



BACKGROUND

The Collaborative Adaptation Research Initiative in Africa and Asia Initiative

The Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) is a seven-year, CAD 70 million research initiative to understanding climate change and adaptation in some of the most vulnerable regions in Africa and Asia.

Through this initiative, four consortia will conduct research in three “hot spots” – regions where demographic trends, socio-economic development pathways, and strong climate signals put large numbers of people and their livelihoods at risk: semi-arid regions, deltas, and Himalayan river basins.

The initiative brings together experts from a variety of disciplines, and links North and South institutions to seek innovative solutions to the problems facing each hot spot. This will enable greater sharing of knowledge and experience, and encourage innovation.

CARIAA’s research agenda addresses gaps and priorities highlighted in the latest report of the Intergovernmental Panel on Climate Change (IPCC) on Impacts, Adaptation and Vulnerability (IPCC AR5 Working Group II). A number of CARIAA researchers have contributed to this report, which was released in March 2014.

CARIAA is funded by Canada’s International Development Research Centre (IDRC) and the UK’s Department for International Development (DFID).

About the hotspots:

River basins: More than 40% of the world’s poor live in the Indo-Gangetic plain, one of the most fertile and populous regions of the world. Over the past years, the Hindu Kush Himalayan region has experienced a gradual increase in temperature and precipitation. This is expected to continue, with higher frequency of extreme weather events such as extended periods of high heat or intense precipitation. Impacts of climate change in this region also include changes in glacial melt, as well as changes to monsoon rains and snowpack melt.

Deltas: Deltas in Africa and South Asia are some of the world’s most vulnerable coastal areas because of a critical combination of biophysical factors and socio-economic characteristics. If current trends of sea-level rise and land subsidence persist, 5.4 million people in Africa and Asia might be displaced by 2050; 93% live in the Ganges-Brahmaputra-Meghna and Nile Deltas combined. Significant populations are also at risk in the smaller but more numerous combined deltas of the Mahanadi tributaries in India and the Volta Delta in Ghana.

Semi-arid regions: Warming temperatures, increasing drought, and changes in precipitation are undermining food security, especially for the poor. Rural livelihoods and incomes are threatened by shrinking water resources and declining agricultural productivity. The IPCC report identifies poor farmers

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and pastoralists in semi-arid regions as most at risk. The changes are expected to lead to changes in crop production in many areas of the world. The report warns that climate change impacts will slow economic growth and impede poverty reduction, further eroding food security, and creating new poverty traps, particularly in urban areas and emerging hunger hotspots. Migration caused by the impacts of climate change will compromise human security.

The four consortia and their research

Four multi-regional consortia have been selected to carry out the research:

The **Himalayan Adaptation, Water and Resilience (HI-AWARE)** consortium will focus on the Indus, Ganges, and Brahmaputra river basins, where climate change impacts on water availability and the livelihoods of the poor are uncertain but likely to be severe. HI-AWARE will be led by the International Centre for Integrated Mountain Development (Nepal) working with the Bangladesh Centre for Advanced Studies, The Energy and Resources Institute (India), the Alternate Energy and Water Resources Institute of the Pakistan Agricultural Research Council, and ALTERRA (Netherlands).

The **Deltas, Vulnerability and Climate Change: Migration and Adaptation (DECCMA)** consortium will explore changes underway in four of the world's most vulnerable deltas: the Ganges-Brahmaputra-Meghna and Mahanadi Deltas, along with Ghana's Volta Delta and Egypt's Nile Delta. The team will assemble sea level projections for the four deltas based on the latest IPCC assessments. DECCMA will be led by the University of Southampton (United Kingdom) working with the Institute of Water and Flood Management of the Bangladesh University of Technology and Engineering, Jadavpur University (India), the National Authority for Remote Sensing and Space Sciences (Egypt), and the Regional Institute for Population Studies (Ghana).

