7ab0029c75 2. More research is needed to understand traditional knowledge in conflict areas for EWS.	1. Regional outlook forums can play a key role in supporting seasonal forecasts for countries affected by protracted conflict, where NHMS capacities are limited.

EWS/EW4A Pillars →		Warning dissemination and communication	
EWS disaggregated Value chain elements →		Warning communication and dissemination	
FCV typology ↓	**Examples of project activities funded by CREWS** → **FCV Constrains** ↓	**Warning messages access and understanding**	**Common Alerting Protocols**
Institutional fragility	In situations of high institutional fragility, the consistent implementation of plans, laws, and policies to build resilience, protect the environment and strengthen adaptation to current and future risks tends to be hampered by financial and capacity constraints, as well as by competing and changing priorities. Government services may be under-resourced and concentrated in urban settings, leaving out large portions of the population	1. In some fragile countries, NHMS have advanced in the development of easily understood messages tailored to different languages. However, warning message tailoring to different audiences needs more attention.	1. CAP has been rolled out increasingly in fragile countries, yet full implementation still needs to be improved.
Contested territories	Challenges to designing and implementing adequate responses in conflict settings tend to be exacerbated in territories under the complete or fluid control of non-state armed groups. The lack of governmental presence and services, significant access challenges, rapidly changing security situations and even more stringent restrictive measures that reduce the potential for funding result in a tendency to exclude territories outside the government's control for anything beyond an emergency response. The maintenance of essential services tends to be limited; the economy tends to be severely disrupted, and data gaps tend to be particularly important – even if a meteorological station remains operational, it often stops transmitting data.	1. Warning messages designed by NHMS can technically be used in contested territories, if the language and crafting of the message if FCV sensitive.	1. There needs to be evidence of the implementation of CAP in contested territories.
High-intensity conflict	Constraints in protracted conflict are exacerbated in high-intensity conflict, with severely reduced humanitarian access, significant destruction of critical infrastructure and services, and development activities commonly brought to a halt. Action is often limited to emergency relief to ensure people's survival. Areas near the front line, usually receiving displaced people, are typically insecure and unstable but allow for a greater depth of action.	1. Transmitting warning messages and ensuring they are understood by communities at risk is challenging during high-intensity conflict. Due to conflict intensity, the population is focused on survival, and hence, other risks might be perceived as irrelevant. 2. Forcibly displaced populations might require warning messages in a different language from the host communities. 3. Warning messages might arrive to the population late or at all, as they can be manipulated/restricted by parties to a conflict. 4. The integrity of messages is essential to avoid misinformation. During high-intensity conflict, there is a risk of cyber attacks and the spread of false information.	1. although CAP is designed to be flexible under different conditions, in high intensity conflict, its functioning will largely depend on infrastructure stability, access to technology, capacity of stakeholder to coordinate. 2. The integrity of messages is essential to avoid misinformation. During high-intensity conflict, there is a risk of cyber attacks and the spread of false information.

Warning dissemination and communication			
Warning communication and dissemination			
Community Radio, informal channels	**Global warning dissemination services: GDACs, Google, FEWSNET etc.**	**Humanitarian Bulletins: WFP and FAO hotspots**	**Channels: Radio, TV, Internet (e.g. social media, google search etc)**
1. Community radios are common in fragile settings and are key channels for warning dissemination, however due to economic and sometimes to political conditions these do not exist in al territories.	1. NDMA and the public in general can easily access global dissemination; Google has become a key source of information. Other global warning dissemination is more specialised and is accessed by NDMA, Ministries of Agriculture, etc.	1. FAO and WFP produce regular bulletins for more fragile countries. Government departments, the humanitarian sector, and donors access these bulletins.	1. It is common in fragile contexts to have a variety of communication channels for early warnings, such as radio, TV, the internet, person-to-person, etc. Rural areas are often the more isolated areas for warning dissemination.
1. Despite the challenges, community radio stations are in contested territories. No matter the circumstances, music is an essential part of society in most cultures; therefore, community radio stations, even in the most complex contexts, represent a necessary opportunity for EWS. (See list of community radios in contested territories)	1. There is no evidence that NSAGs use global early warning communication and dissemination services. Yet as google has increased its reach globally, in contested territories google is used for search where internet access is available.	1. WFP and FAO bulletins tend to be more relevant to national-level decision-making; there is no evidence that NSAG uses this information. 2. There is potential for creating opportunities to communicate such information to NSAGs	1. These communication channels are often available if the infrastructure is in good condition.
1. Community radios might continue functioning; however, this depends on factors such as infrastructure damage, resource availability (fuel for generators), personnel safety, and censorship by parties to a conflict. 2. Community radios, if manipulated by parties to a conflict, could be channels of misinformation and can generate panic. 3. Trusted leaders who often transmit hazard warning information at the community level might be restricted or censored by parties to a conflict.	1. These could still be useful and relevant for national authorise and humanitarian organisations. However, monitoring these sources might be a challenge.	1. These could still be useful and relevant for national authorise and humanitarian organisations. However, monitoring these sources might be a challenge.	1. As described in the community radio, other communication channels could be compromised due to resource availability (fuel for generators), personnel safety, or censorship by parties to a conflict.

