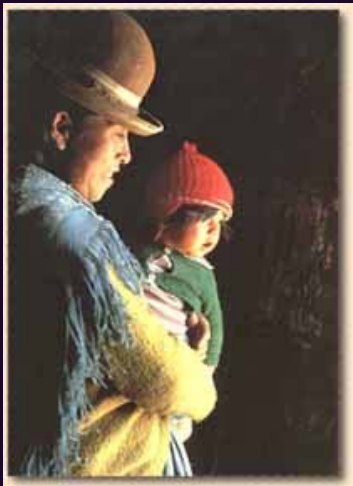


# Coping and Adapting to Climate Change—Andean Communities' Experiences

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The Asian Development Bank  
Manila, The Philippines  
May 22, 2008



# Acknowledgements

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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

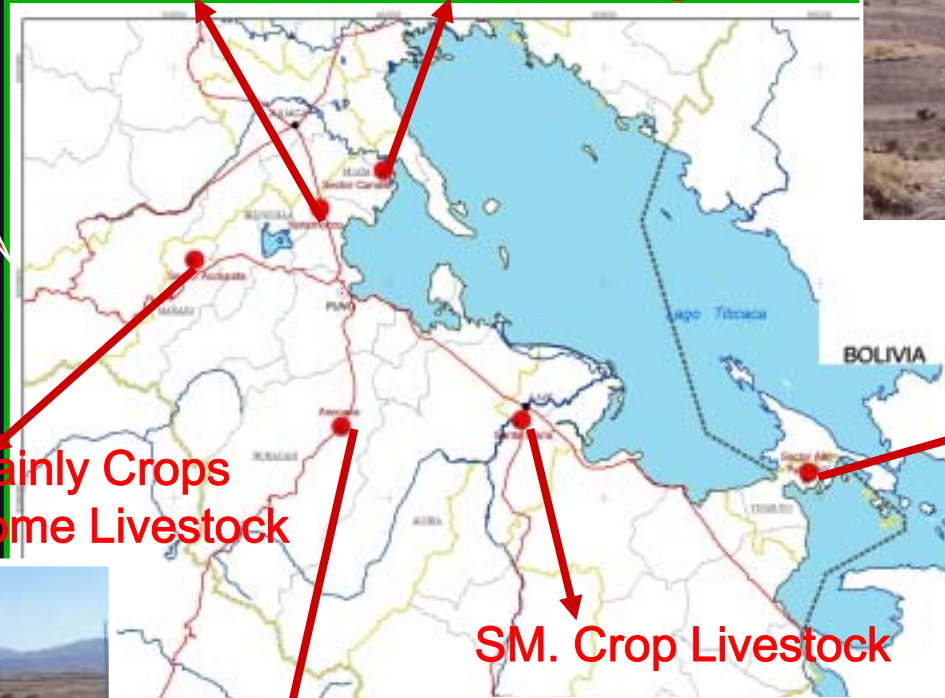
Lake, A.  
Crops and  
Informal Trade

SM. Crop Livestock

An. Livestock  
Crop PS



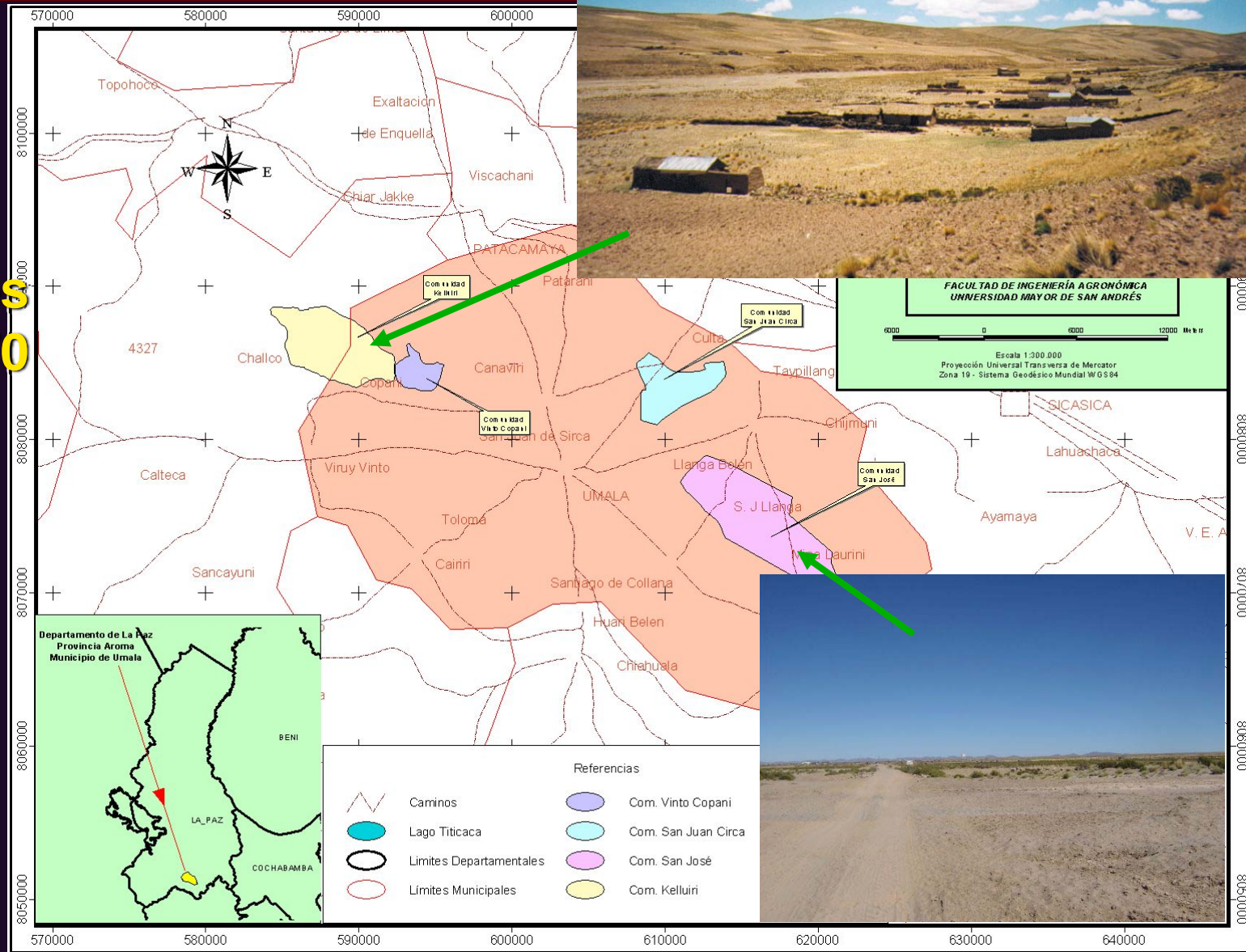
CIP-MU CIRNMA  
WB





# Central Altiplano Bolivia

**BOLIVIA**  
**Four rural**  
**communities**  
**3,770 - 4,070**

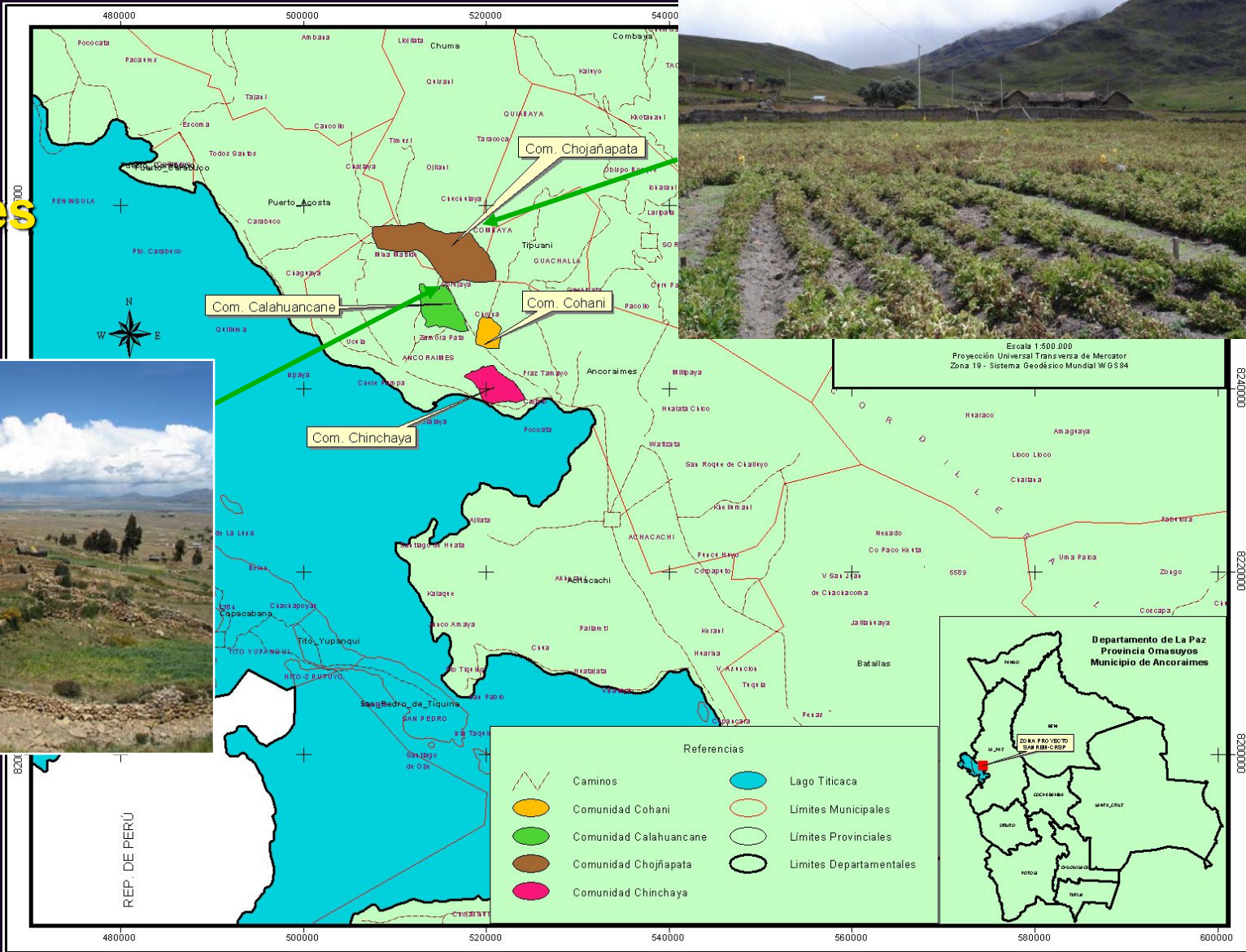


**SANREM CRSP**



# Northern Bolivian Altiplano

**Four  
Communities  
3850 - 4300**





# Southern Altiplano Peru

## SANTA MARIA



## APOPATA



4,400m



3,900m

NOAA HD and  
SANREM CRSP

# Overview

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# Participatory Workshop Methods



