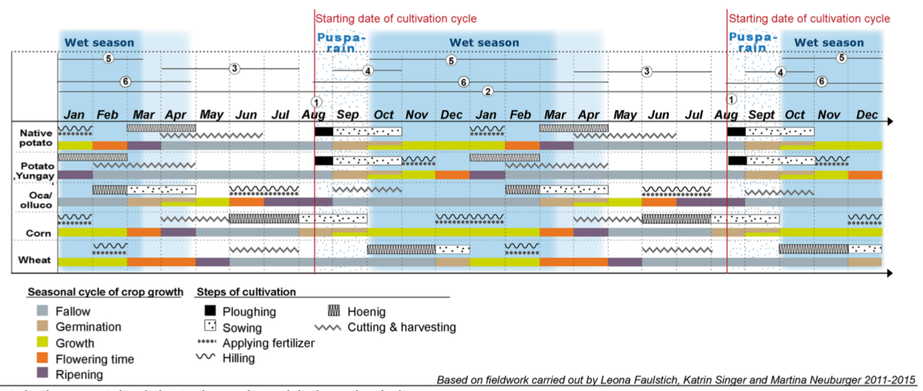
AgroClim-Huaraz

Water availability and water demand of small-scale farmers in the Peruvian Andes

An interdisciplinary research project (2019-2022)

Motivation

- Traditional rain-fed farming threatened by climate and economic change
- Inconsistency between perceived changes and uncertain measurements
- Incomplete knowledge about factors affecting both water demand and water availability hinders the development of adaptation strategies



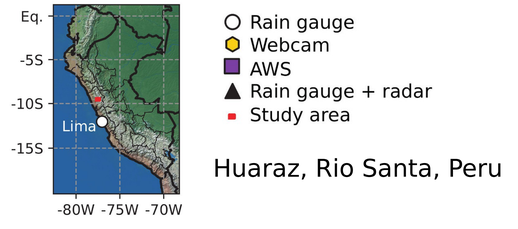
Based on fieldwork carried out by Leona Faulstich, Katrin Singer and Martina Neuburger 2011-2015

Reports by the peasants in relation to changes in precipitation and agriculture:

① In former times rainy season started in August.
② Waiting for the rain - if sowed earlier than the first rainfall, the crops might be hit by the frost or the drought.
③ In former times the rainy season stopped in April. Nowadays it occasionally continues until June or July.
④ The period for sowing and harvesting depends on altitude, soil moisture and climate.
⑤ Today, there is less rain than before. However, if it is raining it is a brief and heavy rain which destroys plants and the water disappears quickly. Consequently the people feel that there is less rain // they have to wait for the rain to return.
⑥ Ground frost, hail and heavy rains causing damages to the plants

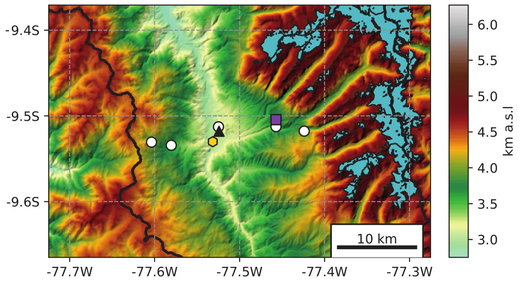
↑Agricultural calendar of the main crops used in the Study Area, and results of the farmer interviews. From Gurgiser et al. (2016), Earth Syst. Dynam., https://doi.org/10.5194/esd-7-499-2016

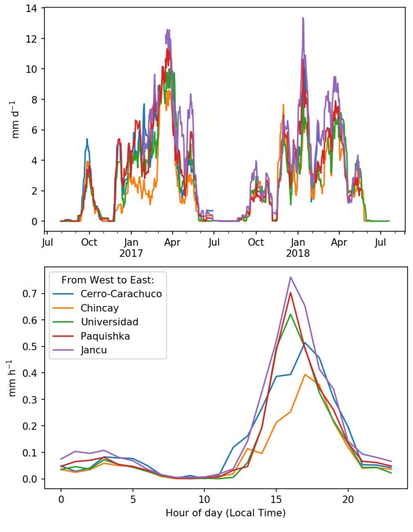
Study Area



- Rain gauge
- Webcam
- AWS
- Rain gauge + radar
- Study area

Huaraz, Rio Santa, Peru



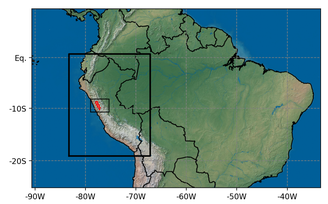


↑Daily precipitation and daily cycle of precipitation measured at the 5 HOBO locations (see map)

Methods

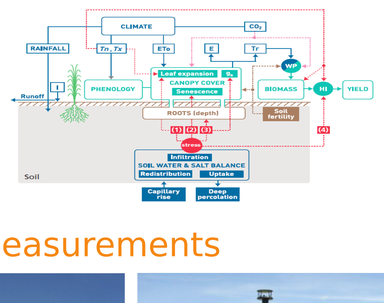
Atmospheric modelling (WRF)

- 1979-present, 2 km resolution
- "Regional reanalysis" set-up (ERA5 forcing)
- → large and local scale factors of climate variability and water availability



Crop modelling (AquaCrop)

- Calibrated based on local measurements
- NDVI capability for long-term assesssment
- → Vulnerability of most used crops to climate variability



Interviews

- Farming practices
- Perceived changes

Knowledge transfer

Plot scale agro-meteorological measurements

- Crop growth and biomass
- Evapotranspiration: eddy covariance and EcoBot
- Climate variables: atmosphere, land

← AWS at Llupa field site (study area); Example of EC station; Ecobot - see Wohlfahrt & Tasser (2015), Int J Biometeorol.

The project

www.agroclim-huaraz.info

↑Photos: Katrin Singer

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