



ARIZONA INSTITUTE FOR RESILIENCE
Solutions for Environment and Society



THE UNIVERSITY OF ARIZONA
Arizona Institute
for Resilience

WELCOME



I have the privilege of working with an outstanding, diverse, and talented group of scientists, staff, and students at the Arizona Institute for Resilience who are dedicated to making our world a better place. Their efforts are a constant reminder that, amid an uncertain global future, by working together across disciplines, borders, and cultures we have incredible opportunities to enhance our living situations and ensure a bright future for our societies.

From helping local agriculturalists adapt to the increasingly arid landscape of the United States' Desert Southwest, to providing national government organizations with the latest scientific environmental assessments, to collaborating with communities to advance their climate resilience, AIR members work across sectors to ensure that our solutions work where they need to, for the people who need them most.

Together, we accept where we are now, and we aspire to move forward grateful for the opportunities that modern challenges present to us: to go beyond what has previously

been achieved in research, in conservation, or in application. Our world needs a new perspective that integrates scientific disciplines with community knowledge, enhances environmental adaptation and accelerates technology development for the benefit of all societies—today.

In the next few pages, you'll see just a snapshot of our activities, and I hope it leaves you inspired and excited to learn more. As an impact-driven institute, making a tangible difference motivates us every day. We welcome you to join us. Your support could provide a life-altering experience for an undergraduate student, clean water installations for a community in need, a new plan for improving food access in rural Africa, and so much more.

With gratitude,

A handwritten signature in blue ink that reads "Sharon K. Collinge". The signature is fluid and cursive.

Sharon K. Collinge, PhD
*Director, Arizona Institute for Resilience
The University of Arizona*

LAND ACKNOWLEDGEMENT

Our Institute at the University of Arizona sits on the ancestral homelands of the Tohono O'odham and Pascua Yaqui/Yoeme people whose relationships with this land continue to this day. We offer gratitude to the land and the people who have stewarded it for generations, and commit to sustaining relationships that recognize and acknowledge the people, cultures, and histories that make up our community.



An aerial photograph of a braided river system. The river channels are light blue and grey, winding across a landscape of brown and tan earth. A large, central island of brown earth is prominent, with a dark shadow cast upon it. The overall scene depicts a dynamic and changing natural environment.

OUR WORLD IS CHANGING...

ARIZONA INSTITUTE FOR RESILIENCE

We turn science into actionable,
community-oriented solutions.

Our focus is **resilience**—the capacity
to **respond** to environmental change in
innovative ways, by adapting toward more
sustainable and **equitable** outcomes.





As an inter- and transdisciplinary institute spanning the University of Arizona campus, the Arizona Institute for Resilience (AIR) brings together researchers, educators, problem-solvers, and innovators from diverse disciplines—science, engineering, humanities, economics, public policy, law, the arts, and beyond—to co-create innovative and practical solutions to the many environmental and resilience challenges confronting our world today.

Our Institute comprises a core team of researchers and educators who work within our centers and programs to build more resilient systems and foster community collaborations. Our solutions engage a full array of disciplines, professional schools, international capacity, and entrepreneurial opportunities. Looking to the future, we help individuals, governments, businesses, and communities manage risk and find opportunities in global change.



OUR MISSION

To develop and apply diverse knowledges in creating solutions to environmental change through interdisciplinary research, community relationships, and experiential learning.

OUR VISION

A vibrant and sustainable Earth where communities are resilient to environmental change.

OUR VALUES

- Inclusion
- Innovation
- Integrity
- Respect
- Wellbeing



FOCUSING ON DIVERSITY, EQUITY, INCLUSION, AND JUSTICE

At AIR, we pursue actionable solutions to local and global environmental problems. These solutions require a foundation in social, racial, and environmental justice.

We stand with Black, Indigenous, People of Color, LGBTQIA+ communities and disabled individuals. We aim to challenge oppressive systems, to support the transformation to an equitable society in Tucson, across the U.S., and around the world. AIR sits on the ancestral homelands of the Tohono O'odham Nation and the Pascua Yaqui Tribe.

UArizona's commitment as a land-grant university and a Hispanic Serving Institution is mirrored in AIR programs that focus on creating authentic relationships and engagement while striving to build healthy, thriving, and resilient communities.