Protracted conflict	Protracted conflicts exacerbate constraints that characterise situations of institutional fragility. In addition, conflicts frequently harm the environment on which people rely to survive, disrupt and destroy essential services and the economy, and reduce access to the most affected parts of the territory, which leads to a weak governmental presence and a limited presence of development actors (ICRC 2020a). This can result in poorly served areas where people more acutely feel the effects of conflict – from displacement to death, injury and disrupted essential services. Even though violence may be localised, the long-term consequences of these conflicts tend to affect the whole of a country by weakening governance and institutions and mobilising the government's efforts towards restoring security at the expense of other priorities. This notably contributes to a scarcity of reliable historical data that challenges longer-term planning, projections and models. Access to adequate finance is limited by the weakness of institutions, reduced absorption capacity, and restrictive measures (such as sanction regimes or financing modalities).	1. Warning messages are not fully tailored to all population groups affected at different levels during long periods of time of conflict. (See Annex 2)	1. Limited evidence on implementing CAPs in countries affected by protracted conflict.

EWS/EW4A Pillars →		**Preparedness to respond**		
EWS disaggregated Value chain elements →		**Early action planning**		
FCV typology ↓	**Examples of project activities funded by CREWS → FCV Constrains ↓**	**Global and regional contingency plans**	**Humanitarian Early Action Protocols**	**National, provincial and municipal contingency plans**
Institutional fragility	In situations of high institutional fragility, the consistent implementation of plans, laws, and policies to build resilience, protect the environment and strengthen adaptation to current and future risks tends to be hampered by financial and capacity constraints, as well as by competing and changing priorities. Government services may be under-resourced and concentrated in urban settings, leaving out large portions of the population	1. Regional DRR agencies (e.g. CEDEMA) have advanced the development of regional contingency plans covering fragile countries, yet they need to be helpful in testing and updating them regularly.	1. There is a growing number of EAPs developed by multiple humanitarian agencies in fragile contexts (see Anticipation Hub report 2023)	1. NDMAs in fragile countries have advanced the development of contingency plans for several hazards; however, large-scale simulation exercises are limited by budget constraints, political interest, etc. 2. Contingency plans often need to be updated regularly and tested.
Contested territories	Challenges to designing and implementing adequate responses in conflict settings tend to be exacerbated in territories under the complete or fluid control of non-state armed groups. The lack of governmental presence and services, significant access challenges, rapidly changing security situations and even more stringent restrictive measures that reduce the potential for funding result in a tendency to exclude territories outside the government's control for anything beyond an emergency response. The maintenance of essential services tends to be limited; the economy tends to be severely disrupted, and data gaps tend to be particularly important – even if a meteorological station remains operational, it often stops transmitting data.	1. There is no evidence that NSAG in contested territories use contingency plans for EWS.	1. One of the most significant gaps in Early Action Protocols is their focus on the most stable contexts. Contested territories are often left behind in early action implementation.	1. National plans often can not be implemented in contested territories.

1. Community radios exist in most countries experiencing protracted conflict; these are crucial channels of warning communication. (see annex 4)	1. These global services offer an opportunity to access warning messages in these contexts for certain hazards (mostly floods, droughts, el tropical storms, ENSO); they tend to be used by government departments such as agriculture, DRM and humanitarian/development organizations.	1. They are produced for countries affected by protracted conflict, so there is more opportunity to use them to anticipate crises.	1. These channels are available but limited to some regions. In some areas more affected by conflict, telecommunication and energy infrastructure can totally or partially restrict access to warning dissemination.

