

# The Early Warning, Early Action, Early Finance (AWARE) Platform: Promoting early warning of and effective response to climate hazards

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*The AWARE platform disseminates information on climate, market, health, nutrition, and population displacement, to promote collaborative efforts by multiple partners at local-to-national scales to enhance preparedness, response, advocacy, and resource mobilisation in times of high climate risk.*

## Supporting farming communities to adapt to climate shocks

Climate change is bringing increasingly variable weather and more frequent floods and droughts to low- and middle-income countries. Within agriculture, this is causing economic losses and unemployment, and making farmers reluctant to invest. Smallholders, particularly those who are

women, youth, people living with disabilities, or indigenous communities are struggling to improve their livelihoods, and poverty and tensions are on the rise.

Three key challenges prevent communities from adapting to climate change. First, authorities have insufficient data on communities' vulnerability to climate shocks and lack systems for monitoring and warning of impending events. Second, coordination and information-sharing between relevant institutions (meteorology, agriculture, disaster management, finance) tends to be poor, and there is often a mismatch between the local level of climate impacts on communities and the provision of assistance by high-level institutions. Third, without accurate data and a cohesive process for collaboration, authorities are unable to develop coherent disaster plans, and therefore take a reactive approach to disaster-management; this also includes how they provide finance.

The AWARE Platform helps countries overcome the challenges outlined above and respond to impending climate events in advance to protect people before a disaster based on early warning to early action and finance. Its 'Early Warning' capability enables authorities to access indicators related to environment, crop price, disease, nutrition, and population-displacement, so that they can anticipate and monitor the impacts of climate shocks. The 'Early Action' facility summarizes actions to be taken under specific scenarios indicated by the Platform's Early Warning tools. Its 'Early Finance' mechanism ensures that institutions can access funding at the early stage of an unfolding climate event to help ensure, for example, that evacuations run smoothly, food security is maintained, and that both lives and livelihoods are protected.

The Platform has been developed as part of the CGIAR Initiative on Climate Resilience (ClimBeR) to transform the adaptation capacity of land, water, and food systems. Specifically, this piece of research is demand-driven by efforts to 'build capacity for policies that match local needs with available tools to promote "governance for resilience" (G4R) that operates effectively across multiple levels and scales.' This goal complements the Initiative's key outcomes, which include science that helps reduce risk to food producers' livelihoods and agricultural value chains, ensures policymakers have evidence on which to base robust policies, and to understand and act on security risks posed by climate change. The AWARE Platform is being developed for Guatemala, Kenya, Morocco, Nigeria, Philippines, Rwanda, Senegal, Sri Lanka, and Zambia - all countries that are highly vulnerable to climate change but have a lower capacity for resilience.

## Preparing communities to become AWARE

The AWARE Platform is targeted for use by government departments and agencies, humanitarian organizations, and funders. The first step for its effective use involves identifying the risks to communities and developing plans to mitigate those risks. This work is carried out using tools provided in the Platform's Early Action dashboard. At this stage, users carry out community risk assessments, focus group discussions, and key informant interviews, using guidance documents available through the Platform.

This data is then used to populate four data structures: 'Category', which covers aspects of a community's life and the physical assets that could be affected by a disaster; 'Impact', which includes data on direct and indirect impacts of different hazards on the community; 'Possible Anticipatory Actions', developed in response to the identified impacts; and a comprehensive Anticipatory Action Plan based on all the information gathered. This plan outlines actions to be undertaken during three phases: 'Preparedness', six to nine months ahead of a potential hazard; 'Readiness', when a hazard is forecast for the following week or so; and 'Active', when the event is imminent.

For example, a rural community of 4000 people might be identified as largely depending on rearing livestock for their livelihoods, having substandard roads and infrastructure, depending on water from local supplies that are easily contaminated, and having minimal protection for household assets. In the case of a flood, anticipated direct impacts might encompass deaths and injuries to people (especially the most vulnerable community members - the elderly and disabled) and livestock, destruction of homes, damage to livelihoods and a lack of water, with indirect impacts including poor sanitation and waterborne disease, as well as, children becoming sick and dropping out of school.

