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**How can Anticipatory Action Programming Support Women?
Application of the Reach-Benefit-Empower-Transform Framework in Nepal and
Nigeria**

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ABSTRACT

As floods increase in frequency and intensity due to climate change, anticipatory action (AA) programs offer a promising approach to mitigate their impacts. However, there is limited research about how AA programming can address the specific needs of women, who often face heightened vulnerabilities during disasters. This paper applies the Reach, Benefit, Empower, Transform (RBET) framework to examine gender dynamics in AA programming through case studies in Nepal and Nigeria—two flood-prone countries where AA initiatives have been piloted. Using data from key informant interviews and focus group discussions with stakeholders, including government agencies, NGOs, local advocacy groups, and direct beneficiaries of flood programs, we assess barriers and enabling conditions for AA to reach, benefit, and empower women and broader opportunities for transformation of gender norms and social inequalities. Our findings reveal key implementation challenges, including limited funding, weak integration with broader disaster risk reduction efforts, and inadequate early warning systems. However, we also identify practical strategies for improving AA’s gender responsiveness, such as relying on individual rather than household-level data, providing accessible early warning information, offering aid modalities that meet women’s specific needs (such as dignity kits), ensuring women’s participation in community decision-making, and facilitating ongoing inclusive household and community dialogues in flood-prone communities rather than only responding to specific flood warnings. The paper concludes with recommendations for scaling up gender-inclusive AA programming to enhance resilience and reduce the disproportionate impacts of flooding on women.

Keywords: anticipatory action, gender, disaster risk reduction, flood risk, reach–benefit–empower–transform (RBET) framework, Nepal, Nigeria

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ACRONYMS

AA	Anticipatory action
CSO	Civil Society Organizations
EWS	Early warning systems
FGD	Focus group discussion
INGO	International non-governmental organizations
KII	Key informant interview
RBET	Reach, Benefit, Empower, Transform (framework)
RCS	Red Cross Society
UNFPA	United Nations Population Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
WFP	World Food Programme

1. INTRODUCTION

As global temperatures rise, the frequency and severity of natural disasters are increasing (Pörtner et al., 2022; Swinnen et al., 2023). While every country faces a unique profile of natural hazards, floods are among the most damaging to lives and livelihoods, especially in developing countries (Jevrejeva et al., 2018). Recent estimates indicate that 1.81 billion people globally live in locations at high risk of flooding (Rentschler et al., 2022). While floods can be devastating for all, they pose heightened risks for vulnerable communities—especially women and girls (Chowdhury et al., 2021). Floods can limit women’s access to food, reduce dietary diversity, diminish their decision-making power within the household, restrict access to essential services like healthcare, threaten their physical safety, and exacerbate time poverty (Fruttero et al., 2023; Hidrobo et al., 2020; Malapit & Brown, 2023; Nand, 2023).

With improvements in weather and climate forecasting, there is growing interest in taking preemptive actions—such as providing cash transfers, equipment, and medical supplies—in the critical window between a flood forecast and the event itself. These anticipatory actions (AA) aim to prevent damage and protect lives and livelihoods (Anticipation Hub, n.d.; FAO, 2023; World Bank, n.d.). Early evidence suggests that AA can enhance household resilience to floods (e.g., Balana et al., 2023). However, relatively little is known about how to design AA programs that effectively mitigate the effects of flooding for women specifically.

Understanding how to design AA policies and programs that are effective for women is essential given the increasing frequency of floods, their disproportionate impacts on women, and the growing opportunity to intervene early. The “Reach, Benefit, Empower, Transform” (RBET) framework offers a useful lens for evaluating the gender dimensions of AA programs (Johnson et al., 2018; Quisumbing et al., 2023). In this framework, programs that *reach* women include them as beneficiaries, and programs that *benefit* women improve their well-being. However, merely reaching or benefiting women does not ensure that they have agency within programs, or the ability to set and pursue their own goals (Kabeer, 1999). Programs that *empower* women provide them with this strategic decision-making power, and those

that *transform* address harmful gender norms that inhibit equal outcomes. This paper demonstrates how the RBET framework can enhance our understanding of the gendered effects of AA and improve its potential to mitigate the negative impacts of flooding on women.

To do so, we conduct two country case studies on gender dynamics in AA approaches in countries heavily impacted by flooding: Nepal and Nigeria. While Nigeria ranks among the top 10 countries globally in terms of the absolute number of people at high risk of flooding (approximately 39 million), Nepal ranks among the top 10 in terms of the share of population exposed to high flood risk (approximately 22 percent of the population) (Rentschler et al., 2022). Both countries have experimented with AA programming to varying degrees in an effort to mitigate the effects of floods. Examining the successes and challenges of supporting women through AA programming in these contexts is important from both a humanitarian perspective and for providing lessons to other countries expanding their AA efforts.

To inform the case studies, we draw on data from key informant interviews (KIIs) and focus group discussions (FGDs) with government agencies, non-governmental organizations (NGOs), donor agencies, academic institutions, and local advocacy groups. These groups are either directly involved in AA programming or engaged in broader disaster risk reduction efforts. In Nepal, we also interviewed direct beneficiaries of flood relief programs. These interviews and discussions shed light on two key themes for each case study: (1) the current state of AA implementation, including implementation challenges that affect its effectiveness for all flood-affected populations, and (2) the barriers and enabling factors for integrating gender considerations into AA frameworks programs.

In order for AA programming to reach and benefit women, it must first be implemented successfully. We identify four key issues that affect AA implementation. First, stakeholders report inadequate funding for disaster risk reduction programs, including AA, despite extensive damages from recurring flooding. Second, AA programming often operates disconnected from other disaster risk reduction efforts and social programs targeting the same populations, limiting its effectiveness. Many stakeholders perceived that AA targeting—both in terms of which individuals benefit from programs and

which localities are selected—lacked transparency and was potentially politicized, emphasizing the need to integrate AA with other programs and adopt a widely-shared AA framework. Third, early warning systems face major challenges, including late warnings and a lack of public awareness on how to respond effectively after a warning. Finally, rapid deployment of resources is hindered by accessibility issues in areas with recurring floods, and in Nigeria, ongoing conflict in flood-prone areas further limits access.

We designed interview guides using the RBET lens to explore stakeholders' perspectives on the barriers and enabling conditions for AA programming in each country to reach, benefit, and empower women. We also examined the potential for AA to transform social relations and gender norms in ways that enhance women's agency. Applying the framework yields several practical insights. Our research shows that *reaching* women depends on AA targeting that relies on high-quality, individual-level data on vulnerability; inclusive dissemination of information about AA; easy-to-navigate registration processes and support systems (including those utilizing women staff members); and early warnings that are accessible and understandable for women. Stakeholders emphasized that for AA to *benefit* women equally, program operators and designers must consult women on their needs—especially regarding preferred aid modalities, how intra-household decision-making dynamics affect targeting strategies that work for women, and how to mitigate potential unintended consequences, such as intimate partner violence (IPV). Cash transfers as well as dignity kits (supplies to meet women's hygiene needs) are often preferred, but context-specific approaches are essential.

For AA to *empower* women, stakeholders highlighted the importance of involving women in community decision-making and planning processes and building their capacity to influence decisions and prepare for and respond to floods and other shocks. A few *transformative* programs were cited that engage men and other community members to elevate women's roles in community decision-making. Stakeholders noted that program operators can facilitate household- and community-level dialogues on flood preparedness, ensuring women play a prominent role. A key recommendation for scaling up gender-transformative AA is to engage communities in flood-prone areas on an ongoing basis, rather than only in response to a specific flood warning.