Preparedness to respond					
Early action planning		**Early Action Financing systems**			
Crisis modifiers and shock responsive social protection	**Community contingency plans**	**Financial institutions/Banks/ Insurance companies**	**Cash transfers institutions**	**Donors**	**Humanitarian Disaster risks financing mechanism**
1. Crisis modifiers in the humanitarian and development sectors have become a key tactic to adapt to changing contexts in fragile countries, yet there are still ad hoc tactics. 2. Shock-responsive social protection is growing significantly in fragile countries, yet there is potential to scale up these systems further to cover a broader range of vulnerable populations.	1. Community contingency planning in fragile countries is often supported through community based DRR planning, yet one key challenge is the lack of scale. Often these processed are project based and have limited coverage. 2. Even when communities count on contingency plans, a lack of updates and practice leads to their ineffective use.	1. These institutions can support EWEA processes in fragile countries.	1. Mobile phone private companies have become critical partners for cash transfer programming for early action. Yet, there is a need to increase pre-agreements and processes for smooth and fastest implementation.	1. Donors' appetite to support early action in fragile countries is growing, particularly in the humanitarian sector. 2. Research funding from humanitarian and development donors is growing, and in recent years started to focus in fragile contexts.	1. Disaster risk financing instruments and options for early action are growing in fragile contexts, yet there is need to advance in their implementation.
1. More and more often, humanitarian actors (focused on protection and peace) with access to contested territories apply crisis modifiers to anticipate crises. Such protection-type actors are shifting to more active anticipatory action.	1. Often nonexistent, as described in the community risk mapping section.	1. Financial institutions operate in contested territories. However, their operations can be limited due to security territories. 2. Remittances from diaspora and remittance companies are crucial to survival in contested territories.	1. Mobile money services, microfinance institutions, cooperatives, and community savings groups can be found in contested territories. If done in an FCV-sensitive way, they are all crucial for cash transfers at the community level in contested territories.	1. Contested territories might face funding restrictions, 2. some countries with contested territories also suffer sanctions.	1. In contested territories, microinsurance and community-based insurance might exist. 2. Humanitarian and development organisations play a crucial role in disaster risk financing in contested territories, yet it is limited due to security.

High-intensity conflict	Constraints in protracted conflict are exacerbated in high-intensity conflict, with severely reduced humanitarian access, significant destruction of critical infrastructure and services, and development activities commonly brought to a halt. Action is often limited to emergency relief to ensure people's survival. Areas near the front line, usually receiving displaced people, are typically insecure and unstable but allow for a greater depth of action.	1. There is no evidence that regional natural hazards-related contingency plans include scenarios supporting early action in high-intensity conflict.	1. EAPs do not have scenarios of activation during high-intensity conflict. 2. Although interest is growing in developing compound risk-related EAP (integrating conflict, displacement and natural hazards), these need to be implemented.	1. National contingency plans, might become irrelevant during high intensity conflict, as V&E of population can change drastically. 2. Forcibly displaced population (and migrants) might be out of reach of pre-conflict contingency plans.
Protracted conflict	Protracted conflicts exacerbate constraints that characterise situations of institutional fragility. In addition, conflicts frequently harm the environment on which people rely to survive, disrupt and destroy essential services and the economy, and reduce access to the most affected parts of the territory, which leads to a weak governmental presence and a limited presence of development actors (ICRC 2020a). This can result in poorly served areas where people more acutely feel the effects of conflict – from displacement to death, injury and disrupted essential services. Even though violence may be localised, the long-term consequences of these conflicts tend to affect the whole of a country by weakening governance and institutions and mobilising the government's efforts towards restoring security at the expense of other priorities. This notably contributes to a scarcity of reliable historical data that challenges longer-term planning, projections and models. Access to adequate finance is limited by the weakness of institutions, reduced absorption capacity, and restrictive measures (such as sanction regimes or financing modalities).	1. Disaster-related contingency plans are limited and often focused on urban and easy-to-access areas. 2. NDMA and civil society often need more resources to develop contingency plans, update them if they exist, and test them. They do not include conflict sensitivity	1. Over the last few years, humanitarian EAPs have been developed in protracted conflict but tend to focus on easy-to-access areas. 2. There is an opportunity to enhance context analysis in EAPs and integrate conflict sensitivity.	1. Governmental contingency plans are not often tailored to specific groups affected by conflict, such as displaced and people with disabilities, etc. (see annexe 2)

