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Anticipatory action in the 2025 Pakistan floods: Multi-agency activations, early warning, cash assistance, and lessons for flood risk management

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Abstract

The 2025 Pakistan floods provided an important real-world test of the country's growing shift from reactive disaster response toward anticipatory action (AA). This study examines the anticipatory action (AA) activations implemented before the 2025 Pakistan Floods and documents implementation experiences, operational learning, and lessons from these activations. A qualitative case study approach was adopted, drawing on post-activation learning records, operational reports, and institutional reflections from organizations involved in anticipatory action activations. Early warning messages were estimated to reach more than one million people through government and humanitarian communication channels, while documented anticipatory action activations supported over 26,000 people through evacuation processes and provided anticipatory cash assistance to approximately 15,000 people. The documented activations supported preparedness, protection of essential assets and livelihoods, and community readiness; however, operational and coordination challenges related to communication, trigger harmonization, and institutional procedures were also observed. The findings highlight the growing institutionalization of anticipatory action in Pakistan and emphasize the need for stronger coordination, harmonized trigger mechanisms and improved information management.

Keywords: Anticipatory action, forecast-based financing, forecast-based early action, 2025 Pakistan floods, flood early action protocol, anticipatory cash assistance, early warning systems, disaster risk financing, humanitarian preparedness, flood risk management

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1 Introduction

Pakistan is significantly affected by climate-related disasters, with global warming playing a major role in changing weather patterns worldwide (Shehzad, 2023). These shifts have led to a rise in extreme weather events, causing widespread loss of life, livelihoods, infrastructure, and socio-economic stability. Germanwatch has consistently ranked Pakistan among the most climate-vulnerable nations globally, placing it within the top 20 countries most impacted by climate-related extreme weather events over the past 30 years (Germanwatch, 2026).

Floods are among the most frequent and destructive climate-induced disasters in Pakistan. The country increasingly experiences both riverine and flash floods, with their frequency, intensity, and duration escalating each year (Waseem and Rana, 2023). In 2022, Pakistan was the most affected nation, mainly due to significant economic losses (Germanwatch, 2025). The Indus River and its tributaries often flood, causing extensive damage to low-lying areas and affecting lives, livelihoods, housing, and infrastructure. In the lower Indus Basin, where the river is elevated above the surrounding lands, breaches in embankments can lead to extended flooding, causing severe damage and hindering recovery (IFRC, 2025).

Anticipatory Action (AA) involves taking pre-emptive steps in anticipation of predicted hazards to mitigate or prevent acute humanitarian impacts before they fully materialize (Anticipation Hub, 2024). This approach requires pre-established protocols, credible forecasting systems, and pre-arranged funding that activates once specific trigger thresh-

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olds are met. Anticipatory actions have become crucial in managing climate hazards through rights-based, impactful, scalable, and sustainable approaches, with the potential to reduce humanitarian needs (Umar et al., 2024). For this study, an intervention was considered anticipatory action when it was implemented before the expected peak impact of the hazard, based on forecast information, and initiated according to predefined or agreed-upon trigger criteria and pre-arranged operational or financing mechanisms.

The 2025 monsoon season in Pakistan highlighted the importance of anticipatory action approaches, with above-normal rainfall and multiple flood events. The monsoon began on June 26, earlier than the usual onset date of July 1, with excessive rainfall leading to severe flooding in July, August, and September. These conditions led to extreme riverine and glacial lake outburst floods, and widespread inundation across Punjab, Khyber Pakhtunkhwa, Gilgit-Baltistan, Kashmir, Sindh, and Balochistan. A rare deep monsoon depression from the Bay of Bengal intensified rainfall across the country in September (PMD, 2025).

From August 20 to 24, the Pakistan Meteorological Department's Flood Forecasting Division (FFD) monitored escalating rainfall and rising river levels. Repeated alerts warned of a major hydrometeorological event. By August 25, forecasts indicated exceptionally high floods in the Sutlej River and significant flooding in the Ravi and Chenab rivers. On August 27, the Chenab River reached record flood peaks at various locations. During the monsoon season, the PMD issued 26 advisories, and the National Disaster Management Authority (NDMA) released 16 advisories.

In response, technical and disaster management institutions implemented preparedness and flood management measures, including continuous river monitoring, barrage regulation, and controlled water releases. Coordination among irrigation authorities, the PMD, and disaster management agencies was crucial in informing forecasts, issuing advisories, and managing riverine flows. Government institutions, humanitarian organizations, UN agencies, and International NGOs activated their early/anticipatory action protocols to reduce impacts across different parts of the country.

However, the 2025 floods claimed 1,037 lives, including 283 children, with Punjab and Khyber Pakhtunkhwa being the hardest hit. Additionally, 1,067 people were injured, 229,763 houses were damaged, 22,841 livestock were lost, and 2,811 km of roads and 790 bridges were damaged. Over 2.2 million acres of cropland were affected, with the largest reported losses in Punjab, followed by Sindh and Khyber Pakhtunkhwa (NDMA, 2025). Provincial governments provided emergency shelters, food, safe drinking water, and essential services, including medical camps and livestock fodder, to evacuees.

Unlike previous studies that have primarily examined anticipatory action through individual organizational experiences or specific interventions, this study provides a comparative operational assessment of how multiple humanitarian organizations and government institutions activated or implemented anticipatory actions ahead of the 2025 Pakistan floods. By comparing trigger mechanisms, activation thresholds, anticipatory action packages, coordination arrangements, operational achievements, and implementation challenges across organizations responding to the same flood event, the study provides new operational insights into how anticipatory action is implemented in practice. The comparative assessment demonstrates that while humanitarian actors shared the common objective of acting before flood impacts, they adopted different trigger mechanisms and anticipatory action packages to guide activation and implementation. These findings highlight the need for greater harmonization of trigger mechanisms, anticipatory action packages, and inter-agency coordination to strengthen the coherence, effectiveness, and scalability of future anticipatory action systems in Pakistan and other flood-prone settings.

This study examines the activation of anticipatory actions during Pakistan's 2025 floods, focusing on their implementation, reported operational outcomes, coordination arrangements, and lessons learned. It analyses the early interventions by humanitarian organizations and government bodies, compares their trigger mechanisms and action packages, and identifies operational challenges, coordination gaps, and lessons to inform the strengthening of future anticipatory action systems. The study aims to understand how anticipatory actions were activated and implemented, what operational outcomes were reported, and what lessons can be drawn from this process.

2 Literature Review

2.1 Evolution of Anticipatory Action and Forecast-Based Humanitarian Actions

With climate-related disasters becoming more frequent and severe, traditional humanitarian strategies that focus mainly on responding after disasters are increasingly under strain. These reactive systems often kick into action only after the disaster has struck, causing delays in assistance, greater losses, and heightened humanitarian needs (Wilkinson et al., 2018). To address these shortcomings, Anticipatory Action (AA) has emerged as a groundbreaking approach in disaster risk management. It enables humanitarian agencies to act proactively by leveraging forecasts, predetermined triggers, and pre-arranged funding systems (IFRC, 2021).

This strategy is built on three main components: reliable forecasting systems, pre-established early action protocols, and pre-arranged funding that is automatically released when specific thresholds are met (IFRC, 2021). These elements allow humanitarian organizations to carry out timely interventions such as providing evacuation support, distributing anticipatory cash, safeguarding livelihoods, prepositioning relief supplies, and disseminating early warning information.