This paper makes three key contributions to research and policy. First, it enhances our understanding of the gender dynamics in programs aimed at mitigating the effects of flooding. Women are more likely to suffer disproportionately from disasters if such programs fail to address their specific needs. Second, it adds to the growing literature on AA by assessing how AA addresses women's needs and the broader challenges in implementing AA effectively. While emerging research has begun exploring the effectiveness of AA in reducing flooding impacts at the household level (e.g., Balana et al., 2023), our study offers unique insights from stakeholders on the practical challenges of implementing AA, with a focus on women. These implementation challenges will influence whether AA can be scaled as part of a broader disaster risk reduction strategy. Finally, the paper builds on an important literature that provides frameworks for incorporating gender considerations into the study of policies and programs (Johnson et al., 2018; Quisumbing et al., 2023).

The remainder of the paper is structured as follows. We first present a conceptual overview of AA programming and the RBET framework. Next, we provide background on our two country contexts, including their flood exposure, approaches to disaster risk reduction, and gender norms. We then outline the methodology used in our desk review and fieldwork. The results section is divided into two parts: first, we examine insights into AA implementation, and second, we discuss gender considerations in AA programming. The paper concludes with recommendations to enhance gender considerations in future AA programming.

2. CONCEPTUAL FRAMEWORK FOR GENDER CONSIDERATION IN AA

Although there is growing recognition of the value of gender responsiveness in AA programming and in disaster risk reduction more broadly, there are limited frameworks and tools to help policymakers evaluate how well gender has been integrated into AA. This paper fills this gap by clearly defining AA and by laying out how a well-validated framework for gender consideration in policies and programs (the RBET framework) can illuminate gender consideration in AA.

2.1 Anticipatory Action Programming

Anticipatory actions are proactive measures taken by governments and by national and international non-governmental organizations (NGOs) to reduce the impacts of forecasted hazards, particularly climate-related disasters, before they occur. The nature of these actions varies based on the type of disaster, its location and context, and the available forecasting tools and analyses (Anticipation Hub, n.d.). Examples of these actions include distributing emergency supplies like water purification tablets and mosquito nets ahead of a tropical storm; providing sandbags and shovels in preparation for a flood; or issuing cash transfers or specialized seeds before extreme weather conditions (Anticipation Hub, 2022a). Regardless of the variety and scale of the investments made, most anticipatory action (AA) programs share several key components. The study's conceptual framework identifies four core components of AA programming: forecasting and early warnings, program design, pre-arranged financing, and aid delivery.

- **Forecasting & Early Warnings:** Forecasting and early warning systems (EWS) rely on technology, data, and monitoring to predict potential disasters. Timely dissemination of warnings to at-risk communities and authorities is essential for triggering of AA programs (UNOCHA, n.d.). Early warnings are communicated through various channels, including sirens, text and voice messages, and radio broadcasts (Šakić Trogrlić et al., 2022), with the expectation that stakeholders and communities will take appropriate action in response to these notifications.
- **Program Design:** Program design involves planning the logistics of AA, including identifying what aid is needed, when and how it will be delivered, and who the recipients are. It also includes activities like mapping, community consultations, and training exercises such as disaster simulations.
- **Pre-Arranged Financing:** AA requires funding that is secured in advance. This allows programming to start immediately once a trigger—such as rising water levels in a flood-prone area—is activated (UNOCHA, n.d.).

- **Aid Delivery:** This refers to both the types of aid provided and the methods used for distribution. AA aid often comes in the form of cash vouchers, delivered through bank transfers, door-to-door distribution, or pickup points. It may also include in-kind support like WASH supplies, dignity kits, or food provisions (Balana et al., 2023; Thalheimer et al., 2022), aimed at helping recipients prepare for disasters or relocate if necessary.

2.2 Reach, Benefit, Empower, and Transform Framework

The Reach, Benefit, Empower and Transform (RBET) framework provides a useful lens for analyzing gender dynamics within AA programming. For AA to effectively promote resilience for women, it must address the structural barriers that hinder disaster preparedness and recovery. The RBET framework categorizes programs based on whether they reach women, benefit women, empower women, or transform gender relations within households and communities. Although initially developed to evaluate the empowerment impacts of agricultural development projects (Quisumbing et al., 2023; Quisumbing et al., 2024), we apply it here to the context of AA programming.

RBET links project or program objectives, strategies for achieving those objectives, and indicators to monitor progress (Johnson et al., 2018). The framework is comprised as follows:

- Programs with a **Reach** objective aim to ensure that men and women—regardless of wealth, caste, ethnicity, or life stage—have equal access to program activities. In contexts where gender intersects with other forms of disadvantage, this involves overcoming barriers that women and disadvantaged groups may face in accessing program information or benefits.
- Programs that aim to **Benefit** women focus on improving their well-being. Thus, it is essential that women’s needs and preferences are incorporated into program design.
- Going beyond Reach and Benefit, programs that aim to **Empower** increase women’s agency by strengthening their decision-making power and giving them opportunities to exercise collective action.

- Finally, programs with a **Transform** objective seek to shift gender norms and attitudes on a larger scale. These programs engage both men and women at the community level to address structural inequalities.

2.3 Country selection and study context

This study draws on data from Nepal and Nigeria, two countries with significant flood risk, though their disaster risk reduction and AA landscapes, as well as their cultural and gender norms, differ. Evaluating AA programming in these contexts allows us to identify both common cross-context challenges—applicable to other flood-prone regions—and those unique to each country. In addition to interviews with stakeholders in both capital cities, we conducted interviews in Nepal’s Kailali district, a flood-prone area in Sudurpashchim Province (Anticipation Hub, 2022b). In Nigeria, this study focuses on the northeastern region, where high risk of flooding overlaps with ongoing conflict.¹

In Nigeria, the flood season coincides with harvest season, threatening agricultural production and food security (Akukwe et al., 2018). Significant flooding also causes displacement, as seen in July 2022 when flooding affected 4.4 million people, displacing 2.4 million (UNOCHA, 2023). Flooding is most severe in northeastern states, where conflict complicates disaster preparedness and response. AA has gained traction, with Nigeria adopting an Early Action Protocol for flooding in 2022, aiming to reduce loss of life, assets, livelihoods and risks of sexual exploitation (IFRC, 2022b, 2022a). The Early Action Protocol is one example of cooperation between local and international NGOs to strengthen AA.

Women head only 18.6 percent of households nationally in Nigeria and just 5.7 percent in Nigeria’s northeast (Nigeria National Bureau of Statistics, 2019). Many women depend on their husbands for mobility, with women reporting needing to obtain their husband’s permission to go to the town market, health center, or neighboring towns (Laouan, 2022). In northeastern Nigeria, women face practical difficulties as well as unfavorable gender norms for accessing information, as only 34.2 percent of women aged 31–64 in Nigeria’s northeast region are literate (Nigeria National Bureau of Statistics,

¹ Data were collected in the capital city of Abuja, due to increased security risks related to regional travel in the northeastern region of Nigeria.

2019). The lack of formal education among women may leave them dependent on men for information, which has implications for reaching women both before, during, and after disasters (Blair, 2024).

In Nepal, frequent natural hazards such as floods and landslides are relatively common, driven by the country's steep terrain, remote locations, and heavy monsoon seasons (Rai et al., 2020). In 2021 alone, above-average rainfall resulted in 144 floods in Nepal—60 percent more than in 2020 (Gauchan, 2023). Irregular rainfall outside of monsoon season is also on the rise and may have devastating impacts; unseasonal rainfall in October 2021 affected approximately 5,415 households across 17 districts and displaced 3,385 people (IFRC, 2021). International non-governmental organizations (INGOs) have been leading AA programming for several years in response to Nepal's increasing vulnerabilities to flooding. For instance, The World Food Programme (WFP) has been implementing AA programming since 2015 and the Nepal Red Cross Society (RCS) launched their first AA pilot in 2018 (REAP, 2021). While no federal AA framework exists yet in Nepal, United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) launched an AA framework for flooding in partnership with federal, provincial, and local authorities in 2021 (UNOCHA, 2021).

