

# Cash Before Crisis: Blockchain-Enabled Anticipatory Action for Vulnerable Populations in Nepal

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# Executive Summary

## Panel Topic

This brief examines the application of blockchain technology for anticipatory humanitarian action, focusing on how digital platforms can transform disaster response systems to reach vulnerable populations before climate disasters strike. The research centers on Nepal's Rahat platform as a proof-of-concept for integrating technology, financial inclusion, and disability-inclusive disaster preparedness.

## Big-Picture Value

The significance of this research extends far beyond Nepal's borders. With climate disasters increasing in frequency and intensity globally, vulnerable populations—particularly people with disabilities—face disproportionate risks. The World Health Organization estimates that 1.3 billion people worldwide live with significant disabilities, and these individuals are 2.42 times more likely to die in disasters. Traditional humanitarian response systems consistently fail to reach these populations in time.

This case study demonstrates that anticipatory action, enabled by blockchain technology, can fundamentally transform how humanitarian assistance reaches hard-to-reach populations. The 30:1 return on investment and 93% reduction in response time represent not just efficiency gains but potentially life-saving improvements that can be replicated across the 43% of Nepal's population living in flood-prone areas and similar vulnerable communities worldwide.



## Case Study Snapshot

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

**Location:** Nepal's Terai region (Barbardiya, Gulariya, Janaki, and Tikapur districts)

**Hard-to-Reach Population:** People with disabilities, seniors (60+), pregnant/lactating women, and scheduled castes

**Core Challenge:** Nepal's Terai region faces recurring floods with inadequate disaster response systems. Traditional aid delivery is reactive, fragmented, and inefficient, leaving vulnerable populations—especially people with disabilities—at severe risk during climate disasters.

**Key Findings:** The Rahat blockchain platform successfully delivered anticipatory cash transfers to 774 beneficiaries with disabilities within 5.5 hours of activation, while 4,583 people received early warnings. The platform improved coordination, transparency, and accountability among stakeholders while addressing barriers to financial inclusion.

# Mapping of Policy Stakeholders

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The findings from this research are relevant to multiple policy actors operating at different scales and with varying mandates. Understanding their roles and interests is essential for effective knowledge translation and implementation.

## National Government Actors

- National Disaster Risk Reduction and Management Authority (NDRRMA): Primary policy owner responsible for national disaster preparedness standards, coordination protocols, and resource allocation
- Nepal Rastra Bank: Central bank with authority over financial regulations and digital payment infrastructure, currently exploring Central Bank Digital Currencies (CBDCs)
- Department of Hydrology and Meteorology: Provides early warning data that serves as trigger mechanisms for anticipatory action

## Sub-National Actors

- Provincial Disaster Management Committees: Coordinate disaster response across municipal boundaries and manage provincial-level resources
- Municipal Disaster Risk Reduction Focal Persons: Front-line implementers in 753 municipalities responsible for beneficiary registration, distribution, and community engagement
- Local Disaster Management Committees: Execute on-the-ground operations and maintain community relationships

## International Organizations

- Danish Red Cross: Primary international partner with EUR 2.5 million committed for scaling, viewing Nepal as a regional proof-of-concept
- Nepal Red Cross Society: National implementing partner with 145 district chapters ready for adoption
- UNICEF, Mercy Corps, and other humanitarian organizations: Potential adopters and collaborators with complementary programs
- SAARC Disaster Management Centre: Regional coordination body for potential model replication in Bangladesh, India, and Pakistan

## Technical and Private Sector Partners

- Rumsan: Technology provider responsible for platform development, maintenance, and updates
- Mobile Money Providers: Essential partners for last-mile cash distribution requiring partnership agreements
- GSMA Innovation Fund: Current pilot funder with potential for continued support

# Solutions

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## Priority Recommendations

Based on the research findings, the panel has identified three interconnected priority recommendations that together constitute a comprehensive approach to scaling anticipatory action in Nepal.

### Recommendation 1: Institutionalize Anticipatory Action in National Policy

Incorporate anticipatory action protocols into the National Disaster Risk Reduction Strategic Action Plan 2025-2030, establishing clear legal frameworks for blockchain use in humanitarian contexts (distinct from cryptocurrency regulations) and creating unified trigger thresholds and beneficiary selection criteria across all 753 municipalities.

### Recommendation 2: Scale Platform Deployment with Capacity Building

Expand from 4 pilot municipalities to 20 flood-prone districts within 6 months, targeting 50,000 beneficiaries, while simultaneously training 500 municipal disaster focal persons on dashboard use and trigger mechanism interpretation. This requires coordinated investment in infrastructure (95% mobile coverage), equipment (tablets/smartphones for 500 field coordinators), and human resources (2,000 community volunteers).

