HeatNexus

Heat adaptation research for action



The Institute of Development Studies is supporting HeatNexus (Heat Adaptation Research for Action), a network of nine Wellcome-funded research projects focused on heat adaptation interventions to enhance health in various low- or middle-income countries from 2024 to 2030.

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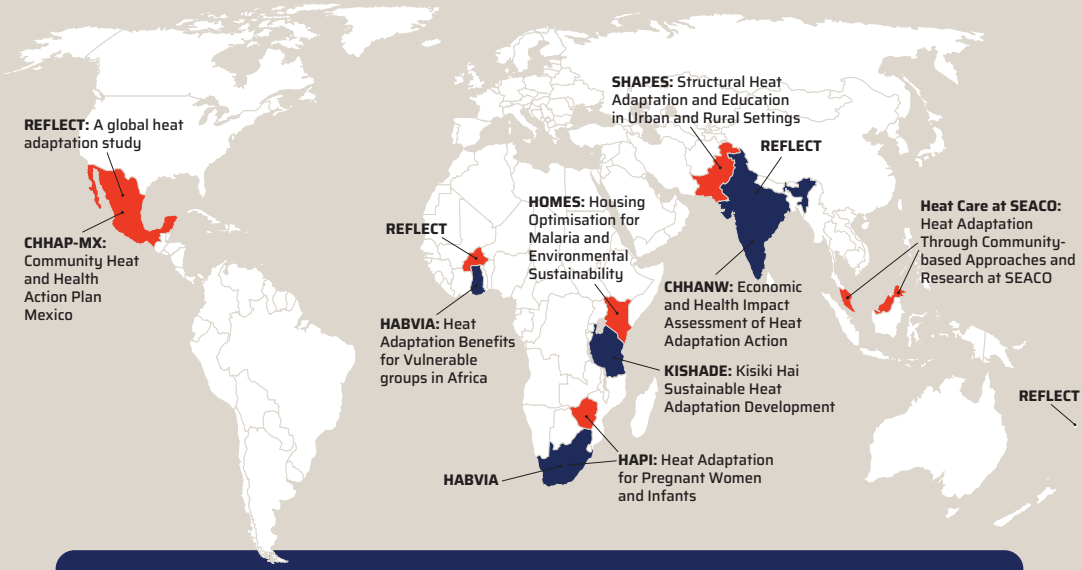
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HeatNexus
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GLOBAL DISTRIBUTION OF PROJECTS



The projects

HeatNexus unites **nine pioneering projects** across continents, tackling the health impacts of extreme heat in low- and middle-income countries. By combining local expertise, community engagement, and real-world interventions, the programme drives practical, transformative solutions to build resilience against escalating heat challenges.

Cover image: Farm worker surveys dry field.
Credit: Victor Guerrero Diez/Shutterstock.com



Farmer walking with cow at sunset.
Credit: Saeed Ahmed Abbasi/Pexels

SHAPES: Structural Heat Adaptation and Education in Urban and Rural Settings

Rising global temperatures and heatwaves pose critical health risks, particularly in low- and middle-income countries (LMICs) such as Pakistan. Vulnerable groups, including children, the elderly, and outdoor workers, are disproportionately affected due to inadequate housing, limited access to cooling solutions, and insufficient public awareness. Without effective intervention, these challenges will exacerbate health inequities and reduce resilience to climate shocks.

This project aims to enhance thermal comfort and health outcomes through cost-efficient, scalable interventions. Strategies include improving energy supply, ventilation, promoting behaviour change, and co-developing localised cooling solutions that address both urban and rural challenges.

Aims and Objectives

To develop sustainable and affordable heat adaptation strategies tailored to the needs of Pakistan's diverse socio-economic and geographic contexts.

- Design and test practical cooling solutions for households in urban and rural areas.
- Improve community awareness and behaviours related to heat mitigation.
- Evaluate the health, social, and economic impacts of proposed interventions.
- Provide evidence-based recommendations for urban planning and rural development.

CONTACT

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A modified house in Siaya. Credit: Teresa Bange

HOMES: Housing Optimisation for Malaria and Environmental Sustainability

This project will implement temperature-reducing modifications in various house types in Siaya and Kwale Counties, Kenya, through a stakeholder-informed approach. The project will create prototype houses to improve comfort and reduce malaria risk, showcased in workshops and advocacy activities to promote healthier rural living standards in Kenya.