Woman-headed households in Nepal are relatively uncommon, at 32.4 percent, but increasing male migration has shifted more women into these roles (Dahal et al., 2022; Prasain, 2023). While 52 percent of women earners can independently decide how to use their earnings, this autonomy varies significantly by caste and ethnicity, with Dalit and ethnic minority women often experiencing greater freedom compared to higher caste women (CARE, 2015). Around 26 percent of women in Nepal are not able to read and write, posing challenges in disaster preparedness and response (Ministry of Health and Population, 2023).

3. METHODS

3.1 Data collection

This paper relies on data from a combination of key informant interviews (KIIs) and focus group discussions (FGDs). Study participants include stakeholders from government agencies, international NGOs, international governmental organizations (IGOs), donor agencies, academic institutions, and local

advocacy groups that are relevant to disaster risk reduction (DRR) broadly and women's empowerment in each country. When possible, we aimed to sample organizations led by women or that play a prominent role in advocating for women's needs and priorities. In both Nepal and Nigeria, the majority of the KIIs and FGDs were conducted in the capital cities, where the relevant organizations are often headquartered within the country. However, in Nepal, we additionally conducted KIIs and FGDs with both households and front-line service providers of flood-related aid in the Kailali district of Sudurpashchim Province, an area at high risk of recurrent floods which has been piloting AA programming—a central form of DRR (Karki, 2022). Our primary interest was in AA, though we found that many organizations either considered their mission broader than only AA or had a focus well-aligned with AA but did not use that term. As a result, when we reached out to organizations to participate, we focused on DRR as a 'universally understood' term. We identified potential participants through a review of existing AA and DRR literature and a review of the landscape of relevant organizations and agencies. In Nepal, beneficiaries that had received flood-related aid were also recruited for participation in focus groups in consultation with local officials.

In total, we conducted 37 group and individual KIIs: 15 in Nepal and 22 in Nigeria. In Nepal, 4 KIIs were with government representatives, 1 with a donor agency (coded as an IGO), 1 with a researcher, 4 with INGOs, 3 with IGOs, and 2 with local NGOs and advocacy groups. In Nigeria, 3 KIIs were with government representatives, 1 with a donor agency, 1 with a researcher, 3 with INGOs, 8 with IGOs, and 6 with local NGOs and advocacy groups. Semi-structured question guides were developed to explore themes such as the AA framework, the role of women and other marginalized communities in AA programming, monitoring and evaluation, and the sustainability of current AA frameworks. The guides were pre-tested to ensure that they were well understood.² Each interview lasted between one and two hours and was conducted either in-person or virtually, depending on participant availability.

² Cognitive pre-testing is a method which allows researchers to determine whether the intended meaning of a question is understood as intended among the target population (Willis & Miller, 2011).

For the FGDs, we targeted civil society organizations (CSOs) and local advocacy groups, and in Nepal, post-flood aid beneficiaries as well. In Nepal, we conducted one FGD for CSOs—ensuring to include local CSOs led by women—and two sex-segregated FGDs with beneficiaries (one with women and one with men). In Nigeria, we conducted one FGD with CSOs working in disaster risk reduction and preparedness and one with CSOs specifically led by women or those with a focus on women’s rights and empowerment.³ In total, we held 5 FGDs: 2 in Nigeria and 3 in Nepal. The FGD guides were semi-structured and tailored to different groups—disaster risk reduction CSOs, CSOs led by women, and aid beneficiaries—focusing on topics such as AA aid, early warning systems, gender vulnerabilities, intra-household gender dynamics, and critical needs related to flooding. As with KIIs, these guides were pre-tested by local collaborators. Each FGD was conducted in-person with between five to nine participants and lasted two to three hours. In Nepal, researchers from the Integrated Institute for Development Studies translated question guides from English to Nepali when needed; all interviews were conducted in English in Nigeria. Verbal consent was obtained from all participants prior to beginning their KIIs or FGDs. Separate consent was obtained to record interviews using a transcription software, though 15 participants of the total 110 interview and focus group participants did not provide consent to these recordings, and therefore were not recorded.⁴

3.2 Analysis

Fieldnotes and, where available, verbatim transcriptions were collected in individual word documents separated by each KII and FGD. The data collected in these documents were then coded using a combination of deductive and inductive approaches prior to analysis. Deductive codes were collectively developed based on the research questions, interview guides, and a review of relevant literature. Following selection of our deductive codes, we each coded a sub-set of 3 KIIs and or FGDs (9 total) from both countries using these deductive codes while reflecting on potential inductive codes. After this initial round of coding, we developed inductive codes to be incorporated for the full analysis. Each KII and FGD

³ Due to security concerns in Nigeria, we were unable to conduct FGDs with post-flood aid beneficiaries.

⁴ Ethical approval of this study was provided by the George Washington Institutional Review Board.

document underwent two initial rounds of coding by different members of the research team, one from each country team. A third researcher then reviewed both rounds of initial coding to ensure accuracy and consistency in the application of the codebook. This researcher selected and entered the final codes for each KII and FGD into an excel document for further analysis. The deductive and inductive codes used for analysis are provided in Appendix I. The results presented in this paper are based on a thematic analysis, which seeks to identify and analyze patterns within a dataset (Braun & Clarke, 2006).

3.3 Positionality statement

The members of the research team who designed the question guides, led the KIIs and FGDs, and analyzed the data were all based in the United States at the time of data collection. The members of the research team who conducted data collection and completed the analysis did not have prior experience in either Nepal or Nigeria, although other members of the research team have fieldwork and research experience in both countries and guided the development of the interview guides and interpretation of results. The researchers conducting the KIIs and FGDs were all women, which may have helped establish rapport with female respondents—particularly when discussing sensitive topics (e.g., menstruation management in post-flooding contexts). Likewise, within each country, the research team collaborated with a male local researcher, which may have facilitated rapport when engaging with men stakeholders. Further, the local researchers were from well-known and respected research institutes, which may have heightened the study’s credibility among respondents. Regarding interpretation during data collection and analysis, while some Nepalese respondents were able to speak English, others required translation, which may have altered the delivery and understanding of the KIIs and FGDs in Nepal. In both countries, feedback from local researchers on interpretation of interview responses provided essential nuance on local context to help minimize the influence of our own perspectives.

4. RESULTS

Although the theory of change behind AA programming—providing support when a disaster is forecasted to mitigate its worst effects—was not originally designed with the RBET framework in mind, it offers a valuable lens for assessing the potential impacts of AA programs on women. To date, RBET

has primarily been applied to established programs with clear gender equality objectives (e.g., Quisumbing et al., 2023), whereas AA programming differs in that it is relatively new and often lacks explicit gender objectives. The novelty of AA presents both constraints and opportunities for achieving transformative gender-related outcomes. In other applications of RBET, “reach” typically focuses on targeting women specifically, rather than just households; however, AA programming has implementation challenges that must be addressed to ensure it reaches entire communities and households, not just women within them. These issues emerged frequently in our interviews, and we discussed them before applying the RBET framework. Nonetheless, the newness of AA programming also represents an opportunity—unlike legacy programs with established beneficiaries and objectives, AA programs have the potential to adopt ambitious gender goals from the outset.

4.1 Implementation challenges

Overcoming implementation challenges are critical to the success of AA programming, as they affect whether entire communities—and the women within them—are reached. When access is limited or rationed, and women are disproportionately impacted by disasters, these challenges exacerbate gender gaps. In both countries, 48 respondents representing civil society, federal and local government, and donors and INGOs, as well as participants in FGDs with beneficiaries in Nepal, cited various challenges with implementing AA programs that aim to mitigate flood damage. Both Nepal and Nigeria have weak policy implementation capacity, particularly in rural areas (Kyle & Resnick, 2019; Ragasa et al., 2024), so it is not surprising that interviewees in each country context cited policy implementation generally as a key constraint. Specific key challenges included: (1) insufficient resources toward disaster risk reduction and AA specifically; (2) difficulties in selecting beneficiaries; (3) inaccuracy of flood and other disaster forecasting and underdeveloped EWS; and (4) inability to deploy flood response sufficiently quickly.

