

# YieldWise Innovation Scan Phases I and II Report for AGRA

The Global Knowledge Initiative  
YieldWise Innovation Partner  
December 2016

## Table of Contents:

3	Phase I: Innovation Considerations and Options
12	Phase II: Identification of Video-Supported Extension Opportunities
27	Appendix I: List of Experts Consulted
28	Appendix II: References
30	Appendix IV: Background on the YieldWise Innovation Scan

Developed by:



The Global  
Knowledge Initiative

In partnership with:



Funded by:



The  
ROCKEFELLER  
FOUNDATION

## About this Report:

This report is one of three Innovation Scan reports the Global Knowledge Initiative produced in 2016 to support the YieldWise Initiative, a Rockefeller Foundation supported effort to demonstrate a halving of post-harvest food loss in Sub-Saharan Africa. GKI — the YieldWise Innovation Partner — conducted a two-phase Innovation Scan process to address a pressing innovation request from each of the YieldWise Implementing Partners — the Alliance for a Green Revolution in Africa (working to reduce post-harvest loss in Tanzania's maize value chain); PYXERA Global (working to reduce post-harvest loss in Nigeria's tomato value chain); and TechnoServe (working to reduce post-harvest loss in Kenya's mango value chain). In Phase I, GKI investigated possible innovation options and key decision-making considerations. In Phase II, GKI used feedback from the Implementing Partners to delve more deeply into specific innovation opportunities poised to positively impact their ongoing YieldWise efforts.

The following report presents consolidated Innovation Scan findings (Phases I and II) on the innovation request presented by AGRA: *How might we leverage information and communication technologies (ICTs) to scale extension and training solutions that support behavior change among smallholder farmers?* For more information on the Innovation Scan process GKI undertook, see Appendix III (p. 30).

## Acknowledgements:

Ritse Erumi, GKI Doctoral Fellow, researched and authored this report, along with co-author Amanda Rose, Senior Program Officer. GKI Program Officer Renee Vuillaume supported this work.





YieldWise Innovation Scan  
Prepared for: AGRA  
Prepared by: The Global Knowledge Initiative 2016

## Phase I: Innovation Considerations and Options

Photo: Mitchell Maher via Creative Commons

### Innovation opportunity of focus:

*How might we leverage information and communication technologies (ICTs) to scale extension and training solutions that support behavior change among smallholder farmers?*

Agricultural extension and advisory services—those that support the “act of disseminat[ing] expert agriculture knowledge and practices”—play a critical role in enhancing post-harvest management, and thus reducing post-harvest loss, among smallholder farmers (Toyama). As such, enhancing the quality and scope of post-harvest extension services constitutes an essential element of the YieldWise model. The Alliance for a Green Revolution in Africa (AGRA), for example, seeks to provide extension and training on good post-harvest management practices and technologies to 80,000 maize farmers in Tanzania. Operating at that scale, while still maintaining high-quality support to smallholders, presents AGRA—and many others working in agricultural development—with a considerable challenge, but also a welcome opportunity for innovation.

The challenges facing agricultural extension services in Africa are well-documented. Resource constraints, high rates of farmer illiteracy, limited mobility of extension agents, poor linkages between research and extension systems—these are but some of the issues that hinder the provision of extension services in Africa. Layer in the universal challenge of promoting behavior change in adults (a difficult prospect in any environment), and the need for innovation becomes quite clear. Insufficient coverage by extension agents amidst millions of smallholder farmers is recognized as one of the most problematic issues. In Tanzania, estimates indicate the extension agent-to-farmer ratio to be as high as 1:630 (ASHC). Public extension agents, who provide up to 95% of extension services in Tanzania, reach only an estimated 10% of farming households (INAGES).

Information and communication technologies (ICTs) are garnering increasing attention for their potential to help scale agricultural extension and training (Bell). ICTs offer an impressive capability to share knowledge, connect people across distances, and mobilize resources in ways unimaginable even 10 years ago. That said, many ICT for agriculture initiatives (including for agricultural extension) have remained in the realm of successful pilots and compelling case studies, but have not yet achieved widespread



impact at the scale envisioned by so many in this field. According to Michael Bell of the University of California Davis, “many ICT for agriculture initiatives have seemingly oversold themselves in terms of success or they ceased as soon as project funding dried up” (Bell). Bell goes on to state that, “despite the promise and some encouraging initiatives, many ... didn’t reach the scale needed for widespread impact” (Ibid.). The Technical Centre for Agricultural and Rural Cooperation (CTA), which is undertaking an ongoing effort to build an Apps4Ag Database, builds on the critique of the current ICT for agriculture landscape. Through their Apps4Ag initiative, CTA found there is a:

*“highly diverse nature of ICT applications with little coherence in their development process, resulting in huge overlaps in the services offered in some areas and leaving gaps in others. Instead of maximizing their target audience by leveraging several channels, most focus on the power of a single channel to reach their user” (Addom et al.).*

These criticisms of the ICT for agriculture landscape highlight a prevailing dichotomy that characterizes this space: on the one hand, unparalleled possibilities, fueled by falling device costs, fast-expanding ICT (especially internet) access worldwide, advances in big data, etc.; and on the other hand, a debatable track record in leveraging this potential to promote behavior change and achieve impact at scale. Indeed, bridging this gap between the unparalleled possibilities for and the debatable track record of leveraging ICTs for agriculture (including agricultural extension and training) offers a compelling space in which AGRA and other agricultural development proponents are poised to inject innovation and creativity.

## Considerations for decision makers:

There are a host of factors with which decision makers must contend as they consider how they might leverage ICTs to scale extension and training solutions that effectively promote behavior change among smallholder farmers. A few of the most important considerations follow below. These considerations are meant to serve as a caution ahead of reviewing the innovation options offered: more business model evaluation and customer/user analysis is warranted in advance of determining how and which ICTs might be most effective in scaling extension and training solutions.

- 1. Design for scale from the outset.** The principles of achieving scale are well known, at least based on the evidence of the innumerable companies (and their software applications, products, and services) operating at scale in our daily lives. In the realm of ICTs, the Googles, Facebooks, and Twitters of the world, even the mobile phone revolution itself, serve as everyday reminders that achieving scale (and doing so quickly) is possible. But the golden rules of achieving scale too often aren’t followed in agricultural development. Thus, many promising ICT for agriculture pilot projects fall victim to the issues raised above.

Joel Selanikio, globally recognized ICT-for-health expert and [Magpi](#) creator, highlights five characteristics of highly scalable ICT-based interventions, each of which is worth bearing in mind. Scalable ICT-based solutions are those that: offer a really useful product (this is non-negotiable); use cloud-based infrastructure; require no training for users to understand and apply the technology; can be used by a vast number of users as is (i.e., no customization by programmers needed); and need no consultants or “experts” to fuel adoption (Selanikio, 2013). As such, the most pertinent issues are about business model, not technology. For Selanikio, scalability requires business models fueled by paying customers, not



donor-supported grants (Selanikio, 2016). Numerous business models exist within the ICT sector (e.g., freemium plans for software applications and advertising-based revenue models); further business model innovation is likely to emerge, especially as the ICT for agriculture field matures.

- 2. Incorporate what supports behavior change.** Behavior change literature and practice show that human behavior is complex and that access to knowledge is not always sufficient to spur change. Therefore, extension models and technologies that simply focus on sharing information about post-harvest management may not be terribly effective. A person's behavior is derived from a combination of their capabilities, the opportunities before them, and their motivations (Miche et al). To effectively mobilize these behavior drivers, interventions need to consider the **knowledge and skills** that create the capacity needed to change, the **resources** that set up opportunities to change, and the **incentives** that motivate change.

Too often, extension and training programs promote knowledge and skills in isolation of the resources and incentives needed to spur a person into action. Indeed, the bundling of knowledge, skills, resources, and incentives via ICT platforms has proven an increasingly effective strategy for promoting behavior change (Bell). This may involve partnerships with mobile network operators to support an increasingly robust suite of services that address a number of farmer needs, such as mobile money applications and e-extension services (Ibid.).

