

15: Democratizing Food Systems Technology

A man with short dark hair, wearing a green and blue plaid shirt, is shown in profile from the waist up. He is holding a tablet computer with both hands and looking at the screen. He is standing in a field of tall green grass or crops. The background is slightly blurred, showing more of the field and some trees in the distance under a bright sky.

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We help farmers in vulnerable communities with crowd-sourced, mechanising field and research data, organized with artificial intelligence, that improves efficiencies with the right technologies, becoming a trusted resource that accelerates smart farming, builds new markets and establishes new economies.

The Problem

Small holder farmers in developing communities are languishing today due to low rates of productivity, food insecurity, lack of market access, malnutrition and dramatic climate changes in their environment. It has been estimated that 60% of their losses are due to lack of the right technologies.

To fill this gaping need and empower these farmers, we are building a crowd-sourced, experiential, AI/data-driven advisory platform with strong community feedback loops, that places best practices around smart farming at their fingertips... bridging the gap for accessing technology and leveling the playing field.

Beyond funding our platform, we need your help to promote community awareness so we can collect information from surveys, census data and more. Uniquely responsive to indigenous needs, our program addresses core challenges across global food systems and unlocks the potential of data and technology to generate positive systemic transformation one community at a time.

The Solution

Democratizing technology can profoundly change the way people see things. In fact, we are essentially co-creating new visions for small-holder farming communities, helping them to build nurturing and regenerative food systems with smart farming. By collecting crowd-sourced data, organized and delivered in a personalized way, our solution is game changing. It will help small-holder farming communities to build new markets, raise entirely new economies and promote confidence, trust and dignity in communities that are marginalized and vulnerable to external shocks like climate change, pandemics, war and more.

The Impact

Usable data with lasting impact is built from the ground up... and this takes time. In the building phase - where we collect indigenous learnings and curate these with artificial intelligence-generated research - we believe our short term impact will be social cohesion. This occurs when farming families come together to discuss unique farming challenges and how they are surmounting them.



Working closely with a local university to collect indigenous knowledge, and integrate it with evidence-based research, our medium term impact will be to apply crowd-sourced data to everyday challenges of farmers and provide road maps for achieving better results. We also gain sustainability from an army of students who work in our program - an alumni of “Food Systems Ambassadors” that can continue building new visions by democratized technologies.



Long term, as results are published across communities, we envision wide-scale use of regenerative best practices that improve production and livelihoods, integrate subsistence farming with global food networks, improved gender inclusiveness in policy development, the formation of new markets and much more.



Small-holder farmers in vulnerable communities will no longer be left behind or forgotten. Suffering from inefficient production that contributes to generational poverty and poor health, our solution positions rich streams of curated, actionable smart farming data that was previously inaccessible - both indigenous and evidence-based learnings - into a trusted, crowd-sourced solution that empowers them, unlocking and promoting best practices that are both transformational and essential for building resilient, thriving economies.



Turning Barriers into Opportunities



From Big Data to End-users: Creating and organizing volumes of structured and unstructured data (indigenous and research/applied data) into digital libraries that have easy to access and useful information. Dissemination of the findings will be a challenge given that a large part of our target has limited access to the internet and knowledge of digital tools.



1. Gathering community co-created data and combining it with evidence from global institutions, using artificial intelligence, to deliver data that uses easy to understand tools like infographics and data visualization (i.e. USAID “agrilinks”); organized into discrete “helps” for small-holder farmers
2. Collaboration between teams of data scientists and research institutes / universities to build artificial intelligence models and produce insights from collected data;
3. Governments are planning infrastructure like 5G and broadband that bridge the digital divide, bringing access to internet/telephony
4. Partner with local actors (e.g. extension workers, state agencies, NGOs, universities) to disseminate our solutions to end users
5. Dissemination: solutions tailored to each target (e.g. voice to text capacity for linguistic barriers)



Funding and Partnerships: Our solution relies heavily on human, digital and hardware resources that could render it costly. Additionally, it involves the cooperation of stakeholders needed to collect, process and analyse the data. The success of this project depends on our ability to define sustainable business models around the content covered by our solution and sharing attractive ways to involve our different partners.



