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

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Tharandt, 25 September 2012

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 **role of AF systems** in relation to AD

1. Objectives

- 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)

- Analyze the **trade-off** between the different production alternatives evaluated.

2. Research Approach
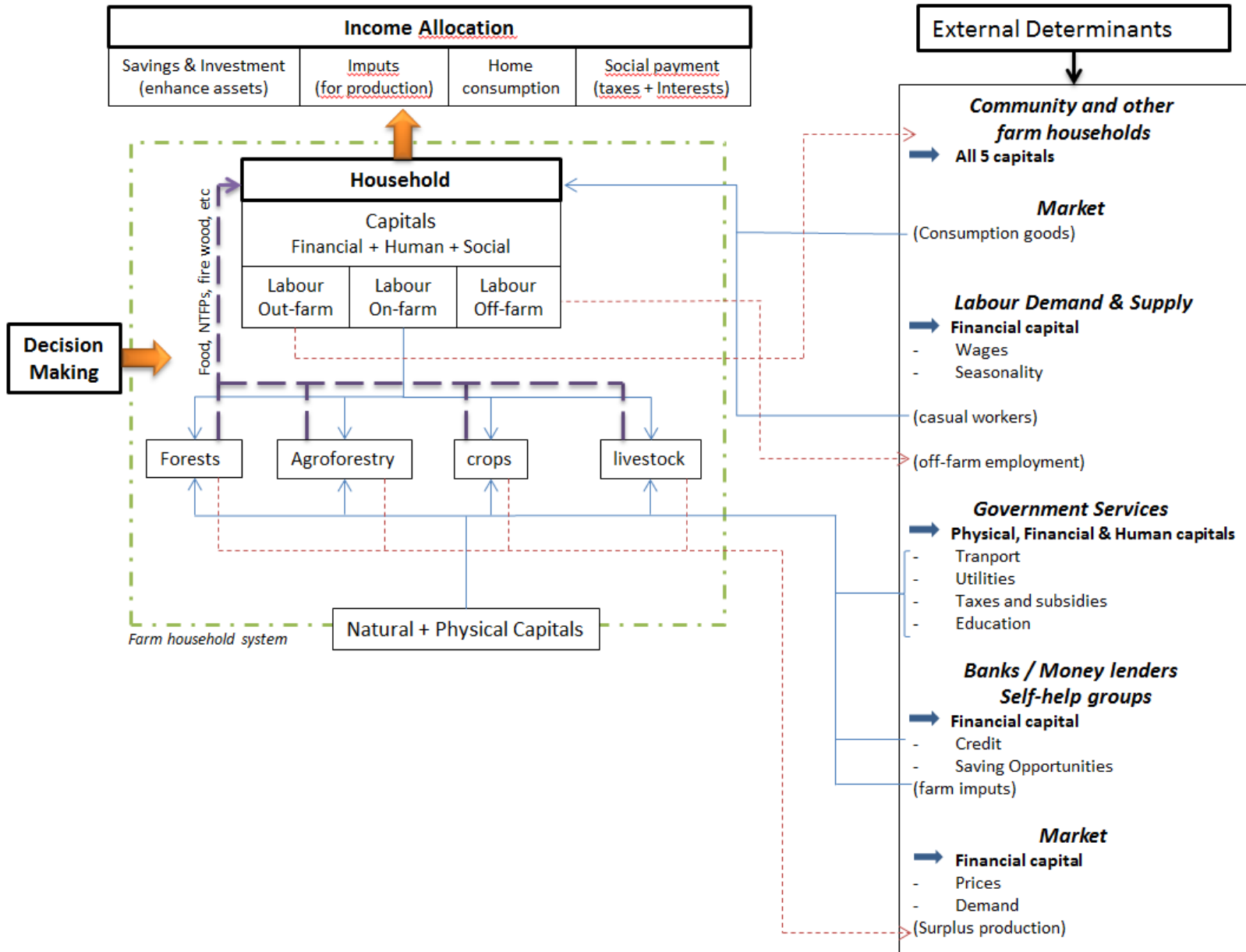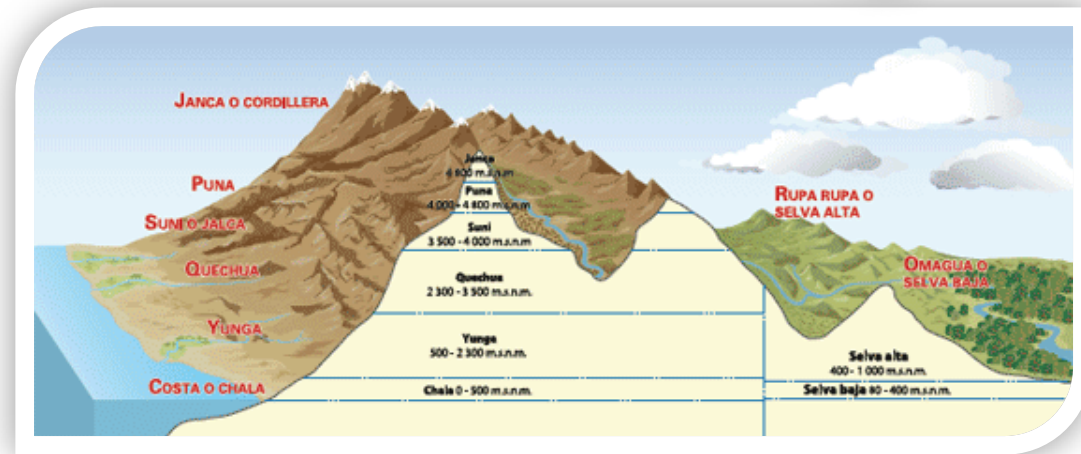
3. Study Area:

Mantaro – Peru

Subbasin: Achamayo

3000 - 4500 m.a.s.l.

T°: 4-18 °C

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

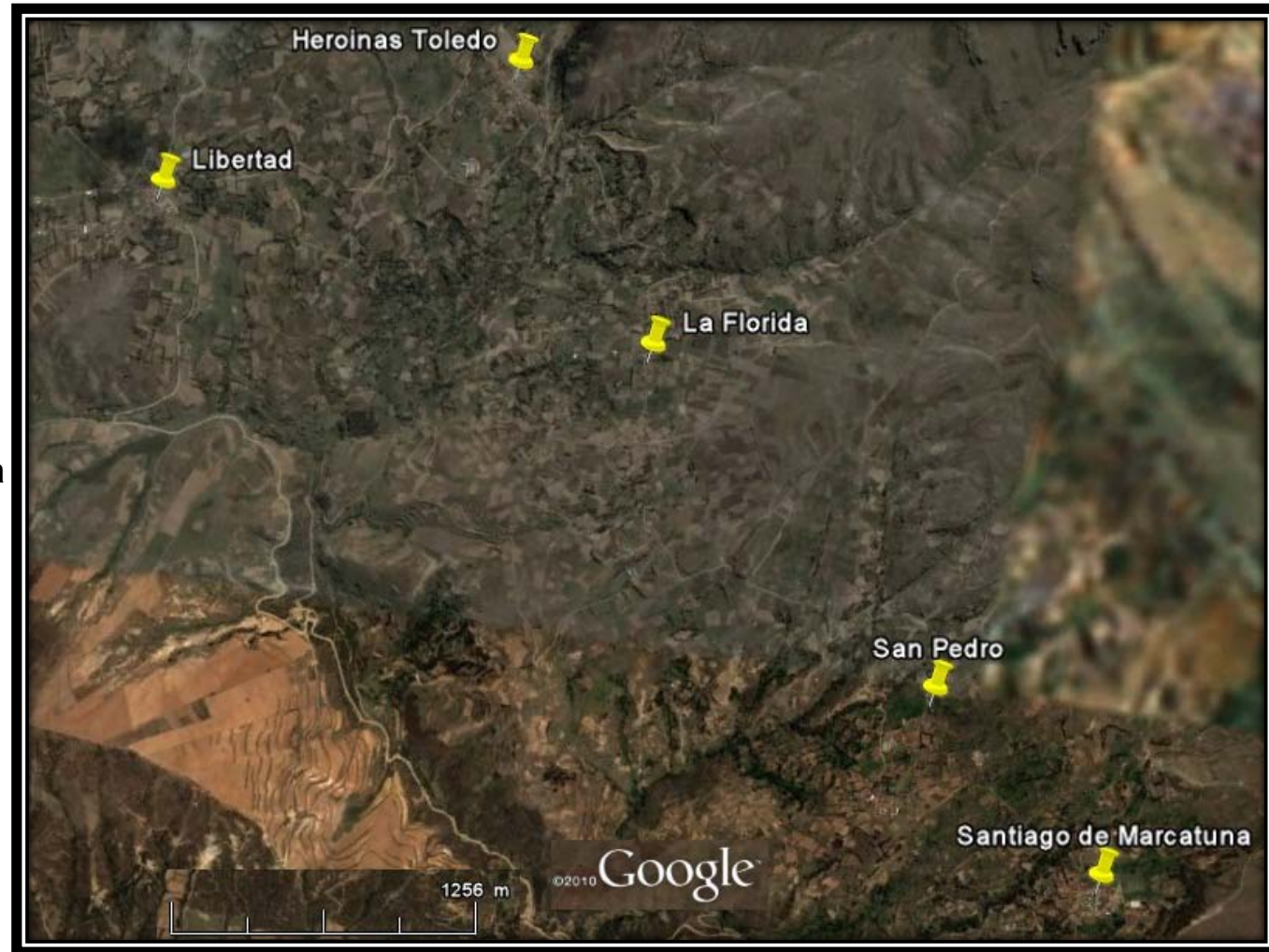Subsistence economy based on agriculture and livestock.