Forecast-based Financing (FbF) has gained prominence as a key operational tool for implementing AA. FbF connects weather forecasts and risk analysis with predetermined actions and funding arrangements, ensuring that resources are mobilized before disasters occur. Research indicates that acting in advance can lessen disaster impacts, cut humanitarian costs, and bolster community resilience (Coughlan de Pérez et al., 2015).

The growing use of Early Action Protocols (EAPs) by humanitarian bodies and governments highlights the increasing global institutionalization of AA. These protocols define triggers, procedures, funding mechanisms, and responsibilities that steer anticipatory interventions (IFRC, 2021).

2.2 Anticipatory Action in Flood Contexts

Floods are among the most destructive hydrometeorological hazards globally, causing significant impacts on lives, infrastructure, agriculture, livelihoods, and ecosystems (UNDRR, 2025). Climate change has exacerbated flood risks by increasing the frequency and intensity of extreme rainfall and altering hydrological systems (IPCC, 2023).

AA has been increasingly applied to flood scenarios because such events often offer lead times that allow for early interventions. Research from Bangladesh shows that anticipatory cash transfers before flooding improved food security, reduced negative coping strategies, and helped households protect their productive assets (Pople et al., 2021). Similarly, anticipatory actions implemented before dzud events in Mongolia and before flood events in Nepal have contributed to livelihood protection and improved humanitarian outcomes (Dunsch et al., 2025; FAO, 2018).

Typical flood anticipatory measures include disseminating early warning information, providing evacuation support, offering anticipatory cash assistance, evacuating livestock, protecting agricultural assets, and pre-positioning relief supplies (FAO, 2023). Evidence indicates that such actions can help reduce exposure to humanitarian impacts and protect livelihoods and critical assets among at-risk communities (WFP, 2026a). Anticipatory cash assistance has proven to be one of the most effective interventions in flood-related AA. Cash transfers provided before disasters enabled households to secure essential supplies, evacuate safely, and protect livestock and other critical assets (WFP, 2026a).

2.3 Institutionalization of Anticipatory Action in Pakistan

Pakistan is particularly susceptible to climate-induced disasters such as floods, droughts, heatwaves, and glacial hazards. The devastating floods of 2022 caused widespread humanitarian and economic impacts and highlighted significant recovery and reconstruction needs (Government of Pakistan, 2022). These experiences contributed to growing attention to anticipatory approaches in Pakistan.

In recent years, Pakistan has made notable strides in institutionalizing AA by establishing the National Coordination Forum on Anticipatory Action (NCF-AA), developing Early Action Protocols, enhancing forecasting systems, and improving coordination between humanitarian and technical bodies.

The Pakistan Red Crescent Society (PRCS), in partnership with the German Red Cross (GRC), Red Cross Red Crescent Climate Centre, and government agencies, has crafted a Flood Early Action Protocol for the Indus River and its tributaries. This protocol outlines predefined triggers, early actions, and funding arrangements for riverine flooding across various sections of the basin (IFRC, 2025). Various humanitarian actors, including the WFP, FAO, START Network, Welthungerhilfe (WHH), UNICEF, and government bodies, have increasingly incorporated AA into their disaster preparedness frameworks. Their interventions encompass anticipatory cash assistance, early warning dissemination, evacuation support, livestock protection, and community preparedness measures. The 2025 floods marked one of the most extensive anticipatory action initiatives in Pakistan, involving numerous humanitarian organizations and government agencies executing forecast-based interventions ahead of peak flooding.

2.4 Research Gap

Despite the growing implementation of AA worldwide, empirical evidence on operational learning, institutional coordination, and post-activation assessments remains scarce, especially in developing nations. Most existing studies focus on conceptual frameworks, trigger systems, funding mechanisms, and the effectiveness of anticipatory cash interventions (Wilkinson et al., 2018).

There is a lack of comprehensive research on large-scale, multi-agency anticipatory action activations in Pakistan, particularly concerning operational effectiveness, coordination frameworks, achievements, and lessons learned during actual flood events. This study aims to fill this gap by examining the anticipatory actions activated during the 2025 Pakistan Floods, analysing implementation processes, coordination strategies, achievements, and operational challenges to enhance future anticipatory action systems.

3 Methodology

3.1 Research Design

This research employed a qualitative case study method to explore the implementation of anticipatory actions during the 2025 floods in Pakistan. This approach was chosen for its ability to provide a detailed evaluation of the processes involved in implementation, coordination mechanisms, operational experiences, and lessons learned from a real disaster. Case study approaches are particularly suitable for investigating complex humanitarian interventions involving multiple stakeholders, institutional frameworks, and operational settings. The study specifically aimed to understand how anticipatory actions were activated and executed during the flood event, to examine the reported achievements and operational outcomes, and to identify operational lessons from the activation process (Fig. 1).

The author was professionally involved in anticipatory action coordination in Pakistan during the period examined in this study. In this capacity, PRCS, as co-chair of the Learning and Evidence Sub-Thematic Committee under the National Coordination Forum on Anticipatory Action (NCF-AA), jointly facilitated the post-activation learning and reflection process involving organizations that implemented anticipatory actions during the 2025 floods. The process provided an opportunity for participating organizations to document and share their operational experiences,

