
International Resilience Lab

FY2026 Report



THE UNIVERSITY OF ARIZONA
ARIZONA INSTITUTE FOR RESILIENCE

International
Resilience Lab

Message from the International Resilience Lab

The University of Arizona (U of A) is well positioned to be a leader in resilience research in and around Arizona and abroad. With food insecurity rising around the globe, climate changes driving recurrent humanitarian crises, and a widening information resource divide, both new insights and a new generation of creative and collaborative researchers are needed. In 2021, The Arizona Institute for Resilience (AIR) made a strategic investment to develop a program that would harness the talent of U of A faculty, students, and researchers to form partnerships to address some of the world's most pressing social and environmental challenges. We present the third Annual Report of this initiative, representing the International Resilience Lab (IRL) during fiscal year 2026 (FY26), from July 1, 2025–June 30, 2026.

In February 2025, the United States Agency for International Development (USAID), one of the largest donors for the global resilience agenda, was shuttered. IRL was hard hit by these changes, and the impacts will be long-lasting. Indeed, we lost talented researchers, prematurely terminated projects prevented the maturity of valuable insights, and many funding avenues now no longer exist.

But the changes also reignited our purpose. Building resilient food, water, and livelihood systems and supporting adaptation to climate and environmental change remain deeply important, and research and partnerships are essential to identify and co-create solutions. The redoubling of our motivation springs from our conviction that studies produced in this turbulent moment

will provide insights that will shape the debates, dialogues, and science that will reform the international community's approaches to climate adaptation, disaster risk reduction, and resilience. In the spirit of resilience, we move forward with hopes that international cooperation on these topics will not only weather these shocks but will re-emerge transformed with improved understandings and approaches. We hope IRL's work may play some small role in supporting this transformation.

In FY2026, IRL pursued research that continues to build collaborations around the Globe, from South Asia to the Caribbean and Africa. Our research projects fell under three themes:

1. **Climate and Weather Information for Adaptation and Decision-making**
2. **Physical and Social Dimensions of Land Degradation and Environmental Change**
3. **Shocks and Changes in the Humanitarian and Development Sectors.**

This report details our recent research and partnership engagement efforts in FY26.



📷 Zack Guido



 Zack Guido

IRL Mission and Vision

IRL is a group of researchers with diverse disciplinary expertise who have a common commitment to advancing resilience, climate adaptation, and disaster risk reduction in international contexts. IRL envisions a reality where solutions to global social and environmental challenges are developed through collaborative, socially engaged, and culturally appropriate scientific research. IRL believes that this type of research contributes to making the world more resilient and sustainable and requires transformative change. The mission of IRL is to collaboratively lead and facilitate socially engaged research and collaboration between the U of A and local and global partners.

IRL Goals

1. **Produce cutting-edge research and scholarship on resilience, climate adaptation, and disaster risk reduction in international contexts.**

IRL accomplishes this goal by collaboratively leading socially engaged research projects; promoting inter- and transdisciplinary collaboration, knowledge exchange, and educational opportunities for faculty, staff, and students at the U of A; and partnering with higher education institutions in the Global South.

2. **Catalyze and support a community of U of A faculty, students, and researchers to advance academic and educational opportunities related to resilience, climate adaptation, and disaster risk reduction in international contexts.**

IRL accomplishes this goal by developing community events and platforms where individuals can connect and collaborate on relevant academic and educational initiatives; connecting faculty, students, and researchers at the U of A to opportunities to obtain funding for socially engaged research; and managing information and knowledge exchange among network members and academic units.



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Team

Core IRL Team in 2025–2026



Zack Guido

Director, International Resilience Lab; Associate Research Scientist, Arizona Institute for Resilience



Stefanie Herrmann

Research Scientist, International Resilience Lab, Arizona Institute for Resilience



Diana Githu

Graduate Student Researcher, PhD candidate, Arid Lands Resource Sciences



Erica Goto

Research Scientist, International Resilience Lab, Arizona Institute for Resilience



Sarah Clark

Program Manager, International Resilience Lab, Arizona Institute for Resilience

U of A Graduate and Undergraduate Researchers

Diana Githu – PhD candidate, Arid Lands Resource Sciences

Elise Arellano-Thompson – RISE Intern, PhD, School of Geography Development and the Environment

Harshit Khatwani – RISE Intern, Bachelor of Arts in Journalism, Global Studies, & Political Science

Monica Brody-D’Urso – RISE Intern, Bachelor of Science in Medicine and Bachelor of Arts in Spanish

Other U of A Research and Working Group Collaborators

Aaron Lien – School of Natural Resources and the Environment

Anna Josephson – Agricultural & Resource Economics

Birtukan Asmare – former IRL

Cheryl Valdez – MPH student, Mel and Enid Zuckerman School of Public Health

Elise Gornish – School of Natural Resources and the Environment

Jeff Michler – Agricultural & Resource Economics

John Kramkowski – Human Rights Practice and Arizona Online

Neda Fletcher – Human Rights Practice and Academic Programs & Strategic Initiatives

Sriram Iyengar – College of Medicine

Susannah Dickenson – College of Architecture, Planning, & Landscape Architecture

Tarnia Newton – School of Health Professions

Tim Finan – Bureau for Applied Research in Anthropology, Emeritus

William K. Smith – School of Natural Resources and the Environment

William Simmons – Human Rights Practice and Gender & Women’s Studies

Organizational Affiliations of External Collaborators*

- The Alliance for Biodiversity and Centro Internacional de Agricultura Tropical, Global institution based in Italy
- American Cancer Society, United States
- Associação de Jovens Indígenas/ Indigenous Youth Association (AJI), Brazil
- CARE International Niger, Niger
- Caribbean Coastal Ocean Observing System, Puerto Rico, United States
- Caribbean Institute for Meteorology and Hydrology, Barbados
- Consejo Superior Universitario Centroamericano, Central American regional institution based in Ghana
- EPARREH (Estudos e Práticas Agrícolas e o Reencantamento Humano – Agricultural Studies and Practices and the Human Reenchantment), Brazil
- George Washington University, United States
- Independent Researcher, India
- Institute for Statistical Social and Economic Research, University of Ghana, Ghana
- International Centre for Evaluation and Development, Kenya and Ghana
- Mercy Corps, United States
- Shiv Nadar University, India
- Stockholm Environmental Institute United States, United States
- TANGO International, United States
- Tegemeo Institute for Agricultural Policy and Development, Egerton University, Kenya
- Tulane University, United States
- Universidad del Valle de Guatemala, Guatemala
- Universidade de São Paulo (USP), Brazil
- Universidade do Estado do Pará, Brazil
- Universidade Estadual de Campinas (UNICAMP), Brazil
- University of Denver, United States
- University of Miami, United States
- University of Puerto Rico, Comprehensive Cancer Center, United States
- University of Puerto Rico, Medical Sciences Campus, United States
- University of South Florida, United States
- University of the Virgin Islands Caribbean Exploratory Research Centre, United States
- University of Victoria, Geography, Canada
- University of Victoria, Pacific and Asian Studies, Canada
- US Forest Service Rocky Mountain Research Station, United States
- US Geological Survey, United States
- Youth for Human Rights Aagahi, Pakistan



* External collaborators meet the minimum bar of having co-developed an IRL program, project, event, working group, and/or grant proposal.

2025–2026 Achievements

IRL’s activities and impact between July 1st 2025 and June 30th 2026

Produce cutting-edge research and scholarship on resilience, climate adaptation, and disaster risk reduction in international contexts.

