Poverty and Hazard Linkages

Global Risk Identification Programme Proposal Development Coordination Meeting

Friday, 19 May 2006

CIESIN
Earth Institute
Columbia University
www.ciesin.columbia.edu

Data Improvements Poverty Mapping

- Global
  - Produce global map of poverty proxies
  - Explore biophysical correlates
- National
  - Catalog data sets with subnational poverty measures
  - Produce clean, usable, geographic databases
  - Create integrated collection of data sets
  - Explore biophysical correlates
- Outreach
  - Web site
  - Papers
  - Atlas

CIESIN's collection of Poverty Data

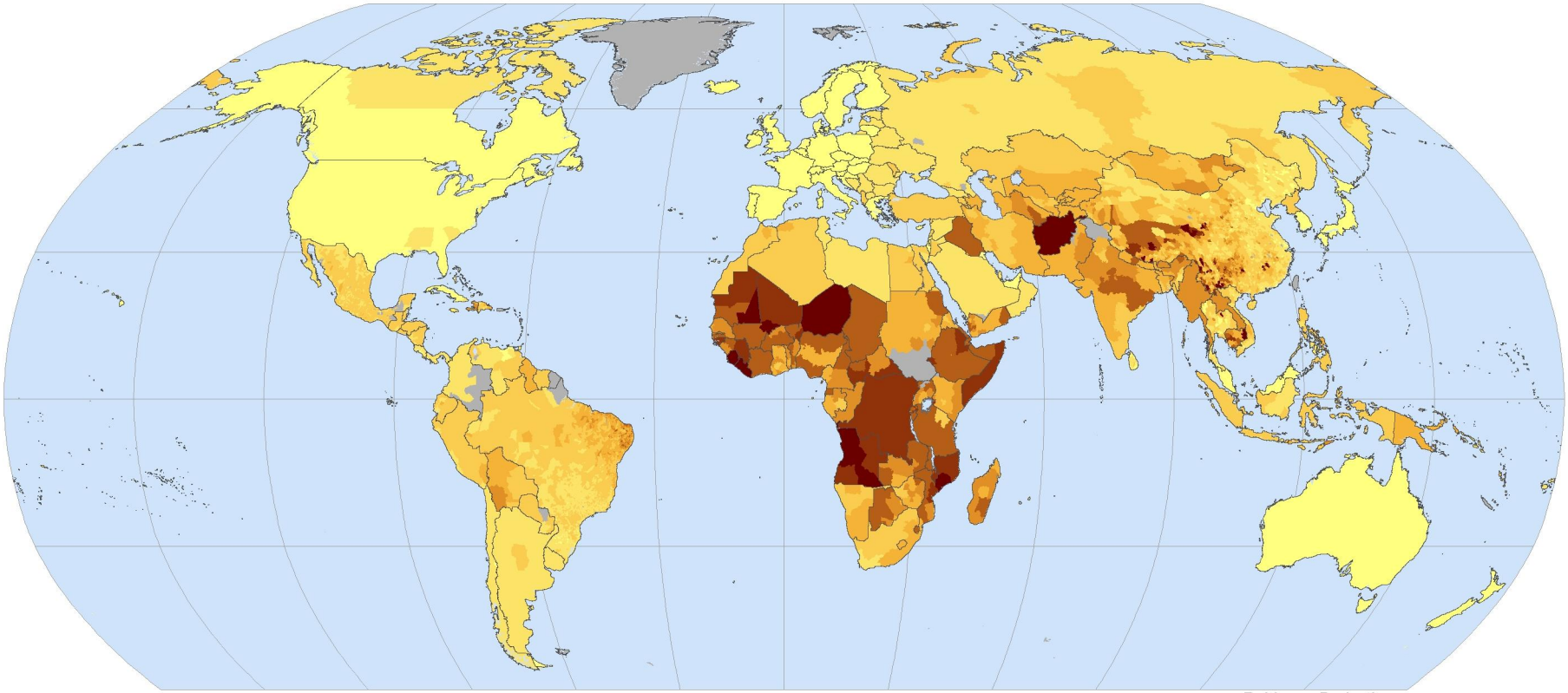
Global extent, sub-national scale:

- Malnutrition and Infant Mortality Rates (underweight children), all translated to a common quarter-degree grid.

  * Data available for 196 countries. Sub-national data available for 77 countries, compromising 80% of the world population (90% non-OECD).

National extent, sub-national scale:

- Measures of Poverty and Inequality at various scales of analysis (first to third administrative divisions) for 19 countries. Highest level of spatial detail ranges from 314 units (Bolivia) to 10,476 (Viet Nam)



Robinson Projection

Measures of Poverty

Infant Mortality Rates

By Subnational Administrative Unit

Subnational mortality rates are adjusted to 2000 using national trend data.
Original data for 96% of countries are from 1995 or later. All data are from 1990 or later.

