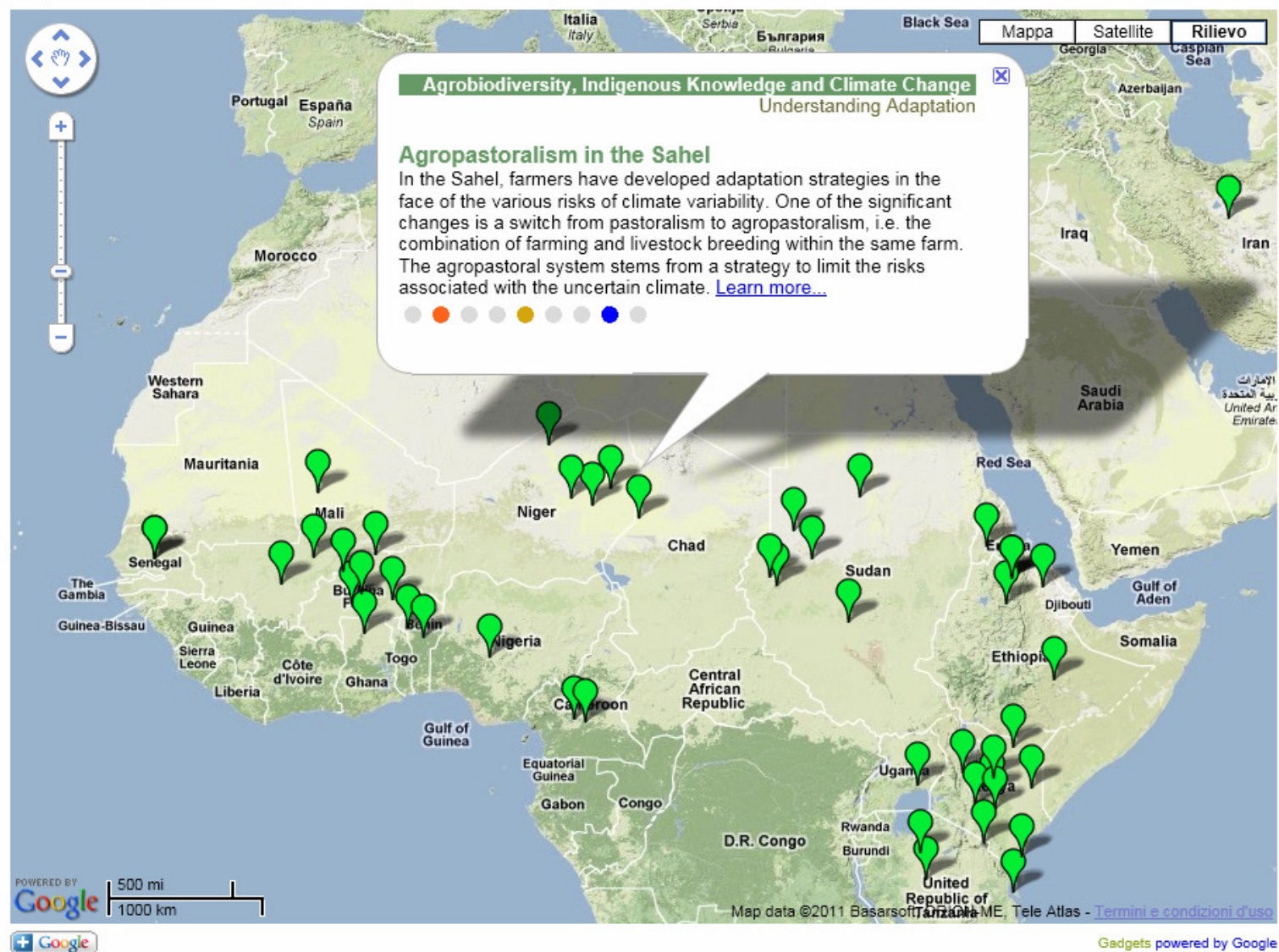




# The role of agrobiodiversity in coping with climate change: the experience of rural communities and indigenous peoples

Ximena Cadima Fuentes



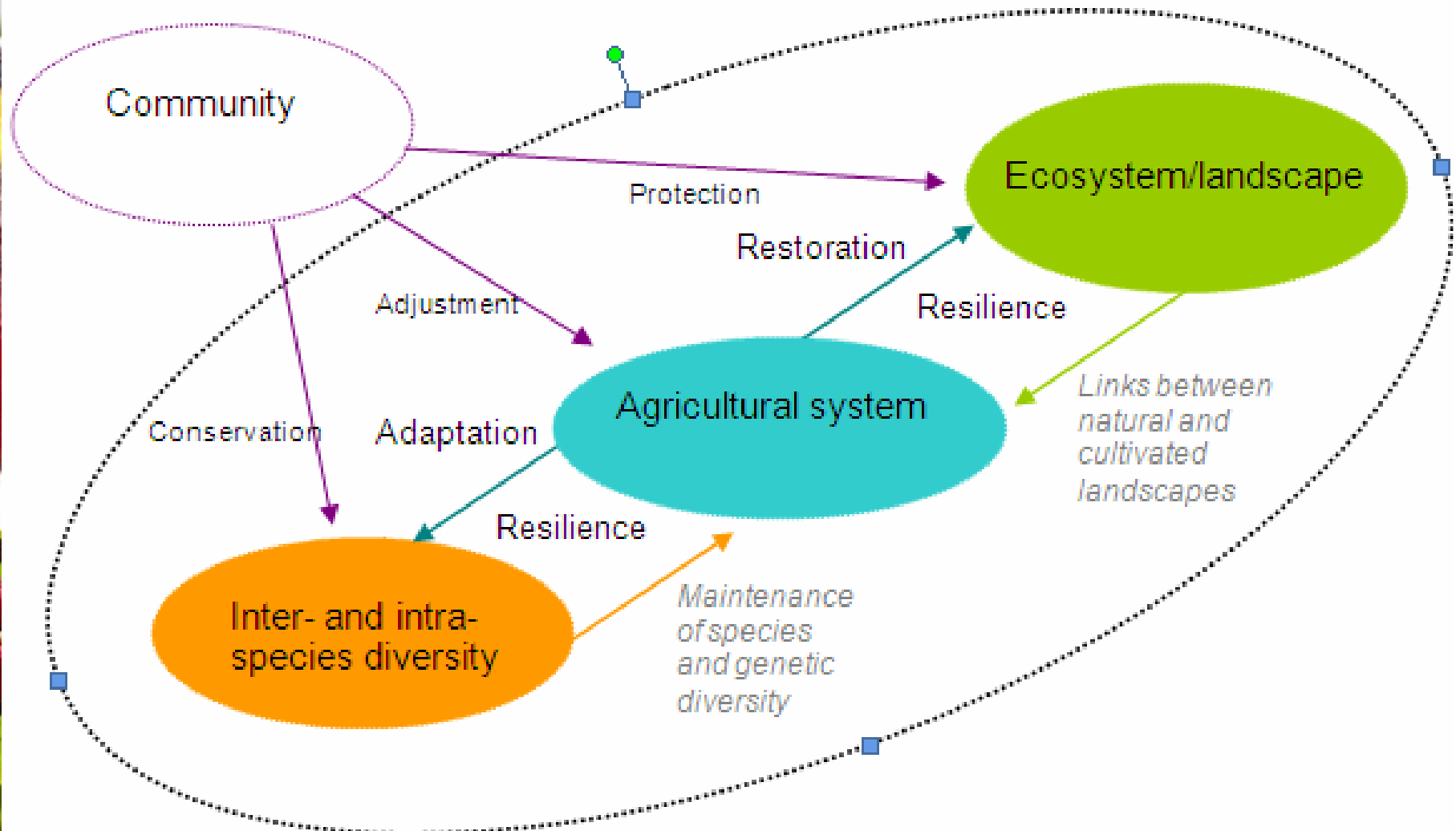


These cases present a wide range of climate adaptation measures and coping strategies of rural and indigenous communities including landscape restoration, changes in cropping systems, cultivation of stress-tolerant crops, organic agriculture, changes in livestock and fisheries management, indigenous beekeeping, biodiversity management, diet diversification, and soil and water management. Often, these strategies are the elements of integrated and site-specific approaches based on the indigenous and local knowledge, practices and innovation. You can recognize these strategies based on the following labels:

- Agroforestry, ● Cropping Systems, ● Stress-tolerant Crops, ● Organic Agriculture, ● Livestock, Fisheries and Bees, ● Biodiversity Management,
- Landscape Restoration, ● Diet Diversification, ● Soil and Water Management.

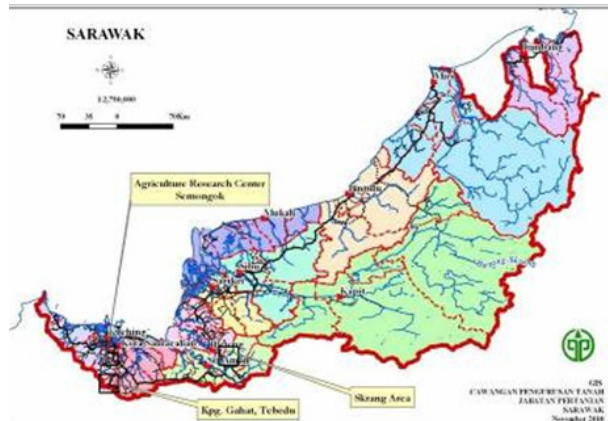
# Lessons learnt

## Adaptation dynamics



# Conclusions

- Three general conclusions
  - Adapting involves a range of different actions at all three levels;
  - Innovation is based on both TK and new information; the social cultural and political dimensions are key;
