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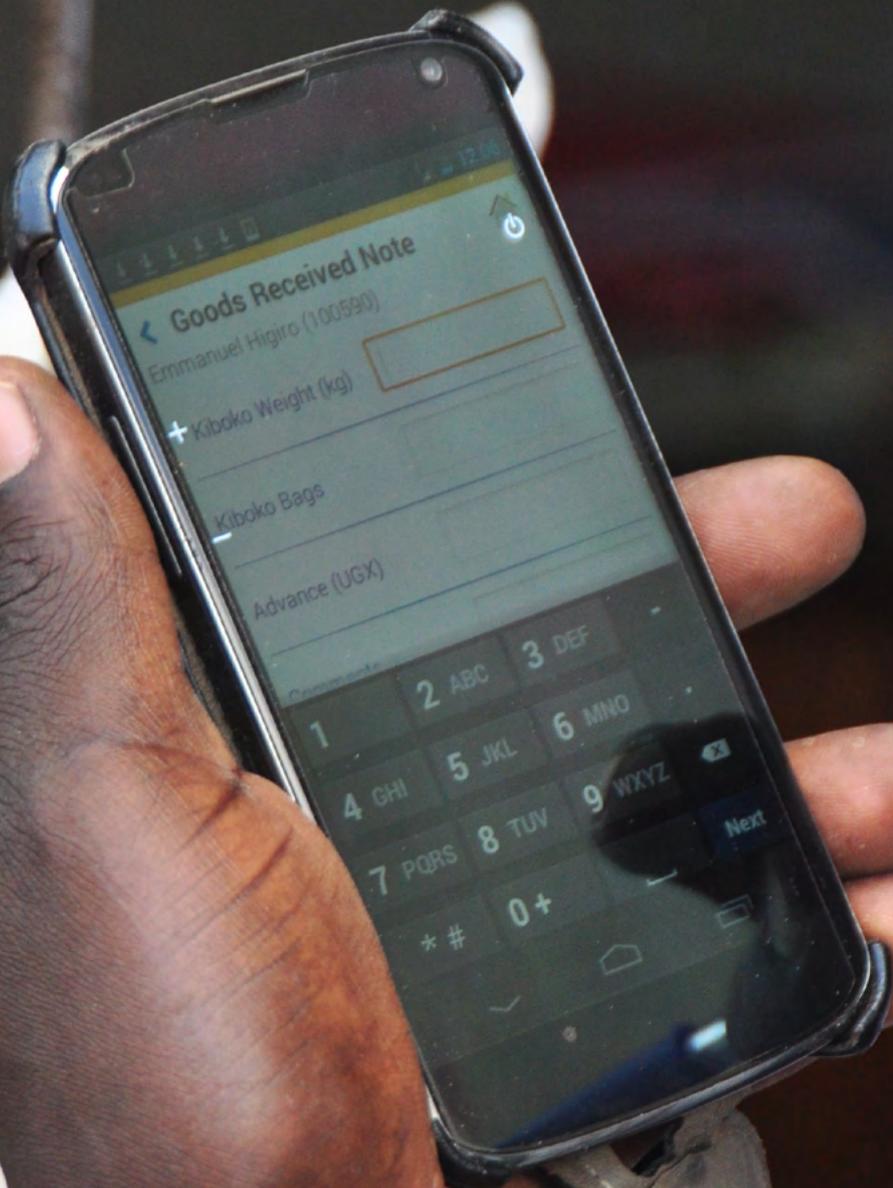


Use of ICT for Agriculture in GIZ projects – Status quo, opportunities and challenges

Sector Network Rural Development Africa (SNRD)

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List of Abbreviations

ABFS	- Agribusiness and Food Security
BMG	- Bill and Melinda Gates Foundation
BMZ	- Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
BoP	- Base of the Pyramid
CARI	- Competitive African Rice Initiative
CCKN-IA	- Climate Change Knowledge Network in Indian Agriculture
CGIAR	- Consultative Group for International Agricultural Research
CTA	- Technical Centre for Agricultural and Rural Cooperation
DFID	- Department for International Development (United Kingdom)
FAO	- Food and Agriculture Organization of the United Nations
GADeR-ALC	- Gestión Ambiental y Desarrollo Rural en América Latina y Caribe
GIS	- Geographical information system
GIZ	- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GPS	- Global Positioning System
GSM	- Global System for Mobile
KfW	- Kreditanstalt für Wiederaufbau
ICIPE	- International Centre of Insect Physiology and Ecology
ICRAF	- World Agroforestry Centre
ICT	- Information and Communication Technology
ICT4D	- Information and Communication Technology for Development
ICT4Ag	- Information and Communication Technology for Agriculture
IICD	- International Institute for Communication and Development
ILRI	- International Livestock Research Institute
IT	- Information Technology
ITAACC	- Innovation Transfer into Agriculture-Adaptation to Climate Change
mAgri	- Mobile for Agriculture
M4D	- Mobile for Development
MDG's	- Millennium Development Goals
MMS	- Multimedia Messaging Service
MNO	- Mobile Network Operator
MSME	- Medium-, Small and Micro-Entrepreneur
NGO	- Non-governmental organization
NICE	- Network for Information on Climate (Ex)change
PPP	- Public-Private Partnership
ProGED	- Promotion of Green Economic Development
RML	- ReutersMarketLight
SDG's	- Sustainable Development Goals
SIDA	- Swedish International Development Cooperation Agency
SMS	- Short Message Service
SNRD	- Sector Network Rural Development
TVET	- Technical and Vocational Education and Training
UNDP	- United Nations Development Programme
UNICEF	- United Nations Children's Fund
UCFA	- Uganda Coffee Farmers Alliance
USAF	- Universal service and access funds
USAID	- United States Agency for International Development
USSD	- Unstructured Supplementary Service Data
VAS	- Value Added Service
VC	- Venture Capitalist
WG ABFS	- Working Group Agribusiness and Food Security
WHO	- World Health Organization
ZNFU	- Zambia National Farmer Union

Introduction

“Digital change is bringing sweeping change at an economic, political and societal level throughout the globe. Nothing is impervious to digital change — it even affects the field of international cooperation. The digital evolution continuously changes the way we work, offering new opportunities and business potential, yet posing considerable challenges too.”

This is the opening phrase of ‘The guiding framework for digital change at GIZ 2015-2018’, as presented to GIZ in January 2016. The document confirms GIZ’s strong conviction and strategic vision that digital change needs to form a key pillar of GIZ’s overall strategic process, and that in the coming three years all efforts will be geared towards shaping and aligning different (strategic) processes throughout the company to realize this vision.

Over the past seven years, along with the renewed interest of the world’s largest institutions and development agencies in agriculture (specifically related to food security, climate change and environment, but also more in general to the UN’s SDG) the topic of ICT for Agriculture (ICT4Ag) has rapidly gained momentum. An increasing number of people in the developing world, also in rural areas, nowadays have access to new and modern information and communication technologies (ICT) such as mobile and smart phones, tablets, television, and radio, as well as internet and digital services such as mobile banking or market prices and weather forecasts. ICT4Ag is thus increasingly being considered as a potentially powerful entry point and instrument to transform poor agricultural practices, yields and revenues in a large number of developing countries into farming that can economically sustain and improve the livelihoods of hundreds of millions of small farmers, and that can continue to feed the world’s growing population. By doing so - looking at the wider context - ICT4Ag has the potential to become a powerful instrument to *shape* a forward looking and inclusive rural transformation. The 2013 conference on ICT4Ag in Kigali, Rwanda, together

with new developments in earth observation technology (drones, radar, better and cheaper satellite data) as well as data access and processing have only intensified the hopes placed in ICT4Ag since.

But lessons from the past have also shown that exaggerated expectations on technology and connectedness can lead to frustration and abandonment, if these technologies are not well designed for, integrated in, and adapted to human processes. Cyclic innovation, trial and error, prototyping, rapid learning, adaptation and re-adaptation are typical characteristics of modern ICT-development processes that do not always easily match with more thoughtful, longer and slower processes of project design, implementation and evaluation of ‘traditional’ development agencies and implementing organizations. New methods of experimentation and quick learning about and with ICT’s need to be developed, shared, improved and standardized. Some organizations have been quicker at engaging this process than others, but none can claim to have found the golden bullet for digital change yet. More patient institutions which did not too enthusiastically participate in the initial ICT4D euphoria of the past 15-20 years saved energy and resources on a number of expensive and unsustainable experiments which took place in that period, and are now well-placed to ‘do the right thing’, if they succeed in capitalizing on their own and others’ insights.

The present study on the “Use of ICT for Agriculture in GIZ projects – Status quo, opportunities and challenges” is meant to be a practical guideline

for projects and planning officers alike, and was commissioned by the Sector Network Rural Development Africa (SNRD) in collaboration with the Sectoral Project “Rural Development” (SV ELR) in Bonn. During the SNRD conference in March 2015 in Addis Ababa, the need for GIZ to catch up with ICT4Ag became evident and thus to look deeper into the use of ICT4Ag in GIZ projects and their lessons learned, and the SNRD Working Group Agribusiness and Food Security (WG ABFS) decided to take the lead and to coordinate this study. It is based on an analysis of past, current and planned ICT4Ag experiences in GIZ, with special focus on extension, training and agricultural value chain development, and enriched with experiences and lessons learned by other developing organizations. The WG ABFS entrusted Mr. Francois Laureys with this work in December 2015 in order to share and discuss the results and recommendations at the annual WG ABFS-Meeting in Lomé, Togo, in March 2016.

The objective of the study was to provide a general overview on the development, risks and potentials of ICT4Ag, to do a stock taking and compile a list of ongoing GIZ projects with ICT4Ag experience, to gain more insight in the current application and use of ICT solutions in GIZ agriculture programs and projects, to collect the available results and learnings ‘from the field’, and to match these with global lessons on ICT4D and ICT4Ag. Based upon the findings, the study is meant to be a practical guideline and to provide inspiring examples and ideas from within GIZ,

and to line out entry points and recommendations to GIZ project staff (especially the member projects of SNRD) and GIZ planning officers for agriculture and rural development to better integrate ICT4Ag solutions in ongoing and future GIZ projects, but also to have an idea about the technical and institutional requirements in order to be sustainably successful. Finally, the guideline also offers a broad list of existing global ICT4Ag-solutions for various project objectives and purposes.

Since 2000, over 150 GIZ projects have had an ICT-focus, but relatively few ICT-based innovations or solutions have been applied in the agricultural and rural development sector, and capitalization upon ICT4Ag-experiences has been more anecdotal than standardized in GIZ. But ‘learning’ nowadays can take place along many more ways than via the traditional knowledge transfer channels - and ICT’s play an important role in this innovative learning, too. Current ICT4Ag-related initiatives of GIZ are already avoiding the early mistakes of similar projects, and are gaining and applying new insights along the way.

Along with GIZ’s guiding framework for digital change 2015-2018, the upcoming ‘IKT-Toolkit’ or the ‘Plug&Play Workshop on ICT4Ag’ (Feldafing, November 2015), and many other recent activities around ICT for Development (ICT4D) by and within GIZ, it can be seen as part of GIZ’s initial steps to engage the process of digital change, also in the agricultural sector.

Methodology

The study, commissioned by SNRD Africa's WG ABFS in close collaboration with the Sectoral Project "Rural Development" (SV ELR) in Bonn, took place from mid-December 2015 to mid-February 2016, and consisted of the following activities:

1. Desk study on existing GIZ-documentation, -reports and -publications on topics related to ICT4D, ICT4Ag and innovation in agriculture, and on relevant other international publications.
2. Investigation on the use of ICT4Ag in recent, current and upcoming GIZ projects and programs
3. Exchanges and in-depth interviews with implicated GIZ project-staff and GIZ planning officers

In order to collect in-depth information and identify current and planned uses of ICT in agricultural and rural-development related projects/programs (apart from the ones with clear ICT4Ag elements in project design), emails were sent to 52 persons. Additionally, an invitation to fill in a short online survey with 10 questions was sent to approximately the same group and number of persons. Subsequently, emails with requests for information were sent to another 24 persons.

In total, over 50 persons responded with information or referred to other persons within GIZ like in a snowball system, and 10 filled out the survey. 13 persons responded positively to an invitation for an interview via Skype or phone, and 11 interviews were effectively realized (2 did not succeed for technical/connectivity reasons).

The study included a broad range of actors: GIZ agriculture and rural development projects on all continents (in collaboration with the sector networks SNRD Asia and GADeR-ALC in Latin America), but also GIZ projects related to agriculture and rural development in the broader sense such as projects working on economic development and inclusive business, rural youth, finance, education, TVET, natural resource management, biodiversity and climate change. The consultant also spoke to people in GIZ headquarters, mainly planning officers, sector projects and special initiatives such as SEWOH and the green innovation centers. Often people also referred to other resource persons and via a snowball system more than 35 projects currently using ICT4Ag have been identified and interviewed.



Chapter 1 – What is ICT for Agriculture?

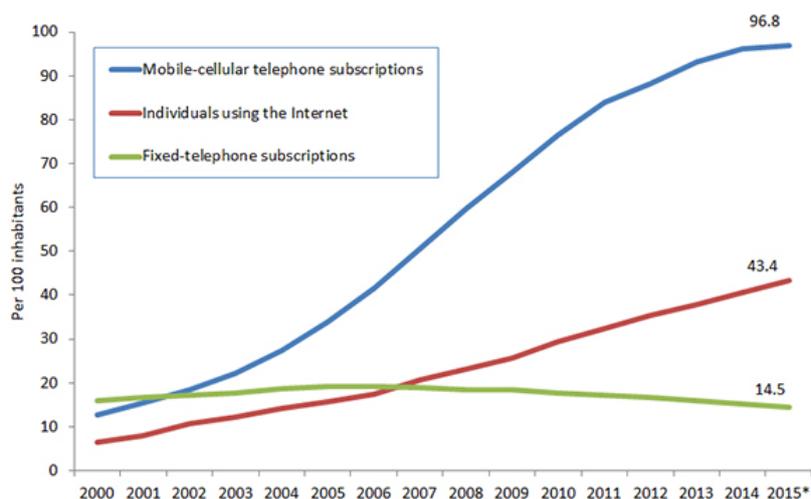
Definition and lessons from the past

All over the world, Information and Communication Technologies (ICTs) have become increasingly important in all aspects of our daily life and work.

In its latest report “Digital Dividends”, the World Bank states: “Digital technologies—the internet, mobile phones, and all the other tools to collect, store, analyze, and share information digitally—have spread

quickly. More households in developing countries own a mobile phone than have access to electricity or clean water, and nearly 70 percent of the bottom fifth of the population in developing countries own a mobile phone. The number of internet users has more than tripled in a decade—from 1 billion in 2005 to an estimated 3.2 billion at the end of 2015.”¹

Global ICT developments, 2000-2015*



Note: * Estimate
Source: ITU World Telecommunication/ICT Indicators database

And the World Economic Forum in its Global Information Technology Report 2015 concludes: “As a general-purpose technology, the impact of information and communication technologies—or ICTs— extends well beyond productivity gains. ICTs act as a vector of social development and transformation by improving access to basic services, enhancing connectivity, and creating employment opportunities. (...) If harnessed properly, ICTs can

create economic opportunities and foster social and political inclusion, ultimately contributing to shared prosperity. From an economic point of view, ICTs boost productivity and reduce transaction and information costs. They allow new models of collaboration that increase workers’ efficiency and flexibility. ICTs foster entrepreneurship and create new business models.”²

Global Mobile Data Traffic Growth / Top-Line
Global Mobile Data Traffic will increase 10-Fold from 2014-2019



1 “Digital Dividends”, World Bank 2016, page 28

2 “Global Information Technology Report 2015”, WEF 2015, page 17

But both influential sources also point to the fact that the digital revolution does not equally benefit all countries and all people, and that its ‘dividends’ in many cases still are to be delivered:

“Digital dividends—the broader development benefits from using these technologies—have lagged behind. In many instances digital technologies have boosted growth, expanded opportunities, and improved service delivery. Yet their aggregate impact has fallen short and is unevenly distributed.”³

And:

“The ICT revolution has not so far reached large parts of the planet. Many of those who stand to gain the most from it are not yet connected. In order to better leverage ICTs for development, a higher level of preparedness and better infrastructure and access are needed. In this context, government leadership and vision are critical. Finally, we observe that digital divides exist within countries. Even in the most advanced economies, only certain segments of the population are benefitting from ICTs. Many are left behind because of their age, limited digital literacy, lack of access, or remoteness.”⁴



³ “Digital Dividends”, World Bank 2016

⁴ “Global Information Technology Report 2015”, WEF 2015

ICT4D

This notion of a ‘digital divide’ – a gap between the ‘connected’ and ‘the non-connected’ or between the ‘advanced’ and ‘less-advanced’ has existed since the fast rise of digital technologies from the late nineties of the past century on – and it has led to the creation of the concept of ‘ICT for Development’ (ICT4D) to help overcome the specific barriers and obstacles that were supposed to hinder or slow down the adoption of ICT in developing countries.

