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FOR INTERNATIONAL SECURITY AND LAW

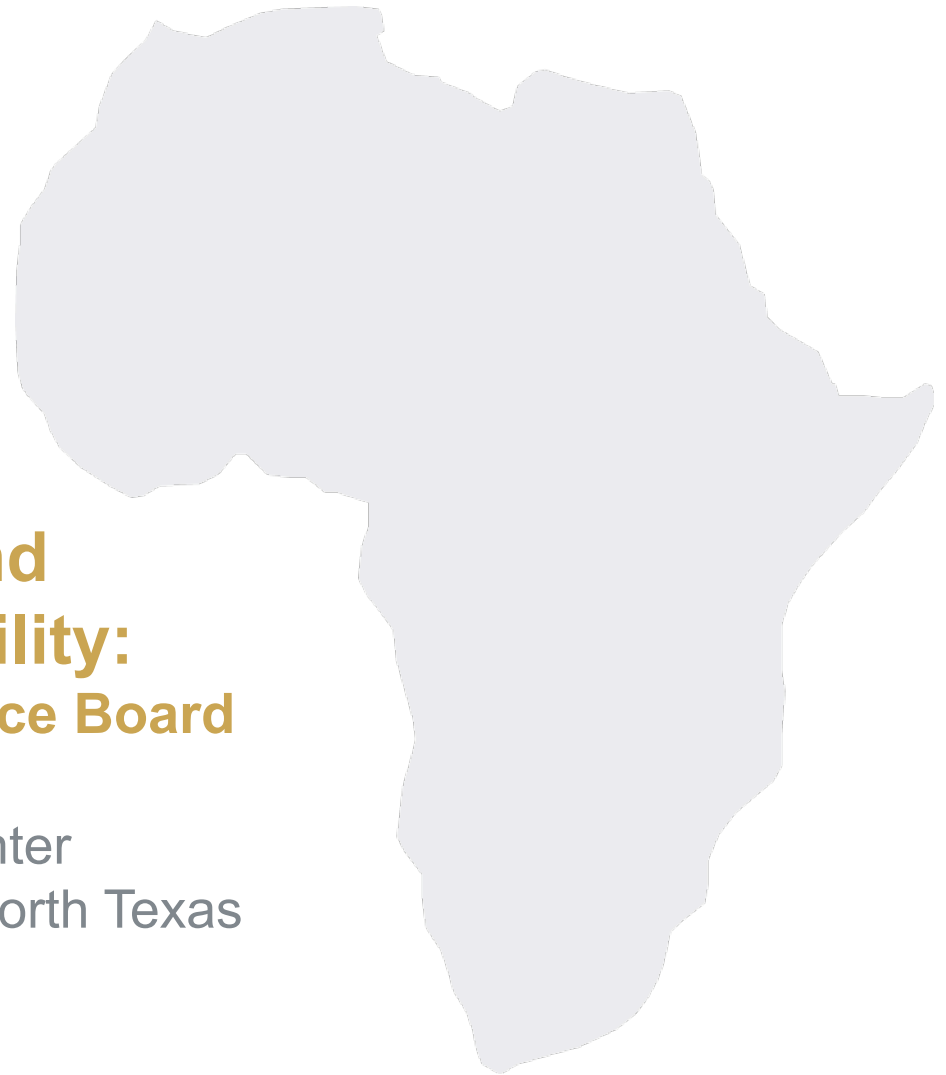


CLIMATE CHANGE  
AND AFRICAN  
POLITICAL STABILITY

# **Climate Change and African Political Stability: Briefing for the Defense Science Board**

Ashley Moran, Strauss Center  
Dr. Cullen Hendrix, University of North Texas

*June 14, 2010*



# Briefing Overview

- Climate Change and African Political Stability program
- Social Conflict in Africa: A New Dataset and Findings
- Mapping Insecurity in Africa: A New Model of Climate Change Vulnerability
- Upcoming research



## Overview

- Five-year program funded by DoD Minerva Initiative
- Collaboration between four universities, led by the Strauss Center at the University of Texas at Austin
- Aims to assess *how* climate change could make African countries more vulnerable to humanitarian disasters and conflict, and *how* this could in turn affect African political stability and U.S. security



## Research areas



Climate change and  
conflict vulnerability



Government capacity to  
mitigate climate stress



Foreign aid for  
climate change adaptation



## Climate change and conflict

- Scholars, policymakers are concerned that climate change, environmental degradation will lead to conflict
- Weak and ambiguous findings with respect to interstate, intrastate war
- Other forms of social conflict may be more likely
  - Interstate wars are rare
  - Insurgency entails significant start-up costs, government is (comparatively) well-armed
  - The state may not be an appropriate target



