

# **Regional Coordination and Capacity Building for Spatial Vulnerability Assessments and Climate Vulnerability Mapping**

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Center for International Earth Science Information Network (CIESIN)

Mid-Atlantic Regional Climate Symposium

*Climate Change and the Tropics: Implications and Adaptation*

*Session II: Addressing Vulnerability*

*Climate Change Adaptation in the Tropics*

November 21, 2014

Rutgers University, New Brunswick, New Jersey

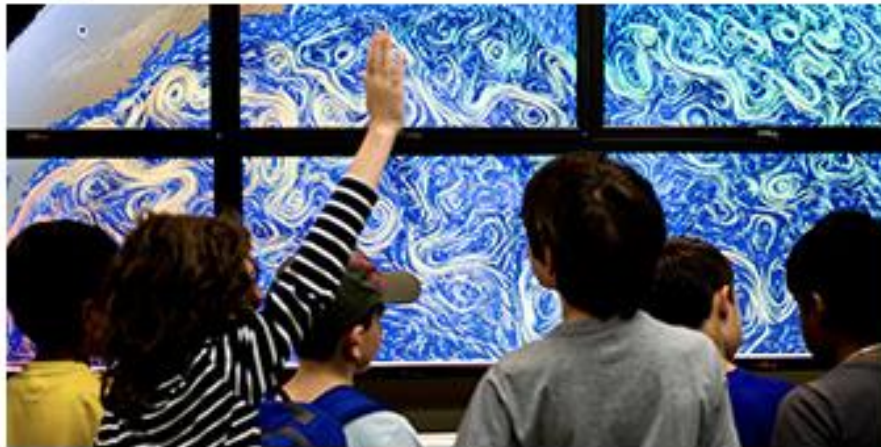
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# THE EARTH INSTITUTE COLUMBIA UNIVERSITY



The **28 Columbia-based research units and programs of the Earth Institute** are home to over 850 scientists, students, postdoctoral fellows and staff working to advance understanding in engineering, biology, and earth, health, and social science. All of the complex interdisciplinary work of the Earth Institute is grounded in the hundreds of research projects based at these units and in these programs.





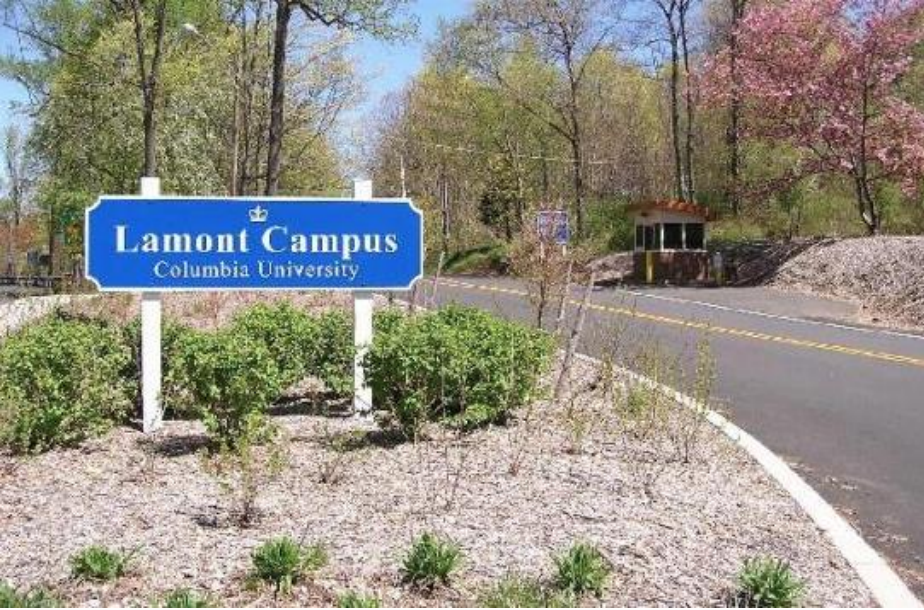
 OPEN  
HOUSE

Whether you're an aspiring young scientist or a long-time science enthusiast, you're sure to enjoy Lamont-Doherty's Open House. Tour a lab, participate in hands-on earth science demonstrations, and learn from world-renowned researchers about their latest discoveries.

