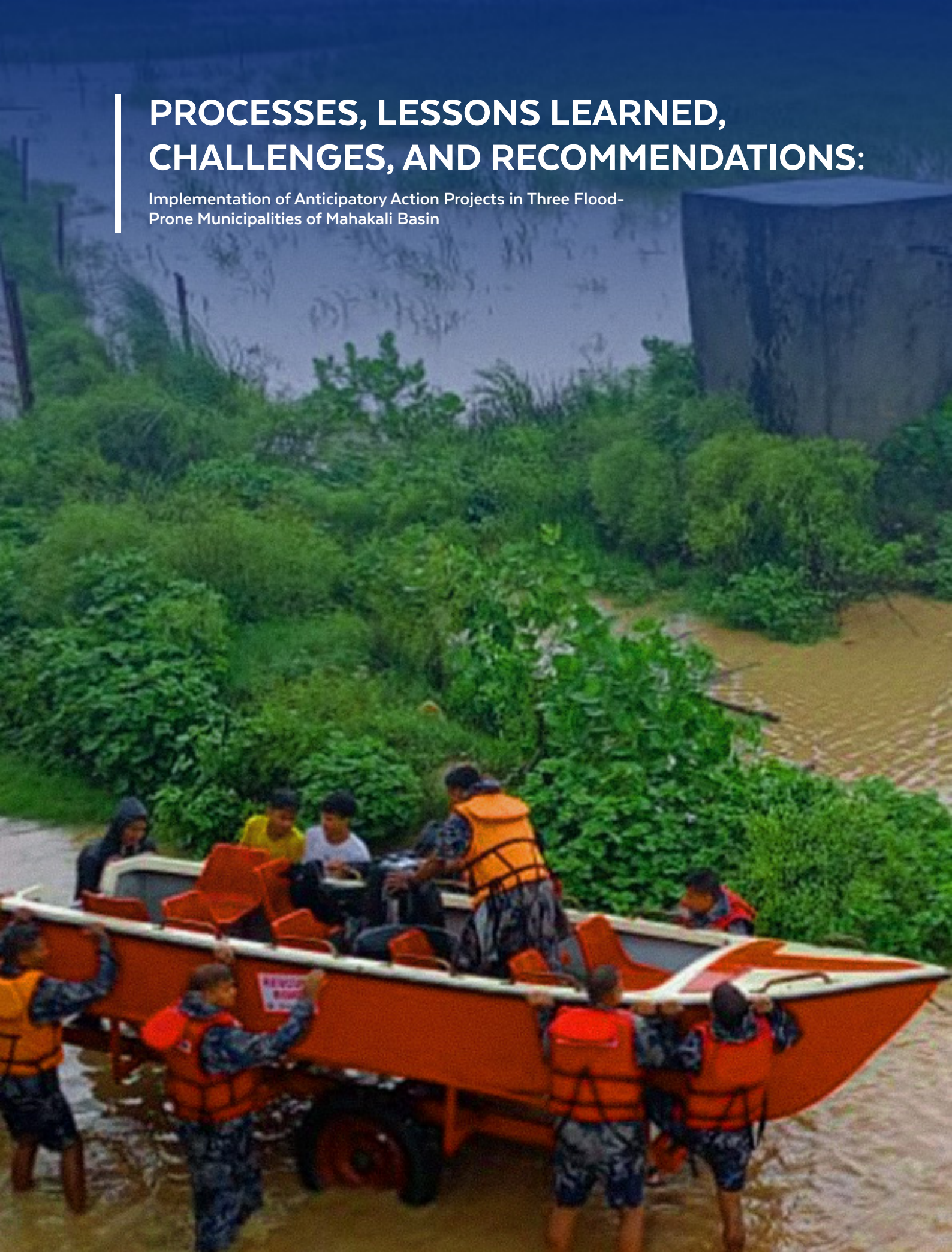
PROCESSES, LESSONS LEARNED, CHALLENGES, AND RECOMMENDATIONS:

Implementation of Anticipatory Action Projects in Three Flood-Prone Municipalities of Mahakali Basin



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SUMMARY

This document thoroughly analyzes two anticipatory action projects executed in the Mahakali Basin. Led by Naxa and in partnership with several organizations including Danish Church Aid (DCA) Nepal and the Institute of Himalayan Risk Reduction (IHRR), these projects were supported by the Global System for Mobile Communications Association (GSMA) and the Asian Disaster Preparedness Center (ADPC). Targeting the municipalities of Dodhara Chandani, Bheemmdatta, and Parshuram, the projects showcased the transformative potential of household-level risk assessments using digital and spatial technologies during a rare cloudburst event. Early action interventions led by local stakeholders utilizing various data and tech solutions like DASTAA facilitated timely and effective risk assessment, risk communication and early action interventions. This coordinated approach mitigated immediate flood impacts and demonstrated scalable strategies for building resilient communities.

The document captures essential outputs, lessons learned, challenges encountered, and strategic recommendations, aiming to guide future projects to enhance and expand anticipatory action systems across Nepal for better preparedness and adaptive response to disaster risks.

