



# Innovation in weather data and climate change solutions: improving cassava crop yields for smallholder farmers across Tanzania

Concept note for interventions that have the potential to be scaled to millions of farmers across Africa



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## Executive Summary

**Background:** In Sub-Saharan Africa, agricultural losses due to climate change are predicted to be severe in several areas. Some models indicate that average yields of rice, wheat and maize will decline by up to 14%, 22% and 5% respectively by 2050. While increased temperatures and lower rainfall threaten to significantly reduce yields of certain crops, scientists believe that cassava productivity could be positively impacted. Smallholder farmers, the vast majority of whom are women, will be disproportionately affected by climate change. For these farmers, the goal of increasing cassava yields, which are currently on average at only one-third of their potential, is important as cassava can provide an excellent insurance against possible famine due to changing weather patterns. In order to increase yields, farmers must have access to cassava specific agro-meteorological information and other weather data products, such as crop insurance, to improve productivity and food security.

**Problem:** Access to credible, local weather data and other weather-related products for smallholder farmers in Sub-Saharan Africa is limited. Poor weather tracking infrastructure and forecasting are major barriers to farmers receiving the information they need to increase yields and combat global warming. A recent report by the Economic Commission for Africa stated that Africa has eight times fewer weather stations than recommended by the World Meteorological Organization, with the majority of existing weather stations not even reporting data. Additional data indicates that Tanzania only has about 15 weather stations that meet international requirements, while the country has a need for 300 to 500 stations. When farmers do receive weather information or weather-specific agronomic advice, it is often inaccurate or communicated in a way that farmers do not understand.

**Solution:** With a grant from the European Union, Kukua has developed a low-cost, Internet-connected and solar-powered weather station that provides real time weather data. By installing 100 weather stations across Tanzania, Kukua, Foreca and PARTNER X will fill a significant gap in Tanzania's weather tracking infrastructure gap. In addition to installing weather stations, Kukua and partners will implement a user-centered design approach to develop cassava agro-meteorological products that will empower smallholder farmers and make them more resilient to climate change. These products will be tested with approximately 3,000 cassava farmers during design phase, and potentially up to 17,000 during the pilot. GSMA reports that a user-centric approach in service design can help develop better, more usable, weather services for farmers.

### **Specific Objective of this Proposal:**

- To increase the number of new weather stations in Tanzania by 100
- To implement a user-centered design approach to develop two prototypes of agro-meteorological products that will have impact on cassava growing smallholder farmers
- To pilot the two prototypes with 20,000 cassava growing smallholder farmers in Tanzania



**Expected Outcomes:** To improve weather data collection infrastructure, Kukua and partners will install 100 weather stations in cassava growing regions of Tanzania. Data from these stations will be used to improve the understanding of cassava growth dynamics, nutrient and water requirements in order to increase cassava productivity and quality. Additionally, data from stations will aid scientists and partners in the creation of a database of geospatial cassava agronomy information that can be used to identify constraints to cassava productivity. Finally, the project will work alongside smallholder farmers and other key stakeholders to create a set of cassava agro-meteorological products, such as hyper local weather forecasts and crop insurance, to improve cassava yields and increase the food security of farmers.

**Scalability:** The effects of climate change, and the concurrent lack of accurate weather data, is a major problem across the entire African continent. We aim to make our solutions scalable to millions of farmers across Tanzania and other African countries. We are already in touch with partners who will enable us to scale these interventions rapidly across multiple countries, including telecom companies and seed companies like SeedCo.

For more information, please contact Tom Vanneste: [tom@kukua.cc](mailto:tom@kukua.cc)

