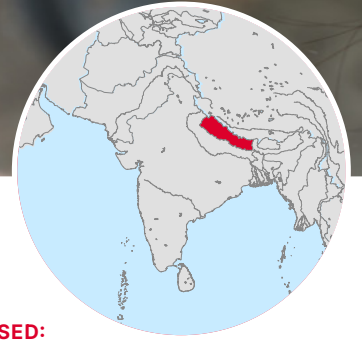
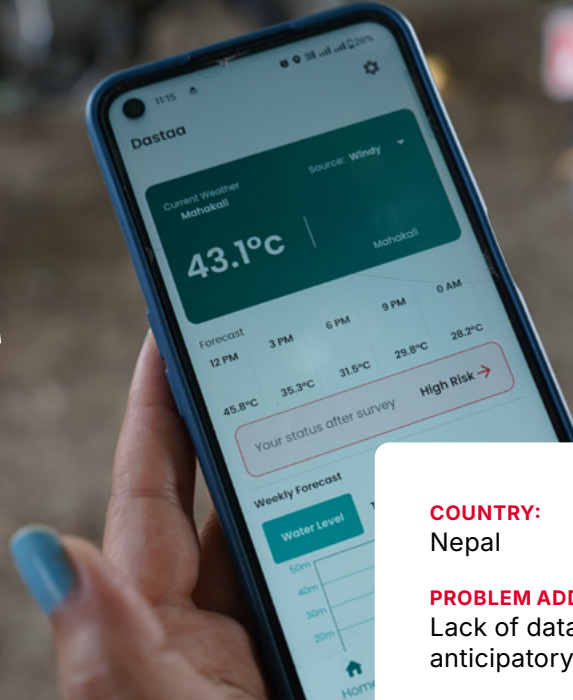


CASE STUDY

NAXA

Digital and spatial technology for anticipatory action in Nepal



COUNTRY:
Nepal

PROBLEM ADDRESSED:
Lack of data-driven, household-level anticipatory action plans

TECHNOLOGY USED:
Geospatial mapping, data analytics, mobile and web-based platforms, IVR, SMS

KEY PARTNERS:
Institute of Himalayan Risk Reduction, DanChurchAid Nepal, Viamo Nepal, Nepal National Social Welfare Association

BUSINESS MODEL:
Originally donor funded, evolving into a hybrid business-to-government (B2G) and business-to-business (B2B) model by offering software-as-a-service (SaaS) to humanitarian, government and private-sector clients

FIND OUT MORE: naxa.com.np

The GSMA Innovation Fund for Anticipatory Humanitarian Action supported NAXA and its partners to scale its digital platform – Digital and Spatial Technologies for Anticipatory Action, or DASTAA – in flood-prone communities of Nepal. To reduce the impacts of extreme climate events, such as heavy rainfall, DASTAA enables data-driven disaster preparedness through household-level risk assessment, early warning messaging and relief distribution. The project involved assessing household vulnerability in advance of disasters, monitoring early warning indicators and supporting local governments and humanitarian agencies to make evidence-based decisions that strengthen community preparedness and enable faster recovery.

GSMA Innovation Fund for Anticipatory Humanitarian Action

NAXA Project Outcomes October 2023–March 2025

127k

Early warning messages (IVR, SMS) disseminated



300+

Local government stakeholders trained



80k

People reached by the project



11k

Households equipped with personalised risk assessments and disaster management plans, ensuring better preparedness for floods



870

At-risk households supported with cash and voucher (CVA) assistance totalling \$32,000

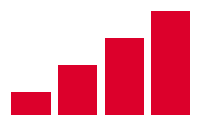


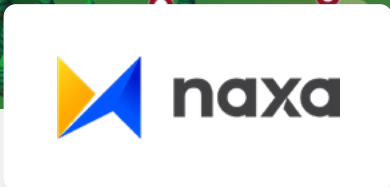
\$454,000

Additional investment unlocked from other sources during the GSMA grant period



GSMA
Mobile for Development





About NAXA

NAXA uses digital and spatial technologies to tackle some of humanity's most pressing challenges. Founded to transform how organisations, governments and individuals use geospatial data for decision-making, NAXA works with a range of partners to design and implement solutions that benefit society. One such innovation is DASTAA – a disaster management platform that facilitates anticipatory action through accurate early-warning communication and cash and voucher assistance (CVA).

