Rapid Appraisal of the ICT for Agricultural Extension Landscape in

GHANA

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Modernizing Extension and Advisory Services

Rapid Appraisal of the ICT for Agricultural Extension Landscape in GHANA

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Contents

Introduction and Caveats

This is one of three rapid appraisals prepared on the Information Communication technology (ICT) for agricultural extension landscape for Ghana, Tanzania and Ethiopia, three New Alliance countries. The appraisals were conducted primarily as "desk studies" from the US during December 2012 and early January 2013. They were conducted in order to provide potential New Alliance ICT Challenge Grant applicants with information on apparently promising uses of ICT to extend the reach and impact of agriculture extension and advisory services so that such applicants would be able to consider which organizations and services they might include in their grant application or proposed teams. They also provide an overview of each country's ICT landscape.

An applicant may know more about the organizations and services identified or know of other organizations or services not included. "Promising" options identified in each study may or may not be so promising given the time available to prepare the studies. Further, given an evolving ICT landscape and the resources accessed for the study, the appraisals may include errors or omissions or be outdated by the time the ICT Challenge Fund Request of Applications is issued. Also one point of concern identified was that a number services listed may not be sustainable without on-going donor support; may not have been evaluated to assess their impact; nor may they be appropriately scalable to meet the goals of the New Alliance. Challenges and strategies are also subjective and may be inaccurate. In short, the appraisals are provided just as one source of information for potential grant applicants to consider.

Executive Summary

The following report is a rapid desk review that focuses on the use of Information and communication technologies (ICT) and the current ICT landscape in Ghana. Ghana is one of the fast growing economies in Africa and the agricultural sector plays a vital role in this country, with approximately 52 percent of the labor force engaged in agriculture[1]. Ghana has many agricultural extension approaches, ranging from the top-down commodity-based approaches to more participatory approaches like the World Bank's Training and Visit (T&V), commodity participatory approaches, and farmer field schools (FFSs).[2] However, innovative ICT based approaches, which provide advice to farmers on-line, and the promotion of mobile phones and community radio stations, have become valuable tools to provide crop information to farmers, especially in rural areas. Numerous new ICT approaches have been promoted over the years by the various extension service providers, including the Ministry of Food and Agriculture, non-governmental organizations (NGOs), producer organizations, and other farmer organizations. The following report summarizes existing ICT projects used for agriculture extension in Ghana, as well as many promising projects that have the potential to grow in the future.

[1] Food and Agriculture Organization of the United Nations, Ghana Country Profile

[2] Ministry of Food and Agriculture, Ghana

Information and communication tools such as cell phones, the internet, radio, and television can dramatically improve farmers' and intermediaries' access to information relevant for rural households, production agriculture, and agribusinesses. The tools can be used to raise awareness or to provide specific information in response to questions about agricultural technologies, markets, prices, etc. As such these tools are just a part of the extension process and are most effective if combined with established good extension practice.

For extension in general and for ICT in particular to be effective, the service has to be **client focused** and **needs driven,** providing **credible content** and a **relevant as well as actionable message** through a **trusted messenger**. Furthermore, access to information is just part of the formula for success. Farmers have to see sufficient evidence that they are convinced to turn the new information received into 1) a willingness to test the approach and then 2) if the test is successful, adopt. Success of an IC tool or approach therefore also depends on **availability of required inputs**, **sufficient knowledge** to test and use those inputs appropriately, and **access to markets** for them to profitably sell their outputs.

The Present ICT Situation

Information & Communication Technology (ICT) tools represent a key component of the agricultural extension strategies employed by public and private institutions in Ghana. There is a healthy diversity of programs and projects disseminating agricultural techniques, production tips, and market information employing radio, cell phones, internet platforms, video and TV. Most initiatives integrate tool-based efforts with services to deliver production information to farmers. Extension programs that use technologies that have high adoption and penetration in Ghanaian society, such as cell phones and radio, were more prevalent than initiatives focusing on TV or video. The implementation of ICT extension initiatives in Ghana involves partnerships between business, government, NGOs, and farmer-based organizations in order to produce technical content, support the ICT tool, and target specific grower groups/ farmer audiences.

Public Sector

- The Ghana Cocoa Board has teamed with up the Hersheys cooperation and the World Cocoa Foundation to establish **Cocoalink**, an outreach program that uses voice and text messages for two-way communication via mobile phone. Farmers can send in photo inquiries and receive weekly messages. Extension officers also use the service to collect information on the growers.

- The International Rice Research Institute has created the **Nutrient Manager for Rice** application, which is currently being utilized in the Philippines. There are plans to create and implement an application specifically for Ghana during 2013.

For-Profit Organizations

- **Esoko**, a Ghanaian company operating in 16 African countries including Ghana, provides a mobile phone platform that allows the exchange of information throughout agricultural supply chains. Applications such as mobile alerts, scout polling, and Push SMS (bulk SMS) provide real-time market information to farmers, allow traders to seek sellers and bid on crops and inputs, businesses/ large buyers to track stock and inventory, and NGOs and government to conduct awareness campaigns and collect information from clients and project beneficiaries. At the end of 2011, 10,000 Ghanaian farmers were receiving alerts.

- **Farmerline**, a 2012 US State Department Apps4Africa Climate Change award winning app, creates two-way communication where agricultural specialists can send messages to farmers via cell phone and farmers can call agricultural specialists with their questions. A pilot with 1,000 fish farmers will begin in 2013.

- farmforce, a commercially available mobile application provided by the Syngenta Foundation, serves as a record keeping device for farmers, following each farmer's produce to market and allowing farmers to be paid electronically. This project is going live January 2013.

- GeoTraceability is a young company that uses a Garmin GPS and specialized GIS to collect agricultural data from farmers that can be aggregated to create a larger picture of agriculture of a particular commodity or in a certain area.

- Hekimax, a Canadian company, has teamed up with ACDI/VOCA to create **MojaCast**, an interactive voice messaging product that includes reminders on agro-chemical application times, delivery schedules, and many other messages.

Donor-Funded Projects

- The **Africa Cashew Initiative**, funded by GIZ, TechnoServe, and FairMatch Support, delivers SMS text messages to hundreds of cashew farmers in the Brong-Ahafo region, reminding them of when to conduct key agricultural practices.

- B-BOVID, a social enterprise, has teamed with the NGO TRACTOR to establish the first **ICT learning center** in Ghana, which is being funded by the Ghana Rubber Estate Limited, GREL. The center trains farmers to use ICT tools to improve productivity, and has already worked with over 8,700 farmers.

- Freedom Fone, receiving support from the Knight News Challenge, is an open source, interactive voice-based communication platform, which is being used in Ghana to make farm radio broadcasts, provide callers with market information, and feedback on voicemails.

- **Prep Eez**, a Ghanaian company, holds the contract with the Ministry of Food & Agriculture (funded by West Africa Agricultural Productivity Program, WAAPP) to develop the e-extension platform for the national extension service. It has designed an e-extension platform to link MOFA, CSIR, and WAAPP content and is translating content into local language. It is training extension officers to access content on Smart phones. Prep Eez also partners with MTN to provide a fee-for-service mobile phone network called Farmer Direct. Farmers will also be able to call an interactive voice response system (IVR) to receive production and market information in local

languages. Call centers staffed with CSIR students can provide technical follow up if needed. The system is set to launch in February 2013.

Non-Governmental Organizations

- **Digital Green** is currently working in collaboration with the World Cocoa Foundation to create and disseminate videos to cocoa farmers. In addition to this project, Digital Green has started a social network called **Farmerbook**, and is also able to track farmer data which can be utilized by partner organizations.

- **Farm Radio International**, a Canadian-based not-for-profit, reaches over 74% of Ghanaians via radio, helping farmers obtain more information on value chains, production, and adaptation to climate change. In addition to this, they offer online training programs to broadcasters.

- The International Fertilizer Development Center, IFDC, and the Alliance for a Green Revolution in Africa AGRA, have teamed up to create **mFarms**, which is a web and cell phone-based platform that provides affordable tools to improve communication along the agricultural value chain, and monitor agricultural inputs and production.

- Global Media Foundation, in their project titled, "**Community Green Agricultural Revolution Project** " (C-GARP), based in Sunyani, uses radio to connect farmers to extension officers and agricultural information. Their radio drama seeks farmers on their farms and records them talking about their agricultural problems. These recordings are then played back on the radio show and a panel of extension officers and other farmers discuss possible solutions to answer the question.

- **Talking Book**, created by Literacy Bridge, is a small, handheld audio computer that allows users to play, record, and categorize audio recordings. It is being used in Ghana to train farmers in rural areas in new agricultural practices. Literacy Bridge has plans to develop a new version of Talking Book that will reduce energy consumption.

Summary of Initiatives

The overview below lists various initiatives and projects, which are utilizing ICT to provide agricultural extension type of services, and that were identified as part of this rapid assessment. They are sorted from two perspectives: in the left hand column by the type of IC tool used, and in the right hand column what kind of service is provided (information based or market oriented). In Appendix A each of these projects and initiatives is described in greater detail.

Tool-based	
Cell	• Africa Cashew Initiative • Cocoalink • Esoko • Farm Radio International • Farmforce • Farmerline • FreedomFone • mFarms • MojaCast

Service-based	
Information (e.g., through call centers, or other content sources)	• B-BOVID • Farmforce • Farmerline • Freedom Fone • GeoTraceability • Prepeez • Savannah Young Farmers Network • Talking Book

	• MTN Mobile Money • Nutrient Manager for Rice • Prepeez • Savannah Young Farmers Network
Radio	• Africa Cashew Initiative • Farm Channel • Farm Radio International
TV	• Farm Channel
Video	• Digital Green • World Cocoa Foundation: Video Viewing Club
Internet	• Digital Green • Farm Radio International • FreedomFone • mFarms • Nutrient Manager for Rice • Syecomp

	• TRACTOR
Markets	• Africa Cashew Initiative • Esoko • Farm Radio International • Farmforce • Freedom Fone • mFarms • Prepeez • Syecomp

The ICT Landscape

Ghana has been at the forefront of the information and communications revolution in Africa for more than a decade. As one of the first countries to introduce widespread liberalization in basic telecommunication services, in August 1994, Ghana took an important step forward in embracing the potential of competitive markets to generate growth and innovation in the sector (NTP-05)[3].