OUR APPROACH

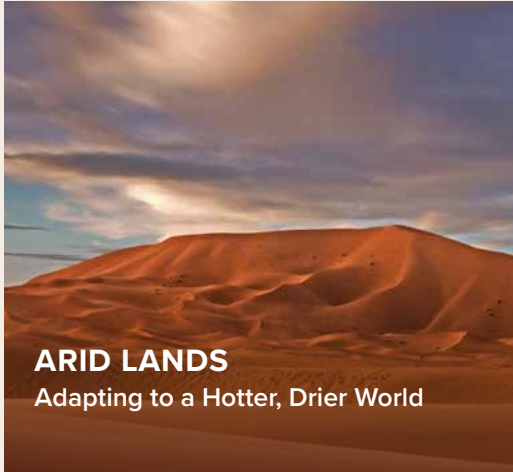
Throughout our history, AIR has created collaborations across campus and across communities to explore environmental changes and their consequences with the goal of formulating specific, socially-oriented, achievable solutions to help communities adapt to environmental change.

We empower our partners by working beyond the academic world to produce accessible and useful knowledge. We convene teams of technical and creative experts from across the university, the state of Arizona, and the world to catalyze fresh, practical, and transformative environmental solutions.

Our activities especially build and strengthen UArizona's environmental and experiential education opportunities. We work to enhance the environmental communication capacity among students, faculty, and external networks.

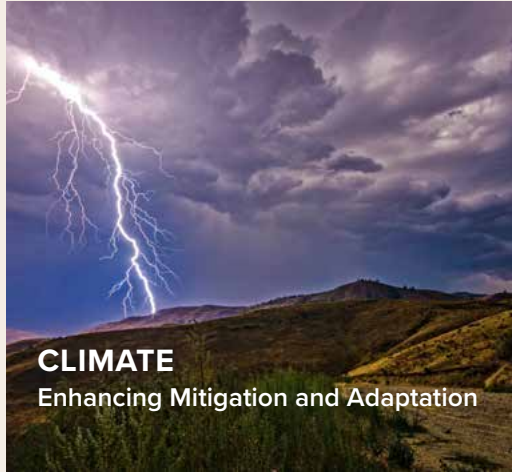
OUR THEMES

AIR's centers and programs work collectively to address six core research and engagement themes. These themes are central to our collective vision and represent essential areas we will address to prepare our societies to adapt to environmental change.



ARID LANDS

Adapting to a Hotter, Drier World



CLIMATE

Enhancing Mitigation and Adaptation



COMMUNITIES

Promoting Collective Wellbeing
Across Cultures



ENERGY

Designing Efficient and
Equitable Solutions



ENVIRONMENT

Fostering Ecosystem Resilience



WATER

Advancing Sustainable
Water Management

ARID LANDS

Adapting to a Hotter, Drier World

In the midst of a decades-long megadrought, the Desert Southwest, in which AIR is located, is at the forefront of aridification, the process in which regions become increasingly dry due to rising temperatures and diminishing water resources. AIR is ideally positioned to leverage new technologies, elevate Native wisdom and practices, and demonstrate for the global community how we can preserve traditions while adapting to a more arid world.

- ¹ Dry farming strategies involve planting seeds much deeper than conventional farms would or grouping crops closer together—practices designed to conserve the moisture in areas that receive only six to ten inches of annual rain.
- ² Paleontological collections from the Desert Southwest stored at AIR enable our researchers and naturalists to understand how climate, food systems, plants and animals have interacted across time in our arid landscape.
- ³ AIR climate researchers and urban planners are investigating how communities can better respond to extreme heat. Our emphasis is on helping governments mitigate heat-related illness and death through urban measures that reduce heat impacts, as well as predicting and preparing for heat waves.
- ⁴ The Natural Resources Workforce Development Fellowship operated within AIR provides graduate students with opportunities for training and practice in developing actionable science to inform natural resource management decisions across the Southwest.



Photo credits: 1. Indigenous Resilience Center; 2. Tumamoc Desert Laboratory; 4. Southwest Climate Adaptation Science Center

CLIMATE

Enhancing Mitigation and Adaptation

AIR climate scientists work with partners from the private sector, academia, and local, state, federal, tribal, and international governments to help bring the best-available knowledge to challenges related to weather and climate in the Southwest and around the world. We build sustained, collaborative relationships to help communities create lasting and equitable climate resilience.

- 1 As the weather around us changes, our communities must become more climate resilient. AIR researchers provide blueprints for communities and individuals to cope with extreme weather, sea-level rise, floods, fires, and other climate impacts.
- 2 AIR researchers bring the most recent climate data to planners and decision-makers, helping cities, agriculturalists, land managers, and other groups develop climate change adaptation plans that proactively serve their constituents and priorities.
- 3 The monthly Southwest Climate Outlook, produced by AIR climate researchers, is a premier summary of regional climate conditions for everyone from ranchers monitoring local droughts, to water resource managers watching seasonal storms, to scientists looking for reliable and clear graphics for public presentations.
- 4 Working across borders, AIR social and environmental scientists are assessing how communities throughout the global south are dealing with stressors caused by climate change. Our efforts aim to improve early warning systems and help communities adapt to new regional climates.
- 5 AIR climate scientists compile and store large-scale data for analysis, seeking to predict extreme weather events in the Southwest and across the world. Meteorological predictions enable communities to prepare for storm events or floods and plan for irrigation and seasonal water use.

