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Anticipating shocks through social protection

Emerging evidence on socioeconomic outcomes



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Food and Agriculture Organization of the United Nations
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Abbreviations

CEA	cost-effectiveness analysis
CERF	central emergency response fund
FAO	Food and Agriculture Organization of the United Nations
FBF	Forecast Based Financing
FbAA	Forecast-based Anticipatory Action
FCS	Food Consumption Score
IFRC	International Federation of Red Cross and Red Crescent Societies
NDC	nationally determined contributions
PICO	population, intervention, comparator, outcome
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	randomized controlled trial
SOP	standard operating procedures
SRSP	shock-responsive social protection
WFP	World Food Programme

1. Introduction

Climate change is increasingly recognized as a threat to human development, disproportionately affecting the most vulnerable populations and exacerbating existing inequalities. Its impacts, particularly in rural areas, undermine food security, livelihoods, and health, thereby intensifying poverty and vulnerability (Banglore *et al.*, 2016; FAO, 2024a). In this context, social protection systems have emerged as a critical policy tool for enhancing resilience and supporting climate adaptation, especially within agrifood systems (FAO, 2017).

The **integration of social protection into climate strategies** is gaining visibility on the global agenda, as reflected in the Policy Basket defined under the Global Alliance Against Hunger and Poverty initiative. Specifically, one set of interventions under the policy basket is dedicated to integrated programmes for climate and shock resilience (Global alliance against hunger and poverty, 2025), highlighting the relevance of anticipatory, adaptive, and shock-responsive social protection¹ as key instruments to reduce vulnerability and support populations exposed to increasing climate risks. These approaches align with the broader goal of promoting inclusive, forward-looking strategies that protect livelihoods, build resilience, and contribute to sustainable rural transformation.

At the national level, nationally determined contributions (NDCs), the core mechanism through which countries articulate their climate action commitments under the Paris Agreement, provide a critical entry point for aligning social protection with climate policy. Nearly all countries (99 percent) reference measures to avert climate-related loss and damage in agrifood systems, and 89 percent include provisions to minimize such impacts, often through mechanisms such as early warning systems and shock-responsive support. Yet, **only 13 percent of current NDCs explicitly reference social protection programmes in relation to agrifood systems**, with most of these concentrated in low-income and climate-vulnerable countries and its inclusion remains largely generic, frequently referencing safety nets without specifying instruments or delivery mechanisms (Crumpler *et al.*, 2025).

This limited integration due to seemingly different factors, and different focus on outcomes highlights a missed opportunity. Social protection can play a transformative role in enabling just transitions in agrifood systems, by addressing the underlying socioeconomic and environmental drivers of vulnerability. In rural areas, well-designed social protection programmes can foster adaptive livelihoods, safeguard assets, and strengthen households' capacity to cope with both gradual and sudden climate shocks (Bhalla *et al.*, 2024; FAO, 2017). As countries move to update and implement their NDCs, there is a pressing need to improve policy coherence between climate objectives and social protection systems.

In this context, **anticipatory action has gained increasing attention as a mechanism to strengthen the climate responsiveness of social protection systems**. Anticipatory approaches provide assistance *before* an expected hazard occurs, based on credible forecasts, allowing households, governments and partners to take preventive measures that reduce losses and support faster recovery (FAO, 2023). When embedded within social protection frameworks, these measures have the potential to be more timely and more effective.

Building on this understanding, **the present literature review seeks to examine the socioeconomic impacts of anticipatory social protection measures, with a view to informing integrated climate and poverty reduction strategies**. Anchored in the G20 Policy Basket and framed within the NDC process, this review aims to contribute to the evidence base needed to support more coherent, inclusive, and forward-looking social protection policies that respond to the dual challenges of climate change and rural poverty. Specifically, this literature review aims to synthesize the available evidence on the socioeconomic impacts of anticipatory social protection in the context of covariate shocks. The review follows an adapted version of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure methodological transparency and its objective is structured using the population, intervention, comparator, outcome (PICO) framework (Frandsen *et al.*, 2020), which is commonly applied in evidence synthesis to define and focus the research.

¹ Anticipatory social protection refers to the use of a social protection system to deliver early, preventive support to populations forecasted to be affected by a shock, before the shock occurs. Shock-responsive social protection systems are designed to anticipate, prepare for, and respond to shocks in ways that protect poor and vulnerable people and help them recover (European Commission, 2019). Adaptive social protection is a broader, integrative approach aimed at strengthening household resilience by combining social protection with climate change adaptation and disaster risk reduction strategies (Bowen *et al.*, 2020).

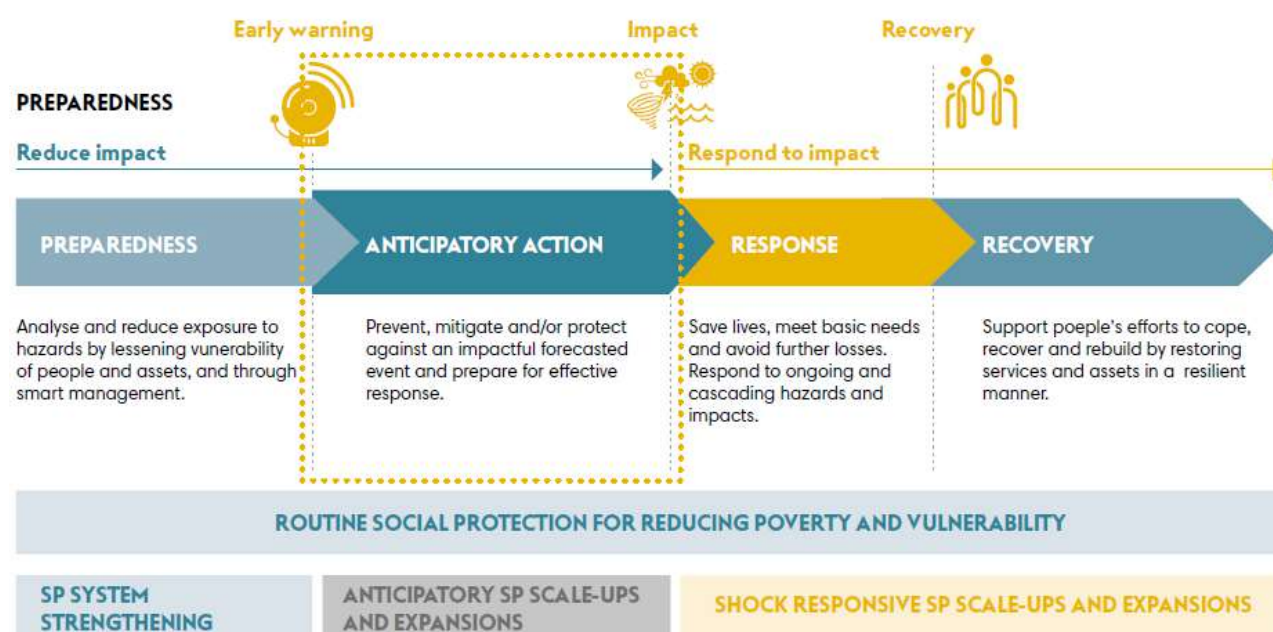
2. Framing shock-responsive social protection and anticipatory action

In the face of increasing climate volatility and disaster risk, **governments and humanitarian actors are shifting from reactive responses to proactive**, risk-informed strategies (Poole and Clarke, 2024). Social protection systems (through instruments like cash transfers, food assistance, or public works) are increasingly recognized as critical platforms to support people before, during, and after covariate shocks (FAO, 2023; FAO and Red Cross Red Crescent Climate Centre, 2023). Originally focused on scaling up after crises, the shock-responsive social protection (SRSP) agenda has evolved to include anticipatory interventions, which aim to reduce harm before a shock materializes (FAO, 2023).

SRSP refers to the ability of social protection systems to adapt and expand in response to shocks. This can involve vertical expansion (increasing benefit size), horizontal expansion (including new beneficiaries), or piggybacking on existing systems to deliver emergency support. It allows for more efficient, coordinated responses and better use of existing delivery infrastructure, especially where shocks are becoming more frequent and predictable (Poole and Clarke, 2024; REAP, 2021; Smith and Bowen, 2020).

Anticipatory action is a specific ex-ante approach within this evolving framework. It involves delivering pre-emptive support (e.g. cash transfers, inputs) before the peak of a shock, based on hazard forecasts and vulnerability analysis (FAO, 2017; Weingartner and Wilkinson, 2019). Anticipatory action interventions are implemented within a defined anticipatory action window, namely the timeframe between a forecast-based trigger and the onset or peak of a hazard, and are operationalized through pre-arranged financing, pre-identified beneficiary lists, and standard operating procedures (SOPs) that define roles and actions (Figure 1). When linked with social protection systems, anticipatory action can leverage existing registries, communication, and delivery mechanisms to reach vulnerable populations efficiently and at scale (FAO, 2023). Forecast-based financing mechanisms release funds automatically once a trigger threshold is met, enabling swift action and avoiding delays linked to humanitarian appeals.