Infant mortality rate, 2000
(deaths per 1000 live births)

- < 9.1
- 9.1 - 25.0
- 25.1 - 50.0
- 50.1 - 75.0
- 75.1 - 100.0
- 100.1 - 125.0
- 125 - 150.0
- 150.0 <
- no data

National Boundary

Subnational boundaries have been removed from countries for clarity.

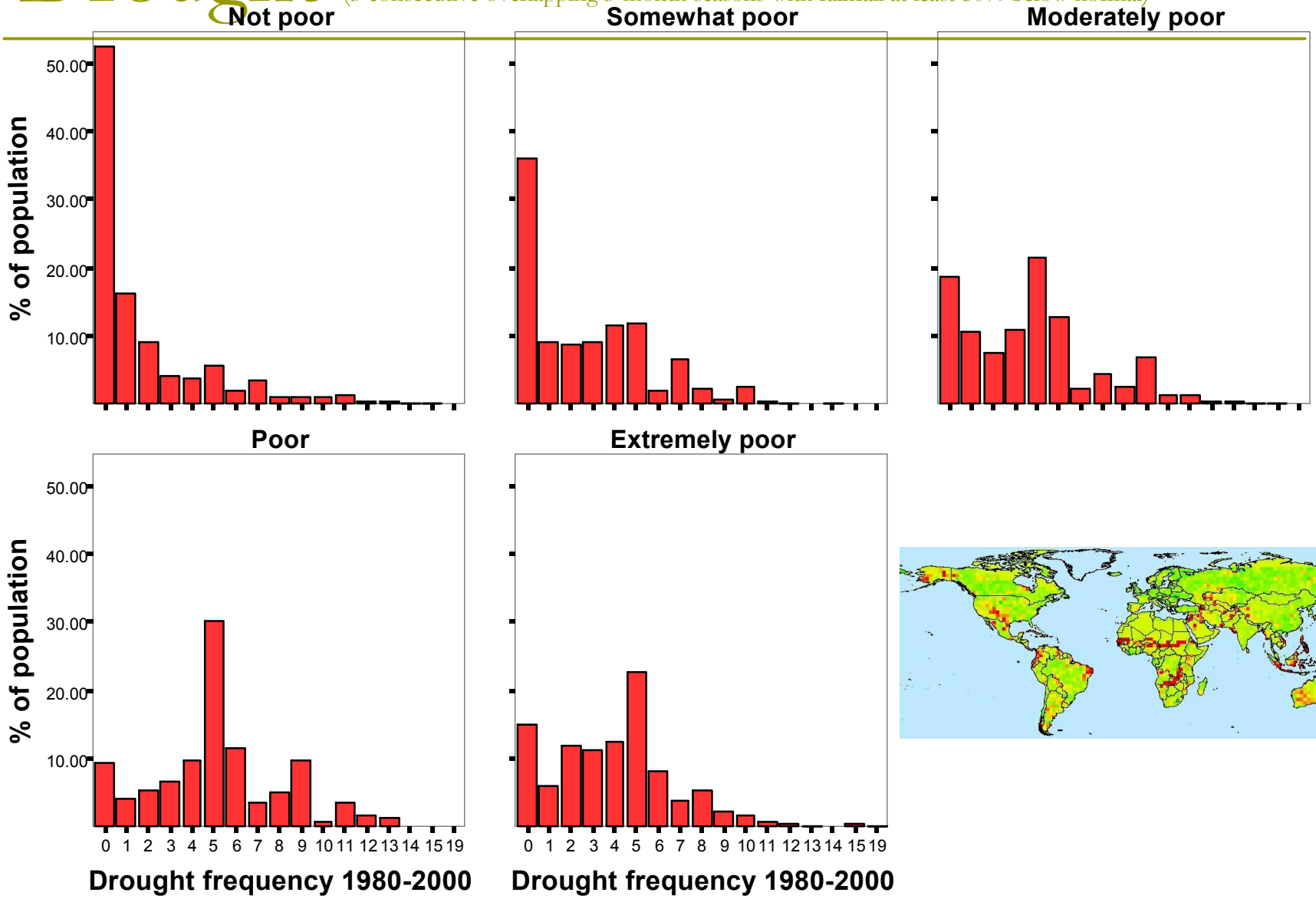
Poverty is a central component of vulnerability