Prof. Richard Heeks of the Development Informatics Group at the University of Manchester describes three initial stages of ICT ‘for development’:

1. The IT4G (Information Technology for Government) period (broadly ranging from the late 1950’s to the mid 1990’s):

“The first digital computer put to use in a developing country was installed in Kolkata in 1956 at the Indian Institute of Statistics for numerical calculation work. From that early start until the 1990s, there were two application emphases in the use of computing for development. Initially, government was the key actor, and IT was applied mainly to internal administrative functions of the public sector in developing countries. During the 1980s, the multinationals and other firms came to the fore, and IT was seen as a tool for delivery of economic growth in the private sector.”⁵

2. ICT4D 1.0 (from the mid/late 1990’s to the mid/late 2000’s):

“Two things happened in the 1990s that gave birth to what might be called ICT4D 1.0. The first was general availability of the Internet. The second was the Millennium Development Goals (MDGs). (...) The digital technologies of the 1990s were new tools in search of a purpose. Development goals were new targets in search of a delivery mechanism. That these two should find each other and fall in love was not unexpected. They had a baby called “ICT4D”, born in a flurry of publications, bodies, events, programs and project funding (...). The key actors became international

development organisations and NGOs; and the priority application of ICTs was to the MDGs.”⁶

3. ICT4D 2.0 (the era in which we currently evolve):

The advent of this era is characterized by rapid disappearance of limitations to reach and interact with the ‘bottom 5 billion people’ - thanks to the increasing availability and accessibility of mobile phone (coverage), to new technologies like *cloud computing*, to *digital convergence* (allowing ‘old’ technologies like radio, tv and video to merge and interact with newer technologies), to the increasing capacity for local content creation, to the increasing potential for interaction, to new services and applications, and to new innovation models: “‘Laboratory’ (pro-poor) innovation is that done outside of poor communities but on behalf of the poor. ‘Collaborative’ (para-poor) innovation is that done working alongside poor communities. Its use has grown during ICT4D 1.0 and it will be central to ICT4D 2.0. ‘Grassroots’ (per-poor) innovation is innovation by and within poor communities.”⁷

To conclude:

“In conclusion and above all, we can see that [current] ICT4D 2.0 is about reframing the poor. Where ICT4D 1.0 marginalised them, allowing a supply-driven focus, ICT4D 2.0 centralises them, creating a demand-driven focus. Where ICT4D 1.0 – fortified by the “bottom of the pyramid” concept – characterised them largely as passive consumers, ICT4D 2.0 [today] sees the poor as active producers and active innovators. Three overarching questions for this next phase therefore emerge. How can the poor be producers of digital content and services? How can they create new incomes and jobs through ICTs? And how can we recognise and scale the ICT-based innovations they produce?”⁸

5 From: Richard Heeks, “The ICT4D 2.0 Manifesto - Where Next for ICTs and International Development” (2009), Development Informatics Group at the University of Manchester: <http://www.oecd.org/ict/4d/43602651.pdf>

6 Idem to 1

7 Idem to 1

8 Idem to 1

From this analysis, Heeks derives two main **recommendations for successful ICT4D implementations**:

Moving from a ‘blueprint’ approach to a more process-oriented approach:

- » Participation of beneficiaries in the design and/or construction of the ICT4D project.
- » Flexibility and improvisation in the implementation of the ICT4D project.
- » Learning in order to improve implementation of the ICT4D project (both learning from past experience and iterative learning-by-doing during the project).
- » Utilising and building local capacities including those of local institutions.
- » Competent leadership of the ICT4D project that is able to promote the other four elements.”⁹

Design should become much closer to the on-the-ground ‘reality’:

- » Mapping project realities: finding ways to expose the true situation within the project context, and integrate that into implementation processes.
- » Using hybrids: hybrid ICT4D professionals are those who combine an understanding of technology, systems and development, and thus help to recognise and reduce gaps.
- » Being incremental: breaking the overall ICT4D project down into smaller steps and therefore reducing the extent of gap between design and reality that is undergone at any one time.”¹⁰

Important lessons from the previous ICT4D period have been also bundled in the so-called **‘Principles for Digital Development’**¹¹ which are endorsed by major development actors such as WHO, USAID, DFID, SIDA, UNICEF, the Bill&Melinda Gates Foundation, and many smaller NGO’s. The Principles ‘find their roots in the efforts of individuals, development organizations, and donors alike who have called for a more concerted effort by donors and implementing partners to institutionalize lessons

learned in the use of information and communication technologies (ICTs) in development projects’, and are synthesized in 9 key principles¹²:

1. Design with the user!
2. Understand the Ecosystem!
3. Design for scale!
4. Build for sustainability!
5. Be data driven!
6. Use open data, open standards, open source, open innovation!
7. Reuse and improve!
8. Address privacy and security!
9. Be collaborative!

ICT for Agriculture (ICT4Ag)

Over the past five years, ICT4Ag has become the most widely adopted acronym for the use of Information and Communication Technologies (ICT) in the agricultural sector. The international ICT4Ag conference organized by CTA in Kigali Rwanda in 2013 settled the term ICT4Ag versus ‘e-agriculture’ which was more commonly used in earlier days (alike e-Health and e-Education). Similar to the container-term ‘ICT4D’, ICT4Ag does encompass all ICT’s that are/can be used in the field of agriculture, and which range from older technologies like (analog) video, radio and television to computing, internet, remote sensing, mobile and digital broadcasting. It differs from the acronym ‘mAgri’ which stands for ‘mobile technologies in/for agriculture’ and which limits its scope to the mobile ICT’s, e.g. mobile networks, (smart-) phones, tablets etc.

Compared to the governance, health and education sectors, ICT-adoption in the agricultural sector has started relatively late. This may be due to the perception by ICT4D-actors of agriculture as a difficult environment (poor infrastructure, remoteness, poor education etc.), and to the fact that agriculture in developing countries has received relatively little attention from the international community since the early 1990’s – until it rapidly climbed up the donor agenda from the World Food

9 Idem to 1

10 Idem to 1

11 Digital Principles (2013): <http://digitalprinciples.org/>

12 See Annex 5 for the detailed 9 Principles

Crisis in 2009 on. The increasing attention has further been stimulated by the following five main trends that have been the key drivers of the use of ICT in agriculture, particularly for poor producers, and are expected to continue shaping the prospects for using ICT effectively in developing-country agriculture¹³:

1. low(er)-cost and pervasive connectivity
2. adaptable and more affordable tools
3. advances in data storage and exchange
4. innovative business models and partnerships
5. democratization of information, including the open access movement and social media.

The general recommendations and lessons from the previous ICT4D implementation period can and should be applied in ICT4Ag - but projects should remain aware that some **specific factors in agriculture influence the use of ICT-innovations**, such as:

- » **Age, literacy and education of the target group, as well as other characteristics** (farm size, gender, motivation etc.). From a study in 2010 (Prof. A.M. Kashem, Bangladesh Agricultural University Department of Agricultural Extension Education) on the use of mobile phone for agricultural information by farmers in Bangladesh it appeared that: *“literacy, annual income, cosmopolitanism, agricultural knowledge, aspiration, self-confidence and attitude towards technology of the mobile phone user farmers had significant positive relationships with their use of mobile phones in receiving agricultural information from the input dealers, while the age of them had significant negative relationship with the use of mobile phones in receiving agricultural information from the input dealers.”*¹⁴
- » **Seasonality of agricultural production.** The FAO states that: *“This issue may be affecting the sustainability of short-term productivity ICT services as farmers request them only at the time*

*of need. As agriculture is inherently seasonal, with several dormant months a year, the question of sustainability for these types of service arises. If they are a small part of a larger portfolio of services, this is less of an issue, such as for an MNO. However, a dedicated service provider would likely need to offer other services (likely for other target markets) to remain viable during the interim periods.”*¹⁵

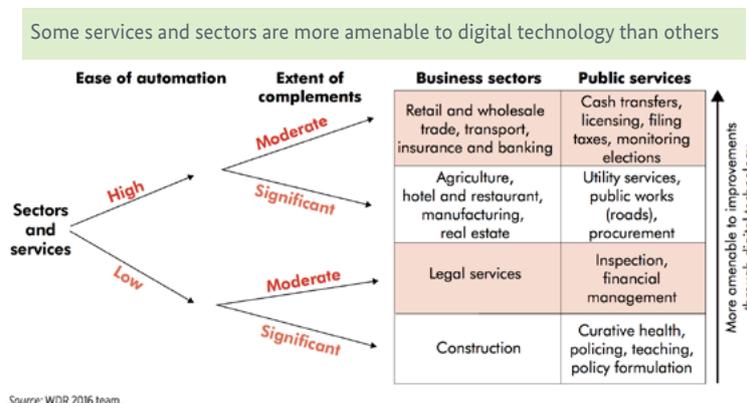
- » **Geographical spread of the target group** can affect the cost of awareness raising, training and mobilizing large groups of farmers.
- » **Geographical remoteness of the target group** can impact availability and accessibility of high-end infrastructure (electricity, connectivity etc.).
- » **Heterogeneity:** while there are still very large numbers of farmers in developing countries, their heterogeneity in/between regions/countries (in terms of type of agricultural production, geographical circumstances, climatic conditions, timezone, language, culture, etc.) can impact negatively on the economic attractiveness of providing services, or on the real value of the provided services for sub-groups of farmers.
- » **Sustainability.** The FAO concludes that: *“Most (...) pilots (are) subsidized by governments or multilateral institutions. While these players may have to continue providing data collection services, private players’ move into the delivery of information (e.g., Value Added Services with mobile phones) can encourage sustainability and greater reach. Two common business models are being explored around the globe: i) subscription models and ii) pay-as-you go models based on usage. There is still the issue of whether end beneficiaries will pay for such services, as farmers are often highly price-sensitive and prefer carrying out their business as they have always done. Mobile phones present an additional issue as the*

13 From “ICT in Agriculture Sourcebook”, Infodev 2012 - <http://www.ictinagriculture.org/sourcebook/module-1-introduction-ict-agricultural-development>

14 From: “Proceedings of The 2nd International Conference on M4D Mobile Communication Technology for Development M4D 2010 10-11 November 2010 Kampala, Uganda”, <http://uu.diva-portal.org/smash/get/diva2:644251/FULLTEXT01.pdf>, page 80-89

15 From: “ICT uses for inclusive agricultural value chains”, FAO 2013 - <http://www.fao.org/docrep/017/aq078e/aq078e.pdf>

VAS provider may charge a fee to the user, and the user has to pay for data and/or phone time charges.”¹⁶



In its World Development Report ‘Digital Dividends’ (2016), the World Bank identifies agriculture as one of the sectors where ICT can have a huge impact potential but the report also points to the more macro-level issues that affect wide adoption of ICT4Ag innovations and explains why many of these innovations fail to scale up and achieve wider acceptance:

1. Market fragmentation, even though market consolidation will, over time, enhance growth prospects.
2. Lack of financially sustainable business models that will attract private sector investments in innovative solutions for small-scale agriculture.

There is great potential for the internet and related technologies to improve rural economies, but four **lessons learned on ICT4Ag** need to be kept in mind:

1. **Agriculture is becoming increasingly knowledge-intensive and high-tech.** Some of the world’s newest industries have started to put money and tech talent into farming—the world’s oldest industry. Digital soil maps, remote sensing, and global positioning system (GPS) guidance are critical tools for modern farmers. “Big data”

for precision agriculture increases yields and efficiency. These high-tech tools mostly benefit big farms that can make large investments in technology. But there are also many innovative ways in which illiterate and otherwise disadvantaged people use digital technologies, such as basic mobile phones.

2. **Basic price and market information systems can improve efficiency and welfare.** A number of recent studies have cast doubt on the overall novelty of information provided to the farmer and the degree of competition in many markets. One explanation of weak effects is low take-up of fee-based price information services. But even when farmers are seemingly better informed, they may not necessarily be able to act on that information because of the inaccessibility of alternative markets and the complex interlinked relationships between buyers and sellers in low-income developing economies. Rather than assuming that an information and communication technology (ICT) approach will always be cost-effective and yield a better outcome, a more nuanced understanding of the underlying institutional environment and constraints is warranted.

3. Technology-enabled interventions are no panacea in themselves, and need to be backed by complementary investments in physical infrastructure, including electricity and literacy.

The versatility and near-constant innovation that characterize digital technologies can sometimes be a distraction that can cause interventions to focus more on the technology than on the demands and priorities of the intended beneficiaries and the trade-offs imposed by resource constrained environments.

4. Information technology (IT) policy and the broader regulatory environment in a country should be discussed jointly.

Whereas the expansion of mobile phone access has been rapid and commercially self-sustaining even among many of the poor, the same is not true of the internet. In the long run, the internet can have an even greater impact on rural growth; much depends on finding sustainable business models to encourage its spread in the poorest parts of the world.”¹⁷

The following **10 key issues fundamental for ICT4Ag implementation in development projects** were put forward by the participants of the international ICT4Ag conference in Kigali 2013¹⁸:

1. Developing partnerships to ensure positive impacts of ICT4Ag initiatives.

All too often, ICTs for agriculture initiatives are developed in isolation, with companies and individuals producing comparable applications (apps) for similar purposes in different countries. Those involved in ICT development should build partnerships and communities of practice that encourage greater collaboration. They should also build on existing models and approaches to develop solutions that have a real impact.

2. Supporting ICTs for extension and advisory services

ICTs have a vital role to play in getting information to farmers and vice versa. Extension and advisory services should take full advantage of the potential of new technologies. They need to focus on proven and innovative ICT tools which recognize the importance of two-way communication. ICTs should be used more innovatively to achieve the goals of extension, and efforts should be made to attract women and young people to work in extension and advisory services.



¹⁷ World Development Report, World bank 2015, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2016/01/13/090224b08405ea05/2_0/Rendered/PDF/World0developm0000digital0dividends.pdf, page 90-91

¹⁸ From: "ICTs for Agriculture – Making it Happen", Charles Pye-Smith, CTA 2014 http://publications.cta.int/media/publications/downloads/1817_PDF.pdf, page 4-7



3. Supporting open and big data for smallholder farmers

Smallholder farmers need to benefit more from 'big data' – datasets which are large, complex and difficult to handle – and information derived from such data should be made available in a format they can readily use. The conference stressed the importance of good data visualization, and the importance of providing real-time data via multiple channels to smallholders and others involved in value chains. There is an urgent need to create a public information platform to reduce data duplication.

4. Ensuring the reliability and availability of high-quality information

Ensuring the reliability and availability of high-quality information. Developing farmers' trust in ICT services and the content they provide is important. They should never be bombarded with information that is unreliable, of poor quality or difficult to use. Indeed, the content – rather than the mode of delivery – should always be the first consideration for those involved in disseminating information to farmers. The conference affirmed that what goes into the content box is more important than the technology; this is a signal for better linkage between research and extension.

5. Ensuring grassroots access to ICT solutions

Many rural communities still have little or no access to ICTs. We need to ensure that they can take advantage of these technologies, in terms of cost, availability and usability. The conference affirmed that what goes into the content box is more important than the technology; this is a signal for better linkage between research and extension. Providers should focus on the household level and adapt information to the local context. They should also recognize the multidimensional needs of farmers and their families, and encourage grassroots community engagement in policy processes related to ICTs.

6. Strengthening the involvement of young people and women in ICT4Ag initiatives

All too often, women and young people are disadvantaged, in a variety of ways, in rural areas. ICTs have an important role to play in empowering young people and women. Women are the pillar of the family in terms of smallholder agriculture and they should be provided with the resources and information they need to improve their productivity and gain access to markets. ICTs should also be used to attract young people to agriculture and ensure that they can develop their potential.

7. **Supporting ICT4Ag entrepreneurship and promising business models**

Policy makers and others working in the field of agriculture need to encourage smart entrepreneurship and ensure that those developing ICT applications develop sound business models. If they fail to do so, then their apps are unlikely to survive or be scaled up for wider use. Apps should be designed to help not just farmers, but all those involved in value chains, from field to fork.

8. **Supporting sound strategies and high-level political buy-ins for ICT4Ag**

ICTs have a transformative influence on farming and food production in countries where governments and policy makers are committed to developing comprehensive e-agriculture strategies. In particular, the conference heard about the successes in Côte d'Ivoire and Rwanda. These two countries are pioneering the development of e-agriculture strategies to support the efficiency and effectiveness of ICTs for agriculture.

9. **Promoting adequate infrastructure and energy for ICTs in rural areas**

Most of the policy pointers above are concerned with the software of ICT development. But the hardware – broadband infrastructure, mobile phone masts, energy provision – is just as

important. Governments should be encouraged to provide access to energy, devices and infrastructure, especially in remote areas. This often works best when they act in tandem with the private sector. Local entrepreneurs also have a key role to play in achieving connectivity, but if they are to do so, they need to develop sound business models. Universal service and access funds (USAF), which are taxes collected from communication operators, have considerable potential.

10. **Promoting sound knowledge management activities**

In addition to the above nine conference recommendations, this tenth recommendation emerged from the follow-up survey that was conducted with the conference participants. Participants suggested the need to address issues arising from awareness-creation, information-gathering and capacity-building on ICT4Ag. They identified the need for more inclusive learning models that promote the existence of knowledge providers at grassroots level using the value chain model.



Chapter 2 – Use of ICT in GIZ projects related to agriculture and rural development

In this chapter, we highlight a number of agriculture or rural development projects with strong ICT-components of which (intermediary) results and lessons can be distilled. The interactive map and the table further on give an overview of identified GIZ projects with ICT4Ag-components or ICT4Ag-related activities. These include also some projects which are not directly related to agriculture or rural

development but which have potential cross-linkages with the sector such as economic development, youth employment, rural finance, climate change etc. The list does not necessarily cover all past, present and planned future GIZ-related ICT-interventions in agriculture, but is mainly intended to give an insight in the recent state of affairs regarding ICT4Ag in GIZ-operations.

CCKN-IA, India

The Climate Change Knowledge Network in Indian Agriculture (CCKN-IA) is one of the few GIZ-projects related to Agriculture in which the use of ICT is central in project design, in the approach and in the activities. The project is in the middle of its operational phase, but already generates interesting learning.

Context

Climate change presents India with major challenges. Rainfall is becoming less frequent but more intense, which is increasingly affecting the use of natural resources and agricultural production. The approximately 700 million rural inhabitants in the affected areas of Central and South India are ill-prepared for the consequences of climate change. Smallholder farmers and households that depend primarily on income from rain-fed agriculture are particularly badly affected. So far, the farmers have received insufficient information on how they can adapt their agricultural activities to climate change. Differing and even contradictory information is often disseminated via a variety of platforms and vendors, stressing the need for a recognized qualitative, timely, affordable and effective information (exchange) mechanism.

Objective

A climate change knowledge network provides information that is increasingly used by relevant actors in agriculture at national, regional and district levels.