*Sample image – not legible for review. For review see Excel Document

1. Shock-responsive social protection delivery systems could become relevant in times of high-intensity conflict, enabling cash to be delivered to a wider number of affected populations.	1. Community contingency plans might not be activated as communities have other priorities for conflict survival. 2. If the population is displaced to areas they do not know, contingency plans linked to a specific territory will not be useful. 3. In the case of host communities, it's crucial to ensure that contingency plans are comprehensive and adequately resourced, as they may otherwise be insufficient.	1. Financial institutions suffer severe challenges during high-intensity conflict due to damage to infrastructure such as bank branches, ATMs, economic sanctions that restrict financial transactions, liquidity issues, etc. Yet often, given international support, these institutions can continue functioning.	1. Although the system can be severely impacted, digital and mobile platform banking services could continue functioning as long as the telecommunications infrastructure continues to operate. 2. Humanitarian actors play a crucial role in supporting cash transfers in times of high-intensity conflict by setting up alternative distribution methods. 3. physical cash transport can become risky due to violence and looting.	1. International donors play a crucial role during high-intensity conflict, 2. international funding for early action can become the only funding available to anticipate disasters when governments have financial restrictions or must repurpose funds for conflict-related activities.	1. During high-intensity conflict, disaster risk financing mechanisms, such as insurance, could be a crucial funding source. However, there is no evidence that insurance has been disbursed at the moment of compound risk of conflict and natural hazards
1. social protection systems are growing in protracted conflict; they sometimes focus on displaced populations and the poorest; there is an opportunity to expand them to be anticipatory and shock-responsive to cover more populations groups affected by conflict (see annex 2)	1. DRR is severely constrained in most conflict-affected areas. The limitations, such as restricted access, risk aversion, low priority for DRR (EWS), and inadequate funding, significantly impede the effectiveness of DRR in protracted conflicts. 2. However, there are some growing examples of EWS in protracted conflict, underscoring the need for further research and development in this crucial area.	1. Protracted conflicts have severe negative impacts on the financial system, operational disruptions due to infrastructure damage, liquidity, and solvency. Sometimes, demand for cash increases as people flee, individuals might not be able to continue paying loans, and assets might also devalue. In some cases, illicit activities increase, which can increase reputational risks. Currency devaluation and inflation are also prevalent. All this can affect the capacity to deliver early action in this complex context.	1. Cash transfers have several benefits in the context of early action in protracted conflicts; this can also be the case as they promote the activation of the local economy, reduce logistics challenges, are scalable, and can be adapted based on projected risks. Yet there are challenges that need to be addressed, such as disruptions in banking systems and the physical safety of populations as they might be victims of extortion/theft. Targeting and identification could be difficult, and corruption could happen.	Donors' support for EWS in protracted conflicts is changing, yet there is still risk aversion, and EWS are not at scale as they are needed. As global funds such as GCF increase their support to conflict-affected contexts, more opportunities will emerge for setting up flexible financial systems for setting up EWS and enabling anticipatory action.	1. DRF instruments are not fully accessible for conflict context, some parametric insurance systems and microinsurance are available, but there is still need to offer a bigger variety of DRF instruments that are tailored for EWS needs for different populations.

ANNEX 2 – KEY EWS IN FCV SETTINGS LITERATURE[17]

Year	Resource	Type	Institution	Authors	Background
2020	"An Agenda for Expanding Forecast-Based Action to Situations of Conflict"	Working Paper	GPPI and Red Cross Red Crescent Climate Centre	Marie Wagner and Catalina Jaime	"This paper argues that Forecastbased Action (FbA) could be expanded to situations of conflict and outlines practical considerations for how to approach this complex endeavour. "
	Link: https://gppi.net/media/Wagner_Jaime_2020_Forecast-Based-Action-in-Conflicts.pdf				
2021	"Compound Risk Analysis: Climate & Conflict in Sudan Hot Spot Mapping to inform Anticipatory Action and OpenStreetMap mapping"	Story Map	Red Cross Red Crescent Climate Centre	Cornelia Scholz, Catalina Jaime and Mark Weegmann	This story map presents OSM as a tool to enhance exposure information in conflict settings, with a case of Sudan.
	Link: https://storymaps.arcgis.com/stories/2f1a015682a148adb0bc07db4426d88b				
2022	What was known: Weather forecast availability and communication in conflict-affected countries	Academic Paper	University of Twente and Red Cross Red Crescent Climate Centre	"Catalina Jaime Erin Coughlan de Perez Maarten van Aalst Emmanuel Raju Alexandra Sheaffer"	By doing a retrospective analysis of the most severe disaster events and historical forecast information, this paper examines whether global forecast models predicted historical floods in conflict-affected regions and whether forecast information was communicated for droughts
	Link: https://www.sciencedirect.com/science/article/pii/S2212420922006409				
2023	Anticipatory action in refugee and IDP camps: challenges, opportunities and considerations	Working Paper	Anticipation Hub	Evan Easton Calabria, Catalina Jaime and Benjamin Shenouda	In the past decade, the number of climate disasters and people displaced by conflict has risen globally, illustrating a pressing need to better understand how already displaced people are impacted by climate disasters. Drawing on case studies from Bangladesh and Syria, this report from the anticipatory action in conflict working group identifies some factors to consider when designing anticipatory actions in refugee and internally displaced persons camps.
	Link: https://www.anticipation-hub.org/download/file-2568				
2023	Early warning systems and early action in fragile, conflict, and violent contexts: Addressing growing climate & disaster risks	Policy Paper	WMO and UNDRR Center of Excellence	WMO and UNDRR Center of Excellence	This policy paper presents key considerations and calls for action to ensure countries in contexts of fragility, conflict and violence are supported by all relevant EWS stakeholders and especially donors, humanitarian and development agencies and civil society actors.
	Link: https://www.undrr.org/publication/early-warning-systems-and-early-action-fragile-conflict-and-violent-contexts-addressing				