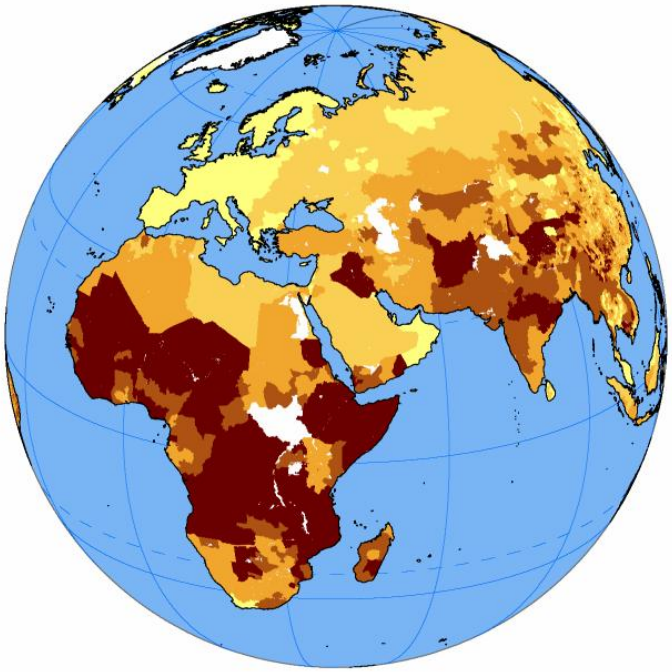
- Due to economic constraints, the poor are forced to live in precarious homes, made of flimsy, non durable materials, on the least-valued plots of land. They build their shacks on steep hillsides, on floodplains, in fragile ecosystems and watersheds, on contaminated land, and other inappropriate areas.

- Because of inadequate construction, their dwellings are particularly vulnerable; and when affected, they have insufficient savings to address the emergencies. Public assistance rarely compensates them for the resulting losses and dislocation. They are forced to reduce already inadequate levels of consumption. These disasters affect the poor's productivity and incomes. The collapse in employment caused by some disasters often forces the poor to emigrate in search of employment or to engage in illegal activities. During disasters, inadequate services and infrastructure further complicate survival efforts. Health risks are similarly accentuated.

Drought

(3 consecutive overlapping 3-month seasons with rainfall at least 50% below normal)