Approach

Implemented by the Ministry of Agriculture, Government of India and the State Department of Agriculture with technical support from GIZ, the CCKN-IA project is integrating various institutional and individual expertise around climate change adaptation in agriculture. Through the use of innovative ICT enabled knowledge exchange platforms, the project envisages to effectively support local adaptation needs of small and marginal farmers. The project is operational on a pilot basis in three selected states of India. CCKN-IA has developed an open source platform called Network for Information on Climate (Ex)change or NICE.

Results and learnings:

The NICE Platform has been developed and is operational – with over 350 users. NICE allows existing knowledge stakeholders from domains like meteorology, agriculture science, extension systems and others to share and adapt knowledge across

multiple subject domains, and to address local climate change adaptation needs. The system is iterative and follows a multimodal approach, enabling two-way communication to link farmers' needs and knowledge providers, on a real time basis. Thus, the project revitalizes existing extension systems, capacities and monitoring systems.

The queries and feedback from the farmers are responded by experts on a near real time basis using the NICE platform and other ICT tools. Various Agriculture programs and schemes are converged in CCKN-IA locations to complement the advisories and support practical application by farmers.

Over 100 subject experts have been trained and use NICE for exchanging localized advisories. More than 100 extension agents have been trained and provided with tablet applications for effective and timely dissemination of advisories. Peer exchange groups of extension agents and subject experts are functional and provide real time exchange of ideas, issues and resolutions via ICT tools like NICE, WhatsApp and telegram.

Advisories in the form of illustrative one pagers and SMS are being developed on a weekly basis at district and block levels and are disseminated on tablets of extension agents, mobile phones of farmers and village notice boards. Over 144 illustrative one-pagers have been developed, validated and disseminated through NICE.

More than **22,000 farmers** are linked to NICE and receive advisory services across 3 project states: Jharkhand, Maharashtra and Odisha. The State Agriculture Department is interested to replicate the approach in other locations. Other Departments like the Forest Department (in Jharkhand) have explored the approach for possible replication.

Next to the Ministry-driven interventions, private partner ReutersMarketLight (RML) is providing market

information as well as adaptation advices to farmers who subscribe to the RML mobile service.



Localized Content / advisory development:

It is crucial to train and organize a large number of actors at different levels to ensure that sufficient qualitative content is being developed. The first challenge was to ensure the critical input for the generation of sufficient localized, timely and validated advisories and content in order to optimize the use of the NICE platform. CCKN-IA has trained over 100 subject experts at state, district and block levels who are creating localized quality advisory services using NICE. Over 350 users (including advisory creators, senior subject experts for validation and translators) are using NICE to generate quality advisory services.

Effective knowledge dissemination:

SMS and/or voice messages via mobile phones are ok for market prices and weather updates, but are not the best suited channels for advisory services - a human interface is more effective when it comes to influencing behavior change. Furthermore, the use of multiple channels (extension agents, SMS, village boards) ensures that both proactive advisory services (based on weather projections and local cropping systems) and reactive (responding to needs, questions and feedback from farmers) are being developed and disseminated on near real time basis.

Over 100 extension agents were trained on the use of and provided with a tablet for effective and timely

dissemination. The tablet application also enabled the extension agents to register the farmers and their local contexts on NICE as well as to provide dynamic feedback and needs of farmers to the experts for further iteration and refinement of advices.

It was also noted that the massive use of the SMS-channel as a push-service with generic messages can lead to a certain saturation, or 'SMS-fatigue'. Farmers expressed that they stopped reading their messages if they would receive too many general advices. A subscription-based model, like the one offered by RML, whereby farmers chose to pay for a certain type of content is a better option than a free push-model.

Capacity development:

Next to building capacity on content creation and content packaging, it is crucial to teach experts to check their knowledge with the actual needs of the farmers, and to facilitate exchange processes. The peer exchange process not only helps sharing in real time but is also building mutual appreciation and strengthening the relation between the field extension cadres and experts.

CCKN-IA has been using a three-pronged approach:

- » field orientation of experts before the cropping season, in order to understand local cropping systems and needs.
- » near real time feedback and response from farmers as well as weekly weather projections and multi-tiered quality norms to ensure validity and quality of knowledge created.
- » training on the use of NICE to develop and validate knowledge thus created.

Local networks and consortia of experts have been created to facilitate effective exchange and integration of climate change adaptation knowledge.

Capacity development of extension agents is critical to ensure the effective exchange of advices at farmer level. Capacity development should not only focus on the use of ICT but also on subject understanding like agronomics, pest and diseases etc., and on

participatory and gender-sensitive approaches.

The project works closely with over 100 community-based extension resources to build their capacities not only for effective dissemination of knowledge to farmers using ICT tools but also as a link between farmers and experts. Capacitating local communities is essential in order to raise awareness on the existence of various sources of knowledge, on the role of extension agents and the services that can be expected from them, and on the fact that farmers can demand specific knowledge based on their local needs.

Mainstreaming innovations:

In order to enable scaling later on, it is critical to develop capacities of related organizations in such a way that they are able to effectively perform their role in knowledge exchange as well as in effective local decision-making processes.

CCKN-IA works with local mandated training institutions like the State Agriculture Management and Extension Training Institutes (SAMETIs) to build their capacities to ensure quality exchange of adaptation knowledge as well as to provide trainings on the use of ICT for climate change adaptation. In partnership with the National Institute of Agriculture Extension Management (MANAGE), CCKN-IA is mainstreaming the capacity building efforts and replicating the approach to other geographies.

Partnerships:

It is important to build partnerships with organizations from different sectors, in order to leverage their specific expertise as well as to build their capacities to share knowledge on climate change adaptation in agriculture.

CCKN-IA is working on an Integrated Public Private Partnership mode with Reuters Market Light (RML) in Maharashtra, and involves different NGO's in the 3 States.

SMS Service for Small Farmers in Uttarakhand, India

Context:

Inadequate information, in terms of relevance and timeliness, has been identified as one of the key hindrances in the decision making of small holder farmers. Access to information is even more critical in a hill state like Uttarakhand where 75% of the population depends on agriculture despite small land holding. There are 2000 villages situated at a distance of more than 5 KM to the nearest road and 500 villages that are not connected by road at all. The scattered and uneconomic land holding patterns that are characterized by 72 per cent marginal land and 47 per cent of land being below the size of 0.5 Ha, further aggravate the issues of the agriculture sector.

Objective:

Improving productivity and income of small to medium farm-holders in the Indian state of Uttarakhand through enhanced access to agricultural information via communication technology (ICT).

Approach:

For the effective introduction of the services the project chose a value chain approach. During the scoping for the project it was observed that major challenges occurred at the producer level such as lengthy payment processes, low institutional storage facilities and processing units, lack of access to unbiased market information and products not being sold to the highest offering buyer. One of the recommendations was that if farmers were aware of the prevailing market prices in various markets in the state as well as outside, they could bargain for better prices for their produce. The mobile based advisory service is additionally providing information on crops, weather, government schemes and other news required to improve the value chain.

GIZ has joined hands with Reuters Market Light (RML) under the develoPPP.de program. RML was

launched in India in October 2007, as part of the Reuters group. The company provides individual farmers with “customised, localised and personalized” weather forecasts, local crop prices, agricultural news and relevant information in the form of SMS messages sent to their mobile phones in their local language. The company operates in 13 states of India and covers over 300 crops and varieties and 1300 markets across these states. RML became an independent company during 2015. As part of the develoPPP.de program, 6000 farmers across the 13 districts of Uttarakhand were to be covered.

Results and learnings

In order to introduce the service, 62 workshops/ training programs were conducted with farmers and farmer groups along with the network partners of the programs. 4000 farmers received individual handholding support. Additionally, a call center was introduced that seeks to address day-to-day queries of the farmers. Further, training programs for government officials were conducted in order to sensitize them on the needs of farmers. Customisation of the service to meet the constantly changing requirements of the farmers was done on a regular basis.

During a mid-term evaluation it was found that 46 percent of farmers assessed the quality of the service to be good, 63 percent reported that they could benefit from the information of good agriculture practices, and 85 percent reported that they benefited from the weather advisory services.

Despite the early successes, some of the learnings by the end of the project are quite revealing: one of the conclusions is that qualitative localized and contextualized advisories via mobile SMS are hard and costly to develop, and that their impact is below expectations. It is not clear whether RML

will continue to offer its specific advisories for Uttarakhand farmers. Observations by the project manager:

“What works for a particular crop in the plains of India does not work in totality for the same crop in the hill state. The content development for the RML service in Uttarakhand was handled by the RML office (North) stationed in Chandigarh, and as such the agri-advisory was developed by experts who were mostly dealing with North India. These experts however seldom take into consideration aspects like geography, terrain, altitude in great detail (for instance a pest advisory for wheat which is very important for a farmer in the plains, might not be of any use to the farmer in Uttarakhand). Coming to the question why the content was not sufficiently localized, the answer is volumes: an advisory development costs - firstly in terms of content development and - secondly in terms of delivery (every text message word costs money, any additional word costs more money, apart from the technology

limitations for sending text messages). It simply did not make economic sense to develop localized content for a small set of farmers (especially in a terrain where climate and whether pattern changes from valley to valley). A company providing advisory service should have the means to gather and develop local information on a sustained basis and also a business model to deliver it. To the best of my knowledge RML is now winding up operations from areas where they are not being supported by externally aided projects or by the government.

Another reason for this is that government is also providing the same information to farmers (free of cost). The company has to compete with the government, which definitely is slow but the outreach is wide and stays in thick and thin. Secondly - even if the advisory is relevant, the input suppliers (fertilizers, insecticides, etc.) are relatively nonexistent in Uttarakhand.”

Young Farmers Innovation Lab, Zimbabwe

Context:

The agricultural sector is the backbone of Zimbabwe's economy, contributing food for domestic consumption and surplus for the market. In addition the sector is the second leading employer contributing more than 70% of employment opportunities, and 13% of the national Gross Domestic Product annually (World Bank 2014). While the agriculture sector has potential to scale employment creation, there are challenges in terms of how to attract the majority of the unemployed segments, namely the youth. Over 60% of Zimbabwe's population is comprised of young people, who have the potential to drive the economy. This demographic is highly educated, skilled, but remains largely unemployed. Some do have access to land, but their productivity is limited and does not translate to economic empowerment. At the heart of this discussion is several issues, namely, lack of innovation within the agriculture sector especially among the young farmers; lack of capacity to leverage agriculture as a viable business; and the costs and risks associated with innovation in the sector.

This pilot project was a multi-partite partnership, funded by UNDP and implemented by GIZ. Other partners included the Zimbabwe farmers Union, The Harare Institute of Technology, Hypercube, Oxfam, Khangela Studios and Watershed College. Microsoft provided technical backstopping and advice. The development of ICT-solutions for and with young farmers and young developers was a component, with the intention to create local ICT-solutions for farming, and to explore the potential of creating new job opportunities for technical students.

Objective:

Innovatively develop and nurture entrepreneurship abilities of young farmers in Zimbabwe, by tapping into seed innovation funds and diverse capacities of

viable strategic partnerships with the private sector, tech and innovation hubs and technical institutions.

Approach:

The program was designed as a collaborative entrepreneurship model targeting young farmers to transform their farming practices into productive and commercially viable agri-business ventures. The pilot targeted 100 young farmers in the dairy and the dried fruit/vegetables sectors from Honde Valley, Murehwa, Gurumonzi, Harare peri-urban and Chimanimani.

The key results expected from the pilot were:

1. Support the development of 100 young smallholder agri-business ventures that adopt sustainable production practices (that are climate-and environment sensitive); as well as new technologies for enhanced productivity and profitability.
2. Enhance the capacity of 100 young farmers to sustainably produce food crops for the market chains locally and globally with high quality food products – including value addition outputs (in targeted poultry, fresh fruit, Vegetables, Herbs and Spices).
3. Build a pool of 10 highly skilled social innovators with capacity to design, test, and pilot and deploy ICT-based agri-business solutions for the food production chain.
4. Support the deployment of an end-to-end tailor-made ICT-based platform with solutions to address diverse challenges across the food production chain.
5. Support the re-design and deployment to scale of the Zimbabwe Young Farmers Innovation Lab targeting at least 5,000 young farmers by 2017.

6. Support the design and deployment to the market of an innovative Young Farmers agro-product Label while establishing market linkages for enhanced profitability.

Results and learnings

By early 2016, most expected results and deliverables are met. More than 90 farmers were trained, a number of apps has been developed (of which four are to be implemented during 2016) and the implementers and funders consider the pilot as a success – from which several learnings can already be torn:

- » The collaboration between multiple partners with different expertise/competences was a strong asset – bringing in knowledge and competences from different perspectives fastens the process of problem solving, and learning is enhanced. New cross-links between traditionally separate sectors/entities are created. But: important to take more time in design phase to well-define roles, responsibilities and tasks of all the partners, and to be aware of mutual dependencies.
- » The used approach was flexible, relatively cheap, and yielded concrete results in a short time-span.
- » The combination of development of entrepreneurial skills and of concrete ICT-solutions appeals to youth and does create new dynamics. Young farmers are more apt to adopt innovations than the older generation, both in their attitude towards farming (more entrepreneurial) as in the uptake of new technology and practices.
- » The ICT-component proved a very big asset to the project itself. Proved to be easier to achieve results here than on the component of improving farming techniques.
- » Bringing together young farmers and student developers to work on (the improvement of) ICT-applications was very fruitful, as it helped to identify and focus on the primary problems expressed by the young farmers, but also because

it stimulated motivation and ownership on both sides.

- » Young farmers already use communication technologies like Whatsapp and social media like Facebook. Tap into these rather than create new platforms. Email lists don't work for the youth.



Challenges regarding the ICT-component:

- » Access to computer/laptop (time) for the student developers. Tight budget can be challenging on this level.
- » Keeping timelines: unexpected delays occurred (holiday season at University, farmers having farm-related priorities etc.). Build in more flexibility in next project phase, plan with delays in mind. Monitoring of the development process should be stricter.
- » Except for the basic record keeping app, the applications could not be tested in the field due to the delays in development. This testing is really important, as many technical bugs can only be detected this way.
- » Within this short timeframe it is difficult to assess whether the developed apps can/will be commercially exploited.

Competitive African Rice Initiative (CARI), West Africa

Context:

Rice is one of the most important basic foodstuffs in Africa. While demand has risen sharply in the last few years, local producers are only benefitting from this to a limited extent. Most of the rice consumed is imported due to lower prices, instead of meeting rising demand through domestic rice production and distribution.

There is scope for increasing yields, but production is already very intensive and earns only meagre incomes for rice farmers. Productivity also remains low in irrigation areas. There is only limited use of equipment and cultivation techniques are inadequate.

CARI is a large multi-country program, building on existing partnerships, and creating new ones. Within the initiative, ICT is being used in some of the intervention areas – but it is not a goal in itself to integrate ICT in the program. Thus, it is seen as one of the tools to improve processes within the rice value chain or to achieve program objectives (more quickly).

Objective:

The main objective of the Competitive African Rice Initiative (CARI) is to increase the competitiveness of African small-scale rice producers, millers and other actors in the value chain and achieve a lasting reduction of poverty.

Approach:

CARI is implemented in Burkina Faso, Ghana, Nigeria, and Tanzania with the aim of reaching 122,000 African rice producers. The direct beneficiaries of this project are male and female smallholder rice farmers with a daily income below 2 US\$. Secondary beneficiaries are rural service providers and rice millers improving their sourcing capacity of quality supply.

In order to assist the rice farmers, the program is supporting both a sustainable increase in the intensity of small-scale rice cultivation and the development of inclusive business models. Such models improve access to equipment and services, and create a more stable market for produce. Consumers are thereby able to purchase rice more efficiently and enjoy better quality rice. The program is applying various business models so as to achieve widespread increases in income.

At the same time, the program is also supporting vegetable cultivation as a way of ensuring product diversity. This leads to additional improvements in food security, incomes and liquidity, and means that producers are less exposed to the risks of product failure. CARI's core functions also include delivering training and education via farmers' business schools, providing training and communication materials, and developing innovative solutions for information and communication technology (ICT).

CARI works in close cooperation with a broad-based consortium of stakeholders from the public and private sectors, including businesses that belong to the German Food Partnership, research institutions, national and international foundations, non-governmental organisations and development cooperation organisations.

Most importantly, the programme is offering matching grants to organisations and businesses that use their own resources for the activities planned by CARI.

CARI's activities operate along four intervention areas:

1. Improved Productivity and quality of paddy rice based on sustainable and competitive rice production systems

2. Increased efficiency of local rice sourcing, processing and marketing through structured value chain linkages, improved technology and process management
3. Improved access to financial services for all value chain actors
4. Enabling environment at national and regional level including policy framework and strengthening of rice sector initiatives.

Activities under intervention areas (1), (2) and (3) are implemented through a Matching Fund (PPP fund). The fund's purpose is to stimulate investments in the value chain that are jointly planned and implemented by at least two partners.

At the time of this study a number of proposals for the matching fund were under study, seven of which contained a component of ICT in their concept. The use of Farmerline in Ghana (voice messages for weather, market prices and agronomic info) is part of one of the proposals. For Tanzania a cooperation with Vodacom, SAP and Esoko is being considered and negotiated.

The Rural Sourcing Management tool of SAP could be an option for the rice value chain. This will depend on SAP's interest in commercializing the software, and on the according pricing model. A challenge may be that the software is too expensive for the involved producer organisations – as investing in ICT is a huge threshold. What is the necessary minimum scale, and can smallholder outgrowing schemes support the costs?

Current use of ICT within CARI:

a. RiceAdvice:

RiceAdvice is an Android based free decision support application (app) for providing farmers with field-specific management guidelines. It is an interactive tool, which generates the recommendations based on farmers' answers to multiple choice questions including:

- » Location
- » Season
- » Rice growing environment
- » Water supply level
- » Crop management practices
- » Rice variety
- » Typical rice yield
- » Crop rotation
- » Organic input
- » Fertilizer which farmers already have
- » List of fertilizers available in the local market & their price
- » Paddy price

Expected users include farmers, extension workers, private rice sectors, development agencies in Africa who are interested in advice for rice production.