Figure 1. Linking social protection and anticipatory action along the disaster risk management cycle



Source: FAO. 2023. *Social protection and anticipatory action to protect agricultural livelihoods*. Rome.
<https://doi.org/10.4060/cc7628en>

Critically, these systems must be tailored to hazard typologies. For rapid-onset events (e.g. floods, cyclones), short lead times demand precise targeting and fast disbursement. For slow-onset shocks (e.g. droughts), phased approaches can facilitate earlier behavioural changes such as preserving assets or adjusting planting strategies (WFP, 2025). Together, SRSP and anticipatory action are linked to and represent a paradigm shift in disaster risk management, from reactive to pre-emptive approaches. When embedded in national systems, they offer a scalable and government-owned pathway for resilience-building and crisis mitigation. Moreover, these mechanisms support countries in meeting climate adaptation objectives outlined in their NDC and in aligning with global frameworks like the G20 policy priorities on social protection and disaster risk financing.

Anticipatory social protection allows for a faster and more predictable response than traditional shock-responsive systems. **Acting before a shock, however, requires a clear and pre-agreed decision-making process that operates independently of political debate over who benefits. Roles, responsibilities, and budget sources must be explicitly defined to ensure rapid activation** (Nesbitt-Ahmed, Clarke and Poole, 2024; Poole and Clarke, 2024). This mechanism also serves as a risk-sharing mechanism or risk deal: a reliable public policy framework that clearly communicates the type and extent of support people can expect from the government in the event of future disasters. Such policies must be transparent and equitable, ensuring that different communities and groups understand how disaster protection measures apply to them, while maintaining sustainable political support over time (Nesbitt-Ahmed, Clarke and Poole, 2024).

Anticipatory action has evolved significantly over the past decade. Initial pilots launched by the World Food Programme (WFP), the Start Network, and the International Federation of Red Cross and Red Crescent Societies (IFRC) around 2015 have since given way to broader institutional uptake. A turning point occurred in 2020 with the first anticipatory activation of UN Central Emergency Response Fund (CERF) financing in Bangladesh, which catalysed a wider shift from reactive to proactive humanitarian systems. As of 2024, there were 154 active anticipatory action frameworks were implemented in over 48 countries, protecting more than 13 million people with USD 248 million worth financing in place (Anticipation Hub, 2025). Impact evaluations and cost-benefit analyses suggest that anticipatory action can generate substantial cost savings and welfare gains (see Section 5.2).

Despite the growing momentum behind shock-responsive approaches, the evidence base remains fragmented, with most studies focused on pilot programmes or limited geographic contexts. While early findings suggest that anticipatory interventions can be both cost-effective and welfare-enhancing, there is a need to better understand under what conditions these approaches work, how they compare to more traditional post-shock responses, and how they can be institutionalized within national systems, particularly in low- and middle-income countries. This literature review aims to address these gaps by synthesizing available evidence on the socioeconomic impacts of anticipatory social protection, with a particular focus on outcomes such as livelihoods coping strategies, and food security. By identifying what works, where, and for whom, the review seeks to inform the design of more integrated and forward-looking policy responses that align with both climate adaptation goals and poverty reduction objectives.

3. Methods

3.1 Review design and reporting standards

This literature review applies an adapted version of the PRISMA 2020 guidelines to ensure methodological transparency and rigor (Page *et al.*, 2021). While the review follows the core steps of systematic literature reviews, including structured searching, screening, and eligibility assessment, it does not include formal quantitative data extraction or meta-analysis. Instead, it focuses on synthesizing the evidence relevant to the socioeconomic impacts of anticipatory and shock-responsive social protection. The review protocol is structured using the PICO framework, which informs the search strategy, eligibility criteria, and synthesis approach. The study selection process is documented using a PRISMA-style flow diagram.

3.2 Search strategy

A search strategy was developed based on the PICO framework and applied to several databases of scientific using combinations of keywords and controlled vocabulary. The search terms covered three conceptual domains: (i) intervention type (anticipatory social protection), (ii) outcomes of interest, (iii) type of hazard/shock, (iv) study design. Boolean operators and truncation were used to enhance sensitivity. Searches were conducted in July 2025, with no initial restriction on publication date. The full search strings are presented in Table A1. In addition, a number of studies known to the author but not retrieved through the database searches, primarily because they were not yet published as journal articles, were included. These manually identified studies were limited to those employing experimental or quasi-experimental designs.

3.3 Eligibility criteria

This literature review aims to assess the effects of anticipatory social protection measures (intervention) – such as forecast-based cash transfers or early warning-based support – on the resilience, income, and adaptive capacities (outcomes) of households in low- and middle-income countries (population), particularly those exposed to climate-related shocks. Where feasible, the review also compares these impacts with those of shock-responsive or post-disaster social protection mechanisms (comparator), in order to identify which approaches are most effective and efficient in promoting inclusive climate adaptation and poverty reduction.

To ensure the reliability and comparability of findings, the review will include experimental and quasi-experimental studies, as well as existing systematic reviews, that assess the causal or well-documented effects of these interventions on individual and household-level outcomes.

Exclusion criteria apply to:

- studies based primarily on simulation models, theoretical projections, or scenario analyses without empirical validation;
- papers that are not written in English;
- studies that do not evaluate a social protection intervention in the context of climate-related shocks;
- articles lacking outcome data on socioeconomic resilience, coping capacity, or livelihoods.

The inclusion and exclusion criteria were defined using the PICO framework and outlined in Table 1.

Table 1. Eligibility criteria

PICO element	Description
Population	Households and individuals in low- and middle-income countries, with a focus on climate-vulnerable groups.
Intervention	Anticipatory social protection measures, such as forecast-based financing, early action, pre-emptive transfers.
Comparator	Shock-responsive or post-disaster social protection mechanisms; or no intervention.
Outcomes	Resilience, coping strategies, adaptive capacity, household income, food security, poverty reduction, loss mitigation, consumption smoothing.
Study design	Experimental and quasi-experimental studies, as well as existing systematic reviews and cost-effectiveness. Descriptive studies with robust outcome assessment were considered in cases of limited causal evidence. Modelling papers were excluded.

Note: PICO = population, intervention, comparator, outcome.

Source: Author's own elaboration.

4. Results

4.1 Study selection

Search results were exported to Rayyan for deduplication and screening. Titles and abstracts were screened against the eligibility criteria. Full texts of potentially relevant studies were then assessed for final inclusion. The study selection process is summarized in the PRISMA flow diagram (Table 2).

Table 2. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram

Search stage	Number of studies identified
Total records identified, of which:	63
• Scopus, Web of Science, Proquest	56
• other methods (working papers and expert consultation)	7
Duplicates removed	8
Records screened	55
Records excluded (title/abstract)	40
Records excluded (full text)	5
Included in the review	10

Source: Authors' own elaboration.

All identified records were screened in two stages: first by title and abstract, and then through full-text review. The initial screening excluded studies that were clearly unrelated to the review scope against predefined inclusion and exclusion criteria. Most studies were excluded for one of two main reasons:

- The intervention did not fall within the scope of social protection or anticipatory/shock-responsive mechanisms (e.g. studies focused solely on early warning systems, climate insurance, or humanitarian logistics without a link to social protection); or
- The study design was not suitable for assessing impact, such as qualitative case studies, very small samples, or descriptive papers without an evaluation component.

Only studies that provided clear evidence through experimental, quasi-experimental, or well-documented evaluative methods, on relevant socioeconomic outcomes were retained for synthesis.

