REMITTANCES FOR ANTICIPATORY ACTION

Lessons from Pilots in the 2022-23 Hurricane Seasons

SEPTEMBER 2024

Introduction

Traditionally, humanitarian assistance has been concerned with the hours, days, weeks, and months **after** a shock. Anticipatory action has emerged as a framework to deliver humanitarian assistance **before** a disaster. The window for anticipatory action falls between the moment the shock is forecasted (the trigger) and when the first impacts are felt.[1] As such, anticipatory action offers an opportunity to minimize losses and damages, including loss of life, before they occur. An IRC pilot found that anticipatory cash delivered before flooding resulted in less food insecurity and negative coping among participants.[2] Evidence from

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[1] "What is Anticipatory Action?," *Anticipation Hub*, viewed August 27, 2024.

[2] IRC and IFPRI, *Acting Before Disaster Strikes: The Impacts of Anticipatory Cash Transfers on Climate Resilience in Northeast Nigeria* (2023).

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FAO also suggests that anticipatory action can maximize the impact of humanitarian investments.[3] As funding for global humanitarian assistance falls short of needs,[4] we must build, test, and improve models for anticipatory action.

Central America has historically been impacted by various natural hazards, including drought, landslides, flash floods, and tropical cyclones. These hazards are becoming more intense and more frequent with climate change, compounding long-standing livelihood vulnerabilities, food and water insecurity, and climate migration across the region.[5] The urgency of climate change and its impacts has pushed the humanitarian sector towards more creative, cost-effective solutions.

Remittances, flows of money from migrants back to their place of origin, may be one solution. These already contribute to development worldwide, in the form of investments in housing, infrastructure, education, and alternative income. With the development opportunity of remittances well-understood and the impacts of climate change ramping up, it is time to consider how remittances can support anticipatory action ahead of climate disasters.

In parallel with traditional overseas development assistance, Mercy Corps has been exploring the potential of remittances for anticipatory action. Remittances make up a sizable portion of gross domestic product and household income in many developing countries, especially in Central America. Remittances are also considered sustainable in the long term. Recently, remittance flows have proven resilient to the global emergency and recession during the COVID-19 pandemic.[6] When timed correctly, these financial flows may be able to fill funding gaps for humanitarian assistance, anticipatory action, and climate adaptation.

This approach of incorporating remittances and diaspora communities adopts a wider definition of who can support and take anticipatory action. Beyond non-governmental and governmental organizations, our definition asserts that communities, households, and individuals can be anticipatory actors. The Remittances for Anticipatory Action model posits that diaspora networks and trans-national households can also support anticipatory action in their places of origin, which are often most vulnerable to the impacts of climate change.[7]

With this motivation, Mercy Corps partnered with a trusted provider of digital financial services to pilot the Remittances for Anticipatory Action model in Central America.[8] Through this model, the partner's clients in the U.S. who regularly send remittances to the study area would receive an early warning message for a forecasted tropical cyclone along with a financial incentive to send. Remittance recipients in Central America could then take that money to prepare for the coming storm: to stock up on supplies, reinforce property, or

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[3] FAO, *Anticipatory Action: Changing the Way We Manage Disasters* (Rome: 2021).

[4] UNOCHA, *Global Humanitarian Overview 2024* (2023).

[5] Karissa Waddick, "Effects of Climate Change on Agriculture in Guatemala and Honduras," (Global Majority E-Journal (2017)): 109; Diego Pons, "Climate Extremes, Food Insecurity, and Migration in Central America: A Complicated Nexus," (Migration Information Source (2021)).

[6] Kangni Kpodar, Montfort Mlachila, Saad Quayyum and Vigninou Gammadigbe, "Defying the Odds: Remittances During the COVID-19 Pandemic," (IMF: Working Paper WP/21/186 (2021)).

[7] Beza Tesfaye and Ellen Reid, "Unlocking the potential of forecast-based remittances for anticipatory action," (Migration Policy Practice, vol. 12, no. 1 (February 2023)).