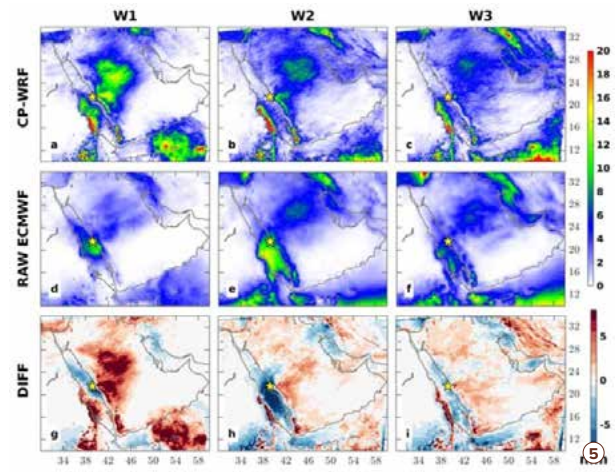
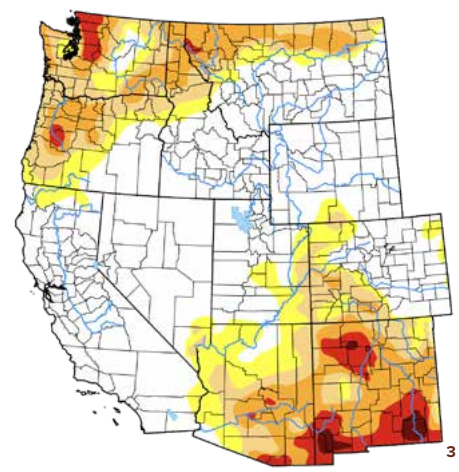


Photo credits: 2. Dan Ferguson; 3. U.S. Drought Monitor; 4. Zack Guido; 5. Center for Applied Hydroclimate Sciences

COMMUNITIES

Promoting Collective Wellbeing Across Cultures

Solutions only work if they work for the people who use them. We put community engagement at the center of our science, ensuring that our research questions address the issues and concerns most important to affected communities, that our data are usable and relevant for diverse partners, and that community members are empowered to understand and apply the solutions we co-create with them.



Photo credits: 1. Agnese Nelms Haury Program in Environment and Social Justice; 2. Earth Grant; 3. Tumamoc Desert Laboratory; 4. Indigenous Resilience Center; 5. Earth Grant; 6. AIR International Programs



- 1 What does equity mean to you? How does it play out in our educational system, and what can we do as individuals, programs, or communities to become more equitable? These are some of the questions that community members, faculty, and students discussed at a 2023 Arizona Town Hall event co-sponsored by AIR.
- 2 AIR educational programs emphasize environmental and science communication skills, preparing students to share their knowledge with diverse audiences.
- 3 An AIR desert naturalists leads community members on hikes up historic Tumamoc Hill, teaching about the native plants and animals, deep cultural history of the hill, and current research projects underway.
- 4 AIR researchers are passionate about collaborative engagement with Native Nations throughout Arizona and across North America. We work with tribes to address some of the largest challenges affecting Native communities today, especially relating to food, energy, water, and education.
- 5 AIR experiential internships allow students to share their new academic knowledge with community partners, while gaining practical skills and experience in diverse local projects in environment, sustainability, and community wellbeing.
- 6 AIR international researchers partnered with scientists in southern Africa to trace causes of food insecurities throughout the region and develop plans to improve food access for the community's most vulnerable populations.

ENERGY

Designing Efficient and Equitable Solutions

Energy is everything. It powers our transportation, heats and cools our homes, grows our food, turns on the lights. At AIR, we are committed to promoting cross-disciplinary energy science and technology research and development to benefit the public and enhance our land grant mission. AIR provides a platform for energy experts to work closely with industry, non-profit, government, and community organizations to address emerging energy challenges and opportunities.

- ¹ The Honorable Shalanda H. Baker, Director of the Office of Economic Impact and Diversity at the U.S. Department of Energy and Secretarial Advisor on Equity, presented the keynote address at the 12th annual Arizona Student Energy Conference.
- ² AIR supports interdisciplinary and innovative research related to energy policy, fuel cells, battery improvement, solar technologies, biofuel design, grid optimization, power supply forecasting, and more. Our researchers work across boundaries to address challenges and develop solutions in the food-energy-water nexus.
- ³ The U.S. Department of Energy Zero Energy Design Designation, awarded to the UArizona Bachelor of Architecture program taught in part by AIR faculty, distinguishes academic programs that teach best practices of zero energy design and require students to apply those concepts.
- ⁴ In 2022–2023, AIR undergraduate interns worked with a non-profit community garden in Phoenix, Arizona, to develop a plan to install agrivoltaics—solar panels that provide shade for crops while generating renewable energy—over the gardens.



