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IMPROVED FRAGILITY AND RISK INDICATORS FOR ANTICIPATORY ACTION IN FOOD, LAND AND WATER SYSTEMS

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WORKING PAPER

INTRODUCTION

For the 1.5 billion people living in fragile and conflict-affected situations, livelihood challenges are compounded by climate change, unsustainable resource consumption, poor governance, and weak social cohesion. Socio-ecological risks have become increasingly prevalent due to climate change, environmental degradation, and conflict. Disaster risk reduction (DRR) and preparedness are critical components of a comprehensive approach to managing and mitigating the impact of disasters. Moreover, given the disproportionate impact of conflicts and the differential vulnerabilities of population groups to displacement, it is crucial to gain an in-depth understanding of the dynamics of socio-ecological risks and implications for resilience-building. Traditional approaches around socio-ecological risks have been reactive, however policy makers and humanitarian stakeholders have recognized the need to shift from a reactive to an anticipatory approach which entails ex-ante, longer term planning.

Monitoring these conflict, migration and fragility risks and informing early action is crucial for preventing severe consequences and strengthening the resilience of Food, Land and Water systems (FLWs). Indeed, various actors such as Red Cross Red Crescent Climate Centre and the UN are implementing and discussing an array of Anticipatory action initiatives. While early action interventions for monitoring socio-ecological risks are gaining prominence the approaches and risk indicators differ considerably within and between climate, development, and humanitarian communities. There is also a fundamental variance in approaches and risk indicators relating to triggers and trigger components. This diversity underscores the need for a cohesive framework which addresses these disparities. This is essential in devising a comprehensive anticipatory framework that assesses the multi-dimensional nature of FLWs.

To allow for precise communication and discourse among experts a comprehensive understanding of early action initiatives undertaken by humanitarian, climate, and development organizations is imperative. In this context, a thorough review of fragility and risk indicators can serve as a useful framework for understanding current monitoring and early action practices related to fragility and risk. The review can then be used to identify limitations and gaps existing in the current approaches which can ultimately inform the development of a novel risk ‘typology’. Given the absence of standardized indicators, methods and triggers for monitoring and addressing socio-ecological risks, the ‘typology’ seeks to establish a new approach that actors and organizations can employ to inform anticipatory action.

Anticipatory action is a proactive approach aimed at reducing the impact of impending crises by identifying, understanding, and addressing potential risks before they escalate. This framework draws from insights provided by the Anticipation Hub, an organization dedicated to advancing the understanding and implementation of anticipatory action. The framework not only defines anticipatory action but also outlines key interventions to address gaps in indicators and trigger components for effective anticipation. Anticipatory action involves the timely identification and response to emerging risks or crises based on early warning indicators. It encompasses a spectrum of activities, from risk analysis and scenario planning to the pre-positioning of resources and the implementation of targeted interventions. Anticipatory action seeks to enhance resilience and reduce the impact of disasters, conflicts, or other crises by acting before the situation reaches a critical stage. According to a recent report by the Anticipation Hub, there are 70 active anticipatory action frameworks in place in 35 countries and another 97 frameworks under development in 2022 (*1*). While this is an impressive number of frameworks, the diversity results in challenges associated with mainstreaming anticipatory action across all levels of the humanitarian ecosystem.

