

Lessons Learned: DRC's Predictive Modelling for Anticipatory Action¹

The humanitarian sector is facing an increasingly complex reality: growing needs, shrinking budgets, and an urgent need to make aid more effective and efficient. Anticipatory Action (AA) has emerged as a promising approach that can complement traditional humanitarian response by reducing costs, increasing preparedness, and preventing crises from escalating. However, significant barriers—such as ethical risks in predictive modeling, the lack of sustained funding, and gaps in coordination—must be addressed to ensure AA is both effective and equitable.

Now, as the humanitarian sector re-examines its priorities in response to funding constraints, there is an opportunity to integrate AA in a way that strengthens, rather than competes with, existing response mechanisms. This paper presents key lessons from the Danish Refugee

Council's (DRC) experience in implementing AA, outlining both its potential and its limitations, while offering concrete recommendations for ensuring that AA becomes a reliable and impactful tool within the humanitarian landscape.

To enhance the effectiveness of AA, humanitarian agencies must prioritize stronger coordination, data-sharing, and ethical safeguards, ensuring that predictive models are used responsibly and do not exacerbate existing vulnerabilities. Meanwhile, donors play a crucial role in securing sustainable, flexible funding and integrating AA into long-term resilience strategies rather than treating it as an experimental alternative. By addressing these challenges, AA can become a more reliable and effective complement to traditional humanitarian response.

Background

Anticipatory Action (AA) is a humanitarian approach that leverages forecasting and predictive modeling to intervene before crises escalate. Unlike traditional response models, AA reduces suffering, improves cost efficiency, and enhances preparedness—an increasingly urgent need in the face of growing humanitarian crises

and shrinking budgets. The Danish Refugee Council (DRC) piloted AA initiatives in Somalia and the Sahel, testing predictive models for both climate and conflict-related stressors. This paper distills key lessons from that initiative to inform the future of AA programming.

Lessons Learned

Advantages of Anticipatory Action in Humanitarian Response

Emerging evidence suggests that anticipatory approaches offer several advantages over traditional humanitarian response, such as cost-effectiveness, local participation, and timeliness in aid delivery,² which were echoed by findings of DRC's initiative.

AA allows communities to engage more effectively in preparedness planning through its longer planning time frames. In DRC's programming, this was evident in the use of Early Warning Early Action Committees (EWEACs), which ensured that interventions aligned with local needs and priorities. The development of contingency plans and trigger monitoring through EWEACs resulted in a high level of

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² Weingärtner, L., & Spencer, A. (2019). *Analysing Gaps in the Humanitarian and Disaster Risk Financing Landscape*. ODI and Start Network.

community acceptance, relevance of programming, and effectiveness. This validation was considered crucial to ensuring the accuracy of both predictive models and actions, thereby improving overall outcomes. More broadly, research highlights that community-led validation is crucial for ensuring accurate, effective early action across different contexts³.

Moreover, AA experts and programme staff interviewed stated that AA provided a more dignified approach than standard humanitarian response interventions by preventing or reducing the negative impacts of a shock in the first place and by being able to address tensions or vulnerabilities related to climate change before they escalate. Additionally, evidence from other AA interventions indicates that it tends to have positive effects at the household level in protecting livelihoods during droughts and floods⁴ and may potentially be more effective than post-shock assistance. In line with these findings, the flood pilot implemented by DRC in Somalia demonstrated that households supported through anticipatory actions achieved more substantial improvements in food security measures and protection outcomes compared to post-shock aid recipients, despite higher vulnerabilities at outset. For example, the average food consumption score of households in the AA group increased by 26 points, compared to a 14-point increase in the group supported only after the shock. However, as again replicated in the literature, not all thematics assessed, e.g. shelter, demonstrated improvements when compared to post-shock assistance groups, and findings varied for minority groups.

Ethical and Operational Risks of Predictive Modelling

Despite these benefits and the growing momentum in support of AA, findings from the assessment also identified potentially negative

impacts or risks associated with AA. For example, significant ethical risks or considerations are associated with publicly sharing predictive models and planned AA programming, which are less of a concern in standard response programming. AA champions interviewed for the assessment noted that parties to a conflict might misuse predictive data, especially if it relates to displacement or conflict. This misuse can lead to adverse outcomes, exacerbating the very issues AA aims to mitigate. Additionally, there is a risk of biased responses, where investments may be disproportionately directed to areas not identified as hotspots, thus worsening vulnerabilities and making the model's predictions self-fulfilling. Such ethical dilemmas underscore the importance of cautious data handling and dissemination.