Possible anticipatory actions generated in response to these potential impacts might be to establish an early-warning system for flooding, develop emergency response and rescue teams, plan evacuation routes and safe havens for people and livestock, and conduct simulation drills for better preparedness. Within the Anticipatory Action Plan itself, these actions are allocated to the Preparedness, Readiness and Active phases. More detail on the specific interventions required, by whom and when, is subsequently outlined.

Specific interventions might be designed for: water and sanitation, education, shelter and housing and restoring livelihoods. Those planned for shelter and housing might include identifying houses vulnerable to flooding (two months ahead), providing sandbags to vulnerable households and identifying how many temporary shelters may be needed (3-7 days ahead), and mobilising local first-aid teams to assist professional rescue personnel on duty (1-3 days ahead). Also included in the Anticipatory Action Plans are financial budgets required to cover the costs of interventions. This finance need can be agreed in advance with the appropriate authorities, with funds released promptly when the 'Readiness' or 'Active' phase is switched on.

### Why AWARE?

Traditionally, most countries across the global South establish an early warning system, which serves as the foundation for providing timely information about water-related hazards, while AWARE takes this information and encourages proactive measures to reduce the impact of disasters. Table 1 provides a comparison of early warning systems and the advantages of the AWARE platform as it focuses on translating early warnings into concrete actions that can mitigate the impact of a hazard or disaster. For example, early actions can include evacuation plans, pre-allocation of resources, reinforcing infrastructure, pre-financing agreements across humanitarian actors, and community preparedness. More importantly, the AWARE platform brings in a wider spectrum of stakeholders, including government officials, emergency responsive managers, humanitarian organizations, and the local communities at risk. It encourages them to take preventive actions before the disaster strikes to minimize its effects and, most importantly, save lives.

## Satellite data provides early warning capabilities

At the heart of the AWARE Platform is the Early Warning dashboard, a data feed drawn from satellite sensors and government information sources to provide information on the conditions of five indicators: climate, markets, health, nutrition, and population displacement (Table 2). The climate section of the dashboard also includes indicators to forecast weather (precipitation, temperature, wind speed, cloud, pressure) in the short-, medium- or long-term, and to monitor the evolution of climate hazards.

**Table 1.** Differences between the current Early Warning System (EWS) and AWARE.

Characteristics	Current EWS	AWARE
Framing Problem	Their approach focuses on reacting to and mitigating the consequences of climate and disaster events by addressing immediate risks and hazards to minimize their impacts	AWARE frames the problem holistically, addressing underlying risk drivers, anticipating future hazards, and considering long-term climate uncertainties and vulnerabilities.
Goal	To deliver timely and accurate information to alert stakeholders about imminent hazards, enabling immediate response actions, informed decisions on evacuations, emergency response, and resource allocation	Goes beyond mere alerts, promoting proactive risk reduction and resilience-building. It facilitates anticipatory actions, early preparedness, adaptive capacity building, and fosters a culture of resilience to minimize hazard impacts and address underlying causes of vulnerability and risk.
Timing	Focus on detecting and alerting stakeholders about imminent or ongoing risks and hazards	Enables proactive preparedness and response measures by providing warnings and triggering actions before a hazard occurs.
Risk perception	Responding to past patterns and events. Often rely on historical data and established thresholds to determine risks	Incorporates a forward-looking risk assessment, climate, and disaster risk projections, and considers emerging risks and uncertainties in seasonal climate change.
Action-oriented Approach	Lack emphasis on proactive actions, often leaving stakeholders to determine appropriate responses on their own.	Emphasizes early actions, finance, and response, bridging the gap between warning and action. Engages stakeholders to develop preparedness and response plans, ensuring actionable measures to mitigate risks and reduce impacts.
Collaboration	May involve multiple stakeholders, but lacks sectoral integration and collaboration	Promotes multi-sectoral collaboration and coordination, integrating knowledge, expertise, and resources across sectors and communities to enhance preparedness and response for locally led adaptation strategies.
Technology and Data Integration	Does not fully leverage technological advancements and relies more on traditional data sources and communication channels	Leverages technology, data analytics, and communication tools to integrate and interoperate different data streams for timely and accurate risk assessment.
User Friendliness	Has a traditional design, requiring specialized knowledge to interpret information, with complex interfaces and limited accessibility, especially for vulnerable communities	Aims to be accessible to a wide range of users, prioritizing clear communication, intuitive interfaces, and user-centric design.
Relevance of System	Focuses on specific hazards or sectors such as meteorological events or natural disasters, providing valuable information within their scope. However, may not address broader systemic risks or emerging climate change challenges.	Adopts a holistic and integrated approach, considering multiple hazards, climate projections, and socio-economic factors to provide a comprehensive understanding of risks and their impacts across sectors.
Outcomes	Focus on issuing alerts and warnings to inform stakeholders about potential hazards, with the ultimate outcome measured by the number and timeliness of the warnings issued.	Focuses on tangible outcomes, aiming to trigger early actions, preparedness measures, and resilience-building initiatives based on the information provided. The success of AWARE is measured by its contribution to risk reduction, impact minimization, and adaptive capacity enhancement.
Communication	Typically employs one-way communication channels where experts or authorities disseminate information to end-users, limiting active community and stakeholder participation and engagement	Prioritizes two-way communication and stakeholder engagement, facilitating dialogue, feedback loops, and participatory processes. Aims to ensure that information is not only shared but also understood, contextualized, and acted upon collaboratively.
Resources	Require substantial resources, including infrastructure, technology, and human capacity. They often rely on centralized data collection and analysis, which can be expensive and time-consuming.	Utilize shared resources and technological advancements such as remote sensing, satellite imagery, and crowdsourced data to enhance data collection and analysis. Emphasizes the integration of existing resources, knowledge, and expertise within a multi-stakeholder framework to maximize collective capacity and achieve resource efficiency in addressing risks.