Aims and Objectives

This project is aiming to improve health in rural Kenya by modifying homes to reduce indoor heat, malaria risk, and enhance work performance, focusing on community-driven thermal comfort and safety.

- Assess knowledge, attitude, and perceptions of the local community on the use of house modification for improved health benefits.
- Monitor effects of house modification on thermal stress to occupants in rural western and coastal Kenya.
- Determine the impact of house modification on malaria incidence, heat-related illness, and work performance.
- Assess the impact of house modification on mosquito numbers in mosquito-proofed houses.

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heatnexus.org/projects/climate-reselient-housing-in-kenya/



Cool roof installation in Segamat, Johor, Malaysia.
Credit: Monash University Malaysia/Examedia Technocraft

Heat Care at SEACO

Southeast Asia is increasingly exposed to extreme weather conditions and heat-related mortality is projected to rise by 295% by 2030, necessitating urgent action to mitigate these health risks.

Operating through the **South East Asia Community Observatory (SEACO)** in Segamat, 'Heat Adaptation Through Community-based Approaches and Research at SEACO' combines innovative behavioural and structural interventions to address heat risks. By implementing heat literacy programnes and passive cooling technologies like cool roofs, the project aims to reduce heat-related illnesses, improve thermal comfort, and enhance community resilience.

Aims and Objectives

The project aims to develop and evaluate scalable interventions that mitigate the health effects of extreme heat while fostering resilience in semi-rural Malaysian communities.

- Training communities in awareness and preparedness for heat exposure, symptoms, and risk factors of heat-related illnesses, adaptive behaviours, and accessible cooling strategies.
- Deploying cool roofs to improve indoor thermal comfort and reduce energy costs.
- Utilising wearable devices, indoor sensors, and weather stations for precise monitoring of heat impacts.
- Empowering communities through co-design and capacity-building initiatives.
- Educating general population and health workforce by providing heat literacy tool kits.
- Generating evidence-based findings to inform national and regional heat-health policies.

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HABVIA team applying highly reflective roof paint in low-income settlement Khayelitsha, Cape Town. Credit: V. Moyo

HABVIA: Heat Solutions for Vulnerable Groups in Africa

The HABVIA project bridges critical evidence gaps by gathering high-quality cohort data on physiological and mental health outcomes alongside climate and socio-economic factors in four heat-vulnerable sites across Ghana and South Africa. By leveraging existing community-health partnerships, HABVIA evaluates physical and behavioural adaptations and develops heat-warning systems to protect vulnerable groups.

Aims and Objectives

HABVIA aims to advance Africa's capacity to address extreme heat by evaluating real-world adaptations, building local research expertise, and informing policy with evidence-based recommendations.

- Collect and analyse cohort data on physiological, mental health, and socio-economic outcomes in four study sites.
- Evaluate physical (e.g., cooling technologies) and behavioural adaptations to reduce heat stress for informal dwellers and manual labourers.
- Develop and pilot community-relevant heat-warning systems tailored to local contexts.
- Build African research capacity through PhD programmes, postdoctoral training, and climate-health education initiatives.
- Engage actively with African and global climate-health networks to expand the impact of project findings.

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Woman attending chief-led community meeting in ZImbabwe.
Credit: @Irene Basimike/ CeSHHAR Zimbabwe

HAPI: Heat Adaptation for Pregnant Women and Infants

Vulnerable populations in urban South Africa and semi-rural Zimbabwe are particularly at risk of extreme heat due to socio-economic challenges and limited access to cooling resources.

The HAPI Study explores a range of protective mechanisms, including behavioural, built environment, and environmental innovations. By working across six maternity facilities and their surrounding communities, the study aims to identify scalable interventions to reduce heat-related health risks for pregnant women and infants.

Aims and Objectives

The HAPI Study seeks to develop and evaluate evidence-based strategies to protect pregnant women and newborns from the adverse effects of extreme heat, ensuring these interventions are both scalable and sustainable.

- Investigate the impact of extreme heat on maternal and neonatal health outcomes.
- Test interventions targeting behaviour, housing, and environmental adaptations.
- Empower communities with knowledge and tools for effective heat mitigation.
- Provide actionable evidence to inform health policies and heat adaptation strategies.