  - Use of traditional crop and livestock species/varieties/breeds, with new materials has been a common feature



# CLIMATE CHANGE AND INDIGENOUS COMMUNITIES: STRENGTHENING ADAPTABILITY, RESILIENCE, AND INNOVATION

- Addressing the maintenance and exchange of materials (GR)
  - Determine diversity extent and distribution
  - Analyse local seed supply systems and communities needs
  - Identify genebank characteristics and additional materials to be held in genebanks
  - Analyse access issues and develop work plan

To facilitate genebank / farmer working patterns that can best serve the local communities

Indigenous communities will be able to develop strategies for using and accessing genebanks in ways which meet their needs



**Improved availability of relevant and appropriate diversity and increased understanding and use of genebanks.**

## Farmers perspective of climate change

- Issues that farmers are raising and their requests

### Problems indicated from the survey

|                                   | Households | 204    | 99   |        | 105  |  |
|-----------------------------------|------------|--------|------|--------|------|--|
| Problems                          | Total      | Skrang | %    | Mawang | %    |  |
| 1 flood                           | 19         | 13     | 13.1 | 6      | 5.7  |  |
| 2 drought                         | 128        | 27     | 27.3 | 101    | 96.2 |  |
| 3 heavy rain                      | 16         | 11     | 11.1 | 5      | 4.8  |  |
| 4 uncertain rain                  | 89         | 61     | 61.6 | 28     | 26.7 |  |
| 5 season disruption               | 19         | 19     | 19.2 | 0      | 0.0  |  |
| 6 high temperature                | 45         | 36     | 36.4 | 9      | 8.6  |  |
| 7 disease                         | 137        | 69     | 69.7 | 68     | 64.8 |  |
| 8 less yield                      | 34         | 0      | 0.0  | 34     | 32.4 |  |
| 9 weeds difficult to control      | 26         | 26     | 26.3 | 0      | 0.0  |  |
| 10 agronomic practices            | 49         | 48     | 48.5 | 1      | 1.0  |  |
| 11 bird pest                      | 28         | 12     | 12.1 | 16     | 15.2 |  |
| 12 insect pest                    | 154        | 92     | 92.9 | 62     | 59.0 |  |
| 13 rat pest                       | 44         | 13     | 13.1 | 31     | 29.5 |  |
| 14 monkey pest                    | 17         | 16     | 16.2 | 1      | 1.0  |  |
| 15 squirrel pest                  | 28         | 0      | 0.0  | 28     | 26.7 |  |
| 16 Engkabang season affects yield | 21         | 2      | 2.0  | 19     | 18.1 |  |