- 3. Clarify the extension and training objectives to be met.** ICTs can be used within the context of extension and training programs to serve a variety of needs, such as: diagnose problems faced by farmers; collect information on farmers' practices; raise awareness on a general topic (e.g., well-known best practices); provide targeted information to address a specific need or opportunity of an individual or group of farmers; enable access to inputs and credit services; help farmers link with markets and buyers; support business planning; and collect and respond to farmer feedback on a host of issues (Vignare). The objectives of a particular intervention should be taken into account when determining which ICTs might be best suited.
- 4. Understand potential users.** The most effective ICT-based extension and training programs are those that are clear about their target audience, provide information tailored to users' needs and interests, and use multiple channels to connect with those users (Bell). Decision makers also should consider their potential users' appetite for risk-taking and willingness to adopt new technologies and approaches. Rogers' theory of technology diffusion notes that, in most contexts, there are "innovators" and "early adopters" who take up a new technology or approach with little resistance (Rogers). Subsequent research by Gladwell, for example, highlights that "wider adoption relies on attracting 'early adopters' up to around 15% of the target population" (Gladwell). It is important to understand the characteristics of these likely "early adopters" and how the tipping point of 15% might be achieved when developing and implementing ICT-based extension and training programs.
- 5. Take a flexible approach.** Experts agree that successful ICT-based extension and training programs "show remarkable flexibility and agility of effort" (Bell). This includes avoiding getting locked into an ICT infrastructure that might not address operational constraints or emerging needs and opportunities. Technical issues involved in maintaining flexibility include, but are not limited to, issues of: ICT tool



interoperability; ability to “push”, “pull”, and analyze information from various sources; bundling of multiple services and applications; and ensuring long-term data and infrastructure improvements.

- 6. Prioritize gender considerations.** Gender considerations need to be prioritized in the identification of ICT-enabled extension and training solutions for smallholder farmers. It is estimated that 53% of small-crop producers in Tanzania are women (World Bank). Additionally, post-harvest activities are primarily considered women’s work in Tanzania (Leavens & Anderson). However, women farmers often encounter gender-based barriers in accessing training and other farming inputs. Therefore, approaches to addressing post-harvest loss reduction through training will need to be designed for and actively engage women.

## Summary of innovation options reviewed:

### Categories of ICTs for agricultural extension and training

The following table provides a list of the leading ICTs and related tools that have featured in agricultural extension and training programs to date. The options are organized by technology type, and feature 1-2 examples of how this tool has been used to support agricultural initiatives. The categories of ICTs featured include: **(1) broadcast technologies** that disseminate audio and visual content to a distributed audience; **(2) mobile devices and services** that leverage both conventional and smartphone technology to communicate with and provide services directly to users; and **(3) computers and internet-based resources** that enable individuals and groups to tap into a host of online assets from simple websites, to web conferencing, and more (Vignare).

Broadcast Technologies	
	<p><b>Radio</b> Radio interventions focus on broadcasting information to farmers, such as through advertisements or radio dramas. Radio talk shows generally allow farmers to correspond with the broadcaster via SMS.</p> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Well-recognized for its effectiveness in promoting improved practices among farmers, <a href="#">Farm Radio International</a> has a mission to help “African radio broadcasters meet the needs of local small-scale farmers in rural communities. Their <a href="#">participatory radio programs</a> are distributed through over 500 African radio broadcasters in over 38 African countries.</li> </ul>
	<p><b>TV</b> “Edutainment” television programs are used to entertain while communicating important information.</p> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>A <a href="#">reality TV show</a> produced by Oxfam and broadcast on YouTube highlights the struggles and opportunities of female farmers in Tanzania: <a href="#">Female Food Heroes/Mama Shujaa wa Chakula</a>.</li> </ul>



	<p><b>Video / Mobile Cinemas</b></p> <p>The use of simple videos to train farmers often in rural areas and at farmer group meetings is a growing area of application. Typically, this option requires an educational video, a screen, projector, and generator (if not solar-powered).</p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• The <a href="#">Cinema-in-a-backpack</a> is a mobile, easy to operate package of tools including a projector, speakers, battery, and a tablet, being piloted by MOSAIC 2B in South Africa. Their pilot is testing whether such technologies are viable options for <a href="#">small-scale entrepreneurs</a> seeking to provide entertainment and other consumer-based services in rural villages.</li> <li>• A <a href="#">Mobile Cinema</a> program run by the Swiss and Dutch aid agencies emphasizes sensitizing farmers on good agricultural practices and innovative technologies poised to enhance their on-farm productivity and efficiency.</li> <li>• A farmer-to-farmer video project by <a href="#">AfricaRice</a> — in which local production teams are trained and farmers demonstrate/teach — is said to have significant reach among women farmers.</li> </ul>
	<p><b>Solar Projector (to support video broadcasts)</b></p> <p>Projectors that are powered by solar energy are emerging as a potential viable option in places where power supply may be limited, inconsistent, or non-existent.</p> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>• In Malawi, OneBillion.org is piloting a <a href="#">solar-powered mini-projector</a> developed for teaching in schools. The <a href="#">Solar-Powered Optoma ML750e</a> projector was designed to address issues of mobility, brightness, durability, simplicity, and of course, power supply.</li> </ul>
	<p><b>Print Media</b></p> <p>Printed material is still viewed as a viable form of communication, despite persistent inefficiencies with sharing and integrating the information provided. Comics can be used to communicate information on post-harvest management practices and technologies; printed pictures and diagrams also prove important in areas where low literacy rates prevail.</p> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>• A <a href="#">comic book</a> on maize planting was created by the Africa Soil Health Consortium (AHSC) and distributed through the Farm Input Promotions Africa (FIPS-Africa) network of village resource advisors. A FIPS officer reported that farmers who received copies of the comic book were 20% more likely to adopt the maize spacing recommendations being promoted by FIPS-Africa. The comic targeted young people and provided those in farming families with opportunities to interact on good farming practice.</li> </ul>



## Mobile Devices and Services



### Mobile Messaging Services

The delivery of information to farmers via short message service (SMS) and audio (voice calls and interactive voice response, or IVR) is another option in play. Examples of the type of information that can be delivered includes information on the weather, climate, market prices, new skills, and reinforcement of old skills.

#### Examples:

- Messaging platforms that support delivery of information via different channels – SMS, audio (voice and IVR), or video include, but are not limited to: [8Villages](#); [Awaaz.de](#); [Farmerline.co](#); and [FrontlineSMS](#). These platforms often are used alongside regular radio broadcast, where they are used to field questions and broaden the reach of the messages, and/or call centers where farmers can receive feedback on their specific inquiries.
- [AgriNet Uganda Limited](#) operates a market intelligence system that provides real-time agricultural commodity prices and trade alerts (e.g., communicating opportunities to buy or sell to a specific market) via SMS, as well as through email, radio, and other channels.



### Information Management Platforms

Internet-enabled mobile phones and tablet devices are becoming increasingly accessible in Sub-Saharan Africa. As device prices continue to drop, this trend is likely to continue. As a result, sophisticated software applications that bundle multiple service offerings are becoming more available. While their viability remains unproven in many cases, these multi-function applications offer a growing innovation space ripe for experimentation and learning in the context of scaling extension and training efforts for YieldWise.

#### Example:

- Safaricom's [Connected Farmer Platform](#) offers a multi-function application that includes: farmer database management; communication with farmers and other value chain actors; transaction tracking and mobile payment management; and administration / data analysis, among other functions. The platform functions off-line, and allows information sharing between / among internet-enabled and conventional mobile phones.

## Computers and Internet-based Resources



### Computers

Low-cost computers can be used to easily record and disseminate training sessions, as well as support print and web-based resources such as online learning platforms and agricultural extension resource repositories.