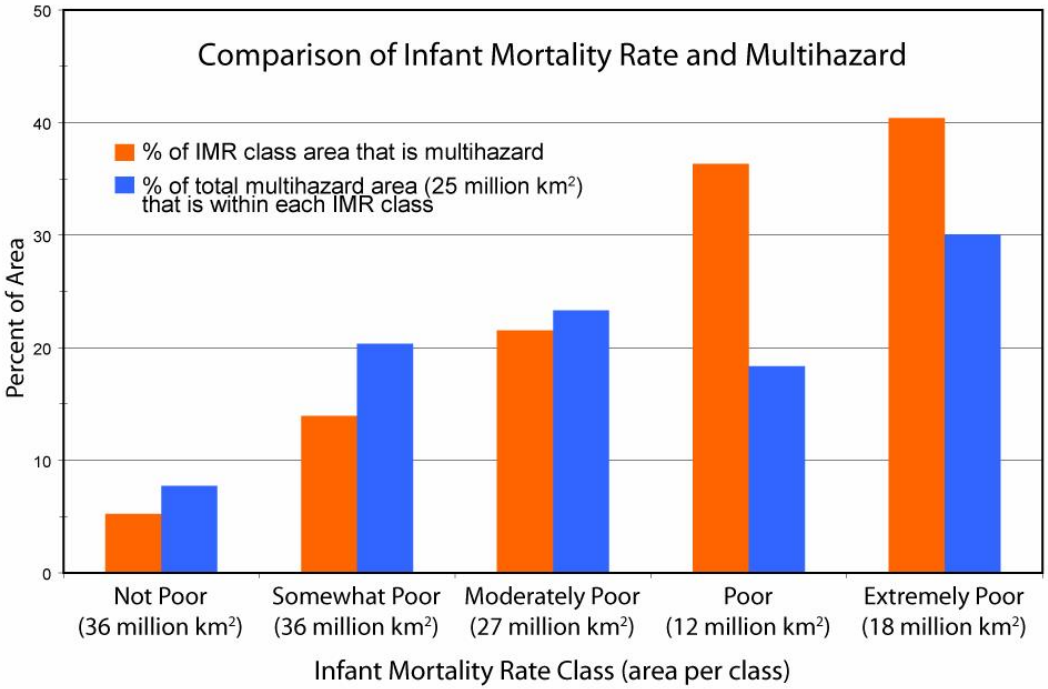


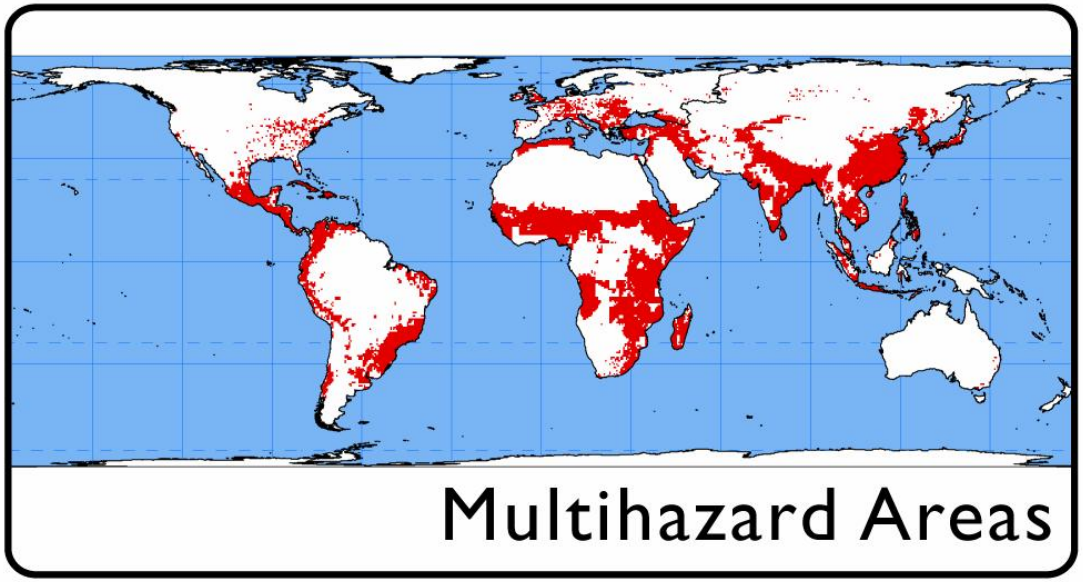


Infant Mortality Rates

(per 1,000)

Not Poor	1.9 - 15
Somewhat Poor	15.1 - 32
Moderately Poor	32.1 - 65
Poor	65.1 - 100
Extremely Poor	> 100