[8] Since this is a small-scale pilot that Mercy Corps would like to replicate in the future, we chose to keep the identity of our digital financial services partner anonymous in this report. These pilots were jointly funded by the Carnegie Corporation of New York.

even evacuate. The model was active for two hurricane seasons (2022-2023) during which time no storm impacted our study area. With this limitation, we did not have the opportunity to collect data to evaluate the model's efficacy and our primary question: Can early warning messages incentivize more timely and greater remittances to at risk recipients?[9] The purpose of this report is to document the pilot process to encourage further refinement, testing, and evaluation to test the impacts of the Remittances for Anticipatory Action model. The following discusses the process for designing and setting up the model, the experience of the pilots, and considerations for others interested in implementing a similar anticipatory action model.

Design & set up: Step by step

The design phase consisted of two main assessments. In the first, Mercy Corps spoke directly with communities in Huehuetenango, Guatemala, to better understand their experiences with climate shocks, access to early warning information, and the importance of remittances. In the second, climate experts helped identify the most appropriate hazard, trigger, and data sources for the anticipatory action model.

TABLE 1: PILOT PROCESS TIMELINE

Phase	Step	Period
Design	Preliminary design	October 2021
	Partner search	November 2021 - June 2022
	Understand the context: Community assessment in Huehuetenango, Guatemala	April - June 2022
	Define hazard and trigger: Climate assessment	April - August 2022
Set-up	**Build partnership**	Starting June 2022
	Determine forecast monitoring protocol	Starting June 2022
Implementation	Pilot 1	October - December 2022
	Pilot 2	August - December 2023
	Modify as needed	October 2022 - December 2023

[9] The pilots in the 2022 and 2023 hurricane seasons were designed as an experiment to test the Remittances for Anticipatory Action model. Participants were randomly selected and assigned into groups A, B, and C from a pool of the partner's clients who had sent remittances to the study area in the past 6 months ("senders"). Treatment groups A and B would receive messages via push notification and email nudging them to send money to friends and family in the forecasted area of storm impact. They would also receive a financial incentive to send ($5 discount or $3.99 fee waiver, depending on group). The control group C would not receive any message or financial incentive. In the event of a storm that triggered sending messages, we planned to analyze remittance transfer data, most importantly *time sent* and *time received*, and to conduct surveys with senders. Surveys would have focused on sender decision making, intentions, and reported outcomes for recipients. Although we were unable to test the study hypotheses or produce findings on the efficacy of the model, we were able to refine the model design, processes and tools, as documented in this learning report.

The set-up phase consisted mainly of building a partnership with a remittance service company well-suited to the needs of the model and the target community. With this partnership in place, we agreed upon a monitoring protocol. At every point of this project, we refined the design and processes based on lessons learned, new information, and access to new tools. The following sections document these steps and iterations over the lifetime of the pilots.
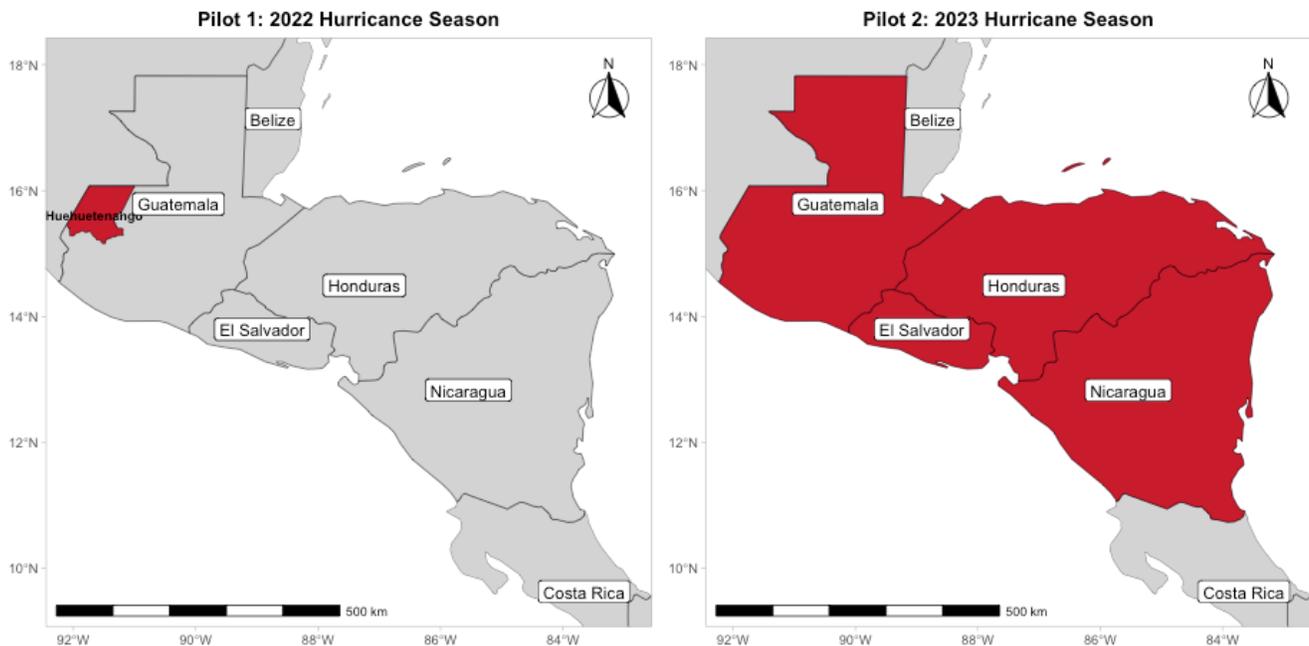