### Recommendation 3: Establish Sustainable Financing Mechanisms

Reallocate 15% of existing disaster response budgets to anticipatory action, starting with high-risk municipalities, while creating dedicated anticipatory action funds with automatic disbursement protocols. Diversify funding through GSMA Innovation Fund, corporate CSR partnerships, international climate finance mechanisms, and government budget integration.



## Research Overlaps Supporting Recommendations

- **Speed and Inclusion:** The 5.5-hour distribution time (compared to 72+ hours traditional) and 97% independent fund access by people with disabilities demonstrate that technology can solve both speed and inclusion challenges simultaneously
- **Cost-Effectiveness:** The 30:1 ROI and 68% reduction in administrative costs validate the economic case for shifting from reactive to anticipatory approaches
- **Coordination Efficiency:** The 60% reduction in coordination meetings and elimination of duplicate registrations address the primary challenge identified by 67% of municipalities
- **Stakeholder Support:** 91% beneficiary satisfaction and 40% reduction in post disaster grievances indicate strong social acceptance

## Remaining Gaps

Several areas require further validation before full-scale implementation:

- **Scale Effects:** Will efficiency and accuracy maintain at 10x current beneficiary numbers?
- **Seasonal Variations:** Performance differences during monsoon vs. dry season remain untested
- **Multi-Hazard Application:** Effectiveness for slow-onset disasters (drought) vs. rapid-onset (floods) needs verification
- **Behavioral Change:** Long-term impact on community preparedness behaviors is not yet documented



# Recommendations Deep Dive

## Context and Political Fit

The recommendations align with Nepal's existing legal and institutional frameworks:

- **Disaster Risk Reduction Management Act 2017:** The current legal framework supports anticipatory action principles and can accommodate the proposed policy integration without major legislative changes
- **Municipal Autonomy:** Nepal's federal structure grants municipalities significant autonomy in disaster response, creating natural entry points for platform adoption
- **Regulatory Considerations:** While cryptocurrency is currently banned, Nepal Rastra Bank is actively exploring CBDCs. The regulatory framework needs clarification to distinguish humanitarian blockchain applications from cryptocurrency, but the political environment is favorable
- **National Dialogue:** The ongoing National Dialogue on Anticipatory Action creates a timely opportunity for policy integration
- **SDG Alignment:** The solution directly supports Nepal's commitments to SDG 1.5 (resilience building) and SDG 13 (climate action), as well as the Leave No One Behind principle

## Institutional and Operational Feasibility

**Lead Implementation Architecture:** NDRRMA serves as policy owner and standard setter at the national level, with Provincial Disaster Management Committees coordinating across municipalities and Local Disaster Management Committees executing operations. Rumsan provides ongoing technical support and platform management.

**Capacity Development Roadmap:**

Timeline	Activity
Month 1-3	Core team training (25 master trainers from NDRRMA)
Month 4-9	Municipal cascade training (disaster focal persons from 100 municipalities)
Month 10-12	Community volunteer mobilization (2,000 volunteers for beneficiary support)
Ongoing	Quarterly refresher trainings and simulation exercises

Infrastructure Requirements: Expanding mobile network coverage to 95% of target areas (from current 87%), providing tablets/smartphones to 500 field coordinators, establishing solar charging stations in 50 remote locations, and creating redundant server capacity in Kathmandu and Pokhara.

Critical Success Factors: Dedicated project management unit within NDRRMA, 24/7 technical support helpdesk during disaster season, clear escalation protocols for system issues, and regular inter-agency coordination meetings.

## Financial Considerations

### Investment Requirements:

- Initial Setup: Platform development, beneficiary onboarding, trigger mechanism development
- Ongoing Operations: SMS/IVR costs, capacity building workshops, dashboard maintenance
- Infrastructure: Mobile coverage expansion, device procurement, solar charging stations, data centre redundancy

### Funding Avenues:

- GSMA Innovation Fund: Current pilot funder with demonstrated interest in scaling
- Corporate CSR Partnerships: Successful eyewear company model can be replicated with other private sector partners
- International Climate Finance: Green Climate Fund and other climate adaptation mechanisms
- Danish Red Cross Commitment: EUR 2.5 million already committed for scaling
- Return on Investment: The 30:1 ROI means each dollar spent on anticipatory action saves \$30 in disaster damage and response costs. For Nepal, where annual flood damages average NPR 2.5 billion, this represents potential savings of hundreds of millions of rupees annually.