Multihazard Areas

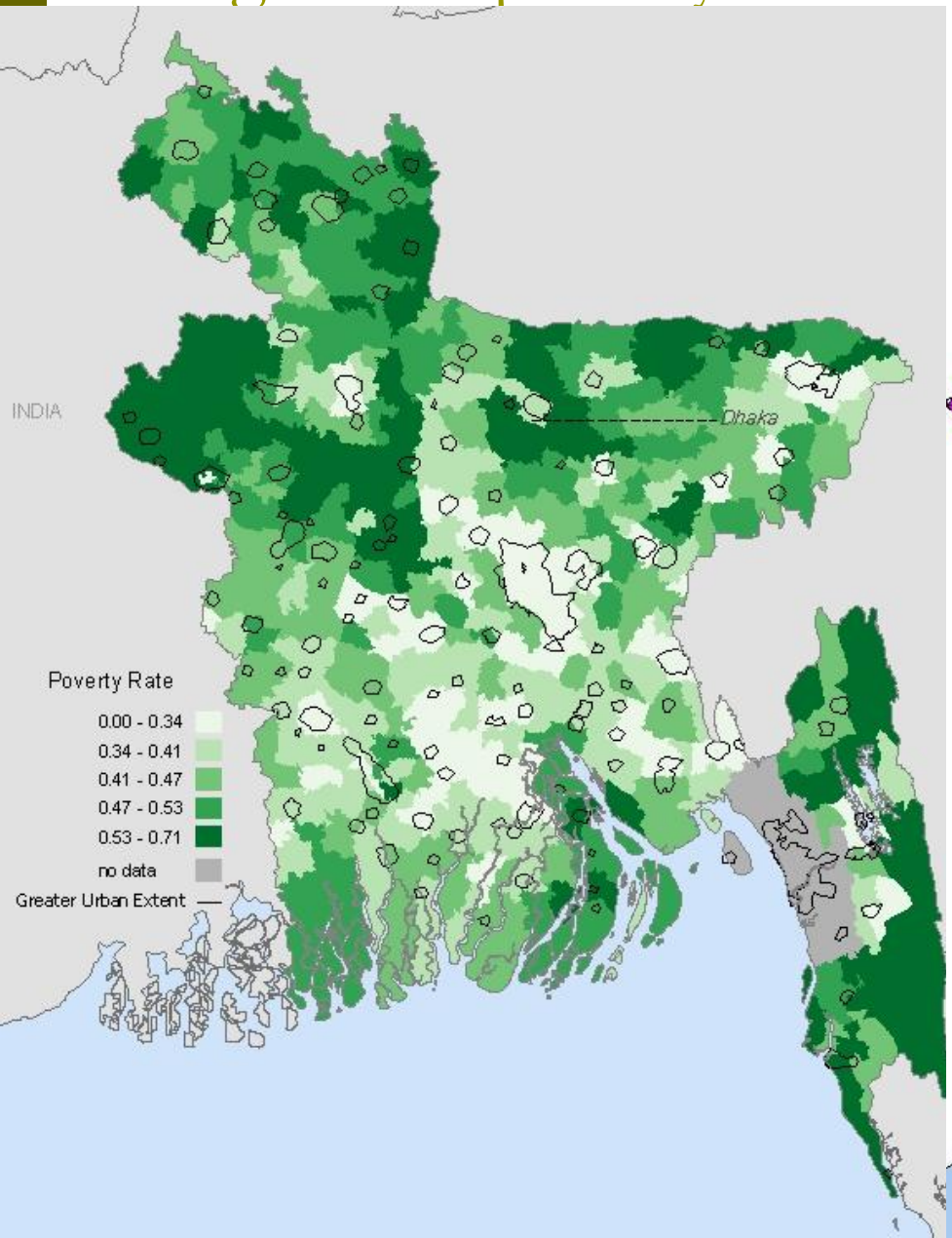
Case Study: Bangladesh

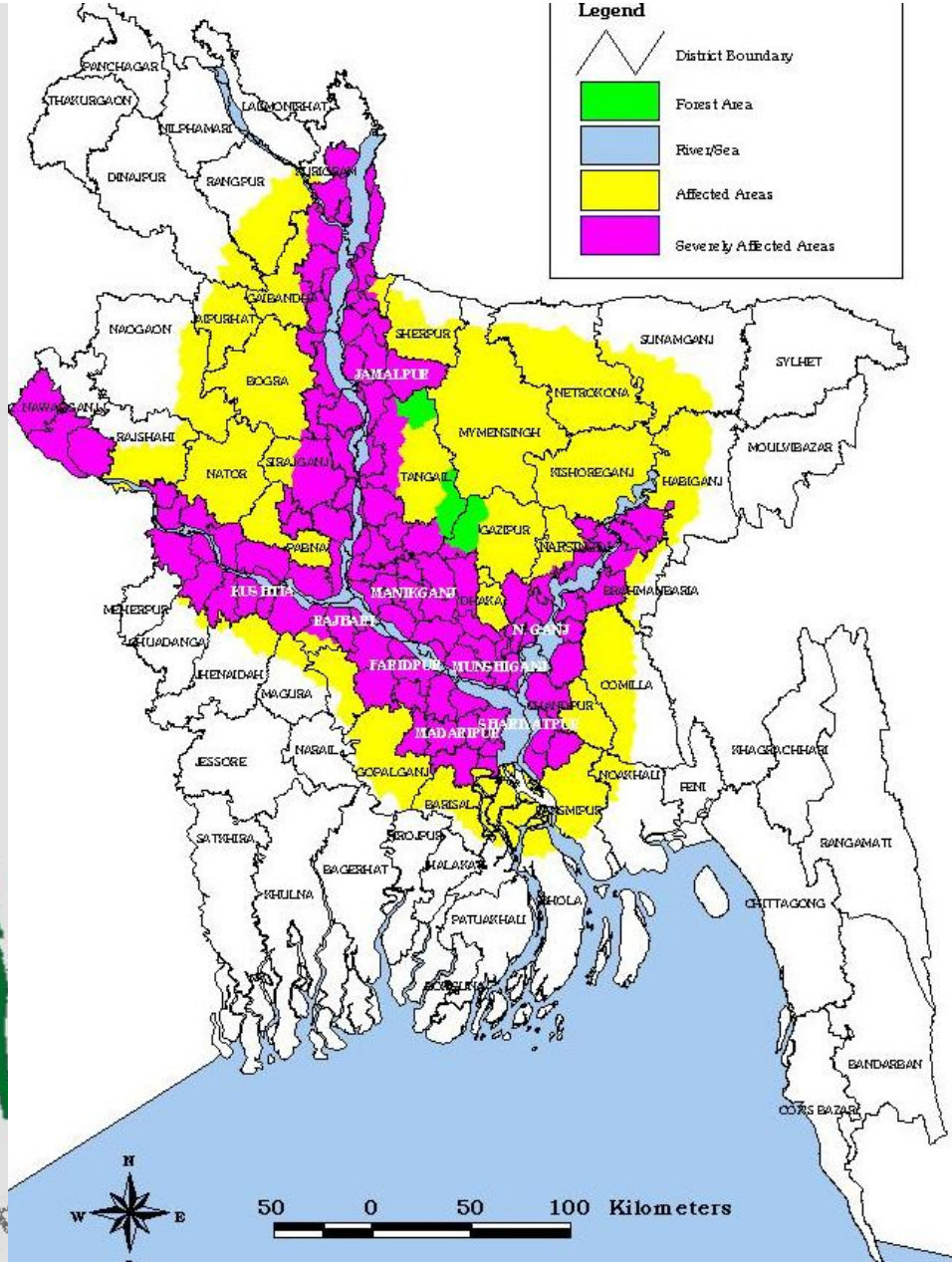
- Since independence in 1971 Bangladesh has endured almost 200 disaster events that have caused more than 500,000 deaths.