17 By the author. This can be expanded further to include other relevant literature.

Year	Resource	Type	Institution	Authors	Background
2024	Beyond the forecast: knowledge gaps to anticipate disasters in armed conflict areas with high forced displacement	Academic Paper	University of Twente and Red Cross Red Crescent Climate Centre	Catalina Jaime, Erin Coughlan de Perez, Maarten van Aalst and Evan Easton-Calabria	This paper answers the question: what is the state of knowledge of EWEA for climate hazards in countries affected by armed conflict and high levels of forced displacement? Findings demonstrate that most research focuses on climate science rather than social science across six elements of the EWEA value chain: 1. hazards analysis, 2. understanding vulnerability and exposure, 3. warning communication and dissemination, 4. forecasting availability and monitoring, 5. early action planning, and 6. financing systems.
	Link: https://iopscience.iop.org/article/10.1088/1748-9326/ad2023/meta				
2024	EWS in FCV settings	Report	GFDRR	Lara Loussert, Moussa Sidibe, Karima Ben Bih and Esesua Olubukola Ikpefan	"This study, led by the Global Facility for Disaster Reduction and Recovery (GFDRR) teams working on the Disaster-FCV Nexus thematic area and the Hydro met Services and Early Warning Systems thematic area, aims to contribute to GFDRR's overarching objective: to help low- and middle-income countries understand and reduce their vulnerability to natural hazards and climate change. More specifically, the purpose of this report is to provide valuable insights into the nuances of early warning systems (EWS) implementation within fragile, conflict, and violence (FCV)-affected contexts against growing natural hazards, offering practical recommendations and identifying entry points for enhancing stakeholder coordination, optimizing resource allocation, and fostering community resilience."
	Link: https://www.preventionweb.net/publication/early-warning-systems-fragility-conflict-and-violence-affected-settings-shielding				
2024	Handbook on Early Warning Systems and Early Action in Fragile, Conflict, and Violent (FCV) Contexts: Addressing growing climate and disaster risks	Handbook	COE - WMO and UNDRR	COE - WMO and UNDRR	The purpose of this document is to identify the basic requirements for EWS in fragile-, violent, and conflict-affected countries and provide considerations and guidance on these to further the implementation of EWS in FCV contexts. The Handbook can help: • Support the implementation of EWS in FCV contexts • Foster common understandings and expectations of EWS in FCV contexts • Enable common planning and approaches • Support multi-stakeholder and cross-sectoral collaboration • Strengthen monitoring of EWS in FCV contexts.
	Link: Forthcoming				

ANNEX 3 – POPULATION GROUPS AT HIGH RISK OF DISASTERS IN FCV SETTINGS[18]

This list is a sample of people impacted by FCV conditions and likely to be impacted by hazards, which could further exacerbate their vulnerability. These sub-populations groups should play an active role in the design of people-centered early warning systems.