**Saturday, October 11, 2014, 10 AM - 4 PM**

The Lamont-Doherty Earth Observatory is located at 61 Route 9W, Palisades, NY





## CIESIN celebrates its 25<sup>th</sup> anniversary in 2014

- **CIESIN founded in 1989** as a non-profit consortium based in Michigan
- **Center within the Earth Institute since 1998** based at the Lamont campus
- **About 45 professional staff** from the social and natural sciences, information technology & data management plus students, postdocs, and visitors

# Selected CIESIN Projects

- Socioeconomic Data and Applications Center (SEDAC)
- African Soil Information Service (AfSIS)
- Health Effects and Geochemistry of Arsenic and Manganese (NIEHS Superfund Research Program)
- African and Latin American Resilience to Climate Change (ARCC) Program (USAID)
- Planning for Resilience in East Africa through Policy, Adaptation, Research, and Economic Development (PREPARED) Program (USAID/East Africa)
- Consortium for Climate Risk in the Urban Northeast (CCRUN NOAA RISA)
- *Terra Populus*, NSF DataNet project
- Interaction Research in Complex Informal Learning Environments (IRCILE) (NSF)



BILL & MELINDA  
GATES foundation

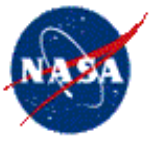


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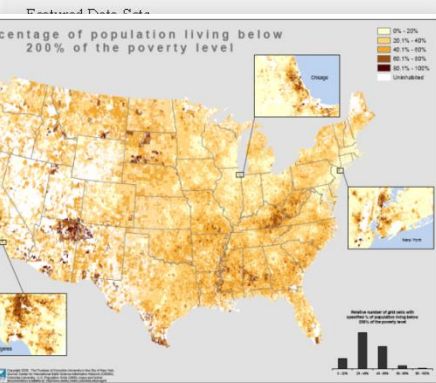
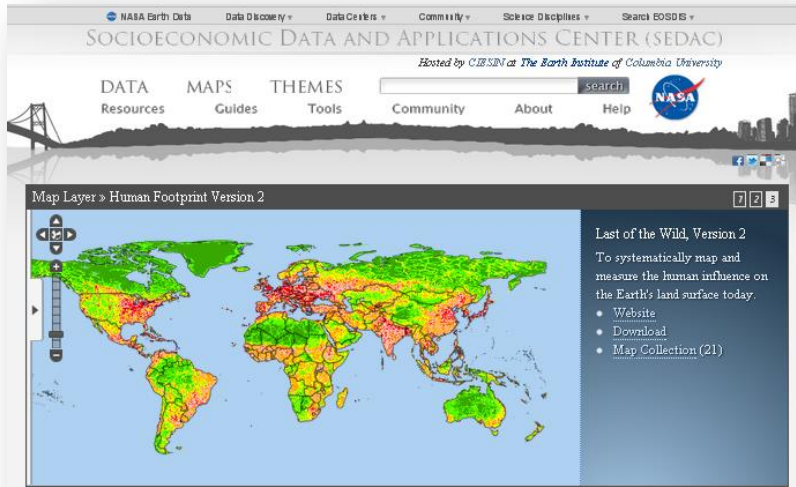


# NASA Socioeconomic Data & Applications Center (SEDAC)

<http://sedac.ciesin.columbia.edu/>



- SEDAC supports the integration of socioeconomic and earth science data
- Focus on human dimensions of environmental change
- Direct support to scientists, applied and operational users, decision makers, and policy communities



More Data Sets...  
To provide a geographically explicit and

News  
More News...

Earthquake Experts from China  
Treaty Multiple Status Matrix - Netscape 6

ICA  
Advisory  
and  
Nan  
Pew  
Cob  
Que  
Spe

Environmental Treaties and  
Resource Indicators

home | treaty locator | country explorer

Status Matrix

Definitions for Signatory | Party | Former Party  
-Remove items from either columns or rows by unchecking them, then click refresh page.  
-Add items to cart by checking, then click refresh page or view cart.  
-Clicking on an agreement or party will take you to a summary for that item.