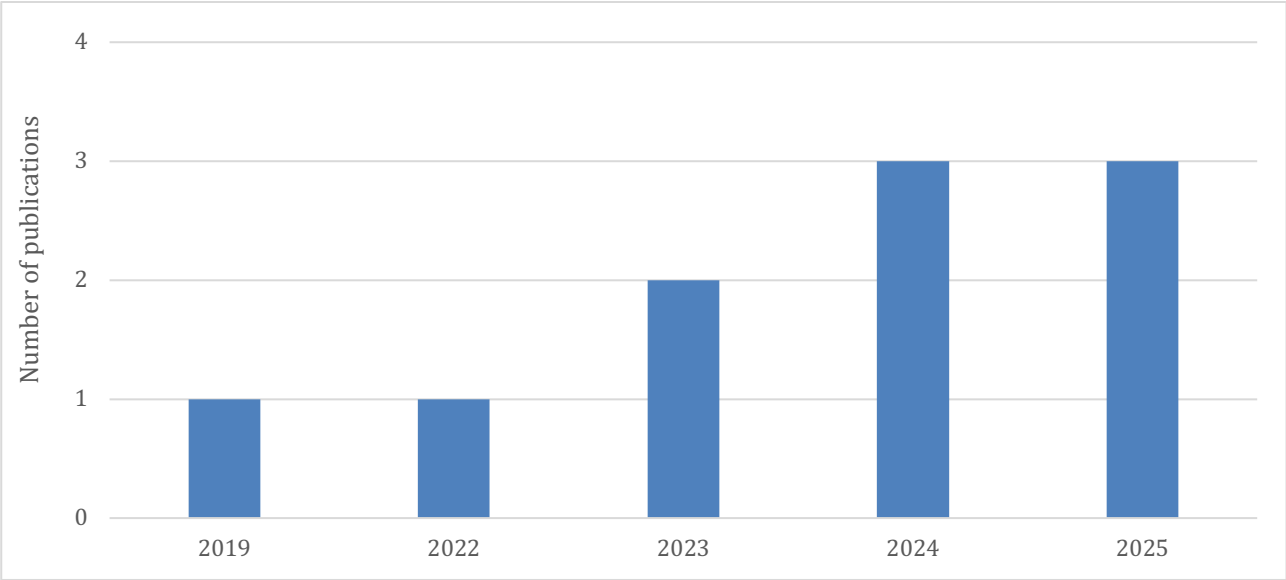
4.2 Study characteristics overview

This review includes ten papers focused on anticipatory social protection interventions in low- and middle-income countries (LMICs); however, one paper (Christian *et al.*, 2025) presents two case studies (Bangladesh and Nepal) yielding 11 case studies in total. These interventions primarily consist of anticipatory cash transfers in anticipation to climate-related shocks such as floods, droughts and extreme cold events. In most interventions, anticipatory cash transfers are triggered by early warning systems and implemented in collaboration with humanitarian or governmental actors. All studies are situated in low- and middle-income countries (LMICs), with a concentration in Asia and sub-Saharan Africa. The geographic distribution of studies is as follows: Asia and the Pacific account for the majority, with studies conducted in Bangladesh (four studies), Nepal (one study) and Mongolia (two studies) – including one multi-country study covering both Bangladesh and Nepal. In sub-Saharan Africa, studies were carried out in Nigeria, Niger and South Sudan, along with one multi-country study encompassing Lesotho, Madagascar and Mozambique.

This literature is relatively recent, with most evidence emerging in the past five years, reflecting the novelty and growing policy interest in anticipatory approaches. Figure 2 shows the distribution of included studies by year of publication, revealing a clear increase in research attention to anticipatory social protection over time:

- Between 2017 and 2020, only one study per year was published.
- Starting in 2023, there is an increase, with two studies in 2023 and three studies each in 2024 and 2025.

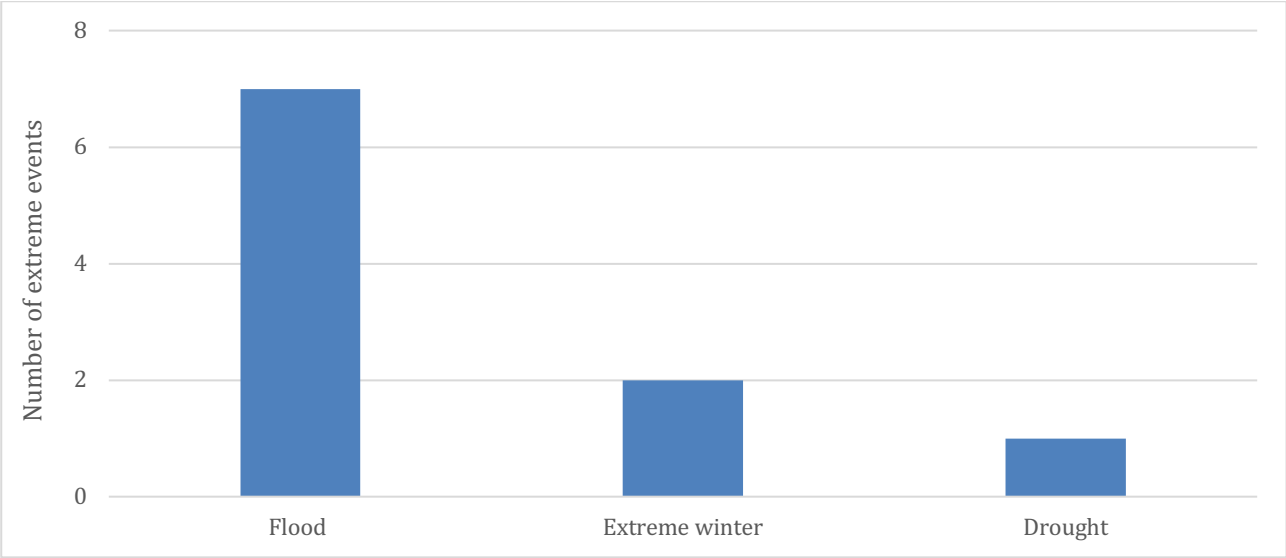
Figure 2. Number of studies by year of publication



Source: Authors' own elaboration.

Among the extreme events examined, floods are the most frequently studied, featuring in six out of nine studies, followed by extreme winter events in two studies and drought in only one (Figure 3). The reviewed studies employ a range of methodologies, including five quasi-experimental designs, four experimental designs, and one cost-effectiveness analysis, reflecting a growing commitment to rigorously evaluating the impacts and efficiency of anticipatory social protection interventions (Table 3).

Figure 3. Type of extreme events considered in the study



Source: Author's own elaboration.

The average value of the cash transfers across the included studies is approximately USD 154, with a range from USD 40 to USD 400. The amount of anticipatory cash transfers varied significantly across interventions, suggesting differences in cost structures, targeting strategies, or local needs. While some programmes offered relatively modest amounts (e.g. USD 40), others provided substantially higher levels of support (up to USD 400), even repeated over time, like in the case of Niger. In some cases, also early warning information and in-kind support were also provided (i.e. veterinary kit in Mongolia).

Table 3. Type of studies' design and comparison group

Study	Country, type of hazard	Study design	Comparison group
Gros <i>et al.</i>, 2019	Bangladesh, flood	Quasi-experimental	Non-recipient
Gros <i>et al.</i>, 2020	Mongolia, extreme winter	Quasi-experimental	Non-recipient
Balana <i>et al.</i>, 2023	Nigeria, flood	Randomized	Post-shock assistance
Gros <i>et al.</i>, 2023	Bangladesh, flood	Quasi-experimental	Non-recipient
Baliki, Bruck and Weiffen, 2024	South Sudan, flood	Quasi-experimental	Non-recipient
Mogge, Röckert and Krähnert, 2024	Mongolia, extreme winter	Randomized	Non-recipient
Pople <i>et al.</i>, 2024	Bangladesh, flood	Quasi-experimental	Traditional humanitarian response
De Brauw, 2025	Lesotho, Madagascar, Mozambique	Cost-benefit analysis	Post-shock assistance
Christian <i>et al.</i>, 2025	Nepal, flood	Randomized	Post-shock assistance
	Bangladesh, flood	Randomized	Post-shock assistance
Pople <i>et al.</i>, 2025	Niger, drought	Randomized	Recipients of traditional response Early short response Early long response

Sources: Author's own elaboration based on Gros, C., Bailey, M., Schwager, S., Hassan, A., Zingg, R., Uddin, M.M., Shahjahan, M. *et al.* 2019. Household-level effects of providing forecast-based cash in anticipation of extreme weather events: Quasi-experimental evidence from humanitarian interventions in the 2017 floods in Bangladesh. *International Journal of Disaster Risk Reduction*, 41: 101275. <https://doi.org/10.1016/j.ijdr.2019.101275>; Gros, C., Easton-Calabria, E., Bailey, M., Dagys, K., De Perez, E.C., Sharavnyambuu, M. & Kruczkiewicz, A. 2020. The effectiveness of forecast-based humanitarian assistance in anticipation of extreme winters: a case study of vulnerable herders in Mongolia. *Disasters*, 46(1): 95–118. <https://doi.org/10.1111/disa.12467>; Balana, B., Adeyanju, D., Clingain, C., Andam, K.S., De Brauw, A., Yohanna, I., Olarewaju, O. & Schneider, M. 2023. *Anticipatory cash transfers for climate resilience: Findings from a randomized experiment in northeast Nigeria*. Washington, DC, International Food Policy Research Institute. <https://doi.org/10.2499/p15738coll2.136812>; Gros, C., Pronti, A., Sheikh, K., Hassan, A. & Shahjahan, M. 2023. Effects of anticipatory humanitarian cash assistance to households forecasted to experience extreme flooding: evidence from Bangladesh. *Hydrology Research*, 54(11): 1315–1328. <https://doi.org/10.2166/nh.2023.111>; Baliki, G., Bruck, T. & Weiffen, D. 2024. *Impacts of early action support on lives and livelihoods in South Sudan*. Berlin, ISDC - International Security and Development Center. <https://isdc.org/publications/impacts-of-early-action-support-on-lives-and-livelihoods-in-south-sudan-the-life-in-bentiu-study-final-impact-report>; Mogge, L., Röckert, J. & Krähnert, K. 2024. *Impacts of Anticipatory Cash Transfers in the Context of Weather Disasters*. Ruhr Economic Papers. DE, RWI. <https://doi.org/10.4419/96973236>; Pople, A., Hill, R., Dercon, S. & Brunckhorst, B. 2024. *The Importance of Being Early: Anticipatory Cash Transfers for Flood-Affected Households*. CSAE Working Paper. Centre for the Study of African Economies. University of Oxford. <https://ora.ox.ac.uk/objects/uuid:12ea16b2-edc0-4af5-8824-132aba4557bd>; De Brauw, A. 2025. *Cost-Effectiveness of Anticipatory Action. Lesotho, Madagascar and Mozambique*. Technical Report. Initiative on fragility, conflict and migration. Montpellier, France, CGIAR. <https://hdl.handle.net/10568/173370>; Christian, P., Dunsch, F., Heirman, J., Kelley, E., Kondylis, F., Lane, G., Waidler, J. *et al.* 2025. *Fast Action for Floods: RCT Evidence on Forecast-based Cash Transfers from Bangladesh and Nepal*. w34414. Cambridge, MA, National Bureau of Economic Research. <https://doi.org/10.3386/w34414>; Pople, A., Premand, P., Dercon, S., Vinez, M. & Brunelin, S. 2025. *The Earlier the Better? Cash Transfers for Drought Response in Niger*. Policy Research Working Paper. Washington, DC, World Bank. <http://documents.worldbank.org/curated/en/099739106042542554>.