First, interviewees in both countries noted the discrepancy between the frequency of flooding, the extensive damage caused by recurring flooding, and the overall lack of emphasis within government on prevention. One civil society leader in Nigeria framed this issue succinctly: “When we know that these things happen every year, why is the government not putting a precautionary measure to stop that

flooding from happening?” In Nepal, an interviewee from an INGO cited frustration with all of the efforts put into planning for AA without resources to implement the plans: “The biggest challenge for AA is that we develop these plans, but we never have funding.” Respondents in both countries noted that for AA specifically, both governmental policymakers and INGOs were concerned about tying up limited funding in AA programming, which might be wasted if a disaster does not occur. Several respondents noted that cost-benefit analysis might help cut through some of these concerns and strengthen political will to invest in AA.

Beyond funding, our findings also point to low effort and resources put into the type of coordination needed to make AA programming work in practice. The majority of interviewees in both countries raised that coordination failures abound between both high-level stakeholders that finance different AA pilots and between AA stakeholders at the national level and frontline staff. Respondents in both Nigeria and Nepal speculated that the novelty of AA and the lack of a widely agreed-upon definition or understanding of how to integrate it into existing disaster management frameworks made communication more difficult. Even among INGO interviewees in our sample, we saw disagreement between respondents in how they conceived of AA: while an interviewee from one INGO viewed disaster preparedness as integral and connected to AA programming, an interviewee from another INGO noted that disaster preparedness and AA should operate on separate tracks due to the differences in the programming content, targeting, and funding mechanisms. Weak coordination and a lack of an agreed-upon definition for AA can mean that responsibilities and authorities of different stakeholders are unclear and introduces inefficiencies.

Second, both stakeholders and beneficiaries highlighted challenges in targeting prospective aid recipients, such as differing selection criteria across different areas, politicization of the selection process, and disputes between community members following aid delivery. Representatives from civil society organizations in both countries mentioned that targeting criteria are often not disclosed to implementing partners or communities, leading to confusion and mistrust. In Nigeria, two stakeholders explained that beneficiary selection is being politicized, with specific geographic locations prioritized over others for

reasons other than flood risk. Moreover, some beneficiaries noted that conflict arises in their communities when only some individuals receive aid. The lack of transparency and perceived bias in aid targeting not only reduces its effectiveness but also undermines trust in the actors involved and weakens social cohesion—particularly between beneficiaries and non-beneficiaries (Kosec & Mo, 2024).

Third, inaccurate flood forecasting presents significant challenges to launching AA programs. Respondents in both countries expressed concern about the tight distribution window between flood forecasts and actual flooding, causing prepositioned materials to potentially arrive too late. Moreover, flooding forecasts are not always accurate, leading to aid being delivered to communities that are ultimately unaffected by the forecasted flood and, conversely, not being delivered to communities that are affected. As a respondent in Nepal explained, “Sometimes you anticipate [a] flood in a particular area and provide support to people, but if you support, then those people who get support don’t get a flood. And those who didn’t get support, get [the] flood.” Even when populations are reached by EWS, more often than not, an early warning does not come with support to prepare for or recover from a flood.

The rate of inaccurate forecasts can also affect how individuals respond when they do hear early warnings. Respondents in both countries also shared that when early warnings are very frequent—as can happen in flood-prone communities—and if floods sometimes do not follow after an early warning signal, then communities sometimes start ignoring the early warnings over time. All these concerns can be summed up by a quote from an NGO implementer in Nigeria who said, “Will the triggers be accurate? Will it come too early? Will it come too late? You know, will we be able to respond?”

Fourth, remoteness and inaccessibility complicate flood-prone communities’ access to AA. A governmental representative in Nigeria described the logistical difficulties: “We have logistical challenges. We have electricity challenges. We have connectivity issues. We have road infrastructure that are [in] hard-to-reach areas.” In Nigeria, conflict exacerbates the difficulty of access issues to flood-prone communities. AA implementing organizations fear for their own security working in many of Nigeria’s flood-prone localities, and relief materials can be damaged or stolen in transit or while being stored in warehouses to be deployed in case of flooding. Remoteness also creates logistical issues for accessing AA

benefits for targeted groups, even if AA is deployed as envisaged. Aid beneficiaries in Nepal shared their frustrations with aid delivery, noting that the cost of traveling to access their bank accounts exceeded the value of the aid itself. Similarly, aid disbursed via store credits was often difficult to access due to long travel times and high costs at stores during floods. Although these examples cited were from aid intended to support recovery from floods, these problems could be greater in the AA context, where the window between credit disbursement and flooding is even smaller and households are hard-pressed to incur logistical costs to access support.

4.2 Reach

Beyond these broad implementation challenges that AA programs face, reaching women through AA programming, as with other types of aid, relies on high-quality data on vulnerable groups, individual-level rather than household-level identification of beneficiaries, inclusive information dissemination across multiple modalities, and aid registration processes and modalities that are easily accessible for women.

4.2.1 Identification of beneficiaries

We found broad support among stakeholders for prioritizing women and other vulnerable populations in AA programming, with a predominance of the stakeholders we interviewed highlighting its importance. Several stakeholders also specifically highlighted prioritizing girls and other youth, people living with disabilities, elderly women, pregnant women, and single women as vulnerable groups to prioritize in their programming. Beyond prioritization, organizations are using various tools to plan for vulnerable populations, including government social protection records, socioeconomic data, flood history, social registers, and vulnerability indices. For example, six government and NGO respondents from both countries mentioned using preexisting databases, rapid surveys, and risk assessments to develop informed action plans to ascertain the specific risks and disaster impacts that women face and to design programs around this analysis.

Yet, relying on existing databases and records has drawbacks for reaching women and other vulnerable populations as beneficiaries. Many of these existing databases identify households rather than

individuals. Respondents in both countries, across a variety of stakeholder groups (including aid beneficiaries), noted that this can limit the reach of programs to women as men, as household heads, implicitly become the primary recipients of aid. As a female respondent from a civil society organization in Nigeria noted, “If you give [aid] to the men, the ... men take the money for themselves. The women should be the recipients.” While it is impossible to know how men and women in any given household would distribute resources (and it is important not to make generalizations), this concern does highlight that men and women may have different objectives which may not be met when households rather than individuals are targeted. One CSO respondent in Nepal shared similar concerns related to aid reaching women: “In [a] patriarchal society, [the] head of household is male, so when you go to [an] area with relief materials, [the] name of [the] household comes under men. It could be food items or cash, but we give it to them [the male household head]. Women are not taken into consideration as [a] primary recipient.” This issue is exacerbated in societies with restrictive gender norms around access to resources within the household, where aid distribution defaults to male household heads, excluding women from decision-making roles.

High-quality, individual-level data is also needed on other dimensions of vulnerability to improve targeting for women. Although stakeholders in both Nepal and Nigeria target women and people with disabilities in their existing AA efforts, some marginalized groups such as low-caste, ethnic minority, widows, and LGBTQI+ people, are often still left out. Across all our interviews in both Nepal and Nigeria, few interviewees referenced targeting efforts based on caste, ethnicity, widowhood, or LGBTQI+ status. One INGO representative in Nepal noted that even when efforts are made to reach low caste populations (Dalits), “there are other groups even within Dalits like Badi and Chamar. They are never addressed properly.” Stakeholders note that relying on government lists—which sometimes exclude certain populations—can make it more difficult to reach socially marginalized populations. In Nepal, for example, one INGO interviewee shared that, in their experience, the Nepalese government is reluctant to gather or utilize data on ethnicity because it is politically sensitive. In practice, this means that women from marginalized groups may be more likely to be excluded from receiving AA. This exclusion may be a

result of the costs of reaching unbanked, socially marginalized, less literate, or more geographically remote groups, but tends to undermine the inclusivity of AA.