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CH:1 ABOUT THE PROJECT

1.1 ACT FIRST: ADOPTING CUTTING EDGE AND FRONTIER TECHNOLOGIES FOR BUILDING RESILIENCE THROUGH ANTICIPATORY ACTION, NEPAL

Start Date: **October 2023** End Date: **January 2025** Implementation Country: **Nepal**

IMPLEMENTATION LOCATION

1. Bhimdatta Municipality Ward 9,10,11
2. Dodhara Chandani Municipality Ward 6, 7Ward 9,10,11

DONORS:

GSMA Innovation Fund for Anticipatory Humanitarian Action

DONOR: UK AID

PARTNERS

- NGOs: Institute of Himalayan Risk Reduction (IHRR),
- Nepal National Social Welfare Association (NNSWA)
- Telecommunication Partner: Viamo Nepal
- Research Institutions: Development Research Institute (dRI)
- International Humanitarian Organizations: DanChurchAid(DCA) Nepal

LIST OF ACTIVITIES

- Deploy a risk assessment platform to compute vulnerability, exposure and risk scores, and to generate household-level risk profiles.
- Integrate real-time & forecasted weather information into the visualization platform to regularly monitor the triggers and highlight the exposure, vulnerability and risk.
- Design and develop hazard-specific, and area-specific early action messages and alerting protocols in consultation with local stakeholders and the Department of Hydrology and Meteorology (DHM)
- Dispatch the early warnings & early action messages through IVR, SMS & push notifications and monitor effectiveness during monsoon.
- Partner with government and humanitarian agencies (Dan Church Aid) and encourage them to use the information to design Early Action and Cash and Voucher assistance (CVA) programmes for at-risk households based on risk profiles.
- Consult with local government stakeholders and sensitise/train them to be able to operationalise the platform themselves.

OBJECTIVES

- To lessen disaster impacts on households through improved anticipatory actions, fostering collaboration among diverse stakeholders for a unified approach.
- To ensure every household gets crucial information and resources, aligning with Nepal's "Early Warnings for All" initiative.

DELIVERABLES /OUTPUTS

- Households are more aware of their exposure, vulnerability and risks to hazards, in both digital and printed forms.
- A mechanism in place to continuously monitor trigger values to dispatch early warning.
- Households have increased access to tailored and localized early warning and early action messages.
- The most at-risk households have increased capacity to cope with disaster events by receiving CVA support.
- Local government & stakeholders are capacitated to design and implement better-targeted DRRM & CVA programs.

DELIVERABLES /OUTPUTS

- Households are better prepared to anticipate and withstand disasters.
- Local risk communication mechanism is more efficient, effective and technology-aided.
- Local Governments & Humanitarian agencies collaborate and implement better-targeted and inclusive DRRM programs.

1.2
DIGITAL AND SPATIAL TECHNOLOGIES FOR ANTICIPATORY ACTION (DASTAA)

Start Date: **December 2023** End Date: **February 2025** Implementation Country: **Nepal and Bangladesh**

IMPLEMENTATION LOCATION

Dodhara Chandani Municipality and Parshuram Municipality in Nepal, and Dakshin Sreepur and Tahirpur Sadar, Tahirpur Upazila in Bangladesh

DONORS:

Asian Disaster Preparedness Center (ADPC).

PARTNERS

- NGOs: Field Ready Bangladesh, Nepal National Social Welfare Association (NNSWA), Nepal Flying Labs (Nepal)
- Research Institutions: Development Research Institute (dRI)
- International Humanitarian Organizations: DanChurchAid(DCA) Nepal

LIST OF ACTIVITIES

- Hazard, exposure, vulnerability and risk assessment to generate household-level risk profiles.
- Real-time access to current weather conditions and forecasts.
- Map visualization for hazard mapping and situational awareness.
- Continuous reporting of multi-hazard incidents for easier response.
- Preparation of Integrated Geodatabase (Spatial as well as datasets)
- Tailored risk communication, with visualizations of risk scores and categories customized to individual users via SMS.
- Generation and distribution of Household-Level Disaster Risk Management Plans (HDRMP) based on surveyed data.
- Capacity-building training sessions for stakeholders, users, and administrators at each local level

OBJECTIVES

- To enhance household preparedness of approx. 9,000 households in flood-prone regions of Nepal and Bangladesh, empowering them to anticipate and withstand disasters more effectively

DELIVERABLES /OUTPUTS

- Generating Household Level Disaster Risk Management Plans (HDRMPs) for approx. 9000 households by assessing flood hazard, vulnerability, and exposure of each household in the region.
- Profile vulnerable and marginalized populations ahead of disasters to develop inclusive disaster management strategies.
- Integrate risk and weather information to provide customized early warnings and early action information.
- Provide easy and timely access to forecasts and near real-time observations to households.
- Support relevant stakeholders in designing targeted Disaster Risk Reduction/ Management Programs.
- 6. Build the capacity of relevant stakeholders for proactive disaster management.

DELIVERABLES /OUTPUTS

Outcome 1: Enhanced Disaster Preparedness - Households in flood-prone regions of Nepal and Bangladesh are equipped with improved preparedness measures, enabling them to anticipate and withstand disasters more effectively.

Outcome 2: Data-driven decision-making - Local governments, humanitarian agencies, and relevant stakeholders leverage DASTAA in designing better-targeted and inclusive Disaster Risk Reduction/Management Programs.

CH:2 OVERVIEW OF PROJECT LOCATIONS

This chapter provides an introduction to the project, and project locations outlining the rationale, objectives, scope, and significance of addressing flood vulnerability in the Mahakali River Basin.

2.1 ABOUT THE MAHAKALI RIVER BASIN AND FLOOD VULNERABILITY

The Mahakali River system lies at the westernmost border of Nepal. Originating in the Api Himal within the Himalayas, the river has a discharge of approximately 658 m^3/s at the Sharada Barrage1. However, its flow fluctuates significantly during the monsoon and winter seasons. The river's total catchment area spans about 15,440 km^2, of which approximately 5,625 km^2 lies in Nepal supporting nearly 18.58 lakhs population across India and Nepal2. Mahakali River flows from Darchula to Baitadi, Dadeldhura and Kanchanpur in Nepal.

