Kulima Intelligence is a start up that collects data from smallholder farmers using smart sensors and leverages machine learning to create data that improves yield and increase food security in Africa.

The use of smart sensors also known as Internet of things and combining it with artificial intelligence is a new frontier for technology. It is both unconventional and creative because there has not been such an approach taken with smallholder farmers particularly in the developing countries at such a scale.
It is creative because it uses a hybrid of powerful technologies to solve a complicated need of food security.
This idea also leverages the expertise of partners from different backgrounds such as Women farmers, agrochemical producers , researchers and technology engineers to bring together diversity of thought which thereby increases chances of positive results.

Using a portable and inexpensive weather station fitted with smart sensors and drone imaging, readings from the environment will be extracted and relayed into the cloud platform via mobile internet connectivity. Once the data has been received in the data warehouse it is analysed using artificial intelligence algorithms that look for patterns and trends . These data sets are further analysed to give predictive analytics of outcomes if various actions are taken on the plants.
As more weather and environmental data is collected more accurate predictive models can be created. The objective of collecting and analysing this data is to be able to make sense of the effects of Climate change and environmental impact. Once all this data is collected it will be shared with the organisations that will use it to improve assistance to farmers and in being proactive to alleviate drought and famine.

We expect this model to be successful because of the following factors

- We are building it from the grassroots, with the collective input of the farmers and every entity involved in the agriculture ecosystem.The group of Site-Specific Agriculture - Big Data from CIAT will partner Kulima, bringing expertise on the analytical side, in particular leveraging Kulima and CIAT`s experience on machine learning algorithms. In a nutshell we are banking on the diversity of the team.
- We intend on using the most reliable technology services available . on the user end of the farmers where we collect data, we intend on making the technology very simple and user friendly so that the farmers get the best results. Once the data has been collected into the cloud we intend on using precises algorithms to compute and analyse the data to get actionable information.

Implementation plan, Budget and timeframe

Phase	Objectives	Timeline	Estimated Expenses	Responsible Partner

Set up	• Research & Consultations • Prototyping and production of sensors.	4 Months	Admin- USD18,400 Dev & Production -USD30,000	• All Partners on board • CIAT
Pilot Phase	• Roll out to farmers • system goes live for data collection. • Testing of Hypothesis • Outreach Campaign	6 Months	Admin- USD 27,600 Tech Operations- USD 8,000	• Kulima Intelligence • CIAT • All Partners on board
Evaluation	• collect feedback from all stakeholders • Evaluate activities and data collected	2 Months	Admin - USD 9,200 Feedback sessions-USD 6,000	• Kulima Intelligence • CIAT • All Partners on board

During the pilot we expect to generate the following data

Raw Data	Actionable Data
1. Weather / Climate data a) Rainfall patterns. b) Air humidity c) soil humidity d) soil PH levels e) wind speed and direction f) sunlight intensity g) plant thermal imaging from drones 2. Plant growth data 3. Farmer behaviour	1. When to plant for maximum harvest. 2. When to treat the soil with fertilizers for maximum absorption by plants 3. Warning informations when plants are under stress. 4. Remedial actions to take when plants are under stress. 5. Factors affecting plant growth 6. Tailor made data for farmers based on their farming behaviour

Success of the project will be measured in these key result areas

1. Acceptance of concept by smallholder farmers
2. Successful collection and transmission of accurate reading from the field from the Smart sensors
3. Creating of data that predicts trends and models that can be used to improve farming activities.

When the pilot is a success the next step will be to increase the number of partners gradually as we roll out the solution to other geographical location. We will also take additional steps to improve the quality of data collected and predictive results so as to create more accurate and actionable information.