RiceAdvice can be used on Android devices (version 4.1 and up). Although RiceAdvice can be largely used without an internet connection, an active connection is required from time to time to synchronize information with the database server.

No formal evaluation data regarding RiceAdvice in CARI are available yet, but the following observations were gathered in interviews:

- » *“The application seems relatively easy to handle, but requires some basic digital literacy. Its’ primary target group is extension agents. The app is used for guiding the advice of extension agents or technical agents who support farmers through the crop cycle. A specific innovative element is that it is not only based on the agronomic conditions, but also on the financial capacity of the farmer: how much money does he have to invest, what are then the optimal scenarios, reducing cost on inputs or optimizing yield? The app is relatively flexible on these terms.*
- » *Another positive element is that this app has been developed for use in different countries. Once the app has been well calibrated in a specific context/zone, it can easily be scaled.*
- » *However, a minus point may be that it is not a ready-to-use product. It needs to be calibrated per context first: during 1-2 crop seasons and with a minimum of 20 demo farms in a particular agro-ecology the optimal use of fertilizers and other inputs need to be analyzed. This is a time-consuming and cost-intensive step – which is now supported by the project, but it remains to be seen whether direct stakeholders (e.g. rice millers, exporters, input suppliers, government) will be willing to sustain these investments in the future.*
- » *Furthermore, the calibration process can be frustrated if particular weather/climate conditions arise. This has been the case in Burkina Faso. The app may thus be less suited for regions where climate conditions are erratic.*
- » *An important limitation of the app is that it is currently only available on tablets – this makes the necessary investments in hardware too high. Syngenta Foundation has advised and proposed to develop a smartphone based version.*
- » *The idea is that RiceAdvice should become available on a commercial basis. The software in itself is free, but investments in hardware*

are needed, as well as money for supporting the extension agents. The strategy of CARI is to conclude the calibration process in the four countries and then to quickly demonstrate the product, in order to interest private parties in contributing (with expertise, hardware or monetary). As the demand for rice in the target countries is higher than the supply (and still rising), the expectation is that the private stakeholders in the value chain do have an interest in improving the value chain at the level of the smallholder production.

- » *Marketing: the users (extension agents) who use the app during the calibration period are important actors for the marketing of the app – as their satisfaction is a good indicator for the usefulness and effectiveness of the tool. In the next phase which will be rolling out RiceAdvice in Senegal and Nigeria, demonstrations will be organized to interest private parties.”*

b. The Wienco Rice Project (Ghana):

This project uses the Farmforce software developed by the Syngenta Foundation. The use of Farmforce is considered as a pilot

Farmforce is a Software-as-a-Service solution that links smallholders to agri-value chains by enabling traceability, compliance with standards, facilitation of agricultural extension, and input-output management. Farmforce can also help expand access to other services such as soil fertility management.

Farmforce is used to efficiently manage outgrower schemes and contract farming programs. Its functionalities include:

1. Coordinate activities of field staff and farmers
2. Track harvest and growing activities in real-time
3. Provide full traceability from field to market
4. Comply with food safety and sustainability standards
5. Access digital records (no paper) that are centralised and always up-to-date
6. Streamline logistics
7. Manage cash and input loans
8. Increase the number of potential buyers for smallholder produce

Objective:

The goal of the project is to integrate 3000 rice producers (30% women) into sustainable and competitive business models that lead to increased paddy production as well as to improvements in quality. As a result, the income of the farmers is expected to double by the end of the 2-year project. This project contributes to the reduction of poverty of smallholder farmers in Weta in the Ketu North District, Asutsuare in the Osudoku District and Dawhenya in the Ningo prampram District, Ghana.

Approach:

In order to double the yield and income of farmers, support is given to farmers through training in Good Agricultural Practices (GAP) and provision of improved technical packages. Wienco/ Bayer is supporting farmers with a designed rice input package of agrochemicals, hybrid seeds, fertilizers and spray machines. In terms of access to finance, the project deploys a credit and pay back system which allows farmers to pay at the end of the season with

paddy. The farmers also have their rent charges paid in advance to allow for water canal maintenance necessary for good water management. The tonnage of paddy obtained from repayment of credit and the extra purchased from farmers are milled and packaged into the Wienco Aduahene rice brand for retailers to sell to consumers. By supporting contract farming arrangements between farmers and off takers, the project enables farmers to market their product.

Results and learnings:

No evaluation data are available yet, but some observations were collected via interviews:

“The software seems well-designed, and it incorporates good services. User satisfaction seems positive. - It is offered as a commercial package – which is positive regarding long-term sustainability. However, it is not yet widely used and seems relatively expensive. SFSA may need to reconsider the Farmforce pricing model if it wants to scale it and compete with other similar solutions.”

Agribusiness Management in the Coffee Value Chain, Uganda

Context:

Uganda is one of Africa's largest coffee exporters. More than 1 million farming households (approximately 7 million individuals) rely on growing and selling coffee beans as their major source of cash income. For the larger region of East Africa, these figures can almost be tripled. Smallholder farmers face a number of challenges such as inadequate agricultural practices, limited information and market access as well as limited access to financial services.

In order to address some of these issues, about 54,000 Ugandan smallholder coffee farmers have been organized in producer groups to channel their produce through commercially managed bulking stations being provided with direct market access and released from dependencies and captive relationships with informal middlemen. However, important challenges have remained: Above all, transparency, efficiency and accountability were still problematic at many bulking stations, leading to a lack of trust and hampering cooperation. The manual and paper-based systems were error-prone and did not provide timely and comprehensive overviews.

Objective:

Provide farmers with the opportunity to grow and market more and higher quality coffee and to thereby increase their income.

Approach:

Through the develoPPP.de program on behalf of BMZ, GIZ and the software company SAP have joined forces. Within the development partnership the partners have developed an IT solution for the coffee value chain, featuring a smartphone application linked to a central database with a sophisticated analytical and geographical information system (GIS).

Coffee farmers deliver their bags to bulking stations, where they are registered and issued a bar-coded membership card. Using the SAP smartphone application, their bags are not only recorded on delivery, all subsequent transactions such as cash advances, bulking, hulling, selling to exporters and final payments are captured digitally and synchronized with the central database as soon as mobile network coverage is available. The path of both, the produce and the money, is traced throughout the entire value chain.

While farmers are provided with SMS notifications on deliveries, weather updates as well as information on agricultural practices and prices, traders utilize the system to increase their efficiency when buying, bulking and arranging their transport logistics. Up-to-date market prices can be sent to the bulking stations via smartphone on a daily basis. Centrally, the system provides aggregated seasonal and geographical analytics, yield reports as well as traceability of produce, which is especially relevant for certification.

Results and learnings:

- » 24 smartphones capturing transactions of 13,500 UCFA (Uganda Coffee Farmers Alliance) farmers in Mityana, Mubende and Kassanda digitally
- » 100% adoption rate (comparing paper-based data with digital data)
- » Increased production/deliveries (approx. 10 %)
- » Reduction in transaction costs (- 11%)
- » Significant increase of trust and transparency in UCFA's organizational structure (sample: 100 participating UCFA farmers in three districts)
- » Average price per kg of dried Robusta coffee paid in 2013/14: UCFA farmers 1,674 UGX Non-UCFA farmers 1,467 UGX

The smartphone application addresses various gaps in the coffee value chain ensuring traceability as well as increasing efficiency and transparency. Producers, sellers, buyers and service providers can now collaborate seamlessly through a system tailored to Base of the Pyramid (BoP) businesses. Electronic communication of market information prevents arbitrary prices and handling fees fixed by middlemen. Farmers gain direct access to export markets improving their competitive position and bargaining power, increasing their sales margin and fostering their cohesion as producer groups. Similarly, exporters show great interest in tracing not only the origin of their quality coffee beans but also ensuring that fair prices are paid to the original producers.

Additionally, agricultural and financial service providers as well as input suppliers are starting to link into the system. For example, digital cashless transactions (“Mobile Money”) can now be initiated seamlessly through the smartphone application and immediately at the point of sale of the produce. With a complete transaction record for each individual farmer at hand, banks now have – for the first time – sufficient data to evaluate their risk adequately in order to provide loans for agricultural or even household purposes. Similarly, input suppliers can deliver well-targeted quantities and quality input and link into the existing payment flow. With declining transaction cost and increasing control, profitability increases for all players involved. As a result, smallholder farmers benefit from higher incomes, ultimately leading to improved livelihoods of farmer households.

No formal evaluation data on the use of ICT in the project were available, but the following observations were collected during interviews with associated staff:

» *“Technically, there were no major issues. SAP had been able to test and adapt the software to field-situations in earlier projects (cashew in Ghana), so there were little issues with the users. In the*

beginning we needed to overcome some trust issues, mainly related to the fact that the farmers were used to receive their receipts of delivered quantities on paper – but now the system works well, and they are satisfied with their digital receipts via SMS. In fact, the largest delays we face are more on the level of the PPP, where we have had to wait for the decision from SAP to move the software from R&D to commercial roll-out.

- » *Convincing partners to join the project has been one of our main roles, next to capacity development. This now pays off, as we see that both financial institutions, input suppliers and exporters are interested to join the project in its next phase.*
- » *One of the things that we could try to improve upon is securing the real commitment of all the parties in the PPP-construction: what is their end-goal, is the private party really going to commercialize the software we commonly invest in? We should not run the risk that a private party comes back on its pledges directly after the subsidy period ends.*
- » *The idea is that the project will get a follow-up with from our side a focus on access to finance. We had not expected that the collected data via SAP-application would be so helpful for the facilitation of other value chain linkages like access to finance, inputs and certification – but this has been one of the major revelations. We are now working on a strategic alliance with SAP to broaden scope to other countries and other VC’s.”*

Identified Key Success Factors :

1. Initial training and sensitization
2. Ongoing support in the field, continuous monitoring and adaptation
3. Ownership of data and knowledge (UCFA staff)
4. Increased transparency and trust
5. Aggregated data allows analysis of productivity levels, training effects etc.

Challenges:

1. Phone and internet network, power supply
2. Security
3. Time constraints during double record-keeping
4. Individualisation vs. standardized software application



GreenOvation – ICT-based Private Sector Development through Mobile App Creation for Innovation and a Green Economy, Philippines

Context:

GreenOvation was a small pilot within the larger ProGED (Promotion of Green Economic Development) project in the Philippines, which runs from 2013 to 2017. The ProGED project learned that attitude and habit formation is a key ingredient of the propagation of green practices among MSMEs. With substantial cofunding and technical support from the GIZ headquarters' Sector Project on 'Innovative Approaches to Private Sector Development' commissioned by BMZ, the project launched GreenOvation - an innovative green learning and competition activity to create innovative mobile apps for MSMEs' more rational and sustainable use of energy, materials, water, solid waste, transport, supplies and natural resource management in order to foster a green private sector development.

Objective:

Organize an innovative green learning and competition activity to create innovative mobile apps for MSMEs' more rational and sustainable use of energy, materials, water, solid waste, transport, supplies and natural resource management in order to foster a green private sector development. ProGED implemented this GreenOvation.

Approach:

Activities took place from 1 June to 15 October 2015 in Manila in three steps:

- (a) an ICT-based campaign to mobilize sponsors, mentors and participants,
- (b) three competition and learning rounds, and
- (c) a follow-up package for the winner.

GreenOvation solicited local sponsors from government and nongovernment organizations (GOs and NGOs) and the private sector - not for more funds, but to enhance the sustainability and

commercialization of the resulting apps. After a month long campaign, eight sponsors joined the activity.

GreenOvation targeted college students, professionals, MSME entrepreneurs (existing and starters), Overseas Filipino Workers, investors, industry experts, academics, public servants, and retirees. To attract them, it used a website, five social media sites, university visits, and a press conference. Participants formed three-person teams (an idea person, a programmer and a graphics designer) to qualify.

The public call for the contestants closed in August 2015 with 33 team submissions. 23 entries were selected to join the competition that consisted of three elimination rounds of one day each. Each round had a specific theme, agenda, learning aims and pitching mode. The five teams nominated to compete in the last round transformed their apps to the minimum viable prototypes for the final pitch. With a few minor tweaks, two or three are now ready for the MSME markets. ProGED awarded a PHP 100,000 consulting contract (with specific tasks, outputs and time frame) to the winning team - "OneWatt". With ProGED's guidance, the team will pilot the new app to at least six (6) MSMEs in the first half of 2016.

Results and learnings:

GreenOvation yielded tangible results for the stakeholders: the participants, sponsors, MSMEs, ProGED, DTI (Department of Trade and Industry), and GIZ. Everyone benefitted from the pilot activity. The teams experienced MSMEs as potentially big markets and got valuable feedback and ways to improve their apps through interviews with MSMEs in between the rounds. They learned and pitched to compete for GO and NGO assistance as well as funds from investors and accelerators. The MSMEs learned ways to manage

green applications easier, faster and better via mobile apps. The sponsors got new startup clients.

More importantly, GreenOvation connected ProGED to the mobile app and startup ecosystem: the private sector's young but rapidly emerging, innovative and collaborative constituent.

Observations from interviews with associated staff: *"This project was very 'lean', quickly set up, low-cost, and had a high 'fun'-factor – which was attractive to youth. It built on the enthusiasm of young innovators in Manila, who were willing to put time and energy in a cause that they deemed important (green economy), and in a way that they could easily relate to. The collaboration between ProGED, the private sector,*

MSME's, university and young developers within an experimental setup without heavy monitoring protocols unleashed a dynamic which went beyond the expectations of the project team. They did it differently from traditional hackatons in the sense that there were three weeks in between sessions, with assignments, and more space for learning.

One of the most important outcomes is that the project uncovered the potential and the dynamism of the upcoming IT-ecosystem in the Philippine capital Manila – for development-related objectives. The Green-Ovation competition methodology and approach could easily be replicated in other countries in Asia (and Africa) with similar upcoming IT-oriented ecosystems."

ITAACC - Innovation Transfer into Agriculture-Adaptation to Climate Change, Kenya, Ethiopia, Rwanda, Uganda, Tanzania, Malawi, Guinea, Ivory Coast, Benin, and Togo

Context:

Across Africa, agriculture is the foundation of hundreds of millions of livelihoods and a key driver of development. But most African farmers – especially smallholder farmers – are operating well below their potential. The challenges these farmers face will only grow more severe with climate change, which is already changing rainfall patterns and triggering extreme weather events, including more frequent droughts and floods, in many parts of the continent.

The problem is that Africa's smallholder farmers don't have all the strategies they need to manage the many challenges they face, especially with regard to climate change. A number of innovative solutions to emerging problems already exist, while others are in the research phase. But there has yet to be a widespread transfer of this knowledge into agricultural practice. The challenge is to roll out these innovations for practical application by large numbers of smallholder farmers.

Objective:

Identify viable approaches to roll out innovative agricultural solutions on a broader scale for application by millions of smallholder farmers.

Approach:

ITAACC supports various innovation transfer projects and closely integrates agricultural scientists and practitioners in Africa. The projects are designed in collaboration with international agricultural research centres and realised in conjunction with various partners, including private sector and non-governmental organisations. The basis for this is a knowledge transfer platform that matches offers to agricultural demand.

ITAACC comprises 4 pilots (Evergreen Agriculture, FoodBait, FeedSeed, CAUSA -) which are led by ICIPE, ILRI, ICRAF and AfricaRice and which run on slightly different time schemes from 2013 till early/late 2017. The objectives, results, outputs and experiences of the different ITAACC projects are well described online¹⁹.

In the light of this study, we will limit ourselves here to a summary of the excellent overview of lessons and recommendations that the ITAACC implementers compiled in a so-called e-Guide during a writeshop in Nairobi in October 2015 regarding scaling up innovation to promote climate change adaptation in agricultural development projects.



Learnings:

The focus of the e-Guide is on describing the approaches that projects might take to achieve the uptake and the promotion of scaling innovations in agriculture. The recommendations are not specific for ICT-innovations, but they do provide a good framework for integration of ICT in agriculture-related projects.

In a nutshell, the guide identifies five inter-related critical dimensions: 'Understanding your innovation',

‘Engaging the private sector’, ‘Building Partnerships’, ‘Communication’, ‘Project Management’ and ‘Capacity Development’. Each of these dimensions comes with a number of specific challenges regarding scaling up innovation, but the Communication dimension is central and plays an important role in all other dimensions.

‘*Understanding Your Innovation*’ is about good research and context assessment: what is the innovation, who needs it, who will invest to scale it up, what is the actual demand for the innovative technology, will the demand grow, what is needed to meet that demand, etc.

‘*Engaging the private sector*’ involves addressing critical issues to promote innovation uptake, like developing a viable business plan for innovation uptake through markets, overcoming the challenges of developing public-private partnerships (PPPs) and enforceable contracts with private sector partners, and developing the business capacity of partners, clients and end-users.

‘*Building Partnerships*’ is about identifying, engaging and securing the right partners for the right purposes. For instance, one should differentiate

between *strategic partnerships* and *partnerships for implementation*.

‘*Communication*’, along with information-sharing and interaction, is a key driver of innovation. Therefore it makes sense to discuss a comprehensive, cross-cutting complex of “Communication, Learning and Innovation” as a service provider for project management as well as for the different units and the individual project components.

‘*Project Management*’ is about defining the most appropriate project strategy, mapping the key actors and stakeholders being relevant for cooperation, establishing the right steering structure, structuring processes, and securing that monitoring and learning is standardized and documented in such a way that others can replicate your approach on a wider scale.

‘*Capacity Development*’ is critical to scaling up innovation. It is required both to facilitate the innovation process and, after the innovation has been developed, to enable users to take up the innovation in question. But it may also address the capacity related to innovation transfer (e.g. business skills) and the capacity to bring innovation to scale (e.g. lobbying, marketing skills).



