Reach Alliance

Blockchain for Social Impact:
Empowering Vulnerable Communities Against Climate Shocks in Nepal

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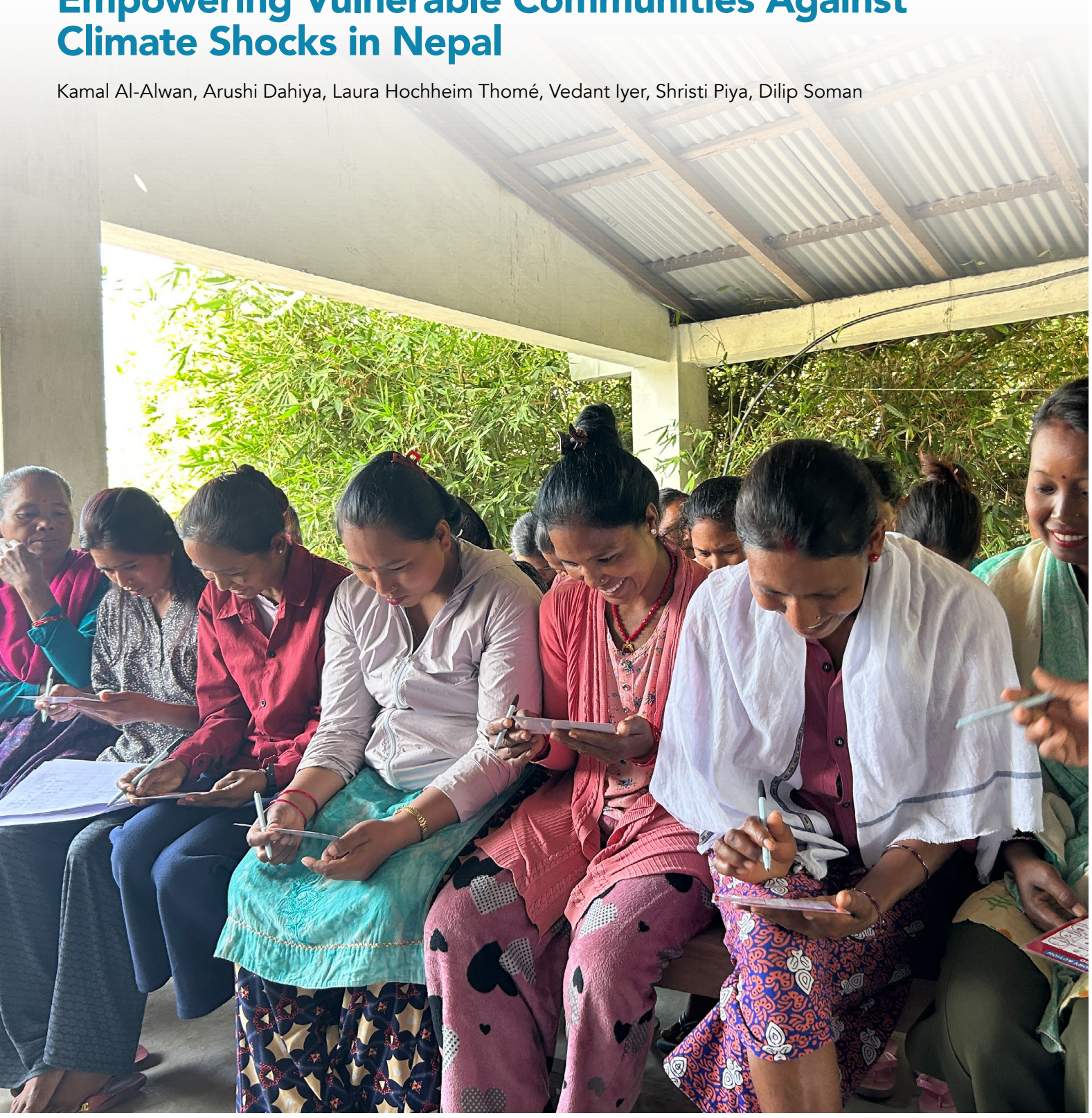

RUMSAN

UNIVERSITY OF TORONTO

Center for Inclusive Growth

The Reach Alliance

The Reach Alliance is a consortium of global universities — with partners in Ghana, South Africa, Mexico, Canada, United States, United Kingdom, Australia, and Singapore — developing the leaders we need to solve urgent local challenges of the hard to reach — those underserved for geographic, administrative, or social reasons. Working in interdisciplinary teams, Reach's globally minded students use rigorous research methods to identify innovative solutions to climate, public health, and economic challenges. The United Nations Sustainable Development Goals (SDGs) provide inspiration and a guiding framework. Research is conducted in collaboration with local communities and with guidance from university faculty members, building capacity and skills among Reach's student researchers.

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Cover photo: Rahat conducting an awareness and digital capacity-building workshop with beneficiaries (Photo courtesy of Rumsan)

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Executive Summary

In Nepal, disaster-prone regions face persistent barriers to effective humanitarian aid delivery due to the country's unique geography and consequently, the nation's natural disaster landscape. The need for inclusive, anticipatory, and resilient aid-delivery systems has never been more urgent, particularly as climate-induced disasters become more frequent and severe.

Rahat, a blockchain-enabled humanitarian aid platform developed by Nepal-based tech firm Rumsan, responds to this need by enhancing the efficiency, transparency, and inclusivity of cash and communication before, during, and after disasters. Rahat facilitates multimodal access including short message service (SMS), interactive voice responses (IVR), mobile apps, and QR-coded physical tokens to ensure that even the most marginalized populations can access aid. The platform enables real-time fund disbursement, centralized beneficiary management, and multistakeholder coordination by consolidating communication, disbursement, and data management into a single interface. Its offline transaction capabilities and partnerships with payment service providers allow the system to function even in the midst of disasters when internet access is scarce. A key innovation within Rahat is its anticipatory action module, which focuses on proactive disaster response and was piloted for the first time in September 2024 during the monsoon season in the Barbardiya, Gulariya, Janaki, and Tikapur districts in Nepal.

Blockchain technology, while only one component of the platform, offers critical benefits. Rahat replaces fragmented, rudimentary tools (like WhatsApp or spreadsheets) with a traceable, secure, and auditable dashboard that streamlines anticipatory action and ensures accountability. By offering multisignatory triggers and real-time tracking, it reduces duplication and builds trust among stakeholders involved in disbursing aid to victims of floods or other natural disasters. However, its success depends on careful integration with Nepal's legal and institutional disaster risk management (DRM) context.

Key stakeholders involved in disaster response in Nepal report that Rahat has improved coordination, accountability, and transparency across agencies and levels of government. The platform's design helps minimize residual risk in emergency aid distribution and contributes to building a more robust, data-driven social protection infrastructure. Compared to conventional development-oriented cash-transfer systems, blockchain platforms like Rahat offer enhanced traceability and reliability — though they require strong technical capacity and inter-agency coordination to fully realize their potential.

The Rahat platform offers a compelling proof of concept for how emerging technologies, when localized and co-developed with communities and partners, can shift disaster response from reactive to anticipatory. By addressing policy gaps, strengthening multilevel partnerships, and refining its user-centred technological design, Rahat exemplifies how inclusive digital systems can foster more resilient, dignified, and accountable humanitarian aid in the face of accelerating climate risks.

Disaster Risk Management Context

Nepal represents a unique and fragile case because of its complex topography — the high Himalayas and low-lying Terai plains (see Figure 1). This distinctive geography makes the country especially prone to recurring

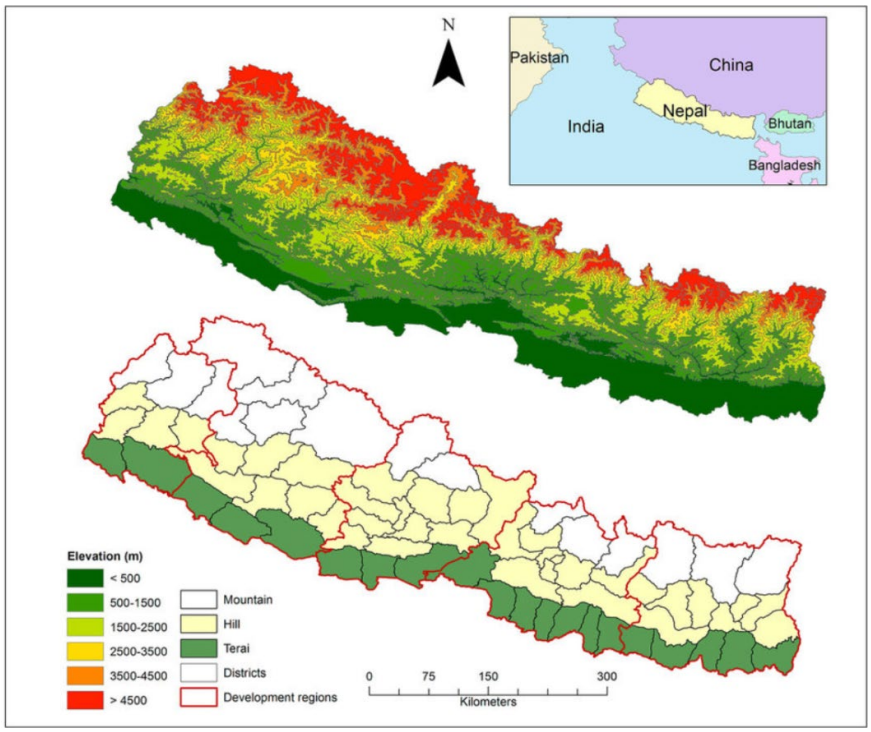


Figure 1. Topographical and political maps of Nepal (from Sanam Aksha, Luke Juran, and Lynn Resler, "Spatial and Temporal Analysis of Natural Hazard Mortality in Nepal," *Environmental Hazards*

the country especially prone to recurring hydrometeorological and geophysical disasters like floods (our focus in this case study), droughts, earthquakes, and landslides. Worse still, these calamities further exacerbate the region's existing social and economic fragilities, marked by poverty, poor infrastructure, caste-based exclusion, and environmental degradation. This dual intersection of climate risk and human insecurity positions Nepal as one of the nations that are most vulnerable to climate change, which is expected to intensify the frequency and impact of natural disasters. Despite growing policy efforts, particularly after the introduction of the Disaster Risk Reduction Management Act of 2017, weak coordination, limited local capacity, and an emphasis on reactive disaster response continue to undermine climate resilience in the region.