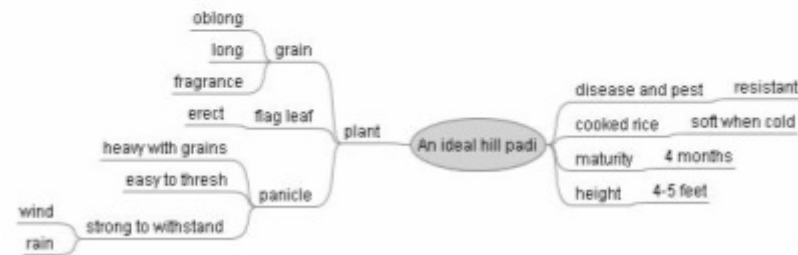
723 comments from 204 households

### Skrang

Location

N1.33694 E111.60815

### Characteristics of hill padi requested

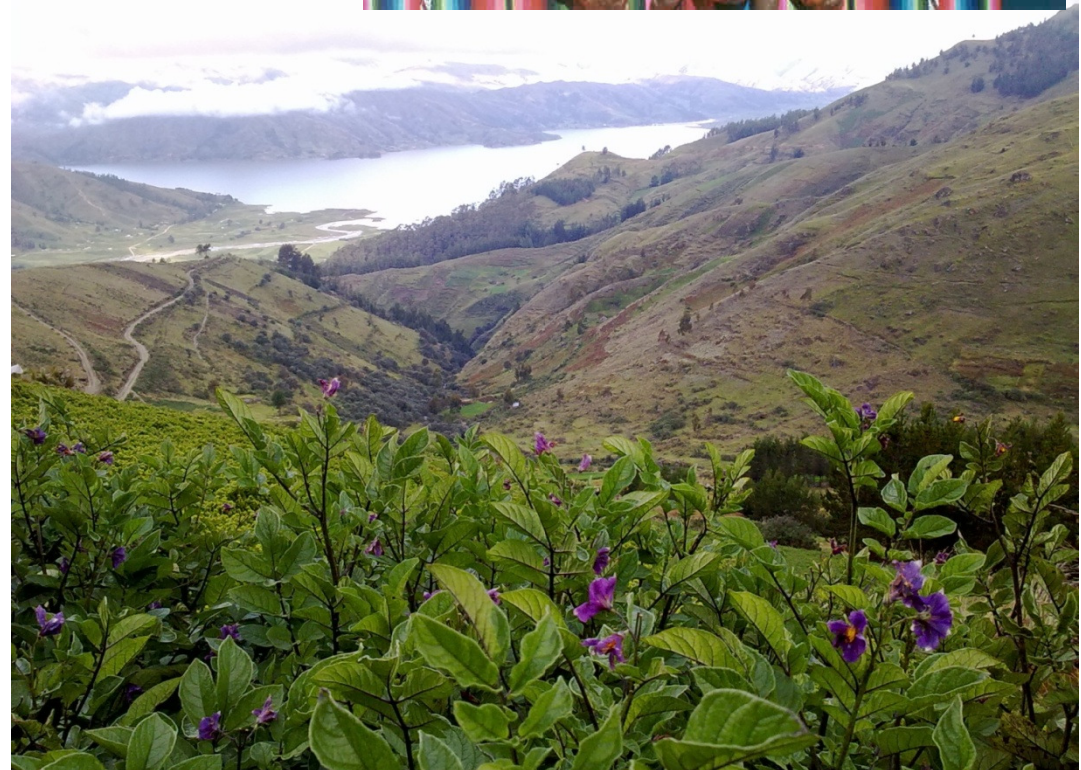
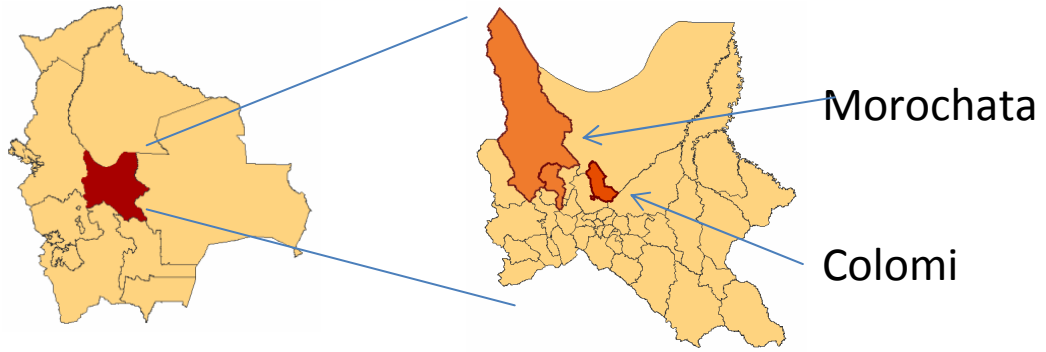