Map of GIZ projects using ICT4Ag

ICT Categories



Extension Services, Productivity,
Learning, Capacity Development



Market Price Systems, Commodity
Exchange, Trading



Value Chain/Farm/Herd
Management



Diagnostic and Collaborative Tools,
Early Warning, Weather



Finance, Payments, Insurance



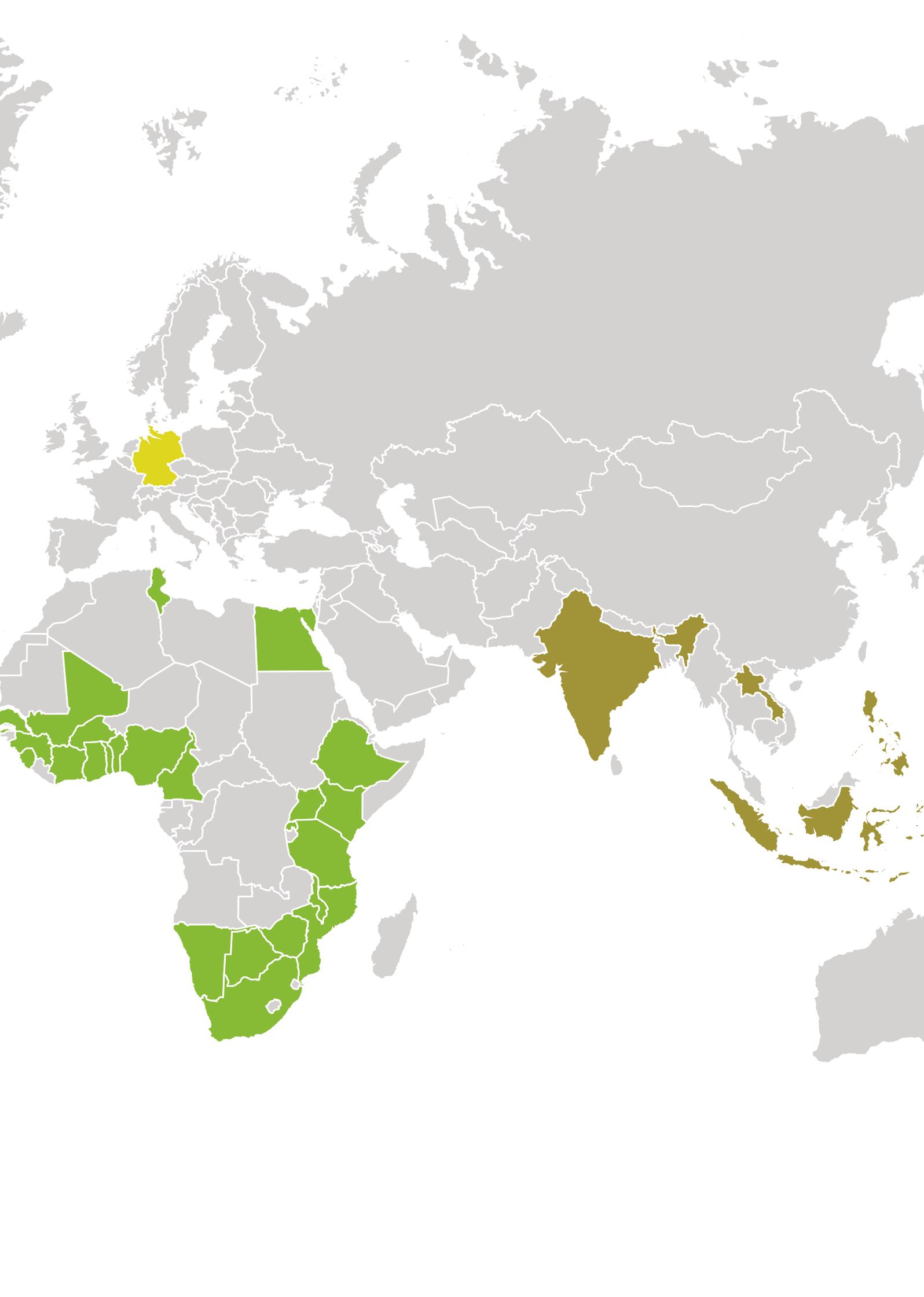
Data Collection, GIS, Field Survey,
M&E



Farmers' Voice, Lobbying, Advocacy



Environment



List of projects

Programme/ Project	African Cashew Initiative (ACI) PN 12.2026.8 PN 15.2165.7
ICT category	
Period	11/2012 12/2018
Country	Benin, Burkina Faso, Ghana, Côte d'Ivoire, Mozambique
Value chain	Cashew
ICT specific project / component	SAP Value chain management/ traceability
ICT Application	SAP Rural Sourcing Management (Value Chain management -database + smartphone) 10+ language versions (including local languages) 6 crops (cashew, shea, coffee, cocoa, rice, sesame) 100.000 + small scale producers, 150.000+ transactions Under development: *Input and service supply *More transactional analytics *GIS crop business views
Short description	Traceability software. High-volume transactions like farmer registration, prepayment, purchase, logistics and payments are recorded and synchronized in the field in real time via smartphone. An intuitive laptop application supports data analysis, facilitates operational field support and ensures traceability.
Observations	Application in pre-commercial phase: 17 supplier organizations 8 countries (GH, BF, UG, BE, CIV, MOZ, SL, MEX)
Further information and contact	www.africancashewinitiative.org Rita Weidinger Rita.weidinger@giz.de Johannes Peters johannes.peters@giz.de
Programme/ Project	Agricultural and Rural Finance Programme (AGRUFIN) PN 13.2200.7 DeveloPPP
ICT category	
Period	05/2014-05/2017
Country	Uganda
Value chain	Coffee
ICT specific project / component	Agribusiness Management in the Coffee Value Chain (DeveloPPP)
ICT Application	SAP Rural Sourcing Management (Value Chain management – Database + smartphone) Application in pre-commercial phase: 17 supplier organizations 8 countries (GH, BF, UG, BE, CIV, MOZ, SL, MEX) 10+ language versions (including local languages) 6 crops (cashew, shea, coffee, cocoa, rice, sesame) 100.000 + small scale producers, 150.000+ transactions
Short description	IT solution for the coffee value chain, featuring a smartphone application linked to a central database with an analytical and geographical information system (GIS). Coffee farmers deliver their bags to bulking stations, where they are registered and issued a bar-coded membership card. All subsequent transactions such as cash advances, bulking, hulling, selling to exporters and final payments are captured digitally and synchronized with the central database. Farmers receive SMS notifications on deliveries, weather updates and information on agricultural practices and prices. Traders use the system to increase their efficiency when buying, bulking and arranging their transport logistics. Centrally, the system provides aggregated seasonal and geographical analytics, yield reports and traceability of produce (relevant for certification).
Observations	The ICT-component is embedded in a larger programme aimed at providing better financing for small holder farmers, and prolongs the efforts of the Neumann Foundation to enhance the capacity of small holder coffee growers to supply coffee to large exporters.
Further information and contact	http://www.worldbank.org/content/dam/Worldbank/Publications/WDR/WDR%202016/Coffee_Project_Uganda_Weisert.pdf Dirk Steinwand Dirk.steinwand@giz.de Carsten Friedland carsten.friedland@sap.com

Programme/ Project	Green Innovation Centre (SEWOH)
ICT category	 
Period	Mid-2014- Jan 2016
Country	Zimbabwe
Value chain	Dairy, dried fruit and vegetables
ICT specific project / component	Pilot project Young Farmers Innovation Lab
ICT Application	ICT-App development contest
Short description	Objective: innovatively develop and nurture entrepreneurship abilities of young farmers in Zimbabwe, by tapping into seed innovation funds and diverse capacities of viable strategic partnerships with the private sector, tech and innovation hubs and technical institutions. A basic record keeping App on Android/IOS has been developed, along with 6 other apps.
Observations	This project taps into the potential of partnerships within a setting of entrepreneurial innovation – while stimulating new jobs creation and piloting ICT-solutions. The risk of failure is mitigated by the relatively low cost of the approach.
Further information and contact	http://www.inno4agric.co.zw/ Charlotte Duevel Charlotte.duevel@giz.de

Programme/ Project	Comprehensive African Rice Initiative (CARI) PN 13.2016.7 PN 13.2450.8
ICT category	  
Period	09/2013-12/2017
Country	Ghana
Value chain	Rice
ICT specific project / component	Wienco Rice Project
ICT Application	Farmforce – outgrower management system
Short description	The goal of the project is to integrate 3000 rice producers (30% women) into sustainable and competitive business models that lead to increased paddy production as well as to improvements in quality. Farmforce links smallholders to agri-value chains by enabling traceability, compliance with standards, facilitation of agricultural extension, and input-output management. Farmforce can also help expand access to other services such as soil fertility management.
Observations	Farmforce is mainly used to efficiently manage outgrower schemes and contract farming programs.
Further information and contact	http://cari-project.org/wp-content/uploads/2015/12/GH-Wienco-pdf.pdf Frederick Phillips fphillips@tns.org

Programme/ Project	International Livestock Research Institute (ILRI), CGIAR PN 12.1433.7
ICT category	
Period	11/2012-12/2017
Country	Uganda
Value chain	Pigs
ICT specific project / component	mPig
ICT Application	SMS messages with actionable information and advisories for pig farmers
Short description	Objective: disseminate information to pig value chain actors to increase pig growth and reproductive performance on farm, improve market access for poor value chain actors and ultimately improve food security through increased pork production. Project still in phase of developing messages. SMS-implementation expected from April 2016 on. Administrative procedures regarding shortcode and licensing, upcoming elections etc. have slowed down implementation timeline.
Observations	The pilot will cover approximately 1.000 farmers in 6 villages.
Further information and contact	http://www.ilri.org/node/39617 https://smspig.wordpress.com/2015/02/25/mpiglaunch/ Kristina Roesel k.roesel@cgiar.org

Programme/ Project	Green Innovation Centre (SEWOH)/Comprehensive African Rice Initiative (CARI) PN 14.0967.1
ICT category	 
Period	10/2014-09/2019
Country	Ghana
Value chain	Rice
ICT specific project / component	mPig
ICT Application	Farmerline - Voice and SMS messages on weather, market prices, advisories Esoko – market prices
Short description	No concrete implementation yet, but collaboration with Farmerline and/or Esoko is under consideration.
Observations	Content development of qualitative advisories for rice farmers seems to be a challenge.
Further information and contact	Mike Bartels Mike.bartels@giz.de

Programme/ Project	Green Innovation Centres in Agricultural Systems (GIA) (SEWOH) PN 14.0967.1 LP008
ICT category	   
Period	10/2014-12/2017
Country	Burkina Faso
Value chain	Rice
ICT specific project / component	-
ICT Application	Possibly: RiceAdvice, SimAgri, PEAT-Plantix or/and MyAgro
Short description	No implementations yet, but 4 applications are under scrutiny for potential further uptake: *RiceAdvice: already functional in BF via CARI *SimAgri: a web-to-SMS platform on market prices and offer-demand operated by the NGO Afrique Verte, already functional in BF *PEAT-Plantix (see Mali) *MyAgro: a mobile lay-away system, allowing smallholder farmers to save for inputs and receive extension advice, already functional in Mali and in Senegal.
Observations	
Further information and contact	Katy Schroeder katy.schroeder@giz.de Minoune Sissao Minoune.sissao@giz.de

Programme/ Project	Innovation Transfer into Agriculture - Adaptation to Climate Change (ITAACC) PN 12.9765.4
ICT category	 
Period	12/2012-03/2018
Country	Kenya, Ethiopia, Rwanda, Uganda, Tanzania, Malawi, Guinea, Ivory Coast, Benin, Togo
Value chain	Various
ICT specific project / component	Foodbait, Feedseed, Evergreen Agriculture CAUSA
ICT Application	The four projects under ITAACC piloted a large number of innovative approaches and technologies related to knowledge transfer and communication, ranging from physical meetings between researchers and farmers, photos, posters and documents to virtual tools (Skype, Webex, Whatsapp), communication platforms, websites and social media (Facebook, Twitter, LinkedIn).
Short description	This programme addresses the issue that most African farmers – especially smallholder farmers – are operating well below their potential. The challenges these farmers face will only grow more severe with climate change, which is already changing rainfall patterns and triggering extreme weather events, including more frequent droughts and floods. A number of innovative solutions to emerging problems already exist, while others are in the research phase. But there has yet to be a widespread transfer of this knowledge into agricultural practice. Via four pilot projects the ITAACC programme has investigated how this transfer could be enhanced for practical application by millions of smallholder farmers.
Observations	The learnings of ITAACC were compiled in 2015 and published online as a list of practical recommendations: http://prod.worldagroforestry.org/itaacc/lessons
Further information and contact	http://www.icipe.org/itaacc Dr. Jörg Lohmann itaacc@giz.de Felix Zeiske fzeiske@icipe.org

Programme/ Project	Responsible and Inclusive Business Hub (RIBH) SADC PN 13.1012.7 (siehe p.8)
ICT category	
Period	01/2014-12/2016
Country	South-Africa
Value chain	not specific
ICT specific project / component	Training programmes for young farmers
ICT Application	After-training mentoring and communication via ICT
Short description	Vastfontein developed a training programme for young farmers, consisting of two 5-day courses (Subsistence Farmer Training, Micro Farmer Training) + follow-up mentoring via ICT (cell phone). The project uses a connected 'technology hub' and 'receiver hubs', and by the second half of 2016, a fiber optic cable should enable Vastfontein to stream its courses to many satellite sites. Next to training sites, the hubs should provide rural farmers access to communication and to exchange platforms.
Observations	
Further information and contact	Rebecca Szrama Rebecca.szrama@giz.de

Programme/ Project	Green Innovation Centre (SEWOH) PN 14.0967.1 LP006
ICT category	
Period	10/2014-12/2017
Country	Tunisia
Value chain	Dairy, red meat, fruit, vegetable
ICT specific project / component	-
ICT Application	Web portal for innovations in sustainable agriculture in the agricultural and agri-food sector
Short description	No specific ICT4Ag implementations yet, but a workshop will be conducted in first semester of 2016 to identify potential opportunities and learn on failed examples of ICT in Tunisia. Also a web site on sustainable and innovative agriculture is currently set up with the partner Ministry focusing on information and knowledge sharing, good agricultural practices, extension and training. Target group: extension workers, trainers. Call for proposals and financing of young entrepreneurs that may also be ICT related. Other possible options: introduction of the SAP rural sourcing/ VC management tool, ICT-based market information systems etc.
Observations	
Further information and contact	Peter Lappe Peter.lappe@giz.de

Programme/ Project	Promotion of sustainable agriculture and rural development (PAD) PN 13.2236.1 DV58486/01/00 (in preparation)
ICT category	
Period	07/2013-06/2018
Country	Tunisia
Value chain	olive oil, non-timber forest products, apricots, pistachios
ICT specific project / component	Diversification of agricultural services, training and extension; integration of the rural youth in the agric. sector for income and job creation
ICT Application	Diverse ICT options possible
Short description	Set up of a participatory web site in cooperation with the GIC on sustainable agriculture with the partner Ministry focusing on information and knowledge sharing, good agricultural practices, extension, advisory services and training. Target group: extension workers, trainers. Analysis and planning phase how to use ICT as a tool to modernize and promote agricultural services, extension and training? how to support the rural youth to develop ICT4Ag based solutions and services to integrate them as service providers in the agricultural sector, provide perspectives and income. In cooperation with agricultural vocational training schools.
Observations	Just started, for the new project phase diverse ICT solutions are possible.
Further information and contact	Nadine Guenther Nadine.guenther@giz.de
Programme/ Project	Food Security and Drought Resilience Programme/ Food security through Improved Agricultural Productivity in Western Kenya (FSIAP-West Kenya) PN 13.2146.2
ICT category	
Period	01/2014-12/2016
Country	Kenya
Value chain	Various
ICT specific project / component	-
ICT Application	Mobile advisories
Short description	No specific ICT4Ag implementations yet, but a proposal for inclusion of ICT4Ag is under development. This is expected to cover innovative ways of using ICT in advisory services using mobile apps and capacity building especially in agricultural vocational training and education.
Observations	
Further information and contact	https://www.giz.de/en/worldwide/24913.html Andrea Bahm Andrea.bahm@giz.de Shadrack Mutavi shadrack.mutavi@giz.de

Programme/ Project	Climate Change Knowledge Network in Indian Agriculture (CCKN-IA) PN 12.2143.1
ICT category	  
Period	06/2013-04/2017
Country	India
Value chain	Various
ICT specific project / component	-
ICT Application	CCKN-IA developed a backbone IT system called Network for Information on Climate (Ex)Change (NICE) that can facilitate gathering and disseminating information for sustainable agriculture. Information is collated, validated and disseminated as text messages (SMS), voice SMS, videos, fact sheets & posters. The system is completely based on open source technologies and can be accessed through a web- and an android based mobile application.
Short description	Making agricultural knowledge and information bases accessible within a timely, dynamic, and farmer-friendly network on sustainable agriculture will help India to operationalize its National Mission on Sustainable Agriculture. CCKN-IA builds on four main intervention areas: 1. Assess existing agricultural information and knowledge flows at the national level and in the pilot states Maharashtra, Jharkhand and Odisha. 2. Establish a consortium of suitable institutions which will operate the knowledge network. 3. Develop capacities of stakeholders and enable them to operate the network. 4. Support policy development, implementation and up-scaling. Partnership with RML for mobile dissemination of market information and advisories.
Observations	The project reinforces the existing extension systems and local networks. Concepts and practical experiences in the pilot areas of the three states will provide a foundation upon which to expand the knowledge exchange network throughout India.
Further information and contact	https://www.giz.de/en/downloads/giz2014-en-climate-change-knowledge-network-india.pdf http://cckn-ia.org/en/ Florian Moder Florian.moder@giz.de Navin Horo navin.horo@giz.de support@cckn-ia.org

