

Forest and trees and their influence in adaptation and mitigation of Climate Change in rural areas of the Andes

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OUTLINE

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1. Objectives

Analyze the use of trees as a **measure** of **adaptation** to agricultural droughts (AD) and as a **contribution** to the mitigation of CC:

- Analyze the implications of AD in the farm household systems (FHS)
- Identify the local strategies used to cope with the AD
- Assess the influence of trees on water availability and yield variation inside the farm staple crops
- and identify its implications between the different production systems and the food security (vulnerability and risk reduction)

Droughts

Droughts	Variables
Metheorological drought	rainfall
Hydrological drought	river runoff
	streamflow
	reservoir levels
	groundwater
Agricultural drought	soil moisture
	consumptive use (yield)

1. Objectives

- Assess the local attitudes toward AF systems and their role in relation to the mitigation of the effects of AD
- Carry out a qualitative comparative analysis between the case studies in order to typify key indicators
- Analyze the trade-off between the different production alternatives evaluated.



2. Methodology: Study Areas



2. Methodology:

Study Area 1: Mantaro – Peru

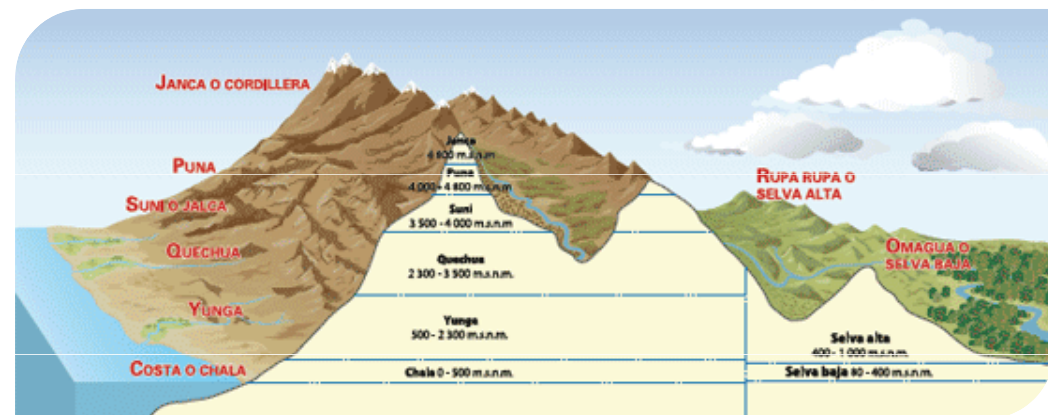
Subbasin: Achamayo

3000 - 4500 m.a.s.l.

T°: 4-18 °C

Pp: 450-900mm (83% Oct-Apr)

Subsistence economy based on agriculture and livestock.



2. Methodology: *Research step 1*

Farming system and farm household systems

- General description of the study area:
→ info. from partner institutes and secondary data (eg. IGP, INEI).
- Specific description of the farming system in the area:
→ complemented with PRAs using diverse tools
- Description of the selected farm household systems (30 per study area):
→ mainly Semi-Structured Interviews
- Assessment on the land-use decision making in the area
→ mainly Semi-Structured Interviews + PRAs



2. Methodology: *Research step 2*

Vulnerability and adaptation capacities

- Description of AD in the area, their distribution and historical evolution
 - secondary data (e.g. IGP)
 - + PRA (Mapping {community + extreme events} + past trends)



- Specific description of AD in the FHS to infer:
 - Damage **Pattern**, **Severity**, derived **Consequences**,
Reaction and **Adaptation** measures adopted by farmers
 - Semi-Structured Interviews



2. Methodology: *Research step 3*






Assessment of an adaptation alternative

- Selection of 6 production systems from the FHS (in pairs)
(3 agroforestry systems + 3 agricultural systems).
→ Same crops + external variables will be minimized.
- Analyze the influence of trees on **Soil Moisture** and **Yield**
→ Semi-Structured Interviews + Participant Observation (harvest)
+ Soil Moisture measurements.
- Assess local attitude towards AF systems and their influence on the FHS
(in contrast to crops)
→ Semi-Structured Interviews + PRAs (ranking + analysis of
adaptation alternative)
- Correlation and analysis of outputs