#### Example

- [The Talking Book](#) is a low-cost audio computer designed for the learning needs of illiterate populations. It is used to record audio and listen to lessons on demand (often after extension officers have left farmer group meetings). It gives farmers flexibility, which is proving effective in addressing the learning needs of women.



	<p><b>Social Media</b></p> <p>There are a growing number of social media resources available to extension agents and tech-savvy farmers with access to internet-enabled devices. Navigating this vast world of resources can be difficult, but also worthwhile.</p> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">E-agriculture</a> is a global online community comprised of over 10,000 members brought together by a focus on utilizing ICT for agricultural development. The group boasts a large, active presence on Facebook, Twitter, and LinkedIn.</li> </ul>
	<p><b>e-Extension Resources</b></p> <p>Example:</p> <ul style="list-style-type: none"> <li>• In 2007, the Philippines launched its noteworthy <a href="#">e-Extension Program</a> through the Department of Agriculture. The Program's <a href="#">e-Learning platform</a> offers dozens of highly interactive courses that integrate puzzles, games, and other features to sustain user interest. Courses are offered online, in-person (through local extension offices), and in a blended format that uses both online and in-person instruction.</li> </ul>

## Innovative approaches to consider: Using ICTs to achieve specific extension and training objectives

Below, we present four case studies of organizations and initiatives that have successfully leveraged ICTs to meet four different extension objectives. In each case, organizations use different type(s) of ICTs (e.g., broadcast, mobile, or computer) to meet their desired objectives, indicating the importance of first determining *what* you want to achieve, then *how* to go about it. These case studies are not exhaustive, neither in terms of extension objectives to be pursued, nor organizations doing compelling work in this space. Rather, they serve as illustrations aimed at sparking creative brainstorming and planning on behalf of AGRA and others interested in leveraging ICTs to scale extension and training solutions that support behavior change among Tanzanian smallholder maize farmers.



## Case Study 1: Esoko

**Objective: Enable farmers to access knowledge, skills, resources, and incentives through ICT-based extension and training services**

[Esoko](#) is a mobile ICT platform aimed at facilitating the flow of market data across agricultural supply chains. It was launched in Ghana in 2006. Individual farmers pay a subscription fee to receive SMS alerts on market information as well as to upload buy and sell offers directly. This service has “helped reduce the costs involved in transacting business and searching for market information. Thanks to the enhanced transparency, farmers have gained the negotiating power needed to secure the most favorable prices for their products” (Narsalay et al.). Impact studies reveal that farmers report an average 40% increase in revenue from using Esoko.

In order to scale, Esoko launched a franchise model in 2009. Institutional users, such as agribusinesses, NGOs, and government agencies, can subscribe as a franchise to create their own agriculture information and training resources on Esoko’s platform. They then disseminate these advisory and training resources to local farmers. Institutional users are also able to poll and survey farmers on their needs and preferences. Institutions use the results to adapt their services and products to suit farmers’ needs. In this way, Esoko is “leading the way in agricultural informatics.” To date, Esoko has active exchanges for nearly 500 commodities and 800 markets in as many as 20 currencies.

## Case Study 2: Grameen Community Knowledge Worker Initiative

**Objective: Empower local stakeholders to serve as trusted, valued extension and training resources for their communities**

Grameen’s [Community Knowledge Worker](#) initiative aims to serve farmers in the most isolated rural villages through a network of peer advisors, or “trusted neighbors”, all of whom are farmers and many of whom were previously extension agents. “The initiative combines mobile technology and human networks to help smallholder farmers get accurate, timely information to improve their businesses and livelihoods.” Each peer advisor, or Community Knowledge Worker (CKW) is provided with a low-cost smartphone (\$80 USD) with custom Grameen apps. Through the apps, CKWs can access a database of agriculture information, such as weather, market prices, and best practices; use simple surveys to collect data on farmers; and take photos or videos as a means of collecting farmers’ stories. Additionally, there is a central messaging system that allows CKWs to track and report their service delivery to Grameen, who in return can provide the CKWs with real-time support.

The Community Knowledge Worker program first piloted in Uganda in 2009, in collaboration with the Food and Agriculture Organization of the United Nations (FAO). Since then, the program has reached more than 300,000 farmers through a network of more than 1,100 CKWs in Uganda, Colombia, Ghana, and the Philippines. In Ghana, Grameen is collaborating with Farm Radio International and Digital Green to distribute multi-media extension resources at a large scale.



## Case Study 3: Digital Green

**Objective: Provide easy-to-understand information in ways that users both enjoy and can envision how to apply what they've learned**

[Digital Green](#) "combines technology and social organization to improve the cost-effectiveness and broaden the community participation of existing agricultural extension systems." They partner with local organizations to produce videos on good agricultural practices, livelihoods, health, and nutrition. The videos feature local farmers demonstrating local best practices. This "just like me" teaching model builds both trust and an emotional connection with farmers. Digital Green then synchronizes the videos with existing extension activities: public and private agricultural extension systems already in place will disseminate the videos through screenings during regular farmer group meetings. The videos are openly available on Digital Green's website and YouTube.

To date, Digital Green has produced over 4,400 videos in more than 20 languages, reaching over 1 million individuals in India, Ethiopia, Afghanistan, Ghana, Niger, and Tanzania. More than 25% of videos were produced by or feature women farmers; the viewing audience is over 70% women (Vignare). In a controlled evaluation, Digital Green was found to be "10 times more cost-effective and uptake of new practices seven times higher compared to traditional extension services" (Bell).

## Case Study 4: Green SIM Service

**Objective: Bundle mobile network services with agricultural content to**

[Green SIM](#) is a packaged service offering that integrates mobile network service with the provision of agricultural information and advice. Launched in India in 2007, Green SIM is the result of a joint venture between the [Indian Farmers' Fertilizer Cooperative Ltd \(IFFCO\)](#), the country's largest farmers' cooperative with over 50 million members, and Bharti Airtel, the country's largest mobile network operators with over 200 million users. Users purchase a Green SIM card that operates like any other Airtel SIM card, but they also receive free access to voice and SMS-based agricultural information.

Green SIM operates via a shared revenue agreement between the two organizations, such that a portion of mobile airtime purchases go to sustain the agricultural service offerings. In addition to the voice- and SMS-based messages, users also receive access to a helpline they can call for extra information or to seek solutions for specific problems. According to GSMA, which provided seed funding for Green SIM, the business model adopts a "virtuous circle approach: Farmers receive free information and access to a qualified helpline at normal tariff ... Airtel gains rural market share, increased customer loyalty and further exposure as a leading mobile operator in India...IFFCO gains brand recognition, preference, and increased sales transactions by increasing the useful services it offers to farmers."

In Kenya, the Eastern Africa Farmer Federation (EAFF) is developing a pilot based on the IFFCO model to reach 100,000 maize and rice farmers.



YieldWise Innovation Scan

Prepared for: The Alliance for a Green Revolution in Africa

Prepared by: The Global Knowledge Initiative 2016

## Phase II: Identification of Video-Supported Extension Opportunities

Photo: Unsplash

### Innovation opportunity of focus:

*How might we leverage video to scale extension solutions that support behavior change among smallholder farmers in Tanzania?*

### Introduction: Phase II Objectives

In Phase II of the Innovation Scan, the Global Knowledge Initiative undertook an in-depth look at video-supported extension options as prioritized by AGRA. AGRA's selection of video was driven by their interest in working with farmers at the farmer group level and in addressing challenges related to Tanzania's agent-driven extension model. AGRA has adopted two strategies that reflect a desire to move towards bottom-up, demand-driven, and integrated support.

First, AGRA is supporting a robust effort to aggregate farmers into groups. Farmer groups can often help farmers realize benefits that are harder to achieve on their own, such as increased access to agricultural inputs, greater legitimacy in advocating for their interests, and better integration with markets and buyers. AGRA's current approach to delivering its programs at the farmer group level presents a ready platform for scaling extension efforts.