Lead time, the interval between forecast trigger and support delivery, is a critical factor in the effectiveness of anticipatory action. Ideally, in anticipatory action setting, the majority of households should receive assistance before the onset of the shock. However, in the case of rapid-onset hazards with short lead times, some recipients may inevitably receive support shortly after the event begins, effectively as early response. The length and reliability of lead time can significantly influence outcomes, particularly when early action enables evacuation, asset protection, or food stockpiling. Among the studies reviewed, reported lead times range from as early as three months to just 24 hours before the anticipated shock peak. In some cases, due to design choice or implementation challenges, a portion of transfers occurred after the hazard peak.

The reviewed studies assess a diverse set of household-level outcomes to evaluate the effectiveness of anticipatory action, with most focusing on short-term measures of welfare and resilience to climate-related shocks (see Table A1 for the full list of studies included). These outcomes can be grouped into six broad domains, reflecting the multidimensional impacts of early action (see Table 4). **Preparedness**, examined in half of the studies (Balana *et al.*, 2023; Baliki, Bruck and Weiffen, 2024; Gros *et al.*, 2019, 2023; Pople *et al.*, 2024), encompasses actions undertaken in anticipation of a shock, such as reinforcing shelters or houses and ensuring the capacity to evacuate oneself, family members, and livestock. A central focus across all studies is on **food security and consumption**, assessed through a diverse set of indicators, including the Food Consumption Score (FCS), Reduced Coping Strategy Index (rCSI), adult and child food consumption, number and size of meals, food quality, the Food Insecurity Experience Scale (FIES), and food expenditure (Balana *et al.*, 2023; Baliki, Bruck and Weiffen, 2024; Dunsch *et al.*, 2025; Gros *et al.*, 2019, 2020, 2023; Mogge, Röckert and Krähnert, 2024; Pople *et al.*, 2024, 2025). These indicators serve as direct proxies for a household's ability to maintain nutritional adequacy during crises.

All studies, except one (Baliki, Bruck and Weiffen, 2024), included proxies related to **livelihood activities** and how these were affected by the extreme event. Livelihood-related outcomes commonly assessed include livestock ownership, herd protection, continuity of income, and labour reallocation or diversification. Some studies also examine the extent to which anticipatory support reduces reliance on negative **coping strategies** (Balana *et al.*, 2023; Christian *et al.*, 2025; Gros *et al.*, 2023; Pople *et al.*, 2024, 2025). Reported behaviours include borrowing money, selling productive assets, and taking on debt. In several cases, early cash transfers were associated with lower use of these strategies, suggesting that timely support can mitigate long-term setbacks and financial vulnerability.

Another area of focus is **subjective well-being and mental health**. Studies from Mongolia, Bangladesh, and Nepal specifically report reductions in psychosocial stress, as well as improvements in subjective well-being and perceived security (Baliki, Bruck and Weiffen, 2024; Dunsch *et al.*, 2025; Gros *et al.*, 2019, 2023). Finally, a smaller number of studies investigate outcomes related to **health** such as water-borne disease, flu, cough and skin rash (Baliki, Bruck and Weiffen, 2024; Gros *et al.*, 2023).

Table 4. Type of outcomes considered

Study	Country, type of hazard	Preparedness	Food security*	Livelihood activities	Coping strategy	Subjective well-being	Health
Gros et al., 2019	Bangladesh, flood	✓	✓	✓			
Gros et al., 2020	Mongolia, extreme winter		✓	✓		✓	
Balana et al., 2023	Nigeria, flood	✓	✓	✓	✓	✓	
Gros et al., 2023	Bangladesh, flood	✓	✓	✓	✓		✓
Baliki, Bruck and Weiffen, 2024	South Sudan, flood	✓	✓			✓	✓
Mogge et al., 2024	Mongolia, extreme winter		✓	✓			
Pople et al., 2024	Bangladesh, flood	✓	✓	✓	✓	✓	
Christian et al., 2025	Nepal, flood		✓	✓		✓	
	Bangladesh, flood		✓	✓	✓	✓	
Pople et al., 2025	Niger, drought		✓	✓	✓	✓	

Note: * Includes indicators such as: Food Consumption Score (FCS), Reduced Coping Strategy Index (rCSI), adult food consumption, child food consumption, number/size of meals, quality of food, Food Insecurity Experience Scale (FIES), food expenditure.

Sources: Author's own elaboration based on Gros, C., Bailey, M., Schwager, S., Hassan, A., Zingg, R., Uddin, M.M., Shahjahan, M. et al. 2019. Household-level effects of providing forecast-based cash in anticipation of extreme weather events: Quasi-experimental evidence from humanitarian interventions in the 2017 floods in Bangladesh. *International Journal of Disaster Risk Reduction*, 41: 101275. <https://doi.org/10.1016/j.ijdr.2019.101275>; Gros, C., Easton-Calabria, E., Bailey, M., Dagys, K., De Perez, E.C., Sharavnyambuu, M. & Kruczkiewicz, A. 2020. The effectiveness of forecast-based humanitarian assistance in anticipation of extreme winters: a case study of vulnerable herders in Mongolia. *Disasters*, 46(1): 95–118. <https://doi.org/10.1111/disa.12467>; Balana, B., Adeyanju, D., Clingain, C., Andam, K.S., De Brauw, A., Yohanna, I., Olarewaju, O. & Schneider, M. 2023. *Anticipatory cash transfers for climate resilience: Findings from a randomized experiment in northeast Nigeria*. Washington, DC, International Food Policy Research Institute. <https://doi.org/10.2499/p15738coll2.136812>; Gros, C., Pronti, A., Sheikh, K., Hassan, A. & Shahjahan, M. 2023. Effects of anticipatory humanitarian cash assistance to households forecasted to experience extreme flooding: evidence from Bangladesh. *Hydrology Research*, 54(11): 1315–1328. <https://doi.org/10.2166/nh.2023.111>; Baliki, G., Bruck, T. & Weiffen, D. 2024. *Impacts of early action support on lives and livelihoods in South Sudan*. Berlin, ISDC - International Security and Development Center. <https://isdc.org/publications/impacts-of-early-action-support-on-lives-and-livelihoods-in-south-sudan-the-life-in-bentiu-study-final-impact-report>; Mogge, L., Röckert, J. & Krähnert, K. 2024. *Impacts of Anticipatory Cash Transfers in the Context of Weather Disasters*. Ruhr Economic Papers. DE, RWI. <https://doi.org/10.4419/96973236>; Pople, A., Hill, R., Dercon, S. & Brunckhorst, B. 2024. *The Importance of Being Early: Anticipatory Cash Transfers for Flood-Affected Households*. CSAE Working Paper. Centre for the Study of African Economies. University of Oxford. <https://ora.ox.ac.uk/objects/uuid:12ea16b2-edc0-4af5-8824-132aba4557bd>; De Brauw, A. 2025. *Cost-Effectiveness of Anticipatory Action*. Lesotho, Madagascar and Mozambique. Technical Report. Initiative on fragility, conflict and migration. Montpellier, France, CGIAR. <https://hdl.handle.net/10568/173370>; Christian, P., Dunsch, F., Heirman, J., Kelley, E., Kondylis, F., Lane, G., Waidler, J. et al. 2025. *Fast Action for Floods: RCT Evidence on Forecast-based Cash Transfers from Bangladesh and Nepal*. w34414. Cambridge, MA, National Bureau of Economic Research. <https://doi.org/10.3386/w34414>; Pople, A., Premand, P., Dercon, S., Vinez, M. & Brunelin, S. 2025. *The Earlier the Better? Cash Transfers for Drought Response in Niger*. Policy Research Working Paper. Washington, DC, World Bank. <http://documents.worldbank.org/curated/en/099739106042542554>

5. Discussion

5.1 Synthesis of effectiveness of anticipatory action interventions

This section synthesizes findings from nine empirical studies (ten case-studies) evaluating the effects of anticipatory cash transfers, on households' socio-economic outcomes following a climate-related hazards. These interventions vary in transfer size, targeting strategy, delivery timing, and covariate risks (e.g. floods, droughts, extreme winter), but offer valuable insights into the impacts of acting in anticipation.

HOUSEHOLDS' PREPAREDNESS BEHAVIOUR

One of the most immediate and observable outcomes of anticipatory assistance is how households respond in the period leading up to a covariate shock. Early cash transfers can enable beneficiaries to take protective or preparatory actions, such as evacuating family members, securing assets, or purchasing essential supplies, that would otherwise be difficult or unaffordable.