Figure 1: Comparative maps showing the study areas in the 2022 and 2023 pilots.

Step 1: Understand the context

The decision to focus on Guatemala, and later Central America, was based on strong remittance flows and vulnerability to climate impacts. After decades of migration to the United States, remittances make up a growing share of gross domestic product in Central America. In 2023, this proportion rose to 19.5% in Guatemala, 23.6% in Honduras, 23.9% in El Salvador, and 26.2% in Nicaragua.[10] For the millions of smallholder farmers across the region, remittances can offer alternative income, often to meet basic needs, as the impacts of climate change threaten agricultural livelihoods.

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[10] World Bank Group, "Personal Remittances, Received (% of GDP)."

To better understand the climate hazards, access to early warning information, and importance of remittances among households in agricultural communities, Mercy Corps conducted interviews (n=18) and focus group discussions (n=12 focus groups with 77 participants total) in Jacaltenango and Nentón, Guatemala in May 2022. These data gave us a starting point to design the model, informed by the communities in our pilot area.

In this assessment, we learned that variable rainfall, drought, and floods were directly contributing to the loss of crops and harvests, increased prices, and decreased job supply.[11] Households were adapting to climate impacts by changing farming practices and timing, seeking non-agricultural work, and migrating seasonally to Mexico or long-term to the United States. Access to climate and weather information, including early warning, varied due to distance and isolation, infrastructure, household resources, and age. For those that did have access to forecasts and early warning, household preparedness and anticipatory action were not common due to a lack of awareness and resources. Remittances were seen as an important resource for household well-being and local economies. The use of remittances was discussed jointly as a trans-border household, among senders and recipients. If remittances were used for disasters, it was after the event, not before.

The descriptions of recent climate impacts and disasters, access and perception of climate and weather information, and remittance behavior allowed the pilot team to design the model for the target community. This contextual understanding influenced our decisions on climate hazard, delivery of messages to senders, and our criteria for a remittance service partner.

❯ **HAZARD: TROPICAL CYCLONES**

Tropical cyclones are multi-hazard shocks, whose impacts include heavy rainfall, flash floods, landslides, strong winds, and storm surges. These impacts can be far-reaching, affecting inland communities such as our initial pilot area, Huehuetenango. At the time of conversations with communities in Huehuetenango in May 2022, households were still feeling the economic impacts of Hurricanes Eta and Iota in November 2020, which had destroyed harvests and damaged property.

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[11] Manuel Constantino Díaz López and Ellen Reid, *Climate Information and Remittances in Guatemala: Assessment Report*, (Mercy Corps and Georgetown University, 2022).

Step 2: Define the hazard and trigger

Anticipatory action is always based on a hazard and predetermined trigger. These must both be clearly defined for the target population and location. For instance, for pastoralists vulnerable to drought in the Sahel, an appropriate trigger may be a measure of vegetation health and density.[12] For monsoon flooding in Nepal, the trigger could be a mixture of forecasts and official government flood warnings.[13] To determine the appropriate hazard and trigger around which to build an anticipatory action model in Guatemala, Mercy Corps conducted a climate assessment with researchers from Columbia University's International Research Institute for Climate and Society.