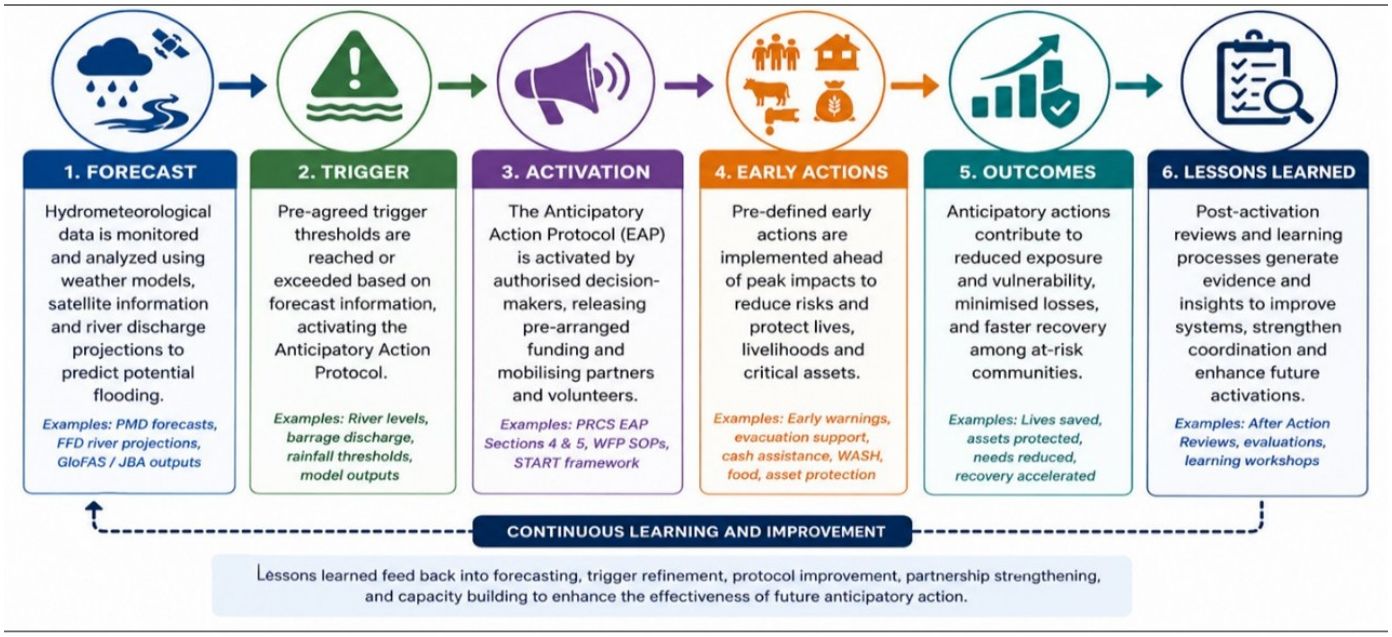

Fig. 1. Conceptual flow of anticipatory action activations during the 2025 Pakistan floods. The framework illustrates the end-to-end process from forecast generation to trigger activation, the implementation of early actions, the outcomes achieved, and the lessons learned for continuous improvement. (Source: Author's conceptualization based on anticipatory action frameworks and operational learning from the 2025 Pakistan Floods. The graphical visualization was prepared with the assistance of ChatGPT (OpenAI) and refined by the author.)

challenges, and lessons learned. To enhance factual accuracy, the preliminary manuscript was shared with participating organizations for technical review and factual verification, and relevant factual clarifications received were incorporated where appropriate before finalizing the analysis. To further reduce the risk of organizational or interpretive bias, the study triangulated evidence across reports and operational documentation from multiple humanitarian organizations, government institutions, technical agencies, and post-activation learning records. To enhance source transparency and traceability, a source matrix was developed linking the principal data, operational claims, and reported outcomes presented in the study to their underlying documentary and institutional sources (Table 1).

3.2 Study Area

The research concentrated on areas in Pakistan affected by floods during the 2025 monsoon season, where both humanitarian organizations and government bodies implemented anticipatory actions. The geographical focus included Punjab, Sindh, Khyber Pakhtunkhwa, Gilgit-Baltistan, and Kashmir, regions that experienced above-average rainfall, river floods, flash floods, and glacial lake outburst floods during the monsoon. Special attention was paid to high-risk riverine zones along the Indus River and its tributaries, as well as districts prioritized by humanitarian organizations for early intervention.

3.3 Data Collection and Sources

This study drew on documentary and operational evidence from multiple sources to assess anticipatory action activations and their reported outcomes. The evidence base included post-activation learning and reflection activities under the National Coordination Forum on Anticipatory Action (NCF-AA), including learning meetings, institutional reflections, operational reports, and post-distribution monitoring findings from humanitarian organizations involved in the activations. Additional evidence was obtained from operational documentation and activation records maintained by organizations implementing anticipatory actions during the 2025 floods. No direct interviews were undertaken for this study.

Secondary data sources comprised reports and advisories from the Pakistan Meteorological Department (PMD), Flood Forecasting Division (FFD), National Disaster Management Authority (NDMA), and United Nations agencies, along with published literature, institutional documents, and technical reports on anticipatory action, flood forecasting, and disaster management in Pakistan. These sources provided contextual insights into the flood's progression, activation triggers, humanitarian impacts, and institutional responses.

To ensure comprehensive coverage of anticipatory action activations, documentary evidence was purposively selected from organizations directly involved in the 2025 Pakistan floods. Selection focused on documents containing operational information relevant to the study objectives, including trigger mechanisms, activation processes, anticipatory actions, coordination arrangements, operational achievements, implementation challenges, and lessons learned. Operational presentations and discussions from the NCF-AA post-activation learning and reflection meeting further informed the comparative analysis by providing opportunities to validate and contextualize organizational experiences.

Table 1. Source transparency matrix for data, operational claims, and reported outcomes used in the 2025 Pakistan flood anticipatory action case study.

Data source	Organization/ Institution	Type of data/ evidence	Coverage period	Used for	Specific source/ document
PRCS activation records and post-activation learning records	PRCS / IFRC	Trigger activation, early actions, beneficiary reach, operational experiences and lessons	Aug–Sep 2025	PRCS activation analysis	PRCS EAP activation notifications and post-activation learning records
WFP/FAO operational documentation and published sources	WFP / FAO	Trigger information, anticipatory cash assistance and implementation details	Aug–Sep 2025	WFP/FAO activation and cash assistance analysis	Relevant WFP/FAO operational records; WFP (2026a)
START Network operational/post-activation records	START Network	Activation information, early actions and multi-sector implementation	Aug–Sep 2025	START Network activation analysis	START Network operational/post-activation record
WHH operational/post-activation records	WHH	Forecast information, early warning and early-action implementation	Aug–Sep 2025	WHH activation analysis	WHH operational/post-activation record
NDMA situation reports	NDMA	Flood impacts, affected population, damage and loss information	Jun–Oct 2025	National flood context and impact data	NDMA Monsoon 2025 SitReps
PMD/FFD forecasts and advisories	PMD / FFD	Rainfall forecasts, river forecasts, flood warnings and trigger information	Aug–Sep 2025	Forecast and trigger analysis	PMD/FFD flood forecasts and advisories
Anticipation Hub publications	Anticipation Hub	Published activation information, operational evidence and beneficiary accounts	2025	Cross-validation of documented activations	PRCS activation article/publication
WFP official publication	WFP	Pakistan-specific anticipatory cash assistance and reported implementation	2026	Validation of WFP/FAO cash assistance	WFP (2026b) Pakistan anticipatory action publication

Documents were included if they represented official organizational or institutional records related to anticipatory action activations during the 2025 Pakistan floods and contained sufficient operational information for comparative analysis. These included Early/Anticipatory Action Protocols (E/AAPs), operational reports, situation reports, activation summaries, post-distribution monitoring reports (where available), and official publications. Documents focusing solely on post-disaster response, lacking relevant operational information, representing duplicate information, or unrelated to anticipatory action implementation were excluded from the analysis.

3.4 Data Analysis

A structured document review and comparative qualitative analysis were conducted on the documentary and operational evidence. A total of 17 documents and operational records were reviewed, including institutional reports, operational documentation, post-activation learning and reflection materials, activation records, and relevant publicly available sources. The review focused on common analytical dimensions derived from the study objectives, including trigger mechanisms, forecast lead time, types of early action, geographic coverage, people reached, coordination arrangements, operational challenges, reported outcomes, and lessons learned. Information relevant to these dimensions was extracted from the reviewed documents and organized for comparison across the documented anticipatory action activations. The analysis examined similarities, differences, operational patterns, trade-offs, and recurring challenges across participating organizations. Quantitative figures, including reported beneficiary reach and assistance figures, were extracted from organizational records and cross-checked, where possible, against post-activation learning materials and relevant public institutional reporting. Evidence from different organizational sources was triangulated to strengthen the factual basis of the comparative analysis. Beneficiary feedback and quotations used in the study were drawn from institutional post-activation learning records and published communication materials rather than from direct interviews or household surveys conducted as part of this study. The approach therefore focused on systematically reviewing and comparing documented implementation experiences and reported operational outcomes rather than applying a formal qualitative coding procedure or statistically testing relationships.