Collaboratively lead socially engaged research projects and programs		Number of research projects 8	Number of research programs 1	Average number of non-IRL partners per research project 4.6	Total number of non-IRL partners for projects and programs 41	Number of new research grants awarded 2
Promote inter- and transdisciplinary collaboration, knowledge exchange, and educational opportunities for faculty, staff, and students at the University of Arizona		Number of U of A faculty and staff research collaborators 6	Number of non-U of A academic collaborators 39	Number of non-academic collaborators¹ 11	U of A student collaborators 4	
Partner with international institutions, particularly in the Global South		Global Regions we’ve worked with in FY26: The Caribbean · Africa · South Asia · Central America · South America · North America · Europe				
Plan for the future through program development		Number of proposals submitted 10	Number of new external institutional partnerships² 16			

1 Non-academic collaborators are research partners from organizations whose primary focus is not research, such as partners from NGOs, community groups, government organizations, etc
2 External collaborators meet the minimum bar of having co-developed an IRL program, project, event, working group, and/or grant proposal.

Catalyze and support a community of University of Arizona faculty, students, and researchers to advance academic and educational opportunities related to resilience, climate adaptation, and disaster risk reduction in international contexts.

Develop community events and platforms where individuals can connect and collaborate on relevant academic and educational initiatives



Total number of event registrants

220+

Countries of origin of event participants

32

Provide University of Arizona faculty, students, and researchers to research opportunities



Number of faculty, staff, and students at U of A connected to funding (includes IRL core researchers and staff)

9

Funding sources:

Caribbean Institute for Meteorology and Hydrology

Social Sciences & Humanities Research Council

US National Institutes of Health National Cancer Institute

**US Department of Agriculture Forest Service –
Rocky Mountain Research Station**

**NASA Earth Science Division –
Earth Surface Mineral and Dust Source Investigation**

Indo-Pacific Scholarships and Fellowships for Canadians

Manage information and knowledge exchange among network members and academic units



U of A faculty, staff, and researchers from

11

different units across campus participated in IRL-stewarded working groups

IRL Research Areas and Societal Impact

Arizona Institute for Resilience (AIR) Themes

- IRL's projects and programs advance the areas of emphasis for IRL's parent institute, AIR, by working on projects and programs that:
- 1 Develop strategies for people living in **arid lands** to adapt to a hotter, drier world
 - 2 Enhance mitigation and adaptation to **climate**
 - 3 Promote collective well-being across cultures in diverse **communities**
 - 4 Design efficient and equitable solutions for **energy**
 - 5 Foster **environmental** resilience
 - 6 Advance sustainable **water** management

AIR Theme	Number of relevant Projects/Programs
Arid Lands	5
Climate	7
Communities	6
Energy	0
Environment	7
Water	1

Societal Impacts Framework

- IRL seeks to connect empirically generated evidence to decision-making. Thus, impact is broadly construed and produces traditional academic outputs, like peer review articles and academic presentations, but is fundamentally oriented toward decision-making. We strive for our impact in a multifaceted way, focusing on 6 measures of societal impact (listed below). While we have a number of new projects, which have only begun to make an impact, we anticipate each project and program's impact to increase across these categories as the work matures, results are produced, and outreach continues.
- 1 **Instrumental Applications:** the research led to tangible changes to plans, decisions, practices, or policies.
 - 2 **Conceptual Impacts:** the research contributed to changes in people's knowledge about or awareness of an issue.
 - 3 **Capacity Building Impacts:** the research contributed to enhancing the skills, capabilities, and resources of individuals or insitutions.
 - 4 **Connectivity Impacts:** the research led to new or strengthened relationships, partnerships, or networks that endure after the project ends.
 - 4 **Social Impacts:** the research has resulted in beneficial impacts to society.
 - 6 **Higher Education Impacts:** This research contributed to improvements to the structure, function, or attitudes within higher education (including improvements focused on cultural changes in higher education, making spaces more welcoming of diverse faculty, students, and knowledge.)

Type of Impact	Number of Projects/Programs
Instrumental Applications	2
Conceptual Impacts	6
Capacity Building Impacts	4
Connectivity Impacts	1
Social Impacts	0
Higher Education Impacts	1



Research Programs

The Caribbean Cancer Research Center on Environmental and Natural Hazards (CARIB-CARES)



Summary

Extreme weather events in the Puerto Rico and U.S. Virgin Islands (the U.S. Caribbean) have routinely demonstrated how interdependencies in critical infrastructure systems generate severe adverse impacts on the health and wellbeing of the populace. This center focuses on how extreme events cascade through the cancer care continuum (the various stages from cancer etiology, prevention, early detection, diagnosis, treatment, survivorship, and end of life) creating adverse outcomes that have been seldom studied in the past. Led by the University of Puerto Rico and the University of the Virgin Islands, this center represents a major transdisciplinary collaborative research activity to develop, support, and sustain education, capacity building, research, and adaptation capacities to help mitigate the impact of extreme events on cancer prevention and control and health disparities in the U.S. Caribbean. In specific, the project seeks to:

- Form a regional knowledge-action network of researchers, physicians, stakeholders, community members, and institutions;
- Increase the number of students and researchers from the Caribbean conducting research on the impact of extreme weather events on cancer;
- Establish a Community Coalition of Partners to develop and strengthen sustainable strategic collaborations with stakeholders and community partners, including academic, nonprofit, community- and government-based organizations to promote scientific and community-focused activities, and;
- Provide capacity-building activities for community members, cancer-care providers, students, and faculty on climate, cancer, and health.

CARIB-CARES is one of 21 exploratory research centers around the U.S. funded by the U.S. National Institutes of Health (NIH). This center, in particular, is funded by the NIH's National Cancer Institute (NCI) for three years with aims to grow into a larger, self-sustaining research and community-engagement center.

Duration and Funding

2024–2027 | \$3,431,581.00 | U.S. National Institutes of Health National Cancer Institute

Key FY2026 Achievements

- Support of several working groups to explicitly engage community-based organizations, government groups, and other relevant stakeholders in both the Virgin Islands and Puerto Rico; 47 total stakeholder organizations have been engaged.
- Co-development of Integration Working Group to improve cross-center collaboration, including three participatory workshops and one online survey.
- Completion of a network analysis study to understand the connectivity impacts of CARIB-CARES among organizations in the USVI and PR. Publications and presentations forthcoming.



IRL Researchers and Research Collaborators

Zack Guido – IRL

Sarah Clark – IRL

Ana P. Ortiz – University of Puerto Rico Comprehensive Cancer Center

Noreen Michael – University of the Virgin Islands Caribbean Exploratory Research Centre

Pablo Méndez-Lázaro – University of Puerto Rico Medical Science Campus

Frank Muller Karger – University of South Florida

LaVerne Ragster – University of the Virgin Islands Caribbean Exploratory Research Centre

Leticia Nogueira – American Cancer Society

Marievelisse Soto-Salgado – University of Puerto Rico Comprehensive Cancer Center

Nancy Cardona-Cordero – University of Puerto Rico Comprehensive Cancer Center

Tracy Crane – University of Miami

Bridgette Troche – University of Puerto Rico Medical Science Campus

Claudia Boneu – University of Puerto Rico Medical Science Campus

Diana Claxton – University of the Virgin Islands Caribbean Exploratory Research Centre

Erick Suárez – University of Puerto Rico Comprehensive Cancer Center

Leidi Garabito – University of Puerto Rico Comprehensive Cancer Center

Lenulisy Rosado – University of Puerto Rico Comprehensive Cancer Center

Melanie Diaz – University of Puerto Rico Medical Science Campus

Polaris Torres – University of Puerto Rico Comprehensive Cancer Center

Carlos Santos-Burgoa – George Washington University

Erole McLean Hobdy – University of the Virgin Islands

Patricia Chardón – Caribbean Coastal Ocean Observing System

James Shultz – University of Miami

Maria Cristy – American Cancer Society

CARIB-CARES Lead Organizations



Other Partner Organizations





Research Projects

IRL's FY26 Research Themes:

- CWI** Climate and Weather Information for Adaptation and Decision Making
- LD/EC** Physical and Social Dimensions of Land Degradation and Environmental Change
- ΔHD** Shocks and Changes in the Humanitarian and Development Sectors

Are Small Scale Farmers Losing Confidence in Weather Forecasts in Tanzania?