The issue of recurring seasonal floods poses a significant threat to the local population including Dodhara Chandani, Parshuram, and Bheemdatta municipalities within the Kanchanpur district Mahakali of River Basin due to increased and unpredictable rain storms, as well as rising water levels in the Mahakali River3. These flood events have frequently led to displacement and significant loss of livelihood. To mitigate flood risks, local disaster risk management plans incorporating all phases of Disaster Risk Reduction (DRR)—preparedness, response, and recovery—have been developed and embedded within the legislative frameworks of these municipalities. Despite these efforts, challenges remain in making risk reduction initiatives effective in mitigating flood risks, mainly due to the poorer socioeconomic status of communities, insufficient hydrological and meteorological stations to monitor and disseminate weather data, and the limited integration of scientific knowledge with local practices have weakened flood prevention measures. As a result, communities in these municipalities remain increasingly exposed to flood-related disasters. Rapid Climate Change and the projected rise in the number of disaster events highlight the need for better disaster risk reduction and management.

1 Nepal River Portal, Mahakali River System, 2019
2 Jha, R. Total run-of-river type hydro-power potential of Nepal, 2011
3 Nepal Risk Reduction Consortium (NRRC)

i. Location Map of Mahakali River Basin with Hydrological and Meteorological stations

2.2 ABOUT PROJECT LOCATIONS

A. Dodhara Chandani Municipality

Dodhara Chandani Municipality, located in Kanchanpur District within Sudurpaschim Province, is bordered by the Mahakali River to the east and the Jogbuda River to the west4. These rivers are major contributors to annual flooding in the municipality, often resulting in significant damage to infrastructure, lives, and livelihoods. Recurrent flooding poses a serious challenge to the local population, making flood resilience and effective disaster management crucial for protecting the community and minimizing the impacts of these frequent natural disasters.

ABOUT MUNICIPALITY

Number of Households: ***9,610***

Total No of Wards: ***10***

Population: ***42,974***

Male: ***18,928***

Female: ***24,046***

SUMMARY - PROJECT BENEFICIARY

Number of Households: ***9,140***

Population: ***485,31***

Male: ***24,456***

Female: ***24,059***

Project Locations: ***Ward 1 - 10***

MAJOR HAZARDS FACED BY DODHARA CHANDANI MUNICIPALITY:

Earthquake | Flood | Human-Wildlife Conflict | Fire | Pandemic | Windstorm

4 Disaster Preparedness and Response Plan (DPRP) 2081, Dodhara Chandani Municipality.

B. Bheemdatta Municipality

Bheemdatta Municipality, situated in the Kanchanpur District of Sudurpaschim Province, faces significant flood risks, particularly during the monsoon season. The majority of its wards are located within high flood hazard zones. During the monsoon season, the overflow of the Mahakali, Jogbuda, Kankatti, Hattinala, Gobaraiya Nala, Bhasi Nala, Khanne Khola and Bhujela rivers frequently inundate the surrounding settlements.[5]

ABOUT MUNICIPALITY

Number of Households: ***27,570***

Total No of Wards: ***19***

Population: ***12,2320***

Male: ***58,232***

Female: ***64,088***

SUMMARY - PROJECT BENEFICIARY

Number of Households: ***6,906***

Population: ***35,561***

Male: ***17,460***

Female: ***18,095***

Project Locations: ***Ward: 9,10,11,12, &13***

MAJOR HAZARDS FACED BY BHEEMDATTA MUNICIPALITY:

Earthquake

Flood and Inundation

Drought

Fire

Coldwave

Windstorm

5 Emergency Preparedness and Response Plan (EPRP) 2081, Bheemdatt Municipality.

C. Parshuram Municipality

Parshuram Municipality, located in Dadeldhura District within Sudurpaschim Province, is situated in a high landslide hazard zone, with nearly all of its wards being vulnerable to flooding6. This is primarily due to their proximity to the Mahakali, Puntara, and Rangoon Rivers, which have historically caused significant flooding in the area. The municipality's vulnerability to river overflow, particularly during the monsoon season, makes effective flood risk management and early warning systems essential for protecting local communities and minimizing the impact of such disasters.

ABOUT MUNICIPALITY

Number of Households: ***7,434***

Total No of Wards: ***12***

Population: ***35,590***

Male: ***16,741***

Female: ***18,849***

SUMMARY - PROJECT BENEFICIARY

Number of Households: ***6,757***

Population: ***39,565***

Male: ***20,340***

Female: ***19,225***

Project Locations: ***Ward 1 - 12***

MAJOR HAZARDS FACED BY BHEEMDATTA MUNICIPALITY:

Earthquake | Flood | Landslide | Fire | Pandemic | Coldwave

6 Disaster Preparedness and Response Plan (DPRP) 2081, Parshuram Municipality.

CH:3 PROJECT IMPLEMENTATION METHODOLOGY

Both projects employed a phased, structured approach to enhance disaster preparedness and reduce the vulnerability of flood-prone communities in the Mahakali River Basin, Nepal

Planning and Stakeholder Engagement Phase

- Formalized partnerships among project partners and local governments for collaborative efforts.
- Conducted initial consultations with local governments, community leaders, and disaster committees.
- Collected available secondary datasets, relevant reports, and other critical resources.
- Revised implementation plan, establishing clear milestones and deliverables for accountability.
- Prepared Inception reports for both projects.

Risk Assessment Phase

- Developed household survey questions for later composite vulnerability computation stages.
- Finalized questionnaires with demographics, and socio-economic data from local government offices.
- Hired and trained local mobilizers in mobile-based data collection techniques.
- Mobilized and trained local mobilizers for conducting field-based surveys at institutional levels.
- Developed comprehensive flood hazard maps for risk assessment and planning.
- Utilized INFORM Risk Model to compute risk, and vulnerability scores for households.
- Generated risk and vulnerability profiles, categorized into high, medium, and low.
- Generated a customized Household Level Disaster Risk Management Plan for families.