**Source:** Table 1 compiled by (Attoh E., and Amarnath G., 2023 In review), with multiple sources of information gathered from (Acosta-Coll et al., 2018; Zhongming et al., 2020; Peek, et al., 2020; Yasmin et al., 2023).

If the Early Warning dashboard indicates that pre-defined thresholds have been breached, it will trigger warnings to signify that a flood, drought, or landslide is predicted. For example, early forecasts might indicate that heavy rain is likely three to four months from now. This will trigger 'Preparedness'

interventions developed using the Early Action dashboard. Later, if forecasts indicate that the hazard will happen in a matter of days, the affected community or communities will be prompted to switch to 'Readiness' level, and finally to 'Active' status.

**Table 2.** Satellite and other indices used to monitor climate, markets, health, nutrition, and population displacement on the AWARE Platform.

<b>Hazard</b>	<b>Index</b>	<b>Data source</b>	<b>Definition</b>
<b><i>Drought</i></b>	Accumulated rainfall	National Aeronautics and Space Administration (NASA)'s - Global Precipitation Measurement (GPM) satellite system; Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS) and observed records	Measure total amount of rainfall over a certain area during a specific time period.
	Dry Spell	NASA's - Global Precipitation Measurement (GPM) product	Drought index based on number of dry days.
	Soil Moisture Condition Index	NASA's- Soil Moisture Active Passive (SMAP) product	Quantifies moisture levels at various depths in the soil.
	Integrated Drought Severity Index	IWMI	Combines data from meteorological, hydrological, and agricultural indices to determine drought severity levels.
<b><i>Flood</i></b>	Flood extent	European Space Agency (ESA) Sentinel-1 and Moderate Resolution Imaging Spectroradiometer (MODIS) NASA's Terra and Aqua satellite data	Measures the extent of flooding to support early action including emergency response mechanisms.
	Accumulated rainfall	National Aeronautics and Space Administration (NASA) - Global Precipitation Measurement (GPM) satellite system	Measures the total amount of rainfall over a certain area during a specific time period.
	GeoGlows or GloFAS	Global Earth Observation System of Systems (GEOSS) Water Sustainability Initiative and European Union - Joint Research Center (JRC)	Provides real-time and near-real-time data on a range of water-related indicators, including river discharge, precipitation, and temperature.
<b><i>Landslide</i></b>	Accumulated rainfall	Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS)	Gridded rainfall time series.
	Accumulated rainfall	NASA's Global Precipitation Measurement (GPM) product	Measure of the total amount of rainfall over a certain area during a specific time period.
<b><i>Market</i></b>	Yearly food prices	UN World Food Programme	Maize (imported); Maize (local); Rice (ordinary, first quality); Rice (ordinary, second quality); Sorghum; Rice (imported)
<b><i>Health</i></b>	Malaria, Diarrhoea, Dengue	Department of Health	Provides information on lead time of health risks using information from rainfall intensity to support early action measures.
<b><i>Child nutrition</i></b>	Stunting, Underweight Wasting	Department of Health and UN World Food Programme	Provides early warning information on stunting and wasting in reference to historical data to support early action measures.
<b><i>Population displacement</i></b>	Total displaced (annual)	Disaster Management Organisations or United Nations	Provides historical information on the people displaced due to climate extremes to strengthen early action protocols.