VIEW CART

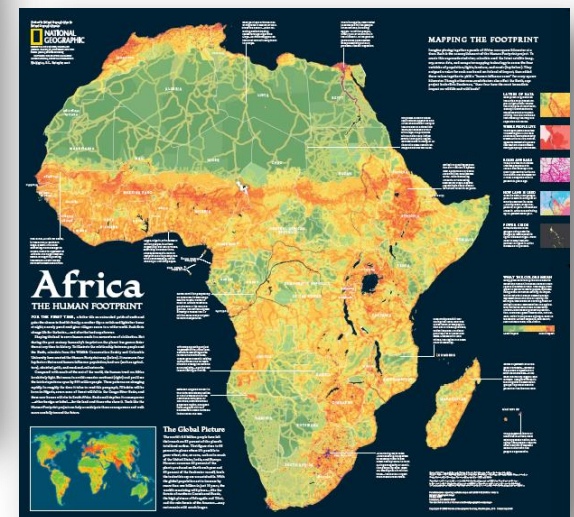
download this matrix | treaty results set | country results set

View in matrix: All Relevant Countries Display this variable: Status

Transpose Table

Refresh Page

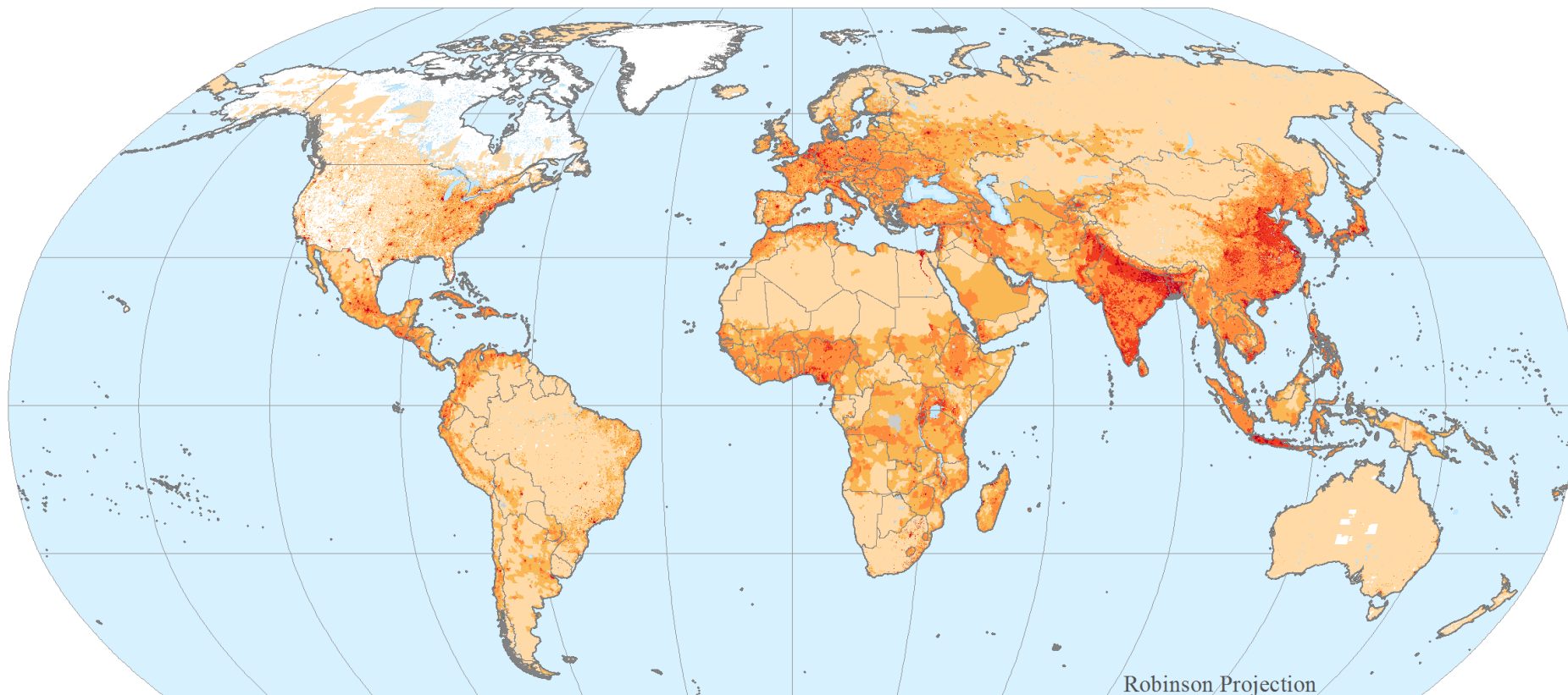
	Convention concerning the Protection of Alps	Protocol for the implementation of the Alpine Convention in the field of mountain agriculture	Protocol for the implementation of the Alpine Convention in the field of nature protection and landscape conservation	Protocol for the implementation of the Alpine Convention in the field of town and country planning and sustainable development
Austria	Party	...	...	...
EC European Communities	Party	Signatory	Signatory	Signatory
France	Party	Signatory	Signatory	Signatory
Germany	Party	Signatory	Signatory	Signatory
Italy	Signatory	Signatory	Signatory	Signatory
Liechtenstein	Party	Signatory	Signatory	Signatory
Monaco	...	Signatory	Signatory	Signatory



# Gridded Population of the World version 4 (GPWv4)

## 2010 Population Density Estimates

The GPW gridded data set provides globally consistent and spatially explicit human population information and data for use in research, policy making, and communications.