Information and Communication Technologies have become increasingly an important part of today's global economy. ICT infrastructural development in Ghana is progressing comparably to other low-income countries globally and above the 1.1% average for Sub- Saharan Africa.

Over the years, several initiatives have been made by the Government of Ghana and other agencies to develop the ICT-infrastructure so as to bridge the digital divide between Ghana and the developed world. Prominent among these initiatives is the development of a national fiber optic network (VOLTACOM) by the nation's electricity provider, the Volta River Authority (VRA).

There have also been massive investments in ICT infrastructure from existing Internet Service Providers (ISPs) and Telecommunication companies, such as the Ghana Telecom, Scancom, Millicom, Westel and Kasapa Telecom Ltd whose activities cover the whole country. In addition, the government of Ghana and other agencies, including the Abdus Salam International Centre for Theoretical Physics (ICTP), has

[3] 7th World Telecommunication/ICT Indicators Meeting, Cairo, Egypt, 3-5 March 2009

trained over a thousand professionals in ICT and related areas to provide the necessary knowledge and skills to support ICT activities in the country. Ghana's National ICT Development Policy (ICTAD), developed under the chairmanship of Prof. Clement Dzidonu has been passed by Parliament to be implemented.

Facts and Figures:

- Ghana's mobile phone network covers approximately 85% of the country's geography
- More than 65% of rural residents in Ghana have access to mobile phones
- Approximately 14.1% of Ghanaians have access to the internet, which is about a 13% increase in since 2003
- More than 80% of Ghanaians, rural and urban, have access to radio and there are approximately 225 stations functioning in the country

Table 1: Mobile cellular subscriptions:

2003	2004	2005	2006	2007	2008	2009	2010	2011
795,529	1,695,000	2,874,560	5,207,242	7,604,053	11,570,430	15,108,916	17,436,949	21,165,843

Source: The World Bank

Table 2: Mobile cellular subscriptions per 100 people:

2003	2004	2005	2006	2007	2008	2009	2010	2011
3.9	8.0	13.3	23.5	33.5	49.7	63.4	71.5	84.8

Source: The World Bank

Table 3: Mobile Network Operators:

Rank	Operator	Technology	Subscribers (as of 09/ 2012)	Ownership	Market Share
1	MTN Ghana	GSM-900/1800 2100 MHz UMTS	11,269,926	MTN (97.7%)	45%
2	Vodafone	GSM-900. UMTS	5,027,207	Vodafone (70%)	20%
3	Tigo	GSM-900. UMTS	3,757,977	MIC (100%)	15%
4	Airtel	GSM-900 2100 MHz UMTS	3,040,580	Bharti Airtel (75%)	12%
5	Glo	GSM	1,610,434	Globacom (100%)	7%
6	Expresso Telecom	CDMA2000 1X	178,071	Sudatel (100%)	1%

Source: Ghana - National Communications Authority

Table 4: Internet users per 100 people:

2003	2004	2005	2006	2007	2008	2009	2010	2011
1.2	1.7	1.8	2.7	3.9	4.3	5.4	9.6	14.1

Source: The World Bank

Radio Stations:

The National Communications Authority (NCA) as at the third quarter of 2012 has authorized 286 FM radio stations in Ghana out of which 225 are operational. The 286 authorizations are made up of 34 Public radio stations, 41 Community radio stations, 11 Campus radio stations and 199 Commercial radio stations[4]. According to the Ghana National Communications Authority, 87% of all men, 75% of all women have access to radios.

Currently the existing ICT infrastructure/services in Ghana include:

- International connectivity via SAT-3 Submarine Optical Fibre Cable
- 800 km National Fibre Optic Backbone, which is being extended to 4000km connecting 23 sites nationwide.
- 4 International Gateways via satellite
- 35 operational Internet Service Providers
- 130 installed VSAT nationwide
- 128 FM Broadcasting stations
- 12 Television stations (6 are free on air)
- 2 fixed line telecoms operators
- 5 cellular telecoms operators

The current underlying statutory instruments governing for ICT in Ghana are the:

- National Communications Authority Act 769 of 2008,
- National ICT4AD Policy, 2003,
- Electronic Communications Act, 2008, Act 775
- National Communications Regulations 2003, L.I. 1719.
- Electronic Transactions Act 772, 2008
- National Telecommunications Policy, 2005 (NTP-05)5

Ministry of Communications

The Ministry of Communications was created out of the former Ministry of Transport & Communications in response to local and global developments in Information Technology industry. The purpose is to enable government develop policies that will help integrate information technologies into the activities of the society and also harness the full potential for effective development.

[4] Authorized FM Radio Stations as of Third Quarter of 2012: www.nca.org.gh/51/116/Industry-Information.html

[5] Ghana - National Communications Authority

ICT for Accelerated Economic Development Policy

As part of efforts aimed at bridging the digital divide, and ensuring a knowledgeable and informed society, the UNDP Ghana is supporting the Government of Ghana (GoG) through its integrated ICT for development program to achieve Government's ICT policy objective of 'ICT for accelerated economic development policy'. UNDP's ICT support to Government also focuses on supporting the Ministry of Information and National Orientation to generate, develop, manage and disseminate information through the use of ICT. Additionally, UNDP facilitates coordination and networking among its implementing partners (IPs), and national counterparts to manage and monitor the use of development resources more efficiently and effectively towards national development. [6]

Community Information Centre Initiative

Ghana's Ministry of Communications is constructing 230 Community Information Centres (CICs). These centers serve as electronic libraries where people from remotely located areas can look up information about topics such as farming, education and healthcare. Depending on the needs of District Assemblies, the support from IICD will target ten CICs in the Northern part of Ghana. IICD will also provide strategic advice to the Ministry and Assemblies in terms of the technical, organizational and financial sustainability of the CICs and technical and business development training for CIC staff members. Advice is also given about connectivity solutions, deploying monitoring and evaluation tools. [7]

Kofi Annan Centre of Excellence in ICT

The Ghana-India Kofi Annan Centre of Excellence in ICT is Ghana's first Advanced Information Technology Institute (AITI) and hopes to establish itself as a home for Knowledge Entrepreneurs of West Africa. Established in 2003, through a partnership between the Government of Ghana and the Government of India, the state-of-the-art facility works to stimulate the growth of the ICT Sector in the Economic Community of West African States (ECOWAS) and provides an enabling environment for innovation, teaching and learning as well as practical research on the application of ICT4D in Africa.

At AITI it is their mission to:

- employ a world class ICT facility and to be the Centre of Excellence in Information and Communication Technology for West Africa for market oriented training of ICT professionals.
- develop and apply research and innovative technologies for socio-economic development for West Africa
- catalyze the growth of the ICT sector in ECOWAS in collaboration with our partners[8]

Apparently Promising Options

There are many promising aspects of the various ongoing initiatives in ICT agricultural extension in Ghana. These initiatives could provide valuable collaborators on future ICT projects and would add value to future proposals that include an ICT component.

[6] United Nations Development Program www.undp-gha.org/project.php?page=17

[7] Government of Ghana

[8] Advanced Information Technology Institute webpage www.aiti-kace.com.gh/

- The **Africa Cashew Initiative,** utilizing SMS messaging, is currently serving only approximately 400 farmers in the Brong-Ahafo region, but the project has potential to serve all cashew farmers in Ghana. Farmers who used the service reported that the messages were very useful, and that the cost was manageable, 2 GHc per year.
- B-BOVID has created the first **ICT farmer training center** in Ghana with the help of TRACTOR and funding from GREL. Currently the center is only able to serve rubber farmers in the Central and Western regions due to its funding source and location, however the organizations are seeking collaboration with other NGOs and corporations in order to expand the farmer base and eventually, construct a second center in another region of Ghana. Last year, B-BOVID was judged one of the Top Ten winners of the UN global Compact Initiative.
- **Catholic Relief Services** (CRS) does not currently apply ICT in agriculture projects in Ghana, but the organization sees several opportunities to link ICT with food security, complementing their current work in education and nutrition: 1) using iForm Builder or similar software to facilitate data collection by CRS staff or by partners at MoFA, 2) university linkages between US and Ghanaian universities to provide distance learning webinar courses, 3) providing price/ market information or other key info to farmers.
- **Cocoalink**, the outreach program created by the Hershey Cooperation, the World Cocoa Foundation, and the Ghana Cocoa Board, aims to serve at least 100,000 farmers by the end of 2014. Currently it is serving over 25,000 cocoa farmers in Ghana. The World Cocoa Foundation is also involved in making video viewing clubs and hopes to use SMS messaging in the future for microfinance.
- The **Community Green Agriculture Revolution Project**, by the Global Media Foundation, is a promising project because it uses a panel of both farmers and extension officers to answer agricultural questions over the radio. This format could make both the answering of questions more interesting to a listener and more trustworthy because of the fellow farmers on the panel. It could also bring up other interesting agricultural issues through the course of discussion. This project currently only functions in Sunyani province.
- **Datadyne**, offers very promising ICT software called EpiSurveyor to do paperless surveys. The software can be accessed online and used by anybody for any type of survey. The cost to use the software can be prohibitive for some, but if it's for a big project this could be a viable option. The EpiSurveyor is a quick way to get real-time feedback from a target audience in any work sector.
- **Digital Green** is a very promising organization, which already has partnered with the World Cocoa Foundation to create and disseminate videos featuring best cocoa growing practices. Digital Green has many different ICT technologies to offer, and focuses on partnering with local implementing organizations in order to build their capacities in providing their communities with extension services.
- **Esoko** is a mobile applications and platform that is currently focused on exchange of market information. However, the platform could be used more extensively and intensively to push/ pull extension messages to farmers and field workers, facilitate agricultural information campaigns, and collect data for programmers and service providers on local production trends, issues, and program impact. An independent study performed by INRA, the French National Institute for National Research showed a 10% increase in farmer revenue among farmers receiving SMS price alerts from Esoko (http://openmarkets.org/research.htm). However, the applicability of the model to production rather than marketing.
- **Farm Radio International** has great potential to grow and collaborate with other organizations in Ghana, which could help to provide additional programs. The majority of rural farmers have access to

radio, and therefore this tool is very useful for disseminating information. Currently, it is estimated that the program currently reaches over 74% of farmers.