Risk Visualization

- Deployed DASTAA platform for comprehensive visualization of risk data layers.
- Created interactive maps with color-coded risk levels for each household.
- Integrated real-time weather monitoring with predictive models for dynamic outputs

Risk Communication

- Organized workshops for Early Warning and Early Action Content Design.
- Prepared a list of messages for different scenarios, and verified with officials.
- Set up multi-channels for risk communications, including SMS, IVR, and WhatsApp.
- In forecasted events, sent early warning messages to the municipality for approval.
- Upon approval, disseminated messages through multi-channel platforms to at-risk populations.
- Distributed Household Disaster Risk Management Plans, empowering locals with essential knowledge.
- Conducted awareness campaigns in local languages for better community accessibility.

Early Action Implementation

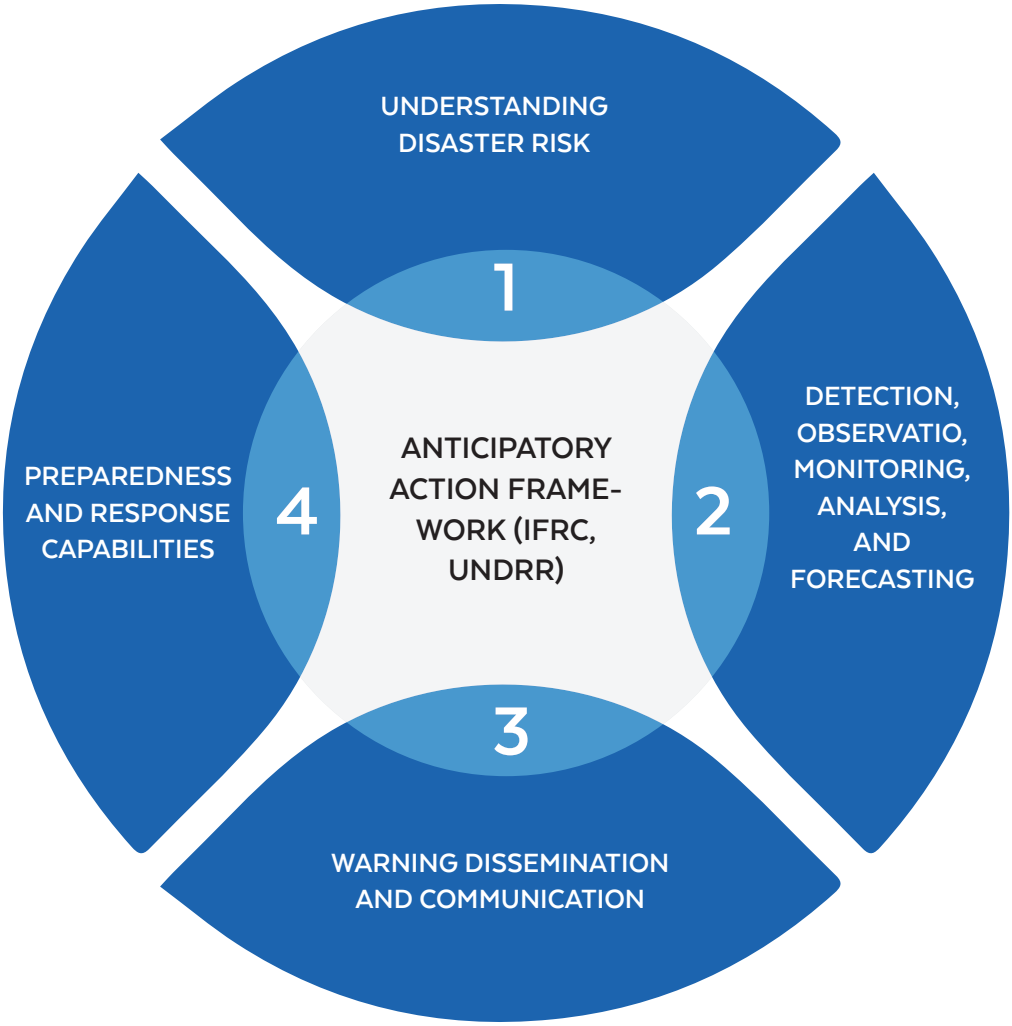
- Defined clear triggers for action in consultation with the government after forecasts.
- Established coordination mechanisms with roles for government agencies, and community groups.
- Developed detailed implementation plans for anticipatory actions at community levels.
- Trained stakeholders, and community members on executing actions through simulation exercises.
- Mobilized Community Disaster Management Committees to enhance readiness and response.
- Implemented an Early Group Cash Transfer to committees; and coordinated evacuation efforts.
- Pre-positioned relief materials, led by local committees and municipal officials.
- Utilized risk, and vulnerability profiles to effectively allocate resources during the relief phase.

Monitoring and Evaluation

- Conducted testing consultations for the DASTAA app with the community to refine features.
- Mobilized local mobilizers to assist the Local Government Office in rapid damage assessments.
- Conducted post-implementation reviews to assess the effectiveness of anticipatory actions deployed.
- Gathered feedback from stakeholders, and communities to improve future disaster readiness.
- Developed SOPs to help local stakeholders continue effective disaster response activities.

CH:4 ALIGNMENT WITH INTERNATIONAL FRAMEWORK

In this section, we critically evaluate our project activities within the Mahakali Basin by comparing them against established international frameworks. We have used the international frameworks on anticipatory action framework outlined by UNDRR and IFRC and have conducted a systematic study to assess our alignment with its guidelines.