2. Methodology: *Research step 4*

Potential interventions for system enhancement

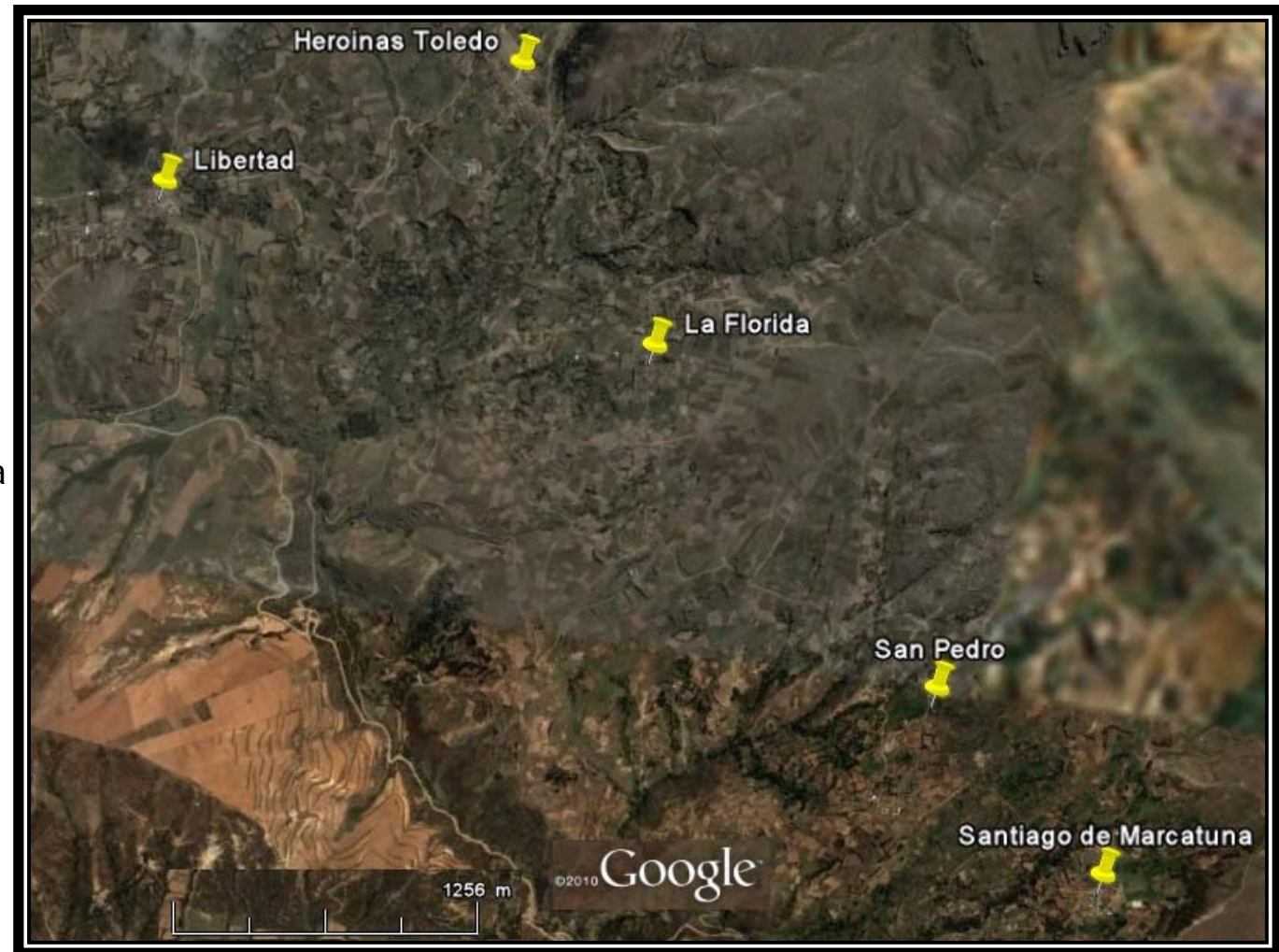
- Description of expectations from farmers of AD events in the future
→ PRAs ("future" diagrams) + Semi-Structured Interviews 
- Identification of vulnerable areas and the feasible adaptation options (for the household)
→ From Secondary data + Research steps 2 and 3 
- Identification of local attitudes toward land use change (w/ focus on forests and agroforestry systems) in relation to CC and its effects on AD
→ From research steps 2 and 3 
- Comparison and Typification of study areas 
- Analysis of trade-off between different goals or production alternatives 

3. Mantaro Field trip: Study Area 1

- Selection of 5 communities and annexes:
 - La Florida
 - San Antonio
 - La Libertad
 - San Pedro
 - Santiago de Marcatuna

- In every location:
 - 1 participatory rural appraisal (PRA) workshop took place