Photo credit: 1. Institute for Energy Solutions

ENVIRONMENT

Fostering Ecosystem Resilience

The environment has been and remains at the forefront of our focus, from our earliest days as the Institute for the Study of the Planet Earth, through our evolution as the Institute of the Environment, to AIR today. We work collectively to understand how our Earth is changing, while simultaneously developing solutions to our greatest environmental challenges that protect both our natural world and human life.



University of Arizona | Environment & Sustainability News



Photo credits: 2. Water and Energy Sustainable Technology Center; 5. AIR Education Initiatives



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- 1 AIR unites environmental communities and scholars across the UArizona campus, hosting events and workshops, funding interdisciplinary projects, and publishing a weekly newsletter that provides a platform for sharing events, opportunities, and environmental research news.
- 2 The National Collaborative PFAS Project, led by AIR environmental scientists, is designed to evaluate the incidence and mobility of PFAS, a “forever chemical” of growing national concern, in soils across the nation.
- 3 AIR environment and health researchers are examining how landscapes can be designed to support pollinator populations, such as bees and butterflies, while reducing disease vectors such as Culex and Aedes mosquitoes.
- 4 Nature-based solutions use nature and natural processes to address societal and environmental challenges, reducing hazard risks while improving natural habitat and social and equity needs. For example, marshes and living shorelines can reduce saltwater intrusion and erosion. AIR environmental scientists are assessing the effectiveness of such solutions over time for long term planning and management.
- 5 AIR undergraduate and graduate student internship and fellowship programs focus on real-world engagement and professional skills to best prepare our problem-solvers of tomorrow.

WATER

Advancing Sustainable Water Management

AIR operates UArizona's leading facility developing new technologies to address water scarcity. Our work in the water sector brings together industry, government, and academia to address some of the grand environmental challenges facing society today. Leveraging the expertise of diverse disciplines across the university, AIR unites hydrologists, microbiologists, environmental scientists, policy experts, engineers, and many more to find solutions to current and evolving local, national, and global water challenges.



Photo credits: 1. Dan Ferguson; 2. Earth Grant; 3. Water and Energy Sustainable Technology Center; 4. Sarah Prasek; 5. Indigenous Resilience Center



- ¹ Effective water planning in the arid Southwest, across the nation, and around the world goes beyond assessing water quality and supply. It requires consideration of extreme events, ecosystem interactions, partner engagement, governance, and more. AIR water policy experts consider it all when crafting a science-based agenda for the Colorado River Basin, ready to help inform management practices throughout the Southwest.
- ² An AIR undergraduate intern worked with the Sonoran Institute to document debris in the ephemeral Santa Cruz River in Tucson. AIR programs have been recognized for their outstanding stewardship of students in environmental leadership.
- ³ AIR water researchers pioneered wastewater-based epidemiology, in which wastewater is tested to track and isolate incidence of disease, including COVID-19, monkeypox, and more.
- ⁴ Pima County community leaders gathered with UArizona researchers for an interactive conversation hosted by AIR, addressing one of the Southwestern United States' most urgent topics: water.
- ⁵ Directly funding and supporting the Navajo Nation's pursuit of enhanced water quality and access, AIR staff have participated in the Nation's Water Access Group, provided funding to help revise the Navajo Nation Water Resource Development Strategy, assisted with digitization of the Nation's Water Resources Library, and supported well installation on tribal lands.



RESILIENCE is **responding** to environmental change by adapting toward more **sustainable** and **equitable** outcomes.

Our success depends upon our partners, who provide critical practical experience that can be integrated with the research of UArizona's outstanding scholars.

Our future depends upon our students, who will become the leaders, citizens, parents, and stewards of tomorrow.

And our world depends upon us. We believe that our collective ability to accept the environmental and global change that is occurring and respond adeptly, with resolution and compassion, will allow us to integrate our diverse knowledges and abilities to live better together on this Earth.

...SO WE WILL CHANGE, TOO.



AIR CENTERS AND PROGRAMS

Agnese Nelms Haury Program in Environment and Social Justice
Arizona Environment
Bridging Biodiversity and Conservation Science
Center for Applied Hydroclimate Sciences
Center for Climate Adaptation Science and Solutions
Climate Assessment for the Southwest
Education Initiatives
Indigenous Resilience Center
Institute for Energy Solutions
International Programs
Research Impacts and Evaluation
Southwest Climate Adaptation Science Center
Tumamoc Desert Laboratory
University Climate Change Coalition
Water and Energy Sustainable Technology Center







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