Programme/ Project	SMS Services for Small Farmers in Uttarakhand (develoPPP) PN 12.1003.8
ICT category	 
Period	04/2012-12/2018
Country	India
Value chain	Various
ICT specific project / component	-
ICT Application	Reuters Market Light (RML) SMS information services to smallholders. Launched in India in 2007, RML provides individual farmers with “customised, localised and personalized” weather forecasts, local crop prices, agricultural news and information via SMS messages in their local language (covering over 300 crops and varieties and 1300 markets across 13 states in India).
Short description	Objective of improving access to agricultural information and communication technology (ICT) for small to medium farm-holders in the Indian state of Uttarakhand. 4000 farmers across the 13 districts of Uttarakhand have been trained and accompanied. Mid-term, 46 percent of farmers assessed the quality of the service to be good, 63 percent reported that they could benefit from the information of good agriculture practices, and 85 percent reported that they benefited from the weather advisory services.
Observations	While the model of providing SMS alerts and market prices for farmers has proven to be useful, the service seems less apt for localized and relevant advisories. Also the long-term provision of the service to the relatively small community of farmers in Uttarakhand by RML proves to be a challenge.
Further information and contact	https://www.giz.de/en/downloads/giz2015-en-msme-umbrella-programme-india-newsletter7.pdf Sanjay Bahti Sanjay.Bahti@gmail.com

Programme/ Project	Rural Development Programme (RDP) IV PN 11.2175.5
ICT category	 
Period	03/2012-04/2016
Country	East-Timor-Leste
Value chain	Not specific
ICT specific project / component	Component 1
ICT Application	Radio and TV spots, video, smartphones.
Short description	ICT not an activity line in programme, but used as a tool to reach project indicators. Radio and TV spots to promote “Good Agricultural Practices” on community and national level. Video. Smartphones were used in a pilot of smartphone based monitoring in rural areas. Mobile application(s) for specific purposes (monitoring, see above).
Observations	
Further information and contact	https://www.giz.de/en/worldwide/24029.html Dominik Langen dominik.langen@giz.de

Programme/ Project	Green Innovation Centre (SEWOH) PN 14.0967.1 LP003
ICT category	   
Period	10/2014-09/2019
Country	Togo
Value chain	Soya, peanut, cashew
ICT specific project / component	Agribusiness Information System (AIS)
ICT Application	ICT-based Agribusiness Information System (SMS/USSD, App, Radio, Social Media, Internet) Focus: Commercialization and innovation promotion
Short description	Originally designed as reinforcing an existing Market Information Tool on soya, peanut and cashew for farmers run by an existing farmers’ union, the project has been redirected towards a broader platform, targeting all stakeholders in the above mentioned value chains creating the possibility to incorporate information/data on inputs, extension, equipment, meteorology, nutrition, certification and assuring an agri-intelligence functionality (analysis of generated data for policy making). Within the remaining time frame, it is unlikely that all functionalities will become operational in the first phase of the program. GIZ/GFA-KIAG will concentrate on the core data collection, storage and analysis features of the system, the market price dissemination service and innovation dissemination services allowing other specific functionalities to be gradually built ‘on’ the core system by other interested parties.
Observations	The project is being carried out by GFA Consulting Group and KIAG, in close collaboration with the Ministry of Agriculture of Togo (MAEH).
Further information and contact	Jean-Pierre Detry Jean-pierre.detry@giz.de Gerrit Johan Bosman (GFA-KIAG Team Leader) Gerrit-Johan.Bosman@gfa-group.de M. André Tokpa yawo.tokpa@gfa-group.de

Programme/ Project	International Rice Research Institute (IRRI), CGIAR PN 12.1433.7 (siehe p. 3)
ICT category	 
Period	11/2012-12/2017
Country	Worldwide
Value chain	Rice
ICT specific project / component	Rice Knowledge Bank
ICT Application	Web-based knowledge bank, mobile Apps such as 'RiceDoctor' and 'Rice Crop Manager'
Short description	Rice Knowledge Bank (RKB) showcases rice production techniques, agricultural technologies, and best farming practices based on International Rice Research Institute's pool of knowledge from research findings, learning and media resources, and in-country projects. Examples of the tools offered by RKB is 'RiceDoctor' – a diagnostics tool on Android and Apple smartphones tool to identify problems in rice crop and provide actionable advice how to manage them, and 'Rice Crop Manager' – a computer- and mobile phone-based application that provides farmers with advice on crop management matching their particular farming conditions.
Observations	
Further information and contact	http://www.knowledgebank.irri.org/ https://play.google.com/store/apps/details?id=com.lucidcentral.mobile.ricedoctor&hl=en http://www.knowledgebank.irri.org/decision-tools/crop-manager

Programme/ Project	Comprehensive African Rice Initiative (CARI) PN 13.2016.7 & PN 13.2450
ICT category	 
Period	09/2013-12/2017
Country	Nigeria, Ghana, Senegal, Burkina Faso
Value chain	Rice
ICT specific project / component	-
ICT Application	RiceAdvice
Short description	RiceAdvice is a bilingual Android App for improving livelihoods of rice farmers in Africa. It aims at guiding farmers in increasing their rice production level based on local conditions. Depending on the location, environmental conditions, rotation, cropping practices, expected sowing date, available on-farm nutrients, desired yield increase, costs of fertilizer and expected rice market price, a farmer can maximize yield and/or profit. Furthermore a farmer gets a plot based fertilizer application plan and a short list of good agricultural practices. RiceAdvice is primarily designed for tablets.
Observations	The App can be used in the field in off-line mode. An internet connection is advisable to synchronize data with the central database server. The App is for the time being provided free of charge (donors funding).
Further information and contact	http://cari-project.org/ https://www.riceadvice.info/en/ http://www.africarice.org/ Stefan Kachelriess-Matthess Stefan.kachelriess@giz.de Anna Stancher Anna.stancher@giz.de Kazuki Saito k.saito@cgiar.org

Programme/ Project	Green Innovation Centre (SEWOH)/ Support of the National Programm for sustainable Small Scale irrigation -PASSIP
ICT category	
Period	2016-2018 (01/2017-2/2019)
Country	Mali
Value chain	Not specific
ICT specific project / component	ICT solutions to fight crop shortfalls
ICT Application	PEAT- Plantix
Short description	The aim is to supply farmers with simple and intuitive tools to recognize and treat plant pathogens and nutrient deficiencies. PEAT developed an App (http://plantix.net) to provide smallholder farmer with customized information concerning best practices, information on preventive measures and independent options for action. The App offers the possibility to simply send a picture of the affected plant directly via smartphone and offers guidance through an easy identification process to determine the plant disease. All pictures sent via the App are tagged with coordinates. The resulting metadata provide valuable insights into the spatial distribution of cultivated crops and most significant plant diseases e.g. in form of high resolution maps.
Observations	ICT Project still in design phase.
Further information and contact	Juergen Hoerner Juergen.hoerner@giz.de

Programme/ Project	Youth Employment Promotion PN 09.2292.2 PN 11.2277.9
ICT category	
Period	04/2010-07/2016
Country	Sierra Leone
Value chain	Not specific
ICT specific project / component	-
ICT Application	Field survey tools, smartphones/tablets
Short description	The use of ICT is in the planning, experimenting with data collection tools offered by Farmerline, Kobocollect and Mergdata: 1. For timely M&E with smartphones/tablets in the field with corresponding Apps (e.g. farmerline). In addition to advising farmers (e.g. via SMS). 2. In a component for working with young people, ICT and urban radio will play a role. These are currently in the analysis phase.
Observations	
Further information and contact	https://www.giz.de/de/weltweit/20949.html https://www.giz.de/en/downloads/en-factsheet-economic-development-youth-reintegration-sierra-leone.pdf Joost Gwinner Joost.gwinner@giz.de Svea Obermaier svea.obermaier@giz.de

Programme/ Project	ProDRA (Rural development and agriculture) PN:14.2471.6
ICT category	
Period	10/2014-10/2016
Country	Togo, Cameroon, Nigeria, Ghana, Ivory Coast
Value chain	Not specific
ICT specific project / component	mData Capture
ICT Application	Mobile data App for agric training planning and report aggregation. Android, cloud server, database, web portal.
Short description	This mobile android version allows field capture of data regarding planning and delivery of agric. entrepreneurship training via smartphone, and generates online (aggregated) data for distance monitoring purposes, feedback loops and reporting.
Observations	This App has been gradually developed by GIZ with local partners.
Further information and contact	https://www.giz.de/en/worldwide/14998.html Moritz Heldmann Moritz.heldmann@giz.de Ulrich Sabel-Koschella Ulrich.sabel-koschella@giz.de

Programme/ Project	Promotion of the Economy and Employment PN 11.2109.4 PN 14.2071.0
ICT category	
Period	06/2013-05/2019
Country	Rwanda
Value chain	n.a.
ICT specific project / component	-
ICT Application	SMS-tool for SME's Public-private exchange
Short description	Development of sms tool, with which the results of public-private dialogues at the district level can be transmitted to the national level, so that questions and demands by the entrepreneurs can immediately be articulated at the national level. The project also works in the ICT sector on the development of mentorship programs for ICT start-ups, together with the Indian actor Intellicap, as part of the promotion of the ICT Chamber. In this system, the partners are supported in the development and the use of the systems.
Observations	
Further information and contact	https://www.giz.de/de/weltweit/20792.html Petra Müller-Glodde petra.mueller-glodde@giz.de

Programme/ Project	Support to De-bushing PN 11.2200.1
ICT category	 
Period	01/2014-12/2017
Country	Namibia
Value chain	-
ICT specific project / component	
ICT Application	Documentary film, diverse ICT
Short description	Via a sector documentary mainly political and economic decision-makers should be informed and mobilized on the topic of deforestation and use of biomass. Looking into the option of setting up a De-Bushing Advisory Service (DAS) for which it is currently developing an institutional framework. DAS - when operational - might utilize or promote ICT based advisory and/or outreach applications.
Observations	
Further information and contact	https://www.giz.de/de/weltweit/28648.html Frank Gschwender Frank.Gschwender@giz.de

Programme/ Project	Programme Competitiveness for economic Growth PN 13.2181.9
ICT category	
Period	04/2015-06/2017
Country	Namibia
Value chain	-
ICT specific project / component	-
ICT Application	Diverse ICT services
Short description	ICT is used for many tasks, including: 1) Company Registration: The process of company registration is digitized. The existing paper files are also digitized. Company registration is simplified and faster, reducing barriers for start-ups. Challenges exist in the conversion of paper documents into digitized files, as well as in the training of long-term employees of the authorities. 2) Financial literacy: messages related to finances, in particular for micro and small enterprises regarding financial management in enterprises, are efficiently and effectively communicated by means of ICT. SMS messages, an app, websites, social media etc.
Observations	
Further information and contact	https://www.giz.de/en/worldwide/32048.html Daniel Bagwitz Daniel.bagwitz@giz.de

Programme/ Project	Sustainable economic development PN 2012.2190.2
ICT category	
Period	01/2013-12/2016
Country	Mozambique
Value chain	-
ICT specific project / component	Mobile financial services.
ICT Application	Diverse ICT services for better mobile financial services.
Short description	The project does support banks in improving their presence and services in rural areas – mainly via strengthening the agents networks, and by providing banks information on rural customer financial behavior. But it is left to the banks themselves to opt for/adopt specific ICT-tools and services.
Observations	Rural areas in Mozambique are still quite underserved, and lack of infrastructure impedes on rapid deployment of ICT – but most banks are recognizing the potential of the rural market and are increasingly using ICT to support their operations in non-urban areas.
Further information and contact	https://www.giz.de/projektdateien/projects.action;jsessionid=F8052D0AD9009DF21EF32BC0C260FD86?request_locale=de_DE&pn=201221902 Tobias Stolz Tobias.stolz@giz.de William Diaz-Alvarado william.diaz-alvarado@giz.de

Programme/ Project	Programme for Sustainable Economic Development (PSED) PN 10.2271.4 PN 15.2090.7
ICT category	
Period	4/2014-03/2019
Country	Ghana
Value chain	n.a.
ICT specific project / component	Micro-insurance
ICT Application	E-learning course Micro-insurance
Short description	Creation and implementation of an e-learning course that leads to the conclusion of “Certified Expert in Micro-insurance”. Target group: employees of insurance companies and students. Objective: Ensuring that access to innovative and demand-driven microfinance services and to employment in MSMEs is improved. Currently provided components are: (1) Banking, financial literacy and consumer protection (2) Micro-insurance (3) Vocational education and training Initiative Ghana.
Observations	
Further information and contact	https://www.giz.de/en/worldwide/19476.html Torsten Schlink Torsten.schlink@giz.de

Programme/ Project	Rural Financial Institutions Programme
ICT category	  
Period	
Country	India
Value chain	-
ICT specific project / component	-
ICT Application	GIS, crop insurance, web, e-learning
Short description	Remote sensing, geo-tagging and geo-fencing to reduce the basis risks of crop insurance and improve the benefits for farmers. Software development to support the product development of agricultural insurance. At present, implementation in pilot projects. Biometric identification of bank customers in villages by hardware and software that is used in rural areas by cooperatives and self-help groups. Linking with core banking systems of banks. Successful test with two banks, replication by others. Introduction and successful implementation of banking / credit cards in rural areas for farmers. Establishment and implementation of Information Web site, e-learning and online audit system for vocational certification of banking and cooperative staff.
Observations	
Further information and contact	https://www.giz.de/de/weltweit/16012.html Detlev Holloh Detlev.holloh@giz.de

Programme/ Project	Access to Finance for the Poor
ICT category	
Period	
Country	Laos
Value chain	-
ICT specific project / component	-
ICT Application	Basic data collection for monitoring and feedback purposes using Excel. Survey on financial literacy skills using ODK (OpenDataKit).
Short description	The project supports 7 microfinance institutions and more than 500 Village Banks in their provision of services to approximately 50.000 peasants in rural Laos. Basic ICT instruments are used for: 1) data collection of transactions and performances of village banks in Excel. Information is aggregated on different levels. It is checked whether the data in Excel can be moved to a safer and more reliable platform. 2) Within the framework of the project a mobile App has been developed in order to perform safe and traceable payments to rural population. The App will (most likely) not be used on the basis of a changed co-financing program of partners.
Observations	Challenges are related to data security, and to the severe limitations of Excel for bookkeeping and monitoring purposes.
Further information and contact	https://www.giz.de/en/worldwide/17492.html Thorsten Fuchs Thorsten.fuchs@giz.de Dennis Fischer Dennis.fischer@giz.de

Programme/ Project	Sustainable Development of the Protected Area System of Ethiopia (SDPASE) PN 58.3034.4 PN 62.3024.7
ICT category	
Period	09/2008-09/2016
Country	Ethiopia
Value chain	-
ICT specific project / component	-
ICT Application	ARCGIS for map creation. Multimedia, radio and television for training and awareness raising. Radio and phones for internal communication.
Short description	The project supports local partner with radio and TV-broadcasts, film development etc. Through the programme, maps have been developed and a GIS system established for the EWCA. The project specifically concentrates on activities which have a knock-on effect within protected areas management, including protected areas demarcation, maintenance and procurement of equipment, training of scouts using national and international experts, website development and training of EWCA experts within Ethiopia as well as abroad. A number of wildlife management activities have been implemented, such as aerial population counts. By the end of 2013, around 900 protected area employees (scouts) had been trained using teaching materials (a.o. manuals that impart basic knowledge in areas such as the management of wildlife populations and protected areas, wildlife tracking and handling weapons) developed by the programme. Field equipment has been procured for the employees of the protected areas, especially radio equipment for communication within the park areas.
Observations	ICT's were not included in the original design (except for a GIS system + database, and basic computer equipment for staff), but were identified as supporting tools during implementation and are increasingly being integrated.
Further information and contact	https://www.giz.de/en/worldwide/18880.html https://www.cbd.int/financial/values/ethiopia-valueprotectedareas.pdf Dr. Ludwig Siegel ludwig.siegel@giz.de

Programme/ Project	Transboundary Use and Protection of Natural Resources PN 10.2260.7 PN 14.2453.0
ICT category	
Period	06/2012-05/2018
Country	Botswana, Southern Africa Development Community (SADC)
Value chain	-
ICT specific project / component	-
ICT Application	Diverse ICTs: web platform, video/multimedia, smartphones/tablets, Digital Broadcasting Radios Knowledge Sharing Platform (SADC TFCA Network Portal) to support expert network in 15 countries. Communication tools for anti-poaching work of park rangers.
Short description	The objective of the programme is to ensure that the regional and national actors improve the implementation of SADC protocols and strategies for sustainable natural resource management. GIZ is contributing to the implementation of the following three regional programmes: 1) Transfrontier Conservation Areas (TFCA) 2) Regional Cross-border Fire Management 3) Reducing Emissions from Deforestation and Forest Degradation (REDD). Strong focus is placed on knowledge sharing and capacity building, and on enhancing policy development at national and regional level.
Observations	This is a multi-country programme, with a number of sub-pilots and -projects. ICT was brought in later during the project.
Further information and contact	https://www.giz.de/en/worldwide/15903.html https://www.giz.de/de/downloads/giz2015-en-sadc-natural-resources.pdf Reinhard Woytek reinhard.woytek@giz.de

Programme/ Project	Promotion of Green Economic Development (ProGED) PN 12.2452.6
ICT category	
Period	(11/2012-2/2016)
Country	Philippines
Value chain	Not specific
ICT specific project / component	Green-Ovation
ICT Application	ICT-App development contest for better energy-efficiency
Short description	A green learning and competition activity to create innovative mobile apps for MSMEs (Medium-, Small- and Micro-Enterprises)' more rational and sustainable use of energy, materials, water, solid waste, transport, supplies and natural resource management in order to foster a green private sector development. With ProGED's guidance, the team will pilot the new App with at least 6 MSMEs in 2016.
Observations	ProGED awarded a Philippine Pesos 100,000 (1.930 Euro) consulting contract (with specific tasks, outputs and time frame) to the winning team - "OneWatt".
Further information and contact	http://greeneconomy.ph/greenovationweb-pdf/ Volker Steigerwald Volker.steigerwald@giz.de