 - Household interviews



Participatory rural appraisal: San Antonio

Mantaro Field trip



Participatory rural appraisal: La Libertad

Mantaro Field trip



Participatory rural appraisal: San Pedro

Mantaro Field trip



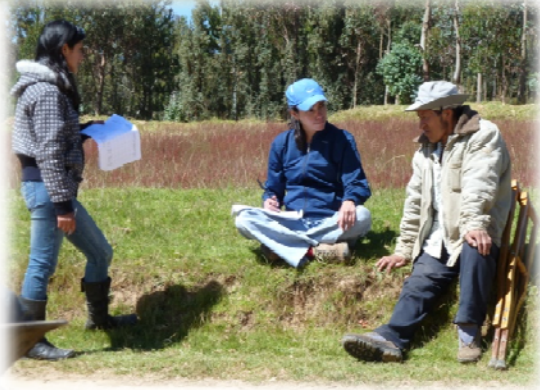
Participatory rural appraisal: Stgo. de Marcatuna

Mantaro Field trip



Household interviews

Mantaro Field trip



3. Mantaro Field trip: Communities selection

3 communities selected: La Florida, La Libertad and San Pedro

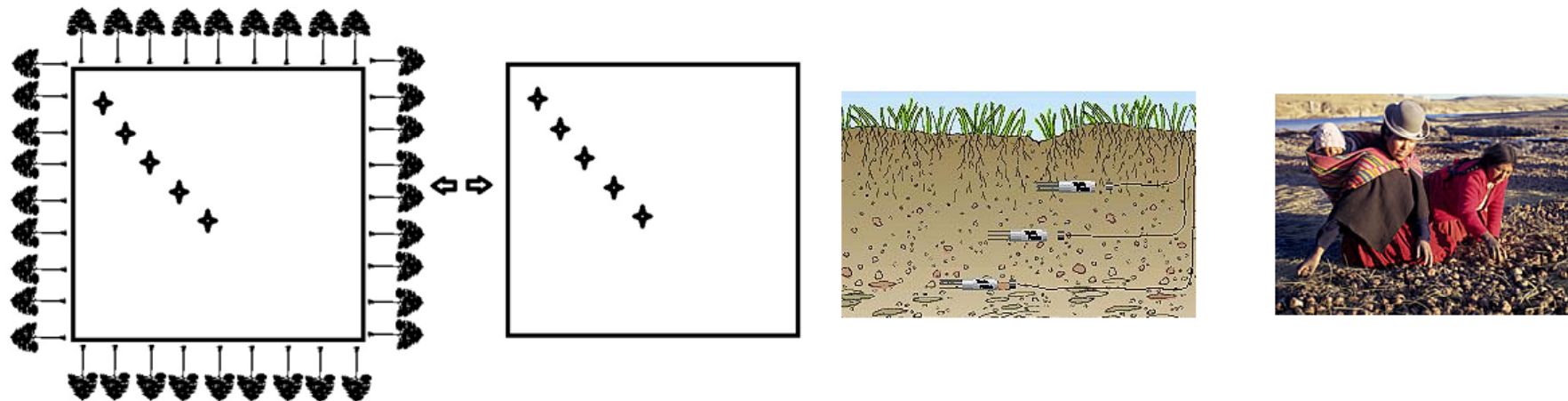
- 10 selected farm household systems (30 per study area) will be assessed (mainly through semi-structured interviews)



- 6 production systems within afore-described farm household systems (3 agroforestry systems + 3 agricultural systems per study area)



->were selected in pairs to analyze the **influence of the trees** on the **soil moisture** and **yield**



