Demographic Differential Vulnerability to Natural Disasters
in the Context of Climate Change Adaptation

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Presentation at Wilson Center
October 23, 2014
Take-Aways

- People with different characteristics, like age and sex, are vulnerable in different ways

- People’s levels of education also makes a big difference

- Research knowledge about these “differential vulnerabilities” exists and policy choices should reflect this knowledge

- Many experts and a new data resource are available
Global Climate Change

- GHG emissions
- Consumption
- Technology
- Innovation

Regional effects on:
- temperature
- humidity
- extreme events (storms)
- sea-level rise

Differential vulnerability

Livelihood

Health/Mortality

Migration

Closing the full circle of population and climate change

By age, sex, level of education, place of residence, and household structure
Education and Differential Vulnerability to Natural Disasters

Guest Editors: William P. Butz, Wolfgang Lutz, Jan Sendzimir
Managing Editor: Stefanie Andruchowitz
1. Various types of outcomes investigated

**Pre-disaster**
- Risk awareness and understanding
- Disaster preparedness
- Living in low-risk areas

**Disaster event**
- Understanding of warning messages
- Evacuation

**Post-disaster**
- **Impacts**
  - mortality, morbidity
  - lost of livestock, damage to house
- **Coping strategies**
  - consumption migration, income diversification
- **Long-term**
  - Post-traumatic stress
2. Empirical evidence from different world regions, types of disasters, units of analysis

- **Unit of analysis**
  - Country
  - Community
  - Household
  - Individual

- **Disaster type**
  - Tsunami
  - Flood
  - Drought
  - Landslide
  - Hurricane
  - Cyclone

- **Country**
  - Asia
    - India, Indonesia, Nepal, Thailand
  - Africa
    - Sub-Saharan Africa, Mali, Senegal, Uganda
  - Central and South America
    - Brazil, Cuba, Dominican Republic, El Salvador, Haiti
3. Evidence that formal education reduces vulnerability

**Disaster mitigation**
- Less likely to live in high risk areas
- Higher awareness and understanding of risk in community
- Better access to information
- Better disaster preparedness

**Disaster impacts**
- Lower risk of mortality
- Lower incidence of malaria infection
- Lower loss of livestock
- Faster recovery from post-traumatic stress
- Less likely to be in temporary housing
- Less likely to involve in climatic-dependent economic activities → greater flexibility to diversify income-generating activities after disaster
- Less likely to adopt coping strategies that reduce human capital investment e.g. take children out of school
Special Issue in *Ecology & Society*: Education and Differential Vulnerability to Natural Disasters

**EDUCATION**
(Secondary-level plus)

- **Country-level**
  - Lower mortality
    - 1980-2010, 125 countries
    - Striessnig, Lutz and Patt (2013)
  - Better disaster preparedness & response
    - Cuba, Dominican Republic and Haiti
    - Pichler and Striessnig (2013)

- **Community-level**
  - Lower mortality & animal losses
    - 2000-2009, Nepal
  - Consumption and income smoothing
    - 2009-2011, Thailand
    - Garbero and Muttarak (2013)

- **Individual-level**
  - Higher disaster preparedness
    - 2012, Phang Nga province
    - Muttarak and Pothisiri (2013)
Data Explorer: A new resource

- Based on 500+ population experts’ input
- Provides population projections for 195 countries
- Six scenarios of fertility, mortality, migration and education
- Graphical presentation
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Go-To’s

• Special Issue of *Ecology and Society*, “Education and Differential Vulnerability to Natural Disasters”:  
  http://www.iiasa.ac.at/publication/more_RP-14-001.php

• IIASA’s new Data Explorer resource: 
  http://witt.null2.net/shiny/wittgensteincentredataexplorer/


• Bill Butz’s email:  william.butz@icloud.com