Accurate weather prediction is one of the 20th century's most significant achievements, saving lives, protecting property, and guiding risk management globally. Annual investments in weather and climate services amount to tens of billions of dollars, delivering returns far exceeding their cost. Despite these advances, small-scale farmers in the Global South often underuse weather forecasts, exacerbating food insecurity and reduced agricultural productivity in these vulnerable communities. Over the past 30 years, research has prioritized seasonal climate forecasts (SCF) over daily weather forecasts, even though SCFs are less accurate and less impactful for farmers' daily decision-making. To address this gap, this study investigates why farmers do or do not use weather forecasts.

Duration and Funding

2025–2026 | Internal Funding

Key FY2026 Achievements

- Data collection: 535 of phone surveys completed in collaboration with GeoPoll.
- Data analysis using Structural Equation Modeling and Qualitative Coding.
- Academic Paper, "What Shapes Farmers Use of Technical Weather Forecasts? Evidence from Tanzania", in preparation for submission to a peer-reviewed journal.

IRL Researchers and Research Collaborators

Erica Goto, IRL

Zack Guido, IRL

Sarah Clark, IRL

Stefanie Herrmann, IRL

Birtukan Asmare, former IRL



Joseph K. Masonda

Enhancing Climate Resilience in the Caribbean through the Improvement of Caribbean Climate Outlook Forums (CariCOF)



The Caribbean Climate Outlook Forum (CariCOF) is a key platform for integrating climate forecasts into risk planning in the Caribbean. One of 21 regional climate outlook forums globally, CariCOF includes training on seasonal and sub-seasonal forecasting and a workshop connecting climate service providers with decision-makers. Held biannually since 2012, CariCOF has met 23 times, mostly in person. This research project investigates how CariCOF has influenced sectoral climate risk decision-making and evolved to meet the region's growing demand for climate information.

Beyond the preparation of an evaluation report, the research team has conducted further analysis of the participatory workshop, interview, and survey data collected in the months before and after the May 2024 CariCOF in Georgetown Guyana. An academic paper “Beyond Instrumental Use: How Regional Climate Networks Facilitate Multiple Uses of Climate Information Services” was submitted to Global Environmental Change which will contribute to the literature on the role of regional climate outlook forums in climate adaptation.

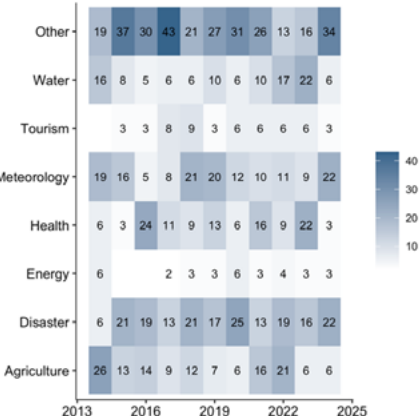
Duration and Funding

2024–2026 | \$67,990.00 | Caribbean Institute for Meteorology and Hydrology (CIMH)

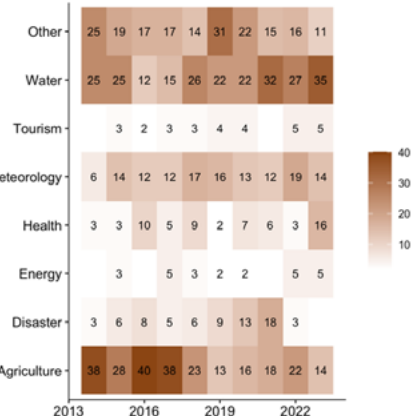
Key Achievements

- Data Analysis of:
 - Participatory workshop data from May 2024 CariCOF in Guyana
 - Interview data from in-person and online interviews with members of the CariCOF network
 - Survey data of 115 members of the CariCOF network
- Academic paper “Beyond Instrumental Use: How Regional Climate Networks Facilitate Multiple Uses of Climate Information Services” submitted to Global Environmental Change Advances.

Wet CariCOF: Sector Percentage in Each Year



Dry CariCOF: Sector Percentage in Each Year



IRL Researchers and Research Collaborators

- Erica Goto, IRL
- Zack Guido, IRL
- Sarah Clark, IRL
- Adrian Trotman, Caribbean Institute for Meteorology and Hydrology
- Roche Mahon, Caribbean Institute for Meteorology and Hydrology

Healing Forests: Mapping Biodiversity and Multispecies Relations in Northeast India



Amid COVID-19, Khasi traditional healers (*nong sumar*) drew on ancestral knowledge from the 1918 flu pandemic to combat the virus but faced challenges due to habitat loss from deforestation and mining. This research explores the connection between traditional healthcare, wounded ecosystems, and forest-reliant Indigenous communities. It investigates how Khasi *nong sumar* manage medicinal plants, nurture future knowledge keepers, and restore forest biodiversity. Through community-based participatory research, the study conducts biodiversity audits, maps forest degradation, and develops tools to address biodiversity loss. The goal is to create decolonial maps and strategies for holistic ecosystem management, involving Khasi trainees and students.

Duration and Funding

2023–2027 | \$72,462.35

- \$54,620.97 (Grant received as \$74,984.00 Canadian Dollars) from Social Sciences and Humanities Research Council (2023–2026)
- \$17,841.38 (Grant received as \$25,000.00 Canadian Dollars) from Social Sciences and Humanities Research Council 1515159: Stewarding Forest Pharmacies through Indigenous Science Partnership: A New Approach in NE India (2026–2027)

Key FY2026 Accomplishments

- Data Collection of focus group, interviews, and forest visits with traditional healers
- Data Analysis of interview and forest visit data to understand how traditional medicinal plant availability and health is changing throughout the forests
- Workshop to present results to project participants and representatives of the Khasi traditional healer association (Seng Nong Sumar Dawai Khasi Nylla Association)
- Development of Plant Information Cards for nong sumar use
- Awarded \$17,841.38 grant from Indo-Pacific Scholarships and Fellowships for Canadians (IPFSC) for a new related research project, “Climate Mitigation and Vulnerability: Understanding Indigenous Community Responses in India,” to be funded from 2026 to 2028.

IRL Researchers and Research Collaborators

Erica Goto, IRL

Sarah Clark, IRL

Harshit Khatwani, University of Arizona, Journalism, Global Studies, & Political Science

Monica Brody-D’Urso, University of Arizona, School of Medicine

ann-elise lewallen, University of Victoria, Pacific and Asian Studies

Jane Warjri, Independent Researcher in India

Pulljohn Wañniang, research assistant in India

Indigo Underwood, University of Victoria, Geography



Mapping Biocrust Community Composition and Functional Diversity Across Global Drylands

LD/EC



This research project deals with biocrusts, thin layers of living organisms like cyanobacteria, mosses, and lichens that form on the soil surface in dry areas all over the world. While biocrusts fulfill important ecological and climate functions - preventing erosion, improving soil health, capturing CO₂, regulating water cycling in dry environments - we know little about their spatial extent and response to global change, in part because we cannot use many of our existing multispectral remote sensing tools for assessing biocrust communities to the same degree we can for vascular plants. This project integrates data from the hyperspectral Earth Surface Mineral Dust Source Investigation (EMIT) sensor and other complementary satellite observation records to better map and understand biocrust community composition and functional diversity across drylands.