4.2.2 Inclusive information dissemination across multiple modalities

While the overall issues with EWS—such as accuracy and timing of warnings—are relevant for all populations, our interviews emphasized that even accurate and well-timed early warnings sometimes do not reach women and other vulnerable populations. EWS programming often relies on technology like mobile phones, which women are less likely to own. Numerous respondents across both countries representing nearly all stakeholder groups noted that men are more likely to receive EWS messaging than women and that EWS are sometimes too technical for rural women to understand. One Nepalese NGO respondent highlighted that mobile phone ownership is more common among men and that women may not receive critical information if men are away:

“Mobile [phone] ownership is usually male over female which doesn’t make sense for women. [A man] might go out and receive info and not communicate to [his] female counterpart. She may be affected then during [the] rainy season. [There is] no one to help her or for her to seek help from.”

Our FGDs with women aid beneficiaries in Nepal confirmed this, as only one woman had their own phone and another woman shared one with her husband, while all male beneficiary participants indicated owning a phone. The asymmetry in access to technology is a growing challenge in Nepal, as many men migrate to India for work, taking their mobile phones with them, ultimately blocking the flow of AA information to women and other vulnerable household members.

Even when EWS reach individuals, stakeholders in both countries noted that some vulnerable communities do not understand the warnings they receive (e.g., because the individuals are illiterate or because the language is overly technical) and are therefore unable to act upon them. Beneficiaries in Nepal also noted that EWSs often come too late or at inconvenient times (e.g., middle of the night) to be helpful. Individuals living with disabilities or with low literacy levels face specific challenges in accessing and interpreting messages. Audio-based messages could make messages more accessible for those with low literacy and vision-related disabilities, yet these do not work for those living with deafness. As the leader of a civil society organization in Nigeria highlighted:

“A deaf person has to go along with a sign language interpreter who tells him the situation of things in town. And now imagine...there’s a news on the television, on radio and all that, about flooding issues. He or she may not be able to catch up on these things [flooding] that have been there.”

We did find examples of organizations in both countries also using multiple media modalities to improve the reach of early warnings to women, including mobile phones, radios, posters, dramas, and social media. In Nigeria, a governmental respondent mentioned the use of dramatized awareness campaigns to disseminate disaster related information in communities with low literacy rates. They also distribute informational leaflets printed on cloth rather than paper to prevent them from being destroyed. In Nepal, NGOs have incorporated sign language, braille script, and audio messages to ensure that AA-related information reaches deaf individuals. Each of these are promising approaches to overcome barriers in access to information for women and other marginalized groups.

Even when early warnings reach individuals successfully, our interviews revealed that it is equally important to disseminate information accessibly about what to do once an early warning signal has been issued and to navigate potentially different ideas and preferences between men and women around early warning response. In a FGD of stakeholders in Nigeria, one man remarked that in the northeast region, women living in flood-prone communities are more likely to want to evacuate in advance of a flood but may be unable because they rely on the men in households, who are determined to stay put. An NGO representative in Nepal said, “We thought if we give [the] message, people start moving. But they waited at their households. We struggled a lot to convince them. We found a lot of people waiting for [the] flood to enter their house before leaving.” Widely disseminating information about what to do after an early warning—and when to do it—could help to improve the utility of early warning signals for mitigating the impacts of flooding.

4.2.3 Accessible registration processes and distribution methods

In addition to establishing high-quality, individual-level targeting and accessible EWS, for AA to reach women, both the registration processes for AA programming and the modalities of AA support must include women and cover their needs. Social norms and caregiving responsibilities limit women’s ability to attend informational campaigns and training simulations as well as their ability to travel to aid

distribution points. A Nigerian respondent from a civil society organization shared that “there are some communities where women cannot work at the town hall where the information is being given.” Another respondent from a civil society organization in Nepal noted that “it is hard for women to travel to simulation exercises because they have to get back early to get kids from school. So, it is hard for them to participate.” Ultimately, this limits the reach of these activities to community members with more free time—often men. Similarly, an INGO respondent in Nigeria stated that:

“While men are more free, even young boys, to go out and travel and get information from their peers, women are most of the time sitting at home. Since they stay home, they may not have access to public information. As such, they might not be as informed as their male counterparts or even as the male children.”

Stakeholders in both countries emphasized the value of community volunteers in conducting risk assessments, identifying aid recipients, and engaging with them through registration processes. Including women as volunteers is beneficial for ensuring that AA programs effectively reach female beneficiaries. Women volunteers often have unique insights into the specific needs of female beneficiaries. In Nepal, for instance, local health workers collect and maintain data on pregnant and single women, ensuring these groups are not overlooked in flood response. Additionally, the gender of volunteers is particularly important in contexts such as Nepal and Nigeria where social norms discourage interactions between men and women. A respondent from the Nepal Red Cross Society also shared that female health volunteers help to identify spaces where women and other target populations gather, allowing Red Cross staff to know where specifically to reach women. These approaches help ensure populations excluded from pre-existing registers and social protection systems (which may be biased toward male heads of household, for example) are captured in AA programming. A representative from United Nations Population Fund (UNFPA) in Nepal summarized this overall approach well:

“We work closely with partners like the [Nepal Red Cross Society] who mobilize [Red Cross] volunteers from the community level including women in the registration process. After the readiness trigger we have also provision to mobilize female community health volunteers ... women know the local citizens and contexts and [gender-based violence] cases also.”

Another barrier aid reaching women can be access to bank accounts. Women and other vulnerable groups are less likely to have an account in their name compared to men—a concern shared by

stakeholders in Nigeria and Nepal, as well as aid beneficiaries in Nepal. One CSO respondent in Nepal noted that, “People with disabilities don’t have bank accounts and even if they have bank accounts, there are other issues. [A] blind person goes to the bank, but the staff doesn’t trust them, and [the] bank doesn’t have support staff. People with disabilities don’t have a disability card or a citizenship card.” However, solutions are available, including the services the WFP provides in preparation for supplying individuals with anticipatory cash transfers in Nigeria. The organization found that financial inclusion is severely limited for women and subsequently contracted with a financial service provider to ensure targeted populations are pre-registered and have existing access to banking services. Overcoming barriers to opening and operating a bank account in a woman’s name, or otherwise not requiring bank accounts to receive AA aid, may facilitate aid reaching women and other vulnerable groups.

4.3 Benefit

For AA to benefit women in flood-prone areas, it must meaningfully improve their welfare. For example, is the type of aid received valuable for the disaster in question? Does it arrive when individuals need it? Is it distributed in such a way that women members of households can use it? And does it include goods that women value?

4.3.1 Ensuring aid modalities that address women’s needs in flood-prone areas

The type and form of delivery of aid are important factors that determines whether aid ultimately benefits women. AA programming typically distributes aid as cash or vouchers as these forms are perceived as very flexible, though may also provide in-kind aid (e.g., drought-resistant seeds, or dignity kits—which contain essential hygiene-related items and often include menstrual hygiene products). Yet, some of these aid types benefit women more than others. Women aid recipients in Nepal indicated that cash-based assistance has advantages because it is more flexible and grants them the autonomy to choose how they would like to allocate their resources. A representative of an implementing NGO in Nigeria recounted reasons for using cash and voucher assistance for programming:

“I think one of the reasons is because of the flexibility it provides. Because you know, sometimes you do your assessments, and you see this is what the household needs...And you go and procure, let's say [non-food items] or food items, but maybe the household

would rather have millet than spaghetti. So, if you use cash voucher systems, it provides more flexibility, especially multi-purpose cash voucher systems. So we're looking at it more in terms of giving the people more choices than being restrictive in the services we're providing.”