The **PRISE (Pathways to Resilience in Semi-Arid Economies)** consortium will draw lessons for inclusive and resilient economic development in semi-arid regions. Its project focuses on investment and development choices, and will work with stakeholders in government, business, civil society, and regional economic organizations. Research focuses on climate risk, institutional and regulatory frameworks, markets, and natural and human capital. The project will shed light on climate risks and opportunities, leading to better informed policies and investments. PRISE will draw lessons from Pakistan and Tajikistan in Asia, Burkina Faso and Senegal in West Africa, and from Kenya and Tanzania in East Africa. It will be led by the United Kingdom's Overseas Development Institute working with Innovation, Environnement et Développement en Afrique (Senegal), the University of Dar Es Salaam (Tanzania), the Grantham Research Institute of Climate Change, London School of Economics (United Kingdom), and Sustainable Development Policy Institute (Pakistan).

The **ASSAR (Adaptation at Scale in Semi-Arid Regions)** consortia's project starts from the premise that, by the middle of this century, the impacts of climate change may demand radical changes in livelihood systems. It takes the long view in addressing how climatic, biophysical, social, political, and economic dynamics

interact in semi-arid regions. The researchers will identify relevant drivers and trends and use develop scenarios to help communities and decision-makers develop robust adaptation strategies. Research will be carried out in 14 countries across Africa and South Asia, including Pakistan and India. ASSAR will be led by the University of Cape Town (South Africa) working with the University of East Anglia (United Kingdom), Start International (United States), Oxfam Great Britain (United Kingdom), and the Indian Institute for Human Settlements (India).

The projected outcomes

CARIAA will produce a new body of evidence that will inform adaptation plans and policies on a range of scales, from local to regional, and over a variety of time frames. It will help communities and countries prepare for likely shifts in their livelihood base. It will also build expertise in climate change adaptation in semi-arid regions and provide lasting networks for exchange of this new knowledge between Southern and Northern institutions.

Working with local stakeholders and decision-makers, the research teams will produce simulations showing possible migration and land use changes that may result from climate change, and the various adaptation choices for affected populations. These simulations will reflect the different effects climate change may have on men and women, and the different options they have for coping.

While building networks of expertise, this research will help policymakers better understand the likely impacts that climate change will have on migration in these regions and the options available to affected populations. Understanding these impacts and the choices available is crucial for developing strategies that can help people adapt, for instance by ensuring that urban areas are prepared for an influx of migrants, by improving social supports for displaced men and women, or by supporting alternative livelihoods that may keep people on the land.

Regional Context:

The Hindu Kush Himalayan region has the largest concentration of snow and ice outside the north and south poles. It feeds the headwaters of ten of Asia's largest rivers, bringing precious water to more than 210 million mountain dwellers and another 1.3 billion people downstream — many impoverished. Himalayan glaciers act as a natural buffer to the region's highly variable climate, releasing water when rainfall is scarce and temperatures high. As a result, the Indo-Gangetic plain below is one of the most fertile and populous region in the world.

The region is also highly vulnerable to climate change. Temperatures are expected to gradually rise, with a modest increase in precipitation in the source areas of the Indus, Ganges and Brahmaputra rivers by the end of this century. Glaciers will recede, but runoff from glacier melt is expected to rise until at least 2050. Changes in glacier volume and surface area may also affect atmospheric circulation patterns that drive the South Asian summer monsoon. These changes could put the livelihoods of millions at risk.

Downstream, coastal-dwelling populations in South Asian deltas like the Ganges-Brahmaputra are dense and

growing rapidly, with high rates of poverty. Low-lying coastal deltas are highly vulnerable to sea-level rise and to changing temperature and rainfall patterns. The latest assessment report of the IPCC projects a rise in sea levels of up to 98 cm by 2100.

Migration is already an established household response to environmental and economic pressures. With climate change, more vulnerable people will turn to migration as a means of coping. A projection of existing trends suggests that globally, more than 8 million people could be displaced across deltas by 2050, with the Ganges-Brahmaputra-Meghna delta among the most affected.

In rural areas, projected changes in temperature and precipitation threaten water supplies, food security, and agricultural incomes and will potentially displace hundreds of millions of people. The IPCC projects that over this century, impacts on migration patterns will compromise human security.