Second, AGRA is utilizing a community-based extension system as an alternative to the traditional extension system that relies on government-funded agents. In this community-based system, local farmer communities serve as sources of information and provide extension services and support to their fellow farmers. AGRA calls these individuals "village-based resources persons" (VBRP). Their membership within local social networks and proximity to local agricultural conditions position them as knowledgeable and more readily available resources for the local communities. A recent national smallholder household survey conducted by the Consultative Group to Assist the Poor (CGAP) in Tanzania found farmers primarily turn to their social network — friends, family and community members — and hardly ever to extension agents, as their sources of agricultural information (Anderson et al 2016). Therefore, AGRA's focus on equipping VBRPs to serve their communities is contextually strategic. These two strategies frame the context into which AGRA plans to introduce video-supported extension services.



Video is increasingly used as a mechanism for building knowledge and practical skills within agricultural extension efforts. Extension models in many developing country contexts typically rely on agents that disseminate information and provide ongoing training and support to farmers. Video often is used to train and update extension agents on new agricultural practices. With farmers, use of video typically focuses on spurring behavior change through raising awareness, providing training, and encouraging the uptake of good agricultural practices. Alongside digital technologies, such as mobile devices and applications, video is seen as a way to provide relatively affordable ways to scale the reach, and boost the efficient delivery of, agricultural extension efforts.

## Design Considerations for Video-Supported Extension:

Decision makers interested in incorporating video into agricultural extension efforts are encouraged to consider factors likely to influence behavioral outcomes. The Phase I section of this report outlines six considerations for initiatives seeking to leverage information and communication technologies (ICTs) to promote behavior change among smallholder farmers. Below, we drill down on how these same considerations might offer guidance for utilizing video for agricultural extension within AGRA's YieldWise interventions.

- **Design for scale from the outset:** Farmer group meetings present a prime opportunity for disseminating information on good post-harvest management practices via video. The farmer group context creates an environment in which learning can be reinforced through the social network. Video-supported extension solutions will likely need to capitalize on these opportunities and specifically hone in on the role VBRPs can play in implementing such solutions. VBRPs' proximity to farmers and likely participation in farmer group meetings can enable them to (a) gain a better understanding of farmer interests and needs, and improve the support they provide to farmers; (b) reinforce messages provided in the videos and foster a collaborative learning environment; (c) identify opportunities for follow-up; and (d) deepen ties within the farmer social network.
- **Incorporate what supports behavior change:** Difficulties in fostering behavior change are well known. Therefore, the messaging and content of videos will need to reflect a deep understanding of target farmers. This understanding might be seen in terms of the knowledge and skills that will enable farmers to acquire the **capacity** to change, the **resources** that will generate opportunities that enable farmers change, and the **incentives** that will motivate them to change their behavior. Practically, this likely means engaging with farmers and other value-chain stakeholders to learn more about farmer perspectives, such that video content and design can take these factors into account. Farmers can provide invaluable insight on a range of topics, such as: the contexts in which they operate; the interests, needs, attitudes and beliefs that motivate their choices and current practices; and knowledge gaps around good post-harvest management, as well as other knowledge gaps farmers seek to fill. This underscores the importance of the agricultural extension solutions are ultimately demand-driven efforts in which farmers play key roles in shaping design and development.
- **Clarify the extension and training objectives to be met:** The key objective of video-supported extension within the YieldWise initiative in Tanzania is for smallholder farmers to improve their post-harvest management practices. Bell



(2015) suggests that, to effectively achieve behavior change among farmers, ICT agricultural extension efforts should focus on providing information that:

- **Raises the awareness of the target audience:** It is important to ensure that information is accessible and widely available to smallholder farmers. This highlights the importance of using communication channels beyond video to reinforce key messages provided via video (such as mobile and radio).
  - **Piques the interest of the target audience:** Information should appeal to the interests and needs of farmers, and possibly increases their desire to know more. Feedback mechanisms aimed at incorporating information provided by the audience should be integrated into program design. When thoughtfully produced, video can be a compelling communication medium through which target audiences interface with visuals of people with whom they can identify. This can increase the credibility and appeal of the information among the target audience.
  - **Elicits a desire and decision among the target audience to do something:** A well-produced video for agricultural extension should communicate the relevance and benefits of the idea and demonstrate the ease with which the idea can be tested and applied.
- **Understand potential users:** For an innovation to achieve impact, it must first be adopted. Therefore, proponents of agricultural extension videos need to understand users' appetite for this type of innovation and the role social networks can play in spurring adoption. The engagement of potential "early adopters" and/or "champions" within local communities and established farmer groups likely will hasten acceptance and eventual adoption of video-supported extension services. Within AGRA's model, VBRPs are well positioned to help identify likely early adopters and champions within their local contexts.
  - **Take a flexible approach:** Infrastructure challenges (e.g. limited telecommunication and inconsistent power infrastructure) often characterize developing country contexts. Video-supported extension solutions need to be flexible and easily modified to address such constraints. Flexibility also helps ensure that user feedback and emerging needs/opportunities can be addressed within a reasonable timeframe. This consideration will directly impact *how* AGRA goes about designing and implementing this aspect of its work and *with whom* AGRA partners to bring it to fruition (such working with local partners).
  - **Prioritize gender considerations:** Women are estimated to comprise 53% of small-crop producers in Tanzania; they are the primary actors in post-harvest activities (Leavens & Anderson; World Bank). Consequently, video-supported agricultural extension solutions that address female farmers' interests and needs should be prioritized. For instance, prevailing gender norms may impede attendance or full participation in farmer group meetings, as well as their ability to rise to leadership positions (Manfre 2013). Attention needs to be given to how video-supported extension solutions are implemented at the farmer group level so that solutions are inclusive. Additionally, female farmers are said to have a preference for female extension agents (Isaya 2015). AGRA is poised to help address this preference by identifying female VBRP candidates and train them on how to support the implementation of video-supported extension.

With these considerations in mind, the next section provides an overview of innovation options for video-supported extension services.



## Implementing Video-Supported Extension Solutions

Implementing a video-supported extension solution involves three main components: (1) video production; (2) video dissemination; and (3) investment in sustainable video-supported extension models. This section provides some background, examples and recommendations for how AGRA might approach the design, development and implementation of video-supported extension solutions. AGRA might choose to undertake each of these components on its own, or engage partners to support all or parts of the components outlined below.

### (1) Video Production

Video production constitutes a key initial task in developing video-supported extension services. It typically involves two categories of activity: content development and technical production of videos. **Content development** relates to how the message a video seeks to convey is created. It involves activities such as identifying the concepts and messages to be expressed in the video; determination of the appropriate video style, such as an "edu-tainment" (educational entertainment) documentary, animation, advertisement, etc; development of a script of what will be said and/or done in the video (where the video involves dialogue or narration); creation of storyboards which are graphic depictions of the sequence of shots planned for the video; and identification of cast and props. **Technical production** involves filming (including the identification of filming locations) and editing. Each of these activities presents an opportunity to thoughtfully consider how the end product will meet the information interests and needs of the target audience.

Within the "video for development" space, decisions around video production activities generally depend on participation levels of the target audience (e.g., smallholder farmers) in the video production process, production cost, and product quality. These factors are often intertwined; AGRA will need to simultaneously consider these factors in the design of a video-supported extension solution. While the scope of participation can vary across main video production activities, it generally falls into three buckets.