Furthermore, our initiatives contribute significantly to the “Early Warnings for All” initiative, which aims to provide life-saving early warning systems by the end of 2027. This initiative seeks to protect all individuals from hazardous weather, water, and climate events. Additionally, our project’s methodologies support key provisions of the Sendai Framework for Disaster Risk Reduction and align with the aims of the Paris Agreement, particularly in enhancing community resilience and adaptive capacities. Moreover, our efforts advance the 2030 Agenda for Sustainable Development by contributing to its goals related to climate action, clean energy, poverty eradication, hunger reduction, health improvement, water sustainability, and the development of sustainable cities. Through this alignment, we underscore our project’s role in global efforts to reduce disaster risks and build resilient communities.

1. UNDERSTANDING DISASTER RISK

Risk assessment was systematically conducted by analyzing key factors such as demographics, socio-economic conditions, historical disaster impacts, and additional data collected through a comprehensive household-level survey to evaluate the vulnerability and coping capacities of households. These insights were then integrated with flood hazard mapping to accurately determine risk categories. The INFORM Risk Model served as the foundation for risk assessment in this project. This scientifically validated framework provided a risk score by integrating Hazards and Exposure, Vulnerability, and Lack of Coping Capacity using the following formula:

Risk = (Hazard & Exposure)^(1/3) * (Vulnerability)^(1/3) * (Lack of coping capacity)^(1/3)

OUTPUTS

- Risk profiles were generated for 24,921 households.
- Categorized households into high, medium, and low risks.
- Developed flood hazard maps through the HEC-RAS hydrological model.
- Localized data-informed targeted preparedness strategies.
- Profiled 300+ indicators of 24,921 households addressing physical, socio-economic, and environmental vulnerabilities.

RECOMMENDATIONS

- Develop localized risk frameworks with national-level standardization.
- Strengthen infrastructure for real-time weather and water level monitoring.
- Provide capacity-building programs to local governments for advanced data integration

ALIGNMENT WITH INTERNATIONAL FRAMEWORKS

Risk assessment formed the basis of IFRC's Forecast-based Financing (FbF), which prioritizes risk analysis to identify at-risk populations and release funding ahead of extreme weather events.1

The integration of household vulnerability, capacity, and exposure data with hazard mapping to assess and understand risk dynamics addresses Sendai Framework Priority 1: Understanding Disaster Risk.2

Empowering local government officials with information on the risk dynamics of each household within the municipality supports informed decision-making for mainstreaming risk-based DRR in policy planning and developing risk-based interventions, aligning with Sendai Framework Priority 2: Strengthening Disaster Risk Governance to Manage Disaster Risk, and Priority 3: Investing in Disaster Risk Reduction for Resilience8. governments for advanced data integration.

CHALLENGES

- Household surveys were delayed due to the unavailability of homeowners in many households.
- Testing and validating multiple models was computationally intensive.
- Limited ground station data hindered hazard map accuracy.
- Synchronizing diverse datasets into a single framework proved complex.
- The absence of historical data in some regions reduced the reliability of risk computation.
- Risk models required customization to address local nuances.
- Challenges remain in using risk information in policy design, and planning.

LESSONS LEARNED

- Comprehensive risk assessments combining local knowledge and scientific data are essential for disaster preparedness.
- Real-time data and predictive models significantly enhance understanding of evolving disaster risks.
- Community participation in risk assessments fosters ownership, awareness, and better risk management outcomes.
- Integration of diverse data sources improves the precision and applicability of disaster risk analyses.
- Early involvement of stakeholders ensures risk assessments are relevant, actionable, and widely accepted.
- Regular updates to risk data accommodate dynamic environmental changes and emerging vulnerabilities.
- Clear, accessible communication of risk information empowers stakeholders to take proactive disaster preparedness measures.

7 IFRC, Anticipatory Pillar of the IFRC-DREF
8 UNDRR, Sendai Framework for Disaster Risk Reduction 2015-2030

2. DETECTION, OBSERVATION, MONITORING, ANALYSIS, AND FORECASTING

Forecast-based triggers were developed to enable timely and effective disaster response by integrating real-time weather monitoring, predictive modelling, and historical data analysis. Led by the Local Municipality Offices in collaboration with the Department of Hydrology and Meteorology (DHM), different threshold levels were identified using rainfall measurements, water levels, and community consultations. The DASTAA platform served as the central hub for processing this data, automating the identification of risk thresholds and triggering predefined actions when those thresholds were met.

The triggers were continuously monitored and tested through real-time events to validate their accuracy and functionality. Feedback from stakeholders was incorporated to refine thresholds and improve system reliability. Local stakeholders, including disaster management committees and community leaders, were engaged in the process, ensuring clarity on how triggers function and fostering community trust.

OUTPUTS

- Established different triggers using real-time weather monitoring and DASTAA-based alerts.
- Supported in issuing 54 Impact Based Forecasting Bulletins.
- Automated risk communication through SMS, IVR, physical sirens and app notifications.
- Triggers facilitated timely evacuations and early interventions.

CHALLENGES

- Limited lead time combined with fast-onset floods left limited time for information dissemination and action.
- Limited internet connectivity in remote areas hindered access to alerts.
- Lack of historical data for calibrating triggers in new regions.
- Resource gaps delayed pre-arranged interventions.

RECOMMENDATIONS

- Coordination with local stakeholders with a contingency plan
- Allocate Emergency Fund and approved by the concerned Authority (e.g. Humanitarian Agency, DCA Nepal MoU with Dodhara Chandani Municipality)

LESSONS LEARNED

- Developing clear, data-driven triggers ensured timely, effective responses and built stakeholder confidence.
- Integrating real-time weather data and historical trends significantly improved hazard forecasting accuracy.
- Involving communities in refining triggers fostered ownership and trust in the forecasting process.
- Regularly updating forecast thresholds maintained relevance to changing conditions and disaster dynamics.
- Automating triggers through platforms like DASTAA streamlined risk communication and enhanced response efficiency.
- Creating multi-hazard-specific triggers addressed diverse risks and improved disaster preparedness precision.
- Providing accessible, simplified trigger outputs empowered non-technical stakeholders to act promptly and effectively.