“DASTAA was initially designed to make risk assessments more granular, from regional to household level. Identifying, mapping and holistically assessing vulnerabilities of a household made risk computation more accurate. With the level of data captured, DASTAA eventually transformed into a risk assessment, communication and management platform, bringing governments, humanitarian actors, and the community together to engage in a proactive anticipation and management of disasters.”

Arun Bhandari, CEO and Co-founder of NAXA

The GSMA Innovation Fund

NAXA is one of the organisations supported by the [GSMA Innovation Fund for Anticipatory Humanitarian Action](#), launched in 2022. This initiative was funded by the UK Foreign, Commonwealth & Development Office (FCDO) and was supported by the GSMA and its members.

The Fund backed solutions that leverage mobile digital technology to help anticipate potential humanitarian impacts and enable effective early response. By focusing on the important theme of anticipatory action, the Fund contributes towards the minimisation of humanitarian impacts and the improvement of preparedness in the face of sudden-onset crises.

The project

Communities at risk: navigating climate impacts in Nepal and emergency preparedness challenges

In Nepal, climate-induced disasters frequently result in loss of life, displacement and economic hardship, particularly in remote communities vulnerable to disasters. These impacts are compounded by limited access to data-driven preparedness measures and targeted recovery programmes. Risk assessments are often conducted at the community level, overlooking the specific vulnerabilities of individual households. This, combined with siloed planning and poor coordination among stakeholders, reduces the effectiveness of disaster risk management efforts.

Meanwhile, existing early warning systems (EWS) typically apply a blanket approach and have limited capacity for early interventions, such as evacuation, anticipatory CVA or disaster risk financing. This challenge is especially pronounced in the Mahakali River basin in western Nepal, where seasonal monsoon floods regularly cause major destruction. Thousands of people are displaced every year due to cloudbursts and river flooding, which have also resulted in loss of life and livelihoods, highlighting the urgent need for more local and anticipatory disaster risk strategies.

From reactive response to proactive preparedness

DASTAA (Digital and Spatial Technologies for Anticipatory Action) is a digital platform developed by NAXA to modernise disaster management. By enabling more local planning and timely intervention, DASTAA facilitates household-level risk profiling and anticipatory action planning, including risk communication and humanitarian cash transfers.

Available as both a mobile and web app, DASTAA combines data, technology and local insights to support evidence-based decisions throughout the disaster. It helps governments and humanitarian agencies identify at-risk households and trigger targeted, timely responses.

Project activities

NAXA's GSMA-funded project focused on improving disaster preparedness and anticipatory action in Nepal. The key components of the project included:

Household-level disaster risk management plans:

Risk profiles were developed for 16,000 households in flood-prone areas, assessing hazards, vulnerabilities and exposure to improve disaster response planning.

Early warning and risk communication system:

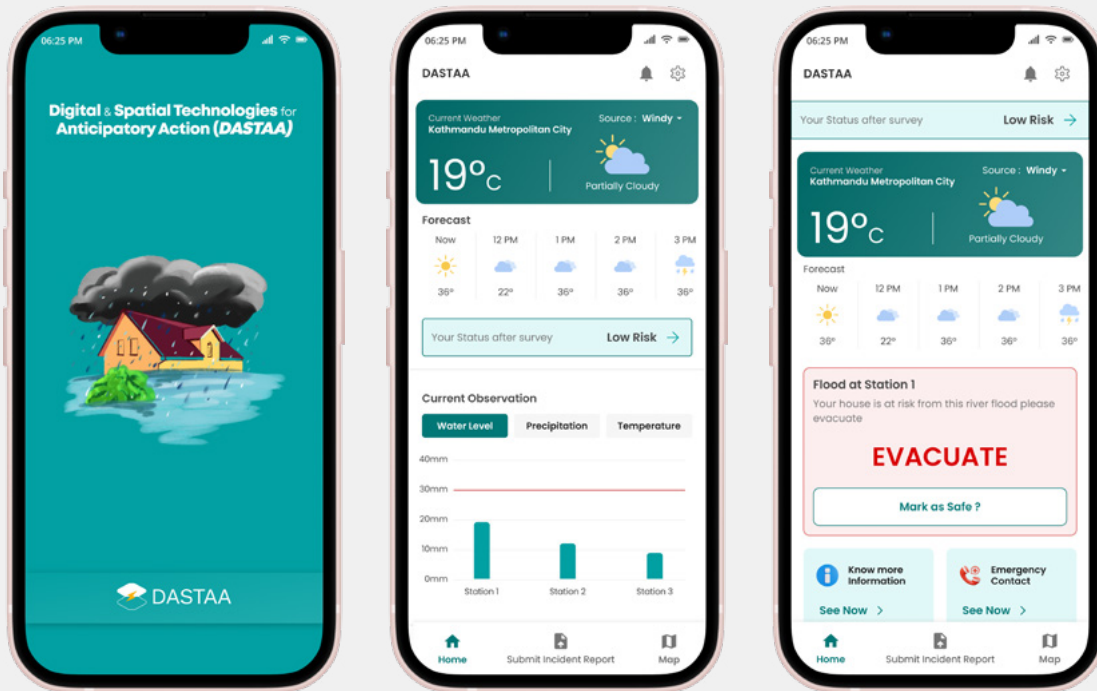
Risk and weather data were integrated to provide customised early warning messages, ensuring that priority communities receive timely and actionable alerts before disasters occur.

Anticipatory Cash Voucher Assistance:

Thresholds and triggers for disaster scenarios were established to facilitate targeted, mobile-enabled financial aid and ensure a faster and more effective humanitarian response.

Key project activities





NAXA's DASTAA mobile application

How the solution works

DASTAA is an all-in-one digital platform designed to strengthen disaster preparedness at both the household and community level. The mobile app enables field teams to collect and access risk data on the go, while the web platform transforms that data into clear visualisations and tailored early warning messages, together providing a dynamic decision-making support tool for timely, evidence-based action.

DASTAA web platform

- **Public dashboard:** Visualises risk and vulnerability data for specific locations, accessible to community members, researchers and academics. Available to all users.
- **Organisation dashboard:** Allows organisations to manage profiles, projects and surveys, aiding in risk assessment and communication, used by humanitarian agencies.
- **Municipal dashboard:** A platform for government users to manage early warning messaging and datasets for local disaster management.

DASTAA mobile platform







- A free mobile app used to conduct household-level surveys and collect risk data – essential for understanding local vulnerabilities.
- Once data is collected, individuals and households can use the app to access early warning information and weather updates, helping them stay informed and prepared for potential hazards.