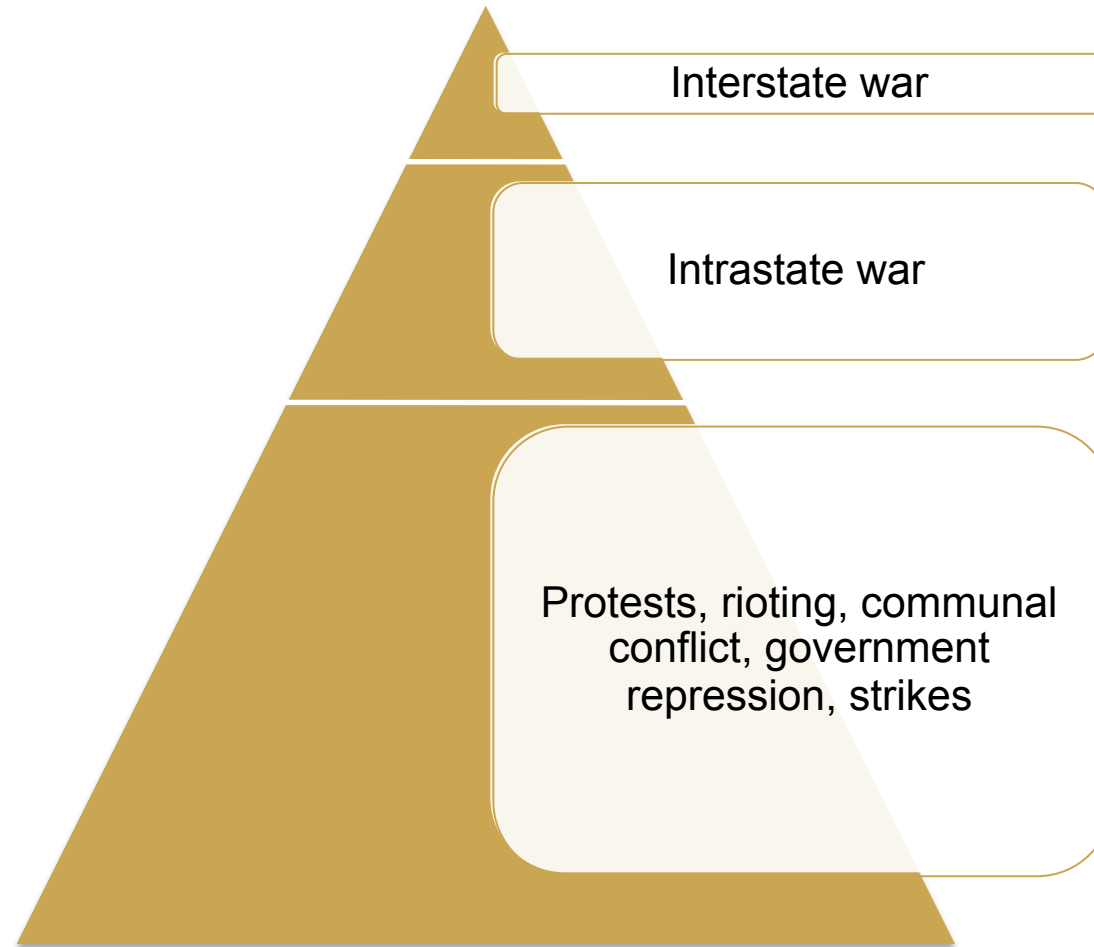
Interstate  
War



Intrastate  
War



# Conventional, state-centered conflict



## Different in kind, not necessarily scale

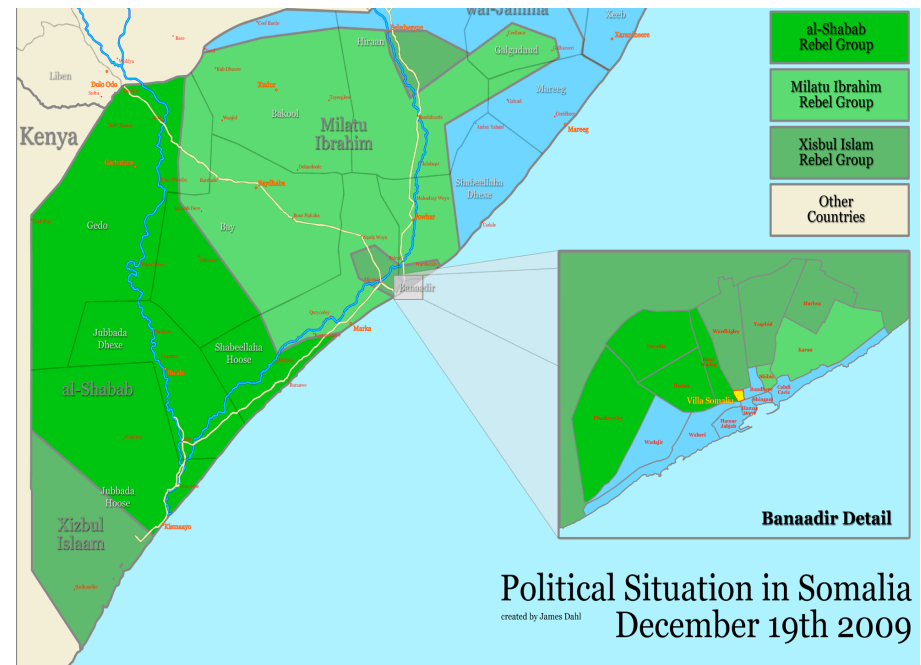
- Kenya
  - 2007: marred elections lead to widespread ethnic rioting, 800-1,500 deaths, political compromise
- Nigeria
  - 1998: Ife-Modakeke ethnic violence kills 3,000 near Osun
  - 2001-2008: Muslim-Christian religious violence kills >1,200 in Jos
- DRC
  - 1999-2003: Ethnic violence between Lendus (agriculturalists) and Hemas (pastoralists) kills at least 8,000 in the Ituri region
- Event death totals are higher than many civil conflicts



Peter Andrew/Reuters

## Different in kind, not necessarily effects

- Massive humanitarian crises
  - Potentially requiring international response
- Creation/signaling of ungoverned space
  - Prominent in failed/fragile states
- Involve countries of strategic interest to USA
  - Kenya, Tanzania
  - West Africa