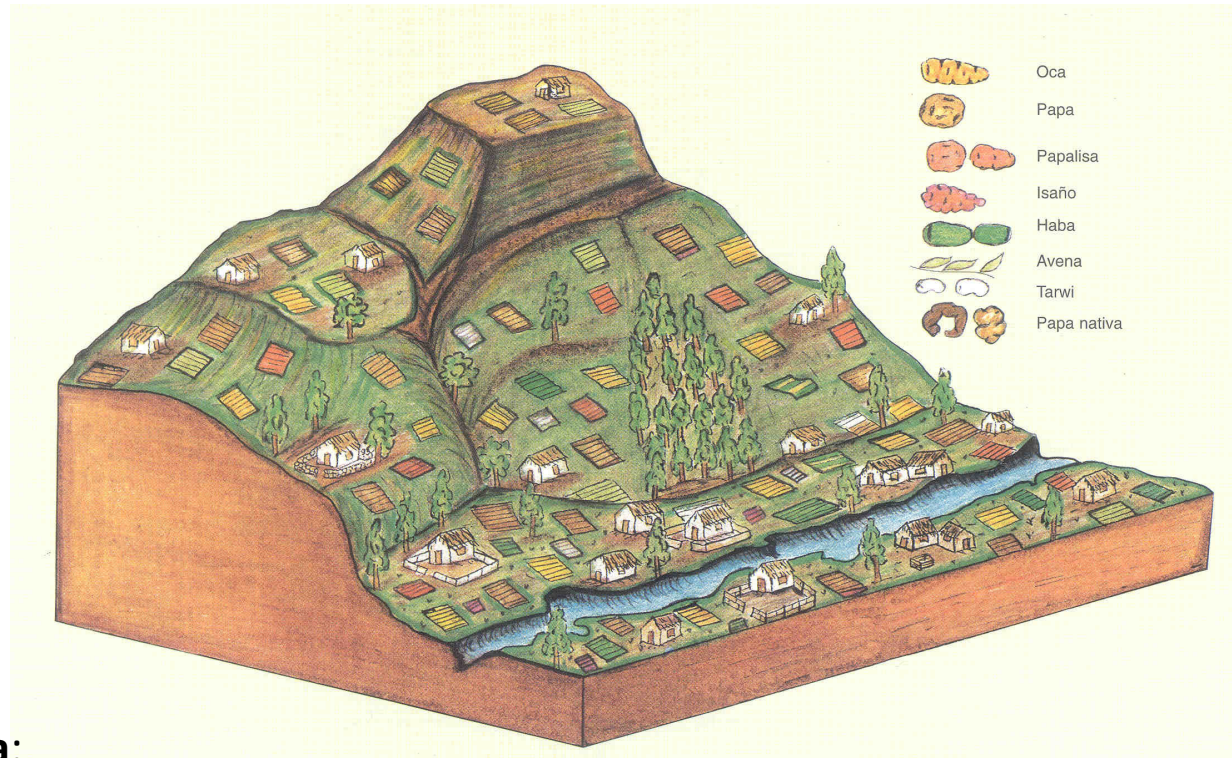
### Rice

Resistance to P&D  
 Strong stems to avoid lodging  
 Taste  
 Texture and flavour  
 Soft when cold  
 Do not easily ferment  
 Withstand drought  
 Withstand rain  
 Adapt to different planting time  
 Grain panicle and leaf characteristics