Thesist selection: Janeth Rodriguez

Mantaro Field trip



Production systems selection from farm household systems

Mantaro Field trip



Yield sampling test

Mantaro Field trip

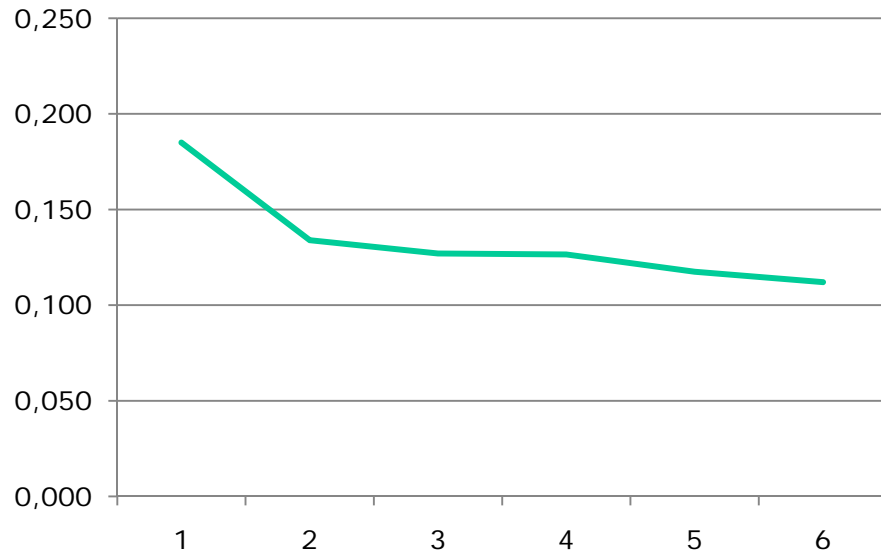


Yield sampling test

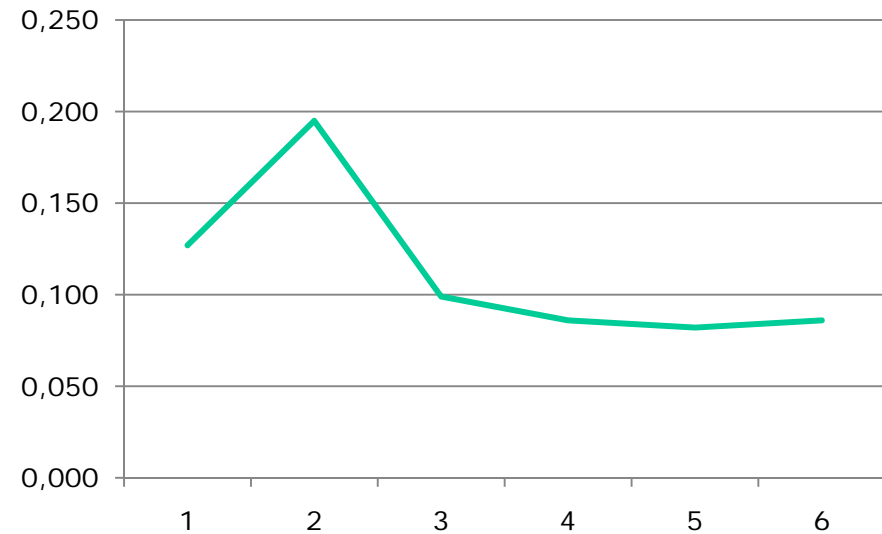
Mantaro Field trip



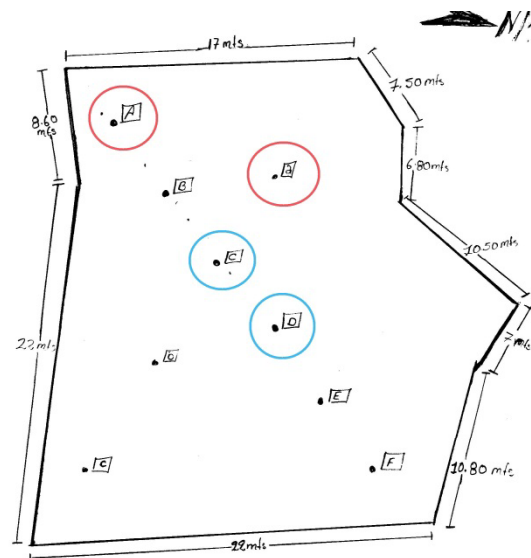
Soil Moisture (prelim.): San Pedro (A. crop)