- The **externally-produced approach** typically has limited or no input from the target audience. It is often considered a supply-driven approach which finds video and communication professionals in charge of the production activities with the aim of creating videos for a wide audience. As professional equipment (such as high-end camcorders, editing software) is used, the production quality of the final product is often high and this is often results in high production costs.
- With the **participatory approach**, target audiences/communities are seen to undertake all or most of the production activities themselves. This is often described as "participatory video" and it emphasizes the importance of having people tell their own stories. Given the demand-driven nature of this approach, less emphasis is placed on quality as more affordable and accessible equipment (such as pocket camcorders, mobile devices, free/open source editing software) tends to be utilized.
- The **hybrid participatory approach** typically involves members of the target audience in the lead on decisions related to content development and technical production, with a development organization and/or professional videography personnel providing support from a technical perspective. Of the three models described, the latter two seem to be garnering more interest among agricultural development proponents. This is due to recognition among development practitioners that target audiences can play an important role in aligning video content with their own needs and interests.



Examples of these three video-production approaches are presented in the table below. The list of examples is not meant to be exhaustive but to provide AGRA with a picture of what seems to be working in the video-supported extension space. The second portion of the table presents recommendations for how AGRA might go about developing a video-supported extension solution. Our recommendations build on good practices identified through GKI's research and shared by experts consulted during the innovation scan.

Innovations Opportunities	
Video Production Options	Examples
<p><b>External Approach</b> <i>Created for Audience</i></p> <ul style="list-style-type: none"> <li>● <b>Video Quality:</b> High</li> <li>● <b>Cost:</b> High</li> <li>● <b>Equipment:</b> Professional</li> </ul>	<p><a href="#">Access Agriculture</a> seeks to “facilitate and build capacity for the production and translation of quality farmer-to-farmer training videos into local languages.” It maintains an online repository of high-quality agricultural videos available for translation into local languages. As an organization focused on supporting south-south knowledge transfer, many of the videos available are produced in developing country contexts, but not necessarily those contexts in which the videos are subsequently used. Consequently, much of their work involves the translation of existing videos into the language of the region from where a request is received. Access Agriculture currently has over 140 videos translated into 70 languages.</p>
<p><b>Participatory Approach</b> <i>Created by Audience</i></p> <ul style="list-style-type: none"> <li>● <b>Video Quality:</b> Low-Medium</li> <li>● <b>Cost:</b> Medium</li> <li>● <b>Equipment:</b> Mobile, Mid-range/Semi-Professional, Professional</li> </ul>	<p><a href="#">Digital Green</a> provides one of the most prominent video-supported agricultural extension solutions within the participatory video landscape. Within its model, village-level actors are trained to “produce and share videos on locally relevant agronomic, health and livelihood practices to motivate and educate community members.” A small group of individuals from the community are typically involved through all aspects of the video production process. Filming is said to typically take 3-4 days. In several of its projects, women have played a key part throughout the video production cycle. Digital Green has supported the production of over 4,400 videos in 6 countries. Videos typically run eight to ten minutes.</p> <p><a href="#">InsightShare</a> “specialises[ ] in equipping and training grassroots communities to facilitate participatory video processes themselves, ensuring long-term capacity is developed locally to support locally-led change into the future.” In their model, they train local individuals to facilitate the production of participatory video within their communities. InsightShare has supported 150 projects with 10,000 participants trained and 400 videos produced by communities spanning 55 countries.</p>
<p><b>Hybrid Participatory Approach</b> <i>Created with Audience</i></p> <ul style="list-style-type: none"> <li>● <b>Video Quality:</b> High</li> <li>● <b>Cost:</b> Medium-High</li> <li>● <b>Equipment:</b> Affordable, Professional</li> </ul>	<p>Early observations from <a href="#">ongoing research at Michigan State University (MSU)</a> on video-supported agricultural extension (led by Charles Steinfield) show that the hybrid model is effective. The MSU research team worked with <a href="#">FIPS-Africa</a>, which has an in-house videographer, to test out the approach in Kenya. Arrangements were made for farmers to lead or have significant input throughout the video production cycle, while MSU and FIPS-Africa focused on providing technical expertise and support through content development and technical production. Filming took about 3 days. Results of this research are currently being finalized. However, consultations with the lead researcher highlighted several learnings: the effectiveness of story-driven (education) videos as a viable method for transmitting knowledge; the value of using a local professional photographer who might be seen to provide greater stability and flexibility in programming; the importance of piloting with a smaller audience to ensure messages are interpreted as expected; the importance of encouraging actors to rephrase messages in their own words; and the value of investing in professionally-made videos that have the potential to more effectively convey a message.</p>



[One Mobile Projector per Trainer \(OMPT\)](#) builds the capacity of local development organizations to "produce educational videos using low cost video cameras and cordless projectors in typically hard to reach locations." OMPT trains organizations to support their target audience through video production and provides equipment such as cameras, projectors and recharging (battery or solar panel) kits that are said to be durable in challenging environments. Training lasts four days. OMPT has trained up to 40 development organizations in 14 countries.

## Video Production Recommendations for AGRA

### Content Development

- **Concepts/Message:**

- Engage farmers (particularly female farmers) throughout the content development process. This will likely support the creation of content that aligns with farmer interests and serve the behavior change extension goals previously outlined: raising awareness, piquing interest, and eliciting a desire to try out new ideas.
- Develop stories that link the benefits of good post-harvest management with other farmer interests, especially those across other parts of the value chain.
- Vet videos with a diverse group of farmers and related stakeholders to ensure messages are conveyed and interpreted appropriately.

- **Video Style:** Develop good story-driven narratives.

- **Script:** If using a hybrid approach, provide technical support to farmers during the story-boarding process but encourage actors to improvise and paraphrase lines in their own words.

- **Cast:** Consider using local actors and, women actors, in particular. A cast of actors that look just like the farmers can be especially compelling and create trust.

- **Cost/Quality:** Consider whether high-quality (professionally) produced videos using a hybrid participatory approach or lower-quality videos produced using the traditional participatory approach might be more effective in communicating a message.

### Technical Production (Filming and Editing)

Consider the role AGRA can play in supporting the development of non-governmental organization (NGO)-based and locally-based video production capacity. For instance, AGRA may consider investing in upskilling NGO staff to develop extension videos.



## (2) Video Dissemination

Farmer group meetings provide a key opportunity to use agricultural extension videos. The work of Digital Green and the Michigan State University-based research noted above highlight how a facilitated video delivery approach can spur behavior change. This approach typically involves facilitators (such as VBRPs) who lead discussions and foster interactions with farmers during video screenings. Facilitators typically answer questions, clarify issues, and obtain feedback. Facilitated videos can also be accompanied by technology demos from champions or early adopters.

Beyond farmer group meetings, videos can be disseminated via mobile phone, depending on the size/length of the video and availability of mobile devices among farmers. The recent national smallholder household survey conducted by the Consultative Group to Assist the Poor (CGAP) in Tanzania found 66% of farmers surveyed owned phones, though 89% of the phones were basic. As mobile uptake increases among farmers, the mobile device may become a more viable choice for spreading videos. However, alternative dissemination models will be necessary for providing information to those who are unable to attend meetings or lack access to mobile devices. While consideration of how actual videos are disseminated is important, raising general awareness about post-harvest technologies and related extension videos might be one approach to courting demand. This could involve a broad campaign, such as a public competition, that creates a buzz about the videos and, post-harvest technologies, more generally.

Examples of video dissemination models are presented in the table below. The list of examples is not meant to be exhaustive but to provide AGRA with a picture of what seems to be working in the video-supported extension space. The second portion of the table presents recommendations for how AGRA might go about developing a video-supported extension solution. Our recommendations build on good practices identified through GKI's research and shared by experts consulted during the innovation scan.