Large Groups



Time Line Development



Focus Groups



Participatory Mapping



Community Participatory Assessments

# Climate Events: Impacts in the South



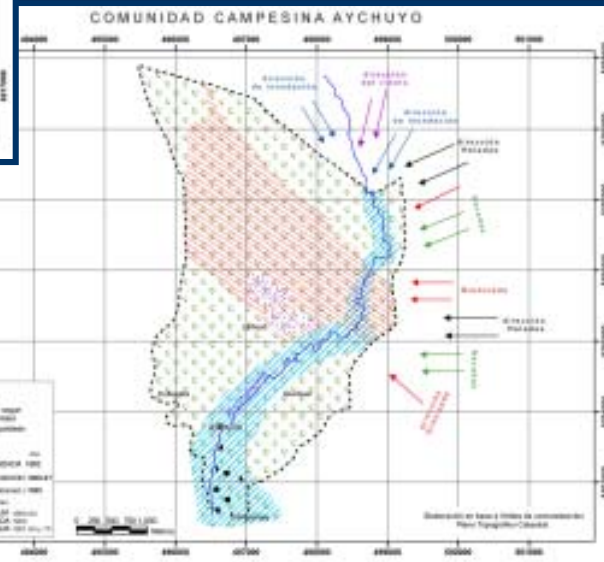
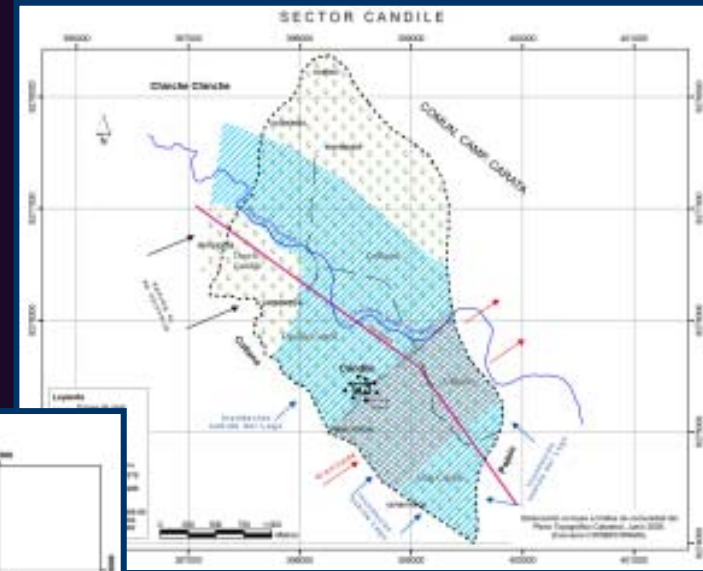
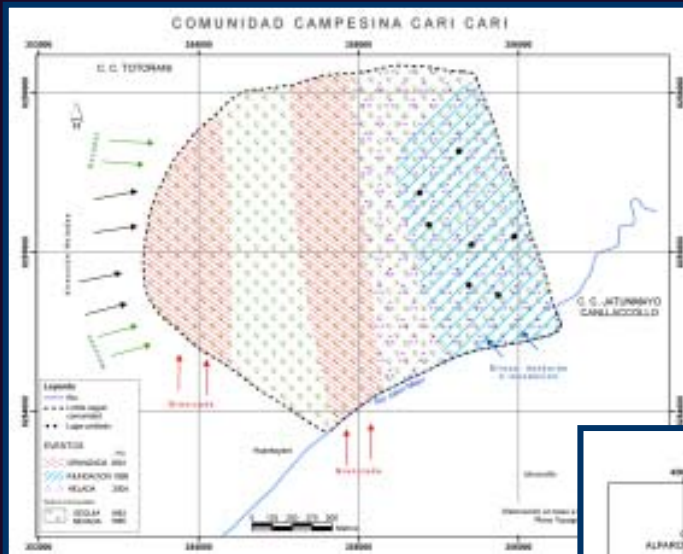
- Spatial variability in the presentation of droughts, floods, frosts, and hail events
- Droughts during Niño years, in some but not all communities in same year
- Floods during wet years from the Lake
- Upper respiratory diseases during cold spells
- Concerns vary according to location, production activities,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