## Stakeholder and Social Dimensions

### Primary Beneficiaries:

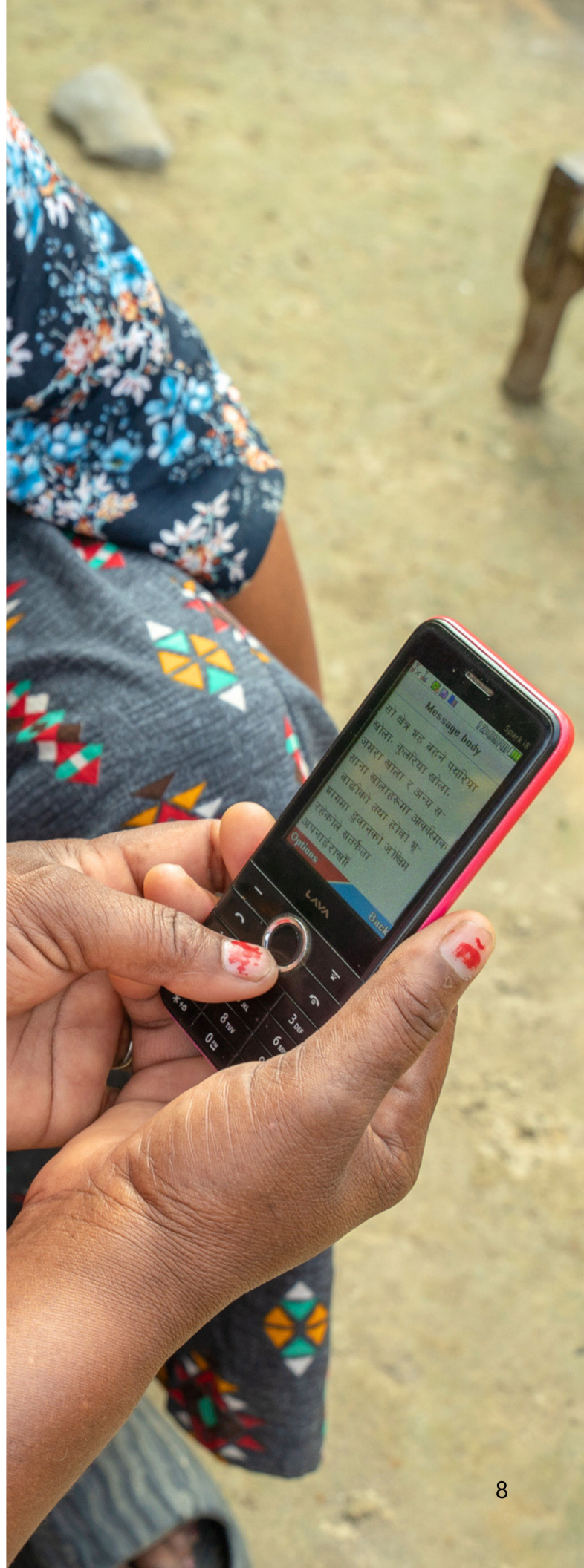
- People with Disabilities: 774 individuals reached in pilot across different disability types; strong advocates due to shift from passive recipients to empowered participants with agency
- Women-Headed Households: 62% of beneficiaries; particularly valued multi-modal communication including voice calls for non-literate users
- Elderly Population: 31% of recipients over 60; appreciated simplified SMS system and family notification features

### Implementation Champions:

- Municipal Leaders: Report 40% reduction in post-disaster grievances and improved political capital from proactive response
- Nepal Red Cross Society: 145 district chapters ready to adopt, viewing it as modernization of their mandate
- Danish Red Cross: Sees Nepal as regional proof-of-concept for South Asian expansion

### Potential Resistance and Mitigation:

- Traditional Aid Contractors: May resist transparency features; engage by highlighting new partnership opportunities in tech support and training
- Local Political Networks: Concern about losing control over beneficiary selection; address through clear, objective vulnerability criteria and municipal oversight roles
- Banking Sector: Initial reluctance about blockchain disruption; mitigate by emphasizing complementary role and increased transaction volumes



# Prioritization and Technical Assistance for Implementation

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## Implementation Priorities

The following actions are prioritized based on urgency, feasibility, and impact:

### Immediate Priorities (0-6 months)

1. Policy Integration: Submit proposed anticipatory action protocols to NDRRMA for inclusion in the National Disaster Risk Reduction Strategic Action Plan 2025-2030
2. Pilot Expansion Design: Identify and assess 16 additional municipalities in flood prone districts for Phase 2 deployment
3. Budget Reallocation Advocacy: Present cost-benefit analysis to municipal budget committees during annual planning cycles
4. Master Trainer Development: Train 25 NDRRMA staff as master trainers for cascade training model
5. Regulatory Clarity: Engage Nepal Rastra Bank to develop guidance distinguishing humanitarian blockchain from cryptocurrency

### Medium-Term Priorities (6-18 months)

1. Scale Deployment: Expand to 20 municipalities with target of 50,000 registered beneficiaries
2. System Integration: Connect Rahat dashboard with Department of Hydrology and Meteorology early warning systems and Bipad Portal
3. Payment Infrastructure: Establish partnerships with all major mobile money providers to achieve 95% population coverage
4. Cascade Training: Train 500 municipal disaster focal persons across 100 municipalities

### Long-Term Priorities (18+ months)

1. National Standards: Establish unified trigger thresholds and beneficiary selection criteria for all 753 municipalities
2. Sustainable Funding: Create dedicated anticipatory action fund with automatic disbursement protocols
3. Regional Expansion: Share model with SAARC Disaster Management Centre for adoption in Bangladesh, India, and Pakistan

## Technical Assistance Requirements

Successful implementation requires coordinated technical assistance across multiple domains:

### Policy and Regulatory Support

- Draft regulatory framework distinguishing humanitarian blockchain from cryptocurrency applications
- Develop model municipal bylaws for anticipatory action adoption
- Create standardized beneficiary selection criteria and trigger threshold guidelines

### Technology and Infrastructure

- Platform scaling and optimization for 50,000+ beneficiary capacity
- API development for integration with existing e-governance systems
- Data centre redundancy setup and cybersecurity hardening
- Mobile network coverage gap analysis and expansion planning

### Capacity Building

- Development of training curricula for municipal officials and community volunteers • Creation of simulation exercise protocols for system testing
- Design of accessible training materials in Nepali with audio/visual options for different literacy levels

### Monitoring and Evaluation

- Establishment of KPI dashboard aligned with SDG indicators
- Design of beneficiary feedback mechanisms and grievance redressal protocols
- Development of long-term impact assessment methodology for behavioral change measurement

### Knowledge Management and Dissemination

- Production of multi-format dissemination materials (policy briefs, video documentation, technical guides)
- Establishment of peer learning networks with other anticipatory action implementers
- Development of regional knowledge sharing platform for SAARC countries



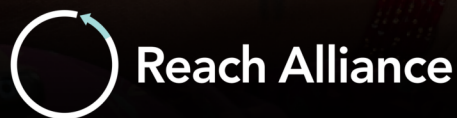
# Recommendations Deep Dive

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The Rahat pilot makes a strong economic case for anticipatory action. Cash reached beneficiaries in 5.5 hours instead of the 72 or more that traditional distribution takes, and each dollar spent saved an estimated \$30 in damage and response costs. Just as important, the platform reached people who are usually reached last: 97% of beneficiaries with disabilities accessed their funds independently, and most recipients were women-headed households. But technology was only part of the story. The pilot worked because municipalities, the Red Cross, mobile money providers, and community volunteers were all pulling in the same direction. Whether it can scale depends on things the platform itself cannot fix, like regulatory clarity around blockchain technology, dedicated funding that outlasts pilot grants, and trained staff across hundreds of municipalities. Open questions remain about performance at ten times the current scale and in slow-onset disasters like drought. Still, with 43% of Nepal's population living in flood-prone areas and partners already committed to expansion, the case for moving from pilot to policy is hard to ignore.

This research is made possible by the support and dedication of Rumsan, especially Smriti Chhetri, Shristi Piya, and Rume Singh, whose consistent communication, coordination, resourcefulness, and guidance throughout were vital.





This work builds on the 2024-25 Reach research report, "[Blockchain for Social Impact: Empowering Vulnerable Communities Against Climate Shocks in Nepal](#)," by Kamal Alwan, Arushi Dahiya, Laura Hochheim Thomé, Vedant Iyer, Shristi Piya, Dilip Soman, and all the impactful partners, community members, and mentors involved in the research.

As part of the "Pathways from Evidence to Action" series, inspired by the African Center for Equitable Development (ACED), the Reach Alliance challenged researchers to identify connections, address gaps, and develop recommendations grounded in their findings. The series comprises thirteen briefing notes developing solutions for urgent climate, public health, and economic challenges and engages practitioners and policymakers in advancing pathways to implementation.

Published by the Reach Alliance | July 2026 | [reachalliance.org](https://reachalliance.org)