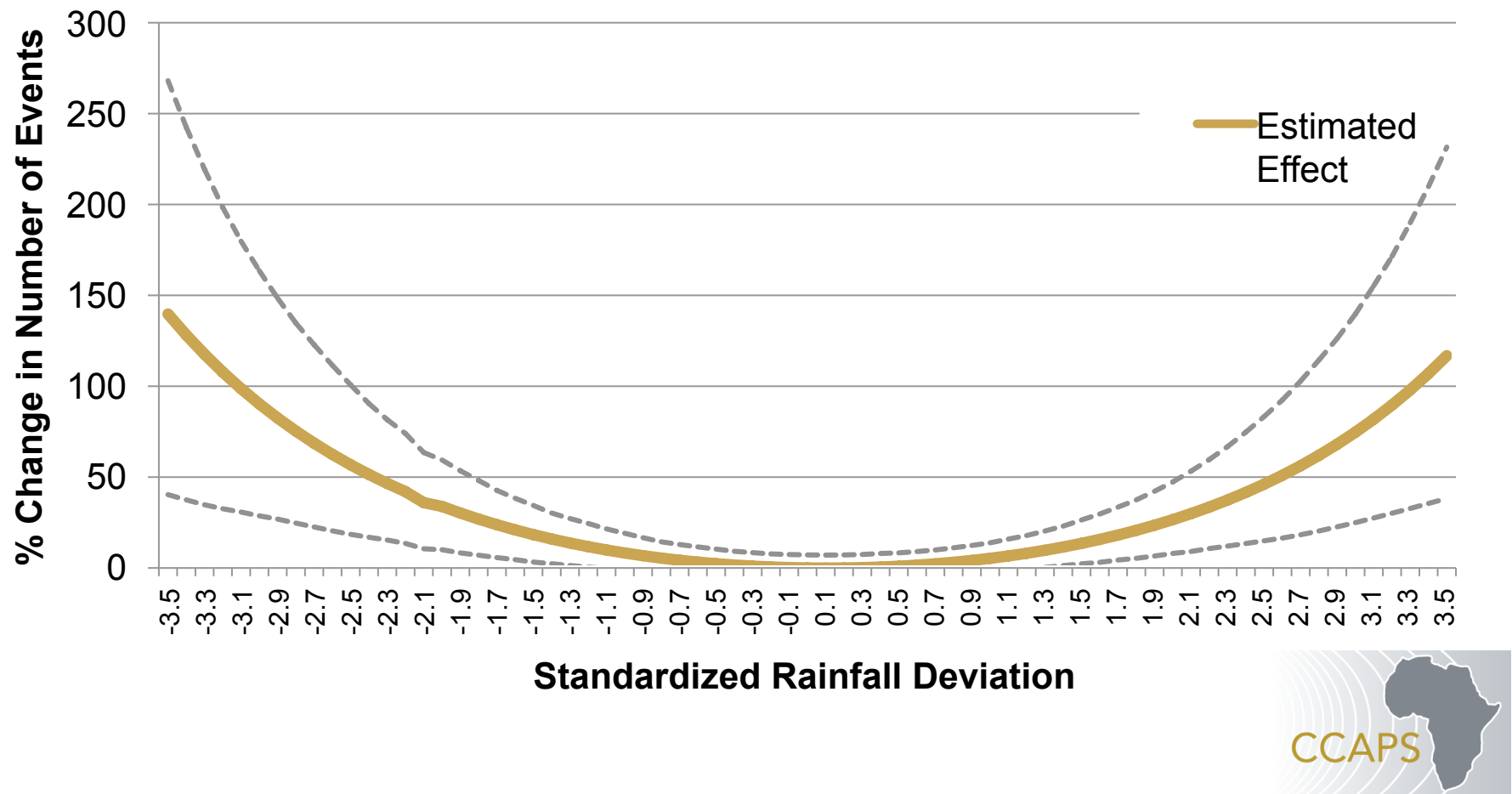
Map courtesy of James Dahl

## New data

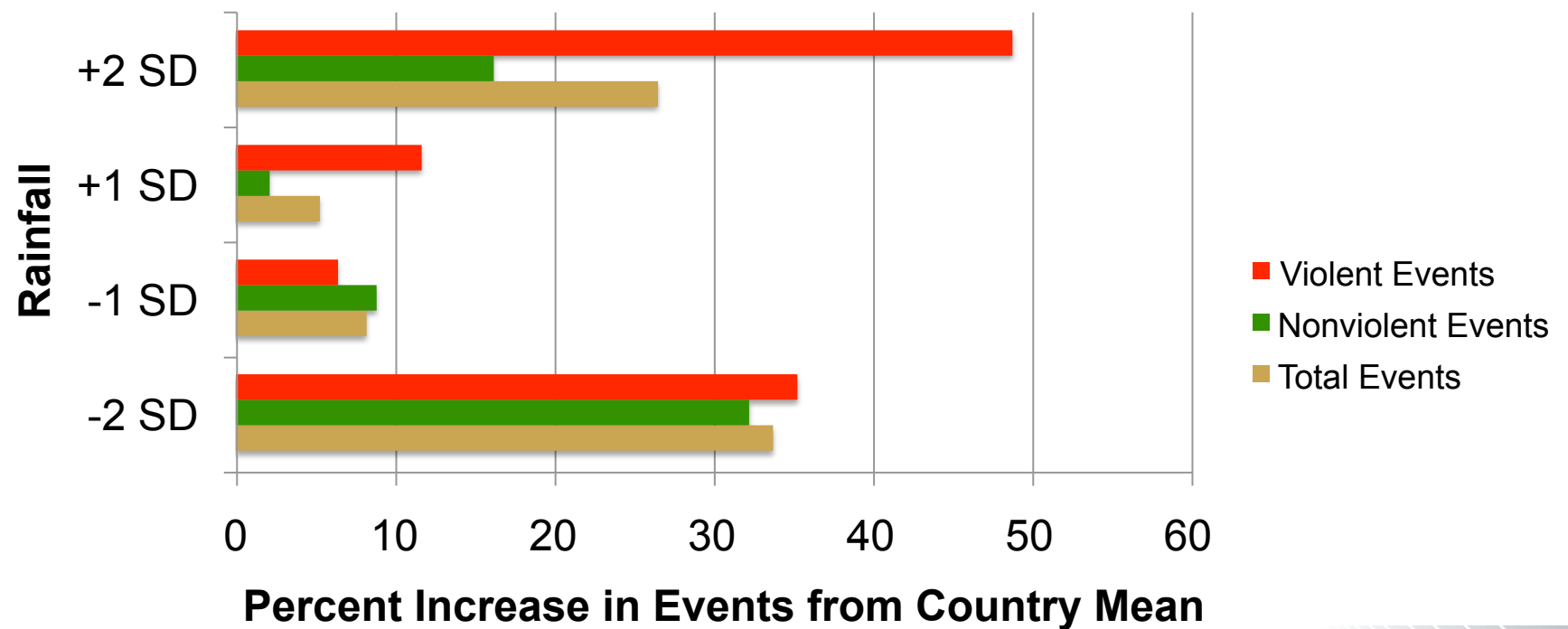
- Social Conflict in Africa Database (SCAD)
- Data collection, analysis project at University of North Texas
  - Co-PIs: Idean Salehyan, Cullen Hendrix
- Covers 47 African countries, 1990-2009
- Over 6,000 events
  - Protests, riots, strikes, government repression, communal violence, intra-government violence
  - Augments existing data sources on inter-, intrastate war
- Online database, visualization tools expected August 2010, hosted by Strauss Center