A few studies demonstrate how anticipatory transfers enhance households' capacity to act proactively, particularly by enabling early evacuation, protecting productive assets, and supporting adaptive investments. These behavioural responses are often observed even when improvements in food security or consumption are modest or absent. In Bangladesh, evidence shows that anticipatory transfers supported households in evacuating and mitigating asset losses. Pople *et al.* (2024) find that early recipients were 12.5 percent more likely to evacuate family members, 24.3 percent more likely to evacuate livestock, and other than 8 percent more likely to purchase food ahead of the peak. Importantly, the cash transfer appears to have complemented the early warning system, with the treatment group 5 percent more likely to report having received early warning information. In the same setting, Gros *et al.* (2023) find that while 87 percent of survey respondents reported receiving early warning messages (with no statistical difference between treatment and control groups), adults evacuation rates were notably higher among cash recipients (27 percent compared to 11 percent of the control group). In Nigeria, pre-shock cash-payment has significant impacts on the number of pre-emptive actions taken before floods, along with increased investment in agricultural inputs and livestock. These effects point to improved capacity for self-protection and the potential for long-term resilience gains (Balana *et al.*, 2023). In South Sudan, households that received early cash assistance were more likely to improve their shelter conditions compared to those that did not receive any support (Baliki, Bruck and Weiffen, 2024).

These results suggest that receiving cash also acted as a behavioural nudge: households who received the transfer were more likely to evacuate than those who did not, potentially due to the combination of warning messages being delivered alongside the transfer, and the implicit signal that receiving cash meant the situation was serious. These findings highlight a broader insight: well-timed anticipatory support may not only mitigate immediate harm but also trigger behavioural changes that reduce the need for negative coping strategies. Understanding how one set of anticipatory actions can catalyse further adaptive behaviour is essential for designing more effective and holistic early action systems.

FOOD SECURITY AND CONSUMPTION EFFECTS

Food security and consumption are among the most consistently evaluated outcomes across the studies: all the empirical studies estimated the impact of early cash transfers on at least one proxy indicator related to food security or dietary intake. The findings are mixed: while approximately six out of ten studies report some kind of positive short-term impacts, the remainder find limited or non-significant effects.

In response to floods in Bangladesh, positive impacts on food security are found by Gros *et al.* (2019), Pople *et al.* (2024) and Chistian *et al.* (2025). Gros *et al.* (2019) finds that forecast-based cash transfers distributed ahead of the 2017 monsoon floods significantly improved household number, size and variety of meals, while also reducing reliance on high-interest loans and distress sales. Pople *et al.* (2024), analysing the same 2020 monsoon, find that most households used the cash transfer to buy food or water and were less likely to go without eating during the flood. In addition, they find that the cash transfer improved child food consumption: children in treated households were 3.8 percentage points more likely to have consumed three or more meals the day prior to the survey and these effects were still strong three months after the intervention. Five-month after intervention they also find an improvement in adult food consumption driven by a large increase in both adult protein consumption

and general nutrient in-take. Christian *et al.* (2025) find immediate improvements in food security in the short term, with a 4.5% decrease in the Food Insecurity Experience Scale (FIES) and an 8 percent reduction in the Reduced Coping Strategy Index (rCSI), as well as a significant increase in meat consumption compared to households that received assistance one month later. These positive effects also persist in the medium term relative to the pure control group, which received transfers two months after the peak. On the other hand, Gros *et al.* (2023), examining the 2020 flood response, found no significant effect on food-based coping strategies.

In Nepal, Chistian *et al.* (2025) provide robust evidence of improved food consumption scores (FCS) and higher protein intake among households receiving anticipatory cash transfers two days before peak flooding in 2022, compared to those receiving post-shock assistance. However, these gains largely dissipated over the medium term, suggesting the benefit of anticipatory action may be time-limited without follow-up support. In Mongolia, Mogge, Röckert and Krähnert (2024) reports no observable effects on food intake of households facing extreme winter conditions, potentially due to a relatively small transfer value and high baseline vulnerability but finds that among lower-wealth households, the anticipatory cash transfer increased total consumption (not disaggregated between food and non-food).

In sub-Saharan Africa, findings are more nuanced. Evidence from Niger also supports the effectiveness of anticipatory action to slow onset hazards (drought). Pople *et al.* (2025) find that large early cash transfers, delivered before the lean season, improved monthly food consumption by 17.6 percent and food security by 8 percent relative to a traditional, reactive transfer approach. Notably, some of these benefits persisted even after the transfers ended, indicating a degree of resilience gain. On the other hand, in Nigeria, Balana *et al.* (2023) finds that a one-time anticipatory transfer of USD 400 did not significantly improve short-term food consumption in view of the 2022 flood compared to the post-shock transfer, although the results show notable improvements in household food security at endline for both groups. Possible reasons listed by the authors include reliance on home-produced food, strong social networks leading to food sharing, potential spillover effects between groups, and a tendency to invest large transfers in durable assets rather than immediate consumption. Possibly, the lead time of at least seven days may not have been sufficient to influence food consumption outcomes meaningfully. Similarly, Baliki *et al.* (2024) finds no significant improvements in food security among flood-affected households in South Sudan, despite widespread use of the transfer for shelter repair and reported increases in satisfaction.

In summary, the effects of anticipatory cash transfers on food security vary across settings. Positive outcomes are more likely when transfers are delivered with sufficient lead time, are of adequate size, and take place in contexts with functioning markets. Notably, in Bangladesh, where flood forecasting systems are particularly advanced, interventions also demonstrated positive impacts.

The positive impacts of anticipatory action on food security are particularly significant given broader evidence on household coping strategies following climate shocks. Across diverse settings, reducing food consumption remains the most common response to income and asset losses, with well-documented consequences for child nutrition and long-term human capital formation. As noted in recent analyses (Hill, Skoufias and Maher, 2019), income variability and post-disaster consumption losses are closely associated with stunting and reduced cognitive and socioemotional development, which in turn limit educational attainment and lifetime earnings. The ability of anticipatory social protection to stabilize consumption and preserve dietary quality in the aftermath of shocks therefore represents a critical channel through which early action can mitigate not only short-term welfare losses but also long-term developmental impacts.

While these results are already relevant to FAO's mandate to improve food security and support resilience in the face of shocks, the studies reviewed rely on a range of different proxies to assess food security including the Food Consumption Score (FCS), food expenditure, decisions to purchase food, meal skipping or portion reduction, and reduced intake of nutritious foods. This diversity in measurement underscores the need for greater harmonization to allow for more robust comparisons and aggregated learning.

LIVELIHOODS AND COPING STRATEGIES

Anticipatory cash transfers can play a key role in protecting livelihoods, facilitating adaptive responses, and supporting recovery after climate shocks. Evidence from Bangladesh, Mongolia, Nepal, Nigeria, and South Sudan shows that such interventions help households safeguard assets, maintain income-generating activities, and reduce reliance on negative coping strategies.

In Bangladesh, anticipatory transfers mitigated asset losses by reducing the asset loss index, and enhanced earning potential. Treated households were also more likely to avoid crop loss, replant, and engage in wage labour shortly after the floods, suggesting early signs of livelihood recovery (Pople *et al.*, 2024). In the same setting, Gros *et al.* (2023) find that early cash reduced livestock mortality by 10–13 percent and productive asset losses by 21 percentage points, enabling recipients to invest in preventive measures such as elevated platforms and boat transport for assets and animals. On the other hand, Christian *et al.* (2025) find modest effects on non-agricultural livelihoods and financial behaviours, with an 11 percent increase in wage income in the anticipatory cash group, but limited impacts on business profits or migration in Bangladesh and Nepal.

In Mongolia, early support to herders significantly reduced livestock mortality, especially for high-value animals, and secured future livelihoods (Gros *et al.*, 2020) while Mogge, Röckert and Krähnert (2024) report that anticipatory cash increased herd size, adaptive investments, and consumption among lower-wealth households, though no aggregate effects were observed. In South Sudan, transfers improved shelter conditions, reducing leakage by 83 percent and increasing the likelihood of good-quality housing by 15 percent (Baliki, Bruck and Weiffen, 2024).

Anticipatory assistance also influences labour and income dynamics. In Nigeria, early cash transfers significantly affected households' labour reallocation decisions, including migration, which viewed as a positive adaptation strategy (Balana *et al.*, 2023) and is align with broader literature observing that cash transfers facilitated labour migration in South Africa. However, in this context no significant effects are detected on crop diversification, mixed farming, or non-farm enterprises, possibly due to limited time for livelihood adjustment or discouragement from prior flood experiences. Nonetheless, anticipatory transfers significantly increased seasonal incomes from non-farm employment, small businesses, and agricultural activities, and supported longer-term investments in productive assets and livestock (Balana *et al.*, 2023). In the face of the lean season, Pople (2025) notes that early transfers contributed to consumption smoothing, especially when timed to precede seasonal price spikes and labour demand.

Overall, these studies indicate that anticipatory cash transfers not only reduce asset losses and protect income sources but also enable adaptive labour responses and early recovery. While effects on diversification and long-term livelihood transformation remain limited, early support appears to strengthen households' capacity to cope with shocks and rebuild their livelihoods more quickly.

SUBJECTIVE WELL-BEING AND HEALTH

Subjective well-being and mental health are consistently measured non-material outcomes across the reviewed studies. Seven case-studies include proxies for subjective well-being, anxiety, or mental health symptoms, reflecting a growing recognition that climate shocks affect not only material welfare but also psychological resilience. Of these, half report positive effects of anticipatory action, though in several cases the impacts are short-lived or limited to specific subgroups.