Innovation Opportunities	
Video Dissemination Options	Examples
Dissemination via Farmer Group	<p><b>Video Facilitation</b> Digital Green and the MSU research project offer examples of the efficacy of the video facilitation model. In both cases, video screenings are accompanied by discussions lead by facilitators who aim to clarify the content of the videos. These discussions take place at farmer group meetings. Research conducted on DigitalGreen showed uptake of new practices was seven times higher compared to regular extension approaches.</p>
	<p><b>Champions/Early Adopters within the Farmer Group Context</b> mPower used an 'ICT Leader' to drive farmer adoption of a mobile-based information app called "Farmer Query System" in a US Agency for International Development (USAID) Agriculture Extension Project in Dhaka. ICT leaders were selected, given mobile phones, and trained on how to obtain agricultural information from an online repository. These ICT leaders typically functioned as "infomediaries" (i.e., information intermediaries), who obtained information from the repository on behalf of the farmers. The program involved around 4,000 farmer producer groups. In 2012, there was only 10% penetration of mobile apps and limited use of the application. As of 2016, there are said to be 4,000 users of the mobile application.</p> <p>Research by BenYishay and Mobarak (2015) highlights the value of cultivating champions among farmers by incentivising them to demo and share knowledge with their peers. They suggest that this approach may be more effective than the typical reliance on early adopters and opinion leaders. Selected farmers are more representative of farmers in their peer group and are therefore seen as more relatable and credible by their peers.</p>
	<p><b>Technology/Equipment Need for Video Dissemination within the Farmer Group Context</b> Video screenings at farmer group meetings typically require durable projectors and alternative power supplies. Solar or battery-powered pico (hand-held) projectors have been found to work relatively well in many developing contexts.</p>
Other Dissemination Options	<p><b>Ad-Hoc Screenings</b> Research by Kumar et al (2015) found that community health workers in maternal and newborn health would schedule ad-hoc screenings for those unable to attend regular community screenings. This often involved holding screenings in women's homes, as well as screenings in multiple locations when community disputes prevented individuals from meeting together.</p>
	<p><b>Mobile Dissemination</b> While viewing extension videos within the social context of a farmer group meeting can support adoption, the growing penetration of mobile devices presents opportunities for video dissemination, formally and virally. Formal dissemination could involve the use of messaging platforms (such as <a href="#">8Villages</a>; <a href="#">Awaaz.de</a>; <a href="#">Farmerline.co</a>; and <a href="#">FrontlineSMS</a>) or a robust supply chain information management system to push videos to farmers. Viral</p>



	<p>dissemination typically involves peer-to-peer sharing of videos.</p> <p><b>General Awareness Raising Approaches (such as Campaigns or Reality Television Shows)</b></p> <p><a href="#">e-Krishok</a> used a "Smart Farmer, Smart Future" campaign to promote ICT-enabled e-Krishok services in the agricultural sector in Bangladesh. The campaign was co-sponsored by a private sector partner.</p> <p><a href="#">Shamba Shape-Up</a> is a farm makeover reality television show aimed at rural farmers. Each episode focuses on tackling problems and making improvements to a farm. A different farm is shown each week and presenters are two well-known actors from a Kenyan soap opera. With an estimated viewership of 10 million, this show demonstrates the potential alternative communication channels, such as television, can have in raising awareness at scale. For instance, they provide an avenue for promoting post-harvest practices/technologies and video-based extension services at a national level.</p>
<p><b>Video Dissemination Recommendations for AGRA</b></p>	
<ul style="list-style-type: none"> <li>• Equip VBRPs to effectively facilitate discussions at farmer group meetings through training and ongoing support.</li> <li>• Cultivate post-harvest management technology champions in farmer groups by using incentives during the 2017 post-harvest season. For instance, farmers who exhibit "early adopter" characteristics or are well respected in their communities can be given free or deeply-discounted access to post-harvest technologies. Investments can be funded/partially-funded through private-sector partnerships. Champions can support video dissemination activities through providing demonstrations and testimonials during video screenings at farmer group meetings.</li> <li>• Consider opportunities to support young farmers in video dissemination efforts, perhaps through an ICT-leader role.</li> <li>• Encourage VBRPs to identify and pursue alternative video dissemination opportunities, for instance, those that address any gender-based barriers that women farmers may encounter in accessing videos. Identify options for building sustainable business models around these opportunities and aim to ensure business models maintain equitable access (such as avoiding the rise of "pay to play" activities which exclude the income-poor). In addition to the production of videos meant for screening at farmer group meetings, it might be worthwhile to produce shorter video clips that reinforce specific ideas. Short video clips with smaller file sizes will be more amenable to sharing virally (i.e., through Bluetooth). They also provide farmers with on-demand access to information.</li> </ul>	



### (3) Investment in Sustainable Video-Supported Extension Models

Low-resource agricultural extension systems in many low-income countries have led to growing interest in how the private sector can drive greater sustainability. This interest is moving beyond typical corporate social responsibility (CSR) programs, which often have a limited lifecycle, to the development of sustainable business models. From the perspective of video-supported agricultural solutions, private sector activities can include advertising, sponsorship of competitions which raise awareness of post-harvest loss solutions, and promotions that drive sales of post-harvest technologies and build customer loyalty.

Sustainability also relates to the reinforcement and enhancement of knowledge that is shared through agricultural extension systems. Within the community health space, ICTs such as short messaging service (SMS), automated voice calls, integrated voice response (IVR), and radio have been used to send patients periodic reminders for activities such as taking medicines/vaccinations, attending medical appointments, and maintaining good health practices. Similarly, ICTs can be used to regularly reinforce post-harvest management messages conveyed through extension videos. They can also be used as a mechanism for enhancing and updating the knowledge of VBRPs on a regular basis.

Examples of approaches to building sustainability into video-supported extension solutions are presented in the table below. The list of examples is not meant to be exhaustive but to provide AGRA with a picture of what seems to be working in the video-supported extension space. The second portion of the table presents recommendations for how AGRA might go about developing a video-supported extension solution. Our recommendations build on good practices identified through GKI's research and shared by experts consulted during the innovation scan.



Innovation Opportunities	
Sustainability Options	Examples
<b>Sustaining the Model</b>	<p><b>Comprehensive Business Model</b>  <a href="#">e-Krishok</a>: In Bangladesh, the government partnered with the private and philanthropic sectors to develop what they call a "zero-cost model" for agricultural extension. The Bangladesh Institute of ICT in Development (BIID), which runs the project, states: "To improve the sustainability of the project, BIID has partnered with various organizations, including input suppliers, who provide content for e-Krishok, link with local retailers, support awareness programs, and in return BIID promotes their products among the farmers for a small cost; in Bangladesh, input suppliers are usually dependent on distributors and retailers, so the companies have little direct connection with farmers. The government is also outsourcing some extension services to BIID." The vision is for e-Krishok to become the "most reliable agricultural extension service provider and integrate other key services for farmers, including market linkage and crop insurance."</p> <p><a href="#">Shamba-Shape Up</a>—a farming edu-tainment reality show—is said to be entirely funded through partnerships with "development, research, agri-business or input supply" actors. It presents a model for how actors across the value chain might collaborate and sustain a project with broad reach.</p>
<b>Sustaining Knowledge</b>	<p><b>ICT Solutions for Knowledge Reinforcement</b>            In Timor-Leste, <a href="#">Mercy Corps</a> found that farmers needed to be reminded about good post-harvest management practices. Thus, in their maize post-harvest storage program, they regularly sent SMS blasts during and after the harvest (the months of February and March).</p> <p>In Kenya, the MSU research team sent reminders a few weeks after video screenings to participant farmers via automated voice calls due to low literacy rates.</p> <p><b>ICT Solutions for Knowledge Enhancement</b>            In Bangladesh, USAID implemented the <a href="#">mPower</a> Agro-Knowledge Bank which makes agricultural information easily accessible to extension agents via mobile phones.</p> <p>Similarly, USAID's Farmer Query Systems (a mobile application) provides VBRPs with easy access to agricultural information. VBRPs send queries to the system, which are forwarded to an agricultural expert who addresses the question and sends answers back to the VBRPs. The project targeted 4,000 farmer-producer groups and each group selected a young farmer who owned a smartphone to serve as an ICT leader (their equivalent of a VBRP, noted above). Farmers initially sent queries for information through the ICT leaders but now use it themselves to obtain knowledge.</p>
<b>Video-Based Extension Sustainability Recommendations for AGRA</b>	
<ul style="list-style-type: none"> <li>Consider the role private sector can play in helping to generate and market information about post-harvest technologies and good post-harvest</li> </ul>	



management practices, such as through online and off-line advertising campaigns.