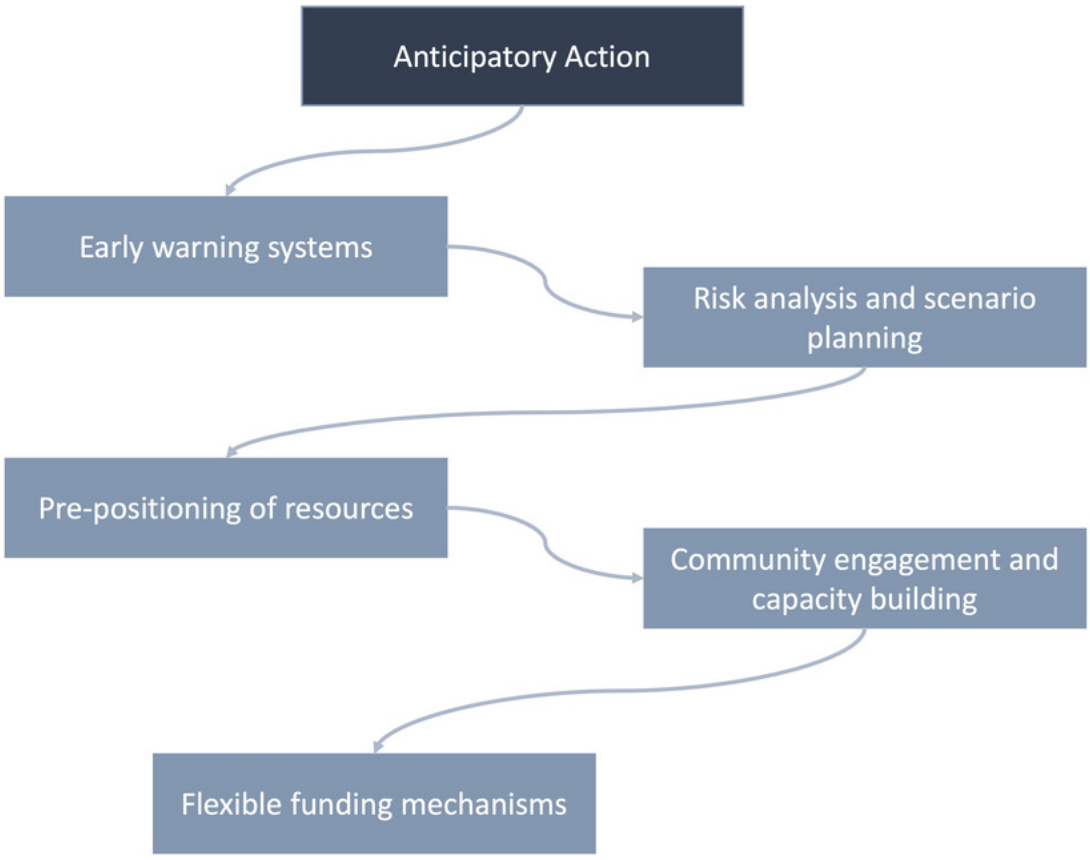

Figure 1: Key components of Anticipatory Action

STATE OF THE ART

Enhancing the effectiveness of anticipatory action requires a nuanced understanding of indicators that signal impending crises. With current global challenges, the convergence of fragility, climate change and socio-ecological risks pose a threat, particularly to vulnerable populations inhabiting conflict-affected settings. As the urgency intensifies, international actors have begun comprehensive assessments and frameworks to frame risk indicators and triggers. These frameworks, while pivotal in shaping anticipatory action, require critical evaluation to understand how risk is currently framed, and if possible, this can be refined or even combined for a more holistic understanding.

While triggers are recognized as crucial components in specific initiatives and strategic plans, their widespread inclusion as a fundamental aspect of global disaster risk reduction frameworks is still an area for further development. These triggers, often defined as precursory indicators or parameters signaling an imminent crisis or disaster, hold immense potential when incorporated systematically into risk assessment and response strategies. However, the four dimensions in which triggers are currently framed are often limited to linear, static indicators, that have very little cross-over to the other dimensions (Fig. 2). For example, hazards are often individually defined, limiting their representation to singular hazards which do not co-occur in space or time. Combined with the hazard level, timing is a critical component which is constrained by forecast skill and lead times and yet is the backbone of AA. In order to maximize trigger performance and response, triggers should make use of hybrid components – incorporating both predictive and observational data. The last two dimensions, the target and activity, are arguably the most challenging to incorporate, yet particularly important for effective intervention. Identifying and targeting the most vulnerable households relies on baseline vulnerability data. However, this data is rarely incorporated into the trigger, thereby limiting accuracy and efficacy. Finally, if the previous three dimensions are integrated and influenced by one-another, AA can identify the most impactful and relevant activities such as cash, care kits or food, since these would be bound by the compound hazards, timing, and livelihood focus.