The Terai region's flooding problems stem from both natural and human-caused (anthropogenic) factors. With over 6,000 rivers flowing from the Himalayas, the area's monsoon rains often lead to overflowing riverbanks that inundate the plains (including in the Terai). These floods are worsened by deforestation, poor embankment maintenance, and

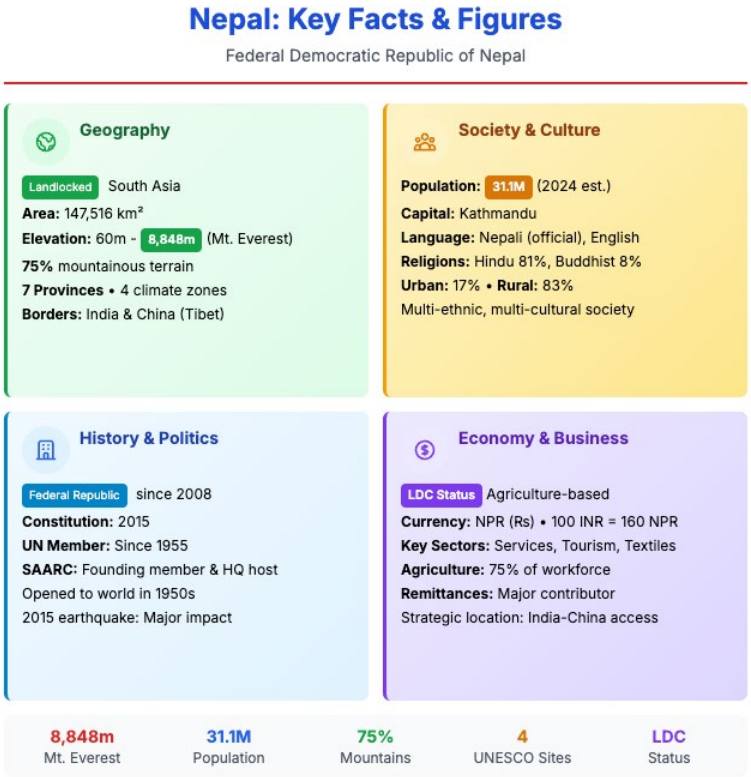


Figure 2. Key country-level statistics of Nepal

Figure 3. A banner about disaster risk management at the Danish Red Cross office in Kathmandu, Nepal

urban encroachment. The region also has an incredibly high population density which has contributed to poor drainage infrastructure, and large areas of informal settlements that have heightened risks and the scale of human and economic devastation from flooding.[1]

Delivering humanitarian aid is a highly complex operation, particularly when it comes to defining and coordinating the roles and responsibilities of nongovernmental organizations, government bodies, and private sector actors. For aid delivery to function effectively, the needs, capacities, and responsibilities of each stakeholder must be clearly established in advance. This clarity is essential because when disaster strikes, the situation on the ground is already chaotic — any ambiguity or confusion over who is responsible for what can lead to delays and inefficiencies at a time when rapid, organized support is most critical.

The management and delivery of humanitarian aid for disaster in Nepal involves a number of stakeholders operating at multiple levels of government. Federally, the Department of Hydrology and Meteorology and the National Disaster Risk Reduction and Management Authority coordinate national disaster preparedness and response efforts. Municipal-level disaster risk reduction focal persons are responsible for local implementation and, as of recently, have gained greater authority in decision making during disasters thanks to legal amendments that assign more power to municipalities. This shift is a significant win for local governments who experience devastation first-hand and understand the local socioeconomic context and thus are best positioned to act quickly. However, despite their increased autonomy, municipalities often lack the financial and technical resources to respond independently and still have to request support from the federal government — a process that can be challenging, especially in the anticipatory phase when the benefits of these programs can be abstract and more difficult to quantify.[2]

Local organizations such as the Nepal Red Cross Society deploy volunteers to deliver aid at disaster sites, while funding partners — including Mercy Corps, the Danish Red Cross Nepal, and the Finnish Red Cross Nepal — finance aid delivery. These funds are transferred to beneficiaries through financial institutions and payment providers who facilitate secure and timely cash transfers.

1 Smrity Upadhyay and Kavita Arora, "Disaster-induced Vulnerabilities and Institutional Response in Indo-Nepal Tarai Region," In *International Handbook of Disaster Research*, edited by Amita Singh (Singapore: Springer, 2023), 413–32.

2 This is particularly relevant given that anticipatory action is still a relatively new approach to aid delivery in Nepal (first introduced in 2018).

In recent years, Nepal has seen notable improvements in DRM, driven in part by the widespread human loss caused by major natural disasters such as the 2015 earthquake and the 2019 floods. However, despite these advances over the past decade, traditional disaster relief approaches' significant limitations persist, necessitating continued innovation and strengthening of disaster risk management systems.

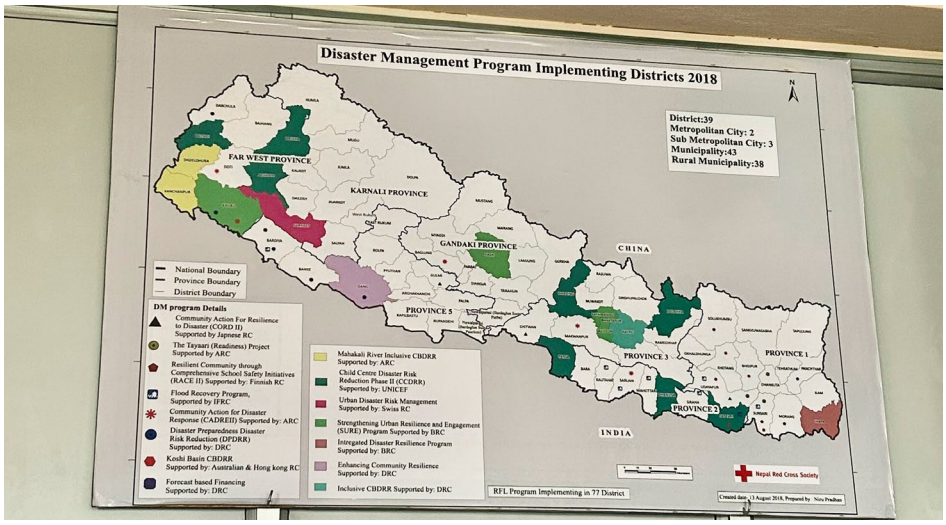


Figure 4. Disaster Management Program Implementation Districts 2018 poster at the Danish Red Cross office in Kathmandu, Nepal

Traditional disaster responses in the Indo-Nepal Terai region have been primarily reactive and focused on postdisaster relief rather than pre-disaster planning. They include emergency rescue, ad hoc relief distribution, and rehabilitation, which are often delayed because of weak inter-agency coordination, lack of real-time data, and insufficient resources. Institutional silos between local, national, and cross-border entities exacerbate this inefficiency and the lack of anticipatory financing and early warning systems can compound disaster impacts year after year, consequently hindering long-term resilience.

Finally, the reactive nature of the traditional disaster management model creates delayed or absent early warnings, minimal preparedness, and a heavy reliance on rescue and relief after impact. This often means that communities suffer from a significant loss of life and property and a long, costly recovery. These limitations of Nepal's DRM prevent some of the nation's most vulnerable populations from being protected, supported, and empowered as disasters occur.

Hardest-to-Reach Populations

Considering that humanitarian action has traditionally been reactive, rather than anticipatory, communities in the Terai region are further put at risk because of long response times. Apart from delays in postdisaster management, disaster-prone communities also face significant barriers to financial inclusion. For example, many households lack access to formal financial services which limits their ability to build financial resilience, save for emergencies, or access timely aid. Another common challenge is the lack of official identity or citizenship cards among beneficiaries, which may restrict their eligibility for government-affiliated financial and social protection programs. Although Terai region's geography and vulnerability to climate shocks put the entire population at risk, some of the most vulnerable community members include

1. people with disabilities,
2. seniors (those 60 and older),
3. pregnant and lactating women, and
4. members of "scheduled castes."

Figure 5. Nepal Red Cross staff (Source: "Monsoon Pilot 2024: Digital and Blockchain Technologies in Anticipatory Action

Some of these hard-to-reach populations are typically also registered in the federal government's Social Security Assistance program.

In Rahat's anticipatory action pilot program in 2024, people with disabilities in the Barbardiya, Gulariya, Janaki, and Tikapur districts were targeted as the main beneficiaries. People with disabilities are already a disproportionately affected group, especially when considering climate disaster scenarios, where mobility, communication, and resource barriers can make rapid actions like evacuation even more difficult. For this hard-to-reach community and other marginalized groups, Rahat's blockchain solution attempts to address these barriers through a dual approach of anticipatory action and financial inclusion.

Research Approach

Our research employed a systematic multiphase approach to examine the effectiveness of Rahat's blockchain solution, with a particular focus on its anticipatory action module. While the case study addresses Rahat's platform as a whole, our analysis centres mainly on the anticipatory action model.

The Rahat anticipatory action project was implemented for the first time in September 2024 in collaboration with the Danish Red Cross (DRC) and funded by the GSMA Innovation Fund in the Barbardiya, Gulariya, Janaki, and Tikapur districts in Nepal's Terai region. The program was designed to facilitate timely and effective actions before flooding occurred in these regions. As a successful pilot, the initiative enabled cash transfers for 774 beneficiaries with disabilities: 410 individuals in Barbardiya and 364 in Gulariya. The distribution of cash support was completed within a rapid time frame of 5 hours, 23 minutes, and 51 seconds after activation. In addition to cash, 4,583 beneficiaries received early warning notifications via SMS and interactive voice response (IVR) five to six hours after activation, ensuring timely alerts.

We began with comprehensive research focusing on three key areas: (1) blockchain technology in humanitarian assistance, (2) anticipatory action approaches in disaster

response, and (3) climate vulnerability in Nepal's Terai region. We analyzed academic literature, reports from the humanitarian sector, and existing documentation regarding the Rahat platform to gain an understanding of current approaches to humanitarian cash transfers, the function of blockchain technology in aid distribution, best practices for anticipatory action in flood response, and the specific challenges involved in reaching vulnerable communities in Nepal. This preliminary research helped us to identify knowledge gaps, particularly concerning the effectiveness of blockchain-based anticipatory action systems and their impact on community resilience, thereby informing our primary research design.

To fill these knowledge gaps, our team conducted field research in May 2025 in Kathmandu. We conducted semi-structured interviews with multiple stakeholder groups who have direct involvement in or understanding of the Rahat platform and its implementation. Relevant groups include officials from Rumsan (responsible for implementation), local municipal government partners, representatives from Danish Red Cross Nepal, community members, and local vendors participating in the voucher system.

