

Coping with climate change vulnerability
- issues related to development and agricultural
linkages in developing countries

Sara Trærup

Department of Geography and Geology,
University of Copenhagen, and
UNEP Risø Centre, Risø DTU

Outline

1. Introduction

Vulnerability

Assessment of vulnerability

Adaptation

Adaptive capacity

2. Climate change and sustainable development

Limpopo, Mozambique 2000

3. Climate change and agricultural linkages

4. Research project

5. Sum up

Does climate change adaptation matter

to drill a well..

Vulnerability

“the degree to which geophysical, biological and socio-economic systems are susceptible to, and unable to cope with, adverse impacts”

IPCC 2007

The vulnerability of a society is influenced by its development path, physical exposures, the distribution of resources, prior stresses and social and government institutions

Assessing vulnerability

Vulnerability assessments:

origin in impact assessments

who is vulnerable,

to what and why

assessments of vulnerability should

- take into account context and scale
- address adaptive capacity

Vulnerability

Who is likely to be vulnerable?

- few resources
- high dependence on natural resources
- income diversification is low
- low quality infrastructure
- live in marginal areas and can be isolated in longer periods with flooding
- no insurance in case of disasters, crop failures,..

Adaptation

”Actual adjustments, or changes in decision environments, which might ultimately enhance resilience or reduce vulnerability to observed or expected changes in climate”

IPCC 2007

Sustainable adaptation involves measures that specifically target the interface between poverty and vulnerability:

- climate risk
- adaptive capacity of the poor
- causes of vulnerability

Adaptive capacity

A general assessment of the determinants of adaptive capacity to climate change includes:

- wealth
- technology
- education
- information
- skills
- infrastructure
- access to resources
- management capabilities

Climate change and sustainable development

Previously addressed as risk management according to

- –early warning and evacuation procedures for flood situations
- –technical or sectoral adjustments to specific climate parameters

Climate change should be approached as a development problem

climate change variability, extreme events and structural changes have major impacts on economic, social, and human living conditions as well as on natural systems

Climate change and sustainable development

Key development-climate links include aspects like:

- Economic development goals such as growth, investments and employment.
- Income generation and distribution.
- Water access and affordability.
- Food access and affordability.
- Energy access and affordability.
- Health status and services.
- Education

Limpopo, Mozambique year 2000

Reconstruction of infrastructure relied on historical climate data

- roads, assumed a 1-in-20 year flood
- bridges, assumed a 1-in-40 year flood

- Significant changes in timing and magnitude of water runoff will increase the frequency and scale of flooding.

- High risk of mal-adaptation to climate change

- inefficient investment

Climate change and agriculture

Main vulnerabilities in the agricultural sector are affiliated to weather and price fluctuations.

Climate change will increase uncertainty and thereby enhance vulnerability in the agricultural sector

Large dependency on rain fed agriculture (over 95 percent) and thereby a high reliance on rainfall.

In Africa 60 – 70 % of the population is dependent on the agricultural sector for employment

→ 45 % of GDP in Tanzania

Climate change and agricultural livelihoods

Farmers are especially vulnerable to

- recurrent drought events
- floods
- soil degradation
- water supply shortages

Farmers are vulnerable because of

- limited availability of inputs and improved seeds
- few technology options
- limited infrastructure and access to markets
-

Impacts on rural households

Climate change will have profound effect on crop yields, live stock and water availability

- decrease in crop yields
→ income, food intake
- decline in conditions for keeping live stock
- increase in demand for man power, e.g. preparing fields, fetching water
→ decrease in leisure time, decline in educational attainment for children

already adaptations to local environments

willing to make further changes to increase the benefits if..

- no unacceptable risk of crop failure and
- clear benefits should be visible

Existing strategies include

agricultural intensification, use of natural fertilizer, soil and water conservation,
crop diversification, and income diversification

PhD research

Little systematic research in the area of adapting to climate change (and increased climate variability) in the agricultural sector in developing countries

Focus on the implication from increased climate variability on small farmers and explore potential implications on household welfare

- and potential adaptation measures, i.e. improved information on seasonal forecasts

PhD research

objectives

explore

- the factors that determine vulnerability of agricultural households,
- the implications from increased climate variability on these factors
- the effect from these changes on household welfare

?

1. what constitutes vulnerability of agricultural households in the research site
2. how does increased climate variability affect this vulnerability
3. and what are (if any) the implications on rural households welfare

PhD research

- Site: **Kagera region, Tanzania**

cc:

increase periods between precipitation

increase incidence of dry spells with almost no rain during dry seasons

increase in events with high intensity precipitation during rainy seasons

Kagera is one of the poorest regions in Tanzania

- 90 percent of the population depends on agriculture, livestock and fishing for subsistence and income
- 4 agro-ecological zones

Socio-economic data, climate data, agricultural data

Sum up

- Climate change should be approached as a general development problem and integrated into a wide range of areas
- Assessment of vulnerability should be context specific
- Climate adaptation does matter
- Poor farmers are risk averse
 - risk of adapting to climate change should be minimal
 - benefits shall be clear
- need for more systematic research on climate change impacts on vulnerability of small farmers and the welfare of rural households