3.5 Study Limitations

This study predominantly relied on documentary and operational evidence, including post-activation reflections,

Table 2. Summary of Anticipatory Action Activations during 2025 Pakistan Floods.

Organization	Trigger Mechanism	Anticipatory Actions	Geographic Coverage	People Reached
PRCS	EAP Sections 4–5 PMD Flood Forecast	Early warning dissemination, evacuation support	Multan, Muzaffargarh, Rahim Yar Khan	>85,000
WFP/FAO	Sukkur Barrage discharge projections	Early warning, anticipatory cash assistance	Khairpur, Sindh	15,000
START Network	JBA / GloFAS threshold system	Multi-sector interventions, WASH, food, evacuation support	KP, Punjab, Sindh	>122,000
WHH	PMD flood forecasts	Early warning, food, dignity kits, hygiene support	Sukkur, Dadu, Thatta	>7,357

institutional reports, and operational documentation produced during and after the anticipatory actions of the 2025 floods. Consequently, the analysis focused mainly on implementation experiences, institutional learning, and operational outcomes rather than on quantitative household-level assessments of intervention effectiveness. Community perceptions and long-term impacts of anticipatory interventions were not directly evaluated within this study's scope. Future research could include household surveys and mixed-method approaches to assess more comprehensively the effectiveness and long-term outcomes of anticipatory actions in flood scenarios.

In addition, because the study relied substantially on self-reported organizational documents and post-activation reflections produced by participating institutions, there is a possibility of reporting bias, including greater emphasis on operational achievements than implementation constraints or unsuccessful experiences. Furthermore, differences in reporting formats, levels of detail, and monitoring practices across organizations may have limited the consistency of comparative analysis. Nevertheless, these limitations should be considered when interpreting the study findings.

4 Findings and Results

4.1 Overview of Anticipatory Action Activations during 2025 Pakistan Floods

In 2025, Pakistan's approach to managing disaster risks, especially during floods, shifted from a reactive, post-disaster response to a proactive model that focuses on acting before disasters occur. This anticipatory action approach translates forecasts into predefined early actions, aiming to protect lives, livelihoods, and critical assets before floods hit, rather than responding only after damage has been done. This proactive shift not only mitigates humanitarian impacts but also facilitates interventions that are more dignified, cost-effective, and timely for at-risk communities.

Both national and provincial governments implemented anticipatory actions through their respective Disaster Management Funds, with a notable focus on Punjab Province. Additionally, various humanitarian organizations, such as the Pakistan Red Crescent Society (PRCS), World Food Programme (WFP), Food and Agriculture Organization (FAO), Welthungerhilfe (WHH), START Network, and UNICEF, activated their Early/Anticipatory Action Protocols across different regions of the country. Table 2 summarizes the main anticipatory action activations documented during the 2025 Pakistan floods, including their trigger mechanisms, anticipatory action packages, geographic coverage, and reported reach.

The comparison also highlights an important operational trade-off associated with differences in predefined trigger thresholds and forecast systems. During the 2025 flood event, WFP/FAO reported during the post-activation learning and reflection process that anticipatory action in Khairpur was activated at a discharge threshold of 450,000 cusecs at Sukkur Barrage. In contrast, the PRCS threshold for the Lower Indus in Sindh was 700,000 cusecs at Guddu/Sukkur and was not reached for activation, while the FAO anticipatory action protocol for Dadu also used a 700,000-cusec threshold and was not activated. WHH, meanwhile, relied on PMD flood forecasts and predefined thresholds for its activation in Sukkur, Dadu, and Thatta, whereas START Network used a different trigger architecture based on JBA/GloFAS forecasts and combined national- and district-level thresholds. Thus, organizations operating within the same broader flood event could reach different activation decisions because of differences in forecast sources, trigger thresholds, and activation arrangements. This variation provided flexibility to tailor activation decisions to organizational and geographic contexts but also created potential challenges for synchronized multi-agency action. The experience suggests that greater alignment of forecast information and trigger thresholds, while retaining flexibility to account for location-specific risk characteristics, could improve the coherence and coordination of anticipatory action during large-scale flood events.

The different approaches also demonstrated distinct operational strengths: PRCS's volunteer-based model enabled direct community-level warning and evacuation support; WFP/FAO's combination of localized early warning and anticipatory cash provided households with flexible resources to protect assets and facilitate evacuation; START Network's locally implemented, multi-sector approach enabled interventions to be adapted to different humanitarian needs across multiple districts; and WHH combined forecast-based activation with early warning and essential household assistance.

4.2 Pakistan Red Crescent Society (PRCS) Activation

Before the 2025 flood peak, the Pakistan Red Crescent Society (PRCS) put into action its Early Action Protocol (EAP) for riverine floods along the Indus River and its major tributaries. This activation marked a significant step in implementing forecast-based humanitarian action in Pakistan, illustrating how early warning systems can support

timely early actions and risk-reduction measures. The EAP was developed through collaboration between PRCS, the German Red Cross (GRC), the Red Cross Red Crescent Climate Centre, government entities, and various humanitarian actors. It segments the Indus River system into three stretches and six operational sections, considering factors like topography, available lead time, and PRCS's outreach capacity. During the 2025 monsoon season, Sections 4 and 5 of the protocol were activated, covering the Chenab River stretch (Trimmu–Panjnad) and the Indus River stretch (Panjnad–Guddu), respectively.

Following the forecasts issued by PMD/FFD on 28 August and 30 August 2025, respectively, PRCS formally activated Section 4 on 29 August and Section 5 on 31 August 2025. These activations enabled PRCS to translate forecast data into two main anticipatory actions: support in dissemination of early warnings and support for evacuation processes through deployment of trained volunteers. These measures aimed to mitigate impacts on lives, livelihoods, livestock, and critical assets before peak flooding.

PRCS deployed volunteers in high-risk areas like Jalalpur Pirwala and Muzaffargarh under Section 4, and Alipur and Liaqatpur under Section 5, to assist with community-level early warning dissemination and evacuation support. This facilitated household relocations before floodwaters reached settlements, thereby potentially reducing exposure among households that acted on the warnings and aiding in the protection of livestock and household belongings. The activation reached more than 85,000 individuals across the targeted locations through dissemination of early warning information and evacuation support activities to 26,000 individuals. Community volunteers played a central role in delivering warning messages, facilitating evacuations, and supporting households in protecting essential assets and livestock before peak flooding. Community feedback indicated increased confidence in official warnings and a greater willingness to act early. As reported in an Anticipation Hub account of the PRCS activation (Kausche et al., 2025), Kulsoom Bibi from Basti Babran, Khan Bela, Jalalpur Pirwala of district Multan reflected: *'We received early warning messages three days in advance. The flood hit our village just one day after we arrived at this relief camp. Without those warnings, we could have lost our lives and livestock. The early warning messages helped us reach a safe place, where we now have access to all basic facilities.'*

Although cash assistance could not be integrated during the Section 5 activation, past responses suggest that cash support could enhance evacuation processes and limit negative coping strategies. Future PRCS activations could benefit from combining volunteer-led actions with anticipatory cash mechanisms. The activation also illustrated effective coordination among PRCS, district administrations, Disaster Management Authorities, Rescue 1122, and local organizations, thereby ensuring consistent messaging and strengthened operational coordination during implementation.