Our sampling strategy used purposive and snowball sampling to identify key informants through our collaboration with Rumsan and leverage their networks to connect with additional relevant stakeholders. Next, we analyzed the collected data using a structured coding approach. This analysis focused on identifying key aspects such as the effectiveness of the early warning system, the impact of anticipatory cash transfers on household preparedness, community perceptions of blockchain-based aid delivery, operational challenges and successes in reaching vulnerable populations, and comparative advantages over traditional cash-transfer programs. By assigning each participant a unique identification number to replace their personal details in all data sets we ensured that interview data were anonymous.

Findings from our research reveal that while the Rahat platform has shown strong operational potential, deeper structural and systemic barriers persist that limit its scalability and long-term impact. These include the absence of a national anticipatory action policy, a national ban on cryptocurrency, and low blockchain and technological literacy among many stakeholders. Building toward a national anticipatory framework and clarifying blockchain regulation will be essential to scaling an innovation like Rahat. Furthermore, frequent and structured touchpoints between stakeholders — from government bodies like the Department of Hydrology and Meteorology to local community managers — are needed to ensure coordination, alignment, and mutual learning. Importantly, scaling anticipatory action remains hindered by unreliable long-term weather forecasting data and unsustainable funding models. Nepal's forecasting infrastructure has improved significantly, but trust and data accuracy remain concerns. These challenges highlight the importance of strengthening anticipatory action frameworks in disaster-prone regions.

Anticipatory Action As a Solution to Disaster Relief

Anticipatory action is an approach to disaster risk management (DRM) that focuses on providing warnings and aid to people living in disaster-prone areas before disaster strikes. More than just immediate cash relief or giving monetary assistance before a disaster hits, anticipatory action in practice includes awareness programs, community workshops,

Table 1. Anticipatory action vs postdisaster relief

			Timing of Aid	
			Anticipation action	Postdisaster
Mode of aid	Physical goods		Physical items prior to disasters	Physical aid after disaster
	Cash	Physical	Physical cash transfers in anticipation	Postdisaster physical cash transfers
		Digital	Technology-based cash in anticipation	Postdisaster physical cash transfers

and sharing important information — it is a highly holistic and community-based approach.[3]

Components of Anticipatory Action: Preparedness, Readiness, and Activation

Typically, to ensure the alignment of public, private, and nongovernmental stakeholders involved in disaster risk management, roles and responsibilities and triggers are all outlined in Early Action Protocols (EAPs). These protocols are drafted in advance of disaster and provide accountability and clarity when disaster strikes.

The Danish Red Cross (DRC) first pioneered the use of anticipatory action in disaster relief in 2018. The DRC Nepal has continued to act on the frontier of anticipatory action, leveraging the expertise of other national DRC and International Federation of Red Cross and Red Crescent Societies chapters that have successfully deployed it, evidenced by its pilot program with Rahat. In the broader context of international aid and development organizations in Nepal, interest in anticipatory action has increased exponentially since 2018. Its adoption has become so widespread that some actors cynically see it as a buzzword aimed to attract funders of aid efforts.

To support this growing use of anticipatory action, the National Disaster Risk Reduction and Management Authority, Nepal's top governing body that coordinates and oversees all disaster relief efforts, has organized three national dialogues on anticipatory action. The first of these took place in 2019, catalyzed by devastating mass casualty natural disasters. They brought together international development organizations, disaster relief officials from all levels of government, and private sector organizations that provide technology solutions to deliver aid in anticipation (e.g., Rumsan). These national dialogues were organized with the explicit long-term goal of creating a unified policy framework for deploying anticipatory action. Although this has not yet materialized, the upcoming fourth national dialogue is heavily focused on collating expertise from different disaster-relief stakeholders to standardize anticipatory action efforts.[4]

3 Juan Chaves-Gonzalez, Leonardo Milano, Dirk-Jan Omtzigt, et al., "Anticipatory Action: Lessons for the Future," *Frontiers in Climate,* 4 (2022).

4 Zoe Scott, "How Can Anticipatory Action Reach Scale and Sustainability? Learning from CERF in Nepal," Learning report, Centre for Disaster Protection, 2023.

Table 2. Understanding the optimal aid delivery model

Aid decision	Superior option	Benefits	Supporting quotes from municipal DRM officials
Mode	Digital cash	Hands decision making to the hardest to reach, enables them to prepare themselves in times of disaster as they best see fit (empowerment). Also enables a "no regrets" approach because cash support better improves beneficiaries' well-being in case of false alarms	"Before there used to be equal distribution of goods. For example, if there were 10 glasses, one glass was distributed to each household, but now people can buy what they need. So if someone needs food, they can buy food and so on."
Timing	Anticipatory action	Ensures the hardest to reach are focused on taking steps to avoid disasters, rather than relying on external stakeholders to rebuild and recover once disaster strikes	"As soon as the disaster struck, they used to believe, since they were victims, they wanted relief. But now they want to avoid being victims. So that's the shift that we have noticed [with anticipatory action]."

Anticipatory Action's Advantages Over Other Forms of Disaster Relief

Multiple stakeholders emphasized that anticipatory action cannot replace disaster risk management in its entirety. Rather, it should be viewed as a component of an overarching disaster risk management strategy that clearly outlines roles and responsibilities for each stakeholder before, during, and after a disaster. A technical officer at an international aid organization in Nepal put this succinctly, telling us "[anticipatory action] is a piece of disaster risk management initiatives, not a stand-alone approach to disaster risk management. [It] will just address the residual risk of disaster risk management initiatives. If you try to cover everything within anticipatory action, it wouldn't work."

As Table 1 shows, anticipatory action differs from traditional postdisaster relief by focusing on preparedness and early response, allowing communities to act before a hazard strikes rather than react only afterward. Municipal government stakeholders consistently emphasized this signature advantage: prior to anticipatory-action-based disaster relief, people would be devastated by disasters and view themselves as victims who needed and therefore demanded aid from the government and international aid organizations. But as anticipatory action has increasingly been adopted, there has been a significant mindset shift among people living in flood-prone areas because they are eager to equip themselves with the support they need to not become victims in the first place once they receive early warnings.[5]

Although not directly an advantage, another important component of anticipatory action programs in Nepal (and globally) is that they use a "no regret" approach, meaning that disbursement of cash or aid is not rescinded if a disaster doesn't strike after the activation stage. This feature further incentivizes beneficiaries to embrace anticipatory action

5 Chaves-Gonzalez, et al. "Anticipatory Action: Lessons for the Future."

because even when climate shocks don't occur, people can use cash and aid to support their livelihoods, instead of fearing retribution through being forced to repay cash or return non-cash aid (see Table 2).

There is also a financial imperative to move toward anticipatory action. Interactive Voice Recordings (IVR) and other forms of early warnings and cash in advance of disasters enable beneficiaries to buy items like sandbags to protect their homes and evacuate areas surrounding river basins, ultimately reducing the human casualties of floods. Property damage is not entirely mitigated by anticipatory action, but its scale is reduced when people are aware of the risk and can put valuables in elevated areas in their homes. This dual effect of mitigating property and human loss reduces the need for postdisaster aid. A stakeholder from a development organization estimated that each dollar invested in anticipatory action results in a 30-dollar reduction in human and property damage, demonstrating its efficacy in not only reducing human suffering, but reducing the financial burden of postdisaster aid that governments and international agencies shoulder.

Anticipatory action differs from traditional postdisaster relief by focusing on preparedness and early response, allowing communities to act before a hazard strikes rather than react only afterward.

The most scalable and effective aid solution is one based on anticipatory action that disburses digital cash. Rumsan is a technology provider that implements this solution using a blockchain-based platform focused on accountability and timely aid delivery.

Rahat's Blockchain Solution

Rumsan is a digital innovation company dedicated to creating impactful solutions for society using frontier technology. Rahat — its flagship solution — supports vulnerable communities by improving their access to financial services, especially in the context of humanitarian aid. The organization has three main operations:

1. Aid access and delivery. Rumsan started with a cash and voucher platform to help vulnerable communities receive timely aid during emergencies.

2. Capacity building. Recognizing that access alone isn't enough, Rumsan runs digital finance and literacy training sessions for beneficiaries, vendors, mobilizers, and humanitarian partners. These capacity-building efforts ensure that all users can effectively use digital financial tools, making aid delivery more inclusive and efficient.

3. Financial resilience products. Rumsan aims to expand into microloans and insurance products to help vulnerable populations build longer-term financial resilience. Although still in early development stages, its vision is to support sustainable economic empowerment beyond immediate aid.

Core Technology Architecture

Rahat is Nepal's first blockchain-based anticipatory action cash-transfer platform. At its technical core, it functions as a digital infrastructure that creates a permanent corruption-free ledger of all aid distributions while consolidating all stakeholder responsibilities and activities and an associated list of beneficiary data that is required in any humanitarian response.