In Bangladesh and Nepal, early recipients of anticipatory cash transfers experienced immediate statistically significant improvements in subjective well-being and reductions in psychological distress. In both countries, households receiving assistance two days before the flood peak had lower PHQ-4 mental health scores, as well as reduced anxiety and depression symptoms compared to post-shock recipients (Christian *et al.*, 2025). The authors also note that these improvements yield greater impacts per dollar transferred compared to multi-faceted anti-poverty interventions. Pople *et al.* (2024 and 2025) find that in Bangladesh, treated households reported an 18.7 percent increase in life satisfaction three months after the intervention, despite modest but important material gains and find that large early cash transfers improved life satisfaction by 17.8 percent and psychological well-being in Niger. Notably, some of these improvements persisted into the lean season, suggesting that well-timed and sufficiently sized transfers can produce sustained mental health benefits, particularly in high-risk agricultural settings.

However, not all studies find such effects. In Mongolia and South Sudan, no significant impact on psychological well-being or mental health was detected, despite reported improvements in physical outcomes like livestock preservation or shelter quality (Baliki, Bruck and Weiffen, 2024; Mogge, Röckert and Krähnert, 2024). In both cases, transfer amounts may have been too limited to alter stress trajectories meaningfully, or in the case of South Sudan households may have faced concurrent stressors, such as food insecurity, conflict, or displacement, that diluted psychological gains.

In addition to mental health, two studies also report positive effects on physical health. In Bangladesh, recipients of early transfers had 10 percent fewer health issues during the post-flood period (Gros *et al.*, 2023). In South Sudan, Baliki (2024) finds that households receiving anticipatory cash were 10 percentage points less likely to suffer from stomach ailments, although no broader improvements were observed across other health dimensions.

TIMING: IMPLEMENTATION OF DELIVERY MATTERS

Pople *et al.* (2024) conducted a heterogeneity analysis to assess how the timing of transfers affects outcomes. Using both linear regression and non-parametric methods, they estimated the marginal effect of receiving cash one day earlier. Their findings suggest that faster implementation enhances welfare: each day of earlier delivery is associated with improvements in child and adult food consumption and reductions in borrowing. Conversely, delays in the days leading up to the flood reduce the effectiveness of the intervention.

Evidence from Chistian *et al.* (2025) reinforces the importance of timing. In their study, while both anticipatory (FbAA) and post-flood groups eventually received transfers, outcomes converged in the medium term, partly because both groups benefited from cash assistance. However, by introducing a third, untreated control group in the medium run in Bangladesh, the authors show that anticipatory transfers continued to yield higher food security scores at least two months after the flood. Moreover, the FbAA group performed as well as or slightly better than the post-flood group, suggesting that earlier delivery not only provides immediate protection but also generates benefits that persist over time.

These temporal dynamics warrant further investigation to optimize the timing of anticipatory assistance.

5.2 Cost-effectiveness of anticipatory action

The economic rationale for anticipatory action rests on its potential to deliver faster, more predictable, and ultimately cheaper responses to crises. By providing assistance before shocks fully unfold, anticipatory interventions can reduce suffering, protect livelihoods, and promote preparedness in a more dignified manner. Early and transparent planning also fosters stronger national dialogue on crisis risk and protection, ensuring that resources are used more efficiently to safeguard a greater number of people (Poole and Clarke, 2024).

While most of the reviewed studies evaluating anticipatory social protection focused on household-level outcomes, cost-effectiveness analyses (CEA) remain limited. Only one of the studies reviewed, consist of a CEA (De Brauw, 2025), and systematically compares the benefits of anticipatory action with equivalent post-shock assistance. This analysis, covering Lesotho, Madagascar, and Mozambique, provides robust and conservative estimates of relative program efficiency.

In each case, the author adopts a fixed budget envelope, comparing the net benefits of delivering anticipatory transfers before a shock versus identical transfers provided afterward. Two core benefit streams are identified: short-term improvements in food security and longer-term income gains through asset protection. Costs related to mistargeting (i.e. inclusion of households not ultimately affected by the shock) are also factored in, although they are found to be negligible due to limited program reach.

The findings² indicate that anticipatory action yields an additional return of 23 to 28 percent over post-shock responses:

- In Lesotho, total program benefits amounted to USD 899 000, equal to 28 percent of total program cost, driven by both higher food consumption and reduced livestock losses.
- In Madagascar, anticipatory transfers increased food consumption scores by 3.26 points, translating to USD 990 000 in food security benefits (23 percent of program cost). Long-term asset benefits could not be estimated due to data limitations.

² The study uses a monetized valuation of food consumption gains based on prior research linking the Food Consumption Score (FCS) to household consumption expenditure. Benefits from asset protection are calculated using data on livestock retention and assumptions on income recovery over a five-year period. While the estimates are conservative, excluding several non-monetized benefits such as improved dignity or reduced coping stress, they provide compelling evidence of the fiscal and humanitarian efficiency of early action.

- In Mozambique, anticipatory assistance led to a 4.2 point increase in food consumption scores and modest asset protection benefits, totalling USD 588 500 in additional benefits, again 23 percent above program cost.

Two additional studies by WFP provide insights into the cost–benefit dimension of these interventions. In Bangladesh, anticipatory cash assistance was delivered at half the cost of traditional post-shock support (USD 13 vs USD 26 per person), while in Nepal, each USD 1 invested in anticipatory action was estimated to save USD 35 in response costs.

These findings emphasize the importance of integrating CEA components into future impact evaluations. As anticipatory action systems mature, their cost-effectiveness is likely to improve through better targeting, enhanced forecast precision, and institutional learning. Routine collection of granular cost data, as well as methods to quantify avoided losses and longer-term resilience dividends, will be essential to inform scaling decisions and policy prioritization.

In sum, the available evidence, though limited to one study, suggests that anticipatory social protection can deliver better outcomes at comparable or lower cost than reactive systems, reinforcing the case for proactive risk management approaches in climate-vulnerable settings.

5.3 Limitations

While the body of evidence on anticipatory action is growing, several important gaps and limitations remain.

First, there are still limited causal impact evaluations of anticipatory cash transfers. Most existing studies rely on quasi-experimental methods, often constrained by operational challenges during emergency responses. Generating more robust evidence is crucial to better understand the trade-offs between acting early and reaching those most in need. In particular, in anticipatory settings where the exact impact area of a climate shock is uncertain, pre-identifying beneficiaries can result in inclusion or exclusion errors as waiting to refine targeting may improve accuracy, but it risks missing the critical action window.

A key ethical limitation concerns the use of randomized controlled trials (RCTs) in humanitarian contexts. Randomly assigning households to treatment and control groups, especially when this entails withholding support during an acute crisis, is viewed by many humanitarian agencies as conflicting with their core principles. This ethical tension restricts the feasibility of randomized controlled trials with pure control in many settings. For instance, the study in Niger did not have a pure control group but compared three kind of responses: the traditional one, the early short and the early long modalities (Pople *et al.*, 2025).

In terms of methods, some of the studies included in the review face limitations related to sample size, statistical power, and identification strategy. A few evaluations (Gros *et al.*, 2019, 2020, 2023) note that small sample sizes and imbalanced treatment and control groups constrained the ability to detect robust effects and perform subgroup analysis. The study in Mongolia also highlights several limitations affecting the analysis, including constraints related to the survey design, specific features of the anticipatory humanitarian assistance intervention, and uncertainty regarding the extent to which the projected winter risks actually materialized (Mogge, Röckert and Krähnert, 2024). This reduces the generalizability of the findings and weakens the causal interpretation of results.

Some studies were also affected by low-value cash transfers relative to the scale of need (Gros *et al.*, 2020), which may have limited the potential to observe strong impacts even when early delivery was achieved. Additionally, reliance on remote data collection methods, such as phone-based surveys and digital wallet disbursements, introduces risks of measurement error and underrepresentation of households without digital access, although these risks were largely mitigated (Pople *et al.*, 2024).

Finally, some studies focused on narrow or highly specific populations, such as herders in Mongolia (Gros *et al.*, 2020; Mogge, Röckert and Krähnert, 2024) or internally displaced people in South Sudan (Baliki, Bruck and Weiffen, 2024) which, while important, may not be representative of broader populations or rural livelihoods in general.

In terms of intervention implementation, several studies noted challenges related to the logistics and delivery infrastructure for anticipatory transfers. The effectiveness of anticipatory actions hinges on timely disbursement and accurate targeting, which in turn depend on pre-positioned funds, digital delivery systems, and functioning and reasonably reliable early warning triggers. In many settings, these enablers remain underdeveloped or

inconsistently applied. Furthermore, the technological capacity to forecast slow-onset shocks such as droughts remains limited in many low-income contexts. For example, Niger and other Sahelian countries have made less progress in drought monitoring compared to flood early warning systems, resulting in weaker triggers and slower activation of anticipatory support (Pople *et al.*, 2025).