Population group	Population Sub group in FCV settings key for the co production of EWS
1. Children and Adolescents	Orphans
	Child soldiers
	Children living in conflict zones
	Children separated from their families
	Unaccompanied minors
	Street children
2. Women	Pregnant women
	Mothers with young children
	Survivors of sexual and gender based violence
	Female headed households
	Widows
3. Elderly	Elderly living alone
	Elderly with chronic illnesses
	Elderly caregivers
4. People with Disabilities	Physically disabled individuals
	Visually impaired individuals
	Hearing impaired individuals
	Individuals with intellectual disabilities
5. Ethnic and Religious Minorities	Indigenous populations
	Minority religious communities
	Minority ethnic communities
	Migrant workers
6. LGBTQ+ Individuals	Transgender individuals
	Gay, lesbian, and bisexual individuals
	Non binary and gender non conforming individuals
7. Internally Displaced Persons (IDPs)	Families in informal settlements
	Individuals living in IDP camps
	Displaced agricultural workers

18 By the author, building on multiple grey and academic research and expert knowledge.

Population group	Population Sub group in FCV settings key for the co production of EWS
8. Refugees and Asylum Seekers	Urban refugees
	Refugees in camps
	Stateless persons
	Asylum seekers in detention
9. People with Mental Health Conditions	Individuals with severe mental illnesses (e.g., schizophrenia, bipolar disorder)
	Individuals with anxiety and depression
	Individuals with substance use disorders
10. Combatants, Veterans and people in detention	Former child soldiers
	Veterans with PTSD
	Disabled veterans
	Demobilized combatants
	Individuals deproved of liberty (in detention centers/jails)
11. Civilians in High Intensity Conflict Zones	Rural villagers
	Urban residents
	Business owners and workers
	Farmers and agricultural workers
12. Health Care Workers	Doctors and nurses
	Paramedics and emergency responders
	Community health workers
	Mental health professionals
13. Humanitarian Aid Workers	Local NGO staff
	International NGO staff
	Volunteers
	Logisticians and support staff
14. Journalists and Media Personnel	War correspondents
	Local journalists
	Freelance reporters
15. Rural and Isolated Communities	Farmers (e.g for example involved in illigal crops)
	Indigenous communities
	Nomadic groups
	Fishing communities
16. Urban Poor	Slum dwellers
	Informal sector workers
	Homeless individuals
	Squatters

ANNEX 4 - EXAMPLE OF NON-STATE ARMED GROUPS (NSAG) IN FCV COUNTRIES, SOME OF THEM SUPPORTED BY CREWS[19]

Examples of FCV countries	Non-state armed groups (NSAG)
Syria	Various Rebel Groups and ISIS: Different factions, including the Free Syrian Army, Kurdish forces (SDF/YPG), and remnants of ISIS, have controlled various regions.
Yemen	Houthi Rebels: Control significant parts of northern Yemen, including the capital, Sana'a.
	Southern Transitional Council (STC): Control parts of southern Yemen.
Somalia	Al-Shabaab: Controls rural areas and some towns in southern Somalia.
Nigeria	Boko Haram: Controls areas in the northeast.
	ISWAP (Islamic State West Africa Province): Splinter faction of Boko Haram with control in the Lake Chad region.
Colombia	ELN (National Liberation Army): Controls remote rural areas.
	FARC Dissidents: Some factions continue to control territories despite the peace agreement.
Iraq	ISIS: Though largely defeated, remnants still control some areas.
	PMF (Popular Mobilization Forces): Some groups within this umbrella have significant control, especially in Shia-dominated areas.
Myanmar	Ethnic Armed Groups: Such as the Kachin Independence Army (KIA), Shan State Army (SSA), and others control various regions.
DR Congo (Democratic Republic of the Congo)	Various Armed Groups: Including the Allied Democratic Forces (ADF), Mai-Mai groups, and others control parts of the eastern provinces.
Mali	Jihadist Groups: Various factions, including those affiliated with Al-Qaeda and ISIS, control parts of northern and central Mali.
Central African Republic	Seleka and Anti-Balaka Militias: Control different parts of the country.
Libya	Various Militias and Factions: Control different regions post-Gaddafi, including parts of Tripoli and eastern Libya.
Mexico	Drug Cartels: Such as the Sinaloa Cartel, Jalisco New Generation Cartel, and others, control parts of various states, especially in the west and north.
Philippines	Abu Sayyaf and Other Islamist Groups: Control parts of the southern region, particularly in Mindanao.

19 OpenAI. (2024). *ChatGPT*. Reviewed by the author , it is recommended to expand to other countries and sub-regions within countries for operational purposes.