1. Finding partners that are building programs that can leverage our solution instead of reinventing the wheel. This will cut down mutual costs as we engineer social change.
2. Create sustainable business models around our solutions that fund existing and future operations and development
3. Support from non-profits and state/region projects for funding



Overcoming the Status Quo: Ingrained mentality and behavior is a main barrier for our solution. While our solution aims to merge indigenous knowledge, research data and digital solutions, our target is largely not accustomed to new technologies so they need to be presented



1. Reshaping farmers' mentalities and behaviour through sensitizing campaigns, promotion and trainings on our solutions;
2. Community inclusion in ideation and solutions: Make use of an iterative, user-centered development approach which emphasizes end-user involvement to ensure the solution meets the needs of the users and eases the solutions' implementation. Government and/or other partners can fund pre-scale, community co-created forums that help us to progressively build the final solution that has a manageable learning curve for the small-holder farmer (i.e., like providing phones preloaded with app, etc);
3. Showcase that our solutions are based on success stories to reassure our target.

Navigating Unknowns



Potential Unintended Consequences

Artificial Intelligence involves challenges, such as the risk of overfitting datasets, resulting in recommendations that don't generalize well with new data inputs.

In a few cases, performance increase advice could produce less benefit relative to technology cost.

Our platform can disrupt power structures of traditional big technology providers causing ripple effects in financing (like lending institutions being nervous about technology they haven't seen before) and farmer debt from technology investments can stress smallholders.



Thinking Ahead - *strategies to avoid these consequences*

Use the best machine learning training techniques and tools available, such as regularization techniques.

Use continuous improvement strategy to close the loop: Information on both success stories and less fruitful outcomes is fed back into our artificial intelligence engine to improve both (a) training data sets; and, (b) underlying assumptions of its model (in cases where outcomes failed to meet expectations).

The AI-based recommendation platform takes into account both performance improvement and cost, as well as what debt is manageable, thus helping farmers avoid runaway debt. We will teach lending institutions about our approach of continuous improvement via feedback mechanisms, and allow them open access to our performance progress information, thus building trust among both farmers and lending institutions.

Our initial thrust will be to gather indigenous knowledge and this involves implementing structured community meetings involving all the stakeholders. Full stakeholder involvement is pivotal for buy-in of the final product. Their use of the product will fuel the success stories we need to progressively build our solution. This will involve project funding so we can engage indigenous NGOs aware of existing social structures (leap-frogging time to develop).

Concomitant with funding, we need university partners to provide students that help with our initial database build. This includes curating indigenous knowledge collected from village meetings and evidence-based research from around the world. These two streams of data, and perhaps others, will build our library that moves knowledge to actionable data for small-holder farmers. The university should have active programs in agronomy, nutrition and the arts (linguistic capacity).

We need technology partners, not necessarily in the farming sector, but with superior competency in artificial intelligence, human-centered App design, mobile telephony and more. Finally, we would like government sponsors from the outset to ensure our program resonates with critical policy considerations.



Similar Solution in Action

In Nairobi, through creation and sharing of agronomy video content through a mobile application, we are offering farmers a helping hand in being informed, adaptive and smarter thus becoming more productive and economically uplifted.

In Kasese, Uganda, by using synergistic farming and nutrition principles we have reversed the condition of stunting in two cases; and, are advancing an ICT/drone-enhanced food system with active community support that can transform food security, household income and mobility (access to market), health education and more.

We have connected tractor owners and smallholder farmers in Sub-Saharan Africa through a farm equipment management and sharing application that reduces total cost of ownership (acquisition, maintenance, license and more) and enables them to earn more, increase production while building livelihoods and improving food security for their families and communities.





 Cohort Participation Countries

ENABLING
TECHNOLOGY TO
CREATE SPACE
OF **TRUST**
BETWEEN FARMERS