Finally, most evaluations are focused on short-term outcomes, such as food consumption, expenditure patterns, and immediate coping strategies. There is a critical need for studies examining longer-term impacts, including effects on resilience, livelihood diversification, and poverty trajectories. Additionally, none of the studies included in the review reports on gender-differentiated impacts on the role of anticipatory action which could have an important role in designing better interventions. .

5.4 Implications of the results for practice, policy and future research

Evidence shows that well-timed anticipatory cash transfers can enhance food security, protect livelihoods, and psychological well-being. However, maximizing impact and enabling scale-up requires attention to operational, policy, and research priorities.

PRACTICE: TIMING, DELIVERY AND TARGETING

The timing of disbursement is critical. Even small delays can reduce effectiveness, as shown in Nepal where only half of early recipients received transfers before the flood peak (Christian *et al.*, 2025) while faster implementation enhances welfare (Pople *et al.*, 2024). Investing in faster disbursement systems, forecast precision, and pre-positioned infrastructure can increase impact. Delivery mechanisms also need strengthening, particularly through the expansion of digital payment systems, improvements in last-mile infrastructure, and early assessments of market functionality. However, it's equally important to remain realistic about the operational limitations inherent in humanitarian programming. Delays in disbursement are not uncommon, especially when scaling up, and just as anticipatory models include margins of error in forecasting, similar flexibility should be embedded in operational planning (Poole and Clarke, 2024).

Targeting remains a critical yet complex aspect of anticipatory social protection. While anticipatory action often benefits the poorest and most exposed, identifying and registering recipient populations in a timely and accurate manner is challenging. There is ongoing debate in the social protection sector regarding the trade-offs between large-scale, data-driven approaches, such as social registries, which may offer broader coverage but also come with exclusion/inclusion risks, and community-based targeting methods, which can be faster and promote local ownership but face their own limitations (FAO, 2024b). Leveraging digital technologies, including data systems and artificial intelligence, can enhance targeting accuracy, but these tools may be most effective when combined with participatory approaches that foster community engagement, trust, and validation. More comparative research is needed to assess the effectiveness, cost-efficiency, and equity of different targeting strategies in anticipatory contexts. In this context, integrating anticipatory action within national social protection systems presents a major opportunity to enhance both timeliness and reliability. Social protection systems, where sufficiently developed, already contain many of the core delivery mechanisms needed, such as registries, communication platforms, and payment channels, which can be leveraged to deliver anticipatory assistance at scale. This integration not only improves the efficiency and accuracy of targeting, but also helps reduce duplication and reliance on ad hoc or externally funded humanitarian responses. Greater alignment between social protection and anticipatory action enables actors to use forecast and early warning information to reach at-risk populations before a shock, thereby improving both cost-effectiveness and impact. Ultimately, institutionalizing these linkages can promote more sustainable support structures that reinforce national systems and enhance resilience over time (FAO, 2023; Poole and Clarke, 2024).

POLICY AND SYSTEMS INTEGRATION: PRE-ARRANGED FINANCE

Anticipatory action and broader social protection tools should be viewed as complementary components within a resilience-building framework. One-off anticipatory cash transfers can provide critical short-term relief, allowing households to take immediate protective measures before a shock hits. However, these transfers alone are unlikely to generate sustained improvements in resilience. To support longer-term gains, anticipatory assistance should be linked with complementary interventions, such as agricultural inputs, training, social insurance, or livelihoods support, that enable recovery and promote adaptive capacity.

At the same time, pre-arranged financing must be readily accessible to ensure these interventions can be implemented rapidly and effectively. Integrating disaster risk financing with social protection and anticipatory action is essential to bridge the gap between early warning and timely response (Poole and Clarke, 2024). Governments should consider establishing disaster funds, insurance mechanisms, or contingent credit lines that can trigger the swift release of resources when shocks occur. Such arrangements not only enable prompt delivery of anticipatory transfers but also strengthen the overall responsiveness of social protection systems to covariate shocks.

There is growing recognition that while anticipatory action is valuable for mitigating short-term impacts, it should not be overstated as a stand-alone solution for building resilience. Proven instruments, such as inclusive and adaptive social protection, decent jobs, and transformative development interventions, play a more central role in lifting households out of poverty and reducing structural vulnerabilities. Closer integration between social protection, anticipatory action, and pre-arranged financing can ensure that households both build and protect their assets, enhancing resilience to future shocks (Anticipation Hub, 2025; FAO, 2021; Poole and Clarke, 2024).

THE CASE OF SOCIAL CASH TRANSFER PROGRAMME IN MALAWI

For scale, anticipatory action must be embedded in national social protection systems, coordinated across sectors, and supported by reliable financing mechanisms. A strong example of such integration is found in Malawi, where the government, supported by the World Bank, has operationalized anticipatory cash top-ups through the country's flagship Social Cash Transfer Programme (SCTP). This adaptive mechanism enables the scale-up of support to vulnerable households in anticipation of climate shocks, initially prioritizing drought. It also depends on robust delivery infrastructure, such as digital payment systems, to ensure timely disbursement once a trigger is reached (World Bank, 2023).

The mechanism was first activated in 2021/2022, when the Government of Malawi delivered anticipatory assistance to approximately 74,000 households across three districts following a late onset of rainfall that disrupted planting activities. This activation occurred amidst compounding shocks, including cyclones and worsening macroeconomic conditions, that heightened food insecurity. The SCTP scale-up contributed to protecting livelihoods by providing early relief to at-risk households.

Since then, the model has evolved to incorporate parametric sovereign risk insurance through the African Risk Capacity (ARC), further enhancing Malawi's capacity to mobilize resources and manage climate risks. In 2024, the ARC made a US\$3.38 million payout to Malawi after drought conditions triggered the insurance during the 2024/2025 agricultural season (Willard, 2025).

Malawi's experience demonstrates the potential of combining technical preparedness, such as accurate early warning systems and forecast-based triggers, with operational readiness, including clear implementation protocols and financing arrangements. It offers a practical and scalable roadmap for embedding anticipatory action into adaptive and shock-responsive social protection systems, with strong government ownership and cross-sectoral coordination. While this intervention represents one of the most advanced operational examples of anticipatory social protection to date, evidence on its effectiveness and outcomes is not yet available. Generating robust evidence, particularly on household-level resilience and well-being, will be essential to inform future scale-up and replication in other settings.

INFORMING FAO'S ENGAGEMENT IN ANTICIPATORY SOCIAL PROTECTION

Despite the growing body of evidence, important knowledge gaps remain regarding the effectiveness, efficiency, and scalability of anticipatory social protection. Most existing studies emphasize short-term impacts, with limited data on long-term resilience, poverty reduction, or sustained sectoral outcomes. While anticipatory action is primarily designed to mitigate the immediate effects of predictable shocks, its integration within broader social protection systems offers potential for longer-term gains. Evaluations should therefore move beyond the immediate aftermath of shocks to assess how anticipatory measures, when embedded in social protection, contribute to durable improvements in food security, livelihoods, and well-being.

Cost-effectiveness is another critical research frontier. Few studies assess the return on investment of anticipatory action compared to post-shock response or routine assistance. Further research is needed to explore how variations in program design, such as timing, transfer amount, delivery modality, and targeting strategy, affect

cost-efficiency and outcomes. In particular, future studies should disentangle the effects of receiving early information versus liquidity support, and how these interact to influence household behaviour and well-being.

From an FAO perspective, several priority research streams emerge:

- **Complementarity of anticipatory action and early response:** There is limited empirical evidence on the comparative effectiveness of standalone anticipatory action versus integrated models. A promising hypothesis is that a layered response constituted by anticipatory action followed by targeted early response to address residual impacts, can outperform either alone in reducing humanitarian needs and maximizing impact per dollar spent.
- **Timing within the anticipatory window:** Research should assess the optimal timing of assistance delivery, especially for sectoral outcomes like agriculture and food security. For climate hazards such as droughts and floods, key questions include: how early is too early, and more importantly, how late is too late?
- **Type and value of assistance:** Comparative studies should evaluate different assistance modalities (e.g. cash vs. in-kind), transfer sizes, and delivery channels in terms of both effectiveness and cost-efficiency. This will help determine which combinations are most effective in facilitating anticipatory action and reducing negative coping strategies post-shock.
- **Behavioural effects and household preparedness:** More work is needed to understand how anticipatory cash or information influences household-level decision-making before the shock. This includes actions like evacuating, protecting assets, or stocking food. Tracking both short- and longer-term outcomes (e.g. nutritional status, asset recovery, livestock mortality) is essential to assess the broader benefits of anticipatory interventions.
- **Role of social protection registries and data systems:** The effectiveness of anticipatory action depends heavily on accurate and timely targeting and reliability of triggers. Research is needed on the appropriateness of using social protection registries, management information systems, and digital tools to identify and reach at-risk populations, alongside analysis of inclusion/exclusion errors and cost-effectiveness.
- **Operational integration with social protection systems:** There is a need to investigate when and where integration between anticipatory action and social protection is most feasible and impactful. This includes consideration of system design, political economy factors, policy mandates, and financing mechanisms.
- **Scaling challenges and opportunities:** To date, most anticipatory actions pilots remain small (typically supporting 200–2 000 households). Scaling to reach 20 000–100 000 households will introduce new operational and coordination challenges. Research should examine how delivery systems, administrative capacity, and governance models adapt under scale.
- **Financing models and instruments:** Finally, more comparative evidence is needed on the strengths and trade-offs of different disaster risk financing instruments, such as sovereign insurance (e.g. African Risk Capacity), contingent credit lines, catastrophe bonds, climate funds, and domestic public finance. Understanding how these can be combined effectively to fund anticipatory social protection is essential for long-term sustainability.