In the pursuit of a more resilient and risk-informed future, the Sendai Framework for Disaster Risk Reduction emerges as a cornerstone guiding global efforts. By emphasizing the importance of understanding disaster risk in all its dimensions, the framework advocates for an approach that addresses the underlying connectedness and drivers of risk, including but not limited to climate change, economic loss, and social vulnerabilities.

The framework focuses on the adoption of measures which address dimensions of disaster risk. Additionally, it prioritizes the enhancement of access to and availability of multi-hazard early warning systems. The framework outlines four primary priorities which include 1) Understanding disaster risk 2) Strengthening disaster risk governance to manage disaster risk 3) Investing in disaster risk reduction for resilience and 4) Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation, and reconstruction.

Within the landscape of disaster risk reduction, the United Nations Office for Disaster Risk Reduction (UNDRR) has also provided a Global Risk Assessment Framework (GRAF). The GRAF provides invaluable insights into the complex landscapes of hazards and vulnerabilities worldwide. Here they endeavor to surpass conventional linear risk assessments, recognized as insufficient in comprehending modern-day risks. Strengthening resilience necessitates a shift from assessing and addressing hazards independently towards acknowledging the systemic nature of risk where shocks frequently cascade and compound in complex ways. The GRAF therefore aims to promote use of scalable, systemic risk information to support planning. However, these frameworks and data standards lack emphasis on triggers.

Triggers and trigger components serve as critical elements in the landscape of anticipatory action, contributing significantly to the efficacy of early warning systems and prompt response mechanisms. While comprehensive assessments and frameworks are vital, the identification and utilization of triggers play a pivotal role in initiating timely actions. Some existing mechanisms prioritize trigger components, aligning with the core principles of anticipatory action. For instance, initiatives like the Forecast-based Financing (FbF) mechanism pioneered by the Red Cross Red Crescent Movement emphasize trigger components derived from meteorological forecasts and predictive models often from both local and global meteorological institutes. FbF strategically links triggers to predetermined actions, ensuring anticipatory measures are activated before disasters escalate, thereby minimizing impacts on vulnerable communities.

In its 2023-2026 Strategic Plan, OCHA is also amplifying its commitment to mainstream and expand anticipatory action following successful piloting efforts. OCHA's implementation strategy involves the facilitation of coordinated and collective anticipatory action approaches. This approach is structured around three pivotal elements: first, a forecast-based trigger integrated into a transparent decision-making process; second, pre-established action plans designed to mitigate emergency impacts and reduce the reliance on humanitarian relief efforts; and third, pre-arranged financial mechanisms.

While not yet released, INFORM Warning aims to provide a comprehensive, quantified, and accessible repository of multi-hazard early warning information. The types of information that will be included are trends in risk drivers and crisis severity, seasonal and cyclical risks and forecasts and predictions. The platform aims to collate and synthesize this information to show the changes of risk at country level over time, including aspects of specific scenarios that could result in a crisis as well as basic information about them- such as the primary drivers of risk as well as the timing, type, and level of impacts. Users can then take the results and combine it with other information to build complete early warning scenarios of impact analysis.

Addressing the multifaceted nature of triggers involves navigating various challenges. One significant hurdle is the contextual relevance of triggers across different regions and hazard profiles. What might serve as a reliable trigger in one geographical location or for a specific type of disaster may not hold the same predictive value elsewhere. This necessitates a dynamic approach, accommodating local knowledge, socio-cultural nuances, and specific vulnerabilities to ensure the accuracy and effectiveness of trigger-based systems. Collaborative efforts between local communities, national agencies, and international organizations are instrumental in tailoring trigger frameworks to diverse contexts, promoting inclusivity and accuracy in anticipatory actions.