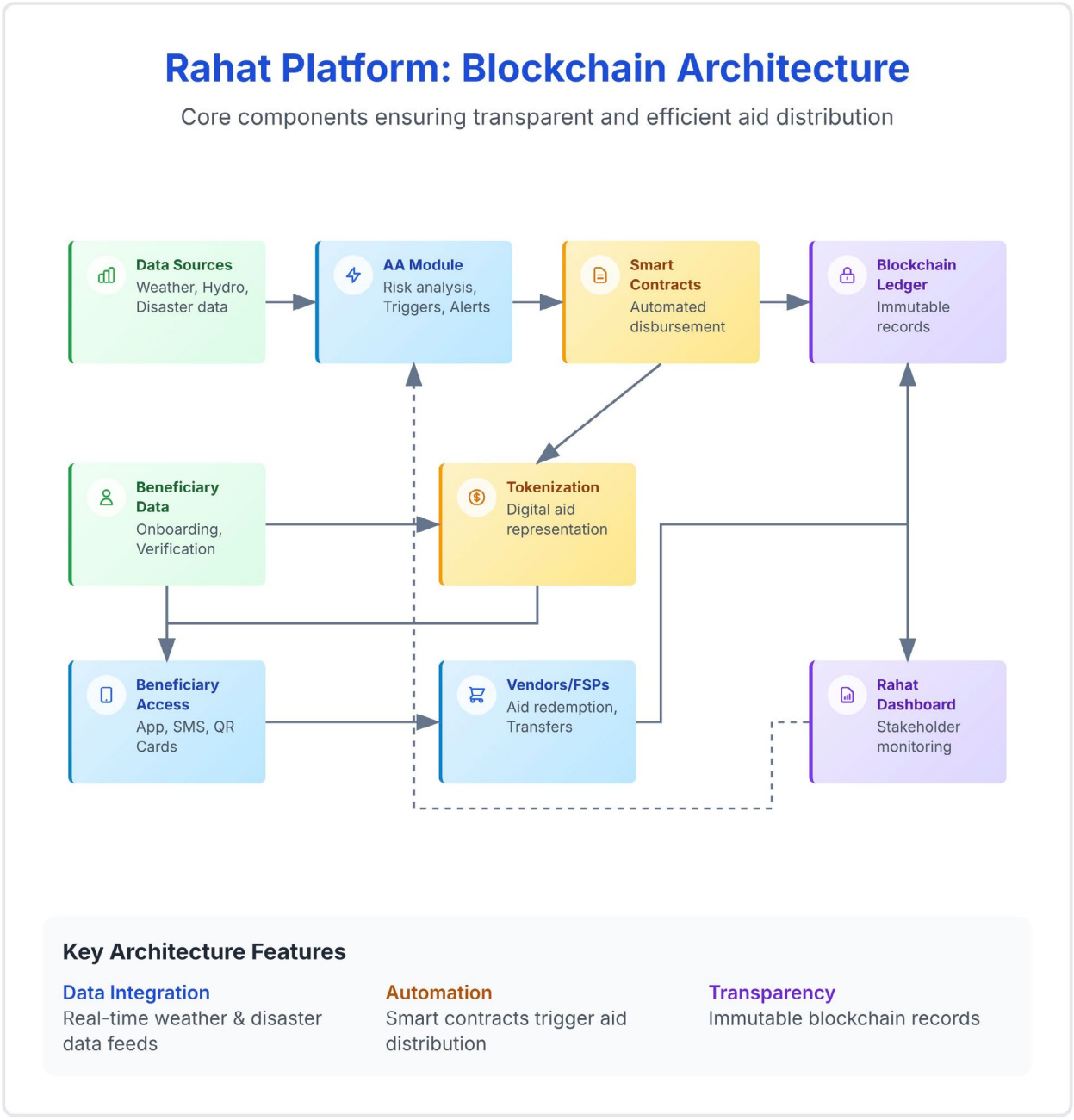
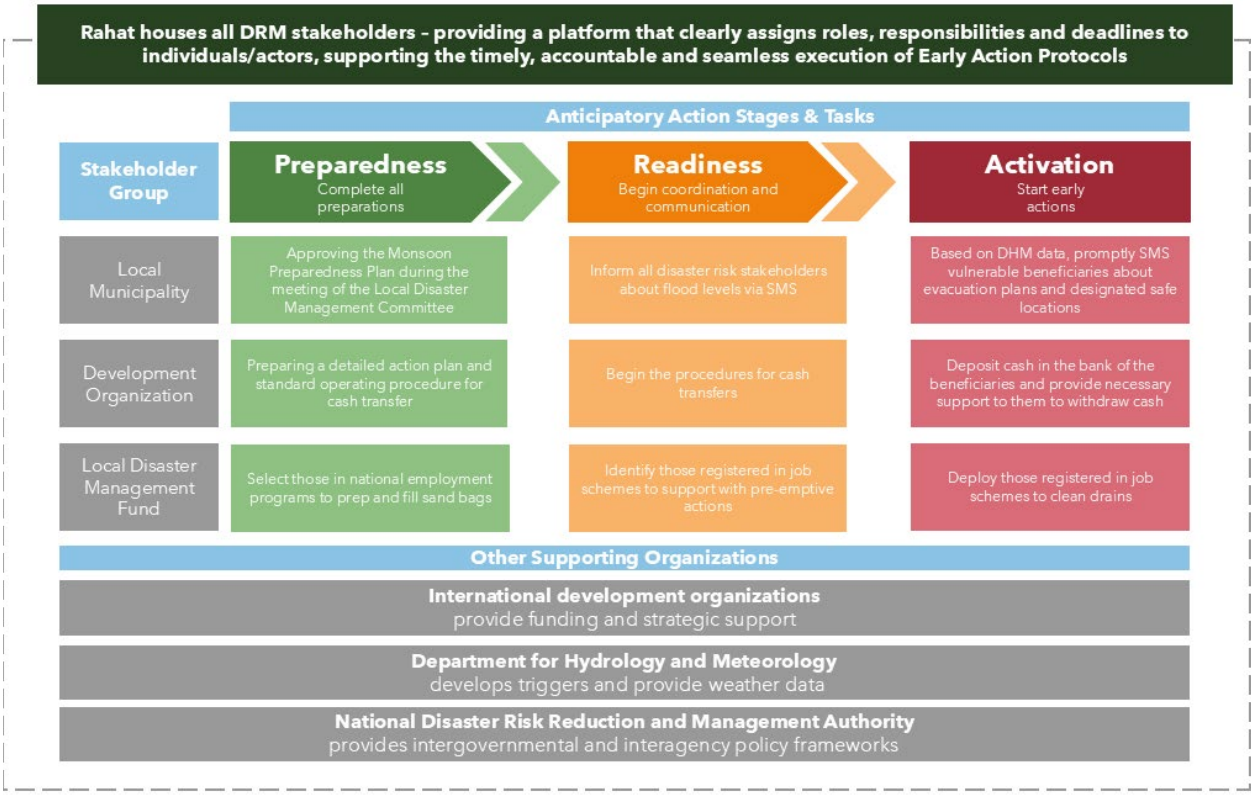


Figure 6. Rahat's blockchain architecture explained



*These are a list of non-exhaustive sample tasks outlined in an Early Action Protocol for the Karnali River Basin in Janaki Rural Municipality that highlight the diverse nature of tasks involved in supporting with flood prevention AA efforts

Figure 7. EAP schematic

The platform was initially developed during the COVID-19 pandemic as a solution for transparent grocery distribution.

The foundation of Rahat's technology stack is blockchain — a decentralized database system that records information in a way that makes it extremely difficult to change, hack, or cheat the system. Unlike traditional databases, blockchain creates a series of "blocks" containing transaction data, with each new block linked to all previous blocks in a cryptographically secure manner. This architecture (see Figure 5) enables Rahat to maintain a tamper-resistant record of every aid transaction, from beneficiary onboarding to initial aid approval to final disbursement.

Importantly, blockchain does not equal cryptocurrency — its function in Rahat is entirely different. Blockchain in this context solves the persistent issue of communication and information management that NGOs and the government in Nepal have long struggled with (see Figure 6). By offering a shared, transparent system for tracking aid delivery and managing beneficiary data, it becomes a highly effective solution in the specific context of humanitarian response and aid delivery in Nepal.

Smart Contracts and Tokenization

One of Rahat's distinctive features is its implementation of smart contracts — self-executing agreements with terms directly written into code. These smart contracts automate the distribution process through tokenization. This automation is a key innovation, allowing for programmed disbursement and operational actions to be executed automatically once predefined

triggers are met. This capability shifts disaster response from being reactive to enabling pre-agreed early action, significantly reducing delays in aid delivery and operational responses.

Tokens within Rahat represent cash that can be exchanged for physical goods or services by authorized vendors. As a blockchain officer at Rumsan explained, "The idea of tokenizing the distribution process [ensures] transparency and efficiency." This tokenization system allows aid agencies to distribute cash, food, or service vouchers digitally while maintaining a verifiable record of every transaction. The effectiveness of these automated, forecast-linked actions, however, is fundamentally dependent on the accuracy and timeliness of the underlying forecast data. Without reliable data to feed into the triggers, the full potential of this automation, which offers a seamless transition from reactive to pre-agreed early action, cannot be fully realized.

Anticipatory Action Module

The most innovative aspect of Rahat's technological solution is its anticipatory action module, which transforms disaster response from reactive to proactive (see Figure 7). The module automates the integration of weather forecast sources and other data, improving decision making and communication prior to disaster events. This system incorporates:

1. A multi-signature trigger system. Critical decisions require approval from multiple authorized stakeholders before funds are released.

2. Hydrological data integration. The platform collects real-time data from various sources including Nepal's Department of Hydrology and Meteorology and the Global Flood Awareness System.

3. Automated early warning notifications. The system sends alerts via SMS and Interactive Voice Recordings (IVRs) to beneficiaries in high-risk areas.

As a project coordinator at the Danish Red Cross described, "The trigger mechanism involves overlaying weather forecasts with risk analysis to prioritize actions and communities ... The application also includes human analysis to ensure accurate and timely decision making."

Comprehensive Dashboard

Importantly, the Rahat platform brings many stakeholders together. This centralization is precisely what is needed in a humanitarian aid-delivery solution and has been missing in aid responses to flooding in the Terai. So how does it operate? Rahat's user interface centres on an integrated dashboard that serves as the command centre for humanitarian organizations and government partners. A staff member of a local develop organization that has supported the implementation of Rahat explained: The platform provides a dashboard for "disaster response, including disbursement, beneficiary management, and anticipatory action modules." It "supports proactive responses with forecasting data and trigger management" and assigns users "specific roles with predefined permissions.

Key dashboard features include:

- Real-time monitoring of funds allocation and disbursement
- Beneficiary data management and verification tools
- Project activity tracking and stakeholder communication
- Integration of multiple weather forecast sources
- Visualization of risk areas and affected populations.