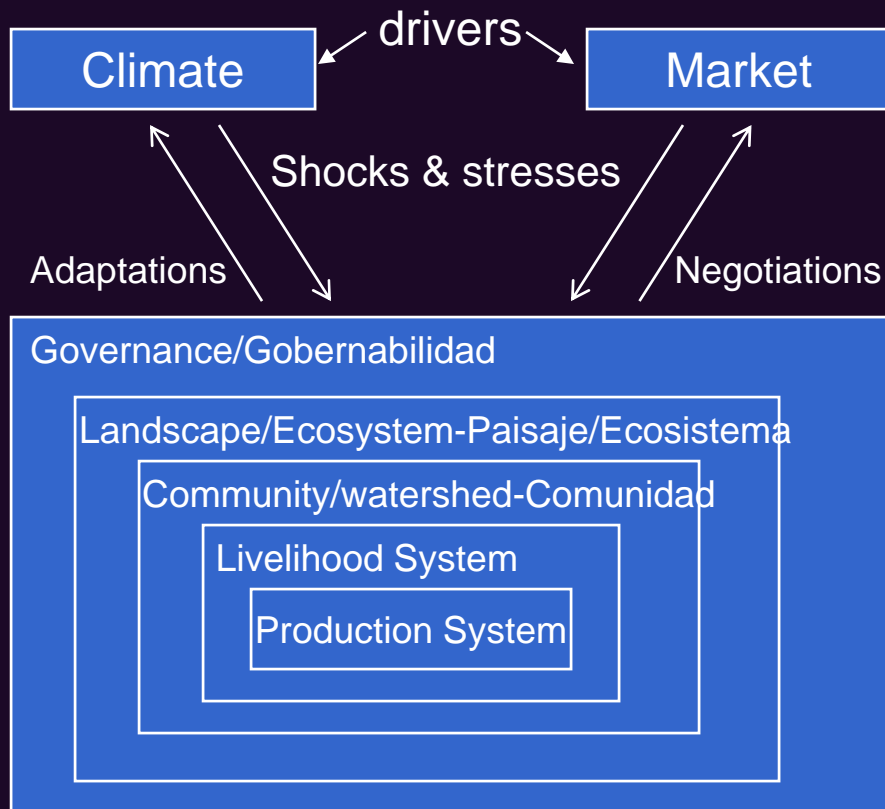


## Five Objectives -

- 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

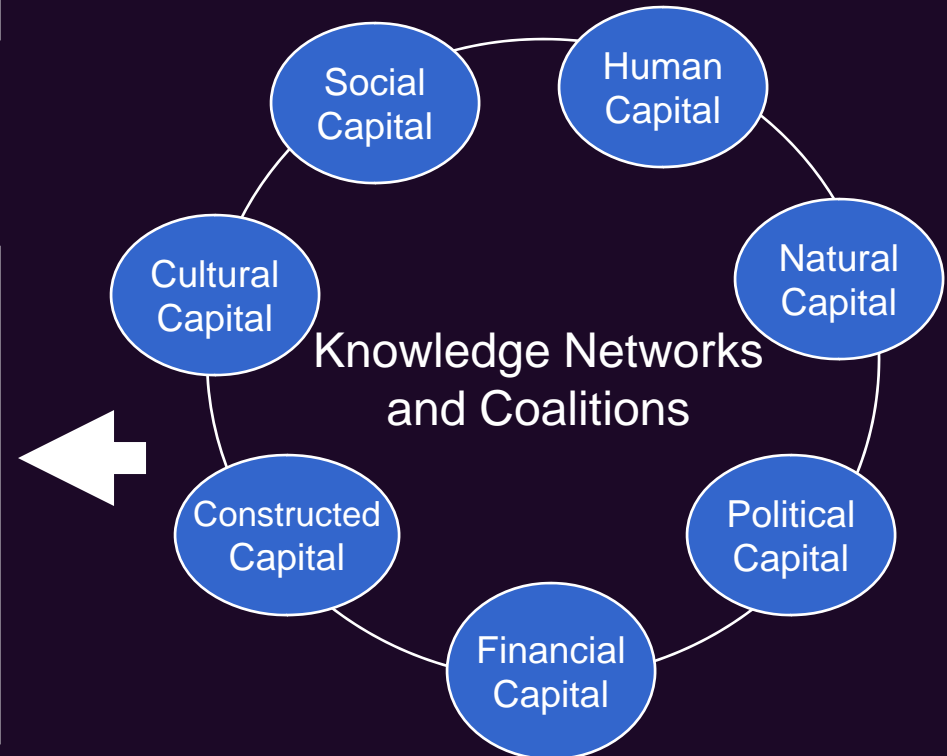
## Structure/ Estructuras



### Hypotheses on the current state and its drivers

Pests	Local Climate
Soils	Local Markets
Biodiversity	Livelihoods

## Agency/ Capacidad de Actuar - Negociación



### Transformative Hypotheses

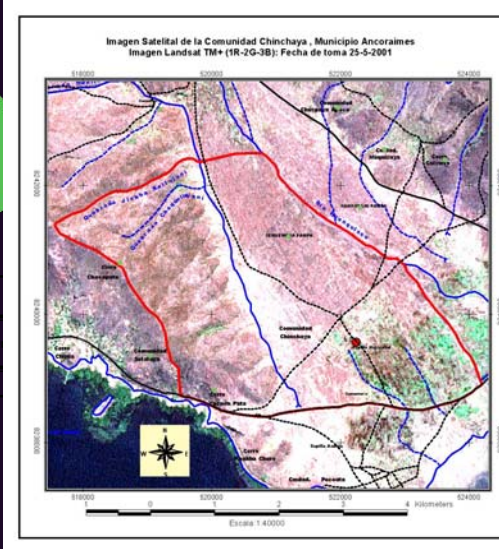
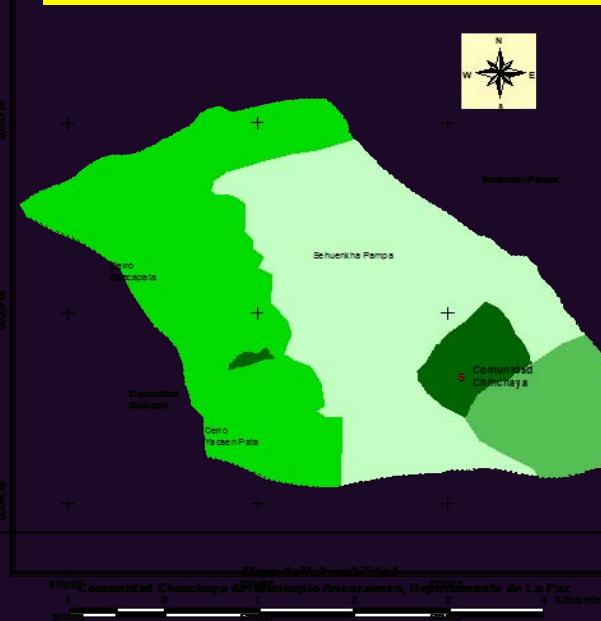