In the climate assessment, researchers conducted a disaster risk analysis for the pilot area, identified climate hazards with recent impacts, and reviewed available climate and weather information for Guatemala. The climate assessment found that the primary hazards affecting households were drought, floods, and tropical cyclones (i.e., tropical storms, hurricanes, and depressions). Although drought and floods were primary concerns of households in Jacaltenango and Nentón, our researchers recommended designing the pilot around tropical cyclones due to the availability of reliable data and clear triggers. This would allow us to work out the model's kinks and generate evidence showing that the model could work before delving into more complicated triggers and less reliable data for floods and drought.

〉 TRIGGER: WATCH OR WARNING

Based on the climate assessment, and later refined with our partner, we adopted the following trigger and pre-trigger for the pilot:

*The **pre-trigger** was based on a qualitative assessment of the track of a forecasted tropical storm or hurricane, as monitored on the NHC dashboard. Note that we excluded tropical depressions from this trigger. Tracks can be forecasted around 4 days ahead of impact. If the track was heading towards the pilot area, Mercy Corps would notify the partner to prepare messages to be sent if the trigger was later met. Although tracks may change, they are a good estimate to condition preparing messages on.*

*The **trigger** was a watch or warning present in Guatemala, Mexico, Belize, Honduras, Nicaragua or El Salvador, with tracks headed towards the pilot area. If the trigger was met, Mercy Corps would ask the partner to send messages.*

The National Hurricane Center (NHC) at the National Oceanic and Atmospheric Administration (NOAA) generates the most reliable and trusted tropical cyclone forecasts for the Atlantic and Eastern Pacific. This data is disseminated to national hydrometeorological and disaster response agencies across the Americas, such as Guatemala's INSIVUMEH (National Institute for Seismology, Vulcanology, Meteorology and Hydrology) and CONRED (National Coordination for Disaster Reduction). These agencies can further scale and refine forecasts for their jurisdiction. NOAA directly issues watches and warnings for tropical cyclones, which influence national and sub-national early warnings in the region.

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[12] Mercy Corps, "Anticipatory Cash Transfers for Climate Shocks in the Horn of Africa," (September 2023).

[13] UNOCHA, *Anticipatory Action Framework: Nepal Pilot* (2021).

Importantly to our design, NOAA publishes tropical cyclone data and forecasts directly on their NHC dashboard, which is publicly available and continuously updated.[14] They also offer a free Application Programming Interface (API) that can automatically share data with external software. With this level of reliability, timeliness, and access, we were able to define our triggers for the model. Ultimately, triggers were based on watches/warnings for a tropical storm or hurricane, with a qualitative assessment of forecasted storm tracks.

Even with the most reliable and latest data, time is a serious limitation when working with tropical cyclone forecasts. Watches come with 48 hours of advance notice. Warnings give only 36 hours before tropical-storm-force winds affect the area.[15] When applied to the anticipatory action model, this leaves 36-48 hours at most to send messages to remittance senders, for them to send money to their friends and family in Central America, who will then pick up their cash, and use it to prepare for the forecasted storm. With the design and trigger in hand, we needed a remittance partner who was up to the challenge of making the model a reality.

Step 3: Build a partnership

The model hinged upon strong partnership with a remittance service company. Based on the initial assessment in Guatemala, we developed a set of criteria for a would-be partner.

- **Clients in the United States and Guatemala.** Remittance service providers may specialize in a certain geographic area, having little or no presence in others. While it would have been possible to enroll pilot participants in an unfamiliar service, we were looking for a well-established company in Guatemala, with senders primarily in the United States. This left us with a handful of potential partners.

- **Cash pick-up.** While remittances may be received directly in bank accounts or as mobile money, cash pick-up was the preferred method to receive remittances in Huehuetenango. Most participants in the assessment used the Banrural network of rural savings banks. Banrural offers collection locations in strategic points outside bank branches, extending their reach in rural areas, reducing travel to pick-up points and time spent waiting in line.[16] To most effectively work with the communities in Huehuetenango, Guatemala, we needed a partner who offered cash pick-up, preferably in partnership with Banrural.

- **Ability to send messages to senders.** This last criterion was not necessary, but ideal. To most easily enroll participants and disseminate early warning messages, we preferred a partner that could communicate directly with remittance senders.