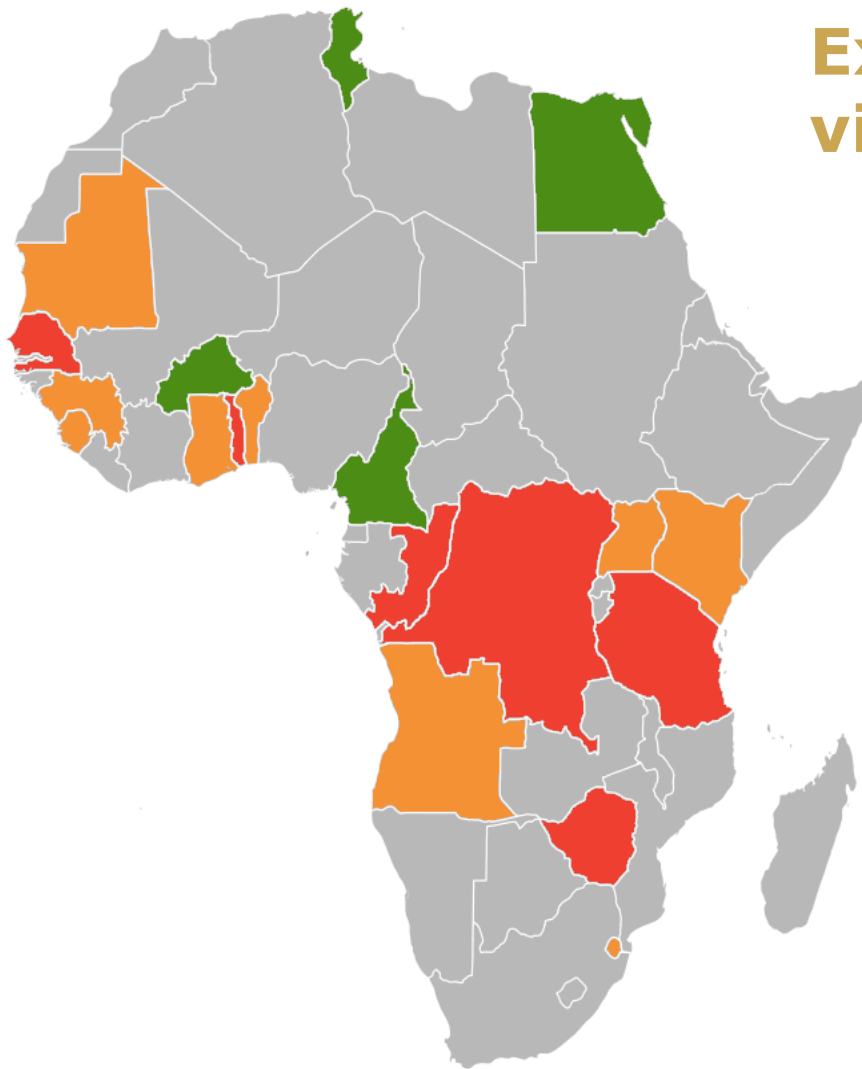
## Extreme rainfall and social conflict events, 1990-2009



## Extreme rainfall and social conflict events, 1990-2009



## Extreme rainfall and violent events, by country



Correlation

Strong  
( $r > 0.45$ )

Moderate  
( $0.45 > r > 0.2$ )

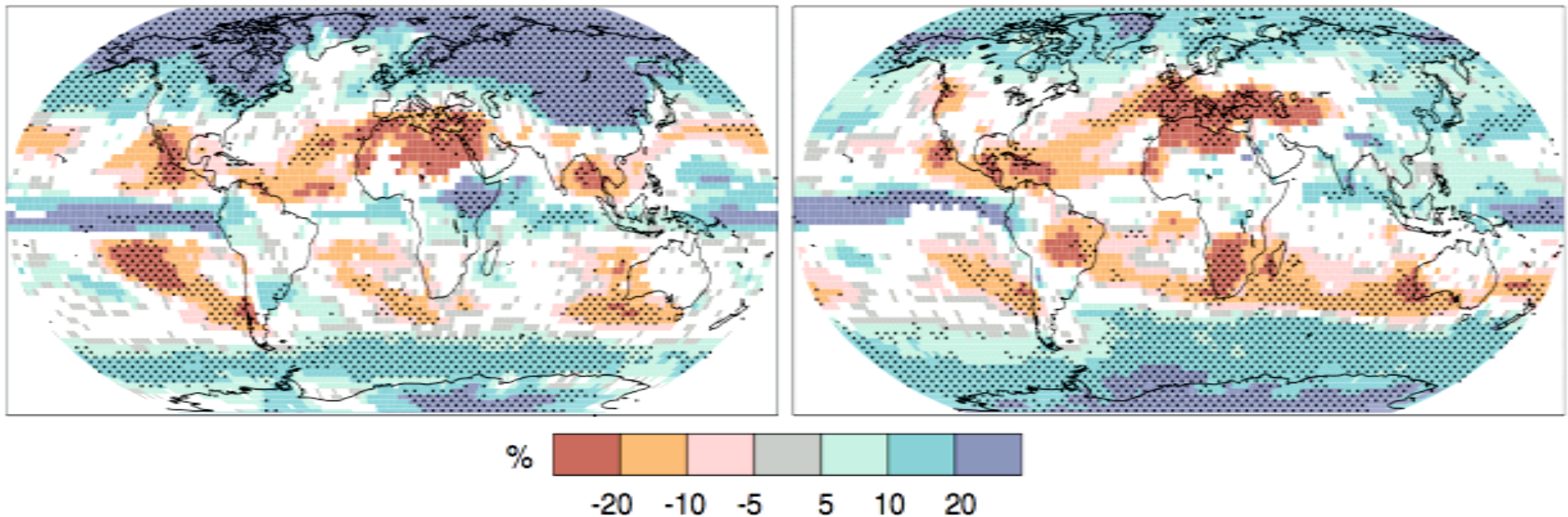
Negative  
( $r < -0.2$ )