ALIGNMENT WITH INTERNATIONAL FRAMEWORKS

Forecast-based triggers aligned with FbF Early Action Protocols (EAPs), enabling pre-arranged actions based on real-time hazard monitoring[1].

Contributed to Sendai Framework Priority 4 by enhancing disaster preparedness through strengthened preparedness and empowering communities with the knowledge and actions needed to anticipate and respond to events[2].

9 IFRC, Anticipatory Pillar of the IFRC-DREF
10 UNDRR, Sendai Framework for Disaster Risk Reduction 2015-2030

3. RISK COMMUNICATION & STAKEHOLDER ENGAGEMENT

Risk communication was carried out with the primary objective of empowering those at risk with the knowledge necessary to make informed decisions. A standard set of early warnings and early action messages were designed and developed in consultations with LG officials and community groups. These messages were clear, actionable, and contained context-specific information which were disseminated through multi-channel risk communication such as Household Level Disaster Management Plans (HDRMPs), Physical Sirens, social media platforms, SMS messages and IVR (Interactive Voice Response). Local stakeholder engagement and mobilization were integral to the success of the project, ensuring that the project interventions were community-driven. Key stakeholders, including local government bodies, community leaders, disaster management committees, and non-governmental organizations, were actively involved. Facilitating multi-channel risk communication ensures alerts reach 'last mile' communities.

OUTPUTS

- Delivered 127,667 IVR messages and 41,500 SMS alerts.
- Distributed risk communication plans in local languages.
- Conducted awareness campaigns and real-time notifications through the DASTAA platform.

CHALLENGES

- Poor internet connectivity restricted real-time communication in remote areas.
- Language barriers limited comprehension in some communities.
- Maintaining updated beneficiary contact details was challenging.

RECOMMENDATIONS

- Ensure risk messages are customized, culturally appropriate and easily understood by the people.
- Develop standardized templates for emergency early warnings and early action messages.
- Develop a swift coordination mechanism for quick approval for sending risk communication during emergencies.

LESSONS LEARNED

- Designing clear, actionable messages through collaboration improved trust and ensured timely community responses.
- Disseminating early warnings through multiple channels reached remote populations and minimized information gaps.
- Localizing messages in community languages increased comprehension and accessibility for diverse audiences.
- Proactively engaging stakeholders during message development enhanced alignment with local needs and realities.
- Incorporating feedback loops strengthened communication strategies and fostered community-driven improvements.
- Establishing redundant communication channels ensured reliability during digital platform outages.
- Conducting awareness campaigns empowered communities with the knowledge to make informed, proactive decisions.

ALIGNMENT WITH INTERNATIONAL FRAMEWORKS

Supported IFRC CEA Principles through inclusive communication methods[1].

Addressed Sendai Framework Priority 4 by integrating community-driven strategies[2].

Aligns with 'Early Warnings for All' (EW4All), the UN's global initiative for implementing climate adaptation, which was launched in November 2022 at COP27[3].

11 IFRC, Community Engagement and Accountability
12 UNDRR, Sendai Framework for Disaster Risk Reduction 2015-2030
13 UNDRR, Early Warnings for All, 2022

4. PREPAREDNESS AND RESPONSE CAPABILITIES

Early actions are fundamental to anticipatory action, bridging the critical time window between receiving a forecast and the occurrence of a disaster to minimize suffering and losses. A series of proactive measures were undertaken, coordinated closely with local government officials, to implement risk-based anticipatory action strategies. Community Disaster Management Committees (CDMCs) were mobilized, and youth volunteers actively participated in planning and execution, enhancing local engagement. Once a hazard forecast was received, pre-approved protocols were swiftly activated. During the 2024 monsoon season, evacuation measures prioritized minimizing risks to human life and mitigating potential flood-related damages. To address food and shelter needs, early Group Cash Transfers (GCTs) were provided to nine CDMCs, while Multi-Purpose Cash (MPC) assistance was distributed directly to households to meet urgent necessities. These cash-based interventions also supported early recovery efforts, helping restore livelihoods and fortify community resilience.

Local communities were at the forefront of recovery efforts, empowered to lead initiatives that ensured immediate relief and long-term sustainability. Through partnerships with local authorities, vulnerable individuals from Dodhara Chandani and Bhimdatta Municipalities were relocated to safe shelters. This comprehensive approach highlighted the effectiveness of coordinated early actions in reducing disaster impacts and building resilient communities. Engaged local governments, NGOs, and CDMCs through participatory planning, workshops, and joint reviews. Built capacities of local stakeholders through training programs and feedback loops.

OUTPUTS

- Group Cash Transfers were provided to 9 Community Disaster Management Committees (CDMCs)
- 272 households received Multi-Purpose Cash Assistance (MPC) to address urgent needs.
- 733 households benefited from cash-based assistance for early recovery.
- Around 1,433 people from Dodhara Chandani and Bhimdatta Municipalities were relocated to eight safe shelters, including schools and community centres.
- Pre-positioned relief materials in vulnerable areas.
- Conducted household evacuations based on risk scores.
- Distributed Household Disaster Management Plans (HDRMPs) for preparedness.
- Mobilized Community Disaster Management Committees (CDMCs) for local leadership.
- Local officials and community leaders actively participated in project planning.
- Capacity-building programs strengthened local disaster response capabilities.
- Community ownership of interventions enhanced sustainability.