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[14] NOAA, *National Hurricane Center and Central Pacific Hurricane Center*.

[15] NOAA, "What is the Difference Between a Hurricane Watch and Warning?," National Ocean Service, viewed August 27, 2024.

[16] Díaz López and Reid, *Climate Information and Remittances in Guatemala: Assessment Report*.

With this list in mind, we conducted a partner search and ultimately entered into a partnership with a trusted provider of digital financial services. Ahead of the 2022 hurricane season, we refined the study design, clarified roles, and established clear processes for implementation with the partner.

Step 4: Determine forecast monitoring protocol

During the first hurricane season (2022), we monitored forecasts manually. A diligent consultant followed a daily monitoring procedure based on NOAA's NHC dashboard, increasing monitoring to every 12 hours or fewer based on tropical cyclone activity. By the second hurricane season (2023), the Mercy Corps Technology for Development (T4D) team had developed an application that automatically pulled data from available APIs and sent emails to project staff under certain conditions. This saved time and money by not requiring daily attention and operating for less than a cent per month.[17]

Figure 2: A screenshot of the NHC dashboard on October 31, 2022 showing the potential track of Tropical Storm Lisa, later to become Hurricane Lisa.

The automated monitoring pulled information from NOAA's NHC and WFP's Advanced Disaster Analysis and Mapping (ADAM), which combined NOAA data with other sources.[18] Through a combination of data from these two sources, we were able to monitor forecasts and determine if triggers had been met. We were unable to include data or reports of local impacts. In Central America, these are usually reported on national agency websites or social media feeds. Due to the complexity of pulling these and the need to have the automated monitoring script up and running before the start of the hurricane season, we opted to manually monitor any impacts.

After the 2023 hurricane season, we considered building out the email application into a publicly available dashboard that would link forecasts, real-time data, and local impacts to inform humanitarian response. To determine the need and feasibility of building such a dashboard, we completed an early warning scoping exercise to identify existing sources of early warning information for tropical cyclones in the Caribbean Basin and Eastern Pacific regions, reliable information sources on local impacts from local and international actors, and gaps in in these sources.

The scoping exercise confirmed that NHC and ADAM were still the most optimal data sources for forecasts and weather data, and that there is not a reliably updated and standardized data source for local impacts. Ultimately, the recommendation was to not spend time and resources to create a dashboard, and instead to

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[17] The cost in August 2024 was $0.40 per month.

[18] UNWFP, *Advanced Disaster Analysis and Mapping (ADAM).*

improve upon the automated email monitoring for future iterations of this model and other anticipatory action projects based on tropical cyclones in the Americas.

Step 5: Modify as needed

At every step of design, set-up, and implementation, the pilot team sought to improve and streamline the model. The most notable examples come from improvements to the process of triggering messages, the monitoring tool, and the geographic scope of the pilot.

Process of triggering messages. The model initially included only trigger messages. Through trial and error, we modified this process to include pre-trigger communication, allowing our partner more time to prepare and approve messages before the trigger was met. Mercy Corps would send the partner a pre-trigger email if the track of a storm was forecasted to impact the pilot area, without a watch or warning. This would give the partner up to 4 days to prepare messages. Once the trigger was met, Mercy Corps would alert the partner, who could quickly send messages.

Monitoring tool. As discussed in Step 4, the model initially hinged upon manually monitoring the NHC dashboard for forecasts, following a multi-step checklist. After testing this checklist and the data sources in year 1 of the pilot, Mercy Corps T4D was able to automate the process. The automated script went live in the 2023 hurricane season, year 2 of the pilot, sending the Mercy Corps pilot team pre-trigger and trigger emails automatically. Mercy Corps would then qualitatively assess the forecasted track of the storm and time between notification and predicted impacts to determine whether or not to alert our partner to send messages.

Geographic scope of the pilot. In year 1, the pilot was limited to one department in Guatemala. We extended this scope in year 2 after one storm nearly affected our limited study area. In November 2022, Hurricane Lisa was predicted to impact Huehuetenango and warnings were in place for neighboring areas. This satisfied the trigger threshold, and the team sent messages to pilot participants. Hurricane Lisa ended up veering North, only bringing rain to the pilot area. While we collected limited remittance transfer data from participants, the sample sizes were too small to produce findings. We also chose not to conduct surveys with participants, since the storm had minimal impact on households in the study area. Learning from this experience, we expanded the pilot in year 2 to include all of Guatemala, El Salvador, Honduras, and Nicaragua. Instead of operating at the departmental level, we chose to zoom out to the national. This was intended to have a greater chance of observing a tropical cyclone in the study area and to give a greater margin of error for forecasts, which are inherently uncertain.