### Potatoes

Resistant to  
 -Necose (nematode)  
 -Phitophora infestans  
 -Rhizoctonia  
 Flourey  
 Shorter cycle (for 4 harvests/year in place of 2)





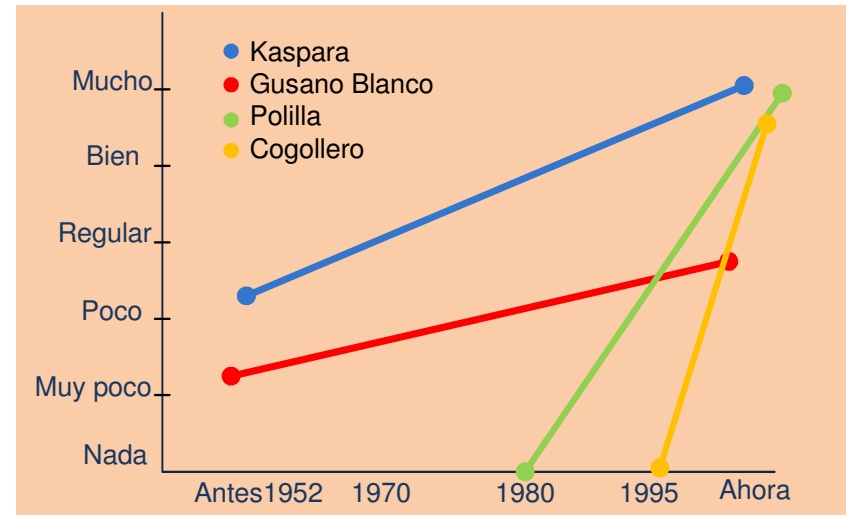
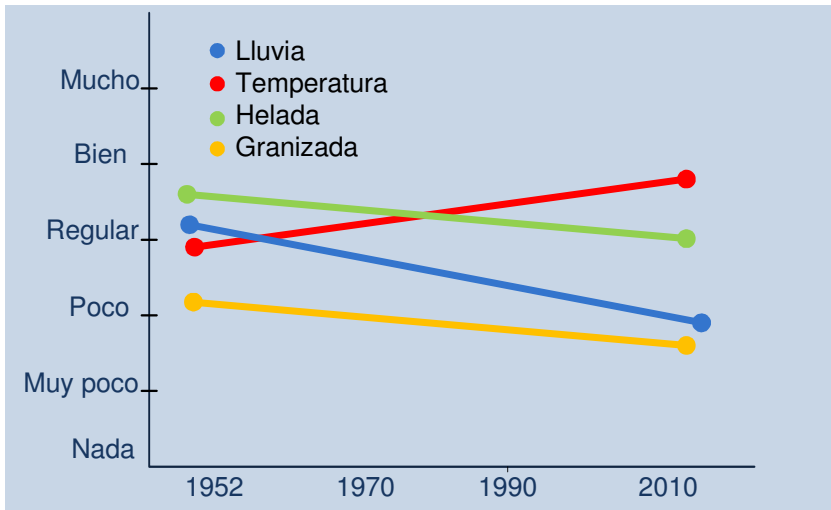
### **Morochata:**