The objectives of the project are to:

1. Develop a biocrust hyperspectral library across multiple spatial scales;
2. Quantify critical biocrust functional traits through new measurements at core research sites;
3. Map biocrust community composition and function at local, regional and global scales

Duration and Funding

2024–2027 | \$559,338.00 | NASA Earth Science Division,
Earth Surface Mineral and Dust Source Investigation

IRL Researchers and Research Collaborators

Stefanie Herrmann, IRL
William K. Smith, SNRE
Sasha Reed, US Geological Survey
Miguel Villarreal, US Geological Survey

Key FY2026 Achievements

- Conference presentations:
 - » Multiscale Framework for Mapping Biocrusts with Hyperspectral Data Using the MICA Algorithm (Poster presentation – Fall Meeting of the American Geophysical Union 2025)
 - » **Reed, S.C., Smith, W.K.**, et al. “Pushed Over the Edge: Using Multi-scale Approaches to Understand and Forecast Dryland Responses to Climate Extremes”. AGU Fall Meeting, New Orleans, December 2025.
 - » **Smith, W.K.** et al. **2025**. “Can hyperspectral reflectance predict the response of leaf photosynthesis, nutrients, and pigments to less frequency, larger magnitude rainfall pulses in a semiarid C4 grassland?”. AGU Fall Meeting, New Orleans, December 2025.
 - » **Smith, W.K.** et al. **2025**. “Multi-scale hyperspectral and thermal imaging reveals a novel biocrust degradation - climate warming amplification feedback”. 17th Biennial Conference of Science & Management on the Colorado Plateau & Southwest Region, Flagstaff, AZ.
- Manuscripts:
 - » “Limits and opportunities for hyperspectral detection of biocrusts through feature-based spectral matching” *in preparation*.
 - » **Villarreal, M.L., Von Nonn, J.**, Stahl, M., **Herrmann, S., Reed, S., Lauria, C., LeBeau, R.**, Duniway, M.C. and **Smith, W.K.** Fusion of deep learning and pixel-based UAS models for characterizing dryland plant, soil, and biocrust patterns across land use gradients. *In preparation*.
 - » **Smith, W.K., Reed, S.C., Villarreal, M., Herrmann, S.**, Rutherford, A., Javadian, M., Lauria, C., Zhang, F., Kokaly, R., Poulter, B. Multiscale remote sensing of functional indices within a long-term climate manipulation experiment reveals a novel biocrust degradation—climate warming amplification feedback. *Communications Earth and Environment (in review)*.

Towards Land Degradation Neutrality: Collaborative Governance and Implementation of Sustainable Land Management Practices



Achieving global Land Degradation Neutrality (LDN) requires a deeper understanding of the socio-institutional conditions that enable effective Sustainable Land Management (SLM) across diverse geographical contexts. While substantial progress has been made in documenting SLM practices and their biophysical impacts, critical gaps remain in understanding how implementation conditions, stakeholder dynamics, and collaborative governance processes shape socio-economic and ecological outcomes. This research project addresses these gaps through a multi-method, cross-case analysis drawing on global datasets, including the World Overview of Conservation Approaches and Technologies (WOCAT) database and original survey data from SLM practitioners across 41 countries.

The project is organized into three interconnected phases. The first examines the enabling and hindering conditions influencing SLM implementation and their relationship to socio-economic outcomes. The second investigates how stakeholder composition, participation across project phases, and decision-making arrangements affect project effectiveness in achieving intended outcomes. The third advances this analysis by operationalizing the Integrative Framework for Collaborative Governance (IFCG), to assess how collaborative dynamics of principled engagement, shared motivation, and capacity for joint action influence perceived decision-making effectiveness and project outcomes.

Across the project, the findings demonstrate that while SLM practices are widely associated with positive socio-economic outcomes, these outcomes are not systematically explained by individual technical or contextual factors alone. Instead, they emerge from complex interactions among institutional conditions, stakeholder configurations, and collaborative governance processes. Strong legal frameworks, supportive institutional arrangements, and stakeholder collaboration were commonly identified as enabling conditions, while financial constraints and limited SLM knowledge emerged as the most frequently reported barriers. However, supportive implementation environments alone do not guarantee improved outcomes. Rather, broader stakeholder inclusion, meaningful participation across different stages of implementation, and strong collaborative capacity consistently contribute to better socio-economic and ecological outcomes.

Overall, the project demonstrates that the effectiveness of Sustainable Land Management depends not simply on the presence of stakeholder participation, but on how collaborative processes are structured, sequenced, and supported within broader institutional systems. By integrating socio-ecological systems thinking with the Integrative Framework for Collaborative Governance, this research provides actionable guidance for policymakers, practitioners, and development organizations seeking to design more effective, inclusive, and scalable pathways toward achieving Land Degradation Neutrality.



Towards Land Degradation Neutrality: Collaborative Governance and Implementation of Sustainable Land Management Practices

Duration and Funding

2020–2026 | \$111,000³ | University of Arizona, Margaret McNamara Education Grant, American Association of University Women International Fellowship

Key Achievements

Work on this project has been completed and three manuscripts are under preparation:

- Githu, D. W., Hannah, C., Lien, A., Gornish, E. S., & Guido, Z. Enabling and Constraining Implementation Conditions and Socio-Economic Outcomes in Sustainable Land Management for Land Degradation Neutrality. (Submitted for peer review)
- Githu, D. W., Hannah, C., Lien, A., Gornish, E. S., & Guido, Z. Stakeholder Participation, Decision-making, Socio-Economic Outcomes of Sustainable Land Management in Dryland Regions. (In preparation)
- Githu, D. W., Hannah, C., Lien, A., Gornish, E. S., & Guido, Z. Collaborative Governance Dynamics and Perceived Socio-Economic and Ecological Outcomes of Sustainable Land Management. (In preparation)