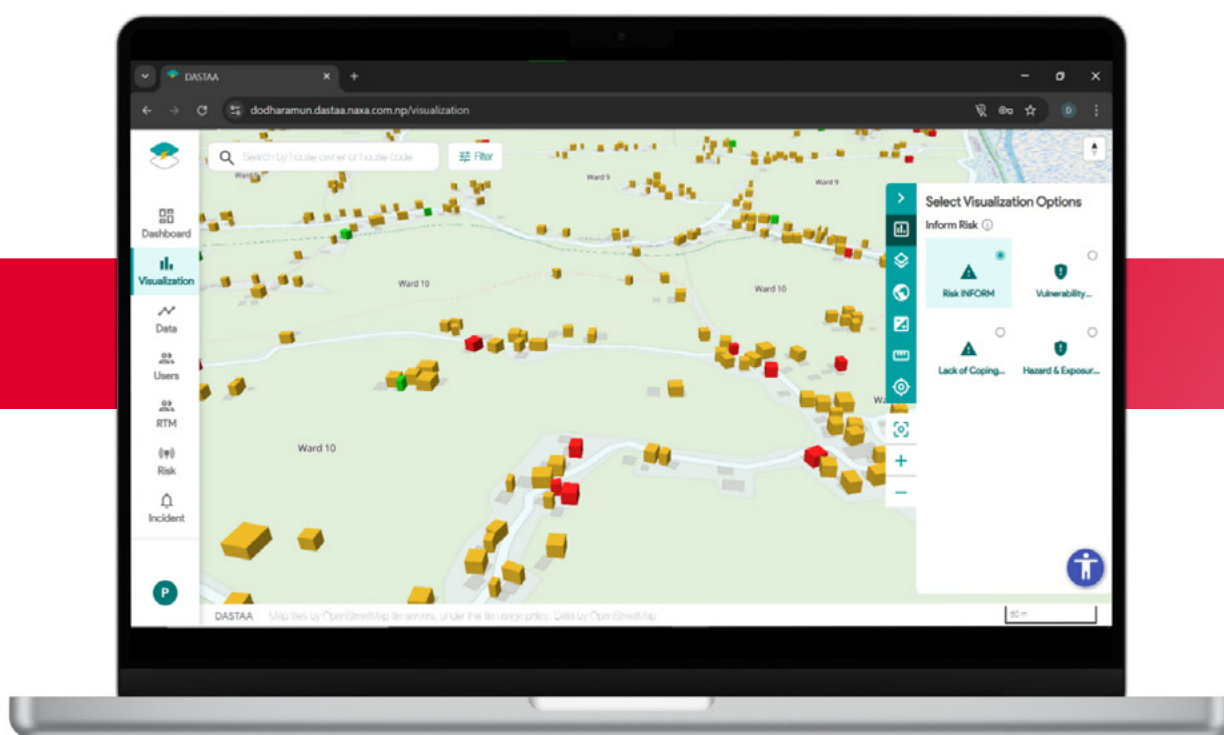
DASTAA modules

DASTAA modules are essential for the design, development and operation of complex disaster management systems. The core modules are described in Table 1.

Table 1:

Core elements of the DASTAA digital platform

Module	What users can see and do
 Dashboard	<ul style="list-style-type: none"> Provides key data on disaster preparedness, community vulnerability, demographics and infrastructure. Designed to support local officials, researchers and stakeholders in identifying and addressing municipal-level risks.
 Visualisations	<ul style="list-style-type: none"> Features an interactive, map-based view of household-level vulnerabilities and risk overlays. Users can explore spatial data using map tools to better understand risk exposure across the project area.
 Data	<ul style="list-style-type: none"> Detailed household survey results are displayed in a table, with filters to view information by municipality or ward. Users can assess vulnerability and access downloadable reports. The overlay section allows users to customise map layers, adding insights on infrastructure, resources and geographic features.
 Real-time monitoring	<ul style="list-style-type: none"> Provides live updates on rainfall and river water levels to track flood risks. Divided into two sections – River Watch and Rainfall Watch – for targeted monitoring and decision-making.
 Risk communication	<ul style="list-style-type: none"> Supports alert management for various hazards. Includes templates, automated alerts, manual alert dispatches and a log of all notifications sent.
 Incident reports	<ul style="list-style-type: none"> Enables users to manage incident reports submitted through the mobile app, ensuring timely documentation and response.



The impact

With support from the GSMA Innovation Fund, NAXA and its partners have created more than 16,000 customised household risk profiles and early warning alerts, with 127,000 IVR messages and 41,000 SMS alerts sent during the monsoon season. More than 870 vulnerable families were reached with CVA, with mobile payments enabling fast and targeted support.