ANNEX 5 - THIS LIST IS A SAMPLE OF LOCAL RADIOS CRITICAL FOR EARLY WARNING COMMUNICATION AND DISSEMINATION IN FCV CONTEXTS[20]

Country	Radio stations and their focus
Afghanistan	Radio Azadi : Operates to provide news.
	Radio Killid : Part of the Killid Group, offering local news and programs.
Somalia	Radio Ergo : Focuses on humanitarian issues, operated by the International Media Support group.
	Radio Shabelle : One of the leading community radio stations.
Yemen	Radio Lana : Provides educational programs and news updates, focusing on local communities.
	Radio Yemen Times : Focuses on peacebuilding and conflict resolution.
Democratic Republic of the Congo	Radio Okapi : A UN backed station providing news and peacebuilding programs.
	Radio Maendeleo : Focuses on local development and community issues.
Central African Republic	Radio Ndeke Luka : Supported by Fondation Hirondelle, providing news and information.
Mali	Studio Tamani : A network of community radios providing news and fostering dialogue.
	Radio Kledu : Engages in discussions on social and political issues.
South Sudan	Radio Miraya : Run by the UN, providing news and information to local communities.
	Eye Radio : Offers a mix of news, education, and entertainment.
Myanmar	DVB (Democratic Voice of Burma) : Operates both in country and from abroad to provide news to Myanmar citizens.
	Mizzima : Engages in community reporting and news distribution.
Colombia	Radio Nasa : Run by the indigenous Nasa people, focusing on local issues and cultural content.
	Radio Guatapurí : Serves local communities with news and educational programs.
Philippines	DXUP FM : A community radio station in Mindanao, focusing on peace and development.
	Radyo ni Juan : Provides news and public service programs.
Haiti	Radyo Lekol : Focuses on education and community issues.
	Radio Tele Ginen : One of the popular community stations providing local news.
Syria	Radio Rozana : Offers independent news and information, often operated from outside the country due to safety concerns.
	Radio Fresh : Operated in opposition held areas, focusing on local news and community issues until it was forced to close due to attacks.

20 OpenAI. (2024). ChatGPT. It is recommended to review and expand by Implementing Partners.

ANNEX 6 – LIST OF GFC-FUNDED EWS PROJECTS AND IMPLEMENTING PARTNERS[21]

Country	GCF IP	Project	LDC	FCV
Malawi	UNDP	Enhancing the resilience of vulnerable communities to climate change through EWS.	Yes	Yes
Madagascar	UNDP	Strengthening the climate resilience of rural communities through enhanced EWS.	Yes	No
Senegal	CSE	Strengthening climate resilience through improved EWS.	Yes	No
Zambia	UNEP	Climate-resilient infrastructure and EWS.	Yes	No
Mauritania	UNDP	Improving climate resilience through integrated EWS.	Yes	Yes
Niger	WMO	Strengthening climate information and early warning systems.	Yes	Yes
Uganda	UNDP	Building resilience to climate change through EWS.	Yes	Yes
Benin	UNDP	Enhancing EWS for climate risk management.	Yes	No
Sudan	UNDP	Strengthening climate information and EWS.	Yes	Yes
Bangladesh	KfW	Climate-resilient infrastructure and EWS for coastal communities.	Yes	Yes
Sri Lanka	UNDP	Developing and implementing national EWS.	Yes	No
Vanuatu	UNDP	Strengthening national and regional EWS for disaster risk reduction.	Yes	No
Fiji	SPREP	Regional projects are enhancing EWS across the Pacific.	No	No
Solomon Islands	SPREP	Strengthening EWS as part of climate resilience efforts.	Yes	No
Nepal	UNDP	Strengthening EWS in mountainous regions.	Yes	No
Mongolia	UNDP	Enhancing EWS for extreme weather events.	No	No
Bhutan	UNDP	Strengthening EWS for climate adaptation and disaster risk management.	Yes	No
The Philippines	LBP	EWS for disaster preparedness in vulnerable regions.	No	No
Papua New Guinea	SPREP	Regional EWS initiatives for climate resilience.	Yes	Yes
Timor-Leste	UNDP	Enhancing early warning systems and climate resilience for rural communities.	Yes	Yes
Moldova	UNDP	Implementation of advanced EWS for climate risks.	No	No
Armenia	UNDP	Strengthening national EWS to manage climate hazards.	No	No
Georgia	UNDP	Development of EWS for flood and landslide risks.	No	No
Tajikistan	UNDP	Enhancing resilience through improved EWS.	Yes	No
Kyrgyzstan	UNDP	EWS as part of national climate adaptation strategies.	No	No
Uzbekistan	UNDP	Development of climate-resilient EWS.	No	No