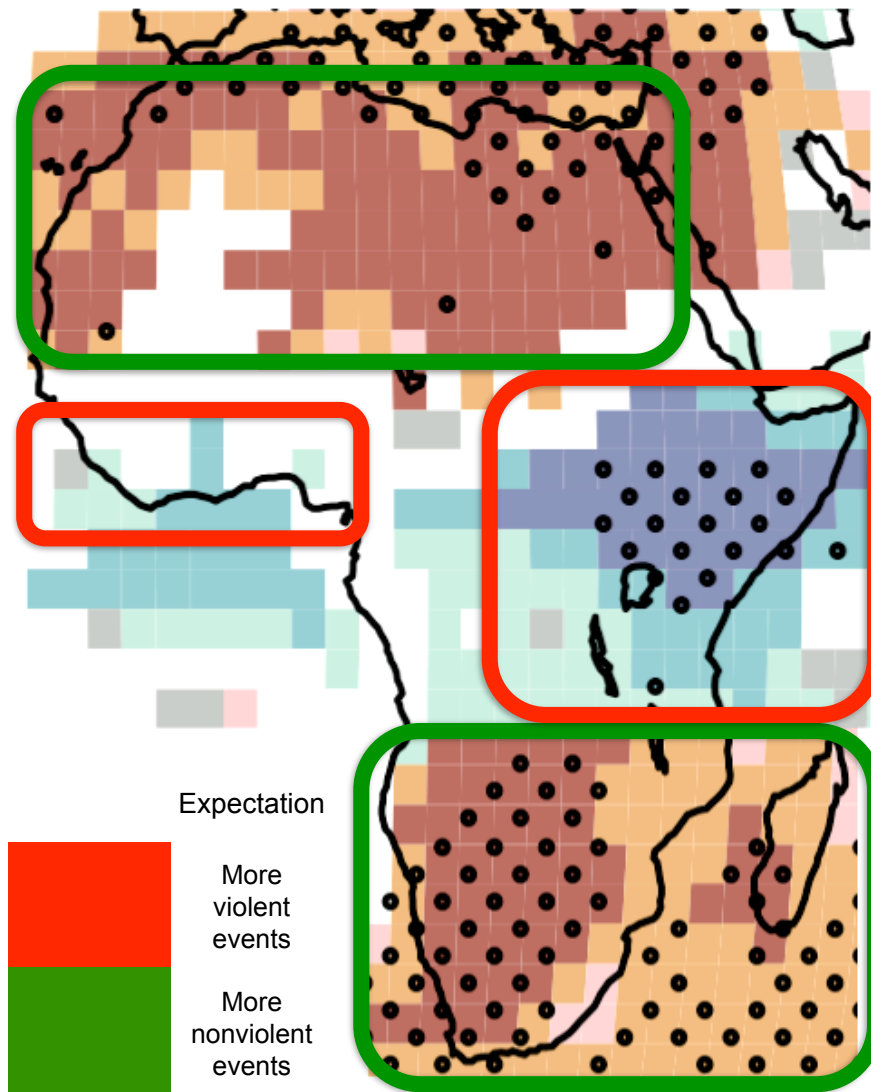


## Climate change and the weather-conflict nexus

Multi-model projected patterns of precipitation changes



**Figure 3.3.** Relative changes in precipitation (in percent) for the period 2090-2099, relative to 1980-1999. Values are multi-model averages based on the SRES A1B scenario for December to February (left) and June to August (right). White areas are where less than 66% of the models agree in the sign of the change and stippled areas are where more than 90% of the models agree in the sign of the change. [WGI Figure 10.9, SPM]



### “Tis easy to see, hard to foresee.”

- GCMs forecast different effects of climate change on rainfall in different regions
  - Less rainfall in north, south
  - More rainfall in east
- Forecast that rainfall will be more “clumpy”
  - More extreme rainfall events
  - Longer droughts
- *Caveat emptor*
  - Forecasts are long term (comparing 2090-2099 to 1990-1999)



## Conclusions and recommendations

- Distinct environmental links between nonviolent and violent mobilization
- Past relationship is not constant across the continent
- Case studies should be paired
  - Match cases with similar environmental stressors, dissimilar outcomes
  - Provides leverage on *mediators* and potential *mitigators*
  - Suggested pairings
    - Zimbabwe-Zambia
    - Kenya-Tanzania
    - Mauritania-Niger



## Climate change vulnerability project

- Led by Dr. Joshua Busby, University of Texas at Austin
- Aims to identify which areas are most vulnerable at the most detailed scale possible
- Combines existing data on physical, socio-economic and political insecurities to develop a holistic model of vulnerability
- Uses Geographic Information Systems (GIS) to locate the confluence of these various types of vulnerability