- **Farmerline**, a cell phone application for asking direct questions to agricultural extension agents, and has the potential to provide a valuable service to a variety of farmers throughout Ghana.
- **Freedom Fone** has been used in Ghana as an open source, interactive voice-based communications platform. The company is interested in making technology accessible to people, focusing on low cost, low power, and flexible phone/audio based information systems. It has been used with radio in Ghana, and can also be used with cell phones. Freedom Fone has the potential to collaborate with many partners/projects.
- **GeoTraceability,** a Garmin GPS and specialized GIS system, has the ability to collect and synthesize a large amount of data for individual farm plots that can provide a more detailed picture of the actual activities taking place on a larger scale than may be realized.
- **mFarms** is a web and cell phone based platform that is being used in Ghana to link smallholder farms to markets and inputs. It has potential to be utilized as an extension tool, providing information regarding agronomic practices, in addition to market information.
- **MojaCast,** created by Hekimax, is currently free of charge to farmers and provides nucleus farmers with key information on agricultural practices via voice messaging. It is estimated that MojaCast is reaching several thousand growers through nucleus farmers, and the product can be used throughout Ghana.
- **Nutrient Manager for Rice**, created by IRRI, should be released in Ghana during 2013. The program is a decision making tool, utilizing web-based and mobile applications. NMR relies on the ability of farmers to indicate their location, and so external GPS support is needed, allowing an opportunity for collaboration with another organization.
- **Prep Eez** has the potential to link farmers to low-cost, accurate technical information by using its network of government (MoFA), universities (CSIR), and donor institutions (WAAPP). The provision of Smart phones to extension agents is supported by training in proper usage. The provision of information in local languages using Ghanaian actors to deliver scripted information, and the option for person-to-person follow-up through a call center may positively impact farmer participation and satisfaction. However Prep Eez's initiatives have not yet been launched so impact cannot be assessed.
- **QAS**, the Ghana question and answer service is run through the Ghana Agricultural Information Network System at the Institute for Scientific and Technological Information. This service connects farmers and extension agents to current research and up to date agricultural information directly through radio phone-ins and emails. The World Bank finished funding this project in 2010 and not all aspects of this service are currently functioning. Reviving this service in a more sustainable way could be very promising because it links directly to a network of researchers and libraries with up-to-date locally based information.
- The **Savannah Young Farmers Network** is a small NGO, relying on volunteers to carry out advocacy and developmental activities. It accesses the three northern regions of Ghana, and utilizes audio conferencing for agricultural extension. Currently the organization has over 1,000 members and has strong potential for expansion if given additional support.
- **Syecomp** is a small NGO that utilizes GPS to assist farmers by making them more visible to buyers, allow for traceability, and helping them meet international requirements. Currently the director of Syecomp is having difficulty finding financing to scale up the business, but it has the potential to

assist farmers to also reduce labor and input costs, forecast yields, allocate resources more efficiently, etc.

- **Talking Book,** developed by Literacy Bridge, has the ability to reach rural farmers via extension workers. Farmers who have used Talking Book saw a 48% increase in production. The device has the potential to be used in many rural regions of Ghana, and the creators are currently working on developing a version, which will use less energy.
- The **Vodafone Americas Foundation** offers funding for promising innovations using wireless technology to address issues in the areas of agriculture, health, and developing economies.

Appendix A: Key ICT Projects and Initiatives in Ghana

<table>
<tr><td colspan="4">Africa Cashew Initiative - SMS Messaging and Virtual Cooperatives, http://aci.africancashewalliance.com/</td></tr>
<tr><td>ICTs employed</td><td>Profit actors</td><td>Non-profit and/or public actors</td><td>Services offered</td></tr>
<tr><td>- Cell phone: push SMS messaging
- Radio</td><td></td><td>- Fair Match Support
- African Cashew Association
- GIZ
- TechnoServe</td><td>- An ICT system for price and weighing information was introduced in 2010 to improve transparency in marketing transaction
- Extension messages are primarily delivered through interactive trainings using pictures supported by peers from the same group and complemented by radio messages (ideally preceding the interactive training). Subsequently, SMS text messages are send to remind about some of the key messages at the most appropriate time.</td></tr>
<tr><td colspan="2">End-users?</td><td>Intermediary Y/N?</td><td>Business model</td></tr>
<tr><td colspan="2">Approximately 400 cashew farmers in five zones of the Brong Ahafo region</td><td>No</td><td>The service is free for registered members during the pilot phases. The cost for broadcasting the messages at a rate of 0.038 Ghana Cedis (GHc) is approximately 2 GHc per year for 52 messages.</td></tr>
<tr><td colspan="3">Contact Information</td><td>Comments</td></tr>
<tr><td>African Cashew initiative
32, Nortei Ababio Street
Airport Residential Area
Accra, GHANA</td><td>Stefan Kachelriess-Matthess
stefan.kachelriess@giz.de
T +233 302 77 41 62</td><td>Peter Keller
peter.keller@giz.de
T +233 302 77 41 62</td><td>Farmers happily stated that the SMS messages were very useful to them. A large majority of farmers interviewed said that they discussed the messages with other farmers, and only a small minority said they were consulting with extensions agents from Ministry of Food and Agriculture (MoFA).</td></tr>
</table>

Africa Cashew Initiative - SMS Messaging and Virtual Cooperatives, http://aci.africancashewalliance.com/			
			Most farmers said that they had done the work suggested in the SMS. The farmers valued the SMS because it reminded them of when to engage in the various farming activities in order to have a productive cashew farm.
References, articles	- www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CEQQFjAA&url=http%3A%2F%2Fafrika.brainbooking.com%2Ffiles%2Ffiles%2F120328_sms_text_messages_ab.pdf&ei=22niULj5AajLigL6xYHoDA&usg=AFQjCNFhmC3HMTtT6igCaHuza8I3uximOg&bvm=bv.1355534169,d.cGE		

B-BOVID: ICT Center, www.bbovid.com, www.tractor-gh.org/index.html			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Computers	- B-BOVID - GREL: Ghana Rubber Estate Limited	- TRACTOR: Transforming Rural Agriculture Communities through Re-engineering	According to B-BOVID director, Issa Quedraogo, "B-BOVID is establishing a modern ICT center where small scale farmers and the youth would be trained and supported to use ICT to improve productivity. The project is expected to help small scale farmers in rural communities to improve their production, access the market and create a platform for knowledge and information sharing. Moreover, it would assist in building their capacity, reduce social isolation and make agriculture a more efficient and prosperous venture. The center will be the first of its kind in Ghana, if not in West Africa."
End-users?		**Intermediary** Y/N?	**Business model**
Currently over 8700 farmers are trained and the number is increasing on daily basis. The farmers trained are mostly rubber out-growers and they are selected from their districts.		Yes	B-BOVID is a Social Enterprise, whereas TRACTOR is an NGO. Both are working together to promote sustainable and Climate-smart agriculture in the western region of Ghana. GREL pays for all the costs involved.
Contact Information			**Comments**
Mr. Issa Quedraogo issaoued@bbovid.com or info@bbovid.com +233 (0) 244 939848 B-BOVID / TRACTOR Limited P. O, Box TD 177 Takoradi Ghana			Just last year, B-BOVID was judged one of the Top Ten winners of the UN Global Compact Initiative at The Social Investment Pioneer Awards in Melbourne-Australia, in recognition of their outstanding contributions to community development in their local region.
References, articles	- http://business.myjoyonline.com/pages/news/201212/98694.php - www.ghanaweb.com/GhanaHomePage/business/artikel.php?ID=259255 - http://p4si.org/latest_news.shtml - http://edition.myjoyonline.com/pages/news/201208/93082.php		

Cocoalink, www.hersheycocoasustainability.com			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Cell: dial-in voice messaging, push SMS messaging, app.	- Hershey Cooperation - World Cocoa Foundation - DreamOval - World Education Inc.	- Ghana Cocoa Board (COCBOD) - Cocoa Research Institute of Ghana	CocoaLink is a farmer outreach program, established in 2010, that uses voice and text messages for two-way communication via a dedicated mobile phone short code. It enables cocoa farmers to send text or photo inquiries directly to experts for diagnostic help and receive practical and timely agricultural and other information. Text messages are sent weekly to the mobile phones of registered farmers from a central service in Accra. The CocoaLink messaging platform is complemented by weekly education sessions to train farmers on mobile phone usage, agronomy and social issues, such as child labor. Field officers and extension agents use a CocoaLink registration app loaded onto smartphones to collect farmer information such as age, mobile number, farm size, average production, preferred language, and a photo. Farmers can also register independently via SMS. Field officers are also using CocoaLink to monitor education sessions and measure the effectiveness of outgoing messages.
End-users?		**Intermediary** Y/N?	**Business model**
To date, over 4,000 cocoa farmers in fifteen villages in Western Ghana have registered to use CocoaLink. The program aims to have 100,000 Ghanaian farmers enrolled by the end of 2014. Number of registered farmers (2012): Men – 6,645 Women – 2,559 Average farm size – 7.95 acres		No	The program is a public-private partnership. Plans include expanding the partnership to include other organizations (both private and nonprofit) working to improve farmer productivity and livelihoods.
Contact Information			**Comments**

Cocoalink, www.hersheycocoasustainability.com		
World Cocoa Foundation Aisha Hassan Aisha.Hassan@worldcocoa.org		Since its launch in 2011, CocoaLink has developed over 55 messages on cocoa agronomy, child labor, and malaria. Over 100,000 SMS have been delivered since July 2011. Almost 40 percent of farmers registered have attended community education sessions. Hershey and WCF estimate that yields of trained cocoa farmers are 15-40% higher than non-trained farmers, although it is still too early to measure CocoaLink's direct impact.
References, articles	- www.reuters.com/article/2012/08/06/idUS137424+06-Aug-2012+BW20120806 - http://worldcocoafoundation.org/cocoalink/	