Persons  
per km<sup>2</sup>

0

1–4

5–24

25–249

250–1000

>1000

No Data

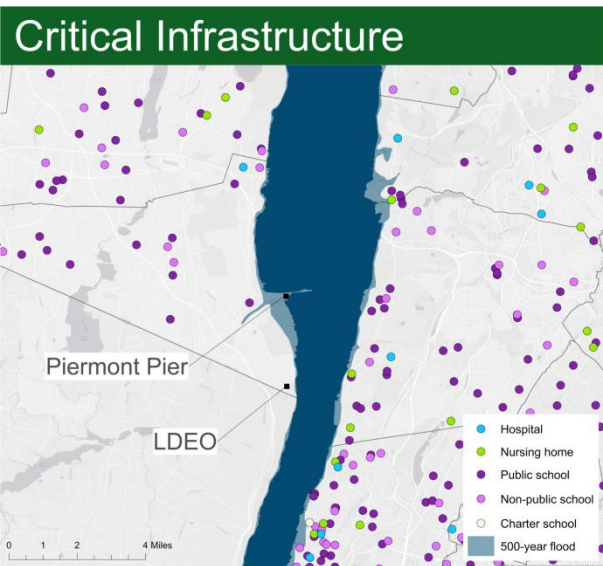
Source: CIESIN, 2014

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# NYSERDA Project with Stevens Institute

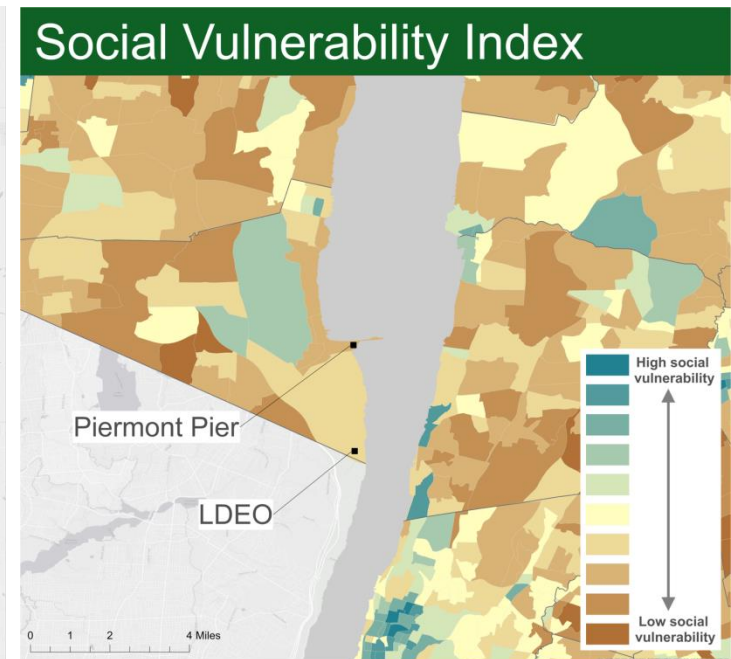
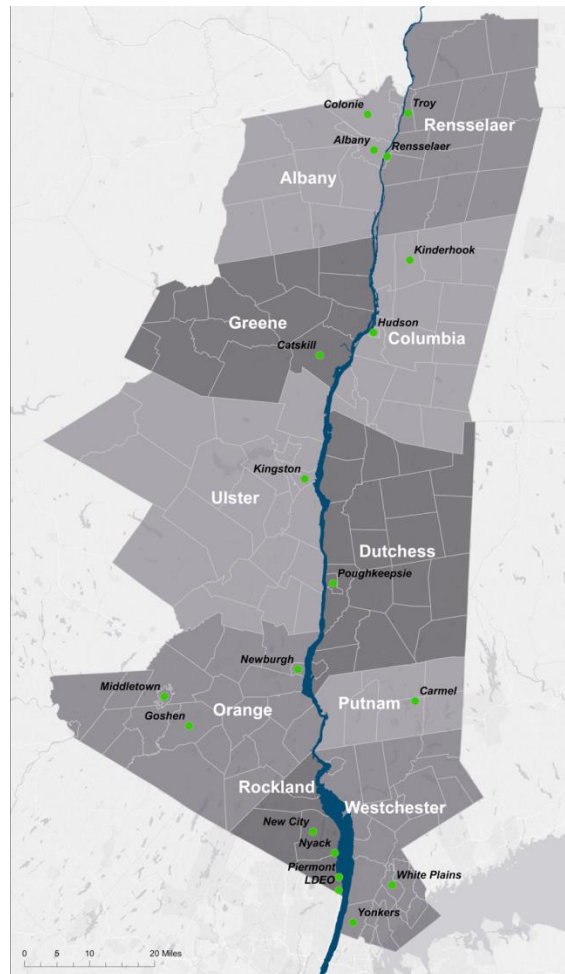
## Hudson River Flood Hazard Mapping Tool