The same NGO representative further emphasized that cash provides dignity to all recipients, and especially to women, because it allows women to discreetly select the services and goods (e.g., menstrual hygiene management products, or children’s clothing and health items) that they prioritize. While cash-based assistance may provide flexibility to beneficiaries, it also runs the risk of being controlled primarily by men—particularly in contexts that favor men’s control over financial decision-making. In such settings, providing additional in-kind transfers that directly benefit women, such as dignity kits and menstrual hygiene management products, may be necessary to ensure that women benefit from transfers intended to support them and to ensure that women’s needs are addressed—a point flagged by stakeholders in both countries. In the FGD with women beneficiaries in Nepal, participants detailed the types of AA aid that would be most welcome, including medicine, clothing for children, and sanitary pads. Conversely, the men beneficiaries mostly cited a desire for items that would provide utility during a flood, including raincoats, long boots, tents, ropes, lifejackets, microphones, and a boat for evacuation.

Beyond aid type, it is additionally necessary to ensure that aid is distributed in sufficient amounts and in the right ‘mix’ to meet women’s unique needs. Both a woman respondent in Nigeria and a member of the mixed-gender civil society focus group in Nepal indicated that food aid, both in terms of AA and post-disaster aid, is often insufficient to meet women’s unique nutritional needs during adolescence, pregnancy, and lactation. This finding is applicable in both pre- and post-disaster settings. An INGO representative in Nigeria said, “If you see 10,000 women are affected, and you think they just need food, this isn’t always correct. 5,000 [of them] might be adolescent girls that have just started menstruating. The food in the market might not meet the nutritional needs of an adolescent that just started menstruating.” To benefit women, AA programming should assess individual-specific needs of the affected population (which entails collecting high-quality, gender-disaggregated data) and ensure that the form, quantity, and delivery mechanisms of AA are likely to meet these needs.

Meeting all need is often impossible in a highly resource-constrained setting, but even in such settings, the aid ‘mix’ (e.g. the distribution of resources across cash, in-kind transfers, and trainings) can be tailored to prioritize women’s needs—including those of adolescents, pregnant women, and lactating women. For example, in a recent survey in Mali on preferences around aid to support crisis response, Bleck et al. (2024) find that when holding budget amount fixed, women’s group representatives prefer different distributions of aid between cash, food, trainings, and equipment and a different balance between pre-crisis investments in AA and post-crisis humanitarian response compared to other (male) community leaders.

Beyond the form of aid, distribution dynamics also matter. Distributing aid, whether cash or in-kind, in-person and directly to the intended recipients may enhance the benefit of aid for women in some instances. Aid that is delivered door-to-door eliminates mobility concerns for women beneficiaries who may be confined to their homes. The use of cash—if delivered in person—also removes the need for access to a bank account.

4.3.2 Navigating intra-household decision-making

In addition, interview participants in Nigeria in particular raised unequal intra-household and intra-community gender dynamics as a constraint that inhibits the ability of AA aid to benefit women. Even when women are prioritized as direct recipients of aid, they may not retain control over aid received because men often control household resources and financial decision-making. As one woman from a civil society organization in Nigeria explained, women who receive aid may go home and give it to their husbands, whether voluntarily or involuntarily. Similarly, a man respondent from an implementing organization in Nigeria said that when men have control over aid allocation within the home, “some of the money may not go directly to the family.” In contrast, the implementer flagged that when women retain control over aid, they will “directly [channel] it...for household use.”

Despite being *reached* by AA (i.e., having some member of their family or themselves receive it), women and girls may thus not benefit from the aid due to norms regarding men’s control over resources within the household, and differing preferences across gender regarding how aid is to be used.

Stakeholders in Nepal raised intra-household dynamics far less, though this could represent lower attention to these issues in this context rather than more egalitarian distribution of resources within households. High-quality individual data on who is benefiting from which types of AA distribution would help implementing organizations navigate these dynamics across contexts, even if stakeholders don't raise them directly. However, there is variation in the experience for women heads of households. Both a representative of a women-led organization in Nigeria and a woman beneficiary in Nepal noted how women heads of household have greater control over how aid is distributed within the home, therefore increasing the likelihood that they and other women in the household benefit from the aid.

4.3.3 Mitigating risks of gender-based violence

Finally, a key condition to ensure that AA benefits women is that women do not face undue risk or harm because of aid distribution. For example, women aid recipients may also face higher risk of gender-based violence because their access to AA resources violates intrahousehold gender norms in which the male head of household expects to manage all resources that come into and out of the home. Respondents from Nigeria said that delivering aid directly to women, whether it be in a pre- or post-disaster setting, may increase feelings of jealousy amongst men, therefore increasing women's risk of gender-based violence. Thus, delivery modalities prioritizing women may inadvertently backfire, and increase their risk of harm. AA programming that relies on gender transformative strategies to promote egalitarian resource sharing within households may be an approach to mitigate the risk of gender-based violence among women AA beneficiaries.

4.4 Empower

Enhancing women's agency in AA programming by including them in program design and conducting empowerment trainings for women and girls, may create pathways to empowerment for women through AA programming. Frameworks for women's empowerment within policies and programs emphasize both the inclusion of the voices of women within discussions and deliberations on program design, as well as visible leadership by women in groups leading those deliberations (e.g., Ragasa et al.

2022). This emphasis was echoed in our interviews in both countries. Stakeholders described the importance of including women directly in the design of AA programs and building the capacity of women and girls to predict and prepare for floods independently.

4.4.1 Women's inclusion in program design

Women can be included in the design process of AA programs in several ways. For instance, a representative from an INGO in Nigeria shared that her agency “brings [women] together as a group and then supports [them]...to see that they contribute to the conversation or designing the needs and how these needs will be met in terms of the kinds of actions [our organization] is taking.” In both countries, respondents identified community disaster management committees, which decide on community responses to disasters before and after they occur, as potential avenues for women's empowerment. While some committees already include women, respondents stressed the need for further advocacy to bolster women's active and genuine participation. A representative from a women-led organization in Nigeria, for example, recounted her experience advocating for women's representation in one community's leadership:

“When we got to the community, it was all men, and we said there are no women in this community. It means women cannot be part of leadership. I mean...it is actually something that got us worried. And before the conversation ended, we had two women on board to be part of the leadership of that community.”

Overt actions by program implementers to include women, as well as encouragements to local leaders, can be powerful ways to shift governance structures to support women's empowerment within AA programming.

Beyond simply including women, improving the *quality* of women's participation in decision-making processes related to AA is essential for their empowerment. Attitudes of aid workers (which can sometimes reinforce unfavorable gender norms), an unwillingness to engage women in strategic decision-making, and gender norms that discourage women's participation outside the home all serve as barriers. We observed how the attitudes of those designing the programs could affect how women are engaged on the ground, reflected in the comments of a female government representative in Nepal, who remarked,

“We are not mobilizing women or affected persons. They are waiting to receive stuff ... They are not empowered to own by themselves and during the flood they just accept foreign assistance.” This comment depicts women as passive recipients of aid rather than as mobilized and empowered individuals playing an active role in shaping aid.

Our findings also indicate that, despite some organizations’ efforts to promote women’s voices in AA interventions, these attempts are often unsuccessful due to prevailing gender norms. In Nepal, a respondent in a group interview indicated that women’s participation in community disaster committees is hindered by norms that position men as the primary decision-makers in a household. A male respondent from an INGO in Nepal said, “Nepal is male dominated. We request women to participate, but they say, ‘no that is the responsibility of my husband.’ Women and children are not actually participating in AA capacity building.” Similarly, a woman representative of a donor organization in Nigeria said that even when women are present during program design consultations, they may refrain from contributing to discussions if men are present.