These outcomes were made possible through a collaboration between NAXA, humanitarian and research partners and local government actors. DanChurchAid brought extensive experience in humanitarian programming and cash assistance, facilitating access to vulnerable communities as a trusted local presence. The Institute of Himalayan Risk Reduction contributed technical expertise on flood modelling and risk assessment, and Viamo led on mobile-based communication, including IVR message co-creation and dissemination. Together with local governments in Dodhara Chandani, Bheemdatt and Parshuram municipalities, the partners co-developed protocols for early action and response.

While NAXA provided the digital infrastructure and data systems underpinning the project, this collaborative model ensured the technology was matched with on-the-ground knowledge, community engagement and the resources needed to deliver targeted anticipatory action.

The main achievements and lessons from the GSMA Innovation Fund grant are outlined below.

16,000

customised household risk profiles and early warning alerts

870

vulnerable families were reached with CVA, with mobile payments enabling fast and targeted support.





Outcome 1:

Communities moved from general disaster awareness to personalised household readiness

NAXA and partners developed household risk profiles using a combination of flood modelling, socio-economic surveys and geospatial data, allowing local governments to categorise households into high-, medium- and low-vulnerability groups. Each household received their risk profile in their local language, complete with practical plans and alerts tailored to their needs. This shift from community-level assessments to individual household risk planning is an important step in how disaster risks are understood and addressed in the area.

DASTAA's early warning alerts relied on a multiplatform, multilingual approach that prioritised clarity and accessibility. IVR messages and SMS alerts were sent to households during the monsoon, along with social media updates, physical sirens and mobile app push notifications. Crucially, the system allowed for risk-specific messaging – for example, households with pregnant women or people with disabilities received customised guidance based on their profile.

Localisation of early warning alerts was key. More than 40 different types of early warning message templates (e.g. preparedness, warning level, danger level) were drafted in consultation with government and community stakeholders. They were then translated into Nepali to ensure widespread understanding. Feedback from the field showed voice messages were more effective than SMS for marginalised or lower-literacy groups, highlighting the importance of user-centred communication and including local stakeholders in the design process.

During the July 2024 cloudburst, these efforts were tested in practice. Families in high-risk areas received early alerts and took proactive measures, such as securing belongings and relocating to shelters, demonstrating the value of data-driven early action. More than 80% of households that received DASTAA's early action messages reported preparing for the flooding accordingly.¹ Consequently, no casualties were reported in the three locations where the DASTAA project was active.

80%

of households acted on DASTAA's early warnings to prepare for the flood

"Before DASTAA, we lived in fear during the monsoon, with little warning and no clear idea of what to do. Floods would catch us off guard, causing panic and confusion.

But last monsoon, I received an early warning call and an alert through the DASTAA app and IVR. We had time to prepare, move to a safer place, and help each other. I even reported blocked roads using the app.

Now, we're not just reacting, we're planning and taking early actions ahead. DASTAA has made me feel safer, and our community stronger and more prepared for the future."

Female community member, Dodhara Chandani

Outcome 2:

Stronger local coordination and readiness for early action

The DASTAA platform supported better disaster coordination, integrating early warning data, household risk assessments and response protocols across local governments, federal agencies and community groups. Municipalities led the roll-out of monitoring stations and played a key role in the use of impact-based forecasting (IBF), which, instead of predicting what the weather will be, communicates the potential impacts it will have on people, assets or infrastructure.

Workshops were organised to train local government and community members on the significance of IBF, to learn more about disaster risk monitoring and to interpret risk matrices in DASTAA to make informed decisions.

"Before DASTAA, it was hard to coordinate during disasters. But last monsoon, I got an early warning alert from DASTAA and quickly teamed up with health workers, volunteers, and municipal staff. We evacuated vulnerable families, provided medical kits, and ensured safe drinking water. With better coordination and clear communication, I can now serve my community more effectively. DASTAA has truly changed how we respond together, we're stronger and more prepared."