The PRCS activation demonstrates the strength of a locally embedded, volunteer-based approach to anticipatory action, particularly for early warning dissemination and evacuation support. Its coordination with district administrations, Disaster Management Authorities, Rescue 1122, and local organizations further enabled forecasts to be translated into community-level action. However, the PRCS experience also illustrates an operational limitation of a relatively focused action package: cash assistance could not be integrated during the Section 5 activation, whereas other actors, such as WFP/FAO, incorporated anticipatory cash assistance into their activation. This suggests that volunteer-led warning and evacuation mechanisms can provide an important foundation for anticipatory action, while the availability of complementary pre-agreed assistance mechanisms may broaden the range of protective actions that can be implemented when triggers are reached.

4.3 World Food Programme (WFP) and FAO Activation

During the 2025 floods, as risks intensified along the Indus River, the World Food Programme (WFP), in collaboration with the Food and Agriculture Organization (FAO), activated anticipatory interventions in Sindh's Khairpur District. Supported by the DG-ECHO crisis modifier mechanism, this activation exemplified a forecast-based approach aimed at reducing humanitarian impacts before peak flooding.

The activation was triggered by projected discharge levels at Sukkur Barrage, historically linked with significant flood impacts (WFP, 2026b). Three high-risk Union Councils—Hadal Shah, Shaheed Naseem Kharal, and Razi Dero Kacho—were prioritized due to their proximity to the river and inadequate flood protection infrastructure. The intervention focused on two anticipatory measures: disseminating early warnings and providing cash assistance. Early warning messages were spread through various channels, including robocalls, radio broadcasts, mosque loudspeakers, and WhatsApp groups, with localized materials in Sindhi covering evacuation procedures, livestock protection, and safe shelter options. Early Warning Kits with radios and loudspeakers were distributed to community focal persons to bolster local preparedness and mobilization.

Anticipatory cash assistance reached 2,200 households, benefiting approximately 15,000 individuals. Each household received PKR 50,000 through mobile wallet accounts, prioritizing female-headed households, persons with disabilities, and families with lower coping capacities. The cash support helped households meet immediate needs, facilitate evacuation, and protect productive assets and stored food items before flood impacts worsened.

Post-implementation findings showed positive outcomes: delivery effectiveness reached 92%, and post-distribution monitoring indicated reduced reliance on negative coping mechanisms among beneficiary households. The intervention also enhanced preparedness and enabled households to take early protective measures before peak flooding. Ms. Noor Bano, a resident of Bachal Mallah, Hadal Shah, reflected: "*The cash I received helped me move my valuables to higher ground and pay for boat transport.*"

The activation underscored the importance of integrating anticipatory cash assistance with community-based

early warning systems and localized communication strategies to enhance preparedness and reduce humanitarian risks in flood-prone areas. The WFP/FAO activation illustrates the added flexibility that anticipatory cash can provide when combined with early warning. Unlike the primarily volunteer-led warning and evacuation approach adopted by PRCS, the WFP/FAO intervention combined localized risk communication with cash assistance that households could use to support evacuation, protect assets, and meet immediate needs before flood impacts intensified. The use of multiple communication channels and locally adapted messaging further strengthened the connection between forecast information and household-level decision-making. This approach demonstrates the value of integrating flexible financial assistance into anticipatory action packages, while also highlighting the importance of sufficiently early and reliable trigger information to ensure cash transfers reach households before peak impacts.

4.4 START Network Activation

The START Network activated its Disaster Risk Financing (DRF) mechanism during the 2025 floods to support anticipatory actions for large-scale riverine flooding in Pakistan. Activation was based on forecast models from Jeremy Benn Associates (JBA) Consulting, which used streamflow projections from the Global Flood Awareness System (GloFAS), combined with population exposure data and local vulnerability indicators, to estimate potential impacts.

The financing mechanism used a two-stage threshold system with national- and district-level triggers. Activation required both thresholds to be exceeded simultaneously, ensuring that forecasted impacts warranted early interventions while accounting for local vulnerability conditions. Following activation, anticipatory actions were implemented by local partners across ten districts in Khyber Pakhtunkhwa, Punjab, and Sindh. START Network members, including Doaba Foundation, SWRDO, FDO, IDEA, Handicap International, Tearfund, ACTED, CARE International, Bright Star Development Society Balochistan, and LASOONA, implemented context-specific early actions to mitigate humanitarian impacts before peak flooding.

These interventions focused on supporting evacuation and camp management, providing food and non-food assistance, ensuring access to safe drinking water, improving sanitation facilities, offering health support services, and conducting community awareness activities. These actions addressed immediate humanitarian needs while enhancing preparedness in high-risk communities. Post-distribution monitoring revealed positive outcomes across several interventions. In Sindh's Jamshoro District, CARE International and Sami Foundation provided food assistance, hygiene kits, non-food items, and livestock support through anticipatory mechanisms. Monitoring results showed improvements in food security, hygiene conditions, and livestock protection, with most beneficiaries considering the assistance timely and adequate. Households also reported financial relief through reduced expenditure pressures and the ability to allocate resources toward health needs and debt repayment.

Similarly, anticipatory interventions by the Doaba Foundation in Muzaffargarh and Gujranwala districts benefited over 122,000 individuals through food assistance, hygiene support, temporary sanitation facilities, water provision, dewatering services, and awareness campaigns. Beneficiary feedback indicated high satisfaction with the timeliness, relevance, and quality of assistance, highlighting the operational value of anticipatory interventions in reducing flood impacts.

The activation illustrated the operational value of locally led anticipatory approaches by integrating forecast information with community-based implementation mechanisms and contextualized interventions across multiple districts. The START Network activation demonstrates the value of combining forecast information with a multi-level trigger system and locally led implementation. Unlike the more organization- or location-specific trigger arrangements used by PRCS, WFP/FAO, and WHH, START Network's two-stage national- and district-level thresholds incorporated forecast information together with population exposure and local vulnerability considerations. This provided a basis for tailoring activation decisions and multi-sector interventions to conditions across different districts. The approach also enabled local partners to implement context-specific actions covering evacuation, food, WASH, health, and community awareness. However, using multiple thresholds and data inputs also requires reliable forecast information, timely analysis, and effective coordination to support rapid activation. The experience, therefore, highlights the potential value of combining a common forecast framework with locally informed risk and vulnerability assessment when designing multi-agency anticipatory action systems.

4.5 Welthungerhilfe (WHH) Activations

During the 2025 floods, Welthungerhilfe (WHH) implemented its flood anticipatory action plan in Sindh Province, targeting high-risk districts such as Sukkur, Dadu, and Thatta. The activation was triggered by forecasts from the Pakistan Meteorological Department (PMD) indicating flood levels exceeding predefined thresholds.

The intervention reached 1,051 households across the targeted districts, including 541 households in Sukkur, 380 in Dadu, and 130 in Thatta. Anticipatory measures focused on reducing humanitarian impacts by disseminating early warning information, supporting evacuation planning and implementation, and providing food assistance, dignity kits, and hygiene supplies to vulnerable households. The activation bolstered preparedness efforts ahead of peak flooding by enabling communities to take protective measures and access essential assistance before impacts intensified. The combination of early warning dissemination and humanitarian support strengthened household preparedness and reduced immediate humanitarian risks among targeted populations.