To address potential connectivity challenges in times of natural disaster, the Rahat app's

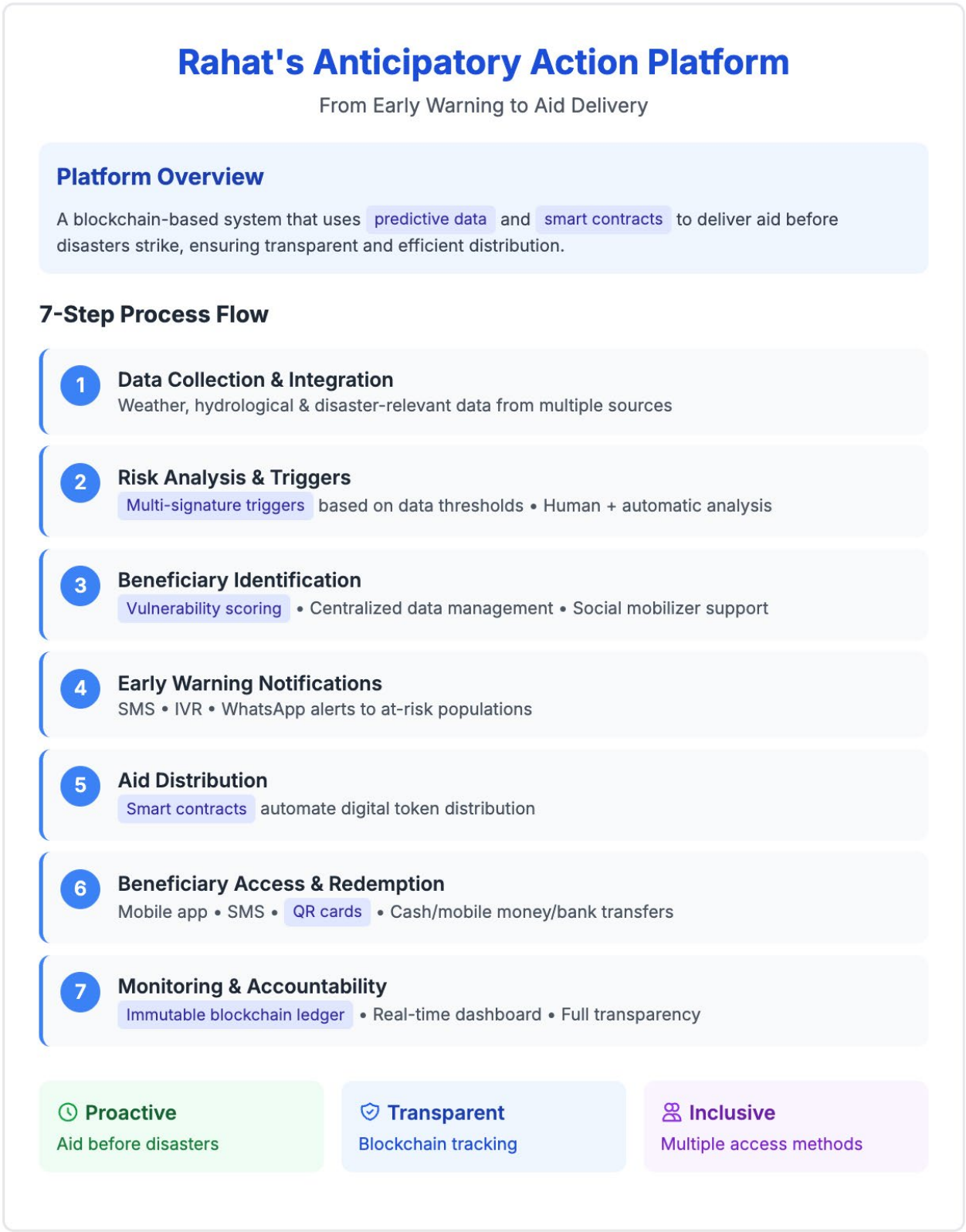


Figure 8. How Rahat's anticipatory action platform works

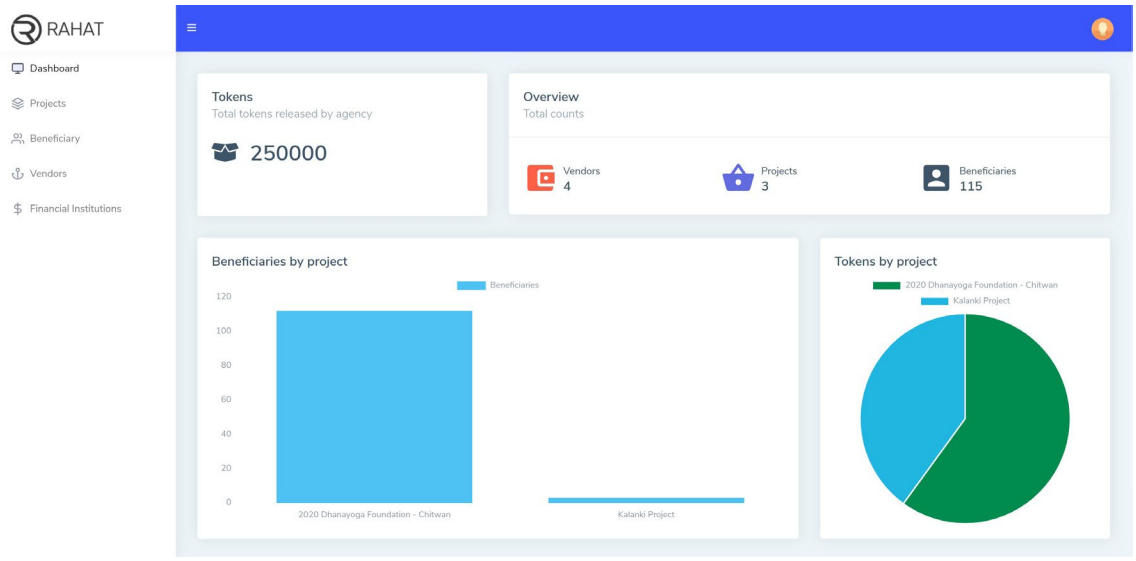


Figure 9. Rahat dashboard

offline functionality allows transactions to be processed without internet connectivity. It syncs transactions when connected to the internet, but double spending can still occur, which needs to be resolved manually.[6] Rahat employs several strategies to overcome connectivity challenges:

- **SMS-based communication:** Essential for areas with basic cellular service but limited internet
- **Interactive Voice Response:** Enables communication with beneficiaries who may have limited literacy
- **QR card distribution:** Physical cards containing QR codes that represent digital tokens for beneficiaries without phones.

Beneficiary Access Mechanisms

For beneficiaries in remote areas who lack technical knowledge and smartphones, Rahat uses "custodial wallets" managed by Rumsan, that allow beneficiaries to control their wallets through SMS. Simply put, a "custodial wallet" is a digital wallet managed by a third party on behalf of the user. This means beneficiaries can access and control their funds through simple SMS commands without needing to navigate the wallet which is sometimes a new and potentially foreign digital technology for them. This approach helps ensure financial access and inclusion for beneficiaries in the Terai region who have limited digital literacy.

The platform supports three primary methods for beneficiaries to access aid:

- **Mobile-based access.** For beneficiaries with smartphones who can use a dedicated app. They do not use the Rahat dashboard — only stakeholders involved in aid distribution and/or monitoring do.
- **SMS-based access.** For those with basic mobile phones but no internet access
- **QR card system.** For individuals without phones, providing a physical token that can be redeemed at predesignated local stores.

6 That is, re-recorded or re-entered in the ledger.

Figure 10. Workshop on user-centric design of the Rahat platform for anticipatory action, 2024 (Source: "Workshop on User-Centric Design of Rahat platform for Anticipatory Action, 2024," Rahat)

A payment service provider involved in the project explained that their role was "to disperse funds, leveraging their offline service provider status, which is crucial during natural disasters when digital services may fail." This multimodal approach ensures that even the most technologically disconnected populations can be served.

Financial Service Integration

To facilitate cash transfers, Rahat integrates with existing financial service providers while maintaining blockchain verification. The platform has "partnered with UNICEF and other organizations, impacting more than 80,000 lives through various projects."

The system accommodates multiple financial distribution channels:

- Direct mobile money transfers for unbanked beneficiaries
- Cash and value vouchers redeemable through local vendors
- Bank transfers where traditional banking infrastructure exists
- Local agent networks for areas without formal banking presence.

The flexibility of these distribution methods allows Rahat to operate effectively across varying contexts while maintaining the accountability advantages of blockchain technology.

Rahat consolidates information management for disaster-relief stakeholders in the form of a dashboard and helps to coordinate roles and responsibilities for each stakeholder, improving accountability (see Figure 9). An official at a development organization, who otherwise was skeptical about the efficacy of blockchain technology, explained this benefit to us: "the main value proposition with the Rahat platform is to simplify. It is centralizing a lot of these different functions that previously were siloed. Say there was one function that was directly transferring bank to bank. There was information through WhatsApp, through email. You want to get all that into one place to make it easier, just one central system where you

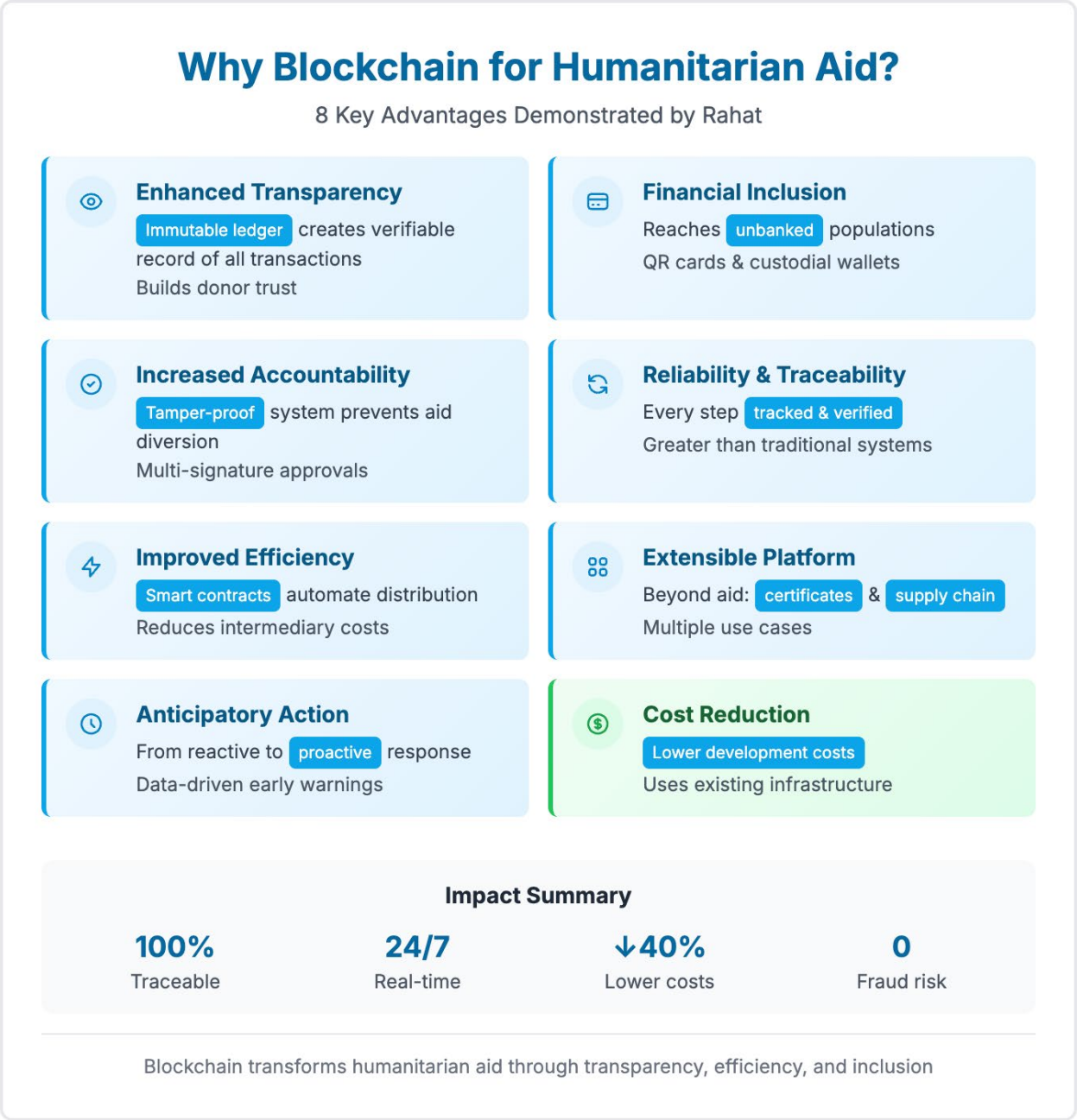


Figure 11. Advantages of blockchain for humanitarian aid

have communication, coordination, information management, and access to the actual weather forecast."