Coordinator, Dodhara Chandani



NAXA training workshop

"When the heavy rainfall in July partially damaged my home, I felt helpless, unsure of how to move forward. Living with a disability already made things challenging, but the support I received gave me a new beginning. With the cash assistance, I equipped myself with synthetic hands and started driving an electric rickshaw. Now, I no longer depend on others; I earn for my own living and move forward with confidence and hope."

Male community member, Dodhara Chandani

Outcome 3:

More efficient and effective cash assistance for vulnerable households

NAXA, in collaboration with DanChurchAid, disbursed NPR 439,2000 (USD 32,000) to 870 households in Dodhara and Bheemdatt municipalities. Working with IME Pay and municipal governments, transfers were made via mobile wallets and government channels, providing direct support to vulnerable and at-risk families. This forecast-based financing model enabled households to use funds for evacuation, food or securing assets during the monsoon season, enhancing their agency and dignity. Pre-agreements with disaster committees and early onboarding to digital systems helped ensure faster, targeted delivery.

User feedback through UX/UI research also informed improvements to the interface and payment tools. By combining anticipatory cash with real-time risk data, DASTAA demonstrated how digital platforms can make humanitarian financing more responsive and equitable.

DASTAA in action: Saving lives in western Nepal

Step 1

Early warning and early action messaging

pre-monsoon–5 July

How the event unfolded and how the DASTAA system helped save lives

Step 1

Early warning and early action messaging

(pre-monsoon–5 July)

In advance of the monsoon, 69 early warning and action messages were developed using the DASTAA platform's scenario planning tools. When the Department of Hydrology and Meteorology issued an Index Based Forecasting (IBF) on 5 July, this triggered tailored alerts and actionable guidance for at-risk communities.

Step 2

Multi-channel dissemination

(6 July, 8:00 PM)

Using DASTAA's communication modules, warnings reached 16,000 households through IVR calls, SMS, sirens, door-to-door visits, WhatsApp and Facebook. Pre-distributed household disaster risk management plans helped families prepare for evacuation.

ANTICIPATORY ACTION (AA) SAVES LIVES

Zero Casualties Despite Record 624 mm Rainfall

DASTAA



In July 2024, Dodhara Chandani municipality in the far western region of Nepal was hit by an extreme cloudburst – characterised by intense, short-duration rainfall. With 624 mm of rainfall in just 24 hours, it marked one of the most intense weather events ever recorded in the region. The resulting flood caused an estimated NPR 1.5 billion in damages (around USD 11 million).

This cloudburst event became a powerful example of NAXA's anticipatory action model in practice. Through proactive planning, data-driven decisions and timely action, the community turned a potential disaster into an example of effective preparedness.

Step 3

Triggering early action

7 July, 2:00 PM

Step 2

Multi-channel dissemination

6 July, 8:00 PM

Step 4

Real-time monitoring and emergency response

7 July, night

Step 3

Triggering early action

(7 July, 2:00 PM)

As the flood risk escalated, evacuation orders were officially issued. DASTAA-supported protocols enabled rapid group cash transfers to Community Disaster Management Committees, which coordinated the safe evacuation of 500 vulnerable people.

Step 4

Real-time monitoring and emergency response

(7 July, night)

DASTAA's real-time monitoring dashboards tracked water levels and at-risk zones, guiding local responders to reach stranded families safely. Community teams navigated challenging terrain to ensure no one was left behind.

Step 5

Post-event relief and recovery

Vulnerability data collected via DASTAA enabled targeted, equitable relief delivery. The platform also generated automated damage assessments, informing local recovery and rehabilitation efforts.

Step 5

Post-event relief and recovery

Key lessons

The NAXA project offered valuable insights into what works when designing and delivering anticipatory action at the local level.