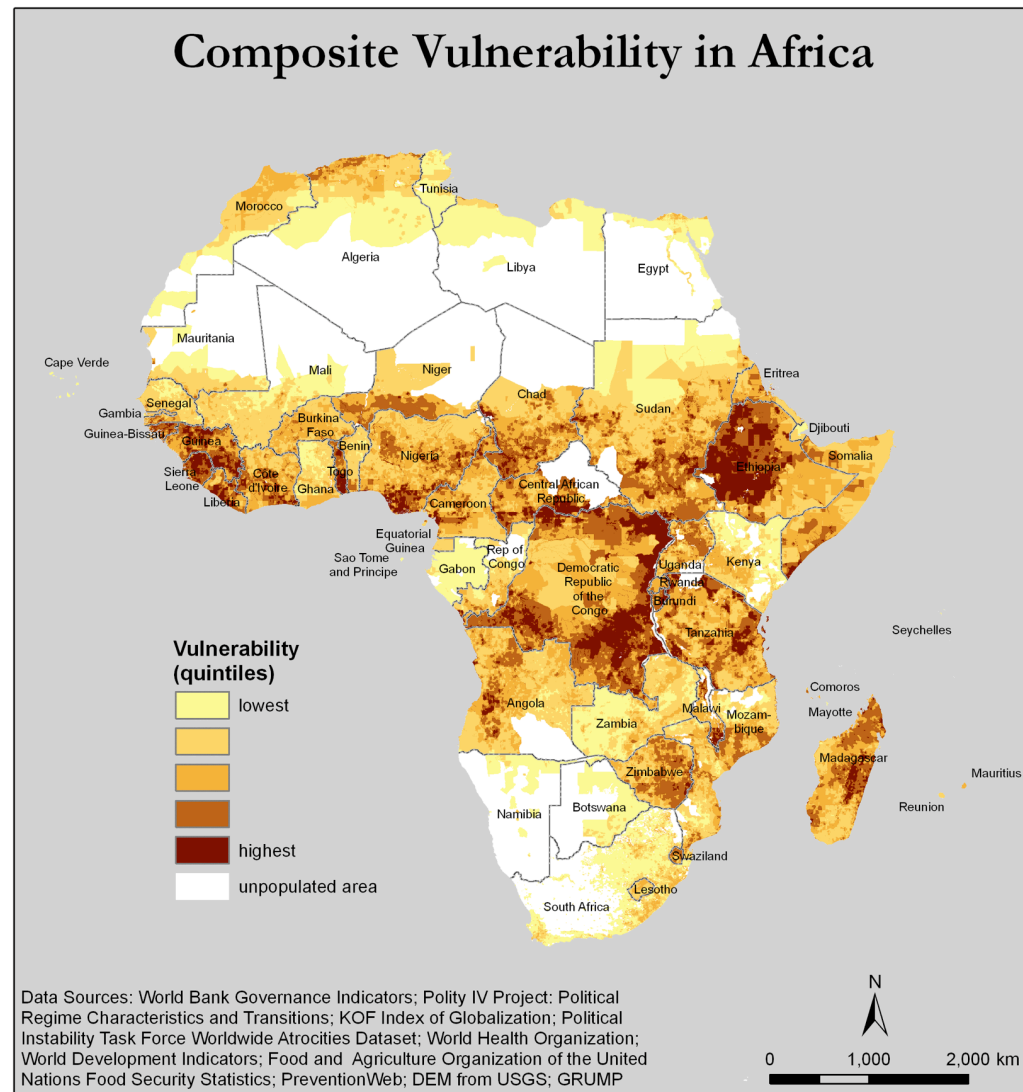


## Holistic model of vulnerability

- Physical exposure
  - Drought, Flood, Wildfire, Cyclone surge, Cyclone wind, Low-elevation coastal zones
- Household and community vulnerability
  - Literacy rate, School enrollment, Maternal mortality, Life expectancy, Dietary energy consumption, Drinking water access, Healthcare expenditures, Spending on nurses
- Governance and political violence
  - Government effectiveness, Voice and accountability, Global integration, Volatility in regime, Years since last major change, Political violence
- Population density



# Mapping Insecurity in Africa

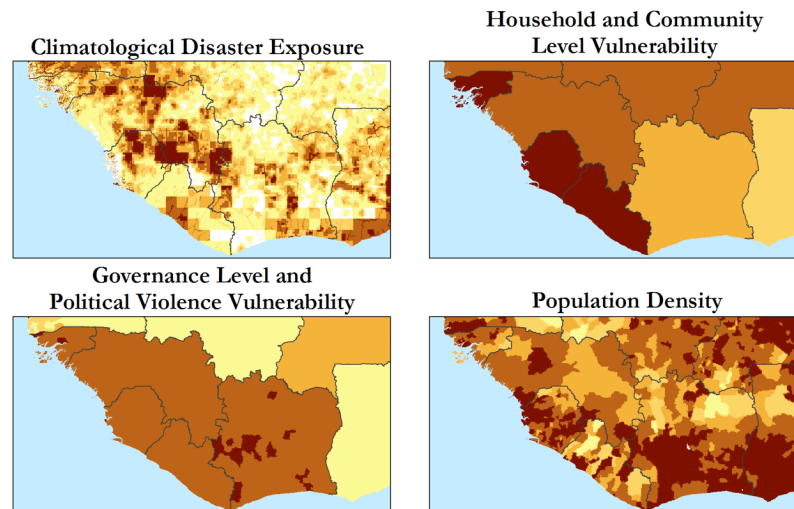
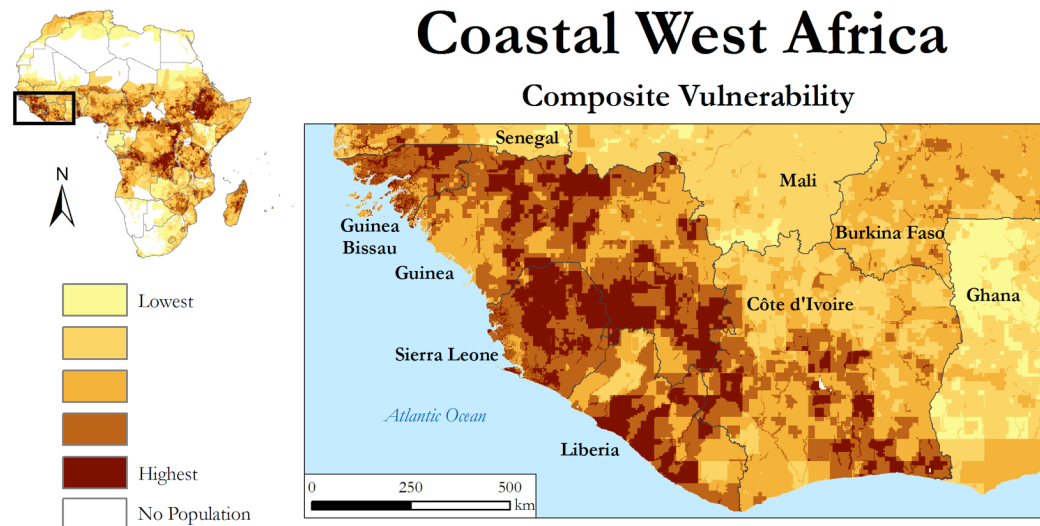


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# Mapping Insecurity in Africa