IRL Researchers and Research Collaborators

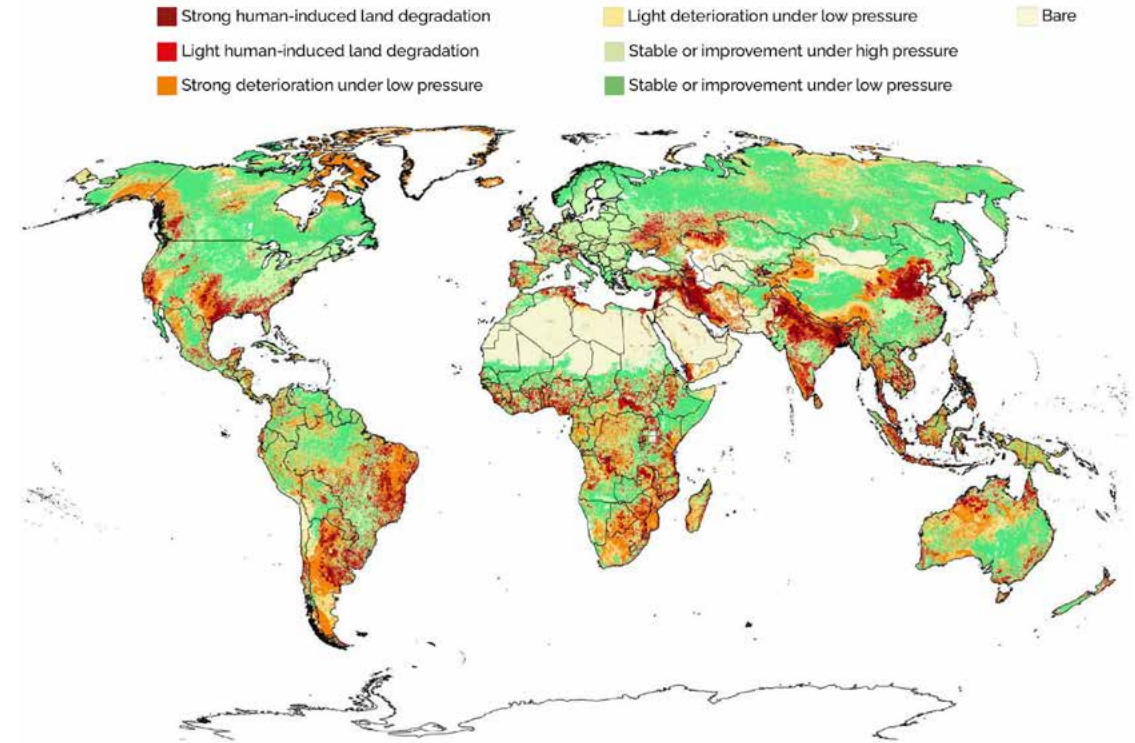
Diana Wanjiru Githu, IRL

Zack Guido, IRL

Corrie Hannah, former IRL and current independent consultant

Elise Gornish, SNRE

Aaron Lien, SNRE



Land Degradation Map from FAO

³ Funding acquired by Diana Githu to support her PhD research

Quantifying Critical Fuel Thresholds



This project addresses the urgent need to reduce wildfire risk across the western United States, especially in non-forest areas where fast-growing grasses can quickly become dangerous fuel. While most wildfire prevention efforts focus on forests, much of the land that burns each year is actually grassland or shrubland - often made worse by invasive grasses that dry out and catch fire easily.

To support the Wildfire Crisis Strategy, which aims to treat up to 50 million acres of land over the next decade, this project will help fire managers figure out where and when wildfire risk is highest so they can take action before fires start. To this end, the goals of this project are to:

1. Quantify the critical fuel threshold for each grassland and shrubland vegetation type in the western US.
2. Use descriptive statistics to identify abiotic drivers (primarily surface meteorology and soils) that produce critical fuel quantities.

The project uses remote sensing data of biomass, vegetation composition data and weather data to create maps of fuel thresholds and fuel risk models to make wildfire prevention more timely, targeted, and cost-effective.

Duration and Funding

2024–2026 | \$210,026

USDA Forest Service, Rocky Mountain Research Station

Key FY2026 Achievements

- Manuscripts:
 - » Stefanie M. Herrmann, Jessica J. Walker, Miguel L. Villarreal, Seth M. Munson, Matthew B. Rigge, William K. Smith, David D. Breshears, Christopher E. Soulard: “Climate pivot points project western US vegetation cover reductions” (Under revision for Communications Earth & Environment)
 - » Manuscript on “Vegetation-specific relationships between herbaceous fuel amount and fire occurrence across the western United States” in preparation
- Compiled dataset of large herbaceous fuel-driven wildfires within 24 non-forest vegetation types across the American west
- Analysis of fuel (aboveground net primary production) and climatic and fire weather variables (vapor pressure deficit, wind speed) for all fire perimeters in the dataset as well as a set of unburned controls

IRL Researchers and Research Collaborators

Stefanie Herrmann, IRL

Matthew Reeves, US Forest Service Rocky Mountain Research Station

William K. Smith, SNRE



Impacts from Abrupt Terminations in Development Aid: Evidence from Burkina Faso and Niger



For decades, the U.S. Agency for International Development (USAID) has been the world's largest national development and humanitarian assistance donor. It has provided critical material and human resources to build resilience to shocks and to respond to crises all over the world, particularly in Sahelian Africa. In February 2025, USAID was shuttered. While the impacts will undoubtedly be profound and reverberate across the globe, they remain largely unquantified. With debates about the role of U.S. foreign assistance invigorated by this recent event, providing concrete evidence of these impacts is essential to shaping future policy discussions.

This project seeks to quantify the immediate effects on household food security and the behavioral responses caused by the abrupt termination of food assistance. To achieve this, the project draws on a panel dataset of 1,758 households, constructed from two survey waves conducted in 2017 and late 2020 in Burkina Faso and Niger. Data was collected by TANGO International from a USAID-funded resilience project: Resilience in the Sahel Enhanced (RISE). In these regions, COVID-19 lockdowns and market closures occurred about six months prior to the 2020 data collection. Approximately 20% of the households experienced an abrupt end to their food assistance. Using this dataset, the project will provide insights into the impacts of COVID-19 and, by analogy, offer a view of the fallout caused by the recent termination of USAID development and food assistance programs.

Duration and Funding

2026–Present | \$13,000 | University of Arizona

Key FY2026 Achievements

- Established a partnership with TANGO international to build on their quantification of the impacts of resilience programming
- Began the analysis of a longitudinal dataset of more than 1,700 recipients of USAID-funded resilience programming activities.

IRL Researchers and Research Collaborators

Diana Wanjiru Githu, Arid Lands Resource Sciences and IRL

Zack Guido, IRL

Erica Goto, IRL

Tim Frankenberger, TANGO International

Lisa Smith, TANGO International

A Retrospective on USAID's Resilience Policy and Programming in Kenya and Beyond



Over the past two decades, the concept of resilience has gained prominence within development and humanitarian organizations as both an organizing framework and a desired outcome. The concept helped spark discussions about aligning efforts across the humanitarian and development spheres, as well as within development sectors. “Resilience” promoted strategies to strengthen the ability of households, communities, and institutions to withstand shocks and stresses, particularly amid escalating climate, food, migration, and conflict-related hazards.

A growing body of research suggests that resilience approaches may reduce future demands for humanitarian assistance and support asset-building in increasingly risky environments. However, in 2025, the sudden cancellation of many USAID resilience awards introduced its own significant shock to the system. The loss of hundreds of millions of dollars, deeply embedded networks of expertise, and coordination for international partnerships presents a pivotal moment to assess the impacts and unintended outcomes of a retrenchment in resilience programming.

This study examines these impacts along with the evolution of “resilience” within USAID’s programming. It focuses on the USAID’s resilience activities in Kenya as a case study which represents one of the Agency’s longest-standing and most robust resilience portfolios.

Duration and Funding

2025–Present | Internal Funding

Key FY2026 Accomplishments

- Completion of 54 Key Informant Interviews of individuals with professional experience in USAID Resilience policy and/or programming

IRL Researchers and Research Collaborators

Sarah Clark, IRL

Zack Guido, IRL

Erica Goto, IRL

Stefanie Hermann, IRL

Elise Arellano-Thompson, SGDE



📷 Zack Guido

**Community Building
Events and Activities**

Community-Building

A core goal of the International Resilience Lab is to catalyze and support a community of University of Arizona faculty, students, and researchers to advance academic and educational opportunities related to resilience, climate adaptation, and disaster risk reduction in international contexts. As mentioned previously in this report, one mechanism by which we accomplish this is by developing community events and platforms where individuals can connect and collaborate on relevant academic and educational initiatives.

Such events and platforms function to strengthen connections across the University, bring external speakers to the U of A, inspire novel research collaborations, and support information and knowledge exchange among network members and academic units. Below we share the community building activities that IRL hosted and co-sponsored for the U of A community in FY2026.