Furthermore, predictive models tend to lack sufficient data specificity to capture or represent outcomes related to vulnerabilities. This limitation should not be overlooked and must be addressed through other means, such as comprehensive vulnerability analyses, in order to ensure that vulnerable groups are not further marginalized than may already occur through traditional humanitarian responses. For example, data from the project pilot indicated that members of vulnerable groups, such as women and minority clan members, performed differently in the AA and post-shock groups. Findings from the pilot intervention demonstrated that while protection-related findings were positively related to AA, women in the AA group did not demonstrate the same level of improvements related to food security as men. In contrast, improvements for women in the standard response group were higher than those for men. Similar trends were seen amongst minority clan members. These findings suggest that AA may be less effective for vulnerable groups in terms of food security - though none of the findings were statistically significant and thus should be interpreted with caution.

³ Food and Agriculture Organization of the United Nations (FAO). (2020). *Applying an inclusive and equitable approach to anticipatory action*.

⁴ Weingärtner, L., & Wilkinson, E. (2019). *Anticipatory Crisis Financing and Action: Concepts, Initiatives, and Evidence*. Centre for Disaster Protection.

Another significant challenge with potentially negative impacts is the high reliance on predictive models and triggers in AA operations, which introduces major risks when these triggers are not appropriate for the context. Accuracy and consistency in the approaches used when developing and activating triggers, preferably based on a country-wide framework, are therefore crucial to the effectiveness of AA. In one pilot, discrepancies in trigger points between coordinating implementing agencies led to inconsistent response timings. A stepwise trigger approach, allowing for phased action based on evolving conditions, could enhance effectiveness.

Challenges in AA Funding and Sustainability

The funding landscape for AA remains challenging for a variety of reasons. Many donors remain hesitant to prioritize it over immediate humanitarian needs, and it is often funded from general humanitarian budgets rather than dedicated streams. With the overall reduction in funding despite growing global displacement and needs, this may exacerbate the perceived trade-off between AA and humanitarian funding and lead to both increased competition and unclear funding allocations.

Humanitarian agencies also face significant challenges in accessing most AA funding opportunities. While donor grants, insurances, and government funding are available, humanitarian NGOs typically have access to only traditional donor grants which tend to go to pooled funding mechanisms and leading actors within the AA space. While the other opportunities are geared towards development actors, AA remains relegated to the humanitarian space, resulting in a mismatch with funding opportunities. Donor representatives interviewed felt it is critical to engage development actors as strong partners and collaborate across the humanitarian-development-peacebuilding nexus.

In sum, while AA presents significant potential benefits, it also carries substantial disadvantages that must be carefully managed. Challenges such as ethical risks, unequal outcomes for persons with vulnerabilities, high reliance on technical aspects such as triggers, and an insufficient or unstable funding environment all pose significant barriers to the success of AA initiatives or may introduce negative impacts.

Preconditions for Effective Use of Predictive Modelling in AA

This assessment further aimed to explore how approaches to data and modeling could best underpin AA for effective operations and what preconditions would need to be met to be able to benefit from the potential added value of predictive models.

Balancing High Level and Localized Approaches
Based on assessment findings, predictive models provided a number of benefits that were able to inform AA programming, including being able to provide longer lead times and identifying broader trends to inform overall organizational planning. Particularly for donors and at a strategic level, high-level models are important and, based on research conducted by DRC, better able to estimate the number of displaced at a country level than the usual methods used in the humanitarian needs overview planning process.

However, for operational purposes, such high-level data is often not suitable, and its complexity may not be needed. While open-source data feeding predictive models supports broad forecasting, local monitoring data is essential for operational decision-making and must be used to validate the broader models. For example in one of DRC's pilot project, no predictive model was available and only basic river-level monitoring was done, with AA programming still implemented effectively. As a DRC operational staff noted, *"We don't need trends but actions; we wanted to refine it to make it more relevant. [...] The value of the model is primarily for validation and in combination with, not as a replacement for, community monitoring data."* However, this

contextual data is resource-intensive and challenging to collect, due to contextual limitations and access challenges, as well as capacities. Consequently, AA, at least based on predictive models, may not be appropriate in all contexts and data conditions.

Enhancing Multihazard Modelling

Furthermore, in order to ensure that data can successfully underpin AA, multi-hazard modeling must be prioritized, as single-hazard approaches do not align with the lived experiences of affected populations. Lessons learned from the project highlighted the benefits of a multi-hazard approach, where possible combining various climate and even conflict events. However, both project staff and donors explained that it is not always clear which hazards are most relevant and integrating them from a technical perspective is challenging. For instance, a donor representative noted that although it was known that flooding was imminent in Somalia, the focus was too heavily on river flooding rather than flash floods, resulting in implementing agencies still being unprepared for the type of flooding that occurred.