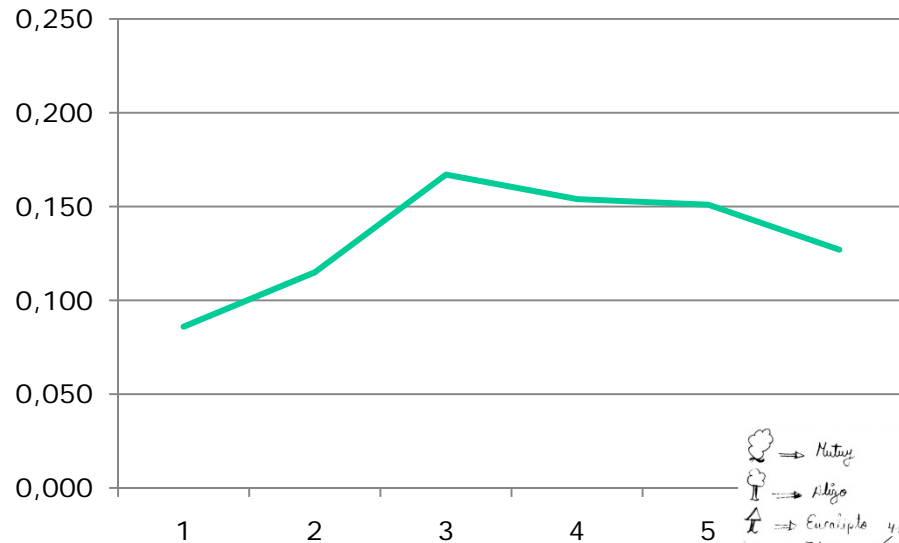
Agric San Pedro A a



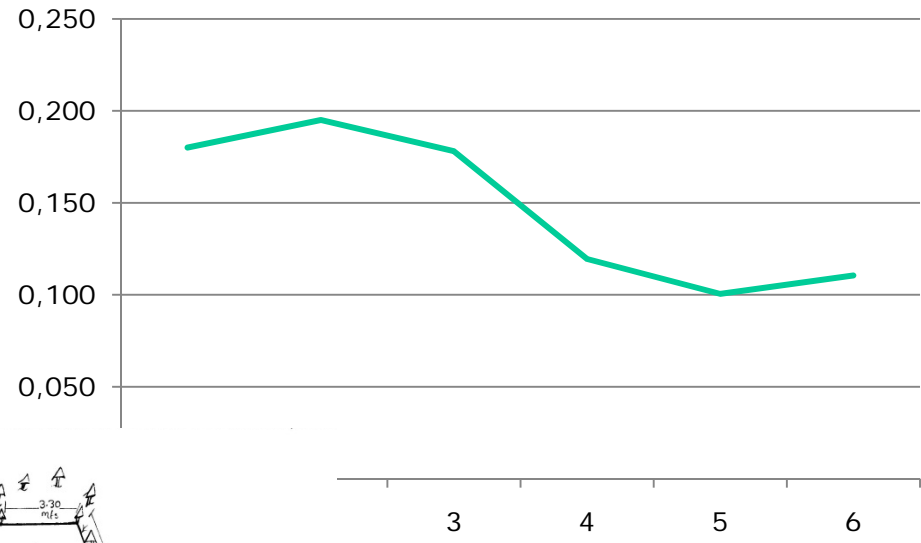
Agric San Pedro C D



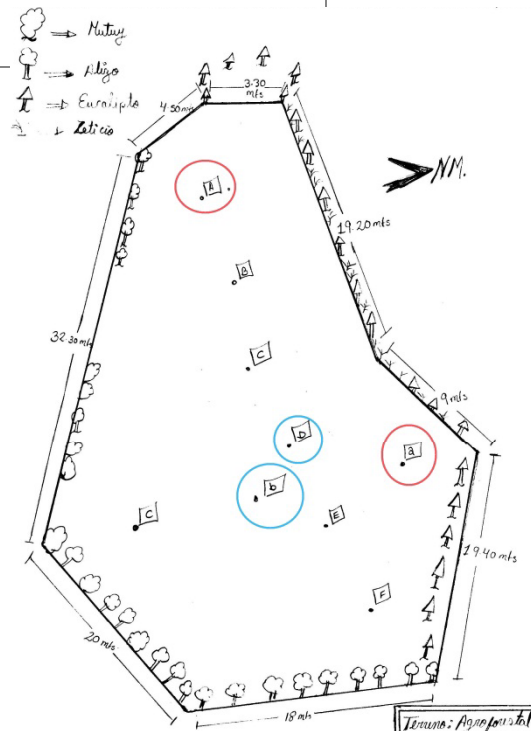
Soil Moisture (prelim.): San Pedro (AF sys.)



AF sys San Pedro A a



AF sys San Pedro D b



4. Research Issues

- ❖ Results from the yield sampling test did not differ significantly with distance to trees. (most probably lack of repetitions)
- ❖ Local inhabitants did not identify AD as such -> just 1 consequence coming from it (mainly in potatoes): Early blight (“Rancho amarilla”).
- ❖ Soil humidity preliminary results -> not clear outcomes
- ❖ Study Area in Bolivia

5. Time Schedule (2011-2012)

Nr	Activity	2011					2012													
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
1,1	Literature review (methodology and from specific locations)																			
	After the Field trip to Peru																			
2,1	Soil moisture measurements																			
2,2	Analysis of the information acquired																			
2,3	Clarification + Redefinition of the methodology and objectives																			
2,4	DAAD Annual report																			
	Field Trip to Peru and Bolivia																			
3,1	Field Trip to Peru - completion of SSI and missing information																			
	Field Trip to Bolivia																			
3,2	Define PRA dates and communities																			
3,3	Identify assessment plots and potential households systems																			
3,4	PRA and semi-structured interviews																			
3,5	Soil moisture measurements + Participant observation																			
3,6	Analysis of the information acquired																			
3,7	Results + Analysis and evaluations+ Typification + Discussions																			
3,8	DAAD Annual Report																			



Thank you