This intervention further illustrated the effectiveness of forecast-based humanitarian approaches in enabling timely action and enhancing support to vulnerable communities before disaster impacts fully unfolded. The WHH activation illustrates a relatively focused, forecast-based approach

that combined early warning and evacuation support with targeted household assistance. Its use of PMD forecasts provided a nationally anchored trigger. At the same time, the combination of warning, food, dignity kits, and hygiene supplies allowed the intervention to address both preparedness and immediate household needs before flood impacts intensified. Compared with the broader multi-sector approach implemented through START Network partners, the WHH package was more focused on selected household-level needs in three high-risk districts. This suggests that the breadth of an anticipatory action package may appropriately vary according to organizational mandate, geographic coverage, available resources, and identified vulnerabilities. At the same time, the experience reinforces the value of linking nationally available forecasts with predefined action packages that can be rapidly deployed at the community level.

4.6 Cross-Cutting Lessons from Multi-Agency Anticipatory Action Activations

The anticipatory action activations implemented during the 2025 Pakistan Floods revealed several cross-cutting lessons that extend beyond individual organizational interventions and reflect broader trends in the evolution of anticipatory action systems in Pakistan. A key finding was the dominant role of early warning dissemination as the most widely implemented anticipatory measure across all activations. Humanitarian organizations and government institutions consistently prioritized disseminating forecast information, raising community awareness, and communicating evacuation and preparedness messages before flood peaks. Early warning activities formed the foundation of most interventions and were often combined with evacuation support, anticipatory cash assistance, and livelihood protection measures. The widespread use of early warning systems demonstrated their central role in reducing risk exposure and enabling timely preparedness actions at the community level.

The findings also highlighted an increasing convergence toward forecast-based approaches among humanitarian actors. Organizations such as PRCS, WFP, FAO, START Network, and WHH adopted forecast information, predefined triggers, and pre-agreed operational mechanisms to activate interventions before disaster impacts materialized. Although activation mechanisms differed across institutions, the overall approach reflected a common transition from reactive disaster response toward anticipatory and risk-informed humanitarian action.

The activations further demonstrated the growing institutionalization of anticipatory action in Pakistan. The establishment of Early Action Protocols, the activation of disaster management funds, the increased use of trigger-based systems, and the strengthening of coordination platforms such as the National Coordination Forum on Anticipatory Action (NCF-AA) indicate an increasing integration of anticipatory approaches within humanitarian and disaster management systems. The multi-agency implementation during the 2025 floods reflected an important shift toward embedding anticipatory action within institutional preparedness mechanisms.

Another important lesson was the value of localized implementation mechanisms. Community volunteers, local organizations, district administrations, and community focal persons played a critical role in translating forecasts into actionable interventions. Localized implementation improved outreach, strengthened trust, facilitated evacuation processes, and enabled context-specific responses tailored to community needs. The findings suggest that strengthening locally led approaches can strengthen the reach, contextual relevance, and implementation of future anticipatory action activations.

The multi-agency comparison further demonstrated that anticipatory action during the 2025 floods was characterized by substantial variation in trigger architecture and action packages. While PRCS, WFP/FAO, and WHH relied on forecast information linked to national forecasting systems, START Network used a distinct JBA/GloFAS-based trigger system incorporating national- and district-level thresholds. Differences were also evident in the composition of anticipatory action packages, ranging from volunteer-led early warning and evacuation support to anticipatory cash assistance and broader multi-sector interventions. These variations reflected differences in organizational mandates, operational capacities, geographic contexts, and available resources, thereby providing flexibility to tailor interventions to specific risks and needs. At the same time, they meant that organizations responding to the same broader flood event could reach different activation decisions and implement different actions. This represents an important operational trade-off: flexibility can support context-specific action, but greater alignment of forecast information and trigger thresholds could facilitate more coherent and synchronized multi-agency action.

Despite these achievements, the study identified persistent gaps in coordination and trigger harmonization. Different organizations applied varying trigger thresholds, forecast sources, activation mechanisms, and implementation timelines, while in some cases, multiple institutions issued flood forecasts without full synchronization. The comparison suggests that future anticipatory action systems in Pakistan would benefit from greater harmonization of trigger thresholds, information-sharing protocols, and coordination mechanisms, while retaining sufficient flexibility to account for location-specific risks and organizational mandates. Such an approach could improve coherence and facilitate more timely and coordinated action across agencies during large-scale flood events.

5 Discussion

The anticipatory actions highlighted the increasing integration of forecast-based interventions in Pakistan and potential benefits of acting proactively against predicted floods. The timing of early dissemination of warnings and organized evacuations support plausibly reduced exposure among households that acted on the warnings. Across government and humanitarian communication channels, warning messages were estimated to reach more than one million people; however, direct agency-reported reach in the documented anticipatory action activations was lower and

is summarized in Table 2. Available operational evidence indicates that many households were able to evacuate from high-risk areas before peak flooding, thereby reducing their exposure to potentially life-threatening conditions.

WFP and FAO's anticipatory cash assistance in Khairpur demonstrated the potential of early financial support to help households prepare for impending flood impacts. The organizations provided PKR 50,000 per household to 15,000 vulnerable people three days before peak flooding. According to WFP's published account, the assistance enabled families to secure food and essential supplies, evacuate safely, and protect livestock and other assets. These documented outcomes suggest that anticipatory cash assistance can support household-level preparedness and asset protection when financial assistance is delivered sufficiently ahead of peak flood impacts (WFP, 2026b). The activations also suggest potential efficiency gains through early evacuations, livelihood protection, and timely assistance delivery; however, further economic assessment is required to quantify cost-effectiveness. The present study does not provide sufficient evidence to establish avoided losses, reduced emergency-response costs, or return on investment.

The documented early actions were designed to address immediate humanitarian and public health risks before peak flooding. Communities in high-risk areas received comprehensive support, including early warning dissemination, evacuation assistance, emergency food and water supplies, temporary shelter management, hygiene and sanitation services, medical care, and repairs to critical water and sanitation facilities. These documented interventions indicate the potential of integrated early action packages to strengthen preparedness and address immediate needs before flood impacts intensify.

The coordination among multiple stakeholders bolstered the effectiveness of early actions. The collaborative efforts of humanitarian organizations, disaster management authorities, and local administrations ensured the effective triggering of anticipatory actions and the harmonization of early warning messages. This alignment strengthened the relationship between forecasts, triggers, and operational responses.