Community Green Agriculture Revolution Project (C-GARP)			
ICTs employed	**Profit actors**	**Non-profit and/or public** actors	**Services offered**
- Radio	-	- Global Media Foundation	A local radio drama records the voices of farmers on their farms asking about agricultural questions or problems. During the radio show a panel of farmers and extension officers discuss the problems and recommend solutions.
End-users?		**Intermediary** Y/N?	**Business model**
The reach of the project is 2,500 farmers in 20 communities in 3 districts		No	NGO. The project is currently self-funded through internal revenue.
Contact Information			**Comments**
Raphael Godlove Ahenu Email: ahenu79@gmail.com or globalmediafoundation@yahoo.com Cell: +233 209323715 or +233 208028666			The organization was very responsive, but can only be contacted directly. There is no information about this project online.
References, articles			

Digital Green: Farmer Book and best practice videos, www.digitalgreen.org			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Computer - Videos	- World Cocoa Foundation	- Digital Green	Digital Green focuses on partnering with local implementing organizations in order to build their capacities in providing their communities with extension services. The system used is unique and innovative, of extension producing and disseminating human-mediated videos that are for farmers, and that feature farmers. In Ghana, Digital Green has partnered with the World Cocoa Foundation to create and disseminate videos featuring best practices within cocoa production to pre-existing farmer groups. DG is aiming to work with a few other organizations in the coming months within Ghana, focusing on diversifying crop messages. Not only does DG train and build capacities in video production and dissemination, but it also creates user-friendly technology in order to track data, such as with a system called COCO - connect online, connect offline, where anyone (the larger audience) can see a number of data sets available by partner, geography (broken down into districts, etc.), screening stats, production stats, adoption stats, etc. DG has numerous technologies available, such as Farmerbook, a Facebook of sorts for farmers who DG's partners work with. This tracks the social network of each farmer, and each individual farmer's videos seen, adopted, and expressed interest in. (www.digitalgreen.org/farmerbook)
End-users?		**Intermediary** Y/N?	**Business model**
WCF and DG will be working with 28 farmer groups each comprised of approximately 30 members. They are aiming to reach an adoption rate of 50% for the		**Yes (lead farmers)**	All of the disseminators are local farmers, which is cost-effective and efficient in terms of reach is for, by and with farmers.

Digital Green: Farmer Book and best practice videos, www.digitalgreen.org		
duration of the one year pilot.		
Contact Information		**Comments**
Lakshmi Iyer Deputy Director - Strategy and Innovation **V** +91.11.41881037 **M**+91.98.71664376 **E** lakshmi@digitalgreen.org **O** D6 & E6, Clarion Collection (The Qutab), Shaheed Jeet Singh Marg, New Delhi-110016, India		
References, articles		

E-zwich, www.ghipss.net/e-zwich			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Smart card payment system	- Bank of Ghana	- World Food Program's Purchase 4 Progress (P4P)	WFP's P4P recently transitioned from paying farmers via check to using E-Zwich, an electronic smart card developed by the Bank of Ghana that allows users (authenticated by fingerprints) access to a network of banks and rural outposts and e-payment/savings. Through E-Zwich, P4P pays farmers individually based on volume delivered. Payment is routed to the association, then automatically transferred to farmers based on their E-Zwich code.
End-users?		**Intermediary Y/N?**	**Business model**
Farmer associations engaged in formal marketing arrangements in WFP's Purchase for Progress (P4P)		No	
Contact Information			**Comments**
Tel: +233 302 610800 e-zwich.support@ghipss.com			In addition to reducing theft and increased convenience for both parties, P4P expects E-Zwich to encourage savings, as farmers can now leave money in the bank instead of cashing the entire check.
References, articles	- https://communities.usaidallnet.gov/ictforag/node/367		

ECAMIC - Eastern Corridor Agro-Market Information Center			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Internet - Cell phones: push SMS messaging	-	- SEND (Social Enterprise Development Foundation of West Africa) - IICD - Catholic Organization for Relief and Development Aid (Coraid)	ECAMIC collects price Information at the local district markets and combines it with relevant other agriculture information at the ECAMIC office and distributes it to district offices through e-mail. Cooperative Information Officers in the district offices then distribute the information to the communities. The officers write the price information on a notice board and explain the other information in face-to-face meetings with community leaders. The project has also started using the Esoko Platform for this and to send offers to sell produce.
End-users?		**Intermediary** Y/N?	**Business model**
24 cooperative farmer communities with around 15.000 members in the Eastern Corridor		Yes	Donor funded
Contact Information			**Comments**
Mr. Mohammed Mumuni Send_tam@yahoo.com, Send-tam@africaonline.com.gh			More farmers are now using mobile phones to receive SMS alerts of district market prices or they request by SMS prices of their produce from various market centers and this project may not be as useful as it was before. Also, with the advent of the Esoko platform being used by farmers to make sales, farmers' principal challenge has become meeting the demand of buyers in terms of stating the quantity (weighing their produce) coupled with a guaranteed quality.
References, articles	- www.iicd.org/projects/ghana-ecamic		

Esoko - Mobile Alerts, Push SMS, Scout Polling Alerts, www.esoko.com			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Cell phone: push SMS messaging - Internet	- Soros - MTN - IFDC	- USAID - FAO - GIZ - IFAD - IFC	Esoko is a ICT software development company headquartered in Ghana but operates in 16 different African countries. Mobile alerts enable parties across the value chain to exchange real-time market information, including crop prices, current demand, and the local of seed and fertilizer. Scout polling alerts allow users (e.g. large buyers) to send out SMS-based polls to track field data and activities instantly. Push SMS allows users to quickly and easily share information via bulk SMS (useful for: awareness campaign by governments or NGOs or by large buyers or sellers in search of goods). In 2010, piloted an automated SMS polling in Ghana, as well as published two commodities indices via SMS on 12 agricultural markets in 7 markets across Ghana. Esoko works with other companies such as Prestat to provide market information to cocoa farmers and MTN on farmer club and agricultural voice helpline initiatives. Esoko is piloting an ICT product which, in addition to market information and weather, it would also include delivery of production information through text messages and ICR.
End-users?		**Intermediary** Y/N?	**Business model**
Traders, researchers, businesses, exporters, farmer groups, consumer associations, NGOs, governments. 10,000 farmers receiving texts (end of 2011) Tends to be used with larger more sophisticated farmers. In Ghana they currently provide their service to the lead farmers in the USAID/Advance Project.		No	- Fee-for-service (subscription levels) - In a survey of participants in the GIZ funded project they found that approximately half the farmers would be willing to pay for the service.

Esoko - Mobile Alerts, Push SMS, Scout Polling Alerts, www.esoko.com		
Contact Information		**Comments**
Mark Davis, CEO, mark@esoko.com Laura Drewett, laura@esoko.com Kwesi Acquah, Director of Communications, kwesi@esoko.com		Esoko is the largest ICT software company in Africa and they have the broadest reach of any such company. A survey conducted in November 2009 of 62 Esoko platform users, found that 100% of users claimed some benefit from it, including 20-40% income improvements. INRA, the French National Institute for National Research, found that smallholder farmers in Northern Ghana have seen a 10% revenue increase receiving and then utilizing Esoko SMS market prices.
References, articles	- http://futurechallenges.org/searchlight/esoko-and-the-future-of-agriculture-in-west-africa/, www.Esoko.com	

Farm Channel, www.farmchannelghana.com/			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Radio - Television - Internet	- GTV - AdFarm, an agricultural marketing and communications firm with offices in the USA and Canada, and Praxis Strategy Group - Praxis Africa (NGO)	- Ghana National Association of Farmers and Fishermen	Farm Channel is a new social marketing communication platform, 100% dedicated to Agriculture, Food and Rural Development in Ghana, Africa. It aims at the Agriculture Value chain and those who will disseminate relevant information to the Agricultural, Food & Rural development corridors such as decision makers, farm managers, investors, agro suppliers, responsible purchasers, Information communication agents, advocacy groups, financial institutions, the general public and corporate bodies who want to promote inputs and services. The Multi-media approach includes: - Television shows – weekly - YouTube Cannel: farmchannelgh - Mobile content – weekly - Radio Shows – in partnership with Adom FM - Farm show and Agric conferences including Fagro 2011 All of the content is produced by Ghanaians.
End-users?		**Intermediary** Y/N?	**Business model**
Viewership is not own is but GTV is very supportive because they feel it is an important part of their mission to support agriculture, Ghana's largest sector of the economy. They get frequent e-mails from viewers about our shows who are interested in either starting a farm or making an existing operation more commercial. The most popular show is the Farmer Brown show, about a rabbit farmer who started with practically nothing and is now a successful commercial operation		No	Funded initially by Praxis Africa and its partners Praxis Strategy Group and AdFarm. Some of shows have been funded by large agri-businesses and various foreign development agencies. Most recently the Ministry of Food and Agriculture has funded some of the multi-show series.

Farm Channel, www.farmchannelghana.com/			
Contact Information			**Comments**
Richelle Matthews <richelle@praxissg.com> 403-410-7659	Tony Mensah-Abrampah, Country Director Praxis Africa Phone: 0272148582 Tony.abrampah@praxissg.com	Delore Zimmerman, Ph.D., President Praxis Strategy Group Phone: 0017013306802 delore@praxissg.com	
References, articles	- www.praxissg.com/praxis-africa/the-farm-channel		

Farm Radio International, www.farmradio.org/country/projects-ghana			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Radio - Cell: telecenter - Internet	- Africa Cashew Alliance	- Bill and Melinda Gates Foundation - World University Service of Canada - Fair-Match Support - IDRC - Commonwealth of Learning - GIZ	- Training services to broadcasters who create programs for small scale farmers. - Help farmers obtain more value for the efforts at every stage of the value chain - Strengthening cashew production - Adapting to climate change in Northern Ghana - A free on-line training program that walks broadcasters through the steps involved in designing and creating a farmer radio program from the ground up.
End-users?		**Intermediary** Y/N?	**Business model**
74% of farmers in Ghana have access to radios, however Farm Radio International is currently only broadcasted on three radio stations in three different regions, Classic FM in the Brong-Ahafo region, Radio Ada in the Greater Accra region, and Volta Star in the Volta region.		- No	Farm Radio International is a Canadian-based, not-for-profit organization working in direct partnership with approximately 400 radio broadcasters in 38 African countries to fight poverty and food insecurity.
Contact Information			**Comments**
Benjamin Fiafor, bfiafor@farmradio.org - c/o WUSC-Ghana PO Box AH 1265, Achimota-Accra, Ghana Tel: +233.302.511.029, Fax: +233.302.518.77			
References, articles	- www.farmradio.org/portfolio/adapting-to-climate-change-in-northern-ghana - www.farmradio.org/portfolio/strengthening-cashew-production-in-ghana - www.farmradio.org/portfolio/project-1/		