Interdisciplinary Working Groups

During a “Dialog on Global Engagement” event on May 6th, 2025, participants identified a strategy to build meaningful, novel collaborations across campus to advance research on resilience, climate adaptation, and international development and work towards the identification of new funding opportunities: the formation of new interdisciplinary working groups. Following that event, IRL used participant input and a series of campus-wide surveys to identify two broad topics of interest for these working groups: (1) Resilience Frontiers for Weather and Climate Forecasts and (2) Collaborative and Context-Specific Research for Climate Adaptation.

These working groups met during the Fall 2025 and Spring 2026 semesters, bringing together diverse groups of University of Arizona faculty, students, and staff (along with a few external partners). While IRL coordinated the groups, members worked to collectively determine the group’s specific objectives, scope, and desired outputs. More information on the working group topics can be found below:



WORKING GROUP 1

Resilience Frontiers for Weather and Climate Forecasts

The ability to skillfully predict weather and climate conditions from days to seasons is one of society's most significant scientific achievements. Forecasts have saved lives, protected property, and informed risk management across nearly every sector worldwide. Yet, despite these benefits, large portions of the global population either lack access to this information, choose not to use it, or misinterpret it, sometimes with serious consequences. Understanding the drivers of use, non-use, and misuse remains an active area of research. At the same time, new tools emerging from generative AI offer promising opportunities to advance both the technical aspects of forecasting and the human dimensions of information use, while also introducing new and complex challenges and risks.

Key FY2026 Achievements

- Biweekly Literature Review Discussion Sessions
- Initial development of a game-based study to better understand how small-scale farmers incorporate climate and weather information into their decision-making.

Working Group Member Affiliations

University of Arizona

- Agricultural Resource Economics
- Arizona Institute for Resilience
- School of Natural Resources and the Environment

Non- University of Arizona

- Mercy Corps

Interdisciplinary Working Groups

WORKING GROUP 2

Collaborative and Context-Specific Research for Climate Adaptation

This working group organized to explore the societal impacts of climate adaptation measures and strategies in different communities, including how different types of research partnerships (transdisciplinary, university-university, south-south, community-engaged, “citizen”-science, etc.) have been used to address climate adaptation questions across contexts and cultures.

Through the process of co-design and discussion, the group decided to focus attention on supporting capacity-building rather than a strictly academic product. The working group developed a track on Climate Migration as a part of the Virtual Global Youth Summit on Human Rights, a large, multi-day event primarily organized by the University of Arizona’s Human Rights Practice Program. The Climate Migration Track consisted of 3 days of educational sessions and workshops. The track, and the Summit as a whole, was hosted in partnership between higher education institutions, community-based organizations, non-governmental organizations, and youth from across the globe. Moving forward, the working group aims to support additional youth convenings and potentially develop a photovoice-based publication and/or an academic investigation into community-engaged research and action partnerships including youth actors.

Working Group Member Affiliations

University of Arizona

- Academic Programs & Strategic Initiatives
- Arizona Institute for Resilience
- Arizona Online
- College of Medicine
- Gender & Women’s Studies
- Human Rights Practice
- Mel and Enid Zuckerman College of Public Health
- College of Architecture, Planning, and Landscape Architecture
- School of Health Professions

Non-University of Arizona

- CARE International



The Virtual Global Youth Summit on Human Rights

March 25–27, 2026

The Virtual Global Youth Summit on Human Rights took place March 25–27, 2026. This collaboratively-designed summit, stewarded primarily by the U of A's Human Rights Practice Program, brought together over 220 passionate young leaders, activists, and students from 31 countries around the world to explore key issues in human rights, social justice, and youth empowerment. The Summit was designed to forefront conversations among youth on issues that closely affect them. Youth shared their experiences from their communities, discussed best practices for addressing key issues, and brainstormed strategies to overcome obstacles.

Summit Organizing Partner Affiliations

Amnesty International

Associação de Jovens Indígenas/ Indigenous Youth Association (AJI), Brazil

Center for Human Rights and Victims of Violations

EPARREH (Estudos e Práticas Agrícolas e o Reencantamento Humano—
Agricultural Studies and Practices and the Human Reenchantment)

Generation Human Rights

George Mason University, College of Humanities and Social Sciences, School of Integrative Studies

Human Rights Educators USA

Indigenous Movement for Peace Advancement and Conflict Transformation

Justice Forward Alliance

Kash Council Society of Political Philosophy

Land is Life

Lost Boys Center for Leadership Development

The Miner Anderson Family Foundation

The Reiff Center for Human Rights and Conflict Resolution at Christopher Newport University

Universal Human Rights Initiative

Universidade do Estado do Pará

University and College Consortium for Human Rights Education

The University of Arizona:

Climate Assessment for the Southwest, A NOAA RISA Team

Human Rights Practice

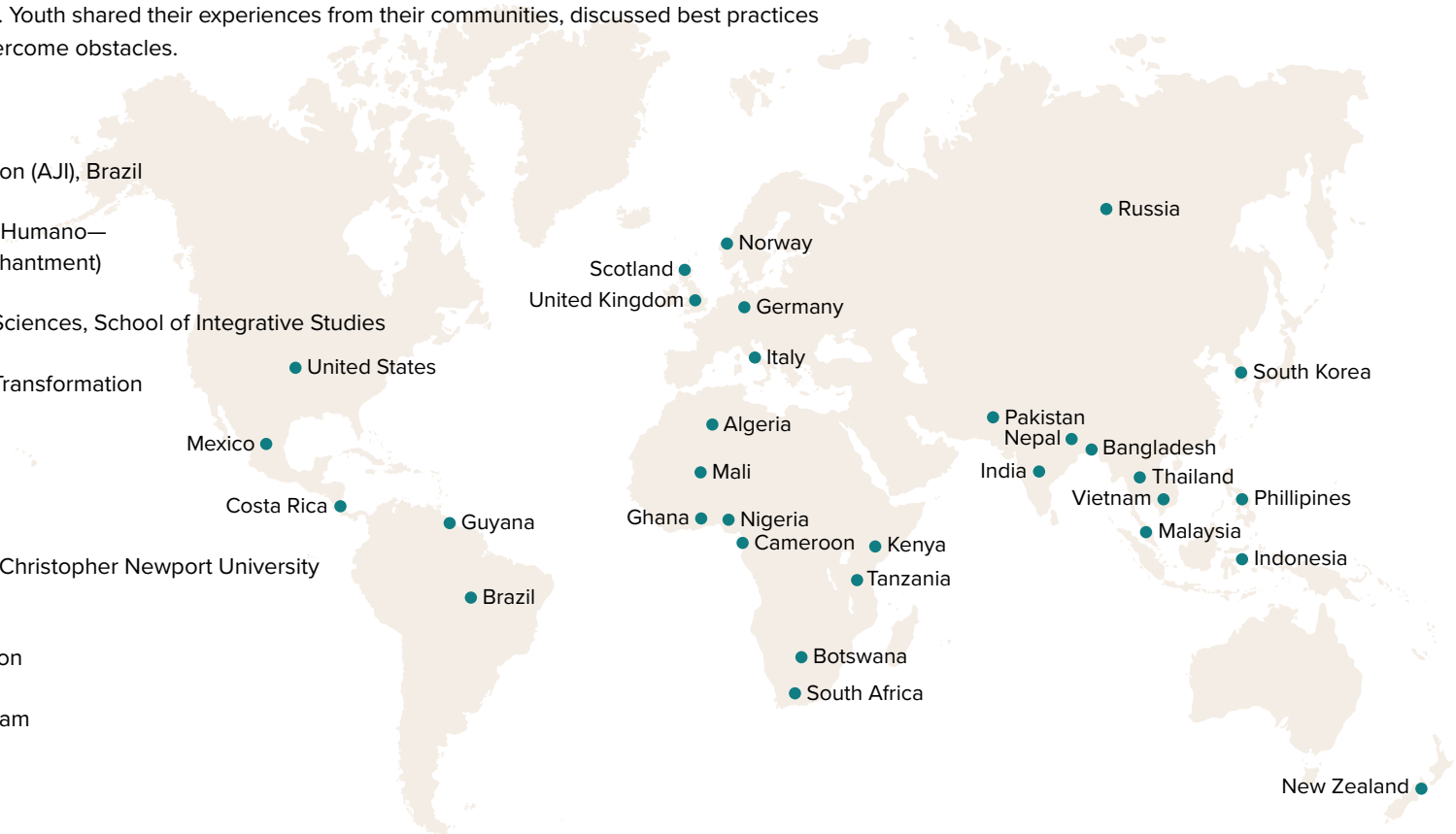
Indigenous Peoples Law & Policy

International Resilience Lab

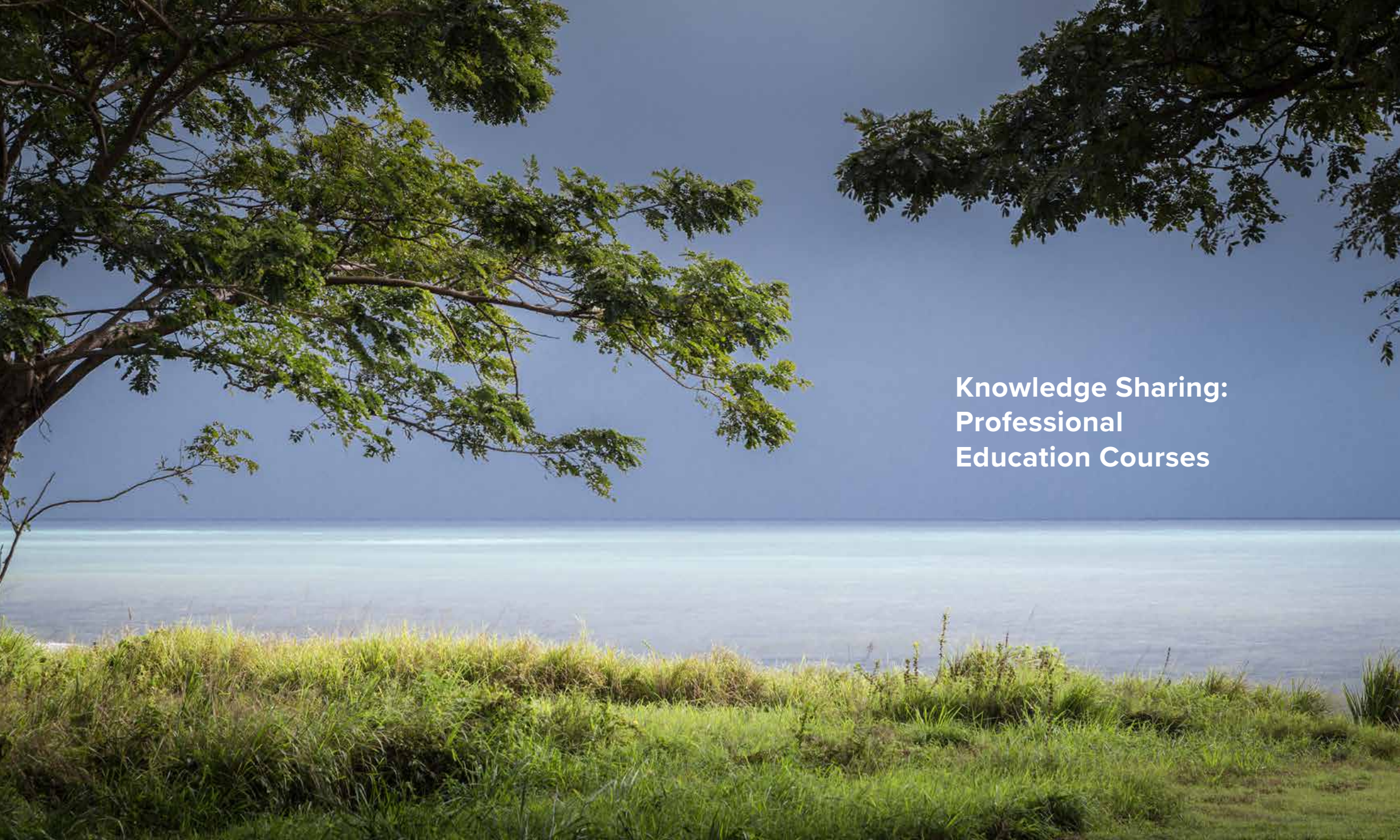
Southwest Center

Women's Association for Women and Victims' Empowerment

Youth for Human Rights Aagahi



Virtual Global Youth Summit on Human Rights map of participant countries

A scenic landscape photograph featuring a calm body of water in the middle ground, framed by a clear blue sky above and a grassy foreground below. Large, leafy tree branches are visible on the left and right sides of the frame. The text "Knowledge Sharing: Professional Education Courses" is overlaid on the right side of the image.

Knowledge Sharing: Professional Education Courses

Knowledge Sharing: Professional Education Courses

Courses Taught in FY26

Course	Description
Dimensões Sociais Relacionadas à Desastres (Social Dimension of Disasters)—an extension graduate course at the Universidade Estadual de Campinas (UNICAMP) Erica Goto 	Extreme weather events impact communities worldwide, resulting in material and human losses. With climate change, the intensification of these events, population growth, and the consequent increase in the number of people living in at-risk areas, the frequency and severity of natural disasters are likely to increase. Studies show that marginalized communities are disproportionately affected, suffering the greatest impacts and taking longer to recover. To reduce disaster risks, it is essential to understand the characteristics and conditions of at-risk populations. Furthermore, it is essential to develop and implement measures and strategies that help communities adapt to these extreme events. Based on these themes, the course analyzes essential data for disaster risk reduction to enhance participants' understanding of the social dimensions of socio-environmental disasters. The four themes will be discussed and presented, in addition to practical activities in R. The themes covered will be: Social vulnerability (factor analysis + linear regression + data visualization); Local capacity for climate adaptation (FEMA – linear regression); Attitudes related to climate adaptation (risk perception, perceived risk experience, intention to adapt.
Earth Systems Geography (GEOG 170)—an introductory undergraduate course for the School of Geography Development and Environment at the University of Arizona Zack Guido	This course is an introduction to the fundamental physical processes that govern spatial distribution and operation of the Earth's land, sea, air, and biological environments. The class takes a geographical approach to understand the atmosphere, hydrosphere, biosphere, and geosphere, as well as the fluxes, interactions and feedback loops among these Earth systems. The course also focuses on how humans have influenced and modified these systems.

Knowledge Sharing: Professional Education Courses

Courses in Development

IRL Members are developing two courses that will be available online and in-person in Spring 2027. They will be teaching these new courses as part of the Masters of Resilience Practice (MRP) program.