- Implement ICT-based mechanisms for knowledge reinforcement/enhancement that complement video-supported agricultural extension, such as SMS and interactive voice response (IVR).
- Consider how barriers (such as those related to gender, age, and household income) may impede access to integrated ICT solutions, and take concerted steps to overcome/mitigate those barriers from the outset.



## Bringing the Three Components Together

AGRA is faced with a unique and exciting opportunity to design an extension solution that targets farmer interests and needs in Tanzania at scale. A robust video-supported extension solution will require the integration of the three video components discussed: production, dissemination and sustainability. Factors such as cost, quality, time, farmer participation levels will drive decisions about how such an integrated solution might be developed. AGRA will also need to decide on its role in undertaking these activities, such as how to sequence activities and whether/when it should undertake activities itself or collaborate with other actors. Here are a few examples of how AGRA might approach the development of video-supported extension solutions.

### **Example I: *Where Time and Cost are Priorities***

Given AGRA's interest in implementing a solution ahead of the first 2017 maize harvest, an aggressive two-stage approach may work well for AGRA. In the first stage, AGRA may consider translating 1-2 relevant videos from Access Agriculture's video repository (external video production approach). These videos could be piloted with a small subset of farmer groups in the Tanzania Southern region using male and female VBRPs as champions. Learnings from this pilot could be used in quick succession to develop post-harvest management videos for farmers in Tanzania's Northern region in the second stage. By involving VBRPs, farmers, and farmer groups in the pilot stage, AGRA can utilize a hybrid participatory video production approach to develop videos that are more aligned to interests and needs of farmers in Tanzania. AGRA may engage organizations familiar with the context, such as FIPS-Africa, in the development of these videos. Alternatively, they may partner with post-harvest technology providers to create educational video-based advertising content, dissemination strategies (such as wide-reaching marketing campaigns), and incentives (such as providing free or deeply discounted access to post-harvest technologies for champions/early adopters). Partnerships of this nature may increase the sustainability of the solution developed.

### **Example II: *Where Farmer Involvement and Integration with Other ICTs are Priorities***

An interest in involving farmers at the start of the project may lead AGRA directly to using participatory or hybrid participatory video production approaches highlighted by the Digital Green and MSU examples. AGRA may train and engage VBRPs to facilitate farmer participation within video production activities and/or facilitate video screenings in farmer group contexts. To further meet dissemination and sustainability needs, AGRA could engage with television producers, radio stations, mobile network providers, and/or mobile messaging platform providers to raise awareness about video-supported extension solutions and reinforce post-harvest management messaging via television, radio, SMS and IVR. VBRPs may also be trained to utilize these communication channels to bolster their video facilitation activities.

### **Example III: *Where Capacity Building is a Priority***

AGRA's interest in building capacity and creating enduring impact within the Tanzanian agricultural ecosystem may lead to a strategy where its implementing partners are trained to produce videos themselves. An organization such as OMPT focuses on providing this type of training and rapidly building up capacity in low-resource contexts. AGRA can also play a critical role in supporting dissemination and fostering sustainability. For instance, AGRA can help organize their YieldWise partners and other organizations focused on providing direct services to farmers into bodies able to collectively advocate for smallholder farmers. AGRA may broker partnerships and assist in structuring agreements between these direct service provider groups and other stakeholders such as post-harvest technology providers and mobile network operators. These



partnerships/agreements could aim to deliver sustainable extension solutions and address other challenges along the value chain.

Presented in brief, these examples offer some insight into how AGRA can draw on its priorities and interests to develop a robust video-supported extension solution. They also demonstrate how AGRA might mix, match and improve on good practices highlighted within the three components and ongoing innovative approaches being used by various actors. Therefore, a critical next step for AGRA should involve a determination of its short- and long-term interests and priorities for the 100,000 farmers it seeks to impact through YieldWise. A follow-up step would involve determining the interests and needs of the smallholder farmers they seek to serve, and how these interests and needs might translate into extension objectives. These two activities should serve to clarify opportunities within production, dissemination and sustainability components of video-supported extension efforts.

## Conclusion

This innovation scan process aimed to support AGRA (and others in similar positions) in considering the many factors for implementing ICT-supported extension solutions among smallholder farmers in Tanzania. Traditional public sector-driven, extension models—where government extension agents are expected to visit individual farmers and/or farmer groups at regular intervals—have been largely ineffective in Tanzania. This presents a clear opportunity to identify how information and communication technologies (ICTs), particularly video, can help AGRA scale its efforts to train 100,000 farmers on post-harvest management practices within the maize value chain. We encourage AGRA to pay close attention to the critical role village-based resource persons (VBRPs) can play in championing video-based extension solutions in their communities. We also encourage AGRA to consider an integrated approach that does not focus on one technology (i.e. video) but draws on multiple communication channels to spur behavior change among farmers. We welcome feedback and discussion on how the content of this report might be used to inform AGRA's work. GKI stands ready as a partner to support AGRA in this innovation journey.



## Appendix I: List of Experts Consulted

It is with sincere thanks that GKI acknowledges the following individuals and their contributions to this Innovation Scan report:

- Camilius Sanga, Professor, Department of Informatics, Sokoine University of Agriculture (TZ)
- Charles Steinfield, Professor, Department of Media and Information, Michigan State University (USA)
- Makai, Benjamin, Senior Manager, Safaricom Social Innovation (Kenya)
- Matthew York, Executive Director, OMPT (USA)
- Sadman Sadek, Service Innovation, Team Lead, mPower (Bangladesh)
- Selanikio, Joel, Founder and CEO, Magpi (USA)
- Susan Wyche, Assistant Professor, Department of Media and Information, Michigan State University (USA)
- Wahyu Nugroho, Director of Agriculture and Food Security Programs, Mercy Corps (Timor-Leste)



## Appendix II: References

- Addom, Benjamin Kwasi et al. "More than Mobile." *CTA ICT Update* 80 (2015): n. pag. Web.
- Anderson et al (2016) National Survey and Segmentation of Smallholder Households in Tanzania: Understanding Their Demand for Financial, Agricultural, and Digital Solutions, CGAP
- ASHC. "The Structure of National Extension Services" Cabi ASHC, N.p., 2016. Web.
- Aulakh, Jaspreet, and Anita Regmi. "Post-Harvest Food Losses Estimation-Development of Consistent Methodology." *First Meeting of the Scientific Review Committee of the Food and Agricultural Organization of the UN 2050* (2013): 1-34.
- Bell, M. "ICT – Powering Behavior Change for a Brighter Agricultural Future." October (2015): n. pag. Web.
- BenYishay, Ariel and A Mushfiq Mobarak. 2015. "Social Learning and Incentives for Experimentation and Communication. " Tech. rep. , National Bureau of Economic Research.
- Gladwell, Malcolm. *The Tipping Point*. Little, Brown and Company, 2000. Print.
- GSMA. "Case Study: Airtel Green SIM." March (2015): n. pag. Web.
- INGENAES. "TANZANIA Landscape Analysis." March (2016): n. pag.
- Isaya (2015) Sources of Agricultural Information for Women Farmers in Hai and Kilosa Districts, Tanzania, Ohio State Thesis
- Leavens, Kennedy. M. & Anderson, Leigh C. "Gender and Agriculture in Tanzania." *EPAR Brief paper No. 134, Evans School of Public Affairs, University of Washington* 134 (2011): 1-14.
- Manfre et al (2013) "Reducing the Gender Gap in Agricultural Reducing the Gender Gap in Agricultural Extension. "
- Michie, Susan, Maartje M van Stralen, and and Robert West. "The Behaviour Change Wheel: A New Method for Characterising and Designing Behaviour Change Interventions." *Implementation Science* 6.42 (2011): 1-11.
- Narsalay, Raghav et al. "Esoko : Empowering Low-Income Farmers with Real-Time Market Data." (2012): 1-4. Web.
- Rogers, Everett. *Diffusion of Innovations*. Fifth. New York, NY: Free Press, 2003. Print.
- Selanikio, Joel. "The Big Data Revolution in Healthcare." *TEDxTalk*. N.p., 2013. Web.
- Suvedi and Kaplowitz What every Extension worker should know: Core Competency Handbook, USAID report



Toyama, Kentaro. "Comparative Laboratory Study of 12 Devices for Agriculture Extension." (2011): n. pag. Web.

