New Methods and Lessons for Science and Policy in Climate Change Adaptation

UNU Keystone Conference on Mapping Social Vulnerability

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Kyrgyz Republic Dashboard

Climate Future

Kyrgyz Republic

Overview | Climate Baseline | Natural Hazards | Climate Future | Impacts & Vulnerabilities | Adaptation

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At a Glance

Temperature	Expected to increase by 2060 ▲ 2°C by 2100 4-5°C
Rainfall	Runoff is expected to decrease ▼ 12%
Extreme	Summertime diurnal temperature ranges are projected to increase, suggesting a pronounced increase in maximum temperatures relative to minimum temperatures.

Key Climate Changes

- A increase in temperature coupled with a decrease in runoff will result in increased incidence of drought, heat waves and eventual crop losses.
- According to the Kyrgyz Republic's Second National Communication to the United Nations Framework Convention on Climate Change, a significant reduction in the country's glaciers and snowfields is projected, with significant implications for the country's water resources . As glaciers shrink, floods will ensue with greater intensity in some areas while water scarcity will become more acute in others .
- Low and mid-lying parts of central Asia are likely to gradually change into more arid, interior deserts with reduced glacial runoff.
- According to the Intergovernmental Panel on Climate Change's 4th Assessment Report, an increase in winter precipitation and a decrease in summer precipitation are projected for central Asia. The low resolution of available Global Circulation Models (GCMs), however, inadequately captures the topographic diversity and resulting precipitation dynamics across the Kyrgyz republic

in Kyrgyzstan, agricultural communities bear significant impacts and therefore need to be the focus of better assessment and planning.

Key Challenge for Kyrgyzstan: Improve food security--reduce vulnerability of agricultural communities to climate change.

To achieve this goal, *we must further shape science and policy thinking about the interaction between climate impacts and human society*.

Key Issues: What are the most effective approaches for government to use evaluate climate impacts, plan and address the impacts to agricultural communities?

For those of us in academia, how can we use these new tools for research to improve the country's knowledge base?

UNU Summer Academies: Social Vulnerability Risk Assessment, Climate Adaptation

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- Tools: Methods for research, assessment, and climate adaptation planning are being examined with traditional DRM—CRM methods are emerging. Various methods and approaches are being tested and used around the world, including here in Kyrgyzstan.

- These were explored at our UNU summer academies (2010-2012), and at a Keystone Conference convened by UNU and Munich Re Foundation -- experts and academics in hard sciences and social sciences.