Comparison with anticipatory action experiences in other flood-prone countries in the Asia-Pacific region highlights both common features and important differences in the institutional and operational design of anticipatory action. Bangladesh and Nepal demonstrate stronger integration of anticipatory action with government systems and social protection mechanisms, illustrating how pre-agreed financing and established public delivery systems can support earlier assistance at scale (WFP, 2026a). Indonesia provides a different institutional pathway in which anticipatory action has increasingly been incorporated into national disaster management arrangements. However, operational readiness, data access, simulation, and subnational capacity remain important for effective implementation (WFP, 2026a). The Philippines offers a particularly relevant comparison for Pakistan because its experience combines pre-arranged anticipatory financing with participatory and locally informed trigger development, digital cash delivery, and multi-stakeholder planning, enabling households to make context-specific decisions such as protecting assets, securing essential supplies, and evacuating before cyclone impacts (Chadburn and Espinola-Abogado, 2025). In contrast, the 2025 Pakistan flood experience demonstrates considerable progress in operationalizing anticipatory action across multiple organizations, but also reveals greater variation in forecast sources, trigger thresholds, and activation arrangements. This comparison suggests that the principal challenge for Pakistan is not simply expanding the number of anticipatory action protocols, but improving interoperability among existing institutional mechanisms. The regional evidence indicates that Pakistan could strengthen its anticipatory action system through greater alignment of forecast information and trigger-setting processes, stronger integration with government and social protection systems, pre-arranged and accessible financing, and joint planning and information-sharing mechanisms, while retaining sufficient flexibility to account for differences in local flood risk and organizational mandates. Thus, the Pakistan experience contributes to the regional evidence by demonstrating the operational coordination challenges that can arise when multiple organizations implement anticipatory action within the same hazard context, and by highlighting the need to balance standardization for coordination with flexibility for context-specific action.

5.1 Operational Challenges and Lessons Learned

While the 2025 anticipatory action activations marked significant advancements in forecast-based humanitarian efforts and highlighted the growing institutionalization of such approaches in Pakistan, several operational and coordination challenges emerged, offering valuable lessons for future improvements, a major challenge was the premature dissemination of early warning messages at the community level, which sometimes led to distrust among at-risk populations when anticipated impacts did not materialize. Additionally, unannounced river breaches and diversions significantly affected available lead times, thereby limiting the effectiveness of planned early actions and underscoring the need for synchronized communication protocols and real-time coordination among forecasting institutions, humanitarian partners, and local authorities. The activations also revealed that existing flood limits and thresholds used for forecasting and risk categorization need to be revised, as some thresholds no longer accurately reflect current hydrological realities, affecting the accuracy and timeliness of anticipatory action trigger mechanisms. Communication gaps and misinformation regarding planned and unplanned breaches, expected lead times, and peak-flow timing further confused communities, reducing trust and limiting uptake of early actions in several high-risk locations. Furthermore, institutional and operational constraints affected timely implementation, including delays in fund transfers due to procedural requirements within financial systems, challenges in obtaining No Objection Certificates (NOCs) from provincial and district authorities, and occasional interference in the selection of intervention sites. The involvement of multiple institutions issuing flood forecasts without full synchronization also created uncertainty in trigger activation and decision-making processes, potentially delaying imple-

mentation and leading to inconsistent warning messages for response agencies and vulnerable communities.

6 Policy Implications and Way Forward

The study's findings underscore several key areas where anticipatory action systems in Pakistan could be bolstered. Early warning messages should be issued based on clearly defined, evidence-based thresholds and forecast information, with sufficient lead time for communities to take appropriate protective action. This approach can help reduce the risk of premature or inaccurate warnings that may erode trust among vulnerable populations and reduce their responsiveness to future alerts. The flood thresholds and trigger levels currently established by the Pakistan Meteorological Department (PMD) need to be reassessed and refined to better align with current hydrological conditions. This adjustment would allow for earlier activation of triggers and maximize the time available for anticipatory measures.

Enhancing flood information management systems is vital to provide timely and accurate updates on both planned and unexpected river breaches, which will help reduce misinformation and build trust within communities. Incorporating breach scenarios into flood routing models could further boost forecast accuracy and enable more realistic planning for lead times. Furthermore, the procedures for fund release and obtaining No Objection Certificates (NOCs) should be digitized and pre-authorized using pre-established inter-agency standard operating procedures (SOPs, International NGO). This would facilitate the swift allocation of resources within the available timeframes.

Enhanced collaboration among government bodies, financial institutions, and humanitarian organizations is essential to ensure the seamless and transparent implementation of anticipatory actions at all administrative levels. Harmonizing triggers, thresholds, and early action plans across different agencies would also enhance coherence and amplify the overall effectiveness of interventions. Additionally, standardizing cash transfer values through the National Coordination Forum on Anticipatory Action (NCF-AA) and the Cash Inter-Agency Working Group would ensure equitable, consistent, and swift multi-agency responses across all risk areas.

Beyond these immediate operational measures, anticipatory action should be more systematically integrated into Pakistan's existing disaster risk reduction and disaster management policy and planning frameworks. This includes incorporating anticipatory action approaches, predefined triggers, roles and responsibilities, financing arrangements, and early action measures into relevant provincial and district-level disaster management plans and Monsoon Contingency Plans. Establishing agreed-upon thresholds and protocols for issuing early warnings, while maintaining flexibility for location-specific risks, could further strengthen the link among forecasting, early warning, anticipatory action, and preparedness. Such institutional integration would help move anticipatory action from primarily project- or organization-specific mechanisms toward a more coordinated component of routine disaster preparedness and risk reduction planning.

Pakistan already has an important foundation for monitoring, learning, and evidence generation through post-activation learning and reflection processes, including the learning and reflection workshop convened under the Learning and Evidence Sub-Thematic Committee of the National Coordination Forum on Anticipatory Action (NCF-AA). These existing mechanisms provide an important platform for capturing operational experiences and lessons from anticipatory action activations. However, there is a need to further strengthen and systematize this process through a standardized monitoring, evaluation, and learning framework applicable across anticipatory action activations. Such a framework could establish common indicators for trigger performance, forecast lead time, timeliness of early action, people reached, delivery of cash and other assistance, evacuation support, livelihood and asset protection, beneficiary feedback, implementation challenges, and coordination performance. Post-activation reviews could also systematically assess whether triggers were reached as forecast, whether actions were implemented within the available lead time, and which operational or institutional constraints affected implementation. Where feasible, comparable measures of outcomes and cost-effectiveness could be incorporated to facilitate cross-organizational learning and strengthen the evidence base. Building on the existing NCF-AA learning and reflection mechanism in this way would allow lessons from individual activations to inform the refinement of triggers, financing arrangements, operational procedures, and institutional coordination for subsequent events, rather than establishing a parallel system.

7 Conclusions

The anticipatory action activations for the 2025 floods represented a significant step in Pakistan's shift from traditional reactive disaster responses to a more proactive, forecast-based risk management approach. The widespread implementation of these anticipatory measures by humanitarian organizations, government bodies, and local stakeholders underscored the growing institutional commitment to proactive strategies. It emphasized the benefits of taking action before hazards fully unfold. By converting forecasts into early actions—such as issuing early warning messages, providing evacuation support, distributing anticipatory cash assistance, implementing livelihood protection measures, and pre-positioning humanitarian aid- these initiatives were intended to reduce humanitarian risks and strengthen community preparedness.

The study's findings indicate that anticipatory actions facilitated timely actions before peak flooding, enhanced coordination among humanitarian and technical institutions, and supported efforts to protect lives, livelihoods, livestock, and critical assets in high-risk areas. The collective implementation of early actions demonstrated the potential of collaborative approaches to strengthen anticipatory action mechanisms and reduce disaster risk.