Farmforce, www.farmforce.com			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Cell phones		- Syngenta Foundation - Swiss Government	This intricate mobile software will collect on-farm data as submitted by farmer (when planted, fertilized, etc.), track that specific produce through the value chain to the processor, ending in a mobile transfer of funds to the farmer. This service will be best utilized by cooperatives, out-growers, aggregators, buyers, processors, exporters, etc., that are working with a large outgrower scheme.
End-users?		**Intermediary** Y/N?	**Business model**
Rice Farmers		No	Farmforce is a Software-as-a-Service offer where farmers will pay a one-time setup fee and an annual subscription fee that varies depending on the number of mobile devices using Farmforce. The collected fees will be used to sustain the service by paying licensing fees that cover operation, maintenance and support. Farmforce was developed with funding from the Syngenta Foundation and from the Swiss government (in the context of promotion of smallholder farmers in developing countries). The users pay licensing fees that are used to cover operation and maintenance cost, and support. Fees will be used to sustain the system but not to generate a large profit. It's assumed using Farmforce will increase incomes of the host (farmer, cooperative, exporter, etc.) and outgrowers.
Contact Information		**References, articles**	**Comments**
Fritz Brugger, fritz.brugger@syngenta.com		https://communities.usaidallnet.gov/ictforag/node/367	Going live January 2013 to rice farmers in Ghana. The Farmforce application will be commercially available on Android devices. The Syngenta Foundation is a not-for-profit entity and Farmforce is a tool to link smallholder farmers to markets so that they get a better income. For the Foundation the measure of success for Farmforce is the number of benefiting farmers, not profit for the Foundation.

Farmerline			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Cell phone: SMS messaging, telecenter	- Farmerline	Funding - Indigo Trust Support (not financial) - USAID Aquafish CRSP - Virginia Tech - Purdue University - World Wide Web Foundation - Engineers Without Borders Prize - US Department of State (Apps4Africa Climate Change Competition – 3rd place: $600)	- Information on agricultural best management practices - Market access - Business plan training workshops - Record keeping services - Access to input suppliers **The voice forum,** a feature that allows farmers to ask questions by calling a toll free helpline (short code). The extension officers are able to answer the questions via a web interface and answers sent to farmers as voice SMS. Farmers can browse through questions and answers by other farmers using the system. **Automated SMS Alerts:** The SMS will include advice on tackling pests or diseases, agricultural techniques, optimum planting times, available subsidies, and weather forecasts, local fairs and crop prices.
End-users?		**Intermediary** Y/N?	**Business model**
Pilot with Indigo Trust: 1,000 fish farmers		Depends on service	Currently donor funded but Farmerline is a for-profit business that plans on being sustainable in five years from the following funding sources: - Farmers who want to pay for premium services - NGOs, government and businesses that use this service to communicate with farmers - NGOs, government and businesses that subscribe to this service
Contact Information			**Comments**

Farmerline		
Alloysius Attah (Co-founder/CEO) Emmanuel Owusu Addai (Co-founder/Tech Lead) team@farmerline.org +233 (0)249 230 704, +233 (0) 267 577 771		Farmerline is a mobile and web-based system that furnishes farmers and investors with relevant agro industry content to improve productivity and increase income. Messages will be sent in the farmers' local language. - Voice forum overcomes reading and writing difficulties, improves knowledge of good farming practices, access to agro-inputs and commodity prices. - Using mobile phones provides real-time support of extension agents; potentially a more cost-effective way of distributing updates/reinforcing other sources of information. - Farmerline saves farmers time and analyzing the calls can help agricultural specialists and research organizations better understand the agricultural challenges rural people face. - Ghana Agro-Input Dealers Association can support trained agro-chemical dealers in proper input marketing and use. - Received 1st place in Mobile Web Ghana Competition - Received 3rd prize winner in the West/Central Africa 'Apps4Africa: Climate Change" competition
References, articles	http://edition.myjoyonline.com/pages/science/201112/78150.php	

Freedom Fone: MobileActive, www.freedomfone.org			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Cell phone: call center - Radio - Computer		- Freedom Fone	Freedom Fone is an open source, interactive voice-based communications platform that enables users to engage with their audiences across literacy, language, and connectivity barriers. Freedom Fone has been used in three major ways in Ghana: - First, to make the farm radio broadcasts, which promoted the use of mulching and minimum tillage on farmers' land,, to make the repeats of the broadcasts available as five minute summaries over a mobile phone call. - Second, the service would provide callers with relevant and current market prices and information for five of the most popular marketplaces in the region - updated by the radio station staff (these services were made available in two languages: Akan and Ewe). - Finally, the service provided the callers with the ability to leave feedback voicemails to the radio station. The phone number to access the Freedom Fone service was repeatedly announced live on the air, both during and outside of the regular timeslot for the weekly farm radio broadcast.
End-users?		**Intermediary** Y/N?	**Business model**
Agricultural service providers, health service providers, community radio stations, NGOs, farmers, rural and urban populations with limited internet access, youth, crisis-affected communities. Over 3,880 phone calls over 2 month period in Volta region of Ghana		Yes	Freedom Fone is a group of developers interested in making technology accessible to the people. The focus is low cost, low power, highly scalable and flexible phone/audio based information systems. The developers are free software and open hardware advocates. Freedom Fone was conceived and developed to take advantage of and reach out to the growing number of mobile phone users in Zimbabwe. The project started out in 2006/7 with the assistance of Tad Hirsch as a proof of concept project called 'Dialup Radio'.

Freedom Fone: MobileActive, www.freedomfone.org		
		In 2008 Freedom Fone received support from the Knight News Challenge to take the initiative further. Thanks to this injection of funds the vision for Freedom Fone has been broadened to facilitate deployments in other countries around the world, including Ghana.
Contact Information		**Comments**
Brenda Burrell kubatana.net@gmail.com +263-4-776008/746448		- While impact is anecdotal, Freedom Fone was used by Farm Radio International to improve two-way communication with listeners at 17 community radio stations in 10 countries to encourage feedback via voicemail in response to agricultural programs. - Interest has also been expressed by Voto Mobile and Text to Change in Ghana. - Freedom Fone can be deployed in an environment with irregular power supply as a stand-alone system with battery backup, and where internet access is available it can be connected to voice over internet protocol (VoIP) services such as Skype. - It is used by the Agriculture Research Institute at Makerere University (in Uganda) to provide farmers with market prices and agriculture extension information.
References, articles	- www.freedomfone.org/page/volta-star-radio-ghana - www.mobileactive.org/case-studies/freedom-fone-field	

GeoTraceability			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Garmin GPS - Customized GIS (Geographic Information Systems) - Barcode scanners - Scannable survey forms	- GeoTraceability - Armajaro (second largest cocoa producer in world)	-	- Each farmer receives a unique farmer ID/code, linked to his/her cocoa certification ID. - The process begins with the administration of a field-based questionnaire delivered on-farm by trained field surveyors, capturing information such as pesticide use, land tenure situation, date of plantation establishment, and key farm and community infrastructure. - GeoTraceability uses scannable paper questionnaires to reduce errors and data upload time. - The surveyors use handheld Garmin GPS devices to accurately map the boundaries of farms.
End-users?		**Intermediary** Y/N?	**Business model**
20,000 cocoa farmers 3,000 cotton farmers		Yes	Private agribusiness; mapping costs vary but are US$15/hectare of cocoa
Contact Information			**Comments**
Daniel Webber, d.webber@geotraceability.com			Impact: Using GeoTraceability, Armajaro is able to quickly determine which cocoa plantations are the oldest to prioritize and target replanting efforts. Armajaro also discovered that actual average cocoa farm size is considerably smaller (1.1 ha) than assumed (3 ha). Although these farmers had higher yields on smaller plots than originally thought, they were also more land/resource constrained.
References, articles	- https://communities.usaidallnet.gov/ictforag/node/365		

Market Information Service Facility and Training, www.iicd.org/projects/ghana-mapronet			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Internet		- Market Access - Promotion Network (MAPRONET) - IICD	This project has constructed 3 basic business information centers where farmers can access market information and other relevant agricultural information through the Esoko platform.
End-users?		**Intermediary Y/N**	**Business model**
In total MAPRONET has 15,000 individual members in 4 regions, but the project will first have impact on 150 users.		Yes	Donor funded
Contact Information			**Comments**
Ibrahim Bala, mapronetghana@yahoo.com			There was some inconsistency with funding partners that resulted in challenges for this project.
References, articles			

mFarms, http://mfarms.org/			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Computer - Cell: push SMS messaging; call center; apps	- IFDC - AGRA		mFarms is a web- and cell phone-based platform that provides affordable tools to build linkages and improve communications and operational efficiencies among actors along the agricultural value chain. The platform consists of mobile applications (java and android and web applications). Among others, the platform has the following capabilities: - production and purchase planning - verification of adherence to production techniques and schedules - broadcasting alerts and extension messages through text messages and interactive voice response services - estimation of production cost A pre-requisite of mFarms is the availability of reliable and trusted geo referenced databases of actors.
End-users?		**Intermediary** Y/N?	**Business model**
Small Farmers		No	IFDC purchases an annual license to use it, and pays for any additional customization that may be required. The service is free to farmers.
Contact Information			**Comments**
Abass Nyo Karim, anyo@ifdc.org FtM Project Leader +233 244210420 Courtney Greene, cgreene@ifdc.org +1-256-381-6600 ext. 357 Patrice Annequin, pannequin@ifdc.org			mFarms is only one of the application / platform / software / tech solutions that we are using in Ghana and in several other countries to interact with stakeholders in various supply/value chains (i.e. we purchase annual license to use it, and pay for any additional customization that may be required). The mFarms suite of applications has been developed in Ghana by a local company called ImageAD, managed by Kwame Bentil (kwame@imagead.net) With less than three years, 5 web and mobile applications have been customized

mFarms, http://mfarms.org/	
	for the use by some value chain actors; - aggregator module - agro-input dealer module - agro-processing module market information platform for agro dealer (MiPAD).
References, articles	- www.ifdc.org/Media_Center/Press_Releases/November_2012/mFarms_ICT_Platform_Launched - http://issuu.com/ifdcinfo/docs/ifdcreport_vol37no4_final/search/3 - www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=207410