CHALLENGES

- Resource constraints delayed some early actions.
- Over-reliance on digital tools excluded vulnerable populations.
- Coordination across multiple stakeholders required significant effort.
- Aligning diverse stakeholder priorities required significant coordination.
- Limited technical capacity at the local level delayed implementation.
- Sustaining engagement beyond project timelines was difficult.

RECOMMENDATIONS

- Develop anticipatory financing strategies for diverse hazards.
- Enhance training for local communities on early actions.

ALIGNMENT WITH INTERNATIONAL FRAMEWORKS

Reflects FbF's Pre-Agreed Actions, ensuring rapid execution of well-defined interventions[1].

Complies with the UN Anticipatory Humanitarian Action Framework to minimize disaster impacts[2].

LESSONS LEARNED

- Household-level risk profiles effectively guided the precise allocation of resources, ensuring targeted and impactful interventions.
- Early mobilization of CDMCs and local volunteers strengthened community-driven disaster response and preparedness efforts.
- Collaborative planning with local governments and NGOs enhanced coordination and timely execution of anticipatory actions.
- Pre-arranged financing mechanisms accelerated early interventions and minimized delays in response activities.
- Tailoring early actions to available local resources ensured the practicality and scalability of preparedness measures.
- Incorporating post-action feedback loops improved disaster response strategies and ensured continuous refinement.
- Engaging stakeholders early aligned interventions with local priorities, fostering trust and sustainable community ownership.

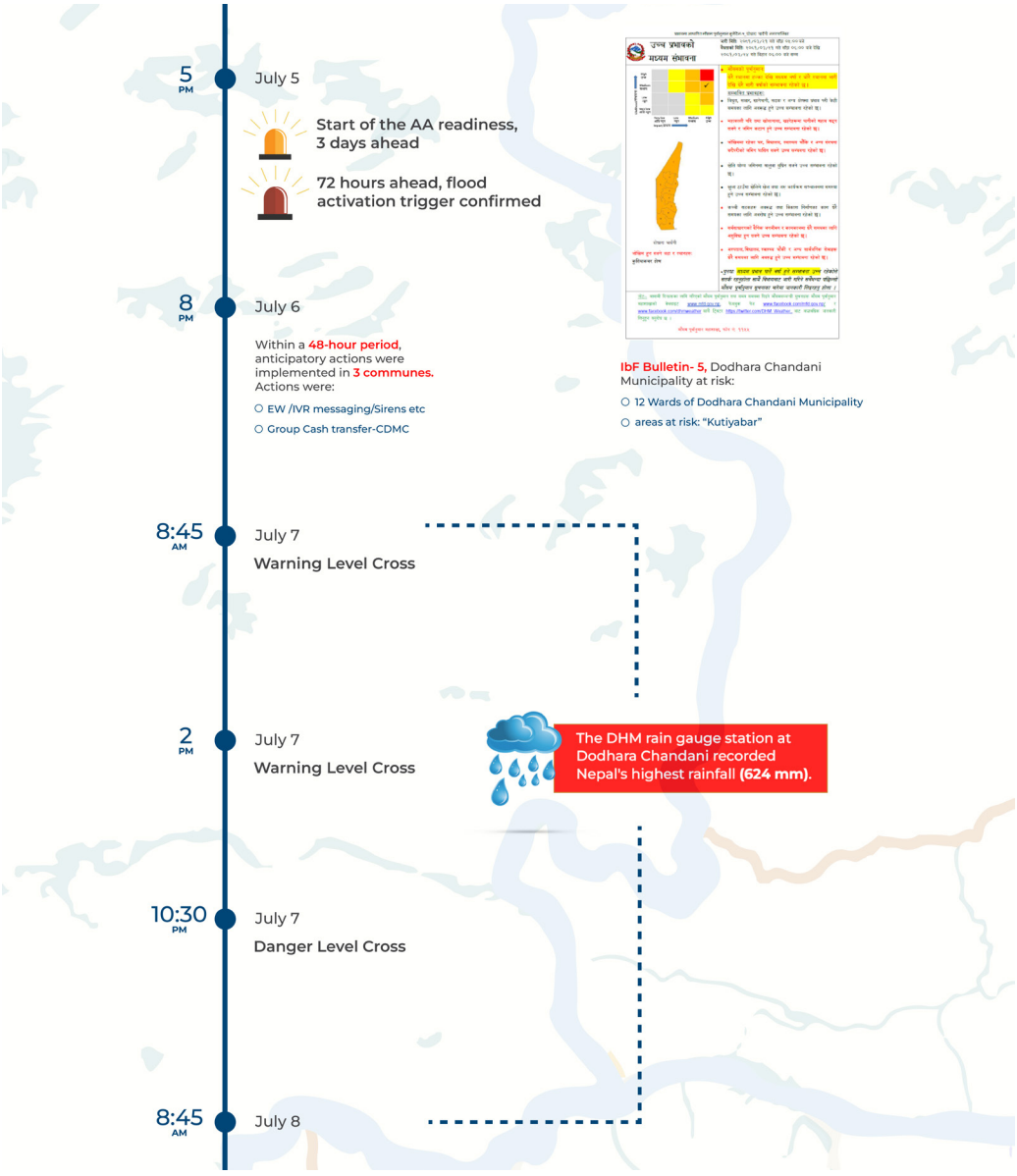
14 IFRC, Forecast-based Action
15 UNOCHA Nepal Anticipatory Action framework for floods, 2024

CH:5 CLOUDBURST EVENT AND OUR ACTIONS

In Dodhara Chandani Municipality from July 7 to July 8, 2024, a devastating cloudburst unleashed an unprecedented 624 mm of rainfall in just 24 hours, causing severe flooding. This extreme rainfall event led to damages estimated at approx. NPR 1.5 billion, severely impacting homes, infrastructure, and livelihoods.

