

# Arequipa Global Change and Human Health Institute

A joint effort of the Universidad Nacional de San Agustín & the University of Oklahoma

The Global Change and Human Health Institute (GCHHI) facilitates research collaborations between the Universidad Nacional de San Agustín (UNSA) and the University of Oklahoma (OU) across three key areas: understanding **environmental change**, advancing **human health**, and designing **adaptive social systems**.

Bringing together multidisciplinary teams of faculty, staff, and students, and partners from the public and private sectors, the Institute aims to **create new knowledge and find solutions that improve Arequipa's environment while supporting the health of its people**.

## OUR GOAL

Through the GCHHI, expand and elevate UNSA as a regional hub for research, education, and innovation that promotes prosperity and health, and builds security for the people of Arequipa and greater Peru.

## OUR VISION

A sustainable and resilient future for Arequipa and greater Peru.

## OUR APPROACH

- Cultivate research capacity and capability at UNSA through peer-to-peer research projects.
- Establish research infrastructure to support faculty and student success.
- Create a culture of engagement with stakeholders.
- Build partnerships and connections to international science community
- Connections to regional and national agencies.

## OUR HISTORY

Established in 2021 with a grant from UNSA, and now in its second phase of funding, the Institute is a bilateral research and capacity building partnership located on the UNSA campus in Arequipa, Peru, and administered jointly by the Office of the Vice Rector for Research at UNSA and OU's Latin America Sustainability Initiative. This novel arrangement has enabled the infrastructure—research, administrative, and technical—needed to support sustained collaborations and strengthen cross-cultural ties.



**GLOBAL CHANGE &  
HUMAN HEALTH INSTITUTE**  
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# Global Change and Human Health Institute's Six Priority Research Projects

## Irrigated Desert Agriculture



The coastal plain of Arequipa is a hyper-arid region where large areas have been converted to agriculture via irrigation. Our team is creating a participatory research program with agricultural communities in the irrigation districts of Arequipa to better understand changes to desert soils and explore how interactions among communities can help make desert irrigation more efficient and resilient to management practices and environmental change.

## Early Skin Cancer Detection



Skin cancer is the second most common type of cancer reported in Peru. In Arequipa, documented cases of skin cancer are rising. Unfortunately, despite the easy accessibility of skin lesions for dermatological examination, <30% of malignant skin lesions are diagnosed at early stages. Our team is integrating state-of-the-art fluorescence lifetime imaging microscopy with advanced machine learning methods to improve skin cancer diagnosis and treatment.

## Public Health & Society



Improving the health of its members is one of the most fundamental challenges of any society. Our research team is developing social tools to better understand deep-rooted health experiences, behaviors, and challenges of the people of Arequipa and the interaction of public health with climate change, environmental contamination, and social dynamics.

## Photothermal Therapy for Cancer Treatment



In Peru, breast cancer is the most common cause of cancer-related death among women. Up to 20% of women diagnosed with breast cancer have an aggressive subtype called triple-negative breast cancer (TNBC), which has limited chemotherapy treatment options. Our team is working to optimize photothermal therapy treatment so that it can be directly applied to treat patients with TNBC.

## Tracking Infectious Disease



Most vector-borne diseases in Peru are characterized by asymptomatic infection or milder flu-like symptoms, increasing the potential for a substantial proportion of infected individuals going undiagnosed. This results in a large 'reservoir' of silent infections and extensive outbreaks of vector-borne infections where the pathogen replicates in humans and is further transmitted. Using wastewater to monitor for infectious diseases, our team will provide a more comprehensive picture of disease burden in communities and enable a faster public health response.

## Integrated Air Quality & Greenhouse Gas Modeling



Anthropogenic emissions, poor air quality management, wildfires and dust emissions all contribute to severe air pollution in Arequipa. Because these pollutants are often co-emitted, a synergistic governance plan for air quality and climate change can offer multiple benefits. Historically, these emissions are tracked and analyzed separately, hindering synergistic approaches to air quality and climate challenges. Our team is working to develop an integrated air pollution and greenhouse gas model to help design effective, resilient solutions.