MojaCast, www.hekimax.com.gh			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Cell phone: push and dial-in SMS messaging, call center - Internet	- Hekimax - ACDI/VOCA	-	MojaCast is an interactive voice messaging product that allows users to send customized, pre-recorded voice messages in bulk, with question and answer response capabilities (e.g. 'press 1 for yes; 2 for no'). The system also aggregates user statistics (e.g. contact made, recipient responses) to facilitate administrator information management. In Ghana, MojaCast has been being piloted since March 2012 to allow 'nucleus' farmers/traders—many with hundreds or thousands of outgrowers in their networks—to communicate more efficiently and effectively with farmers. Messages can include market prices, reminders on application times for agro-chemicals or other key production practices, or coordination information for delivery schedules. The nucleus farmer or trader can record messages (in any language) using either a handheld recorder or a computer installed with a simple recording software (provided by Hekimax, the creator of MojaCast). The message is then delivered for bulk delivery to Hekimax as an MP3, via email or cloud uploading, along with the list of recipient cell phone numbers, the desired time and date of delivery, and the frequency of call back.
End-users?		**Intermediary** Y/N?	**Business model**
As of September 2012, MojaCast in Ghana is reaching a network of several thousand outgrowers through nucleus farmers and traders.		Yes (nucleus farmers and traders)	In Ghana, MojaCast has primarily been marketed as a commercial product to microfinance and banking clients. Its use in agriculture —piloted in 2012—is currently provided free-of-charge as a philanthropic effort, although as demand increases the commercial business model is in place. Nucleus farmers do need to access to a simple voice recorder (or computer with recording software) and an internet connection (e.g. internet café) to send the MP3 and receive the statistics back.
Contact Information			**Comments**

MojaCast, www.hekimax.com.gh		
Phone: +27 21 439 2005 Mobile: +27 71 670 9220 reinier@hekimax.co.za sales@hekimax.com		This product creates significant time and cost efficiencies for nucleus farmers, traders, and aggregators. For example, one nucleus farmer in the northern region of Ghana uses MojaCast to communicate with his 800 rice outgrowers, lauding how it has enhanced his communication flow with farmers. In India, where the product has primarily been used in microfinance, repayment rates of Hekimax clients increased from 40% to 90% after using this technology to remind and educate clients.
References, articles	- www.hekimax.co.za/index.php?option=com_content&view=article&id=14:mojacast-slide&catid=8&Itemid=103	

Nutrient Manager for Rice			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Cell phone: app - Computer		- MoFA - IRRI	The service is a fertilizer recommendation for rice matching the specific conditions and needs of a farmer. This will be available to farmers through staff of institutes of irrigation schemes and extension services. Users will include staff of institutes of irrigation schemes and extension services who will interview the farmers and provide a fertilizer recommendation to the farmers. An estimated 20-30 people will provide the service through either a computer or mobile phone to farmers.
End-users?		**Intermediary** Y/N?	**Business model**
Primarily small-scale rice farmers, farm extension workers, and crop advisors. The expected number of farmers availing of the service in 2013 and 2014 will be several hundred.		Yes	NMR is supported by IRRI and its local partners, and IRRI is developing business plans to engage mobile phone companies and micro-finance institutions that include providing a range of crop management inputs and services. Nutrient Manager for Rice will be available through the internet at no cost to users. AfricaRice will arrange orientation on its use to staff of institutes of irrigation schemes in irrigated area and to staff of extension services in irrigated and rainfed areas. These staff will use the Nutrient Manager for Rice to interview farmers through mobile devices or computers and provide a fertilizer recommendation to farmers.
Contact Information			**Comments**
Tel: +63 2 580 5600 (ext. 2204 or 2587) prstaff@irri.org Bianca Ferrer (IRRI), b.ferrer@irri.org			At the moment, the NMR is only available in the Philippines and is still being piloted so it is still too early to measure its impact. However, it is IRRI's belief that using the application will enable farmers to increase their incomes through increased yields. Since NMR relies on the ability of farmers to indicate their location, external support using GPS may be useful.

Nutrient Manager for Rice	
References, articles	- http://irri.org/knowledge/tools/nutrient-management-decision-tools - http://irri.org/our-science/crop-environment/site-specific-nutrient-management/farmers-and-extension-workers - http://irri.org/index.php?option=com_k2&view=item&id=12193%3Afarmers-get-fertilizer-advice-with-loans-via-mobile-technology&lang=en

Prepeez: E-extension and Farmer Direct, http://prepeez.com			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Institutional Website - Cell: dial-in voicemail, call center - Service-based information	- Prepeez	- World Bank - MOFA - CSIR	1) E-extension platform links content from CSIR, MOFA, WAAPP and user generated content. 2) Smart phone enabled extension officers in the field access content from e-extension platform. Desktop application that district officers are able to use to provide oversight. 4) Fee-for-service Mobile phone platform (operating over MTN) called Farmer Direct. Those within the Farmer Direct network can call each other with unlimited minutes. Developing a database of farmers and farm suppliers who are potential clients for this network. 5) Developing an information system based on voice mail, and an interactive voice response (IVR) system, where farmers can receive production and market information in local languages. 6) Call centers for troubleshooting if not satisfied w/ IVR
End-users?		**Intermediary** Y/N?	**Business model**
Field officers, Farmer based organizations, NGOs, researchers and policy makers		Yes	Currently, funding come from the World Bank. The aspiration, though, is to become fully funded through a fee-for-service model.
Contact Information			**Comments**
Kow Sam – CEO, kowsam@gmail.com 233 020 998 0602 M: +233 244 332136			Prepeez is currently developing a national agricultural e-extension service together with CSIR, MOFA, and the World Bank (WAAPP). Launching in February 2013
References, articles			

Savannah Young Farmers Network			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Cell phone: dial in audio teleconferencing/call center - Computers		- Savannah Young Farmers Network	The Savannah Young Farmers Network (SYFN) is a youth-led NGO in Ghana that uses ICTs to deliver agricultural and rural advisory services, and promote the active engagement of young people in agriculture. One example of how they do this is their Audio Conferencing for Extension (ACE) project, currently running in selected communities in the Builsa District of northern Ghana. ACE uses audio conferencing technology to involve farmers in regular meetings with agricultural officers from SYFN, and a wide variety of agricultural extension experts, agronomists, ICT professionals and researchers from various institutions. Farmers through the initiative receive technical guidance on: good agronomic and animal husbandry practices, post-harvest management, climate change mitigation and adaptation initiatives, Agribusiness planning and Management, Market access etc.
End-users?		**Intermediary** Y/N?	**Business model**
The Savannah Young Farmers Network (SYFN) is a network of young farmer groups across the three northern regions as well as organizations involved in the development of the Agricultural sector with a focus on promoting the active engagement of youth in Agriculture. The organization has a total membership of thousand one hundred (1100) farmers and in network with some national and international organizations.		Yes	The organization is headed by an Executive Director with the support of other officers and volunteers. As a young organization, Volunteers plays a pivotal role in carrying out our Advocacy and developmental activities.
Contact Information			**Comments**
Moses Nganwani Tia			Following the delivery of demand driven Agricultural extension

Savannah Young Farmers Network		
Executive Director Savannah Young Farmers Network (SYFN) gan_wani@hotmail.com savannah.youngfarmers@gmail.com		services via Audio Conferencing, many farmers under the Savannah Young Farmers Network (SYFN) are now able to plan and manage their Agribusinesses; thus enhancing their ability to take to Agriculture as a business. With this capacity development, they are able to establish many more enterprises across the Agricultural value chain. The intervention made by the initiative has therefore nurtured entrepreneurs and created jobs for the larger masses.
References, articles	- http://africaunchained.blogspot.com/2012/05/savannah-young-farmers-network.html - http://agricinghana.com/2012/08/19/a-mobile-phone-application-improves-the-agricultural-producivity-of-smallholder-farmers-in-northern-ghana	

<table>
<tr><th colspan="4">SyecompGh: Farmland surveying, https://sites.google.com/site/syecompgh/home</th></tr>
<tr><th>ICTs employed</th><th>Profit actors</th><th>Non-profit and/or public actors</th><th>Services offered</th></tr>
<tr><td>- Computer
- GPS</td><td>- Syecomp</td><td></td><td>The company strives to implement ICT solutions to address the limited access to marketing outlets for smallholder farmers and others in the agricultural value chain. Syecomp utilizes GIS and GPS to provide an array of farmland surveying and mapping services. GIS surveying and mapping help to establish the spatial locations and concentration of fruits and vegetable farms. The technology determines the supply base of producing firms and establishes a system for traceability and precision production for the farmers. Such services go a long way to addressing the numerous constraints faced by farmers, especially regarding the dispersion of farms, and the lack of location-specific data for production planning, monitoring and targeting. All of which results in an inability to forecast farm yields; inaccurate assessment of supply base; over-estimation of farm sizes; over-paying for labor and other services; difficulties in resource allocation and targeting of small-scale producers for assistance and support.</td></tr>
<tr><td colspan="2">End-users?</td><td>Intermediary Y/N?</td><td>Business model</td></tr>
<tr><td colspan="2">The pilot project, ongoing in the Volta Region of Ghana, is mapping and profiling all smallholder rice farmer organizations, and migrating the data to the well-known Esoko (formerly called TradeNet) market information platform. So far, more than 280 individual rice farmers, representing 45 farmer groups, have been profiled. Potential buyers or traders now receive up-to-date information on rice availability from the region, on the web and on their cell phones.</td><td>No</td><td>Farmers pay for GPS service. The GIS implementation in this initiative offers the locations and concentration of rice marketing centers, makes smallholder rice farmers visible to multiple buyers, and expands the market for locally produced rice. It is also provides certification support and traceability for rice farmers, helping them to meet international requirements.</td></tr>
<tr><td colspan="3">Contact Information</td><td>Comments</td></tr>
</table>