"A cloudburst is an extreme weather phenomenon characterized by an intense and short-lived downpour, often leading to flash floods. These events typically occur when moisture-laden air rapidly condenses due to abrupt cooling, releasing a large volume of rain over a confined area in a short time."

Despite the scale of the disaster, proactive disaster preparedness measures, including pre-drafted early warning messages, timely risk communication, anticipatory financing, and robust community coordination, transformed this potential catastrophe into a remarkable story of resilience and effective disaster management.



Timeline of Anticipatory Actions for the Cloudburst

Our approach to anticipatory actions in response to the forecasted cloudburst event in Dodhara Chandani Municipality is broadly categorized into five key steps, as shown in the diagram below

STEP 1: Pre-Prepared Early Warning and Early Action Messages

- Before the monsoon season, our team and local partners collaboratively drafted 69 early warning and early action messages, covering different scenarios. These messages were designed to be activated immediately based on pre-defined triggers, ensuring rapid communication during emergencies.

- On July 5, 2024, the Department of Hydrology and Meteorology (DHM) issued an Impact-Based Weather Forecast Bulletin warning of potential high-impact rainfall. This triggered the dissemination of tailored messages, including alerts and actionable steps for at-risk communities.

STEP 2: Dissemination of Multi-Channel Warnings (July 6, 2024, 8PM)

- Early warning messages were sent to 10,000 households via IVR calls, ensuring that communities understood the potential flood risk and steps to take for safety.

- Messages were disseminated through SMS, physical sirens, door-to-door announcements, and digital platforms like WhatsApp and Facebook, ensuring maximum reach even in remote areas.

- The Household Disaster Management Plans (HDRMPs), pre-distributed to families, provided detailed guidance on evacuation procedures and emergency preparedness.

STEP 3: Triggering Early Actions (July 7, 2024, 2 PM)

- Based on real-time monitoring and escalating flood risks, evacuation notices were officially issued by the municipality.

- Group Cash Transfers (GCTs) to Community Disaster Management Committees (CDMCs) were activated, enabling the evacuation of 500 vulnerable individuals to designated safe shelters.

- Local teams coordinated logistics, ensuring priority assistance for the elderly, disabled, and other vulnerable groups.

STEP 4: Real-Time Monitoring and Response (July 7, Night)

- The DASTAA platform provided real-time updates on water levels and flood-prone areas, guiding evacuation efforts and resource allocation.

- Local teams navigated rising waters and challenging conditions to ensure no one was left behind, demonstrating effective on-ground coordination.

STEP 5: Post-Event Relief and Recovery

- Accurate household-level datasets facilitated targeted relief distribution, ensuring fair allocation of resources and minimizing duplication
- The DASTAA system was used to generate damage assessment reports, providing insights into affected areas and guiding post-disaster recovery planning.

MAJOR OUTPUTS

- 69 pre-drafted early warning and action messages were activated to ensure timely communication
- 10,000 households received early warnings through IVR and SMS.
- 500 vulnerable individuals evacuated to safe shelters.
- Real-time monitoring guided resource allocation and ensured no casualties.
- Accurate household-level data facilitated targeted relief efforts.

RECOMMENDATIONS

- Expand Pre-Prepared Messaging Libraries: Increase the diversity of pre-drafted messages to cover a wider range of scenarios.
- Invest in Digital Infrastructure: Enhance connectivity in remote areas to ensure broader access to early warning systems.
- Develop Localized Early Action Protocols: Tailor protocols to the unique risks and capacities of different regions.
- Strengthen Anticipatory Financing Mechanisms: Ensure flexible funding for faster activation of early actions.
- Enhance Community Training: Regular capacity-building programs for CDMCs and local stakeholders can improve response efficiency.
- Integrate Local Knowledge in Planning: Combine scientific forecasts with indigenous knowledge for a holistic approach to disaster preparedness.

The Dodhara Chandani cloudburst response demonstrated the power of anticipatory action, showcasing how pre-prepared messaging, real-time monitoring, and community-led interventions can save lives and minimize disaster impacts. This event underscores the importance of scaling anticipatory systems, enhancing local capacities, and fostering partnerships to address future climate-induced disasters effectively.

CHALLENGES

- Fast-Onset Floods Leave Limited Lead Time: Despite pre-planned measures, the sudden nature of cloudbursts challenges preparedness.
- Poor Connectivity in Remote Areas: Digital tools like IVR and app notifications faced limitations due to weak internet and mobile networks.
- Language and Literacy Barriers: Ensuring full comprehension of messages required additional effort in translation and simplification.
- Resource Gaps in Remote Locations: Some areas lacked adequate safe shelters and relief materials.
- Data Limitations for Monitoring: Incomplete ground-level weather data reduced the accuracy of real-time risk predictions.

LESSONS LEARNED

- Pre-Prepared Early Warning Messages Save Time: Drafting messages in advance ensures rapid activation and consistency during emergencies.
- Multi-Channel Communication Maximizes Reach: Combining IVR, SMS, sirens, and door-to-door announcements ensures inclusive communication.
- Localized Messaging Builds Trust: Messages tailored to local languages and cultural contexts improve community understanding and compliance.
- Real-Time Monitoring Enhances Response: Platforms like DASTAA enable data-driven decisions and efficient resource allocation.
- Community-Led Actions Are Critical: Empowering CDMCs with funding and leadership roles enhances the effectiveness of early actions.
- Strong Coordination Reduces Gaps: Collaboration among stakeholders—local governments, NGOs, and community leaders—ensures seamless execution of anticipatory actions.