The evolution of anticipatory action towards a more dynamic, multidimensional indicator holds promise for revolutionizing disaster risk reduction strategies worldwide. However, to realize its full potential, concerted efforts are needed to embed triggers within the foundation of global frameworks, ensuring adaptability and contextual relevance. In the following sections we propose the framing of a novel risk ‘typology’, with a focus on compound triggers. The evolving typology seeks to develop a standardized yet flexible approach that empowers communities and institutions to anticipate, response and mitigate risks effectively.

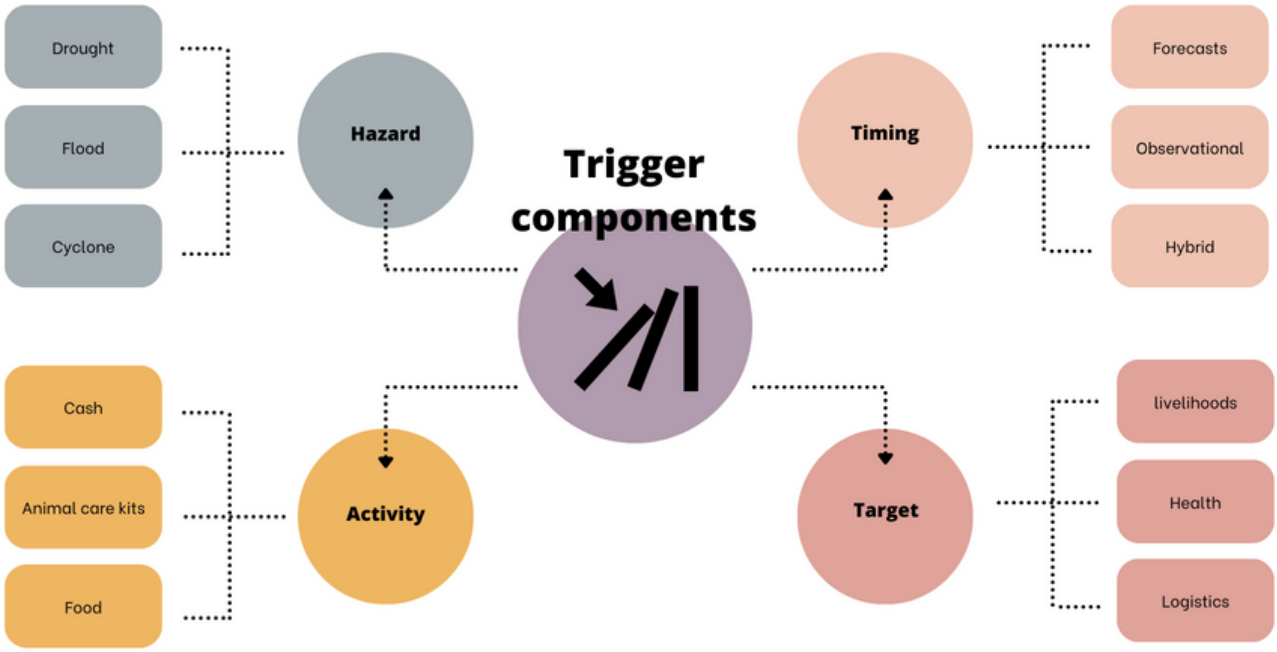

Figure 2: Dimensions of trigger development

In order to improve the efficacy of AA, advances should focus on 1) developing integrated social and environmental indicators or triggers that are location specific, 2) implement continuous monitoring and evaluation and 3) cross-sectoral collaboration (Fig. 3.).