Online mapping decision support



Flood potential along the lower Hudson River

- storm surge
- sea level rise







# PREPARED PROGRAM PARTNERS

- ❑ Intergovernmental
  - East African Community (EAC) Secretariat
  - Lake Victoria Basin Commission (LVBC)
- ❑ Specialized regional science and research institutions
  - Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Centre (ICPAC)
    - Greater Horn of Africa Climate Outlook Forum (GHACOF)
  - Regional Centre for Mapping of Resources for Development (RCMRD): SERVIR-East Africa
- ❑ U.S. Geological Survey
  - Famine Early Warning System Network (FEWS NET)
- ❑ World Meteorological Organization (WMO)
  - Global Framework for Climate Services (GFCS)
- ❑ PREPARED Project, implemented by TetraTech ARD with subcontractors (CIESIN/Columbia U., LTS Africa, WEMA Consult, SSG Advisors, GCAP)



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The **Global Framework for Climate Services (GFCS)** is a UN-led initiative spearheaded by the World Meteorological Organization (WMO) to guide the development and application of science-based climate information and services in support of decision-making in climate sensitive sectors.



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**EAST AFRICAN COMMUNITY**

## **PREPARED PROGRAM OBJECTIVES**

- Improve climate change adaptation technical capacity, policy leadership, and action readiness of regional institutions
- Strengthen resilient and sustainable management of biologically significant transboundary freshwater ecosystems in the East African Community region
- Enhance resilient and sustainable water supply, sanitation, and wastewater treatment services in Lake Victoria Basin





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## **PREPARED PROGRAM CLIMATE CHANGE ADAPTATION COMPONENT**

- ✓ Support the establishment of an EAC Climate Change Coordination Unit (CCCU)
- ✓ **Improve access to and sharing of climate change information**
- ✓ **Mainstream climate change adaptation strategies – conduct Vulnerability, Impacts and Adaptation Assessment (VIA) in Lake Victoria Basin under EAC Climate Change Technical Working Group (CCTWG)**
- ✓ Access to and future management of adaptation funds



**Regional Centre for  
Mapping of Resources  
for Development**

**RCMRD ([rcmrd.org](http://rcmrd.org)) was established in Nairobi, Kenya in 1975** under the auspices of the United Nations Economic Commission for Africa (UNECA) and the then Organization of African Unity (OAU), today African Union (AU).

**RCMRD is an inter-governmental organization** and currently has 20 Contracting Member States in the Eastern and Southern Africa Regions: Botswana, Burundi, Comoros, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Somali, South Africa, South Sudan, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe.

**Mission:** To promote sustainable development through generation, application and dissemination of Geo-Information and allied ICT services and products in the Member States and beyond.

**Vision:** To be a Premier Centre of Excellence in Provision of Geo-Information Services



# PREPARED Climate Vulnerability Index Mapping Workshops

Two training workshops held in 12–16 May and 4–15 August 2014

## at RCMRD in Nairobi, Kenya

CIESIN geographic information specialists Malanding Jaiteh and Tricia Chai-Onn provided a comprehensive training in the framework, data, and methods utilized to develop a spatial vulnerability assessment for the EAC region utilizing the spatial index approach.

### *Objectives of the Workshop:*

- To train GIS specialists in the EAC Partner States to use ArcGIS and R statistics software for CVI mapping;
- To compile and evaluate available data sets, and potential indicators to be derived from them, to construct a regional EAC climate vulnerability index and constituent indices for exposure, sensitivity, and adaptive capacity and to produce maps for regional-scale comparison;
- To re-scale the results of the regional climate vulnerability index to produce national climate vulnerability maps for each of the five EAC Partner States; and
- To assist participants in producing their own customized climate vulnerability indices and maps at the country level.