The Conceptual Framework to Identify Disaster Risk

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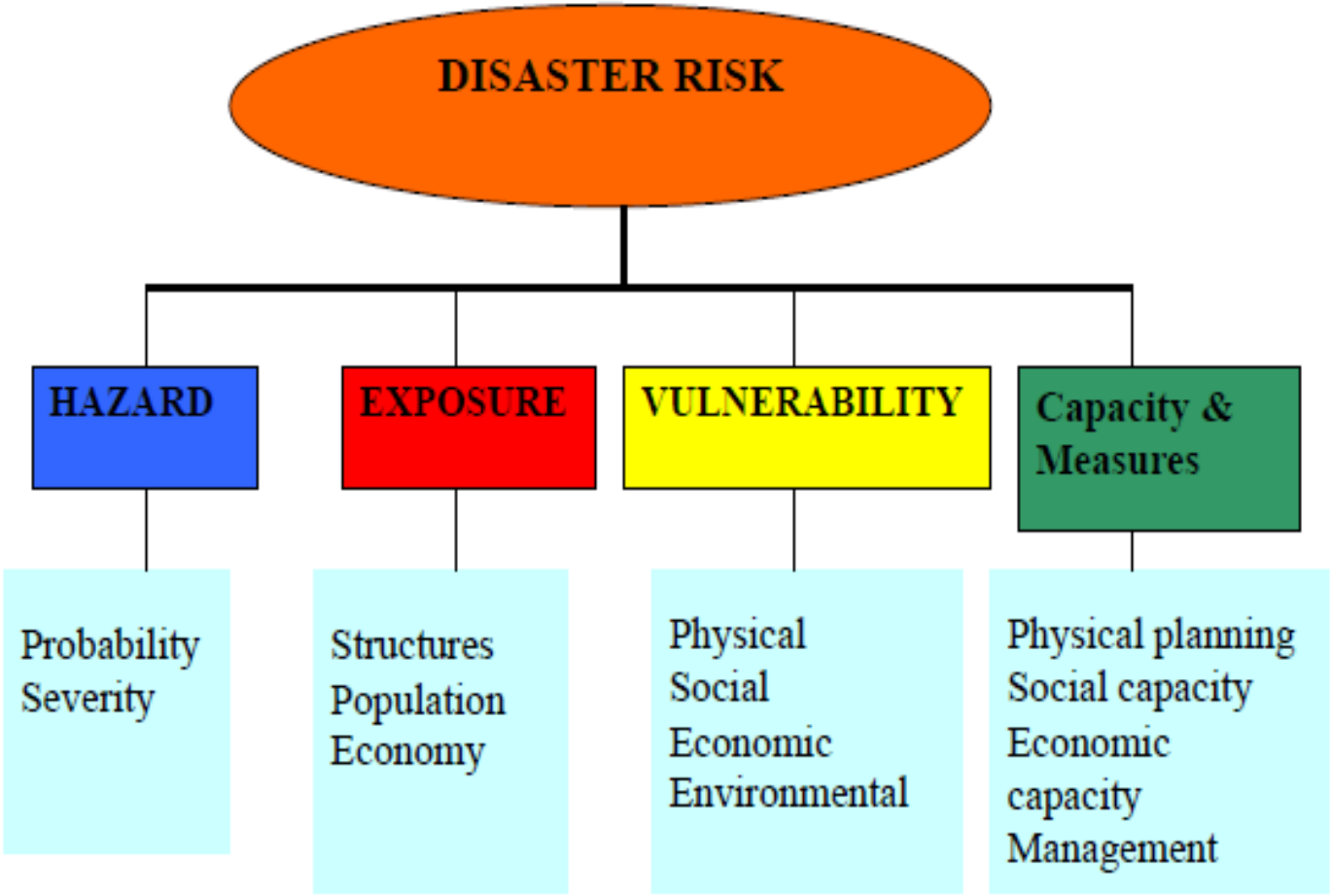

Source: Davidson 1997 : 5; and Bollin et al. 2003 : 67

Baseline Information for Climate Adaptation Planning and Risk Reduction

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- **Assessing vulnerability**. It has only been within the past decade that systematic measurements of what and who is vulnerable have been made (Birkmann, 2006; Cardona et al., 2012).
- **Building resilience**. Increasingly, there is a focus on the examination of community resilience to natural hazards in understanding how to reduce risk and losses from these events. It requires an understanding of the intersection between natural systems, human systems and the built environment.

The IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation

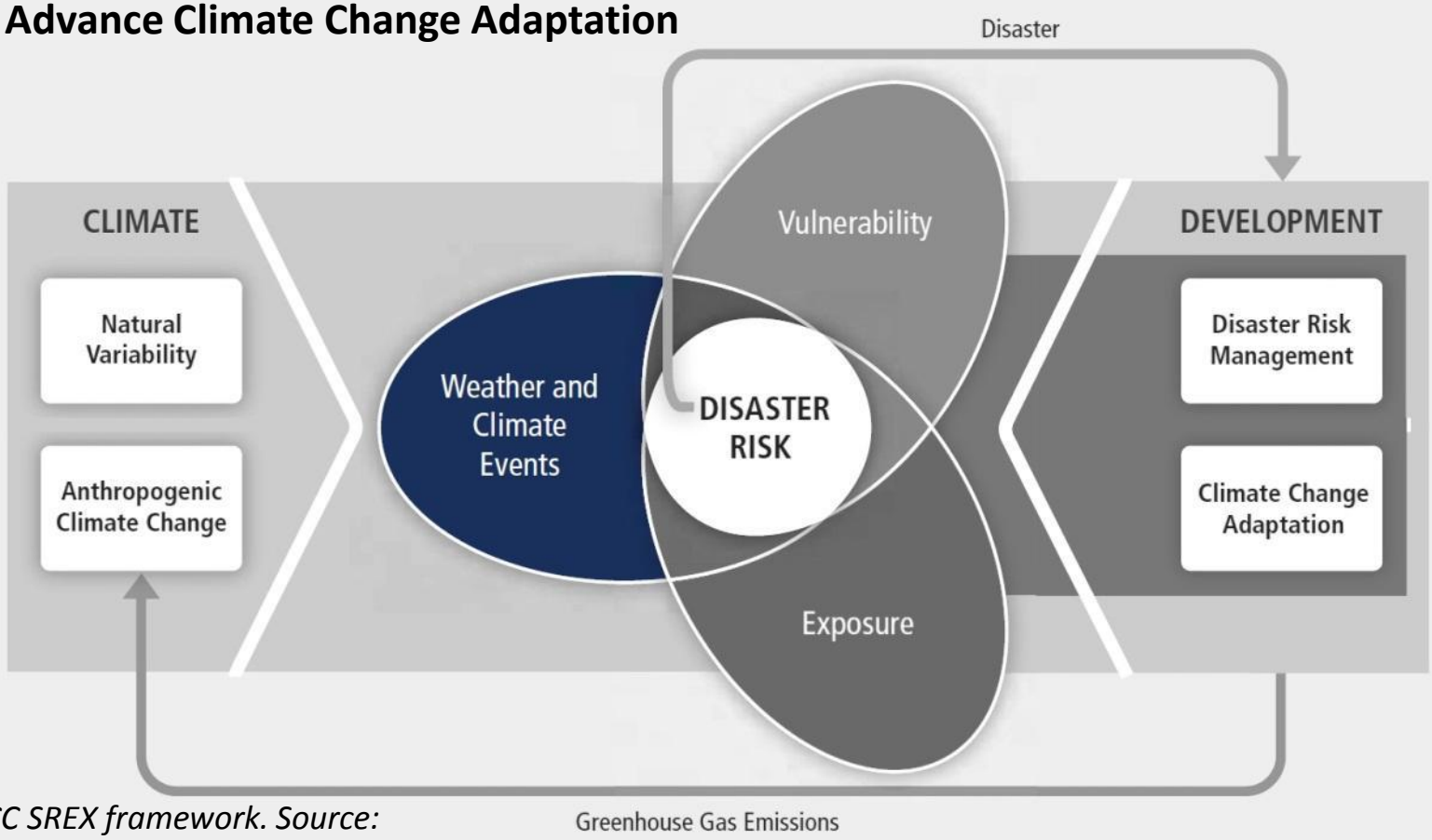
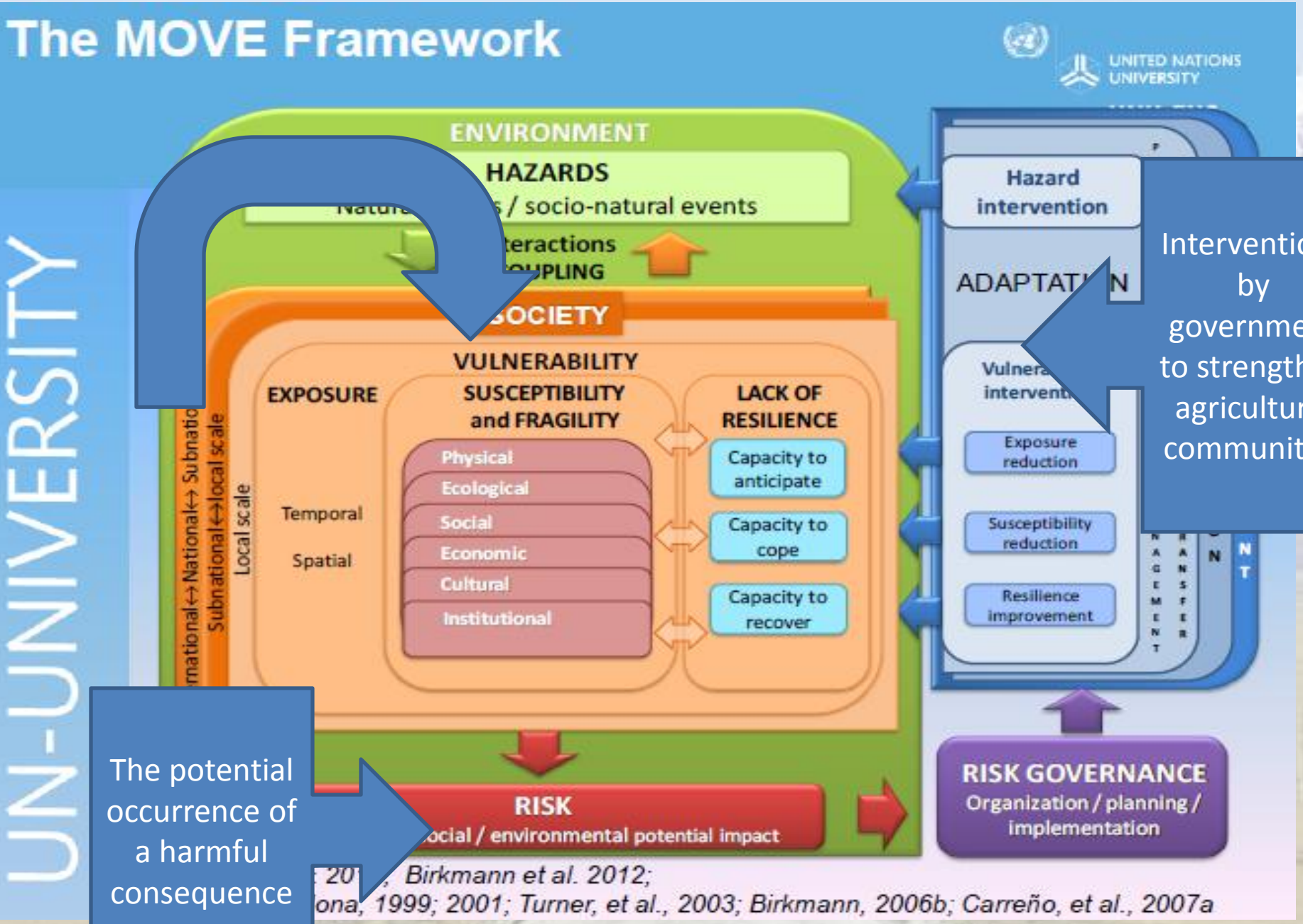