Nevertheless, the activations also exposed several operational and institutional challenges. These included communication gaps, limited lead times due to unexpected river breaches, flood thresholds that need to be reassesed and

refined, delays in fund transfers, and issues in coordinating between forecasting and action-implementing institutions. These challenges stress the importance of continued investment in forecasting systems, refining and harmonizing triggers, improving financing mechanisms, enhancing information management, and fostering inter-agency coordination to strengthen future anticipatory action systems.

Ultimately, the experiences and lessons derived from the 2025 Pakistan Floods offer valuable insights for enhancing the implementation of anticipatory action in Pakistan and provide practical guidance for advancing forecast-based humanitarian action in other disaster-prone regions. Ongoing efforts to harmonize triggers, boost institutional readiness, and improve coordination mechanisms will be crucial to further enhancing the effectiveness and scalability of anticipatory action systems.

Future anticipatory action activations would benefit from more systematic post-activation learning, including formal post-distribution monitoring, outcome and impact assessments, and documentation of lessons across participating organizations. Such evidence would help assess the effectiveness, timeliness, and cost-effectiveness of different anticipatory actions and provide a stronger basis for refining triggers, thresholds, and operational protocols. At the same time, greater harmonization of anticipatory action approaches at national and provincial levels, and their integration into existing disaster risk reduction and disaster management planning frameworks, including provincial and district Monsoon Contingency Plans, could strengthen institutional readiness and support more coordinated implementation at scale.

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Ethical approval and consent to participate

This study relied on post-activation learning records, institutional reflections, operational reports, and secondary documentation. No direct interviews, household surveys, or other primary human-subject data collection were undertaken for this study. The analysis relied on existing institutional records, operational documentation, post-activation learning and reflection materials, and publicly available sources.

Consent for publication

Not applicable.

Availability of data and materials

The data supporting this study are derived from institutional reports, post-activation learning records, and publicly available documents. Additional information may be available from the author upon reasonable request.

Competing interests

The author declares no competing interests.

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References

Anticipation Hub, 2024. *What is Anticipatory Action?* Anticipation Hub. https://www.anticipation-hub.org/about/what-is-anticipatory-action.

Chadburn, O., Espinola-Abogado, M.T.N., 2025. Anticipatory financing: Enabling choice amid displacement in the Philippines. *Forced Migration Review* 76. https://www.fmreview.org/climate-choices/chadburn-espinola-abogado/.

Coughlan de Pérez, E., van den Hurk, B., van Aalst, M., Jongman, B., Klose, T., Suarez, P., 2015. Forecast-based financing: An approach for catalyzing humanitarian action based on extreme weather and climate forecasts. *Natural Hazards and Earth System Sciences* 15, 895–904. https://doi.org/10.5194/nhess-15-895-2015.

Dunsch, F., Adusumalli, N., Balantrapu, T., 2025. *Impact Evaluation of Anticipatory Action in Nepal*. World Food Programme Office of Evaluation, Rome.

Food and Agriculture Organization, 2018. *Mongolia: Impact of Early Warning Early Action – Protecting Herder Livelihoods Ahead of a Dzud Winter*. FAO. https://openknowledge.fao.org/handle/20.500.14283/ca2181en.

Food and Agriculture Organization, 2023. *Anticipatory Action Overview 2023*. FAO. https://openknowledge.fao.org/handle/20.500.14283/cd2966en.

Germanwatch, 2025. *Climate Risk Index 2025: Who Suffers Most From Extreme Weather Events?* Germanwatch e.V. https://www.germanwatch.org/sites/default/files/2025-02/Climate%20Risk%20Index%202025.pdf.

Germanwatch, 2026. *Climate Risk Index 2026: Who suffers most from extreme weather events?* Germanwatch e.V. https://www.germanwatch.org/sites/default/files/2025-11/CRI%2026%20full%20report.pdf.

Government of Pakistan, 2022. *Post-Disaster Needs Assessment (PDNA): Pakistan Floods 2022*. Ministry of Planning, Development and Special Initiatives. https://www.pc.gov.pk/uploads/downloads/PDNA_report.pdf.

IFRC, 2021. *Operational Framework for Anticipatory Action 2021–2025*. International Federation of Red Cross and Red Crescent Societies. https://www.ifrc.org/sites/default/files/2022-05/IFRC_Operational_Framework_for_Anticipatory%20_Action_2021-2025_final_0.pdf.

IFRC, 2025. *Early Action Protocol Summary: Pakistan – Riverine Floods*. Federation of Red Cross and Red Crescent Societies.

Intergovernmental Panel on Climate Change, 2023. *Climate Change 2023: Synthesis Report*. IPCC. https://www.ipcc.ch/report/ar6/syr/.

Kausche, V., Braun, C., Klöckner, J., 2025. *The Pakistan Red Crescent Society Implements Anticipatory Actions for Flooding along the Indus River and its Tributaries*. https://www.anticipation-hub.org/news/the-pakistan-red-crescent-society-activates-early-actions-for-flooding-at-the-chenab-river.

NDMA, 2025. *Monsoon Floods 2025: Situation Reports and Damage Assessment Reports*. National Disaster Management Authority, Government of Pakistan. https://www.ndma.gov.pk.

PMD, 2025. *Pakistan Monsoon 2025 Rainfall Update (1 July–30 September 2025)*. Climate Data Processing Centre, Pakistan Meteorological Department. https://cdpc.pmd.gov.pk/Monsoon_2025_update/Pakistan_Monsoon_2025_Rainfall_Update.pdf.

Pople, A., Hill, R.V., Dercon, S., Brunckhorst, B., 2021. *Anticipatory Cash Transfers in Climate Disaster Response*. Centre for the Study of African Economies, University of Oxford. https://www.anticipation-hub.org/download/file-3482.

Shehzad, K., 2023. Extreme flood in Pakistan: Is Pakistan paying the cost of climate change? A short communication. *Science of the Total Environment* 875, 162973. https://doi.org/10.1016/j.scitotenv.2023.162973.

Umar, M., Salman, D., Ali, R., Shafqat, M.A., Ramsha, M.K., 2024. *Integrating Anticipatory Action with Social Safety Programmes in Pakistan*. Sustainable Development Policy Institute. https://sdpi.org/assets/lib/uploads/Integrating%20Anticipatory%20Actions%20(1)%20(1)%20(1).pdf.

UNDRR, 2025. *GAR 2025 Hazard Exploration: Floods*. United Nations Office for Disaster Risk Reduction. https://www.undrr.org/gar/gar2025/hazard-exploration/floods.

Waseem, H.B., Rana, I.A., 2023. Floods in Pakistan: A state-of-the-art review. *Natural Hazards Research* 3, 362–380. https://doi.org/10.1016/j.nhres.2023.06.005.

Wilkinson, E., Weingärtner, L., Choularton, R., 2018. *Forecasting Hazards, Averting Disasters: Implementing Forecast-Based Early Action at Scale*. Overseas Development Institute. https://media.odi.org/documents/12104.pdf.

World Food Programme, 2026a. *Anticipatory Action Year in Focus 2025*. WFP. https://doi.org/10.71958/wfp132032.

World Food Programme, 2026b. *Pakistan Strengthens Anticipatory Action to Reduce the Impact of Climate-related Disasters*. WFP. https://www.wfp.org/news/pakistan-strengthens-anticipatory-action-reduce-impact-climate-related-disasters.