# AWARE implementation steps

The AWARE platform supports the transition from early warning to early action and finance by involving a structured process to translate the advance notice of water-related hazards or disasters into proactive measures that reduce its impact and protect communities. This is what its implementation process includes:

**1. Early Warning Systems:** Early warning systems are designed to provide advance notice and information about impending hazards or disasters. These systems rely on data collection, monitoring, and predictive models to issue alerts and advisories, allowing communities and authorities to prepare for and respond to potential threats.

**2. Risk assessment:** Risk assessments are conducted to identify vulnerable areas, populations, and assets that may be at risk from specific hazards. This assessment involves analyzing the potential impacts of a hazard and the vulnerabilities within the community.

**3. Early warning alert:** When early warning signs are detected and a potential hazard is identified, the early warning system issues alerts and advisories to relevant authorities, organizations, and the affected communities. These warnings are based on scientific data and predictive models.

**4. Decision making:** In response to early warnings, decision-makers at various levels, including local governments, disaster management agencies, and humanitarian organizations, analyze the information and assess the magnitude of the potential threat. They decide whether to activate preparedness and response measures based on the severity of the situation and the level of risk.

**5. Early action:** To enable early action, preparedness and contingency plans should already be in place. The EA tool has three phases, namely preparedness, readiness and active. These plans outline the specific actions to respond to different hazard scenarios. This includes pre-identifying resources, community volunteers, local government officials, pre-defined strategic locations, response teams, etc.

**6. Early finance:** based on the decision to take early action, resources such as emergency funds, cash vouchers, dry rations supplies, and response teams are mobilized and deployed to the affected areas or used to coordinate with humanitarian actors for resources needed to ensure that the deployed communities in the pre-assigned locations have access to necessary inputs.

**7. Community engagement:** Local communities are engaged and informed about potential hazards and activate pre-planned early actions in the case of major disasters. Community participation and understanding of the AWARE process through real simulation drills, and regular awareness creation are critical for the success of early action measures.

**8. Implementation of Anticipatory Action:** Early action measures that are planned will be promptly implemented based on the early warning indicators through coordination among relevant government institutions, NGOs, CBOs, and international agencies to ensure a coordinated response.

**9. Monitoring and evaluation:** Throughout the active phase and response planning, ongoing monitoring and evaluation will help ensure that early action measures are effective and that adjustments can be made as required.

**10. Learning and adaptation:** After the event, a review is conducted to assess the overall response, identify lessons learned and make improvements for future early action efforts.



AWARE landing page.

# The AWARE Platform in practice: A case study

A pilot project conducted in the upland tea-producing area of Hatton, Sri Lanka, exemplifies how the AWARE Platform works. A first time for Sri Lanka in disaster preparedness, communities were chosen to participate after being identified as particularly vulnerable to floods and landslides. The International Water Management Institute (IWMI), in partnership with World Vision Sri Lanka, The Disaster Management Centre (DMC) of Nuwara Eliya District, the Sri Lanka Red Cross, the local District Secretariat, the National Building Research Organisation, the National Disaster Relief Services Center, and the Department of Agrarian Development worked with local estate communities to strengthen their resilience to such events.

Focus group discussions held with men and women of various ages were used to develop an Anticipatory Action Plan aimed at mitigating the impact of hazardous events. A simulation was then carried out to test the practicality of the plan to mitigate the impacts of the hazard. The three-day exercise began with a 'Preparedness trigger', where the DMC sent a forecast of heavy rain by SMS, and provided information to communities about what they should do in the case of a flood or landslide. This included activities such as cleaning canals and understanding where to evacuate.

On the second day, the communities received the 'Readiness trigger', where they were warned to prepare for the imminent hazard. This preparation included using cash vouchers given to them to obtain dry rations of pulses and legumes from a local vendor. This was done to ensure that the communities received sufficient nutrition during the crisis. They also cleaned the canal using equipment they had prepared the day before. This involved using sandbags to build up bunds and reduce inundation from floodwaters.