4.4.2 Adding empowerment trainings onto AA programming

Trainings that provide women with specific skills relevant to disaster preparedness, that improve women’s advocacy skills for influencing community decision-making, and that engage men and other community members are often key to achieving a program’s ‘empowerment’ objectives (Adida et al., 2023; Kosec et al., 2023; A. Quisumbing et al., 2023). These ideas came up in our interviews, when stakeholders reflected upon how to better position women to shape AA programs. A civil society interview participant in Nigeria specifically mentioned training women and girls to monitor changes in environmental conditions that predict an imminent flood. Equipping women with the knowledge to monitor flood indicators effectively and independently may enable them to take greater control over their own safety during high-risk seasons. Technical programs can also teach women how to fashion their own relief materials from local resources, reducing reliance on external aid and improving their ability to utilize in-kind AA support like flood-tolerant seeds. However, more research is needed to assess whether these types of programs enhance women’s decision-making in AA programming.

Relevant trainings could alternatively focus on equipping women with the skills necessary to advocate for their inclusion in decision-making committees and for their ideas and preferences to carry weight within community deliberations. For example, trainings could equip women with information on the mandates and roles of disaster preparedness committees, how to make persuasive arguments within them, and how to draw on their existing social networks and sources of social capital to influence decision-makers. Ongoing studies in India and Nigeria test approaches to increase women's participation and advocacy skills within community decision-making (Adida et al., 2023; Kosec et al., 2023); similar approaches could be attempted and tested within the context of disaster preparedness and response.

4.5 Transform

Facilitating women's empowerment may require shifts in the mindsets of aid workers, as well as in the attitudes of women themselves, men, entire families, and community leaders. To foster these shifts, employing gender-transformative approaches that engage men and challenge restrictive gender norms is key for conducive environment for women's decision-making. There is some evidence that well-designed, gender-responsive AA slowly are slowly reshaping harmful gender norms within intervention communities. These gender transformative strategies include engaging men and boys in community sensitization sessions around AA and facilitating women's participation in strategic decision-making processes over the long-term. This sustained and inclusive approach promotes the acceptance of women as active participants in community responses to disasters. Over time, it helps community members begin to view women as integral to preparing for and mitigating the effects of disasters and see that their exclusion from decision-making around AA could be detrimental to families and communities.

One promising approach to encourage gender-transformative AA programming involves engaging men and boys in discussions about changing household norms around resources. Speaking about his organization's cash distribution program, one NGO respondent in Nepal explained,

“We have a component within our program called household dialogue. It brings in two different counterparts from within the household and tries to make sure there is an enabling environment within the household for the woman to take part in different extracurricular activities, engage in [tasks] other than household activities, and for the

other counterpart to support the woman in household chores, in decision-making, and sitting at the table.”

As implementing organizations experiment with community sensitization to shift gendered roles and responsibilities within participating households, more feedback from aid recipients is necessary to determine if these approaches are having the desired effect.

Respondents also recommended engaging community leaders, who are mostly men, to catalyze change. A representative from a disaster risk reduction organization in Nigeria recounted a personal experience of working with the local “custodian of the Islamic laws” to promote women’s education. This engagement, according to him, secured buy-in from the wider community for women’s involvement in community decision-making roles. As more women participate in community-level decision-making, an interviewee from an INGO in Nepal observed that communities become more accepting of women’s involvement in decision-making. Specifically, the individual noted that her organization’s previous AA advocacy efforts—designed to support and include women—led to transformation of gender roles over time.

5. RECOMMENDATIONS AND CONCLUSIONS

Both Nepal and Nigeria are in the early stages of implementing AA. At the governmental level, we found that ministries are understandably more focused on disaster response versus disaster preparedness, given the widespread flooding requiring humanitarian response in both countries in recent years. AA is not yet incorporated into federal policies in either country. While stakeholders eager to pilot and develop AA programs and to promote gender and social inclusion with them wish that national dialogues on AA were further along, there is an opportunity to use learnings like these from initial AA efforts in both countries to embed gender responsiveness in AA policies from their inception. We highlight a number of specific policy recommendations in three key areas of AA policy for improving the extent to which AA reaches, benefits, and empowers women and point to its potential to shift unequal social structures when paired with gender transformative approaches.

5.1 Improve the accuracy, timing, and reach of early warning systems

Accurate and timely flood forecasting is a precursor for AA programming, which can only be operationalized if EWS can predict when and where floods will occur with enough accuracy and with enough of a time window to allow for AA to be deployed and used as intended. Accurate and timely forecasting clearly remains an issue in both countries, with many stakeholders citing this as a key barrier to adopting AA on a wider scale. Absent these improvements, many stakeholders noted that they worried that tying up funding in AA may not be worthwhile.

Civil society organizations, NGOs, and aid beneficiaries in Nepal and Nigeria confirm findings from the literature (e.g., Lau et al., 2019; Shah et al., 2022) that gender disparities exist in receiving early warnings, particularly for people living with disabilities. Implementers need to gather gender-disaggregated data and consider the specific needs of vulnerable populations when planning EWS, including access to technology and mobility limitations. For example, lower literacy rates among some women may prevent them from understanding SMS alerts, and many aid beneficiaries lack mobile phone access altogether. People living with disabilities also require tailored approaches for accessibility. To effectively reach all community members, EWS should incorporate diverse communication methods, such as in-person communication, sirens, and SMS messaging, while avoiding relying on any single approach, which can leave out certain groups. Developing communication guidelines in advance and collaborating with marginalized communities living in flood-prone areas would help put a plan in place for reaching all with EWS. For example, individuals living with disabilities in flood-prone areas could be identified and registered in advance to ensure that they receive additional support with gaining access to EWS. Including women as distributors of information might be effective as well. An INGO representative in Nepal cited a recent study showing that communities with female health workers exhibited higher rates of information dissemination around EWS.

5.2 Register individuals in advance and extend household-based registries to individual-level

In both Nepal and Nigeria, stakeholders noted that they often relied on existing data and registries that had household- rather than individual-level information. In Nepal, for example, people with

disabilities may not have national registration cards, which affects their ability to access social protection systems and bank accounts used to transfer cash vouchers. Collecting disaggregated data by sex, age, disabilities, and other indicators that interact with EWS and AA access in flood-prone communities could help to shift distribution systems to the individual level and to allow for women and other marginalized groups to be more effectively targeted by AA programs.

5.3 Consult women prior to flood seasons on aid modalities, aid mixes, and distribution methods

Often, AA programming is shaped by the physical hazards which it is attempting to address. For example, specialized seeds in the case of droughts and floods, shovels and sandbags to protect homes and fields from flood damage and to divert water, water purification tablets to protect water sources from contamination, and food aid, among other forms of support. Because cash can in theory be used flexibly for anything an individual might need to prepare for a physical hazard, it is a common form of AA. Indeed, Balana et al. (2023) found in a randomized controlled trial that AA in the form of cash transfer reduced negative coping strategies by households during floods and increased investments in productive assets to promote future resilience.

However, insights from respondents in both countries underscore that distributing AA support does not guarantee that women will have their needs met during floods. Women have unique nutritional needs and need access to hygienic supplies. Although cash transfers could in theory be used to purchase anything needed by women, in practice this may not happen when women lack financial decision-making power within the household. Women may prefer a mix of in-kind and cash transfers depending on these dynamics, and consulting women in flood-prone areas in advance can support necessary planning processes. In many of these areas, floods are recurrent, and women will have insights into their needs to mitigate the worst effects of floods. Protecting against potential unintended consequences of aid distribution is equally important. Several stakeholders raised concerns that making women the beneficiaries of cash transfers could increase risks of gender-based violence. While studies have found

that cash and food transfers meaningfully *decrease* risks of gender-based violence (e.g., Hidrobo et al., 2016), it is important to investigate these issues in specific contexts.