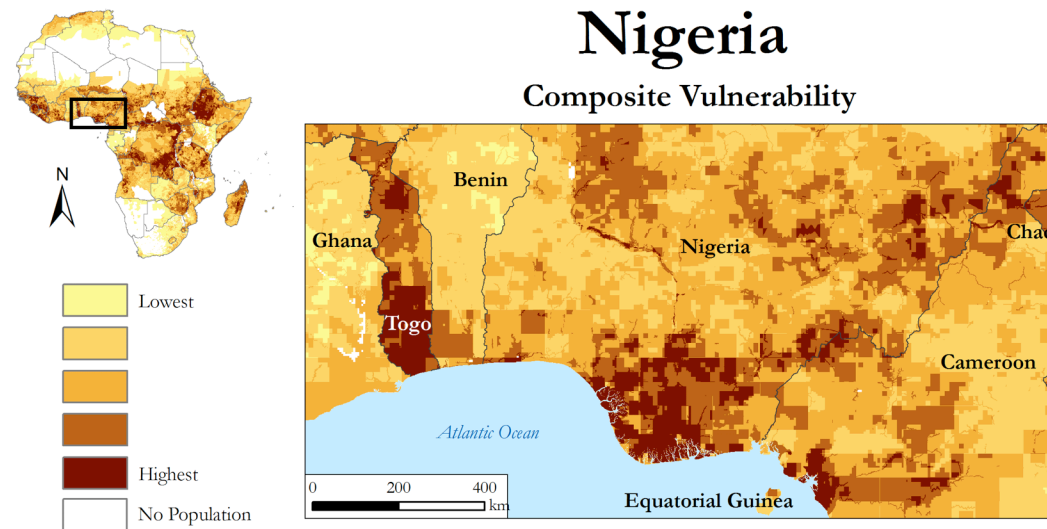


Data Sources: World Bank Governance Indicators; Polity IV Project: Political Regime Characteristics and Transitions; KOF Index of Globalization; Political Instability Task Force Worldwide Atrocities Dataset; World Health Organization; World Development Indicators; Food and Agriculture Organization of the United Nations Food Security Statistics; PreventionWeb; DEM from USGS; GRUMP

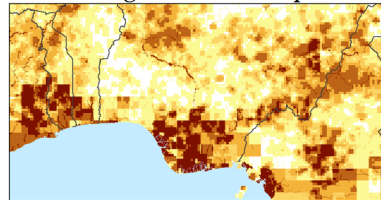
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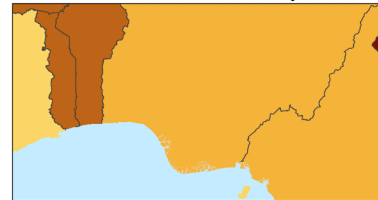
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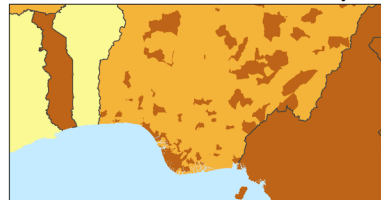
Climatological Disaster Exposure



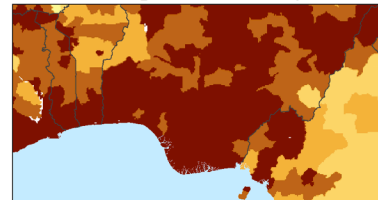
Household and Community Level Vulnerability



Governance Level and Political Violence Vulnerability



Population Density



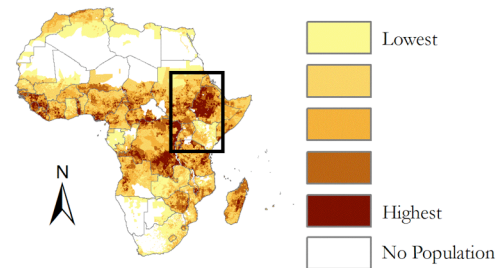
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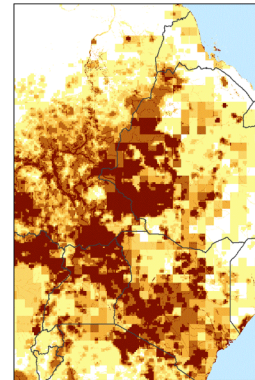


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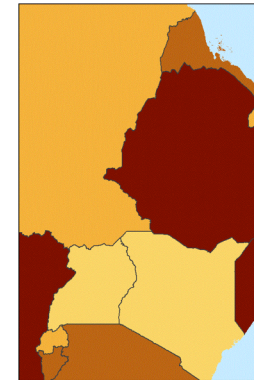


## Western Ethiopia

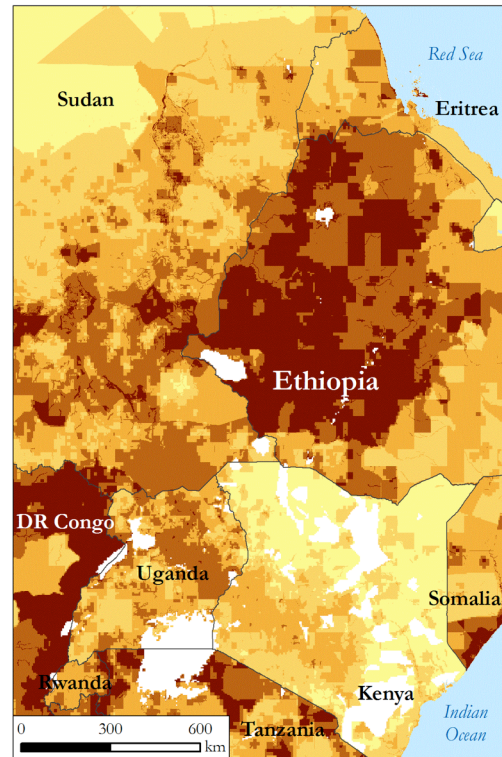
Climatological Disaster Exposure



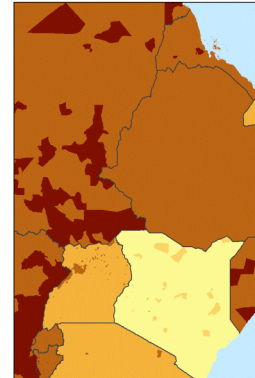
Household and Community Level Vulnerability



