WIMS: Weather Information for Maize Sustainability

Through this challenge, Kukua and IITA will implement an innovative pilot - WIMS (Weather Information for Maize Sustainability) for increased yields of maize amongst 250 smallholder farmers in 5 clusters in Nigeria, harnessing the power of both ground based and satellite generated weather data. Combining weather information with knowledge of maize growing cycles, WIMS will empower smallholder farmers to make better farming decisions in a context of climate change and less predictable weather patterns. Impacts of WIMS will include: enhanced incomes through higher yields; reduced risk of losses during the growing season; improved food security; enriched nutrition for maize growers, their families and communities.

We will create a tailored, localized function within Kukua's Microsoft-supported Weather App for Africa through which to communicate weather forecasts (daily, weekly and seasonal) in addition to agronomic advice driven by the forecasts to extension workers, outreach teams and farmers throughout a growing season. Information will also be delivered via SMS, with comparisons made between the delivery methods. In the future, such information can be scaled to other staple and commodity crops.

Kukua has developed an innovative weather station at the forefront of "Internet of Things" technology: connected to the Internet, solar-powered, and cost effective, it is ideal for Africa. Kukua stations upload weather data to the "cloud" every 15 minutes, and include high quality sensors from DAVIS with a simplified communication piece. Our ground data is combined with weather data collected by satellites, resulting in an enhanced forecast. Kukua has over 65 weather stations reporting data in Nigeria. Our research shows that the majority of farmers in Nigeria lack access to scientific weather forecasts, often relying on traditional methods to predict weather: methods that are increasingly unreliable as climate change brings unexpected patterns. WIMS will apply data-driven forecasts to the challenges of maize farming, resulting in yield increases of up to 20%.

HYPOTHESIS 1 The provision of daily, weekly and seasonal forecasts empowers famers to make more informed agricultural decisions, and to implement climate smart practices where appropriate. Combined with simple agronomic advice, such forecasts have the power to facilitate: more effective and economic inputs; greater outputs and improved livelihoods through yield increases of up to 20%.

HYPOTHESIS 2 Innovative approaches towards the delivery of weather information are critical to ensure success of tool adoption and use among farmers to success. In addition, efficacy of information is crucial to building trust and effecting behavioural change long-term. WIMS' data and technology-driven approach will effect such change by injecting scientific information into an arena typically led by empirical experience.

In the pilot phase, success is expected because we will offer and test an innovative combination of crop-specific weather information and agronomic knowledge, resulting in uniquely relevant advice and decision-making tools for farmers. Longer-term, the easy scalability of this intervention means that success can be expanded across crop types, geographical boundaries and climatic zones. Importantly, success will be driven by the proven positive results derived from the application of information and from increased trust in weather forecasting services when derived from reliable data sources.

PILOT PLAN

- Maximise data from 65+ weather stations in Nigeria, combining it with additional data sources to generate powerful information to benefit maize farmers.
- Develop and pilot algorithm for providing agronomic guidance based on expected weather conditions in target clusters.
- Use tools including smartphones to effectively deliver guidance and suggestions with daily, weekly and seasonal forecasts.
- Use Kukua Weather App and Kukua SMS service to deliver messages to farmers related to the maize seasonal cycle based on weather information. x3 clusters to receive information via App and x2 clusters to receive data via SMS only (for comparison).
- Undertake educational activities to stimulate dialogue about, and understanding of, climate and weather issues specific to the target clusters' needs, experiences and location. In addition, training related to technology use.
- Implement 'push-pull' interaction with farmers and stakeholders through pre and post pilot questionnaires, to demonstrate the efficacy of the project and gather data from target clusters.
- Activate continuous feedback loop throughout the pilot to enable project partners to undertake continuous improvement of service delivery.
- Innovative technologies employed through this project: weather stations designed for Africa; soil moisture sensors to further enhance forecasting models; Kukua Weather App; Kukua SMS service (to be compared for effectiveness and appropriateness).

BUDGET	Quantity	Unit Cost USD	Budget $
Soil moisture monitors	5	2,100	10,500
Ideation and development of:			
Agriculture advice for App			19,000
Algorithm development			12,000
Education development			9,000
SMS service costs	83,350	0.06	5,001
Data provision			5,500
Smart phone provision	40	100	4,000
Training outreach staff	20	300	6,000
Training farmers (workshops)	10	1,000	10,000
Maintenance of weather stations			5,000
Overhead provision		0.15	12,900
TOTAL			**98,901**

Data collected and applied will include: weather & soil moisture data; satellite weather data; farmer baseline data; yield data; feedback on value of services; App versus SMS effectiveness; App usage data.

If successful, the next steps are: scaling across maize farmers in Nigeria then across other SSA countries/ crops. Sustainability will be ensured through the wide use of the App in the long-term by creating partnerships with local input suppliers (agrodealers) and other relevant businesses which have been mapped by IITA in preparation for introduction of innovative tools that can improve farmers' productivity.