Course	Description
Building Resilience: Climate Adaptation and Disaster Risk Reduction (RESI 601) Erica Goto	In this course, part of the MRP emphasis on Climate Adaptation and Mitigation, students will explore how communities prepare for and respond to climate-driven disasters like wildfires and floods. Students will use contemporary tools and datasets to design strategies that reduce risk and build resilience. This course prepares you to apply these skills in emergency planning, climate adaptation, and public policy.
Resilience and Global Development (RESI 611) Zack Guido	This course will be offered as part of the MRP emphasis on International Development. Resilience in the international development field refers to the ability of individuals or groups to maintain well-being, and possibly transform it, despite social and environmental shocks. The course will explore the rise of resilience in international development from its emergence in the wake of the global financial and food price crises in 2008 and the 2011 famine in the Horn of Africa to its current emphasis in development projects around the world that focus on poverty reduction, food and livelihood security, and other beneficial well-being outcomes. In particular, the class will interrogate different logic models of resilience, examine how program implementers put resilience into practice, and engage with the methods used to generate evidence for resilience programming impacts. A meta-question underlying this course reflects our moment in time: what is lost and gained by the recent retraction in international funding for resilience and development? The course will draw on a curated reading list of influential empirical studies and essays, guest lectures from development practitioners, collaborative activities, and an exploratory research project. The research project will teach students skills in conducting systematic evidence reviews and help them evaluate how justifications for resilience programming align with observable evidence of impact.

Annex 1: General IRL Program/Project Information

Project/Program Name	Beginning– Projected End	Funder	Total Funding	Funding kept at U of A	Countries of focus	Core team members ⁴
Are Small Scale Farmers Losing Confidence in Weather Forecasts in Tanzania?	2025–2026	Internal Funding	N/A	N/A	Tanzania	Erica Goto, – University of Arizona (IRL) Zack Guido – University of Arizona (IRL) Stefanie Herrmann – University of Arizona (IRL and SNRE) Sarah Clark – University of Arizona (IRL) Birtukan Asmare – former University of Arizona (IRL)
The Caribbean Cancer Research Center on Environmental and Natural Hazards (CARIB-CARES)	09/2024–08/2027	United States National Institutes of Health National Cancer Institute	\$3,431,581.00	\$171,889.00	The U.S. Caribbean (Puerto Rico and the U.S. Virgin Islands)	Zack Guido – University of Arizona (IRL) Sarah Clark – University of Arizona (IRL) Ana P. Ortiz – University of Puerto Rico Comprehensive Cancer Center Noreen Michael – University of the Virgin Islands Caribbean Exploratory Research Centre Pablo Méndez-Lázaro – University of Puerto Rico Medical Science Campus Frank Muller Karger – University of South Florida LaVerne Ragster – University of the Virgin Islands Caribbean Exploratory Research Centre Leticia Nogueira – American Cancer Society Marievelisse Soto-Salgado – University of Puerto Rico Comprehensive Cancer Center Nancy Cardona-Cordero – University of Puerto Rico Comprehensive Cancer Center Tracy Crane – University of Miami Bridgette Troche – University of Puerto Rico Medical Science Campus Claudia Boneu--- University of Puerto Rico Medical Science Campus Diana Claxton – University of the Virgin Islands Caribbean Exploratory Research Centre Erick Suárez – University of Puerto Rico Comprehensive Cancer Center Leidi Garabito – University of Puerto Rico Comprehensive Cancer Center Lenulisy Rosado – University of Puerto Rico Comprehensive Cancer Center Melanie Diaz – University of Puerto Rico Medical Science Campus Polaris Torres – University of Puerto Rico Comprehensive Cancer Center Carlos Santos-Burgoa – George Washington University Erole McLean Hobdy – University of the Virgin Islands Patricia Chardón – Caribbean Coastal Ocean Observing System James Shultz – University of Miami Maria Cristy – American Cancer Society
Climate Mitigation and Vulnerability: Understanding Indigenous Community Responses in India	2026–2028	Indo-Pacific Scholarships and Fellowships for Canadians	\$17,841.38	0	India	Erica Goto – University of Arizona (IRL) ann-elise Lewallen – University of Victoria, Pacific and Asian Studies Ajmal Klan – Shiv Nadar University Nikas Kindo – Shiv Nadar University
Enhancing Climate Resilience in the Caribbean through the Improvement of Caribbean Climate Outlook Forums (CariCOF) Project	05/2024–09/2024	Caribbean Institute for Meteorology and Hydrology (CIMH)	\$67,990.00	\$44,092.00	Caribbean countries: Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Cayman Islands, Cuba, Curacao, Dominica, Dominican Rep, Grenada, Guyana, Haiti, Jamaica, Martinique, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Maarten, St. Vincent & the Grenadines, Trinidad & Tobago, Turks and Caicos, Suriname	Erica Goto – University of Arizona (IRL) Zack Guido – University of Arizona (IRL) Sarah Clark – University of Arizona (IRL)

⁴ The order in which Core Team members appear does NOT relate to their level of contribution. For the purposes of this report, we list the IRL team members first (in blue) and then the remaining team members alphabetically. Full affiliations for IRL team members are given on page 3 of this report.

Project/Program Name	Beginning– Projected End	Funder	Total Funding	Funding kept at U of A	Countries of focus	Core team members
Healing forests: Mapping biodiversity and multispecies relations in northeast India	2023–2027	Social Sciences and Humanities Research Council	\$72,462.35	0	India	Erica Goto – University of Arizona (IRL) Sarah Clark – University of Arizona (IRL) ann-elise Lewallen – University of Victoria, Pacific and Asian Studies Jane Warjri – Independent Researcher, India Pulljohn Wañiniang – Research Assistant in India Indigo Underwood – University of Victoria, Geography Harshit Khatwani – University of Arizona, Journalism, Global Studies, & Political Science Monica Brody-D'Urso – University of Arizona, School of Medicine
Impacts from Abrupt Terminations in Development Aid: Evidence from Burkina Faso and Niger	2026–Present	University of Arizona	\$13,000.00	\$13,000.00	Burkina Faso and Niger	Diana Wanjiru Githu, University of Arizona, Arid Lands Resource Sciences and IRL Zack Guido, University of Arizona (IRL) Erica Goto, University of Arizona (IRL) Tim Frankenberger, TANGO International Lisa Smith, TANGO International
Mapping Biocrust Community Composition and Functional Diversity Across Global Drylands	03/2024–03/2027	NASA Earth Science Division, Earth Surface Mineral and Dust Source Investigation	\$559,338.00	\$559,338.00	Global	Stefanie Herrmann – University of Arizona (IRL and SNRE) William K. Smith – University of Arizona (SNRE) Sasha Reed – US Geological Survey Miguel Villarreal – US Geological Survey
Quantifying Critical Fuel Thresholds	2024–2026	USDA Forest Service, Rocky Mountain Research Station	\$210,026.00	\$210,026.00	United States	Stefanie Herrmann – University of Arizona (IRL and SNRE) Matthew Reeves – US Forest Service Rocky Mountain Research Station William K. Smith – University of Arizona (SNRE)
A Retrospective on USAID's Resilience Policy and Programming in Kenya and Beyond	2026–Present	Internal Funding	N/A	N/A	Kenya and Global	Sarah Clark – University of Arizona (IRL) Zack Guido – University of Arizona (IRL) Erica Goto – University of Arizona (IRL) Stefanie Herrmann – University of Arizona (IRL) Elise Arellano-Thompson – University of Arizona, School of Geography, Development, and Environment
Towards Land Degradation Neutrality: Collaborative Governance and Implementation of Sustainable Land Management Practices	2020–2026	University of Arizona, Margaret McNamara Education Grant, American Association of University Women International Fellowship	\$111,000.00 ⁵	\$111,000.00	Data from 41 countries across global regions	Diana Wanjiru Githu, University of Arizona, Arid Lands Resource Science and IRL Zack Guido, University of Arizona (IRL) Corrie Hannah, University of Arizona (former) Elise Gornish, University of Arizona, School of Natural Resources and Environment Aaron Lien, University of Arizona, School of Natural Resources and Environment
TOTAL			\$4,522,238.73	\$1,109,345.00		

⁵ Funding acquired by Diana Githu to support her PhD research