Figure 5. IPCC SREX framework. Source: IPCC (2012), modified

The MOVE Framework

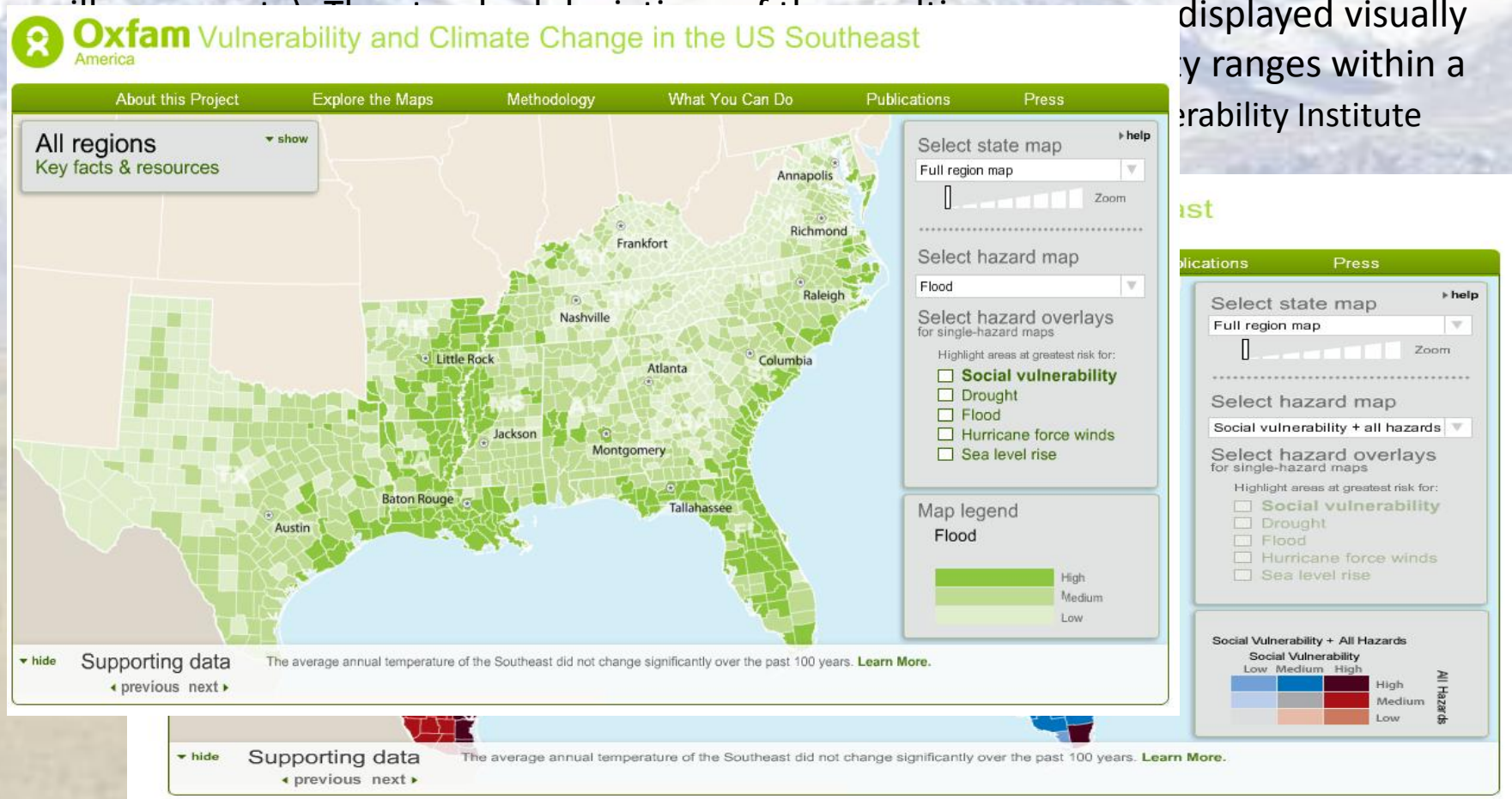


Interventions by government to strengthen agricultural communities

The potential occurrence of a harmful consequence

Social Vulnerability Mapping: SoVI Index

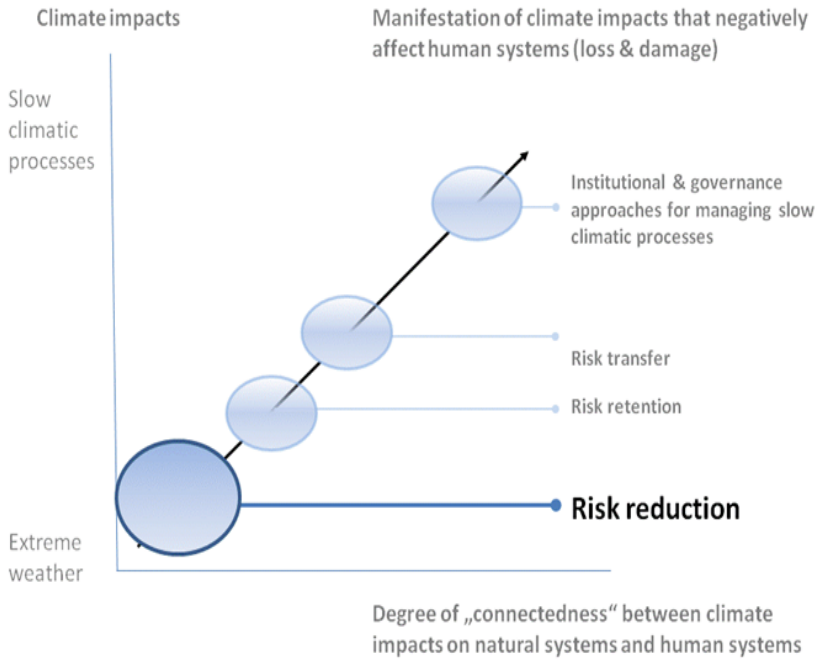
The Social Vulnerability Index (SoVI) is a well-established index method for disaster research to provide an objective snapshot of social vulnerability for a specified region. The index uses 32 variables of Census data to capture generic indicators of sensitivity, adaptive capacity, and social exposure. These variables are statistically integrated with hazards to create a single vulnerability score for a given census unit (ex. Census tract, displayed visually y ranges within a erability Institute