Lesson 1:

Locally grounded communication builds trust and drives action

Local participation was key to NAXA building trust in its early warning messages. By involving young people in household data collection and engaging community leaders in risk communication, NAXA helped foster acceptance of scientific assessments that might otherwise have been met with scepticism. Distributing printed, household-specific risk profiles in local languages also made disaster information feel more relevant and actionable. Alongside this, local government endorsement of the risk scores and preparedness actions strengthened their legitimacy. This approach highlighted the importance of not only generating accurate risk data, but delivering it in a way that people can relate to, understand and easily act upon.

"At first, we were unsure about how DASTAA worked. But as we started using it, we realised that it provides weather forecasts, especially predicting how many days it will rain before a flood. Since we are farmers, this has been really helpful. Through the mobile app, we get updates on when the rain will start, which allows us to plan and harvest our crops accordingly. This way, we can manage our farms while also taking care of our homes. This project has been a great support for us."

Female Representative of Community Disaster Management Committee]



Lesson 2:

Inclusion doesn't happen automatically – it needs to be built into every stage of design and implementation

The use of SMS, IVR, mobile app push notifications and social media provided multiple channels for sharing critical risk messages. However, digital outreach alone was not enough. Poor mobile coverage, shared household phones and gendered barriers meant in-person networks – such as ward committees and local disaster responders – remained essential to ensure early warning information was received.

The project found that women – often the primary caregivers – were highly responsive to early warnings but not always the direct recipients of alerts. This led NAXA to adapt its strategy to ensure women were targeted specifically, either through direct messaging or trusted community intermediaries. It underscored the need for gender-sensitive communication to be a core design principle. Going forward, women should be prioritised as direct recipients of risk messages, with community networks used to reach all household members. This will support equitable access to early warnings and a more inclusive response.

Lesson 3:

Flexible cash assistance supports anticipatory action and recovery

DASTAA's anticipatory cash assistance was successful because the groundwork was laid in advance: recipient lists were validated; financial service providers were onboarded early; and trigger thresholds were clearly defined. This level of preparedness enabled rapid, targeted support when it was needed most during the floods.

Using a mix of cash delivery methods – including mobile wallets, bank accounts and mobile phone-based transfers – helped ensure cash was accessible to households with different levels of financial access and digital literacy. This meant that funds reached recipients quickly and securely. Delivering cash ahead of the worst impacts meant families could act quickly, whether by evacuating, making essential purchases or protecting their homes. By providing assistance in advance, the project not only reduced immediate harm from the floods, but also supported faster recovery and longer-term resilience for affected communities.

What's next for NAXA?

NAXA is entering a new phase of growth, pursuing expansion both within Nepal and internationally. The team has begun scaling its anticipatory action work to new regions, including Bangladesh where it has already completed household surveys in two locations with strong local government support. In Malawi, a new project will use remote mapping to address frequent flooding. NAXA is also investing in feature development, including improved data integration and real-time monitoring to enhance the usability of its platforms.

Looking ahead, NAXA is exploring risk insurance and financing models as a path to long-term sustainability. While recognising that its work primarily supports vulnerable populations with limited ability to pay, NAXA is exploring how some of these funds might support operational costs while delivering direct value, such as household-level insurance coverage.

Lesson 4:

Impact-based forecasting relies on strong local capacity

The use of IBF in the project was a key innovation. Rather than sending general weather updates, forecasts were linked to the likely impacts on people and communities, allowing for more targeted action. NAXA's training and capacity building workshops helped users to interpret and apply this information effectively. To fully realise the potential of IBF, it needs to be embedded in routine disaster planning and accompanied by ongoing investment in local skills and systems. Strengthening forecast interpretation and verification at the local level can help ensure IBF becomes a trusted, actionable tool in future preparedness efforts.



Partnership | Progress | Prosperity

This initiative has been funded by UK International Development from the UK government and is supported by the GSMA and its members. The views expressed do not necessarily reflect the UK government's official policies.