- 2750 to 4250 meters
- 4 crops of potatoes a year
- Commercial potato main crop (few native varieties and improved potatoes)
- Other crops mainly used for household consumption (maize, beans, wheat, oats, barley, oca, and locoto)

### **Colomi:**

- 1000 to 4,800 meters
- Potato main crop
- More than 50 native varieties
- Crop production is diversified (bean, pea, oca, barley, oats, papaliza, wheat, tarwi, isaño, and cherry)

# Local perception of climate change



**Yield losses:**

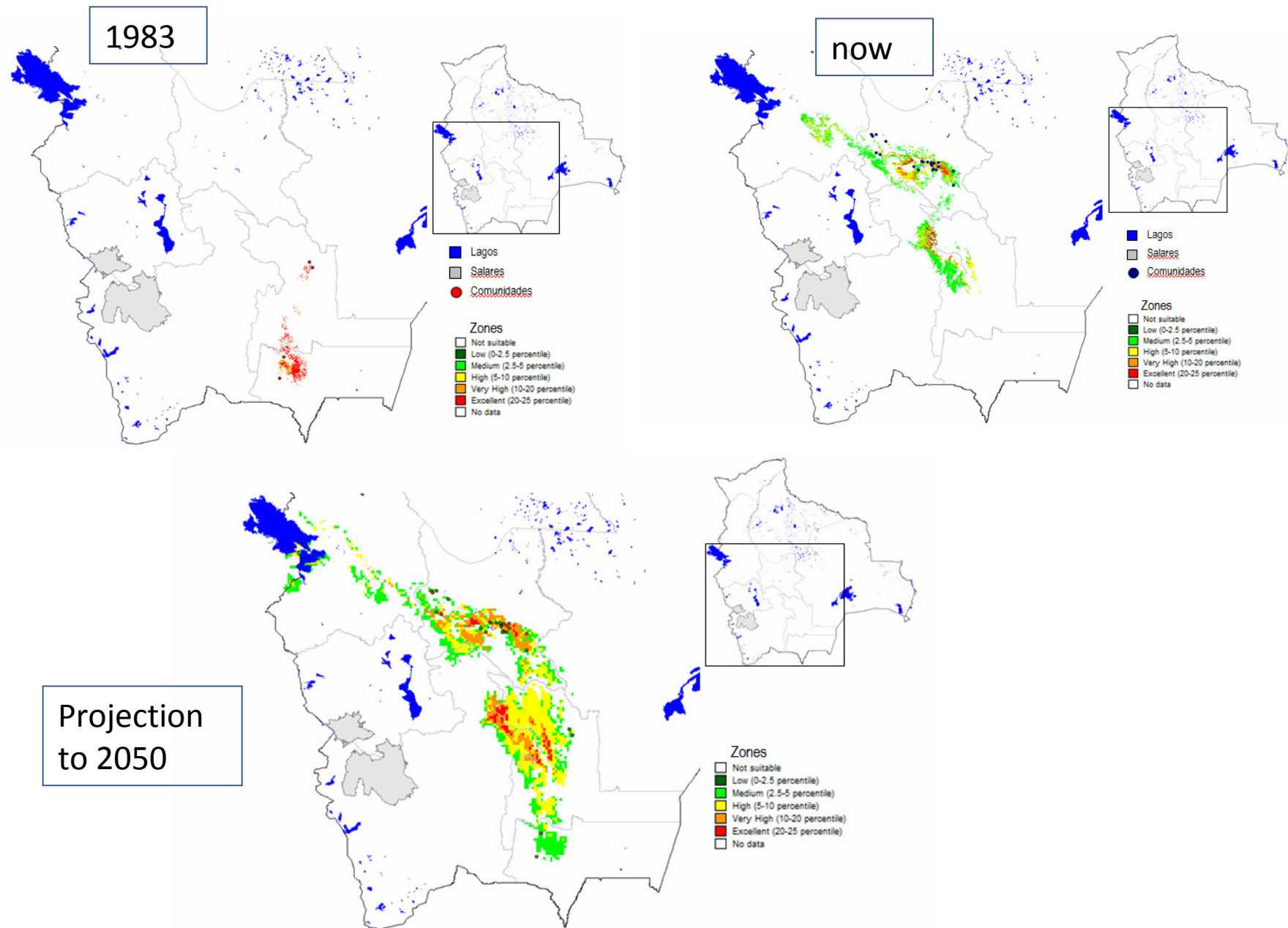
Potato: 1: 10 – 12 (before)  
1: 4 – 5 (now)