- Whilst tropical cyclones are the biggest killers, floods have by far the most widespread, prolonged and damaging effects (every year at least 21% of the landmass is flooded, during severe floods of 1998 the percentage rose to 68%, recently this figure has been exceeded).

- Most of the worst affected people are the poor from the rural areas, and include farmers, day labourers, rickshaw/van pullers, small traders or fishermen on the inland lakes and ponds, but there is a significant urban population whose homes are flooded and livelihoods damaged, particularly in Dhaka and Sylhet.

Bangladesh: poverty and flood affected areas





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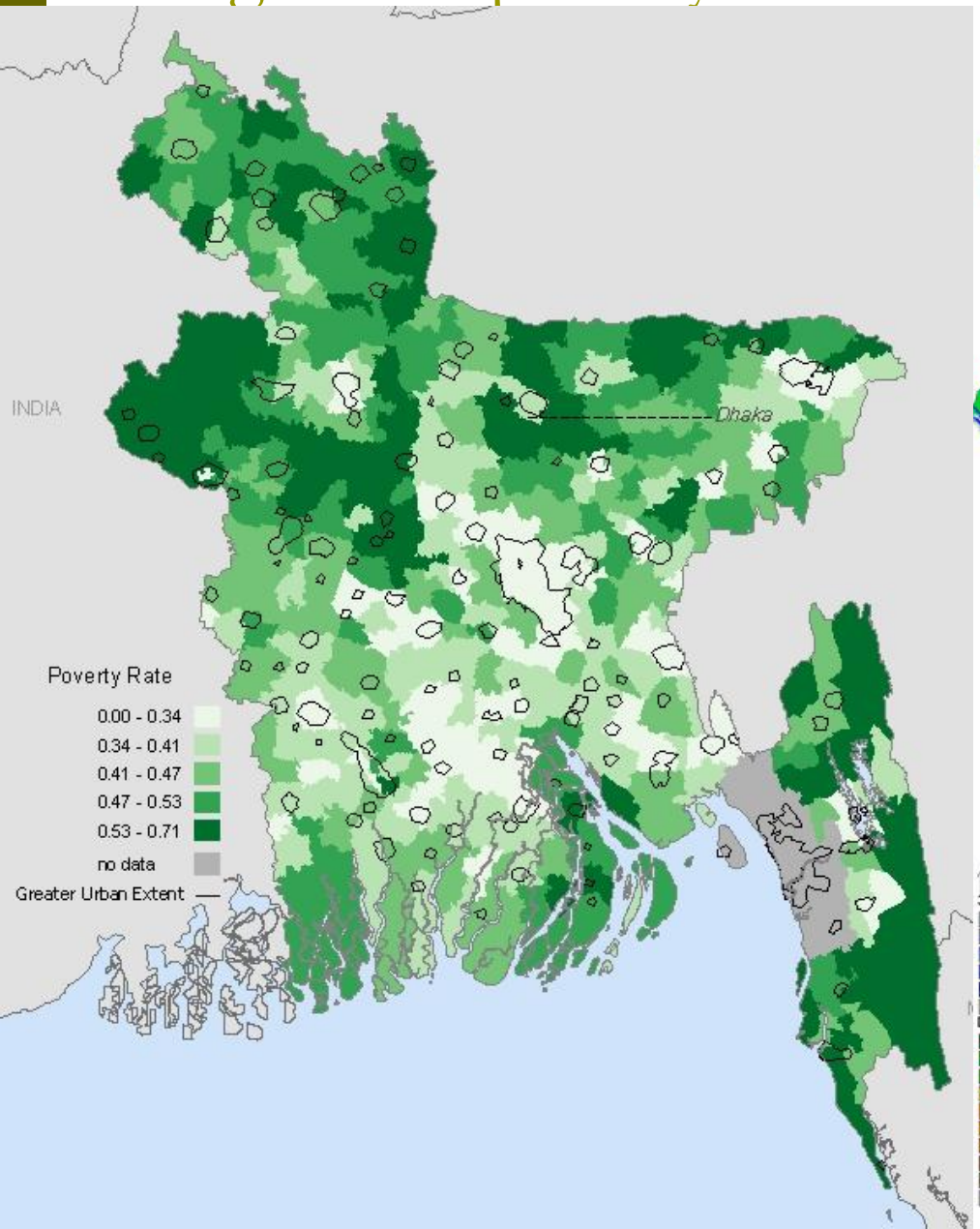
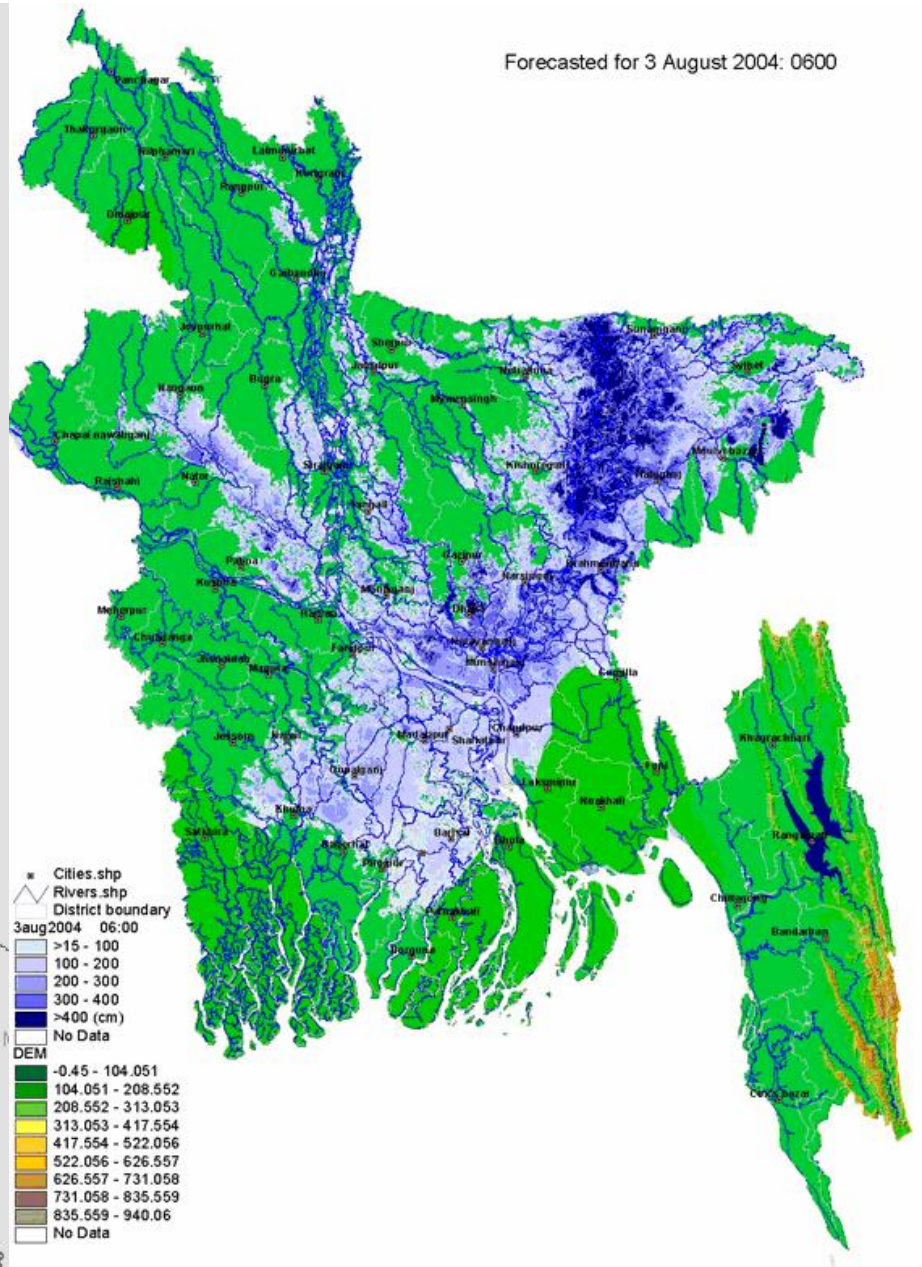




Case Study: Nicaragua

- Partly because of its geographical location, Nicaragua is affected by various natural calamities. Volcanic eruptions, hurricanes, earthquakes, droughts, fires, and floods are common periodic occurrences

- While these calamities often have an adverse impact on the overall economy, recent catastrophes (eg: hurricane Mitch) have shown that the poor are much more likely to be adversely affected than the non-poor.