Increasing Collaboration

Finally, a critical precondition for the successful use of predictive modeling in AA more widely is increased collaboration across actors in the development and utilization of models. Organizations are currently developing various models independently and key informants repeatedly highlighted the importance of collaboration to avoid duplication or inefficient use of resources. However, a lack of transparency about the uncertainties in respective models has led to a hesitancy to rely on models not produced internally, which is compounded by existing competition. Establishing which models are most relevant for specific contexts, openly

acknowledging strengths and limitations of respective models, and aligning source data where applicable is therefore crucial. Such collaboration could furthermore address the challenges identified with developing multi-hazard modeling. Close collaboration with actors who are better established in the climate space, as well as leveraging academics interested in making their work more relevant, could provide

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DRC HQ staff

valuable insights and resources. Additionally, joint learning exercises and reviews can continue to increase trust among AA actors.

In addition to collaboration on model development, coordination within a wider framework for AA at the country level is essential for an effective use of AA programming more broadly. Effective AA responses require coordination of actors within countries in alignment with a broader framework, but significant gaps in commitment to this approach currently exist. Most importantly, there is no established system for coordination and no consensus on who should lead these efforts. A donor representative suggested that this responsibility should ideally fall to local authorities, while another felt that UN coordination bodies should take charge. However, government bodies may not be capacitated or motivated to do so in some settings. Based on key informant reports, UN coordination bodies also appear hesitant to lead due to a certain level of competitive thinking around AA opportunities, leaving significant gaps in the much needed governance of AA.

Recommendations

AA offers transformative potential, but its success depends on action. Humanitarian agencies must refine coordination and ensure ethical data use, while donors must commit to sustainable funding. Without urgent investment, AA risks remaining a promising but underutilized tool in humanitarian response.

For Coordinating Bodies and Humanitarian Organizations Implementing AA:

1. **Engage Development Actors:** Foster engagement with development actors across the humanitarian-development-peacebuilding nexus for AA and advocate for the relevance of AA as a benefit to strengthen resilience beyond the humanitarian mandate.
2. **Champion Shared Approaches:** Promote shared approaches and collaboration among various stakeholders to enhance the effectiveness of AA by acting as a coordinating body and working with local actors to establish country-wide AA frameworks.
3. **Coordinate with Established Actors:** Engage with organizations well-versed in climate modeling AA, such as WFP, IFRC, FAO, and academics to facilitate the development of a robust multi-hazard approach.
4. **Share Learnings:** Increase transparency and trust by sharing learnings and assessments of models internally and externally. Uncertainties in models

should be acknowledged to allow for their appropriate use depending on needs. This can prevent redundancy and promote the use of shared models.

5. **Utilize Multi-level Networks:** Tap into data and organizational knowledge from both local and regional actors to identify which shocks to anticipate when developing multi-hazard models. Particularly local organizations or participatory consultations may tap into expertise and collective memory that exists beyond traditional donor and implementing agency perspectives.

For Donors:

1. **Promote Country-wide Frameworks:** Take an active role in advocating for and supporting the establishment of country-wide AA frameworks, spearheaded by local authorities or coordination bodies.
2. **Encourage Nexus Programming:** Advocate for and fund dedicated AA programs, ensuring they are applied as intended and promote nexus programming.
3. **Support Coordinated Programming:** Fund consortium AA programming to support actors in aligning models, acknowledging and addressing uncertainties inherent in existing models, and leveraging the diverse expertise of different actors to complement rather than duplicate AA efforts.



Founded in 1956, the Danish Refugee Council (DRC) is Denmark's largest international NGO, with a specific expertise in forced displacement. DRC is present in close to 40 countries and employs 9,000 staff globally.

DRC advocates for the rights of and solutions for displacement-affected communities, and provides assistance during all stages of displacement: In acute crisis, in exile, when settling and integrating in a new place, or upon return. DRC supports displaced persons in becoming self-reliant and included into hosting societies. DRC works with civil society and responsible authorities to promote protection of rights and inclusion.

Our 7,500 volunteers in Denmark make an invaluable difference in integration activities throughout the country.

DRC's code of conduct sits at the core of our organizational mission, and DRC aims at the highest ethical and professional standards. DRC has been certified as meeting the highest quality standards according to the Core Humanitarian Standard on Quality and Accountability.

HRH Crown Princess Mary is DRC's patron.

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