Coping and Adapting to Climate Change—Andean Communities’ Experiences

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Overview - Outline

• How does climate (variability and change) impact on the livelihood strategies of rural communities of the Andes. Place/time and market articulation dimensions.
• The nature of climate change in the Altiplano, and the SANREM CRSP – LTRA 4.
Sources

- Small Ruminant Collaborative Research Support Program – drought
- NOAA – Climate variability and HH welfare in the Andes – livelihoods and access to information
- Coping with ENSO in Peru – place, presentation of event, and strategies CIP-MU-WB
- Adapting to Change in Vulnerable Ecosystems – Practices and Strategies SANREM CRSP
Sites

• Rural communities representative of different livelihoods and production systems
• Levels of elevation and nature of climate event
• Impact by climate events and market integration
The time dimension of climate impacts in the Andes

• Climate variability - inter annual variability & spatial variability
• ENSO (El Niño Southern Oscillation) - spatial variability
• Climate trends – the past 30 years - spatial variability
• Climate Change 2030-50 and 2099, global models – Altiplano grid (Seth and Thiebault 2008)
Southern Peru – Participatory Rural Assessment

Communities represent ethnicities, agroecosystem and productive diversity of Peru’s Altiplano

- Dairy Cattle
- Lake, Crop Livestock Q
- Mainly Crops, Some Livestock
- An. Livestock Crop PS
- SM. Crop Livestock
- Lake, A. Crops and Informal Trade

Southern Peru – Participatory Rural Assessment
Central Altiplano Bolivia

BOLIVIA
Four rural communities
3,770 - 4,070
Northern Bolivian Altiplano

Four Communities
3850 - 4300
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Participatory Workshop Methods

Large Groups

Focus Groups

Time Line Development

Participatory Mapping

Community Participatory Assessments
Climate Events: Impacts in the South

- Spatial variability in the presentation of droughts, floods, frosts, and hail events
- Droughts during Niño years, in some but not all communities in the same year
- Floods during wet years from the Lake
- Upper respiratory diseases during cold spells
- Concerns vary according to location, production activities, technological alternatives: loss of animals, loss of crops, raw materials
FINDINGS

Multiple Shocks
Covariant risks

Southern Highlands
Rural Communities

Droughts
Frosts
Floods
Hail
Snow
Place Matters in coping and adaptation

Climate  Agroecology and Institutions
Coping Strategies

In the Northern Region
• Selling of livestock
• Over-harvesting in dry forest - deforestation
• Collective strategies during floods
• Individual strategies during droughts
• Migration of adult males and youth to the jungle and the coast

Southern Altiplano
• Selling of livestock
• Selling of wool and handcrafts
• Stinting on food in the family
• Informal trade
• Migration of male adults and youth
• Non market institutions: access to land, seed, labor (social reciprocity relations)
Barriers to Adaptation

In All Communities
- Limited understanding and access to local and regional governance structures
- Progressive loss of assets trap
- Lack of access to credit
- Lack of insurance mechanisms
- Lack of technological alternatives
- Lack of trust in information of forecasts
- Erosion of social structures due to migration (local knowledge)

In the Altiplano
- Multiple and consecutive shock events- uncertainty
- Lack of understanding of presentation of the hail, frost, and flood events: landscape

In the North Coast
- Isolation during periods of drought
- Flood relocation conflicts
- Long periods of stress during dry years
Role of Climate Information

Information About El Niño

- Awareness and trust in the North;
- Radio is a trusted source; official forecasting sources “not trusted”;
- Scale is a constraint in the forecasts for the Altiplano region;
- **El Niño forecasts listened to in radio in the Altiplano perceived as “belonging” to the coast;**
- While a connection between El Niño and drought occurrence appears to exist in the Altiplano … multiple shocks

Local Knowledge Indicators

- Local scale biological and physical indicators in the North and the Altiplano
- Perceptions that climate is changing, difficulties “reading” the indicators
- Local knowledge exists for agriculture and fisheries
- Loss of knowledge among the youth
- Use knowledge differs between the North and the Altiplano
Main constraints to the growth in agricultural production after el Niño in the Altiplano:
- Lack of seed in all groups
- Lack of cash in the agricultural and passive
- Lack of more land on the agricultural and passive

Sources of information about climate forecasts for decisions in agriculture:
- Local knowledge systems
- Local networks
- Limited outside sources of information – only 4%

Concern with climate risk is a function of ability to cope with shock – there are differences across various types of producers.
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SANREM CRSP LTR4
Adapting to Change in the Andes

Practices and Strategies to Address Market and Climate Risks in Vulnerable Ecosystems

Transitioning to climate resilient livelihoods
Adapting to Change

Five Objectives -

– Shared understanding of drivers of change in Andean Ecosystems
– Local knowledge perceptions of risks and changing knowledge
– Practices and information that explicitly link local and new knowledge
– Strategies for market integration and institutions that contribute to adaptation - biodiversity
– Build capacities and capabilities – pathways to enable agency

Multiple Disciplines – Communities - Stakeholders
Hypotheses on the current state and its drivers
- Pests
- Soils
- Biodiversity
- Local Climate
- Local Markets
- Livelihoods

Secondary research is used to fill in the gaps in primary research as needed for each site.

Transformative Hypotheses
- Bridging knowledge systems for change
- Building coalitions to implement change
- Risk and dread and ability to act
Integrating knowledge systems
Linking Knowledge: Maps – Land Cover, Land Use Change, and Vulnerabilities

Erosion, Drought, Frost

VULNERABILITY

BEFORE

AFTER

VULNERABILITY

Erosion, Drought, Frost
An Integrated Plan for Participatory Research and Evaluation of Impacts

Participatory Approaches: a. To identify concerns, demands, perceptions, risks, and vulnerabilities; b. To conduct research; c. To share findings (socialización)
Research Areas

• Climate trends and change
• Soils, plant biodiversity, and systems
• Dynamics of pests and diseases
• Dynamics of markets and livelihoods – landscape analysis
• Local and New knowledge system integration
• Human Agency and coalitions - Integrating stakeholders
Lessons to Date

• Climate impacts on livelihood assets and ability to recover – Variability

• Land fragmentation and shocks – off farm income and nature of migration

• Markets have multiple effects:
  – Price incentives are mediated by natural capital access
  – Incentives can lead to increase vulnerability to climate
  – Coping with shocks – asset depletion – lack of contingency markets – high covariant shocks
  – Identify niches that value biodiversity
Lessons to Date

• Knowledge systems - information in decisions mostly local knowledge; dimension of expected changes in ecosystems require new knowledge
• Approaches to integrate new knowledge – climate and participation
• Social and political capitals as elements of agency for adaptation
Thank you

Questions