Improving climate information services for sustainable agriculture by integrating scientific and indigenous forecasts using machine learning (ML-CLIMATE)

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**Background**

- Rainfed agriculture in the global South ensures world’s food security.
- Small-scale farmers highly depend on short-term weather forecast.
- No access to scientific forecast → use of indigenous indicators for weather prediction

**Objective**

Study the potential of machine learning (ML) techniques to improve climate services using Indigenous (IF) and Scientific Forecast Knowledge (SF).

The integration of IF with SF will be performed by testing different ML techniques to deliver a skilful Hybrid Forecast.

The ML algorithms will be trained using the indigenous forecast indicators and scientific forecasts as predictors and the observed data as response variables.

**Indigenous weather forecast**

Farmers have limited prior knowledge and access to scientific weather forecasting (SF).

They use indigenous forecasting techniques that are based on agro-meteorological indicators they observe in the field.

**Results: field study and socio-technical data integration**

- Our students on the ground in Ghana and Guatemala to collect IF

**Interactive map of global Indigenous Forecast Knowledge**

More than 65 regions and 1400 indicators are used by smallholder farmers around the world to operationally predict the weather for farm decision-making.

**Conceptual framework**

Figure. Conceptual framework for integration of IF and SF using machine learning techniques and the general methodology of the research.

Figure. Interactive map depicting regions in the world where farmers use indigenous indicators for farm decision-making, together with these indicators and associated scientific literature on the region(s) and indicator(s); example for a study case in Argentina.

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