1. **Contextual relevance of social and environmental indicators:**

Critical to the improvement of AA is the development of novel risks and triggers that are context-specific, incorporating social and environmental components that are relevant to the local population. AA needs to be multi-indicator and regionally appropriate, this ensures that anticipatory action is tailored to the unique vulnerabilities of each community. The indicators should also be co-developed with communities to establish mechanisms for ongoing community feedback to validate and adjust indicators. Cultural practices, community behaviors and local knowledge play crucial roles in identifying triggers. Incorporating traditional knowledge and community perceptions into the indicator framework recognizes the importance of local insights in anticipating crises. The indicator framework should also offer flexibility to incorporate new triggers or adapt existing ones based on changing environment, social or economic conditions.

2. **Continuous Monitoring and Evaluation:**

Implement advanced data collection technologies, such as satellite imagery, IoT devices, and social media analytics, to enable real-time monitoring of indicators and disasters. This facilitates a more dynamic and responsive anticipatory approach. Develop an iterative process for continuous monitoring and evaluation, allowing anticipatory strategies to evolve based on the changing nature of indicators. This adaptive approach ensures that interventions remain effective in dynamic environments. The mechanism would need to establish a feedback loop that captures lessons learned from previous anticipatory actions. Analyze the outcomes of interventions to refine indicator frameworks, promoting a culture of continuous improvement in anticipatory strategies. Building upon hybrid triggers, sophisticated predictive models and early warning systems should leverage continuous monitoring and predictive analytics to anticipate potential crises.

3. **Cross-Sectoral Collaboration:**

Interdisciplinary research teams comprising experts from diverse fields foster a holistic approach to indicator development. These teams can collaboratively identify and refine indicators that capture the complexity of emerging crises. Platforms such as the Anticipation Hub are well positioned to facilitation knowledge exchange, dialogue, guidance and joint training programs for professionals across sectors to enhance their understanding of different indicators. Platforms such as this foster partnerships and collaborative networks across borders, regions and subregions to share best practices, data and expertise. A global collaboration amplifies the effectiveness of anticipatory action, ensuring more coordinated and impactful responses to multifaced crises that transcend individual jurisdictions.

Merging hybrid trigger mechanisms (*2*), we propose a new risk and trigger typology which is able to capture and represent multiple location-specific indicators over a continuum of time (Fig. 3).