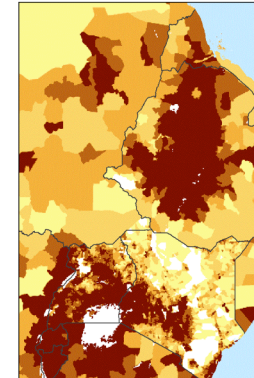
Composite Vulnerability



Governance Level and Political Violence Vulnerability



Population Density

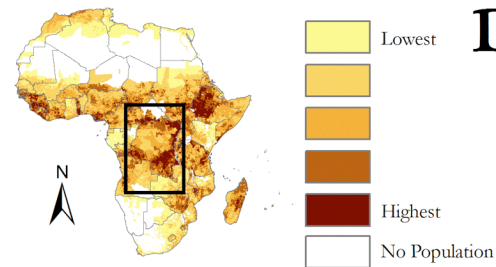


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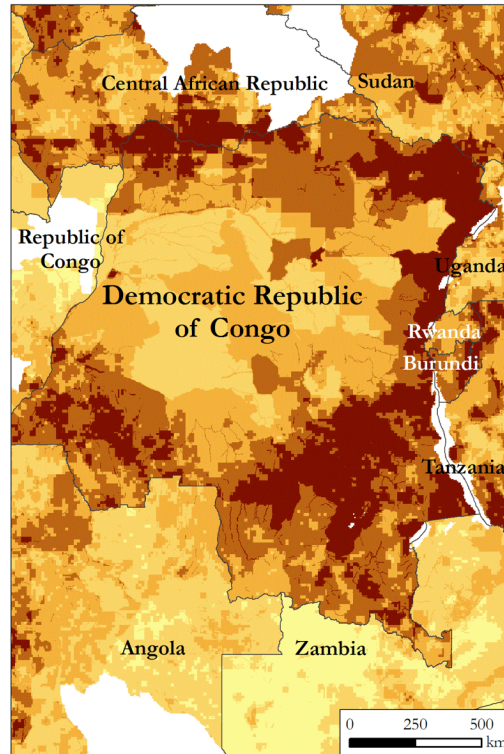


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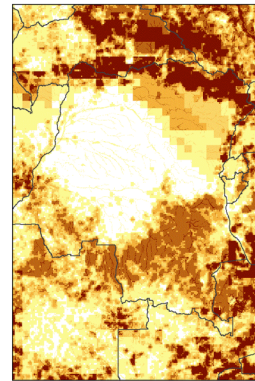


## Democratic Republic of Congo

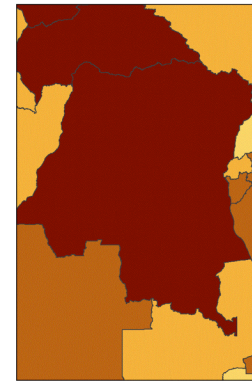
### Composite Vulnerability



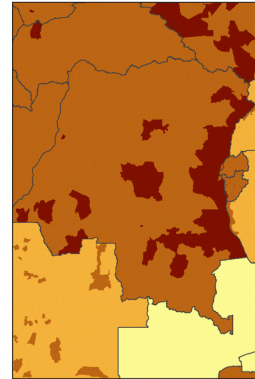
### Climatological Disaster Exposure



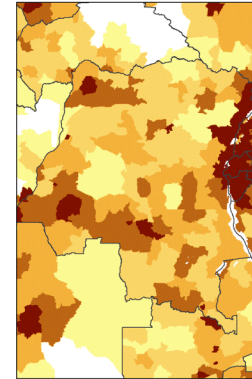
### Household and Community Level Vulnerability



### Governance Level and Political Violence Vulnerability



### Population Density

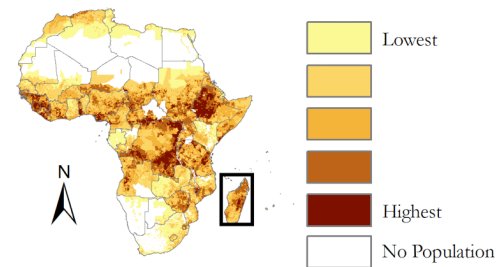


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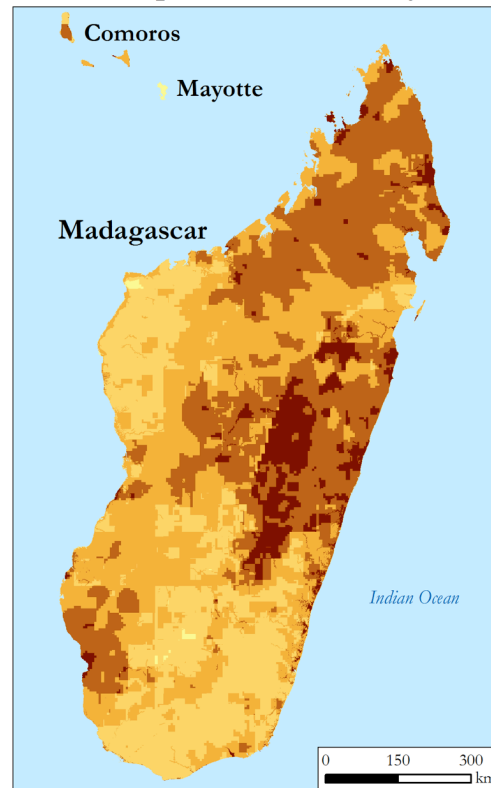
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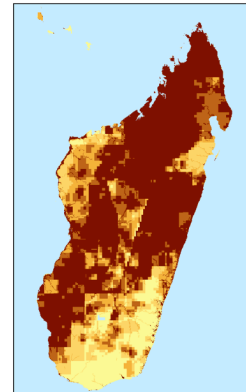


## Composite Vulnerability

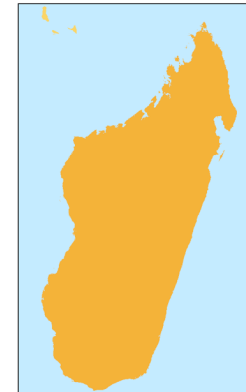


## Madagascar

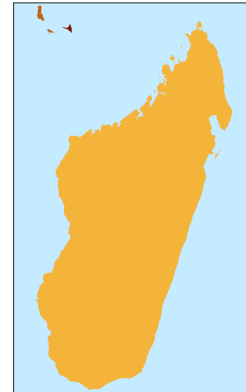
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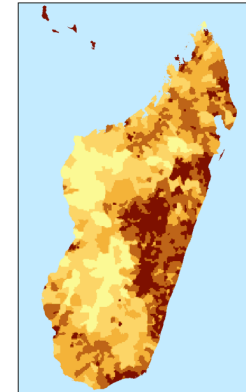
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Other areas of high vulnerability:

- Tanzania
- Zimbabwe
- Rwanda
- Swaziland
- Mozambique

## Next CCAPS research

- Online tools mapping climate change vulnerability and conflict data
- Predictive climate model
- Case studies on constitutional design and conflict management
- Case studies on governance
- Coding and tracking adaptation aid
- Linking climate, conflict, governance and aid