Despite its clear operational gains and its role in addressing many pain points for delivery organizations and other aid stakeholders concerning existing cash-transfer programs, the Rahat platform still faces several structural barriers and design flaws that prevent it from reaching its full potential.

Implementation Challenges

Digital financial illiteracy is one of the common challenges with digital cash-transfers programs, and Rumsan's solution, Rahat, has helped address this issue through digital financial literacy workshops. Apart from the workshops, community support systems and local volunteers play a critical role in guiding individuals through mobile money processes. Beyond digital literacy, other implementation hurdles include system integration difficulties, infrastructure weaknesses, and limitations within the mobile application itself.

A notable issue has been the disconnect between delivery humanitarian organizations and Rumsan, the tech company behind Rahat. As a technology-focused entity, Rumsan's design choices sometimes do not fully capture the realities of field workers. For instance, field staff often lack regular access to laptops, yet the Rahat dashboard, crucial for viewing and updating information, was not initially designed for mobile access during this pilot project. However, a mobile version of the app is currently under development to address this specific need.

Future Technological Improvements

To enhance the Rahat platform's capabilities and address existing limitations, several technological improvements are in the pipeline. These include:

- **Development of mobile applications for field teams.** This directly addresses the need for field staff to access and update the Rahat dashboard on the go, improving operational efficiency.
- **Integration with artificial intelligence (AI) for improved decision making.** Leveraging AI could further refine risk analysis and anticipatory action triggers.
- **Enhanced offline functionality for disaster-affected areas.** This improvement is critical given the potential for internet connectivity disruptions during natural disasters, ensuring continued operation when online access is scarce.
- **Expanded financial service partnerships for broader reach.** Increasing the network of financial service providers will allow Rahat to serve an even wider range of beneficiaries.
- **Incorporation of additional hazard monitoring beyond flooding.** While currently focused on hydrometeorological disasters like floods, expanding monitoring to other hazards would broaden Rahat's applicability for comprehensive disaster risk management in Nepal.

Key Findings of Our Research

Anticipatory Action

Anticipatory action in Nepal offers a number of benefits when compared to traditional cash-transfer programs, although several limitations persist. Previously, national legislation restricted municipalities from distributing cash to flood victims ahead of disasters, thereby limiting proactive disaster response. However, following the introduction of the Disaster Risk Management framework in 2018, anticipatory

action was formally integrated as a disaster-response mechanism. Municipalities are now responsible for convening disaster management committee meetings and verifying beneficiary data through elected local boards to determine which households or beneficiaries will receive relief and in what order.

However, while local governments possess autonomy in disaster management, they often lack the financial resources and operational frameworks needed to implement anticipatory action effectively. Early Action Protocols, developed in collaboration with the Red Cross and Red Crescent Climate Centre in Nepal, outline actions to be taken before floods and identify the triggers and thresholds necessary to initiate early warnings. In 2023 there was a regional dialogue that generated evidence for a political push on anticipatory action's positive impact. This dialogue resulted in a shared goal to establish a national anticipatory action clinic and roadmap along with a framework for Anticipatory Action in Nepal by 2030, to ensure it is recognized as a national process and clarifies the role of the multiple stakeholders involved. Overall, while anticipatory action enhances preparedness and response, its scalability hinges on improved funding structures, institutional clarity, and coordination across government tiers.

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Why Blockchain?

Blockchain technology presents a strong value proposition for disaster relief by enhancing the efficiency, transparency, and accountability of cash-transfer systems. When effectively implemented, blockchain can centralize beneficiary data, streamline the anticipatory action process, and consolidate stakeholder responsibilities during emergencies. The Rahat platform exemplifies this by reducing duplication and ensuring accountability through a transparent, traceable system. Before Rahat's adoption, many nongovernmental organizations (NGOs) and local government actors relied heavily on fragmented communication channels — such as WhatsApp groups and ad hoc spreadsheets — which often led to chaotic coordination, information silos, and inefficiencies in aid distribution.

By contrast, Rahat's blockchain-based dashboard manages both the early action processes and the disbursement of funds, enabling multisignatory transactions and real-time monitoring. These features help build trust — an essential element in humanitarian aid contexts. Moreover, blockchain systems mitigate the risk of fund mismanagement and contribute to a more transparent social protection infrastructure. However, challenges remain, including difficulties in real-time data updating for field staff and ongoing concerns about data protection and the secure management of beneficiary information. Also, explanations of blockchain technology to non-technical aid and disaster risk stakeholders can create confusion and discourage engagement and interest. Still, compared to development-oriented cash-transfer programs, blockchain-based systems offer greater reliability and traceability, though they demand substantial technical capacity and stronger intergovernmental coordination. Ultimately, blockchain complements anticipatory action by minimizing residual risk and enhancing the integrity of aid delivery mechanisms.

Critical Success Factors

For an anticipatory action blockchain solution to work smoothly, it needs certain features built in

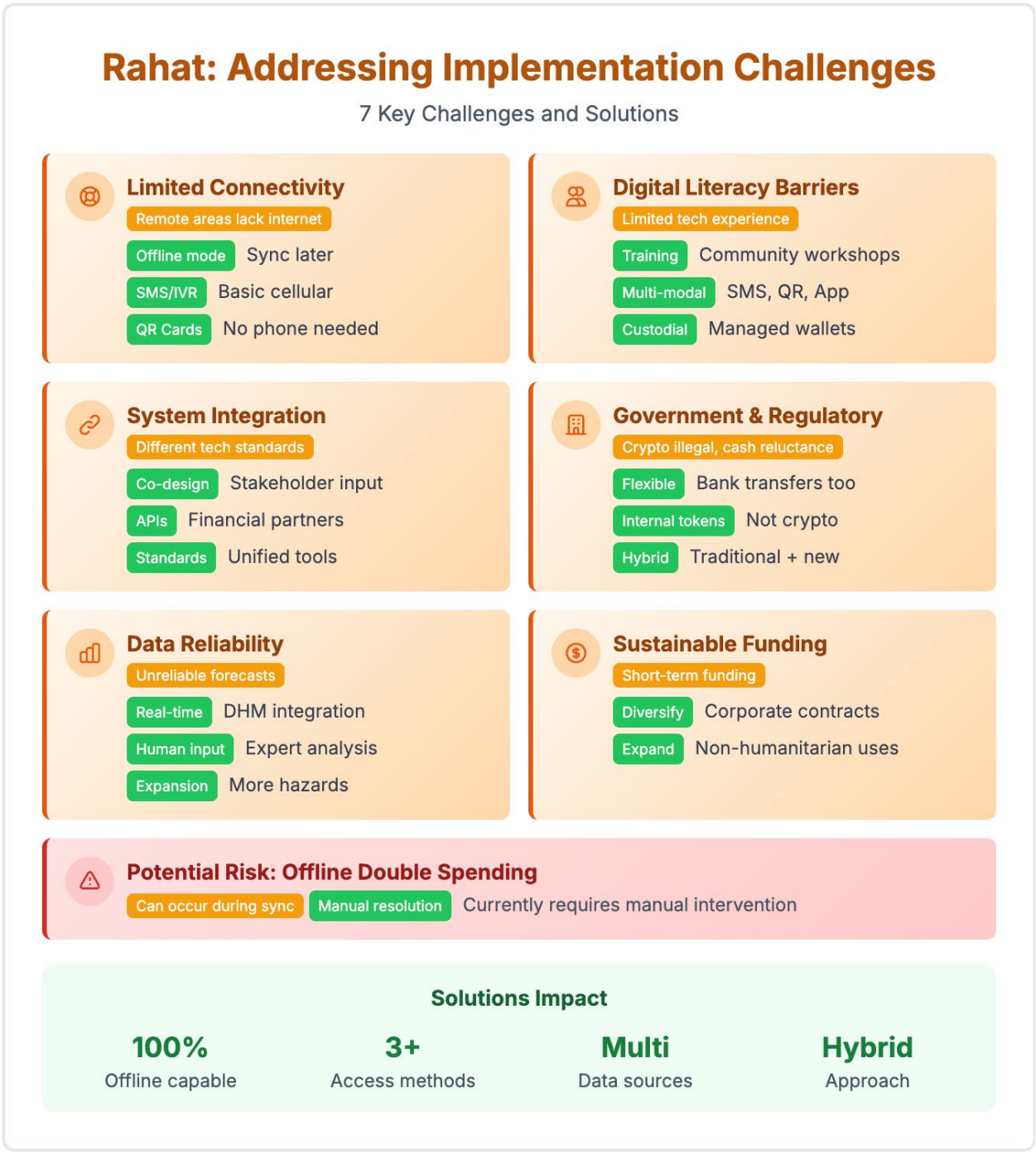

Figure 12. Rahat's implementation challenges

from its design to implementation. For example, the platform's design has to support data sharing and management efficiently and quickly, as required by an early action approach to disaster relief. Awareness workshops were also highlighted as a central part of this initiative. For it to be effective, beneficiaries must develop self-sustainability through financial literacy and understanding of anticipatory action. Strong partnerships and coordination among both implementing and non-implementing actors of the project were also emphasized because enabling collaboration can lead to greater success. These insights point to important considerations for the sustainability and scaling of Rahat's anticipatory action platform.