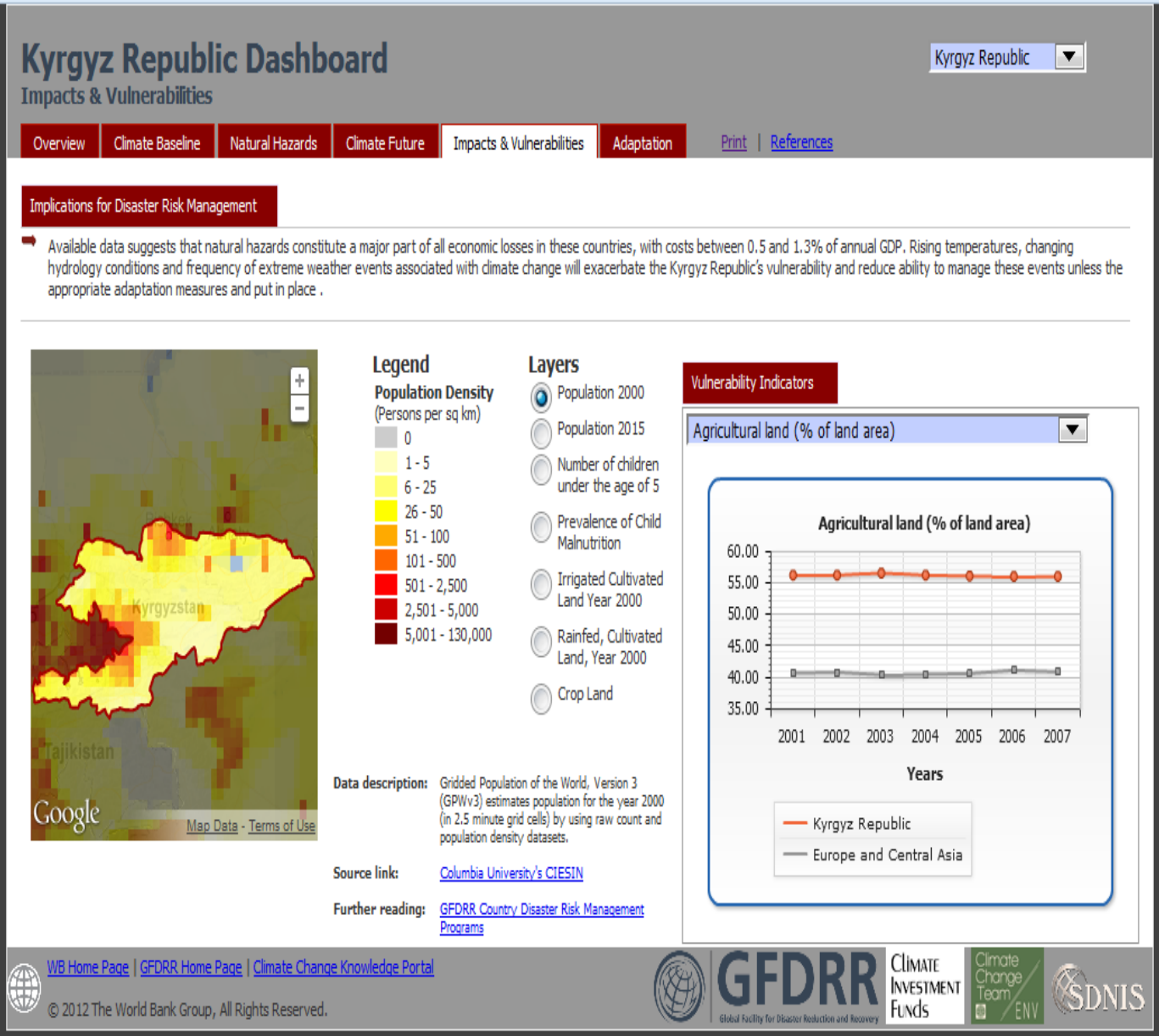
Understanding UNFCCC Loss and damage

"Impacts on human systems, channeled through the negative impacts of climate change on natural systems." UNU-EHS, Keystone Report

Glacial melt from climate variability may shift natural systems causing loss and damage in human systems, such as loss of arable land or freshwater.



Risk reduction measures could be applied with good results for things like frequent storms that may cause annual flooding, recurring small scale droughts, and regular wind storms that may cause minor damage.



More frequent extreme weather events due to climate change will increase the vulnerability of Kyrgyzstan and reduce ability to manage events unless appropriate adaptation measures are put in place.