On the third day, 145 families located at three sites – Kotagala, Yulli Field Estate and Kuduoya – received the 'Activation trigger' from their local designated informant 'Mr Early Warning'. A total of 459 participants, comprising 216 men, 243 women, 77 school students, 13 breastfeeding mothers and three people with disabilities were involved. Each Mr Early Warning used a megaphone to alert their community to the impending flood and advised people evacuate their homes and move to shelters, taking with them rations they had collected the day before.

Communities gathered in their designated Safety Center, where they were registered to maintain a full count of evacuees. The 'injured' were treated by the Red Cross, and all evacuees were given access to clean drinking water, food, and sanitation facilities. Women, children, and men were segregated, to address specific needs, such as privacy required by lactating mothers. Keeping children in a separate space enabled them to continue with their schoolwork, and engage in music and theatre, to distract them from the

challenging circumstances they faced. Other community members prepared food for all evacuees using the rations they had brought.

The simulation ended with an alert from the DMC informing the District Secretariat that the floodwater had receded and that it was safe for the communities to go back to their homes. Participants were then informed, and the Safety Center was closed, enabling community members to engage in post-disaster related activities. The simulation was the first of its kind in Sri Lanka aimed at promoting anticipatory action through early warning systems. It demonstrated the power of such initiatives to mitigate disasters, build resilience in communities, create local ownership, and drive locally led nature-based climate adaptation actions, such as improved river drainage and green infrastructure.



Photo: Pradeep Lyanage, IWMI

## Fostering collaboration, improved governance, and transparency

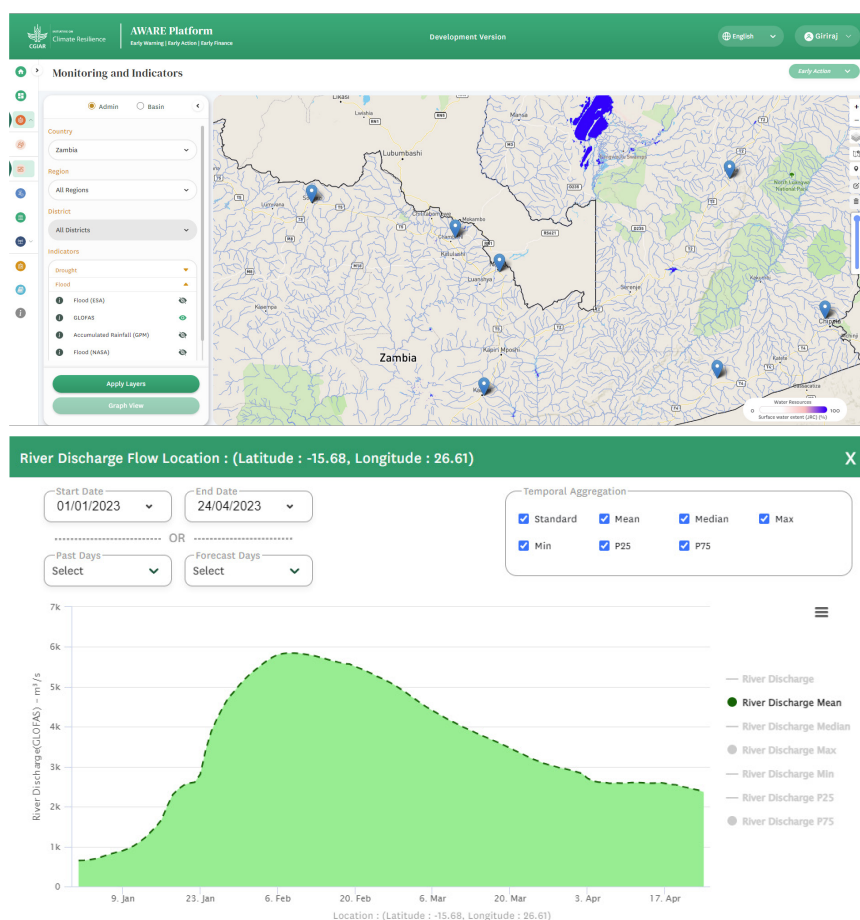
The AWARE platform is designed to be installed across a range of institutions. The process of implementing the system across multiple entities helps to develop an institutional and governance framework capable of a well-coordinated response to climate hazards. Accountability measures built into the Platform during planning set out the roles and responsibilities of key actors in the case of particular thresholds being exceeded and warnings triggered. By tightening the links between early warning and response and helping to break silos through the tools and data collection it provides, the Platform can help to build resilience within vulnerable farming communities who unfortunately, face the greatest impacts of climate change.