Vignare, Karen. "Options and Strategies for Information and Communication Technologies Within Agricultural Extension and Advisory Services." (2013): n. pag. Web.

World Bank. "Levelling the Field: Improving Opportunities for Women Farmers in Africa" (2014)



## Appendix III: Background on the YieldWise Innovation Scan

The global agricultural innovation landscape is vast. Actors continually generate new ideas relevant to the challenge of reducing post-harvest food loss in Sub-Saharan Africa. There is much to learn, adapt, and apply from other industries and sectors. Staying abreast of innovations opportunities requires an ongoing, purposeful scanning mechanism. As the YieldWise Innovation Partner, the Global Knowledge Initiative (GKI) scans for **adjacent innovations** poised to add near-term value to YieldWise, as prompted by innovation requests submitted by Implementing Partners and The Rockefeller Foundation. In this way, GKI will serve as a dedicated "innovation prospector" for YieldWise.

GKI also will run an innovation scan to explore **transformational innovation** possibilities that signal potential to bring about wide-spread impact within the field of post-harvest food loss, and agricultural development more broadly. Beginning in early 2017, GKI will run a series of future-oriented innovation ideation workshops and conduct exploratory research into game-changing trends and opportunities. Thus, our full innovation scanning process will enable YieldWise and its Partners to explore innovation from two distinct but complementary perspectives: adjacent and transformational innovation.

### Innovation attributes guiding our scanning process:

Why does the distinction between adjacent innovation and transformational innovation matter for our scanning process? Namely, they are characterized by different attributes, which propel the scanning process in distinct directions. Transformational innovations, for example, "cause far-reaching changes, affect several branches of the economy, and give rise to entirely new sectors" (Scrase, Stirling, and Geels). Examples of transformational innovations include self-driving vehicles, Internet-of-things technology, 3D printing, and others. These game-changers rarely come along, but when they do, we feel their effects quite dramatically.

Adjacent innovations are distinct from transformational innovation in ways that matter a great deal for YieldWise; they likely will feature more heavily than the rare-but-high-profile transformational innovation in the efforts of YieldWise Implementing Partners. Adjacent innovations align with and build on current practice in an organization, industry, or sector. For example, they are those innovations that readily map to the strategic objectives of YieldWise, and have potential to impact Partners' stated requests. Given the unique environments in which the YieldWise Implementing Partners work, attributes such as affordability, feasibility,

#### Adjacent Innovation Defined

Pursuing "new to the organization" tools, processes, etc., that push organizations to put their core capabilities to new use.

(per the *Innovation Ambition Matrix*)

#### Transformational Innovation Defined

"Developing breakthroughs and inventing things for markets that don't yet exist."

(per the *Innovation Ambition Matrix*)

#### Attributes of Adjacent Innovation to guide scan

- Alignment with current practice
- Affordability
- Feasibility of use given prevailing conditions
- Sustainability
- Strategic fit within YieldWise
- Potential for impact on Partners' stated need



and sustainability also featured heavily in GKI's adjacent innovation scanning process (OECD).

## Innovation opportunities of focus:

In this first round of scanning for adjacent innovation opportunities, GKI sourced requests from YieldWise Implementing Partners as a starting point. Each of the Implementing Partners — the Alliance for a Green Revolution in Africa (working to reduce food loss in Tanzania's maize value chain); Pyxera Global (working to reduce food loss in Nigeria's tomato value chain); and TechnoServe (working to reduce food loss in Kenya's mango value chain) — presented a single, pressing innovation request. These requests — and the innovation opportunities they represent — are described in greater detail in the following pages. In summary, the innovation requests focused on the following issues:

- For the mango value chain in Kenya: ***How might we enhance the traceability of mangoes produced by smallholder farmers in Kenya?***
- For the tomato value chain in Nigeria: ***How might we best support Nigerian smallholder farmers who want to dry tomatoes as a secondary market opportunity?***
- For the maize value chain in Tanzania: ***How might we leverage information and communication technologies (ICTs) to scale extension and training solutions that support behavior change among smallholder farmers?***

On the surface, these requests might seem quite dissimilar. But once you unpack them, common themes and issues emerge, which point to the core objectives of the YieldWise initiative. Indeed, each request directly connects to broader YieldWise priorities, such as:

- How might we ensure large buyers are able to source locally and sustainably from aggregated smallholder farmers? (Intermediate Outcome, M&E Framework)
- How might we help smallholder farmers meet the quantity, quality, and consistency of requirements of buyers? (YieldWise Strategy Component)
- How might we support targeted innovative technologies in specific value chains? (YieldWise Strategy Component)

## GKI's process for Innovation Scanning:

Upon receiving the innovation scan requests from YieldWise Implementing Partners, GKI held a series of consultative conversations with the Partner teams and The Rockefeller Foundation to clarify the requests, gather background, and understand Partners' objectives for the scan process. Our team then undertook a thorough analysis of the "challenge space" represented by each of the requests. We took a broad view of the issues raised by Partners in an attempt to not preordain a particular innovation / solution path. We analyzed the issues from various perspectives; reviewed a diverse set of resources; and spoke with experts knowledgeable in the value chains and challenge areas of focus. We pushed our team members to reframe the requests provided, such that the true drivers of change were put front and center.

Why such an emphasis on understanding the challenge space? In the YieldWise value chains and countries of focus — where smallholder farmers dominate production, operating conditions are tough, and technology adoption is often an uphill battle — translating innovation into impact is as much (or more) about context and incentives for change, as about the technology. Without a clear understanding of the many factors at play —



socioeconomic, cultural, political, geographic, market-based, educational — innovation-led initiatives tend to fall short of their goals. Worse, such initiatives can divert precious resources away from the very real, yet unglamorous, work of incremental progress being made on farms, in aggregation centers, and in processing facilities within YieldWise on a daily basis. For these reasons, GKI presents “considerations for decision-makers” for each of the innovation requests. These serve as our attempt to lay out some (though not all) of the most important factors bearing on the effectiveness of innovation-led initiatives.

In Phase I, our team honed in on particular innovation options that offer interesting, compelling ideas for each request and also account for the “considerations for decision-makers”. The innovation options look a little different for each challenge, and thus are presented in a slightly different format. These options were not meant to be exhaustive, nor are they fully elaborated in this report. Rather, they represented a starting point for brainstorming and further contextual and stakeholder analysis, in which GKI supported the YieldWise Implementing Partners in Phase II of this Innovation Scan.

Looking ahead, GKI will share this report with our YieldWise Implementing Partners and The Rockefeller Foundation. Then we will co-design next steps with Partners. This may involve follow-on conversations with proponents of the innovation options; or additional steps that work best for our Partners. We aim to align our process to the decision-making needs and timelines of our Partners, and thus welcome their close collaboration as we move forward.

## References:

OECD. *Innovation Policies for Inclusive Development*. N.p., 2015. Web.

Scrase, I, a Stirling, and Fw Geels. “Transformative Innovation: A Report to the Department for Environment, Food and Rural Affairs.” *Science and Technology ...* (2009): 1–67. Web.