6. Concluding remarks

This review has consolidated emerging evidence on the effectiveness of anticipatory action, particularly forecast-based cash transfers, in enhancing household resilience to climate-related shocks. Drawing on ten empirical case-studies across Asia and sub-Saharan Africa, and one cost-effectiveness study, the findings reveal a growing recognition of the potential of acting early to mitigate the socioeconomic consequences of covariate shocks.

The impacts of anticipatory action are context-dependent but promising. **Positive effects are most consistently observed for short-term food security, subjective well-being, and asset protection, particularly when interventions are well-timed and targeted to highly exposed households.** Studies in Bangladesh, Nepal, and Niger demonstrate that early assistance can smooth consumption, reduce psychological stress, and enable productive responses such as evacuation, livestock preservation, or livelihood investment. In particular, Bangladesh stands out as a unique case where the high precision of flood forecasting and the concentration of pilot initiatives have contributed to consistently positive outcomes. However, other studies, especially in more complex or resource-scarce settings like South Sudan, report null or heterogeneous effects, underscoring the need for realistic expectations and context-sensitive design.

Despite increasing implementation, **rigorous cost-effectiveness evidence remains limited.** The one available analysis, covering Lesotho, Madagascar, and Mozambique, finds that anticipatory transfers deliver 23 to 28 percent higher returns than equivalent post-shock assistance, reinforcing their value for both humanitarian and fiscal policy.

Several gaps remain. First, the role of targeting, delivery systems, and complementary interventions remains underexplored. Second, there is a notable lack of evidence from Latin America and the Caribbean, where exposure to climate-related shocks is high, especially in the Caribbean, but anticipatory action research remains scarce. Finally, systematic cost data collection and standardized outcome measures are needed to inform scale-up and cross-country comparisons.

These findings have clear implications for policy and practice. As governments and partners seek to strengthen adaptive capacity in agrifood systems, anticipatory social protection aligns directly with the G20 policy basket on integrated programmes for climate and shock resilience. Yet, despite its relevance, anticipatory action remains underrepresented in global climate policy. In practice, international investment in anticipatory action remains minimal: in 2022, global support amounted to roughly USD 50 million, just a fraction of the USD 39 billion in humanitarian aid and USD 390 billion in total development financing (Plitcha and Poole, 2024). On the same note, only a small fraction of NDCs explicitly reference social protection, and even fewer outline mechanisms for forecast-based anticipatory action, early response or pre-arranged financing. This gap limits opportunities for coherence between climate commitments and poverty reduction strategies.

Scaling up anticipatory social protection will require embedding these approaches within national systems, improving risk forecasting, and integrating “cash+” models and pre-arranged financing that link early response to long-term resilience goals. Future research should continue to generate evidence on design, cost-effectiveness, and institutional models that can support broader adoption.

As climate shocks intensify and strain traditional response systems, anticipatory social protection offers a forward-looking tool to support vulnerable populations more efficiently and equitably. Scaling this approach will require stronger integration with national systems, investment in forecasting and digital infrastructure, and a broader research agenda to understand how early action can not only protect, but also transform, livelihoods in the face of climate risk.

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Annex

Table A1. Search strategy

Search block	Terms used
Intervention (anticipatory action)	Social Protection Terms "social protection", "cash transfer*", "safety net*", "social assistance", "income support", "assistance" Anticipatory Action Terms "anticipatory action", "anticipatory", "forecast-based financing", "forecast-based action", "forecast-based", "early action", "early warning early action", "pre-emptive", "ex-ante", "proactive", "climate risk financing", "early response mechanism*", "ex-ante disaster risk reduction"
Hazards/shocks	"climate", "flood", "drought", "shock*", "timing"
Outcomes	adaptive capacit* OR coping strateg* OR resilien* OR household income OR income OR welfare OR well-being OR saving* OR asset* OR "productive asset*" OR "livelihood diversification" OR food consumption OR food security OR "poverty reduction" OR "consumption smoothing" OR "loss mitigation" OR "loss avoidance" OR "risk management" OR "risk coping" OR "disaster preparedness" "livestock", "crop"
Impact/evaluation terms	"impact evaluation", "evaluation", "effectiveness", "outcome", "evidence", "cost-effectiveness", "*experimental", "RCT"
Exclusion terms	"model*", "simulation*", "scenario analysis", "agent-based model*", "climate model*", "predictive model*", "computational model"
Databases	Scopus, Web of Science, ProQuest

Note: RCT = randomized controlled trial.

Source: Author's own elaboration.

Table A2. Studies included in the review

Year	Reference	Country	Initiative studied
2019	Gros, C., Bailey, M., Schwager, S., Hassan, A., Zingg, R., Uddin, M.M., Shahjahan, M. <i>et al.</i> 2019. Household-level effects of providing forecast-based cash in anticipation of extreme weather events: Quasi-experimental evidence from humanitarian interventions in the 2017 floods in Bangladesh. <i>International Journal of Disaster Risk Reduction</i> , 41: 101275. https://doi.org/10.1016/j.ijdrr.2019.101275	Bangladesh	FbF (IFRC)
2022	Gros, C., Easton-Calabria, E., Bailey, M., Dagys, K., De Perez, E.C., Sharavnyambuu, M. & Kruczkiewicz, A. 2022. The effectiveness of forecast-based humanitarian assistance in anticipation of extreme winters: a case study of vulnerable herders in Mongolia. <i>Disasters</i> , 46(1): 95–118. https://doi.org/10.1111/disa.12467	Mongolia	FbF – Mongolia Red Cross Society
2023	Balana, B., Adeyanju, D., Clingain, C., Andam, K.S., De Brauw, A., Yohanna, I., Olarewaju, O. & Schneider, M. 2023. Anticipatory cash transfer for climate resilience: Evidence from northeast Nigeria. NSSP Working Paper 69. Washington, DC, IFPRI (International Food Policy Research Institute). https://doi.org/10.2499/p15738coll2.136812	Nigeria	FbF – IRC and Google
2023	Gros, C., Pronti, A., Sheikh, K., Hassan, A. & Shahjahan, M. 2023. Effects of anticipatory humanitarian cash assistance to households forecasted to experience extreme flooding: evidence from Bangladesh. <i>Hydrology Research</i> , 54(11): 1315–1328. https://doi.org/10.2166/nh.2023.111	Bangladesh	FbF – IFRC, Bangladesh Red Crescent Society, WFP
2024	Baliki, G., Bruck, T. & Weiffen, D. 2024. <i>Impacts of early action support on lives and livelihoods in South Sudan: The Life in Bentiu Study</i> . Buckinghamshire, UK. ISDC (International Security and Development Center). https://isdc.org/publications/impacts-of-early-action-support-on-lives-and-livelihoods-in-south-sudan-the-life-in-bentiu-study-final-impact-report	South Sudan	FbF – CERF
2024	Mogge, L., Röckert, J. & Krähnert, K. 2024. <i>Impacts of Anticipatory Cash Transfers in the Context of Weather Disasters</i> . Ruhr Economic Papers 1065. Essen, Germany, RWI Essen (Leibniz Institute for Economic Research). https://doi.org/10.4419/96973236	Mongolia	FbF – People in Need
2024	Pople, A., Hill, R., Dercon, S. & Brunckhorst, B. 2024. <i>The importance of being early: anticipatory cash transfers for flood-affected households</i> . Oxford, UK, Oxford University Research Archive. https://ora.ox.ac.uk/objects/uuid:12ea16b2-edc0-4af5-8824-132aba4557bd	Bangladesh	FbF (IFRC, Bangladesh Red Crescent Society, WFP)
2025	De Brauw, A. 2025. <i>Cost effectiveness of anticipatory action: Lesotho, Madagascar, and Mozambique</i> . CGIAR Initiative on Fragility, Conflict, and Migration Technical Report. Montpellier, France, CGIAR System Organization. https://hdl.handle.net/10568/173370	Lesotho, Madagascar, Mozambique	Not specified
2025	Pople, A., Premand, P., Dercon, S., Vinez, M. & Brunelin, S. 2025. <i>The earlier the better? Cash transfers for drought response in Niger</i> . Washington, DC, World Bank. http://documents.worldbank.org/curated/en/099739106042542554	Niger	FbF – Government of Niger

Year	Reference	Country	Initiative studied
2025	Christian, P., Dunsch, F., Heirman, J., Kelley, E., Kondylis, F., Lane, G., Waidler, J., et al. Fast action for floods: rct evidence on forecast-based cash transfers from Bangladesh and Nepal. Working Paper 34414. Cambridge, USA, NBER (National Bureau Of Economic Research).	Bangladesh, Nepal	FbAA – WFP

Note: FbF = Forecast Based Finance; IFRC = International Federation of Red Cross and Red Crescent Societies; IRC = International Rescue Committee; WFP = World Food Programme; FbAA = Forecast Based Anticipatory Action; CERF = Central Emergency Response Fund.

Source: Author' own elaboration.

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