21 OpenAI. (2024). *ChatGPT.* Enhanced and reviewed by the author.

Country	GCF IP	Project	LDC	FCV
Cuba	UNDP	Strengthening of EWS for hurricane and climate risk management.	No	No
Honduras	UNDP	Development of community-based EWS for disaster preparedness.	No	Yes
Guatemala	UNDP	Enhancing EWS to manage climate-induced hazards.	No	Yes
Haiti	UNDP	EWS to build resilience against hurricanes and floods.	Yes	Yes
Jamaica	PIJ	Development of EWS for better disaster management.	No	No
Dominican Republic	UNDP	Strengthening EWS for climate resilience.	No	No
El Salvador	UNDP	Strengthening national EWS as part of disaster risk reduction strategies.	No	Yes
Panama	UNDP	Development of EWS as part of broader climate adaptation efforts.	No	No
Peru	UNDP	Implementation of EWS in flood-prone regions.	No	No
Morocco	AFD	Development of EWS to address climate risks in vulnerable regions.	No	No
Tunisia	UNDP	Development of EWS as part of national climate adaptation efforts.	No	No
Jordan	UNDP	EWS to manage water-related climate risks.	No	No
Lebanon	UNDP	Strengthening EWS for disaster risk reduction and climate resilience.	No	Yes
Egypt	WFP	Enhancing EWS to manage climate risks, especially in coastal regions.	No	No

This list complements Figure 2 of the CREWS 19th Steering Committee FCV document.

ABBREVIATIONS

AA	Anticipatory Action
AFD	Agence Française de Développement (“French Development Agency”)
AI	Artificial Intelligence
ASW	Accelerated Support Window
AWOS	Automated Weather Observing Systems
BCG	Business Continuity Grant? (from page 13)
CAP	Common Alerting Protocol
CBEW	Community-Based Early Warning (page 16)
CEDEMA	Caribbean Disaster Emergency Management Agency (Annex 1)
CERF	Central Emergency Relief Fund
CGIAR	Consultative Group on International Agricultural Research
CoE	Centre of Excellence for Climate and Disaster Resilience
CRAF’d	Complex Risk Analytics Fund
CT	Contested Territories
DREF	Disaster Response Emergency Fund
DRF	Disaster Risk Financing
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EAP	Early Action Protocol
ECMWF	European Centre for Medium-Range Weather Forecasts
ENSO	El Niño Southern Oscillation
EWEA	Early Warning Early Action
EW4A	Early Warning for All
EWS	Early Warning Systems
FAO	Food and Agriculture Organization of the United Nations
FARC	Fuerzas Armadas Revolucionarias de Colombia (“Revolutionary Armed Forces of Colombia”)
FCDO	Foreign, Commonwealth and Development Office
FCV	Fragility, Conflict and Violence
FEWSNET	Famine Early Warning Systems Network
GAR	Global Assessment Report
GBV	Gender-based Violence
GCF	Green Climate Fund
GDACS	Global Disaster Alert and Coordination System
GFDRR	Global Facility for Disaster Reduction and Recovery
GPPi	Global Public Policy Institute
HDP	Humanitarian, Development and Peace
HDPC	Humanitarian, Development, Peace and Climate

HI	High-intensity Conflict
ICRC	International Committee of the Red Cross
IDP	Internally Displaced Person
IF	Institutional Fragility
IFRC	International Federation of the Red Cross Red Crescent
IHL	International Humanitarian Law
IP	Implementing Partner
IPCC	Intergovernmental Panel on Climate Change
ISIS	Islamic State of Iraq and Syria
ITU	International Telecommunication Union
LDC	Least Developed Country
NATO	North Atlantic Treaty Organization
NDMA	National Disaster Management Agency
NGO	Non-governmental Organization
NHMS	National Hydrological and Meteorological Services
NSAG	Non-state Armed Group
OSM	OpenStreetMap
PC	Protracted Conflict
PIJ	Planning Institute of Jamaica (page 49)
PTSD	Post-traumatic stress disorder
SDF	Syrian Democratic Forces
SIDS	Small Island Developing States
SOFF	Systematic Observations Financing Facility
SPREP	Secretariat of the Pacific Regional Environment Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UN-OCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNOPS	United Nations Office for Project Services
UXO	Unexploded Ordnance
V&E	Vulnerability & Exposure
WB	World Bank
WFP	World Food Programme
WISER	Weather and Climate Information Services Early Warning
WMO	World Meteorological Organization
YPG	People’s Defense Units

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