Developing Better Data for Addressing Agricultural Risks: Surveys and Lessons from Pilot Projects in the Field

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AUCA TSPC Faculty Affiliates will be working with our partners at United Nations University to comprehensively document lessons from micro-projects.

- Enhance training materials of Agricultural Extension and Community Education
- Develop university curriculum that builds-in model practices for communities to better manage risk and adapt
- Advance national HH surveys to gauge coping strategies such as migration

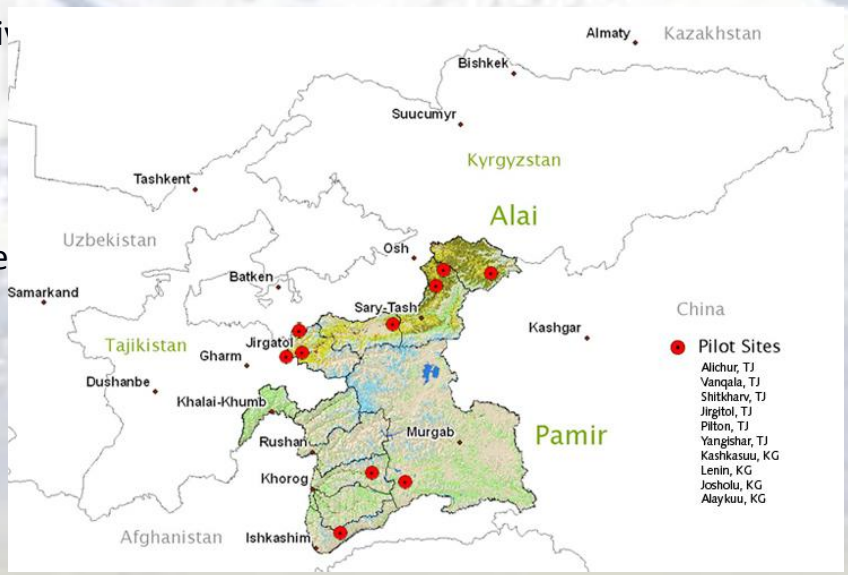
Sustainable Land Management in the Pamir-Alai Mountains (PALM)