Delivery of aid also affects the extent to which women can benefit from AA. The location of aid distribution points affects women's ability to access aid. Women's mobility in both countries is often restricted by household responsibilities and gender norms (Laouan, 2022; USAID, 2020). Implementers should consider the proximity and safety of distribution points, as well as their accessibility for people living with disabilities. For example, during floods in rural Nepal, beneficiaries found it difficult to travel to stores, making it difficult for them to use cash vouchers to mitigate the effects of flooding. In these cases, beneficiaries preferred goods to be delivered door-to-door. In Nigeria, centrally located community spaces, such as schools, are recommended as distribution points. Sending money electronically to women's personal accounts can also be effective, but implementers should ensure that women have accounts or assist them in setting them up.

5.4 Long-term engagement with women in flood-prone communities could promote empowerment and transformation

In both Nigeria and Nepal—as well as in many other countries—floods recur in the same areas. There are year to year differences in exactly which communities are affected and in flood severity, but nonetheless certain localities incur floods over and over. Forging ongoing relationships with these communities—supported by trainings and discussions around preparedness and recovery—will be critical for achieving any empowering or transforming goals for AA programming. The close timing window between an early warning, AA distribution, and the actions that individuals need to take to utilize AA support mean that ambitious gender goals—requiring changes in attitudes and norms—are unlikely to be reached without longer term engagement. Long-term engagement in flood-prone communities could enable implementers to set up community dialogues around disaster preparedness, to train women to participate in those dialogues, and to conduct widespread gender sensitization trainings with community leaders, frontline staff, and community members to raise awareness and support for women's specific needs during flooding.

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APPENDIX I. DEDUCTIVE AND INDUCTIVE CODES

Each of the first-level (deductive) codes utilized during data analysis as well as their respective second-level (inductive) codes are presented in the table below.

Table 1. Deductive and inductive codes

Level	Code/s	Description
First-level (1 st)	#FloodingVulnerabilities	Gender neutral variables that impact flood vulnerability(ies) and or arise from flooding.
Second-level (2 nd)	#AffectingLivelihoods	Geographical and livelihood factors which increase vulnerability to or are severely impacted by flooding.
2 nd	#Predictability	Low ability to predict the onset and intensity of flooding.
2 nd	#GESI	Non-gendered identify factors which increase vulnerability to flooding.
2 nd	#OverlappingNeeds	The impact of other factors, particularly those resulting from previous floods, which compound and further increase vulnerability.
2 nd	#Scarcity	The impact of a lack of resources on flooding vulnerability.
1 st	#WomenVulnerability	Societal factors that impact women's vulnerabilities.
2 nd	#DomesticWork	The impact of women's domestic role on their flood vulnerabilities and needs.
2 nd	#LimitedAccess	The impact of women's low access to resources and services on their flooding vulnerability.
2 nd	#LimitedMobility	The impact of women's low mobility on their flooding vulnerability.
2 nd	#Marriage/SocialNorms	The impact of local gender norms, particularly those related to marriage and the household, which impact women's vulnerability.
2 nd	#OtherVulnerabilities	Other factors that heighten women's vulnerability to flooding.
2 nd	#SEA	The vulnerability of women to sexual exploitation and abuse.
1 st	#Challenges	Explicitly noted implementation or policy challenges surrounding AA and aid response.
2 nd	#Coordination	Challenges related to aid coordination between different levels of stakeholders.
2 nd	#Culture	Challenges related to social and cultural norms which impact the efficacy of AA and other aid programs.
2 nd	#Funding	Challenges related to the funding of AA and other aid programs.
2 nd	#Implementation	Challenges related to the implementation of AA and other aid programs.
2 nd	#Landscape	Landscape or physical challenges which create access barriers for AA and other aid.
2 nd	#Politics	Policy and governmental challenges which impact the efficacy of AA and other aid programs.
1 st	#Suggestions	Explicitly noted policy or implementation actions that should be considered for future programming and or lessons learned from previous approaches.
2 nd	#AidDelivery	Suggestions around the delivery of AA and other aid.

Level	Code/s	Description
2 nd	#Coordination/Capacity	Suggestions around the coordination of AA and other aid programs, particularly via capacity building.
2 nd	#Empowerment/Inclusion	Suggestions around the empowerment/inclusion of local communities in AA and other aid programs.
2 nd	#Intersectional	Suggestions around the inclusion of intersectional approaches in AA and other aid programs.
2 nd	#Multisectoral	Suggestions around the inclusion of other sectors in AA and other aid programs.
2 nd	#Policy/Governance	Suggestions around policy and governance procedures related to AA and other aid.
2 nd	#Science/Tech	Suggestions related to science and technology for AA and other aid programs.
2 nd	#Sensitization	Suggestions related to increasing community awareness and sensitization to AA and other aid programs.
1 st	#MEL	Commentary explicitly related to monitoring and evaluation processes, including data collection and feedback mechanisms.
2 nd	#Capacity/Collaboration	Collaboration with and capacity building of local communities on MEL activities.
2 nd	#DataCollection/Disaggregation	Commentary on the collection and disaggregation of data related to flooding and or AA.
2 nd	#DataIntegration	Commentary related to the development of integrated data systems to capture information related to flooding and aid.
2 nd	#FeedbackMechanisms	Feedback mechanisms used to capture MEL data on AA and other aid.
2 nd	#InclusiveIndicators	Commentary related to the use of or need for inclusive indicators to more effectively target aid.
2 nd	#Mapping/Assessments	Commentary related to the use of mapping related to flooding for AA and other aid.
1 st	#Reach+	Policies and actions which increase the reach of women by AA and other aid programming.
1 st	#Reach-	Policies and actions which decrease the reach of women by AA and other aid programming.
2 nd	#AidAccess	Gender norms and program strategies which impact access to aid by women and marginalized groups.
2 nd	#Awareness/Capacity	Gender norms and program strategies which impact women and marginalized groups' awareness of AA and overall capacity.
2 nd	#DeliveryModalities	Aid delivery modalities which impact the reach of AA and other aid programs to women and marginalized groups.
2 nd	#EWS	Early warning system procedures and methods which impact the reach of messaging to women and marginalized groups.
2 nd	#Identification/Registration	The use of identification and registration strategies in AA and other aid programs to reach women and marginalized groups.

Level	Code/s	Description
2 nd	#InclusiveDesign/Delivery	The inclusivity of women and marginalized groups in the design and delivery of AA and other aid.
2 nd	#Mapping/Assessments	The use of mapping and assessments in AA and other aid programs to reach women and marginalized groups.
2 nd	#Prioritization/Targeting	The explicit targeting and prioritization of women and marginalized groups in AA and other aid programming.
1 st	#Benefit+	Policies and actions which positively impact how women benefit from AA and other aid programming.
1 st	#Benefit-	Policies and actions which negatively impact how women benefit from AA and other aid programming.
2 nd	#Intra-HHDistribution	Distribution of AA or other aid within the household and its ability to benefit women and marginalized groups.
2 nd	#Participation	Participation and representation of women and marginalized groups in aid processes.
2 nd	#AidType	The types of aid distributed via AA and other aid programs and its ability to benefit women and marginalized groups.
1 st	#Empower+	Policies and actions which positively impact the empowerment of women.
1 st	#Empower-	Policies and actions which negatively impact the empowerment of women.
2 nd	#CommunityDecision	The inclusion of women and marginalized groups in community-level decision making around AA and other aid.
2 nd	#InclusiveDesign	The inclusion of women and other marginalized groups in the design of AA and other aid programs.
2 nd	#InclusiveImplementation	The inclusion of women and marginalized groups in the implementation of AA and other aid programs.
2 nd	#StateDecision	The inclusion of women and marginalized groups in state-level decision making.
2 nd	#Training	The provision of training and other capacity building for women and marginalized groups in AA and other aid programming.
1 st	#Transform	Policies and actions which impact local gender norms.
2 nd	#Advocacy	Advocacy for/by women and marginalized groups for greater participation and agency.
2 nd	#Sensitization	Sensitization of community members, particularly men and boys, to gender norms and women's agency.
2 nd	#WorkingWithCulture	Examples of working with cultural factors, such as religion, to transform gender norms.

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