SyecompGh: Farmland surveying, https://sites.google.com/site/syecompgh/home		
Solomon Elorm Allavi AllaviSallavi@syecomp.com +233 201442191 Syecomp Ghana 5th Norla Link-3rd Dade Walk Cantonments-Labone Accra, Ghana		There are bound to be drawbacks and issues that affect the smooth implementation of the activities. Difficulty in accessing appropriate financing to scale up the business is hindering Solomon's venture. Having been able to overcome the initial bottlenecks in starting a new business in Ghana, with limited funds for equipment, software licenses and payment to personnel, growing the enterprise to its full potential is becoming an operational hurdle.
References, articles	- http://agricinghana.com/2012/05/08/tech-solutions-to-agricultural-growth-in-ghana	

Talking Book, www.literacybridge.org/talking-book			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Computer/Video		- Literacy Bridge Literacy Bridge has received grants from multiple funding sources.	The Talking Book is a small, handheld audio computer (12cm x 12cm x 6.5 cm) that allows user to play, record and categorize audio recordings. Units can also transfer audio directly to other devices. It can be pre-loaded with, for instance, agricultural information by extension workers and then shared with a community or group of users. Users can then record their own audio, which they can categorize under programmable subject headings. The device also supports programmable multiple choice quizzes. The device includes a built-in speaker and microphone, and can also be used with external headphones or microphone. It has no display, relying entirely on audio and navigation buttons. All recordings are stored on an internal SD card with current capacity at between 35-140 hours of recordings per device.
End-users?		**Intermediary** Y/N?	**Business model**
According to Literacy Bridge, an evaluation of 37 users from their pilot site in rural Ghana conducted from August 2009 to January 2010 revealed that 91% of users applied a new health or agriculture practice as a result of their use of the Talking Book. Farmers with access to the Talking Book also had an increase in crop production of 48% compared to non-users who had a decrease of 5% (out of a sample of 33 users and 40 non-users).		Yes	Literacy Bridge is currently developing a new version of the Talking Book that would reduce energy consumption and unit costs. They plan to shift their focus to seeding a consumer market, and will use profits from sales in more developed countries to subsidize their devices in poorer markets.
Contact Information			

Talking Book, www.literacybridge.org/talking-book	
Literacy Bridge 1904 Third Avenue, Suite 733 Seattle, WA 98101 info@literacybridge.org 425-780-5669	Clifford Schmidt, Founder, cliff@literacybridge.org Trina Jean Gorman, trina@literacybridge.org Michael Shayne Gary, shayneg@agsm.edu.au Andrew Azaabayne Bayor, andy@literacybridge.org
References, articles	- www.literacybridge.org/files/impact-ICTD2010.pdf - http://ictupdate.cta.int/Feature-Articles/Lessons-out-loud - http://farastaff.blogspot.com/2009/12/talking-book-of-literacy-bridge.html

World Cocoa Foundation: Video Viewing Club and Digital Green, www.iita.org, www.worldcocoafoundation.org			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Video	- IITA - Digital Green	- The World Cocoa Foundation	World Cocoa Foundation, Crop Research Institutes (Ghana). The project trains rural cocoa farmers in Ghana to produce videos that teach improved cultivation principles and pest management to their fellow farmers in order to tackle black pod disease, which can result in major crop losses. It uses Farmer Field Approach (FFS) approach, where farmers themselves are being trained in the production of video films that communicate the principles of improved cocoa cultivation to other farmers. Recently, the WCF CLP participants from the New Ebudiase area in the Ashanti Region of Ghana completed training in the use of Digital Green technologies for cocoa extension. Digital Green utilizes low-cost, modern technology with a participatory model to train farmers in agricultural practices. Through this pilot project based through the WCF CLP Business Service Center, a team of cocoa farmers with the assistance of the Ghana Cocoa Board, Ministry of Agriculture, and WCF CLP project management unit (PMU), are trained to produce training videos within their own communities and cocoa fields. Within the coming months the Digital Green team will return to New Ebudiase to provide training in cocoa extension utilizing these videos. The videos are played on what is known as 'pico players', which are the size of an i-phone and can be directed on a wall. There is no need for a generator with this technology.
End-users?		**Intermediary** Y/N?	**Business model**
The Video Viewing Club has assisted in training 42,000 farmers.		Yes	The World Cocoa Foundation estimates that it cost about $78 per farmer to train using the VVCs. This includes the cost of training a facilitator, viewing equipment (e.g., televisions, video players, generators), and other miscellaneous club implementation costs.

World Cocoa Foundation: Video Viewing Club and Digital Green, www.iita.org, www.worldcocoafoundation.org		
		It does not include the cost of producing each video, which is estimated at roughly $12,000 per episode. Through the end of 2011, the program was funded by international government and private-sector sources. The WCF is also working on finding compensation for the local facilitators.
Contact Information		**Comments**
Ethan Budiansky, Cocoa Livelihoods Program Manager Ethan.Budiansky@worldcocoa.org		The Video Viewing Club will still be used, but movement is towards using mainly the Digital Green platform from here forward. These trainings are particularly useful for women because they can be done at any time during the day. All videos are produced in the local language.
References, articles	- http://r4dreview.org/2009/03/training-farmers-in-sustainable-cocoa-production-using-participatory-video/ - http://worldcocoafoundation.org/what-we-do/VideoSustainableTreeCropsProgramVideoViewingClub_000.html - http://worldcocoafoundation.org/wcf-cocoa-livelihoods-program-pilots-digital-green-in-ghana/	

Women and Development Organization (WADEP) - ICT Support for Rural Agricultural Literacy, www.iicd.org/projects/ghana-wadep			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Internet - Video		- IICD	Videos about yam, cassava and cowpea production and postharvest practices are recorded and presented to farmer associations and extension officers. A local internet cafe has also been started to further improve access to information and the center offers training to school children.
End-users?		**Intermediary** Y/N?	**Business model**
About 15,000 farmers in the Volta Region		Yes	Donor-funded
Contact Information		**References, articles**	**Comments**
Mr Obed Twabu, info@wadep.org			The project also works with farmers to improve their marketing skills and negotiating position.

The Question and Answer Service (QAS)- GAINS, http://gains.org.gh			
ICTs employed	**Profit actors**	**Non-profit and/or public actors**	**Services offered**
- Radio - Internet		- CSIR, Agricultural Information Centres - Community-based FM radio stations - University of Ghana - University of Cape Coast.	The Question and Answer Service (QAS) is one in which the Coordinating Centre of the Ghana Agricultural Information Network System (GAINS) at the Institute for Scientific and Technological Information (INSTI) and its partners answer questions on demand through emails and radio phone-ins.
End-users?		**Intermediary** Y/N?	**Business model**
The primary beneficiaries of the service are: farmers, fisher folks and extension agents. Researchers, policy makers, University teachers and students are the secondary beneficiaries of the service. (700,500 according to initial analyses)		N	Donor funded
Contact Information		**References, articles**	**Comments**
Mr. Joel Sam, GAINS Coordinator Jsam@workmail.com		http://gains.org.gh/sites/default/files/file/Gains%20Brochure.pdf	Not all aspects of this service are currently functioning. This may be due to a current lack of funding. The most promising aspect of this service is that it links to current research and directly to professionals in different particular fields.

Appendix B: References, Articles, Reports, and Evaluations Used

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Kwadwo Asenso-Okyere and Daniel Ayalew Mekonnen. “The Importance of ICTs in the Provision of Information for Improving Agricultural Productivity and Rural Incomes in Africa”. UNDP Working Paper, 2012. http://web.undp.org/africa/knowledge/WP-2012-015-okyere-mekonnen-ict-productivity.pdf

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Appendix C: Contacts and Key Stakeholders

Organization / Project	Contact person and email	Address and phone	URL
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Advanced Information Technology Institute; Ghana-India Kofi Annan Center for Excellence in ICT	info@aiti-kace.comgh	+233 302 67 95 42	www.aiti-kace.com.gh
Africa Cashew Initiative: SMS and Virtual Cooperatives	Stefan Kachelriess-Matthess stefan.kachelriess@giz.de Peter Keller peter.keller@giz.de	32, Nortei Ababio Street Airport Residential Area. Accra, GHANA Stefan Kachelriess-Matthess +233 302 77 41 62 Peter Keller + 233 302 77 41 62	http://aci.africancashewalliance.com/
Agence Francaise Developpement	Bruno Lecierc afdaccra@afd.fr	8th Rangoon Close Ring Road Central P.O. Box 9592 - Airport - Accra, GHANA Tel (233 302) 77 87 55 - 77 88 56 - 77 38 40	www.afd.fr/lang/en/home/pays/afrique/geo-afr/ghana/afd-ghana
AGRA: Alliance for a Green Revolution in Africa	info@agra.org	CISR Office Complex #6 Agostino Neto Road Airport Residential Area, PMB KIA 114 Accra Ghana +233 302 740660	www.agra-alliance.org

Organization / Project	Contact person and email	Address and phone	URL
B-BOVID/ TRACTOR	Mr. Issa Quedraogo issaoued@bbovid.com or info@bbovid.com	B-BOVID / TRACTOR Limited P. O, Box TD 177 Takoradi Ghana +233 (0) 244 939848	www.tractor-gh.org/index.html www.bbovid.com/
CARE, Royal Netherlands Embassy in Accra	Zakaria Yakubu, program coordinator Yakubu.Zakaria@co.care.org	CARE Ghana C.T. 2487 Cantonments Accra, Ghana +233 (21) 923271	
Catholic Relief Services	Lisa Washington Sow, Country Director Lisa.Washington-Sow@crs.org Sara Alexander, Programs Manager Sara.Alexander@crs.org		http://crs.org/
Datadyne	info@datadyne.org	202-643-2820	www.datadyne.org
Digital Green	contact@digitalgreen.org Lakshmi Iyer Deputy Director - Strategy and Innovation lakshmi@digitalgreen.org	Head Office Digital Green D6 and E6, Clarion Collection(The Qutab), Shaheedjeet Singh Marg, New Delhi - 110016, India (t)+91-11-41881037/38 Digital Green 2342 Shattuck Ave. #151, Berkeley, CA 94704	www.digitalgreen.org/
Esoko	Mark Davies, CEO mark@esoko.com Kwesi Acquah, Communications Director kwesi@esoko.com		www.esoko.com/