Over the course of the pilot, Mercy Corps and our partner were able to learn together and reshape the model. This iterative learning and project adaptation should be a feature of any anticipatory action model and partnership. Ultimately, these modifications greatly improved the efficiency of processes and have resulted in a model that Mercy Corps plans to continue to test and refine.

Considerations for others

Despite the lack of a relevant storm and resulting study data during this initial phase, the lessons and improved model represent a success that Mercy Corps plans to carry forward in the future. For others interested in designing and implementing a similar anticipatory action model, we offer the following considerations.

Design for the context. The hazard, trigger, and anticipatory action mechanism must all be designed for the context, in conversation with local community members and stakeholders. In the case of Central America, tropical cyclones based on NOAA data were an appropriate hazard and data source for an anticipatory action model. This was determined after conversations with community members, officials from CONRED and INSIVUMEH, climate researchers, the private sector partner, and experts on early warning systems and remittances in the region.

Identify appropriate data sources. These sources must be appropriate for the type of hazard, the target audience, and the processes of the model. In this example, NOAA data was ideal since it is (1) the most reliable and cutting-edge data for tropical cyclones, (2) most likely to be trusted by U.S. based senders, and (3) could be freely accessed and easily automated through the up-to-date dashboard and API. For other projects, data may need to come directly from the local government. This will affect processes, ability to automate, and timeframes between forecasts and action.

Streamline processes to gain time. Time is a major limitation for anticipatory action. More complicated processes, with more partners or points of handoff, will eat up time that households could use to take action, avoid losses and damages, and get out of harm's way. Through iterative design, we were able to streamline the Remittances for Anticipatory Action model over the course of the pilot. However, even the streamlined model only left households with 36-48 hours to act ahead of a forecasted storm. Looking ahead, blockchain technology may be an opportunity to gain more time through data oracles, self-executed smart contracts, and blockchain-enabled mobile wallets.[19] Mercy Corps Ventures recently piloted a blockchain-based anticipatory action model that resulted in a 90% quicker delivery of funds to participants.[20] Automating triggers and pre-positioning aid via blockchain may help gain time in anticipatory action models for sudden-onset hazards, like tropical cyclones.

Address inherent uncertainty. Even the best forecasts are probabilities. In any anticipatory action model, uncertainty will influence the design, processes, and experience. This uncertainty should be acknowledged in discussions of programmatic risk, organizational reputation, and participant fatigue. What if no trigger is met during the life of the program? How would early warning messages, for example, be perceived by participants if the forecasted hazard does not occur? How would this affect participant willingness to act upon messages in the future? These types of questions must be openly discussed with partners and donors.

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[19] Catherine Jones, Sandra Uwantege Hart, and Beatriz Carvalho, "Anticipate, Automate, Accelerate: A Framework for Blockchain in Anticipatory Action," (International Journal of Disaster Risk Reduction (July 2024)).

[20] Mercy Corps Ventures, "Pilot Insights: Anticipatory Action Leveraging Blockchain for Drought-Impact Pastoralists in the Horn of Africa," (Mercy Corps Ventures (July 2024)).

Next steps

Historically rooted economic inequalities, violence, political instability, social disparities, and land ownership issues all combine with the impacts of climate change, resulting in different levels of vulnerability across the region. Before further pursuing the Remittances for Anticipatory Action model through another pilot, Mercy Corps is conducting an exploratory study in Guatemala during the 2024 hurricane season. This study explores the themes of recipient decision-making around remittances and climate resilience more broadly, and how they fit into the larger context of factors that contribute to vulnerability in the region. The findings of this research will offer evidence on how remittances may be used to build resilience for different groups, and how remittance companies might develop more informed and impactful approaches to remittance sending and receiving.

Through the 2022 and 2023 pilots, Mercy Corps refined and improved the Remittances for Anticipatory Action model. We hope to carry this model forward through a third pilot in the future to evaluate the model and provide further evidence of effectiveness.

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