Wheat: 1: 12 (before)  
1: 4 – 5 (now)

| Cultivo       | Tiempo | Mayo | Junio | Julio | Agosto | Septiembre | Octubre | Noviembre | Diciembre | Enero | Febrero | Marzo | Abril | Mayo |
|---------------|--------|------|-------|-------|--------|------------|---------|-----------|-----------|-------|---------|-------|-------|------|
| Papa Miskha   | Antes  |      |       |       | ■      | ■          | ■       | ■         | ■         | ■     | ■       | ■     |       |      |
|               | Ahora  |      |       | ■     | ■      | ■          | ■       | ■         | ■         | ■     |         |       |       |      |
| Papa temporal | Antes  |      |       |       |        | ■          | ■       | ■         | ■         | ■     | ■       | ■     | ■     |      |
|               | Ahora  |      |       |       |        |            |         | ■         | ■         | ■     | ■       | ■     | ■     | ■    |

**Changes in the agricultural calendar**

# Effect of climate variability in pests: case of bacterial wilt



# *Management of crop diversity*

- Household wealth measured in terms of diversity of potatoes handled:
  - wealthier families manage about 3 varieties
  - middle class families manage about 7 varieties
  - the poorest often grow over 20
- Seed flows: local ferias to sell and buy seed, bartering seed with seed, or seed with work
- Climate disasters reduce community's capacities to self-sufficiency in seed
- Conservation of native varieties connected to cultural and social aspects

# *Community Needs*

- Old varieties that farmers want to rescue and reintroduce (they are aware that there is loss of diversity),
- Varieties from other areas, and new varieties with improved performance (resistant to pest and diseases for commercial production),
- Varieties able to perform well in dry conditions (main problem of climatic variations)
- High quality seed for further multiplication and distribution (to improve traditional seed flows)

# Conclusions and recommendations

- Farmers are aware of the changes occurring in their production environment
- They look for materials with characteristics associated not only with production needs but also with culture and with landscape management
- They are conscious of the need to use crop diversity to help cope with climate change
- PGR institutions are key as technology providers, supporting monitoring of change and maintaining diversity

# Conclusions and recommendations

- Farmers have access to various mechanisms that support the flow of materials, but external support can help
- They have contrasting levels of exposure to and knowledge of genebanks
- Genebanks have to explore ways of supporting community needs

# Conclusions and recommendations

Activities identified to improve access to genebanks:

- Regular visits by farmers to genebanks to help identify materials of interest to the communities;
- Requests of priority varieties to genebanks made by farmer groups or associations;
- The development of agreed procedures for seed multiplication and distribution backed by local authorities;
- Technical support to farmers to maintain the quality of seed during and after multiplication; and
- Support farmers to help evaluate causes for loss of traditional varieties, especially those associated with climate change.

GRACIAS