Programme/ Project	Icecairo / Promotion of the green private sector and inclusive business PN 14.2182.5 "Promotion of Small & Medium Enterprises (PSME) (initially supported by GIZa and Inclusive Business Hub (RIBH) MENA) 13.1012.7
ICT category	Other
Period	Since 2013 (ongoing) 01/2015-02/2018 01/2014-12/2016
Country	Egypt
Value chain	Not specific
ICT specific project / component	Icecairo
ICT Application	Green technology innovation hub
Short description	Icecairo is a green technology innovation hub providing young innovators with a space and a network to help them turn their ideas into green businesses. Established by GIZ and transferred to the pool of Egyptian innovators, icecairo is a community-owned business.
Observations	icecairo provides workspaces and trainings for individuals with innovative ideas. Its goal is to bring together a diverse community of action-oriented thinkers, doers and leaders in a dynamic, intelligent ecosystem.
Further information and contact	salma@icecairo.com Michael Janinhoff (RIBH MENA) michael.janinhoff@giz.de

Programme/ Project	Innovation Factory (IZR project) PN 14.6252.2
ICT category	Other
Period	11/2014-02/2017
Country	Ethiopia, Senegal, Indonesia, Germany
Value chain	Not specific
ICT specific project / component	Realising shared solutions
ICT Application	Knowledge sharing
Short description	The project provides the space for user-driven needs assessments and knowledge sharing. To this end, the proposal creates a space for new thinking and action by combining the topics Agriculture - ICT4Ag, Health (E-health) and the Environment (future4nature), with adequate methods and relevant networks.
Observations	
Further information and contact	https://www.giz.de/en/worldwide/29369.html http://www.innovation-factory.info Angela Zur Angela.zur@giz.de Anne Talk Anne.Talk@giz.de

Programme/ Project	Open Regional Fund for Economic and (Youth) Employment in Central America (FACILIDAD) PN 11.2220.9
ICT category	Other
Period	11/2012-12/2017
Country	Central-America
Value chain	-
ICT specific project / component	ICT development for employment of the youth
ICT Application	Digital applications are used in sub-projects with partners, e.g. courses on digital animation or mobile applications
Short description	Not directly related to rural development – students are trained on mobile application development and animation techniques, in order to tap into the job opportunities offered in these relatively new/young sectors.
Observations	
Further information and contact	https://www.giz.de/de/weltweit/25358.html Irina Kausch Irina.kausch@giz.de

Programme/ Project	Sector Network Rural Development Africa PN 13.2236.1 PN 14.2495.1
ICT category	Other
Period	07/2013-06/2019
Country	Africa
Value chain	-
ICT specific project / component	GlobalCampus21
ICT Application	SNRD Africa online platform
Short description	The SNRD Africa transferred its knowledge management and networking into the GC21 platform and provides working and exchange space for its members; GC21 offers the options to share documents and information, to work jointly on documents, to host webinars, online discussions and meetings via Saba Meeting etc. The SNRD Platform is open to its members and hosts the steering committee, 3 thematic working groups and 2 Communities of practice CoP for the moment.
Observations	
Further information and contact	Nadine Guenther Nadine.guenther@giz.de

Programme/ Project	Sector Project Rural Development PN 11.2226.6 PN 15.2007.1
ICT category	Other
Period	01/2012-03/2018
Country	Germany
Value chain	
ICT specific project / component	ICT4Ag component
ICT Application	
Short description	Resource persons in Headquarter for ICT4Ag
Observations	
Further information and contact	Enno Mewes Enno.mewes@giz.de

Programme/ Project	Sector Project Stengthening ICT in development cooperation PN 10.2216.9 PN 14.2245.0
ICT category	Other
Period	02/2011-03/2017
Country	Germany
Value chain	-
ICT specific project / component	ICT4Ag component
ICT Application	Finalizing the ICT tool kit for GIZ
Short description	Resource persons in Headquarter for ICT4AgResource persons in Headquarter for ICT4Ag
Observations	
Further information and contact	Franz von Weizaecker franz.weizsaecker@giz.de Eric Schuetz eric.schuetz@giz.de Marina Janssen marina.janssen@giz.de

Programme/ Project	Sector Project Digital Worlds PN 14.2490.2
ICT category	Other
Period	12/2014-02/2018
Country	Germany
Value chain	-
ICT specific project / component	ICT4Ag component
ICT Application	
Short description	Resource persons in Headquarter for ICT4Ag
Observations	
Further information and contact	Jan Schwaab jan.schwaab@giz.de

Programme/ Project	Global Forum on Rural Advisory Services (GFRAS, funded amongst others by GIZ)
ICT category	Other
Period	ongoing
Country	Global
Value chain	-
ICT specific project / component	Working group on ICT for agricultural
ICT Application	Global Good Practice Notes on ICT in agricultural extension and rural advisory services
Short description	Working group ICT: http://www.g-fras.org/en/activities/ict-in-ras.html Global Good Practice Notes on ICT in agricultural extension and rural advisory services, for example on videos, mobile based bundled services, mExtension, navigating ICT's for extension and advisory services, radios, web portals: http://www.g-fras.org/en/knowledge/global-good-practice-notes.html General research and lessons learned on ICT4Ag: http://www.g-fras.org/en/knowledge/ict-in-rural-advisory-services.html
Observations	
Further information and contact	Frederik Oberthuer (Planning officer and expert on ICT4Ag, GFRAS focal point in GIZ) frederik.oberthuer@giz.de



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Chapter 3 – Lessons learned from GIZ-supported ICT initiatives in Agriculture and Rural Development

As many of the identified GIZ projects are relatively young or still in implementation or in design/ inception phase, documented lessons on the specific use of ICT in GIZ-supported agriculture or rural development-related projects are scarce. In addition most projects have not yet systematically evaluated the effects of the use of ICT in their projects. In general, most projects try to look at concrete deliverables and outputs, and if possible also at outcomes, and the learning dimension associated with the use of ICT-innovations is less well-covered.

From the identified projects and the expressed intentions on the use of ICT, it may also be clear

that the geographical or thematic scope, the target group and the ultimate goal differ quite substantially per case and that these dimensions do determine to a large extent the chosen strategy and approach, the type of capacities, the type of partners, and the type of technology that is needed for successful implementation. A project that has as its main deliverable to set up a well-functioning content-generation and –dissemination platform (e.g. the CCKN-IA initiative in India) will need other prerequisites than a project that just wants to use a digital tool to enhance communication within a project-component – though both may end up using similar technologies.

Lessons learned and observations on ICT4Ag from GIZ projects, grouped in the following categories:

Partnerships:

All projects stress the importance of partnering – for multiple reasons: building strong relations with (other) funding agencies or financing institutions in order to leverage sufficient financial means to bring ICT-related innovations to scale or replication for instance; pooling expertise and know-how from different sides, in order to maximize the quality and the impact of the intervention; matching private companies with public organizations, in order to broaden mutual insights on economic sustainability versus development-related objectives; identifying and tapping into new and innovative local dynamics, in order to build upon these and further harness local ICT-related job-generation. What becomes very clear is that with the accelerating pace of change (technological, but also climatic, environmental and social), projects need to bundle forces with others where possible! However, managing large and complex partnerships requires clarity on roles and

expectations, shared values and principles, long-term vision and strong steering capacity. Some projects express the need for a thorough re-evaluation of necessary competencies and required specific human resources in their project team for ICT4Ag-related partnerships, e.g. in order to better monitor and judge technological evolution, to better select and manage partners, to better capitalize on knowledge and expertise exchange etc.

Partnering with the private sector on ICT-development and ICT-deployment is recommended by the majority of projects, but this is not a guarantee for success in itself, as commercial interests may sometimes diverge from specific development objectives (as exemplified by the partnership with RML in Uttarakhand, India)²⁰. The driving force for such a partnership should not only be based on a private sector business orientation but at least contain a joint development commitment.

“Engage different partners from different levels and backgrounds to enrich. A strong partners’ network in your country is definitely an asset.”

“It is imperative to seek collaboration with other parties from the start on - we as a development agency do not have the right expertise in developing, testing and marketing ICT-software solutions. We should leave that to the private sector. However, we do need to know what solutions are around, and weigh them in the light of their effectiveness, efficiency and affordability for our intended target groups.”

Room for experimentation and discovery:

Overall, a need for more experimentation is highlighted by most projects to create room for identification of potential local partners and local dynamics, and for assessments of the potentials and the limitations of the local ‘ICT-ecosystem’. What works well in one country or region, may not apply in another. ICT is not a goal in itself, but creating a bridge between existing agriculture programs with

‘hard targets’ and innovative uses of ICT (bearing a high level of uncertainty) is still being perceived as a challenge. A suggestion is to adopt and/or develop light intervention concepts (ICT-app competitions/ demonstrations, ICT showcase fairs, informal gatherings etc.) that can help uncover local and/or regional ICT-dynamics (similar to GreenOvation in the Philippines or The Young Farmers Innovation Lab pilot in Zimbabwe).

“Embrace uncertainty and move forward. Create more space for experiments, maybe via sector projects.”

“Given the level of uncertainty in this type of projects, it would be good to allow maximal flexibility in planning and delivery of activities and results, as well as room for strategic reorientation. If the intention is to pilot an innovation in order to eventually scale it in a later stage, the main focus should be on experimenting and learning.”

Intervention design and planning:

Many projects highlight the importance of adequate project design. A largely shared opinion is that projects should be based bottom-up from research on the local needs, context and eco-system, and be

demand-driven, but should also take a helicopter view on issues of affordability and sustainability (scale, models for income-generation). ICT-components within projects should be realistic, and implementation planning should allow flexibility and re-orientation moments.

There is less consensus on how ICT should be regarded within agriculture-related project design as a whole: for most projects, development objectives should remain core, and ICT should be mainly considered as a tool to better or more quickly achieve these objectives. Certain projects favor a more holistic approach to ICT: this would imply that from the outset ICT is seen as a cross-cutting complex that can support internal processes of information-sharing, information-storage, communication,

learning and innovation, that can support external functions of communication, sharing, partnering, learning, marketing, lobbying etc., that can enhance capacity building, and that can be a tool within project objectives. In this vision, ICT's are not only an instrument but form an integral part of the approach²¹. The two visions do not necessarily bite each other, in the sense that they can exist next to each other – but the chosen setup for either type of project could differ strongly.

Internal capacity:

Regarding existing capacities, many projects express that they lack good insight on existing global ICT-solutions. A frequent remark is that it would be helpful to have a better view on the state of the art of technology and on new technological trends – both in general and sector-specific (→ list of existing global ICT-solutions). Access to, and collaboration with a central 'observatory' on ICT4Ag is put forward as a possibility. Most projects express that they don't consider a lack of technical know-how (ICT-expertise) as a major handicap, especially if this expertise can be brought in via consultants or via partnerships with private companies and NGO's. On the other

hand, many indicate that it would be helpful to have more 'hybrids' (thematic experts and/or project managers who are knowledgeable and familiar with ICT4Ag, preferably in developing country contexts) within project teams. For improvement of capacity on ICT4Ag, 'having internal ICT-capacity within my team' scores highest amongst projects of the survey, directly followed by better knowledge sharing with colleagues via meetings and better knowledge sharing with colleagues via dedicated platforms²². Access to local expert consultants and international expert consultants are also seen as effective ways to haul in extra capacity.

“It would be good to have more expertise on ICT software-development within GIZ, in order to better estimate the required efforts in time and budget.”

“Very often, it is a topic that everyone thinks he can do, but there is very little 'hybrid' experience – that is, people who know about ICT in a developing country setting and context. This is probably one of the main reasons why we have not been further ahead with ICT in our agriculture programs.”

21 The difference between the two visions may not always be clearly visible, as many internal and external information and communication processes of GIZ are already ICT-supported. But the place/importance one assigns to ICT will ultimately strongly impact on project design, project objectives and constitution of implementation teams.

22 See annex 6 for the survey questions and results.

ICT-tools:

There seems to be a large consensus on the fact that GIZ should not try to develop ICT4Ag-solutions or -tools itself. The overarching feeling is that this is best left to private companies. Some projects caution for exaggerated expectations from ICT-tools and point to the fact that human, physical interaction still is the best basis for mutual understanding, trust-building and knowledge-transfer. ICT's can enhance these fundamental processes by reducing geographical

distance, diminishing time constraints, etc. and but cannot fully replace them. The experiences of a number of projects dealing with extension advisories point in the same direction: investing in human capacity to use ICT effectively and efficiently, e.g. training extension agents to become better equipped and better informed intermediaries between farmers and agronomist experts/researchers, is at least as important as providing the technical platform(s) that can facilitate information exchange.

“Do not try to develop software yourself. Private companies are much better equipped to play that role.”

“Do not think that you can do everything via ICT. The electronic tools can support exchange and communication over long distances, but real relations and trust remain crucial factor in knowledge transfer.”

Budget and budget allocation:

On this issue it is clear that the scale and the scope of the ICT-component within a project play an important role. Some projects recommend that for pilots experimenting with ICT-tools or other ICT-related interventions, it is good to work with small budgets – as this stimulates creativity, voluntary

engagement and locally-owned dynamics while allowing room for failure and learning. For larger ICT-implementations, more realistic budget estimations for hardware and software-development should be made in order to limit the risks of project delays or technical failure.

“It is good if you don't have much money – that stimulates creativity, and taps into voluntary engagement.”

“For large-scale IT-projects, more professional guidance on budget would be good. An evaluation of the country-specific cost levels should be made beforehand.”

Guiding principles and positions on ICT-related privacy and security issues:

A recurring observation by a number of projects is that there is a lack of guidelines on issues regarding data rights, data ownership, data security, privacy, intellectual property rights and so on. Some point to the '9 ICT4D principles' (cf. Chapter 1)²³, though these are more related to general 'good practices' regarding ICT4D implementations. For projects it would be helpful to have clear positions on some of the above mentioned issues as these help guide decisions

regarding the choice of technology, partners, business models etc.

Other interesting lessons learned concern the 'dark side' of ICT: projects should be aware of the fact that technology is not neutral and often implicitly carries a number of cultural values which are not always shared by the intended beneficiaries, that ICT can spread 'good information' but also disinformation, rumors and lies, and that it can lead to expenses which are not always compensated by extra earnings!

“We did not sufficiently look into the aspect of data security and privacy. This is definitely a topic that we should elaborate upon on a higher level within GIZ, as we don't have a clear view on what we should do or not do.”

“We should also be aware of certain dangers. For instance regarding spendings on communication, rapid spread of misinformation, data security, manipulation etc. The challenges nowadays are less related to technical problems, but all the more to the quality and the relevance of the information.”



Chapter 4 – Conclusions and Recommendations on the use of ICT4Ag in GIZ projects

The overall picture that arises from the study on the current use and/or implementation of ICT in agriculture and rural development projects implemented by GIZ is one of slowly upcoming interest: there are scattered interesting pilots and a number of very promising initiatives going on in several countries, there are some strong experiences, and new ICT-related activities are being prepared. It may be early days, and there is probably more going on than this study could identify in the short timeframe. Noteworthy too is that the majority of projects contacted seem enthusiastic and eager to adopt and promote innovations that are fostered or enhanced by ICT's²⁴. From GIZ headquarters there is an outspoken will to give ICT a more prominent role in GIZ-programs, and frameworks and guidelines on innovation and on ICT4D are being developed and/or refined. These will most likely promote and support further adoption and integration of ICT.

What can definitely be improved upon is the capitalization of lessons on the use and the integration of ICT4Ag, the speed and quality of internal knowledge sharing within the sector, and cross-fertilization with other sectors. More systematic uptake of ICT-opportunities in new projects could also be a point of attention and address mainly planning officers.

What could GIZ projects do to speed up the use of ICT in Agriculture and rural development? Here are some important lessons learned derived from the study and recommendations from 'early bird' GIZ projects already applying ICT4Ag:

- **“Embrace uncertainty and move forward”** (quote from one of the interviews)
First of all, an obvious remark is: just start, and 'learn by doing'. The experiences with GreenOvation (Philippines) and Young farmers Innovation Lab (Zimbabwe) show that it doesn't require large budgets or long preparations to

pilot an ICT-related project – and that many learnings as well as good results can be obtained relatively quickly. Do short-track pilots, learn and build upon the lessons and the new contacts/networks you have uncovered. These can be short 1-time activities: organize/join ICT4Ag seminars, hackathons, software development competitions and demonstrations, experiment with mobile surveys or data collection tools, photo/video contests etc., or more integrated ones: set up a small ICT-project with clear boundaries within a larger project/program.

→ **Dive into the local ICT-ecosystem**

For country teams which have done little with ICT in agriculture so far, a starting point could also be to explore the local ICT-ecosystem: what ICT's are other organisations and NGO's using, with who are they collaborating, what is their satisfaction with certain (local) solutions and services, what do they recommend? What ICT's do the intended beneficiaries (smallholders and farmer organizations) use, how, and what can they afford? Which other ICT4D- or ICT4Ag-organisations have (had) activities in the country? What are their lessons and insights, who do they recommend to work with? In most capitals and larger cities in developing countries, there are upcoming nuclei of techies, ICT-oriented start-ups, tech-labs²⁵ and more vested IT-companies: where are they, what do they do, what services do they offer (hardware, software development, installation and maintenance, training, advise, content), with who do they work, what do they cost, are they interested in partnering? Do the local mobile operators engage in agriculture-related services, are they interested in doing so, on what terms?

→ **Infrastructure challenges can be overcome**

An often-heard argument for not using ICT is that the local infrastructure in a rural area does

24 There may be a bias here, as it is likely that the persons who are interested in using ICT were more apt to respond to our enquiries than the ones who are not.