Factor 1: Platform Design

Beneficiary management tool. Rahat's platform plays a crucial role as an information management system. Users, including local governments and humanitarian organizations, emphasized that its value lies in the ability to quickly and accurately identify beneficiaries, centralizing all necessary data in one place and reducing duplication. Once beneficiaries are identified, their information gets uploaded to the system, enabling rapid and efficient selection and fund disbursement once the trigger is activated.

Early warning messages. Another important aspect of the platform is its early warning message system. During the preparedness, readiness, and activation phases, Rahat uses multiple communication methods, such as SMS and Interactive Voice Response (IVR), to send early warnings quickly and effectively, helping beneficiaries better prepare for and understand the current climate forecast. In the pilot program, most beneficiaries took proactive measures after receiving early warning messages.

Figure 13. Reach Alliance team at the Rumsan office in Kathmandu

Municipal actors noted that the IVR tool, in particular, proved highly effective for reaching illiterate individuals because it provides voice messages rather than text. Rahat not only enhances reliability by supporting multiple activations in a short time but also significantly improves inclusion and accessibility. In addition to these digital tools, door-to-door communication by local volunteers from the Nepal Red Cross further extended the platform's reach, ensuring critical messages reached even the most vulnerable communities.

Stakeholder communication. A major success factor in Rahat's pilot was the way it enhanced communication and improved transparency and accountability among stakeholders. The Rahat dashboard allowed for real-time activity tracking, enabling stakeholders to assign tasks based on the early action protocol and allocate responsibilities to specific groups. This clear division of roles made it easier to follow up on early action tasks, allowing for a more systematic and efficient response.

Before using Rahat, stakeholders relied on an "informal" network of communication, mainly through WhatsApp, phone calls, and emails. However, as a Danish Red Cross officer noted, "If I don't check my phone for 30 minutes, there's going to be 100 notifications, and it's difficult to go through that, and then you can miss out on important information," adding that for "someone from headquarters level, it is quite overwhelming." This underscores how relying on informal channels can create serious implementation challenges, especially during the high-pressure period following a trigger activation, including missed information, overlapping responsibilities, and limited accountability or coordination among actors.

Humanitarian workers noted that the information recording tool in the Rahat platform was particularly valuable for how it brought together diverse stakeholders, given that anticipatory action is a layered process with responsibilities distributed across different levels. This structure allowed everyone involved to track progress, identify who was responsible for specific tasks, and maintain a record of critical information throughout the project phases. This approach not only clarified individual roles but also strengthened overall communication across various levels of the response.

Finally, in addition to improving communication, Rahat now also supports task and resource coordination workflows. For example, it can automatically trigger early activities like drain clearing after certain forecast thresholds. This functionality expands Rahat's anticipatory action beyond just cash assistance to also support broader operational readiness during the time of disaster.

Factor 2: Awareness Workshops

Rahat's awareness and capacity-building workshops on digital financial literacy and anticipatory action were also a success factor of the initiative. These sessions not only raised awareness about digital fraud risks but also educated beneficiaries on the concept and importance of anticipatory actions. Municipal actors noted that these sessions significantly improved community preparedness and understanding since informed individuals were more likely to evacuate to safer regions, reducing the risk to human life. Local government officials observed that these programs helped reduce instances of fraud because beneficiaries became more cautious about sharing their phone numbers and personal information, addressing past issues where cash transfers were stolen.

These workshops were also fundamental in addressing digital illiteracy, even in areas with low levels of digitization, by equipping communities with the skills they needed to foster digital self-resilience and self-sufficiency. Contrary to initial expectations,

some stakeholders emphasized that literacy and digital literacy were less of a barrier in Nepal than we expected. A staff member from a payment service provider noted that low literacy is "not an obstacle because when it comes to these kinds of anticipatory actions, there is always someone who is helping them [beneficiaries] out ... Even if they are illiterate, there is someone who is assisting them." They also stressed that the Nepalese population's rate of change with respect to digital and financial literacy rates has improved dramatically. For example, five years ago only 40 per cent of people had bank accounts but that number has now doubled to 80 per cent. During the implementation of the anticipatory action project, several volunteers from the Nepal Red Cross and local communities were trained to support beneficiaries, demonstrating that illiteracy can be mitigated, or at least reduced, through community-based assistance and volunteer engagement.

This success factor directly contributed to the outcomes observed in the effectiveness of anticipatory action. As a staff member at a local development organization told us, anticipatory action goes beyond direct cash assistance, with capacity building being one of its primary benefits. "The actions we selected for the anticipatory actions should not harm the community but further build the resilience for other hazards." This shift in mindset and understanding among beneficiaries can lead to more efficient and impactful humanitarian responses.

Factor 3: Partnerships

The Rahat project created a valuable opportunity for collaboration between humanitarian organizations and the tech sector. Implementation partners like the Nepal Red Cross Society and Danish Red Cross noted that the project helped break down barriers to digital technology adoption within their teams, fostering a more innovative culture. This marks an important step in demonstrating how technology can be leveraged to fill critical gaps in delivering anticipatory action.

At the same time, however, the project also revealed challenges in establishing a broader national and institutional framework for collaboration. For example, despite Rumsan's central role, efforts to formalize partnerships with certain government agencies proved difficult. This highlights a key tension: while the project had the potential to foster innovative collaborations, it also exposed the institutional and bureaucratic obstacles that continue to hinder effective cross-sector coordination in anticipatory action.

Scaling and Sustainability

Data Collection for Anticipatory Action

One of the biggest impediments to anticipatory action's broader adoption in Nepal is a lack of data availability, caused by a lack of regional and national partnerships aimed at broad weather data collection. Anticipatory action works best when shocks are cyclical and relatively easily predictable, with ample data from various local, national, regional, and global sources to cross-check and validate each other. These data sources are then collated to identify the relevant levels of predictable variables that can be used as triggers to initiate the required early action protocol. As recently as 2014, flood forecasting data in Nepal was extremely unreliable, until the Department of Hydrology and Meteorology undertook significant efforts to improve the frequency and coverage of its network of over 800 weather stations across the country. These efforts, which include the adoption of telemetrics (e.g., transition from manual to automatic weather stations), have allowed for significant improvements in the Department of Hydrology and Meteorology's

flood forecasts. However, relative to other national contexts where anticipatory action has flourished and been widely adopted, Nepal's forecasts are still unreliable, especially significantly earlier in time from the actual disasters. This lack of accurate forecasting data has resulted in (1) mistrust from people living in flood-prone areas who previously have ignored early warnings and other communications and (2) a reliance on other major weather data collectors when developing anticipatory action triggers (e.g., data from Global Flood Awareness System).

Complementing this past decade's rapid advancements in data collection and accurate short-term flood forecasting, the Department of Hydrology and Meteorology has set its sights on impact-based forecasting and partnered with international development organizations to improve its flood forecasting infrastructure and gain access to data from other South Asian nations that Nepal shares rivers with.

Funding Concerns

Aside from Rahat's technical components, a lack of sustainable funding has jeopardized the progress of disaster risk-management efforts in Nepal. Beyond the uncertainty introduced by US President Donald Trump's funding cuts to USAID, which supported many disaster-relief efforts in Nepal, major funders' interests are also moving away from anticipatory action, according to international aid stakeholders. Part of this stems from the short-term nature of funding contracts, which haven't provided sufficient time to develop triggers, onboard beneficiaries, and ultimately provide aid and early warnings on a recurring basis during each monsoon season. Longer-term funding structures (e.g., ten years instead of three to five years) would enable a clearer demonstration of the long-run cost-saving and empowerment benefits of anticipatory action.

To respond to such concerns about funding, Rumsan is exploring other uses of blockchain to raise funds. For example, it recently partnered with a leading eyewear company to distribute blockchain-based vouchers for free glasses in countries across Southeast Asia and East Africa using its Rahat platform. Rumsan believes these organizations are able to commit to longer-term contracts that mitigate concerns about the benefits of blockchain not being realized due to initially slow digital infrastructure development.

Figure 14. International Federation of Red Cross and Red Crescent Societies (IFRC) country delegation office in Kathmandu

Application of Blockchain in Other Development and Aid Contexts

Similar to the use of Rahat to support corporate foundations' humanitarian efforts, Rumsan is also exploring additional avenues to leverage its blockchain platform, especially in regulatory contexts that enable blockchain to be used to its full potential. For example, Rumsan

is exploring a pilot with UNICEF to carry out blockchain-to-blockchain cash voucher assistance.

In this proposed pilot, both the transaction record and the movement of funds would occur entirely on the blockchain. Unlike the Nepal pilot with Danish Red Cross, which focused on low-tech beneficiaries using SMS-enabled custodial wallets, this initiative is designed for recipients with greater access to digital tools and information. These include previously economically prosperous refugees who have sufficient digital literacy to set up and manage their own digital wallets. Aid would be delivered in the form of cryptocurrency or stablecoins, which are digital currencies pegged to stable assets like the US dollar.

The use of cryptocurrency or stablecoins in humanitarian aid has several advantages: it allows for faster disbursement, greater transparency, and traceability of transactions, and facilitates cross-border payments without reliance on traditional banking infrastructure. By enabling beneficiaries to transact directly or off-ramp into local fiat currency, such models allow for more autonomous and dignified forms of aid.

Innovations like this illustrate how the same Rahat technology used in anticipatory action can be adapted and localized to meet the diverse development and humanitarian needs of different regions. Even within Nepal, the possibilities for scaling anticipatory action technology are large. An official from a development organization told us about the potential for anticipatory action being used in other disasters and national issues. "Nepal struggles with dengue and heat. It would be really nice if we could use [anticipatory action] for three different early action protocols (flood, dengue, heat) because at the end of the day, [Rahat] is an information management system, so why not use this in other contexts? The possibility is quite immense."

Achieving the promise and scale of anticipatory action is not an easy task, and much of it will require significant shifts in policy, partnerships, and technology from Rumsan and anticipatory action stakeholders. In each of these three areas, these scaling considerations inform our lessons learned and implications.

Lessons Learned

Implication 1: Advocate and Build Toward a National AA Framework

Currently, there is no dedicated regulation or policy on anticipatory action within Nepal's disaster-risk-management framework. This regulatory gap poses significant challenges to implementing anticipatory action at the municipal level, where unclear mandates and a lack of institutional support can hinder timely and effective action. To address this, stronger advocacy is needed, particularly during key national platforms such as the annual National Dialogue on Anticipatory Action. These events offer a strategic opportunity to engage stakeholders and build momentum toward establishing a stronger national framework that would provide the necessary policy guidance, coordination, and institutional support to scale anticipatory action initiatives across all levels of government.