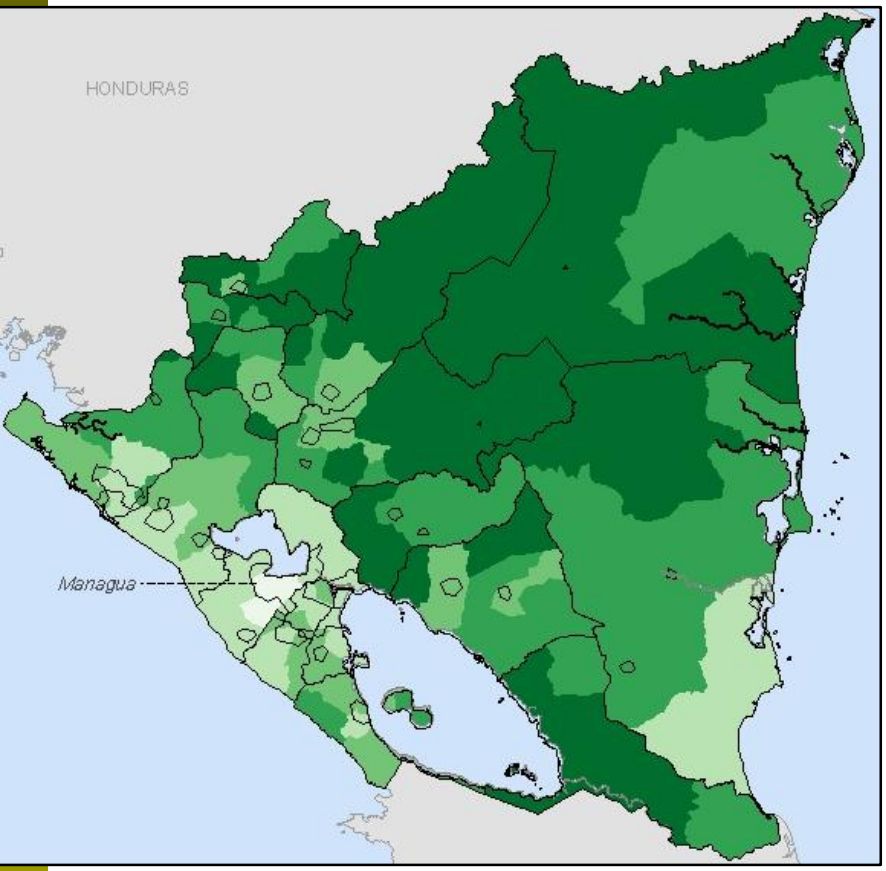
- According to the FISE (Fondo de Inversion Social de Emergencia) classification, of the 58 poorest municipalities in the country, 40 are located in the provinces worst affected by Hurricane Mitch

Nicaragua: Hazards Impact 1972-1998

Year	Type of Hazard	Deaths	Total of population affected
1972	Earthquake	10,000	400,000
1982	Hurricane Alleta	69	N/A
1988	Hurricane Joan	116	185,000
1992	Tsunami	116	13,500
1993	Tropical Storm Gert	13	62,200
1995	Heavy rains	32	1,343
1996	Hurricane César	9	N/A
1998	Hurricane Mitch	4,015 (.08%)	867,752 (17.8 %)

Source: Martine et al. (1999) Population, poverty and vulnerability: Mitigating the effects of natural disasters

Nicaragua: Poverty and Mudslides



Dark green indicates higher rates of poverty

Dark orange indicates areas affected by severe rains and mudslides in July 2004.

Creating Poverty Maps for Small Areas

Challenge…

- Main source of information on distributional outcomes -household surveys -permit only limited disaggregation.
- Very large data sources (e.g. census) typically collect very limited information on welfare outcomes.

Solution…

- Use statistical, small-area estimation (SAE), techniques
- Encouraging results to date (implementation in approx. 50 countries), but non-negligible data requirements

Basic Methodology

- Take unit record census and survey data, from a similar time period
- Using survey data, estimate a model, of a variable of interest (e.g. per-capita consumption); restricting explanatory variables to those that can be linked to households in survey and census.
- Plug in parameter estimates back into the census.
- Predict variable of interest (per-capita consumption), for each household in the census

Not necessarily "Maps"; rather, highly disaggregated welfare indicators

Measures…

- Poverty; Inequality, and Average consumption
- Calorie intake
- Under-nutrition
- Other indicators (health outcomes? life-expectancy?)
- Poverty of "statistically invisible" groups

Mapping Vulnerable/At Risk Groups

Proposal to Extend Analysis to estimate subnational distribution of at risk groups for small areas

- E.g. link demographic health survey data (e.g. vaccination rates, disease prevalence) to census records and generate small area estimates of at risk groups; which can later be linked to hazards data.
- And/or generate welfare indicators for sub-populations (disabled; non-wage earners, women, children, school age children, etc)
- And/or generate indicators scaled up to alternate geographies (i.e. not just aggregated to administrative boundaries, but other spatial extents)

Considerations…

- Data requirements: access to unit record census data; data from similar time periods

Thanks!