3. Study Area:

- 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 (158 Households)

4. Methodology:

Research methodology

- Secondary data analysis

- Field laboratories

  Interviews, round table,

  participant observation

- Natural resource assessment

- Semi-structured interviews
  (2 levels)

- Key informant interviews

4. Methodology: Overview of the different surveys dimensions

- **Household surveys**: 158 households were interviewed allover the watershed – Random Sampling (+ viveros)

- **General interviews** (AD and EE in the FHS): 15/community n=45 - Random Sampling

- **In-depth interviews** (focus on Labor and Income allocation): 4/community n=12 - Purposively selected (selected FHS + diverse sorts of FHS to broaden the understanding)

- **Key informant interviews** – main Stakeholders (IGP/Agrorural/local authorities)

- **Participant observation** and mini pre-post harvest survey in production systems – 6 selected production systems in the 3 communities

5. Mantaro Field trips:
Meetings & participatory rural appraisals

Mantaro Fieldwork - April

Production systems selection
from farm household systems

Mantaro   Fieldwork - April

5. Mantaro – Fieldwork December

Hail

5. Mantaro – Fieldwork December

5. Mantaro – Fieldwork May-July

- Yield measurements -> Participant observation and mini pre-post harvest survey

- General interviews (AD and EE in the FHS)

- In-depth interviews (focus on Labor and Income allocation)

6. Research Status: *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

- Assessment on the land-use decision making in the area
  → mainly Semi-Structured Interviews + PRAs

- In-depth description of the selected farm household systems
  Focus on **Labor** and **Income** allocation
  → Semi-Structured Interviews

6. Research Status: *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

6. Research Status: *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)

7. Preliminary Results

➢ Farmers acknowledge the **presence of agricultural droughts**,

➢ They relate **origin** to temperature and rainfall changes.

➢ There is **low social capital** resources used to address this issue
 ➢ lack of organization and technical support

➢ The **Physical** and **Financial** limitations **could be overcome**
 ➢ With good organization in the community.

➢ The **lack of training and knowledge** to face AD (human capital), **affects** the **reaction and adaptation measures** of the farmers.

7. Preliminary Results

The **presence of trees** in the farm household systems **enables farmers** to:

➢ **reduce risks** from weather hazards, providing more sustainable incomes

➢ trees are **regarded as:**
  - ➢ an **insurance** (e.g. for accidents or other financial shortages),
  - ➢ an **investment tool** (increasing their decision-making power) or
  - ➢ a **retirement pension**.

8. Following steps

- ➢ Analyze the gathered information

- ➢ Identification of Potential interventions for system enhancement

- ➢ Present and discuss the results with the farmers
   and main stakeholders

- ➢ Assess the obtained feedback

- ➢ Develop specific key informant surveys
    - ➢ Interview key informants

- ➢ Doctoral thesis writing, DAAD report, look for publications

8. Time Schedule (2012-2014)

Time Schedule from 2012 to the completion of the research

Activity	2012				2013												2014
	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Biodiversity and INCA workshops	■																
Analysis of the information acquired	■	■															
Results + Analysis and evaluations	■	■	■	■													
DAAD Annual Report		■															
Identification of information gaps and planning for typification + writing						■	■										
Field Trip to Peru								■	■	■							
Typification process + Community workshops and Discussions								■	■	■							
Identification of Potential interventions for system enhancement										■							
Analysis of the information acquired (Typification + Discussions) + writing												■	■	■	■		
DAAD Annual Report															■		
Doctoral thesis writing + submission and defense																■	■
Joint publications																■	■
DAAD Final Report																	■

Thank you

Droughts

Droughts	Variables
Metheorological Drought	Rainfall
Hydrological Drought	River runoff
	Streamflow
	Reservoir levels
	Groundwater
Agricultural Drought	**Soil moisture**
	Consumptive use