Implication 2: Set Up Frequent Touchpoints Between All Stakeholder Groups

As part of ongoing advocacy efforts to build an effective anticipatory action framework, constant communication with stakeholders is key. To enhance coordination, we recommend frequent and structured touchpoints, such as working groups, consultation processes, and regular coordination and planning meetings. A central working group with key stakeholders would help prevent duplication of efforts, reduce fragmentation, and allow for better

alignment of roles, resources, and timelines among partners. These mechanisms would support up-to-date knowledge sharing, ensure alignment of initiatives, and strengthen joint efforts in policy advocacy. Ultimately, it would foster a more cohesive and responsive anticipatory action ecosystem in Nepal

Implication 3: Crypto and Blockchain Regulation in Nepal

A major hindrance to the Rahat platform realizing its full potential is the legal status of cryptocurrencies in Nepal, which are completely banned. However, the nation's central bank, the Nepal Rastra Bank, published a white paper assessing the benefits of launching a central bank digital currency (CBDC) in 2022, demonstrating some government interest in adopting and using cryptocurrency. By advocating for further advancements in Nepal's cryptocurrency and blockchain policy, Rumsan could deliver cash transfers to beneficiaries, further streamlining and centralizing processes through the Rahat platform.

Implication 4: Use a Stakeholder-Based Blockchain Communication Framework

Instead of communicating the value of Rahat and its blockchain technology architecture using a one-size-fits-all approach for all stakeholders, Rumsan should tailor its message. One of the big pain points for people implementing and delivering aid was their confusion with blockchain, muddying its value proposition and consequently reducing the trust they had in Rahat. By solely communicating blockchain technology and its applicability to funding organizations and other high-level decision makers, Rahat could avoid this and ensure

Table 3. Key implications for policy, partnerships, and technology

Area	Finding	Implications
Policy	• There is currently no anticipatory action regulation within the disaster risk-management framework in Nepal • Cryptocurrency is illegal in Nepal	• Advocate and build toward a national anticipatory action framework • Set up frequent touchpoints between all stakeholder groups to avoid duplication of efforts • Address obstacles in current crypto and blockchain regulation
Partnerships	• Barriers to building an extensive national and institutional system for collaboration • There is an overlap of responsibilities and roles • Awareness programs are vital, but there is a need to improve and expand	• Use a stakeholder-based blockchain communication framework • Strengthen and empower local government/community • Build financial sophistication among local communities to ensure self-sustenance of disaster relief delivery
Technology	• The platform was not designed for offline use • Blockchain accounts for just a minor part of the Rahat platform • Explanations of blockchain technology can create confusion and discourage engagement and interest	• Ensure continuous design consultation with aid and delivery organizations as the platform is built out • Create mobile and offline variations to accommodate for ways of working in the field • Decouple platforms from "blockchain" and instead focus on information management • Generate evidence to support funding and scale-up

that stakeholders who need to know about blockchain and its specifics have the information they need, while not confusing stakeholders involved in implementation.

Implications 5 & 6: Awareness Workshops and Community Self-Sustainability

Multiple stakeholders recognized awareness workshops on digital financial literacy and anticipatory action, conducted under the Rahat anticipatory action initiative, as a best practice. To build on this success, we strongly recommend continuing these workshops with increased frequency — both during the preparedness phase and in the postflood period. Additionally, conducting follow-up assessments after flood events is essential to evaluate their impact and identify opportunities for improvement, ensuring the workshops remain responsive to community needs and contribute to long-term resilience.

While financial illiteracy remains a potential barrier, several stakeholders emphasized that it is not one of the major obstacles in Nepal. However, given its importance in strengthening long-term resilience, we strongly recommend continuing and expanding awareness workshops aimed at building financial sophistication among local communities.

Implication 7: Ensure Continuous Design Consultation with Aid and Delivery Organizations As the Platform Is Built Out

Building on the approach established in this anticipatory action project, it is crucial to continue regular, user-centred consultations throughout the platform's development. Incorporating feedback from diverse sectors, especially from those who actively use the platform, will ensure that its design remains practical, effective, and aligned with on-the-ground needs. These ongoing consultations will help bridge the gap between the technological and humanitarian sectors by creating a platform that is both technically robust and user friendly for humanitarian actors.

Implication 8: Create Mobile and Offline Variations to Accommodate for Working in the Field

Understanding the reality of the Rahat platform's end users — members of development organizations delivering aid at the municipal level — is pivotal. Their work in the Terai area often means they have limited access to the internet and have to rely on spotty (although rapidly improving) mobile data. Their work in the field is also arduous and long, preventing them from being able to log changes and mark tasks complete on the Rahat dashboard (which is available on only desktop computers and laptops). Frequent updates from all stakeholders are crucial when delivering aid through an anticipatory action approach so the Rahat platform should be expanded to be available on mobile data and potentially, offline (similar to the Unstructured Supplementary Service Data or USSD technology used by Nepal's leading digital payments companies to execute money transfers without internet access). Rumsan is already developing some of these versions, demonstrating they are receptive to feedback from their implementing partners, who initially lobbied for offline and mobile functionality.

Implication 9: Decouple Platforms from "Blockchain" and Instead Focus on Information Management

Although the Rahat platform incorporates some blockchain technology, its core strength lies in its function as an effective information management system. Given that cryptocurrency is illegal in Nepal and that blockchain remains an unclear concept among many aid stakeholders, Rumsan's messaging should shift away from "blockchain" and instead highlight Rahat's practical value as an information

management tool. Overemphasizing the blockchain aspect has, in some cases, led to confusion or disinterest, limiting stakeholder engagement and the expansion of the platform's adoption.

Implication 10: Generate Evidence to Support Funding and Scale-Up

Adopting a strong evidence-based approach is essential to secure funding and support the scale-up of Rahat. Continued engagement in producing research can help demonstrate anticipatory action's impact and build credibility with funders. To support this, we recommend continued partnerships with academic and research initiatives, such as Rumsan's collaboration with the Reach Alliance, to produce rigorous evidence needed to shift perceptions around blockchain and anticipatory action, influence policy, and attract long-term investment.

Incorporating feedback from diverse sectors, especially from those who actively use the platform, will ensure that its design remains practical, effective, and aligned with on-the-ground needs.

Figure 15. Beneficiaries learning how to navigate the system and early warning messages

Research Team

Kamal Al-Alwan is an industrial engineering student at the University of Toronto researching the intersection of technology and humanitarian aid delivery, with particular expertise in blockchain applications for disaster response and climate resilience. Kamal brings extensive experience in data science and AI solutions from his work at Northbridge Financial, University Health Network, and Microsoft, where he developed machine learning models, automated complex processes, and led cross-functional teams on technology implementation projects. His technical expertise spans operations research, machine learning, and cloud technologies, with a focus on applying these tools to address real-world challenges in healthcare, finance, and humanitarian contexts.

Arushi Dahiya graduated from the University of Toronto with an honours BA in international development studies (co-op), political science, and socio-cultural anthropology. She has worked with the United Nations Office on Drugs and Crime in Laos on an alternative development project focused on reducing illegal opium cultivation and conducted research on climate decarbonization strategies with the 100 Resilient Cities initiative. She has also researched social solidarity economies and how marginalized communities challenge capitalist norms by focusing on prioritizing social profitability over financial gains. As a Jackman Scholar-in-Residence Fellow, Arushi studied sustainability in higher education, coding and analyzing mission statements to assess higher education institutions' commitments to, and framing of, sustainability.

Laura Hochheim Thomé recently completed her Master of Global Affairs (MGA) at the University of Toronto's Munk School of Global Affairs & Public Policy. Across the public sector, NGOs, and international organizations, her work has focused on migration and refugees, human rights, and international development. As a research intern at the International Policy Centre for Inclusive Growth (IPC-IG), she supported international development research projects on social protection policies in the Global South. Laura was also a research volunteer for the "Projeto Vida Migrante Empreendedora," a project supporting the socioeconomic integration of Venezuelan immigrants in Porto Alegre (Brazil). She aims to work in policy assessment, research, and international development projects for refugees and migrants, particularly women in Latin America.

Vedant Iyer recently completed his undergraduate degree at the University of Toronto, where he studied management, data analytics, and economics. He recently interned in McKinsey and Company's Toronto office, where he co-developed the five-year corporate strategy for a major crown corporation. He also designed interview guides and interviewed subject matter experts to gather insights that validated his team's strategy development work. Completing over ten pro-bono consulting projects, he has supported large organizations like Greenpeace and Jack.org and small nonprofits and startups. Academically, Vedant has conducted econometric research on the impacts of foreign-educated students on democracy and how shocks to electoral violence affect political trust in Nigeria.

Shristi Piya has over seven years of experience driving digital transformation in diverse sectors like health, humanitarian aid, and agriculture. She has led impactful projects such as Hamro LifeBank, AgriClear, and Rahat, leveraging frontier technologies like blockchain. As chief development and impact officer at Rumsan, she develops and implements strategic initiatives to enhance organizational efficiency and achieve company goals. Her dedication extends to using Rahat (a flagship product of Rumsan) to address several real-world challenges in access to finance for vulnerable communities through innovative initiatives like anticipatory action.

Dilip Soman is a Canada Research Chair in Behavioural Science and Economics at the Rotman School of Management, University of Toronto. He has degrees in behavioural science, marketing, and engineering, and is interested in the applications of behavioural science organizations more generally, and for welfare and policy in particular. He is the co-author of *Managing Customer Value* (2022), author of *The Last Mile* (2015), and co-editor of *The Behaviorally Informed Organization* (2021), *Behavioral Science in the Wild* (2022), *Cash Transfers for Inclusive Societies* (2023), and *What Works, What Doesn't (and When)* (2024). Dilip serves as the director of the Behaviourally Informed Organizations partnership. He has taught in the USA, Hong Kong, and Canada, and has worked with several corporations, governments, international organizations, and start-ups. His non-academic interests include procrastination, cricket, travel, and taking weekends seriously.

Rumsan, founded in 2013, is a frontier technology company dedicated to driving social impact through innovative solutions. Rahat is an open-source, blockchain-based solution developed by Rumsan. It helps vulnerable communities build resilience against climate shocks. By using mobile phones and blockchain technology, Rahat delivers aid quickly and reliably before, during, and after crises. Rahat has already supported over 87,000 individuals and mobilized $243k worth of humanitarian support to vulnerable individuals.
https://www.rumsan.com

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