Organization / Project	Contact person and email	Address and phone	URL
	Laura Drewett laura@esoko.com		
FAO Ghana Office	FAO-GH@fao.org	FAO Regional Office for Africa FAO Building #2 Gamel Abdul Nasser Road Accra, Ghana P. O. Box GP 1628, Accra, Ghana Tel: +233-(0)302 675000/7010930 Fax: +233-(0)302 668427	
Farm Channel	Richelle Matthews richelle@praxissg.com Tony Mensah-Abrampah, Country Director Praxis Africa Tony.abrampah@praxissg.com Delore Zimmerman, Ph.D., President Praxis Strategy Group delore@praxissg.com		www.farmchannelghana.com/
Farm Radio International: Adapting to Climate Change, Strengthening Cashew Production, Farmer Program eCourse	Benjamin Fiafor - bfiafor@farmradio.org	Accra, Ghana c/o WUSC-Ghana PO Box AH 1265 Achimota-Accra, Ghana +233.302.511.029 Fax: +233.302.518.77	www.farmradio.org/country/projects-ghana/
farmforce, Syngenta Foundation	fritz.brugger@syngenta.com		www.farmforce.com
Farmerline	Alloysius Attah (Co-founder/CEO)	+233 (0)249 230 704/+233 (0) 267 577	http://farmerline.org

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FreedomFone	Brenda Burrell kubatana.net@gmail.com	+263-4-776008/746448	]www.freedomfone.org
GAINS: Ghana Agricultural Network Information, Gov. of Ghana	Mr. Joel Sam Jsam@workmail.com	P.O. Box M. 32, Accra Tel: 233-21-763523 (Direct) / 233-21-778808 ext. 15	http://gains.org.gh/
GeoTraceability	Daniel Webber d.webber@geotraceability.com		
Ghana Cocoa Board and Hersheys: Cocoalink	Jeff Beckham jbeckman@hersheys.com	717-534-8090	www.hersheycocoasustainability.com/
GIZ: German Development Cooperation House	Country Director Siegfried Leffler info@giz.de		
Global Media Foundation	Raphael Godlove Ahenu Jr. *Email: ahenu79@gmail.com* *or* *globalmediafoundation@yahoo.com*	Address Global Media Foundation P.O. Box 2159 Sunyani, B/A Ghana, West Africa	
IFDC (works with mFarms)	Abass Nyo Karim FtM Project Leader anyo@ifdc.org Courtney Greene cgreene@ifdc.org Patrice Annequin pannequin@ifdc.org	Abass Nyo Karim +233 244210420 Courtney Greene +1-256-381-6600 ext. 357	www.mfarms.org
IICD: ECAMIC - Eastern Corridor Agro-Market Information Center	information@iicd.org	P.O. Box 11586 2502 AN The Hague The Netherlands Tel.: +31 (0)70 - 311 73 11	www.iicd.org/projects/ghana-ecamic; www.iicd.org/projects/ghana-wadep; www.iicd.org/projects/g

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		fax: +31 (0)70 - 311 73 22	hana-mapronet
ImageAd (works with mFarms)	Kwame Bentil kwame@imagead.net	P.O.BOX AN 16909, Accra (233) 021 30 30 53	
IRRI: Nutrient Manager for Rice	a.ndayiragije@irri.org Bianca Ferrer (IRRI) b.ferrer@irri.org	Tel: +63 2 580 5600 (ext 2204 or 2587)	http://irri.org/knowledge/tools/nutrient-management-decision-tools
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Literacy Bridge: Talking Book	Clifford Schmidt cliff@literacybridge.org Trina Jean Gorman trina@literacybridge.org Michael Shayne Gary shayneg@agsm.edu.au Andrew Azaabayne Bayor andy@literacybridge.org	Literacy Bridge 1904 Third Avenue, Suite 733 Seattle, WA 98101 425-780-5669 Literacy Bridge Ghana PO Box 16 Nadowli, Upper West Region Ghana	www.literacybridge.org/talking-book/
MAPRONET: Market Access Promotion Network	Ibrahim Bala mapronetghana@yahoo.com	P.O. Box TL1773 +233-(0)372026045	www.iicd.org/projects/ghana-mapronet
Ministry of Communications	Minister: Haruna Iddrisu moct@ghana.gov.gh	P.O. Box M42 Accra Telephone: +233-302 685625/664751	www.moc.gov.gh
Ministry of Food and Agriculture (MOFA)	ict@mofa.gov.gh	MoFA Head Office P. O. Box M37, Accra +233 302 687223 +233 302 687203	www.mofa.gov.gh/
Ministry of Information and National Orientation (MINO)	Minister: Fritz Baffour info@moi.gov.gh	P.O Box M 41 Accra (+233-302) 229870	www.ghana.gov.gh/index.php/governance/ministries/317-ministry-of-information-

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MTN Money Mobile	customercare@mtn.com.gh		www.mtn.com.gh/SubPage.aspx?pageid=559
Prepeez: E-extension and Farmer Direct	Kow Sam - CEO kowsam@gmail.com	233 020 998 0602	http://prepeez.com/
Savannah Young Farmers Network	Moses Nganwani Tia Executive Director gan_wani@hotmail.com savannah.youngfarmers@gmail.com		
SEND (Social Enterprise Development Foundation of West Africa)	Mr. Mohammed Mumuni Send_tam@yahoo.com Send-tam@africaonline.com.gh	Greater Accra Regional Networking Centre, Box A28 Regimanuel Estates, Nungua Barrier, Sakumono 0302716860/0302714921/0302716830	www.sendwestafrica.org/
Syecomp	Solomon Elorm Allavi AllaviSallavi@syecomp.com	Syecomp Ghana 5th Norla Link- 3rd Dade Walk Cantonments-Labone Accra, Ghana +233-201442191	https://sites.google.com/site/syecompgh/
Technoserve: African Cashew Initiative	Kwame Sarko ksarks@yahoo.com badongo@tns.org	+233-244698331	www.technoserve.org/work-impact/sectors/agriculture-agribusiness
United Nations Development Programme	Fred Ampiah fred.ampiah@undp.org		www.undp-gha.org/design/

Organization / Project	Contact person and email	Address and phone	URL
University of Ghana Business School	Dr. Richard Boateng; Executive Director, African Institute of Development Informatics and Policy (AIDIP), Ghana; Lecturer, University of Ghana Business School richboateng@ug.edu.gh	+233-261-599-344	
WADEP: the Women and Development Project	Mr Obed Twabu info@wadep.org		www.iicd.org/projects/ghana-wadep
Winrock International	Mary Renwick, Winrock International, Innovation Program Officer in Water	tel. (703)525-9430 ext 675 MRenwick@winrock.org	www.winrock.org
World Cocoa Foundation	Video Viewing Club: Ethan Budiansky, Ethan.Budiansky@worldcocoa.org Cocoalink: Aisha Hassan Aisha.Hassan@worldcocoa.org	1 202 737 7870 Ghana Regional OfficeHse. No. 4, Blackberries Street, East LegonPMB MD 217, MadinaAccra GhanaTelephone/Fax +233 302 542 187	www.worldcocoafoundation.org

Appendix D: Key Institutions

These institutions provide extension services through various departments councils and institutes some of which are listed below:

Public Extension Institutions

- Association of Church Development Projects (ACDEP) www.acdep.org
- Ministry of Communication
- Ministry of Environment Science and Technology (MEST)
  - Council for Scientific and Industrial Research (CSIR)
- Ministry of Food and Agriculture (MOFA) www.mofa.gov.gh
  - Department of Agricultural Extension Services (DAES)
- Ministry of Information and National Orientation
- Ministry of Local Government and Rural Development (MLGRD)
  - Regional Coordinating Council (RCC)
  - Metropolitan and Municipal District Assemblies
- National Communications Authority
- National ICT Policy and Plan Development Committee
- PAB Development Consultants
- Sasakawa Africa Fund for Extension (SAFE)
  - University of Cape Coast, http://safe-africa.net/UCC.htm
  - Kwadaso Agricultural College http://safe-africa.net/kwadaso.htm

Public Research and Education Institutions

- Advanced Information Technology Institute: Ghana-India Kofi Annan Center for Excellence in ICT, www.aiti-kace.com.gh
- ASTI Agricultural Research and Development http://safe-africa.net/kwadaso.htm
- Cocoa Research Institute of Ghana (CRIG)
- Kwame Nkrumah University of Science and Technology (KNUST)
  - University Information Technology Services (UITS)
- University of Development Studies (UDS)
- University of Ghana (UG)
  - Institute of Statistical, Social and Economic Research (ISSER)
  - Faculty of Agriculture

Appendix E: Institutional Websites

Advanced Information Technology Institute: Ghana-India Kofi Annan Center for Excellence in ICT	www.aiti-kace.com.gh
Cocoa Research Institute of Ghana (CRIG)	www.cocobod.gh/cocoa_research.php
Ghana Agricultural Information Network System (GAINS)	http://gains.org.gh /
Kwame Nkrumah University of Science and Technology (KNUST)	www.knust.edu.gh
KNUST: University Information Technology Services (UITS)	uits.knust.edu.gh
Kwadaso Agricultural College	http://safe-africa.net/kwadaso.htm
Metropolitan and Municipal District Assemblies	http://ghanadistricts.com
Ministry of Communications	www.ghana.gov.gh/index.php/governance/ministries/326-ministry-of-communications-
Ministry of Environment Science and Technology (MEST)	www.ghana.gov.gh/index.php/governance/ministries/329-ministry-of-environment-science-a-technology
Ministry of Food and Agriculture (MoFA)	http://mofa.gov.gh
MoFA: Department of Agricultural Extension Services (DAES)	http://mofa.gov.gh/site/?page_id=74
Ministry of Information and National Orientation	www.ghana.gov.gh/index.php/governance/ministries/317-ministry-of-information
Ministry of Local Government and Rural Development (MLGRD)	http://mlgrdghanagov.com
National Communications Authority	www.nca.org.gh
University of Cape Coast	http://safe-africa.net/UCC.htm
University of Development Studies (UDS)	www.uds.edu.gh/
University of Ghana (UG)	www.ug.edu.gh
UG: Institute of Statistical, Social and Economic Research (ISSER)	http://isser.ug.edu.gh
UG: College of Agriculture and Consumer Sciences	www.ug.edu.gh/cacs

Appendix F: Report Prepared by

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