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Mexican boy drinking water on a hot day.
Credit: Shutterstock/JuanAriza1

CHHAP-MX: Community Heat and Health Action Plan Mexico

This project focuses on co-developing, testing, and evaluating a culturally relevant, community-driven heat-health action plan across eight rural communities in the Soconusco region of Chiapas, Mexico. Combining early warning systems, capacity building, and public education, the initiative empowers communities to proactively manage heat risks while fostering inter-community collaboration.

Aims and Objectives

This initiative aims to reduce heat-related illnesses (HRI) and mortality rates by equipping rural communities with knowledge, tools, and strategies for effective heat adaptation and resilience.

- Develop and test a locally relevant, culturally appropriate heat-health action plan.
- Establish an early warning and surveillance system to predict and address extreme heat events.
- Build capacity among community health workers to identify and treat HRIs.
- Foster behavioural change and preparedness through public education campaigns and communication tools.
- Create an inter-community information sharing network to improve collaboration and dissemination of best practices.

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Rooftops of Indian informal settlement.
Credit: Shutterstock

REFLECT: A global heat adaptation study

REFLECT is a global trial testing the impact of cool roofs on health, environmental sustainability, and economic outcomes, operating in Burkina Faso, Fiji, India, Mexico, and Niue.

Aims and Objectives

REFLECT aims to demonstrate the viability of cool roofs as a scalable, low-cost heat adaptation strategy. Through scientific research, real-world testing, and policy engagement, the initiative seeks to inform global adaptation efforts by generating evidence-based insights into the health, economic, and environmental benefits of cool roofs.

- Assess cool roof effectiveness in lowering indoor temperatures across different climates.
- Measure health outcomes, including heat-related illnesses, sleep quality, mental wellbeing, and cardiovascular health.
- Evaluate environmental sustainability, tracking energy savings, humidity levels, and roof reflectivity.
- Quantify economic impacts, such as reduced cooling costs, productivity gains, and household spending shifts.
- Engage policymakers and local stakeholders to scale up adoption of cool roof technologies in LMICs.

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Trees in croplands in Tanzania. Credit: LEAD Foundation

KISHADE: Kisiki Hai Sustainable Heat Adaptation Development

This study is the most comprehensive effort to date to evaluate the role of trees in croplands in reducing heat stress for agricultural workers. The project will build on the LEAD Foundation's restoration efforts, which have already supported local farmers in regenerating nine million native trees. By studying how trees affect microclimates, the project aims to provide critical evidence for the health and productivity benefits of agroforestry in rural Tanzania.

Aims and Objectives

The project aims to mitigate heat stress among rural agricultural workers in Tanzania by evaluating the human health and environmental benefits of trees in croplands.

- Understand heat risks and local adaptation practices among agricultural workers.
- Evaluate the impact of tree cover on reducing microclimate heat exposure and its potential to protect workers from heat-related illnesses.
- Investigate the role of agroforestry in improving soil health and agricultural productivity.
- Collaborate with local farmers and stakeholders to co-develop training packages and promote sustainable land-use practices.

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heatnexus.org/projects/trees_for_heat_relief



Cool roof painting. Credit: CHHANW field teams, Bhubaneswar and Jaipur

CHHANW: Economic and Health Impact Assessment of Heat Adaptation Action: Case Studies from India

Rising temperatures and recurring heatwaves pose severe risks to health, especially for vulnerable groups such as children, the elderly, and outdoor workers in India. Led by the Institute of Economic Growth, this study evaluates existing Heat Action Plans (HAPs) and pilots new household-level interventions across Bhubaneswar (Odisha) and Jaipur (Rajasthan). By combining health, economic, and environmental assessments, the project aims to deliver evidence-based recommendations for scalable and cost-effective heat adaptation strategies. Data insights from over 7000 participating households shapes community-led outcomes.

Aims and Objectives

This project aims to reduce heat-related health risks and quantify the economic impacts of heat adaptation measures in urban India.

- Assess the effectiveness of current HAPs in protecting vulnerable populations.
- Pilot and evaluate additional heat adaptation interventions tailored to local contexts.
- Quantify the economic value of avoided health risks and associated costs.
- Provide data-driven recommendations to strengthen urban heat management policies.

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The Institute of Development Studies is leading the HeatNexus Network Support Programme, accompanying the nine HeatNexus research projects to support them as they plan and deliver their projects, using a participatory and reflective approach. The IDS team will facilitate capacity enhancement and exchange across the Network, research synthesis to identify coherent bodies of knowledge, knowledge translation and research impact communication, and engaging policymakers and practitioners with the evidence.

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