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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.

Figure. Examples of agro-meteorological indicators for weather forecasting based on meteorology, plants, astronomy, animals, etc.

Decision algorithm for Hybrid Forecast
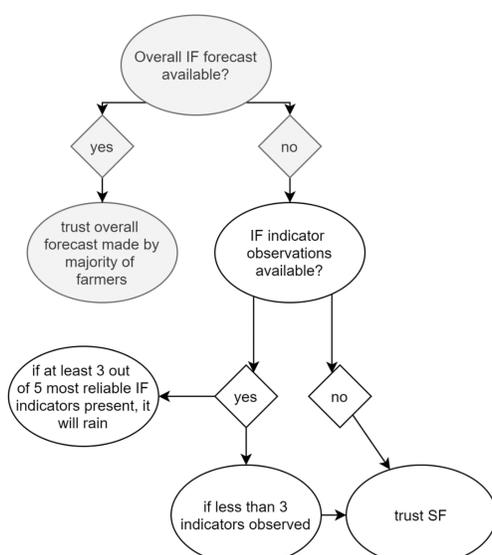
Results: field study and socio-technical data integration

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

- Data integration and skills assessment
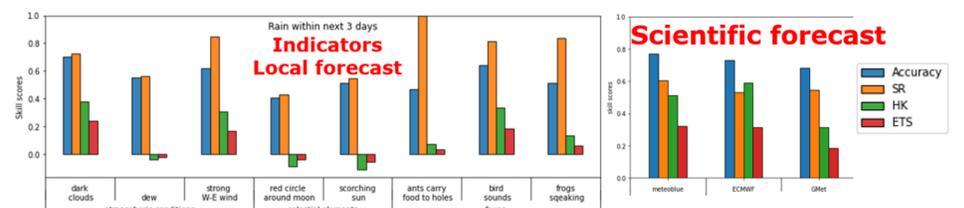
Interactive map of global Indigenous Forecast Knowledge

More than **65 regions** and **1400 indicators** are used by smallholder farmers around the world to **operationally predict the weather for farm decision-making**.
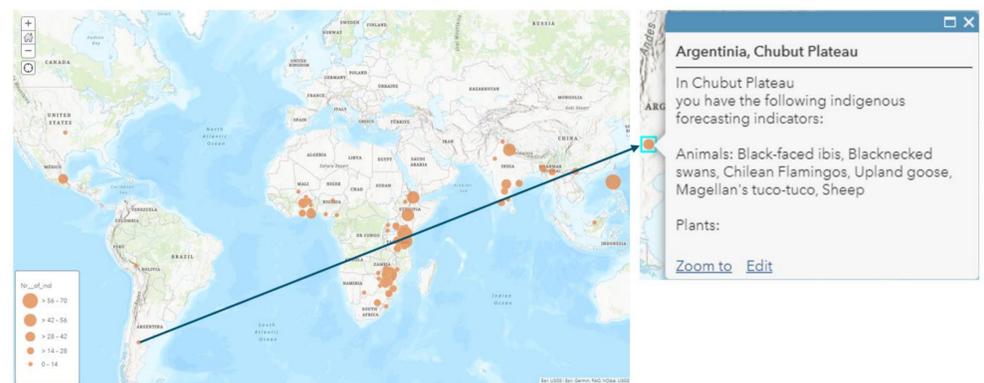
Figure. Interactive map depicting regions in the world where farmers use indigenous indicators for farm decision-making, together with these indicators and associated scientific literature on the region(s) and indicator(s); example for a study case in Argentina.

Acknowledgements