## The technology behind the AWARE Platform

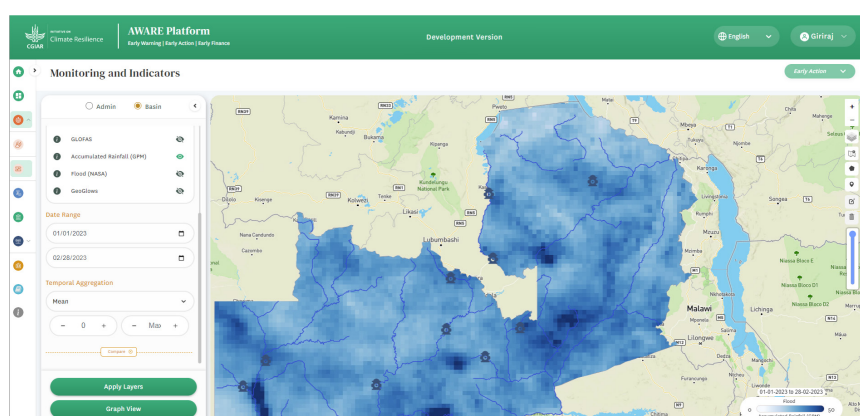
Built using an open-source model and data, the AWARE tech stack provides access to a large repository of earth observation and other data that helps to inform the climate, markets, health, nutrition, and population displacement indicators. Data on past climate hazards, informs likely impacts in the case of a flood or drought, with artificial intelligence and machine-learning techniques used to predict outcomes. The system is implemented using cloud technology, for easy maintenance and to overcome security issues. Coding standards are incorporated for future updates. The Platform is scalable, can be implemented as a stand-alone facility or incorporated into existing systems, and can be adapted for any country.

## Benefits of the AWARE platform

A holistic approach involving public-sector departments (water, agriculture, meteorology, finance) and private-sector organizations (funding bodies, data providers, insurers, NGOs, CSOs) is needed to anticipate and respond effectively and quickly to climate shocks. The AWARE Platform brings these entities together, helps break silos by creating the opportunity for dialogue across multiple actors – specifically between government agencies, NGOs, and local communities, not only provides early warning of climate hazards, but also facilitates an effective response through early action and early finance. It complements the Climate Smart Governance Dashboard,



Flood forecasting information for Kaufe River in Namwala district, Southern Province using AWARE Platform.



Spatial distribution of rainfall derived using NASA GPM rainfall product for Zambia using AWARE Platform.

yet another ClimBeR innovation, which is being developed by IWMI and partners to strengthen nations' capabilities to adapt to climate change in the longer term.

The overarching aim is that, in strengthening communities' resilience to climate change, it will also contribute to achieving United Nations (UN) Sustainable Development Goals (SDG) 1 (No poverty), 2 (Zero hunger), 5 (Gender equality), 13 (Climate action), 15 (Life on land) and 16 (Peace, justice and strong institutions). It is also aligned with meeting the UN Food Systems Summit Action Tracks 'Nutritious food', 'Nature-positive production' and 'Resilience'. Gender and social equity, and better access to climate finance, especially for those most vulnerable are core components of ClimBeR's approach. A focus on how societal, cultural, and political dynamics affect vulnerable communities in the context of climate shocks, and the changes needed to ensure that innovations and technology are leveraged effectively to contribute to broad human development goals such as the SDGs is what distinguishes the Initiative's focus on transformative systems adaptation and the move towards climate-resilient from climate-smart agriculture. This is exactly what platforms such as AWARE aim to do - by integrating technology with local knowledge drawn from key actors, and breaking silos across governing entities through the availability of such tools, ClimBeR science ensures that such climate resilient solutions are just, equitable, and sustainable, and that resilience is built locally to save both lives and livelihoods.

### Citation

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