Dr. Fabrice Renaud, Ms. Nevelina Pachova & Dr. Darya Hirsch
Institute for Environment and Human Security United Nations University

OBJECTIVES:

Environment: To restore, sustain, and enhance, the producti
and protective functions of the trans-boundary
ecosystems of the High Pamir and Pamir-Alai
Mountains, of Tajikistan and Kyrgyzstan

Developmental: To improve the social and economic well-be
of the rural communities and households



TIMEFRAME:

Preparatory Phase: 2001 - 2003
Project Dev. Phase (PDF-B): 2004 – 2006
Full Project Implementation: 2007 – 2011

PARTNERS: Main Donor: Global Environment Facility (GEF)
GEF IA: United Nations Environment Programme (UNEP)
GEF EA: United Nations University (UNU)
Tajikistan: Committee of Environment Conservation, MSDSP, Soil Institute, Pamir Biological Institute, 2 NGOs
Kyrgyzstan: National Center for Mountain Region Development (NCMRD), Osh University; CAIAG, RDF, KG GIS
International: Center for Development and Environment (CDE), University of Bern; Agricultural Law Center, University of New England (NE), Australia; Hokkaido and Nihon Universities, Japan, IAEA, Austria, Odessa Center, UK

Micro-projects @ PALM Sites

	Josholu	Lenin	Kashka suu	Alaiku	Vankala	Shitharv	Alichur	Jirgital	Pildon	Yangishar
(Re)construction of irrigation channels and water pumps										
Demonstration of compost-making										
Growing early vegetables in green-houses										
Cultivation of garlic										
Establishment of orchards with new fruit varieties										
Improved fodder crop cultivation										
(Re)constructions of pasture infrastructure (roads, bridges, stables, irrigation canals)										
Improvement of livestock breeds (sheep, yaks, horses)										
Afforestation and controlled use of existing forests										
Ecosystem conservation through fencing and controlled use of resources within protected areas in the vicinity of settlements										
Alternative income generation (hen breeding, bee-keeping, trout farming, yurt and handicrafts production, eco-tourism)										
Alternative energy (solar panels, solar water heaters)										

Poverty Reduction and Food Security through SLM

Implementation of Targeted Micro-Projects

- **PASTURES**
  - Fencing of pasture areas (KG)
  - Construction or repair of roads and bridges to pastures (TJ)
  - Construction of stables on summer pastures (TJ)
  - Construction of irrigation canals for pastures (TJ)
  - Fodder crop cultivation (KG and TJ)
- **BEEKEEPING**
  - Alternative income generation (bees, fisheries, new breeds, tourism-KG)
  - Establishment of plantations with fast-growing trees for incom
  - Provision of solar panels to poor families (TJ)

Recommendations to Improve Kyrgyzstan's Capacity to

- Develop national strategy for adaptation that includes livelihood improvements in rural areas and broad public awareness and community involvement—this will give national ministries better information and assure $ spent on adaptation programs have higher potential of success.
- Examine and identify an appropriate conceptual framework for better understanding and identifying where Kyrgyz agricultural communities are most vulnerable to environmental change from climate shocks---consider establishing **climate related social vulnerability indices** at multiple spatial scales that can be used by national policy makers and community decision makers.
- Put resources and funding into partnerships with universities and research institutes to collect new data and help improve data availability---this will help overcome today's serious data limitations (it is an ongoing challenge to find, improve, and create appropriate source data sets as well as documentation).
- Better engage with data/indicator developers and users for mutual benefit; and
- Encourage greater input from the Earth observation and other professional communities.

THANK YOU FOR YOUR ATTENTION

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