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## DESIGN AND USE OF COMPOSITE INDICES IN ASSESSMENTS OF CLIMATE CHANGE VULNERABILITY AND RESILIENCE

JULY 2014

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ARCC

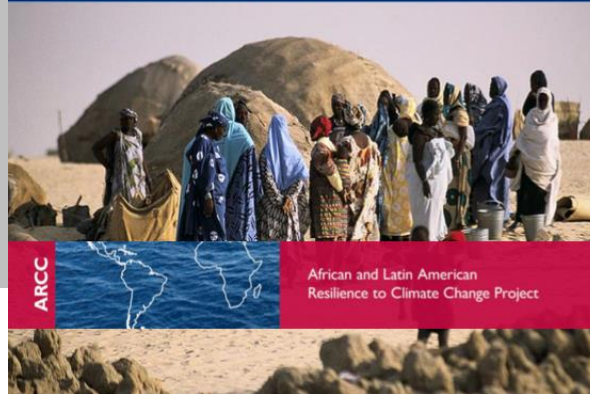
African and Latin American Resilience to Climate Change Project



## SPATIAL CLIMATE CHANGE VULNERABILITY ASSESSMENTS: A REVIEW OF DATA, METHODS, AND ISSUES

AUGUST 2014

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ARCC

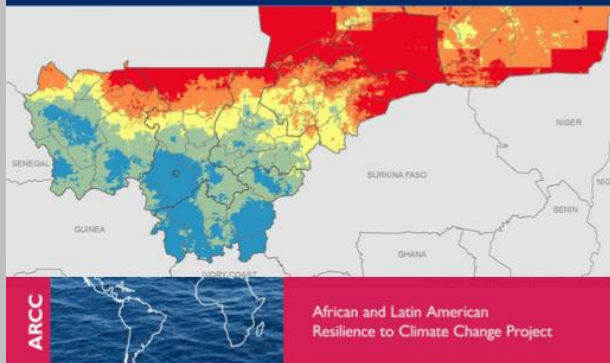
African and Latin American Resilience to Climate Change Project



## MALI CLIMATE VULNERABILITY MAPPING

JANUARY 2014

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ARCC

African and Latin American Resilience to Climate Change Project



## A REVIEW OF DOWNSCALING METHODS FOR CLIMATE CHANGE PROJECTIONS

SEPTEMBER 2014

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ARCC

African and Latin American Resilience to Climate Change Project

# Available Resources

## ARCC Papers prepared by CIESIN staff

Available at: <http://community.eldis.org/.5b9bfce3/publications.html>





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**African & Latin American  
Resilience to Climate Change**

A USAID funded project implemented by Tetra Tech/ARD

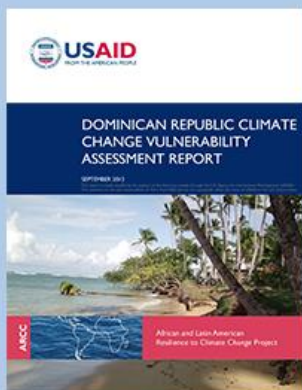
## ARCC Publications

ARCC uses science-based research and participatory methods to identify climate change vulnerabilities for target populations or sectors of USAID interest and to do options analyses to help support decisions around different approaches to adaptation. The compilation of vulnerability assessments, methodology papers and fact sheets listed below are also relevant to USAID's implementing partners, donors and other users of climate change vulnerability assessment information. We will continue to add reports as they become available for publishing.



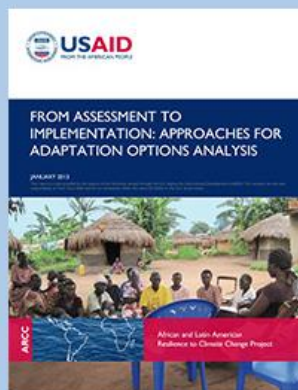
Example of recommended citation: U.S. Agency for International Development. 2012. Uganda Climate Change Vulnerability Assessment Report. Washington, DC.

### Climate Change Vulnerability Assessments



[READ ALL](#)

### Technical Reports



[READ ALL](#)

### Workshop Reports



[READ ALL](#)

Available at: <http://community.eldis.org/.5b9bfce3/publications.html>



# Thank you!

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