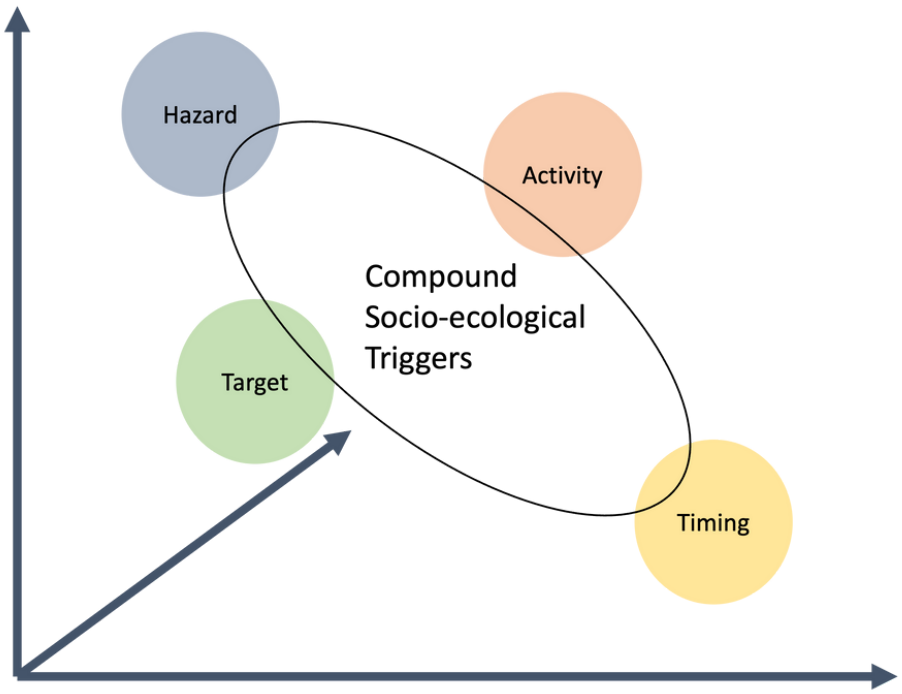

Figure 3: Required shift from linear, to multi-dimensional trigger development

A PROPOSED COMPOUND RISK FRAMEWORK FOR THE WORLD'S MOST VULNERABLE

The occurrence of extreme weather hazards is increasing, with intensified frequency and intensity, leading to significant impact on ecosystems and human well-being (*2–5*). Beyond isolated hazards, the growing emergence of high impact compound events requires immediate attention to minimize further loss and damage (*4,6,7*). Here we propose a multi-dimensional trigger which incorporates interconnected environmental and socioeconomic crises, with a particular focus on the most vulnerable groups, including, refugees, internally displaced persons, asylum seekers and stateless people. In order to ensure contextual relevance and maximize application, this framework was co-developed with UNHCR.

Compound events manifest through the interaction of hazards or drivers, such as extreme heat and drought or strong winds and heavy precipitation. The selection of climate triggers underwent a rigorous methodological process aimed at identifying hazards significantly impacting the world most vulnerable groups. This involved the co-development of climate impacts to regions hosting vulnerable communities. The final selection of climate triggers was three primary climatic threats—extreme heat, drought, and flood—owing to their frequent occurrence and profound implications for displaced individuals.

To synthesize these climate triggers into a unified composite index for each location, we utilized a mathematical technique known as the Euclidean norm. This methodology facilitates the integration of various triggers into a cohesive metric, prioritizing the severity and co-occurrence of these hazards. Unlike conventional averaging methods, the Euclidean norm pinpoints the most substantial values across the different hazards. As a result, it accentuates scenarios where a particular hazard holds notably greater weight or where multiple hazards converge, ensuring the composite index emphasizes the most intense or compound risks faced by displaced populations. The Euclidean norm plays a pivotal role in crafting a composite index devoid of biases towards any singular dominant trigger. Instead, it highlights instances where multiple hazards intersect or where one hazard significantly outweighs others. Furthermore, the approach was therefore able to capture all relevant climate information along a time continuum for a specific location.

Following the selection and synthesis of climate triggers, the analysis incorporated critical livelihood indicators tailored to each location hosting forcibly displaced populations. These livelihood indicators include aspects such as crop health and community health status, over time. This multifaceted approach therefore incorporates the intersecting vulnerabilities of the target population linked to livelihood sustainability and community well-being, beyond just hazards.

For each location, the composite index not only considers the intensity and co-occurrence of climate-related hazards, but also cross-references these with the impacts on local crops and health conditions. This approach allows for a nuanced understanding of the compound risks faced by forcibly displaced populations, acknowledging that a complete trigger event should encompass both climatic threats and socio-economic vulnerabilities associated with focus regions.

While this approach does enable a more comprehensive development of triggers for AA, there are still numerous components which can be improved. Firstly, the compound risks only incorporate a longer-term horizon forecast, yet lack any observational component. Secondly, there are multiple other hazards which could be included. Likewise, there are also multiple socio-economic indicators which should be included to capture the vulnerability component more accurately. Importantly, each of the socio-economic indicators should also be localized with ground-based knowledge in order for them to be effective. Consequently, this framework offers some progressive steps and insights to improve proactive interventions in anticipatory action.

CONCLUSION

Improving indicators in anticipatory action is a multifaceted challenge that requires a combination of technological advancements, community engagement, and interdisciplinary collaboration. By focusing on the integration of social and environmental indicators, continuous monitoring and evaluation, and cross-sectoral collaboration, the anticipatory action framework can become more robust and responsive. This approach ensures that indicators evolve with the changing nature of crises, leading to more effective and timely anticipatory interventions.

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