Bridging knowledge systems for change  
Building coalitions to implement change  
Risk and dread and ability to act

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

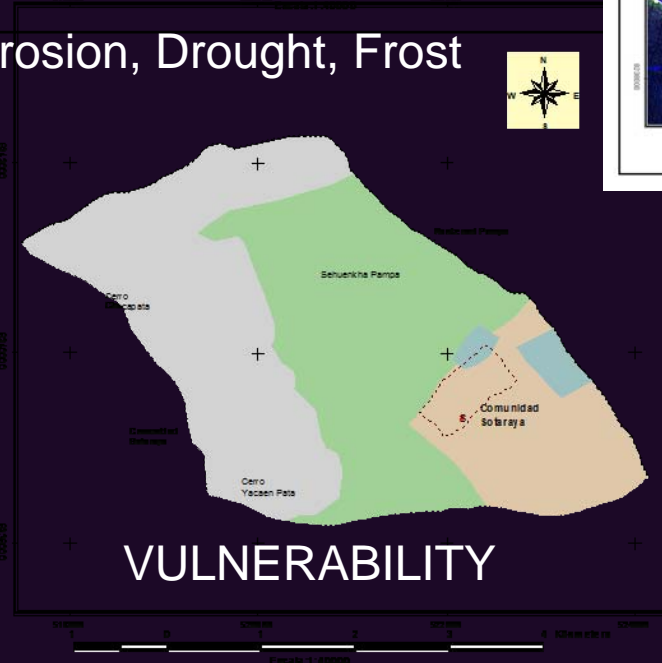
# Integrating knowledge systems

# Linking Knowledge: Maps – Land Cover, Land Use Change, and Vulnerabilities

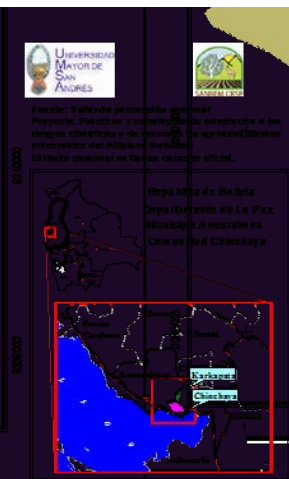
Erosion, Drought, Frost



BEFORE



VULNERABILITY



AFTER



# 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