25 See for an overview of Tech-hubs in Africa the map in Annex 7 (source: World Development Report 2016).

not allow the use of electronic equipment – there’s no electricity, no connectivity, no technical capacity. And while it’s true that circumstances may be harsh and sometimes challenging, there are nowadays all kinds of inventive ways to overcome existing infrastructure barriers: think of solar power, mini-aggregators, mini-VSAT antenna’s, pico-projectors, radios, tablets, smartphones with programmes that work offline etc. The type of ICT projects introduce does not need to be complex – where necessary projects can start with ‘simple technologies’: by enhancing extension services via digital photo, video or digital projection kits²⁶, by improving the content of community radios via digital channels or mobile phone interactivity, or by putting some basic computer equipment to use in farmer-led meeting places.

→ **Look carefully at your target group and context**

Who are the intended users and/or beneficiaries of the ICT-solutions – and what can they tell about the way they use and adopt new technologies? What can projects do to ensure that both men and women, old and young benefit from the ICT-solutions? Build upon what the target group is already using – as this is most likely the type of technology that is considered useful, usable and affordable by the target group. Experimenting with and combining the use of various technologies whilst paying attention to their relevance or effectiveness to men and women both young and old, allows for a multidimensional appreciation of what works for particular groups and for different purposes. Taking a broad approach to capacity building in the use of ICTs enables participating female and male farmers to experience which combination of solutions and services suits them best and allows them to harness the opportunities provided by each. If introducing a new technology, make sure that it is accessible, acceptable and affordable for all (keep gender, age, disability issues in mind)²⁷.

→ **Improve internal knowledge sharing mechanisms**

Improving and enhancing internal knowledge sharing on ICT4Ag requires relatively little effort and can generate results on the short term. Don’t wait for formal evaluation reports but use and/or create channels that foster exchanges, enquiries, contacts, ideas, tips and recommendations on a daily basis. Encourage and cherish informal learning. Start building a digital GIZ ICT4Ag-community – with branches into other ICT4D communities in GIZ and connects with similar national and international communities. Organize regular light webinars on ICT4Ag related topics, for example via GlocablCampus21 and the SNRD Africa. On the longer term, projects can also look more fundamentally at the organization and the prominence of knowledge management within ICT-related programs: with fast technology changes, should more human resources be dedicated to monitoring and learning? Can learning cycles within projects and programs be shortened, or can more learning moments be built in during project implementation? Can more ‘horizontal’ (between country teams) learning be stimulated?

→ **Look into specific indicators, allowing standardized measurement and learning**

Also on the topic of learning, it would be good to look into the question whether ICT4Ag requires a specific monitoring and evaluation framework with separate indicators. What do we want to measure, for what purposes and how? What specific indicators do we consider important (user satisfaction, performance/stability of software, reach, uptake, sustainability, ...)? Is it possible to attribute certain results to the use of ICT (that is, apart from all other factors that contribute to the result)?

26 A recent example of hardware that was specifically designed for use in a rural context is the Digital Classroom System (DCS) – a small portable and solar-powered projection unit for use in rural areas. See: <https://vimeo.com/154777076>

27 In Kenya, NGO’s supporting farmer organisations in the Western and Rift Valley provinces with Farmer ICT Centres discovered that female participation and attendance sharply rose once they moved the Centres closer to the farms, rescheduled the opening hours, allowed in-laws to come separately from their family, and offered training in local native languages. (from: “Promoting Equal Chances for Men and Women to Use and Benefit from ICT-Enabled Agricultural Value Chain Development”, IICD 2015)

→ **Re-apply ‘proven’ software across countries and programs**

Very concretely, the development, use and uptake of certain software applications offers the possibility of further replication across multiple countries. This could for instance be the case with the *MData Capture* application for planning and monitoring (agriculture-related) vocational training in remote areas. This application is already being used in a number of countries in West-Africa – but could possibly serve other countries too. Within the framework of the value chains approach there are huge opportunities in further replicating the use of the *Rural Sourcing Management* software that was piloted and refined during the public-private partnership with SAP which formally ended in 2015. For a number of country programs it could be interesting to look into the potential of using the software in the value chains that they are already supporting or have identified as promising. Thus, further scaling could take place in the cashew, shea, coffee, cocoa, rice, sesame (crops that have already been piloted) value chains, while the integration of other interesting value chains could be considered (e.g. dates or olives in countries like Tunisia) – depending on the interest of large stakeholders to support cost and investments, and on the adaptability of the software to the targeted value chains. This scaling could contribute to bringing down the cost of the software – though this would depend on the terms upon which an eventual new partnership with SAP would be negotiated. Assuming that SAP will launch the software commercially, GIZ’s role could be to help bring together parties (processing industry, exporters, input suppliers, and financing institutions) that would benefit from the use of the software and would be willing to bear parts of the cost, to safeguard the interests of the smallholders and to assure that more smallholders benefit from the approach.

A fundamental question remains of course how far a public agency can/should go in a preferred partnership without distorting market mechanisms: how competitive is the software really (both in terms of quality and of pricing) vis-à-vis other products, does the involved company genuinely see a market for its product in developing countries (if there were no support from the public sector), how big are the risks of putting all eggs in one basket, and last but not least: does the partnership contribute to the further growth of the local ICT-ecosystem, or does it undermine it?

So, while SAP’s software has proven to be reliable and effective and while it is also clear that the data generated by the software can be used to engage other important stakeholders in the value chain, there may be good reasons to continue to explore the product offers of other companies and to work with other providers of similar software (like is already the case with Syngenta Foundation’s Smartforce in the CARI-program) – be it only to keep pressure on the preferred partner(s) to remain competitive.

Finally, an important dimension to consider in this type of setup, where data play a crucial role and where data sharing with other stakeholders can be an important element of the underlying business model, is data-rights and privacy. What exact data are being collected on the involved smallholder farmers and their farms, who ‘owns’ the data, with whom are the data shared and with what purpose, are the farmers aware that their data may be used for multiple purposes, are they aware of their rights, etc.

→ **Break down thematic walls and look for synergy with other existing programs and projects**

More than anything else, ICT’s are transversal and cross-sectoral. Not only can some ICT-applications be used for multiple purposes, they

often can also help to link people, organizations, institutions and sectors that have traditionally been operating apart from each other. It would be a waste of investments and energy not to build upon what has already been achieved in other GIZ-sectors and themes. One of the reasons for including some non-agricultural projects in our overview is that the link between agriculture and climate/environment-related projects is quite obvious, just as the link between supporting micro-finance institutions and rural development, or between creating new jobs and modern agriculture. ICT's being used in project for a specific purpose, may contribute on another level to another project. SAP's Rural Sourcing Management Software for example, while intended primarily to improve the management of the smallholder products within a particular chain, is also able to generate data that can promote the willingness of financing institutions to provide loans. Supporting local industries in developing and marketing ICT-applications can lead to the creation of strong local solutions, but also create new jobs, etc.

The main hurdle to creating strong bridges between separate projects and programs is probably administrative: for management and budgetary reasons, projects have the tendency to become close entities. Creating cross-links and collaboration between different projects demands openness and flexibility at both design and implementation level.

→ **ICT is about communication and people, more than about technology**

From several projects with relation to agricultural research versus extension it becomes clear that the gap between research/agronomic expertise and farmers is still very big. This gap is not only about existing knowledge and expertise that fails to reach the farmers or that is not well-translated in the farmers' 'language'. It is also about

what researchers produce, and what farmers actually need. And ultimately, about mutual understanding and trust. Lessons from CCKN-IA and the ITAACC-projects indicate that enhancing the human interface and discourse between research knowledge and farmers is at least as important as building/providing digital channels/platforms for knowledge transfer. In terms of capacity building, this could mean that the core of the efforts should go into strengthening the capacities of intermediaries (extension agents or well-placed farmers) – both in using ICT to access knowledge and to transfer knowledge, as in using ICT as a channel to foster mutual understanding between farmers and agronomist experts and researchers.

Closely related to the notion that it is crucial to build the capacities of critical intermediaries to use ICT in order to play their role better is also the question whether you want farmers to mainly benefit 'passively' from ICT's (e.g. by receiving better information) or if you want them to adopt ICT actively themselves (e.g. by empowering farmers and farmer organizations to identify, procure and use ICT's for their own chosen purposes). Ideally, farmers would then gradually become less dependent on proposed solutions. And ultimately, the best guarantee for the appropriateness and the sustainability of ICT-solutions in agriculture would be its' massive uptake by farmers. This approach would entail close collaboration with farmers and farmers' organizations, and the challenge would be to identify the right type of partner(s) to carry such an effort on a large scale. We have not encountered projects within GIZ-related programs that go in this direction of 'farmer empowerment with ICT' (apart from the collaboration with ZNFU in Zambia – but it is not clear whether that is related to ICT), but it would be good to discuss the possibilities and the challenges of such an effort.

Some specific recommendations for SNRD Africa as a sector network also became clear in order to support the use of ICT4Ag in GIZ projects:

- During physical meetings of the SNRD, try to collect the ‘needs related to ICT4Ag’, as expressed by SNRD colleagues. Make an inventory of these, prioritize, and address the most urgent ones.
- Create a dedicated ICT4Ag-Community of Practice (CoP) within GIZ. This should be the place where all (practical) questions related to ICT4Ag can be posed, where experiences can be shared, where entry points to further information can be found, and where open discussions can be initiated around issues and challenges related to ICT4Ag.
- Keep it informal – it is important to give members full opportunity to express themselves, ask questions or contribute in any possible way, in order to stimulate quick learning. Use other channels for more formal ‘institutional learning’ trajectories (e.g. project evaluations, studies etc.). It may be good to open membership of this CoP to colleagues from other sectors who could have cross-links, or who could contribute at other levels (technical, country-related etc.). Within the larger CoP, you can of course look into the option of sub-groups. You could have a look at D-groups as an entry point for easily manageable online exchange platforms (email list, doc repository, web pages) – without ads or hidden datamining mechanisms. Note that most well-functioning CoP’s are actively facilitated – some effort by a few key persons should be put into activating the CoP and maintaining its liveliness, without either ‘spamming’ the members. Good practices of CoP-facilitation can be found online, a.o. D-groups has collected some.
- Join existing ICT4Ag-communities. The ones managed by CTA (Web2ForDev, ICT4Ag@dgroups.org) are quite good and cover many countries and a large number of members, but there are also other ones more related to research and/or specific themes within ICT4Agriculture. Establish a list of ‘preferred’ communities and share within SNRD. Encourage other SNRD-members to join online ICT4Ag-related groups of their choice.
- (Co-)Organize regular internal ‘update seminars’ around the topic (maybe together with other ICT-related programs/projects in GIZ). These don’t need to be time- or budget-consuming: if you identify key resource persons around a specific theme, topic, technology, experience or tool, these persons in general are quite willing to prepare and deliver a presentation. You can opt for a format of 1-2 hours in order to allow your fellow colleagues not to lose too much time. Webinars are a good option – but they can sometimes be challenging in terms of technology preparations, especially if many people from developing countries are invited to participate. You can also opt for recording the session on video (or audio + presentation) and make each seminar available online for those who could not make it ‘live’. To gain some ‘traction’ you could think of starting with a few seminars with a ‘high-attention’ value – either because of the topic, or because of the speaker. Other similar formats can be ‘brown-bag lunches’, specific ICT-tools demonstrations etc.



Annex 1 – Relevant players and networks in ICT4Ag

CGIAR: <http://www.cgiar.org/>

CGIAR is a worldwide partnership addressing agricultural research for development, whose work contributes to the global effort to tackle poverty, hunger and major nutrition imbalances, and environmental degradation. It is carried out by 15 Centers that are members of the CGIAR Consortium, in close collaboration with hundreds of partners, including national and regional research institutes, civil society organizations, academia, development organizations and the private sector. CGIAR conducts a number of projects that explore how ICT can enhance the effectiveness and impact of agricultural research and innovation on the above mentioned issues.

CTA: <http://ict4ag.org/en/>

The Technical Centre for Agricultural and Rural Cooperation is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities. CTA is funded by the EU and has its main office in the Netherlands. CTA provides the regular newsletter “ICT update” and organizes annual major conferences, amongst which “Making the Connection” in Addis Ababa 2012, “ICT4ag” in Kigali 2013, and “Fin4Ag” in Nairobi 2014. It also hosts so-called ‘Plug-and-Play’ workshops in various ACP-countries, during which local ICT4AG service providers present their solutions to other agricultural stakeholders.

CIARD: <http://www.ciard.info/>

Coherence in Information for Agricultural Research for Development is a global movement, founded in 2008, dedicated to promote open access to agricultural knowledge, helping to establish

international standards, devising resources and tools that facilitate collaboration and sharing, and amplifying individual partners’ contributions to reducing poverty and hunger.

FAO: <http://www.e-agriculture.org>

The Food and Agriculture Organization of the United Nations (FAO), has launched [e-agriculture.org](http://www.e-agriculture.org) in 2007. e-Agriculture is a global Community of Practice (over 12,000 members from 170 countries and territories) related to the use of ICT for sustainable agriculture and rural development. It came into being after the World Summits on the Information Society (WSIS) in 2003 and 2005 under the lead of the Food and Agriculture Organization of the United Nations (FAO), with the purpose of improving policies and processes around the use of ICT in support of agriculture and rural development. e-agriculture provides a regular newsletter called “ICT Update” and moderates several online discussion forums.

World Bank/Infodev:

<http://www.ictinagriculture.org>

infoDev was founded as an ICT-for-development research leader in 1995. This multi-donor program in the World Bank Group, supports growth-oriented entrepreneurs through a global network of business incubators. We help entrepreneurs gain access to early-stage financing; facilitate mentorship and training programs; and convene entrepreneurs, investors, policymakers, and other stakeholders to share knowledge and best practices. Its relatively new infoDev Agribusiness Innovation Program (AIP) is aimed at generating a competitive, inclusive agribusiness sector in developing countries by helping local entrepreneurs with high growth potentials through locally owned and operated Agribusiness Innovation Centers (AIC). infoDev aims to have a total of 8 AICs implemented by 2018.

Agriprofocus: <http://www.agriprofocus.com>

AgriProFocus is an international network with Dutch roots that promotes and drives farmer entrepreneurship among farmers and their organisations. It builds on the vision that primary producers worldwide are the key to local economic growth and sustainable agri-food systems. Its network focus areas are farm-firm relations, market access/information, access to finance, and gender in value chains. AgriProFocus is active in Africa (12 countries), Indonesia and in the Netherlands and organizes a regular calendar of Business2Business events and fairs, expert meetings, knowledge events and debates. Moreover the network provides brokering services as well as an active online space for networking and exchange.

IFAD: <http://www.ifad.org>

The International Fund for Agricultural Development (IFAD) is a specialized agency of the United Nations which was established as an international financial institution in 1977 as one of the major outcomes of the 1974 World Food Conference. IFAD funds a large number of national programmes and projects, of which some are incorporating ICTs.

GSMA: <http://www.gsma.com/mobilefordevelopment/programmes/magri>

Created in 1995, GSMA is an association of nearly 800 mobile operators and 250 companies in the broader mobile ecosystem, supporting the standardising, deployment and promotion of the GSM mobile telephone system. As a part of its Mobile for Development section, the mAgri program works with mobile operators, the development community and agricultural organizations to enhance the livelihoods of smallholder farmers in emerging markets by improving their access to information, financial services and supply chain solutions, delivered via mobile through sustainable business models. Since its inception the mAgri Programme has directly supported projects with mobile operators across Sub-Saharan Africa and Asia, amongst which the Senekela

market price service in Mali (multipartite project with Orange-Mali, IICD, RONGEAD and the Malian Institut d’Economie Rurale IER).

CABI: <http://www.cabi.org/>

The Centre for Agriculture and Biosciences International is an international not-for-profit organization that improves people’s lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment. CABI’s approach involves putting information, skills and tools into people’s hands, and it has increasingly been using ICT to get its content across.

IICD: <http://www.iicd.org>

The International Institute for Communication and Development is a non-profit foundation established and funded by the Ministry for Development Cooperation of the Netherlands in 1996, additionally funded by DFID (UK) and SDC (Switzerland). IICD’s aim is to support sustainable development through the use of information and communication technologies in developing countries. It has supported an array of ICT4Ag projects in 13 countries in Africa and Latin-America since 1998. IICD closed down in February 2016, but its’ legacy can be found online.

FARA – eRails initiative: <http://www.erails.net>

eRails is an African web portal for Agriculture. This project of the Forum for Agricultural Research in Africa (FARA) aims at building research knowledge management capacity within participating national systems of Africa. The eRails service is free for all those living in Africa working for agricultural and rural development. As an account holder, users are entitled to create various websites in order to publish information about their projects and activities. eRAILS is easy to use and requires no programming skills. It was launched in 2007 and operates out of FARA headquarters in Ghana.

AGRA: <http://www.agra.org/>

The Alliance for a Green Revolution in Africa exists to fulfill the vision that Africa can feed itself and the world—transforming agriculture from a solitary struggle to survive to a business that thrives. Formed in 2006, AGRA is an independent African-led and Africa-based organization committed to putting farmers at the center of our continent’s growing economies. With headquarters in Nairobi and offices in Ghana, Tanzania, Mali and Mozambique, it works worked across 18 countries in Africa.

RONGEAD: <http://www.rongead.org/>

Established in 1983, RONGEAD is an NGO based in Lyon whose activities cover the areas of agricultural and agro-industrial value chains, and its objectives are to facilitate market access for value chain actors, to strengthen producer organizations capacities, to reduce environmental externalities in the process of transformation, and to promote adapted agricultural policies in developing countries. It operates the N’kalo (<http://nkalo.com/>) mobile service in a number of countries in West-Africa, offering market information on a large number of value chains and contributes to the ‘Senekela’ mobile market price service of Orange-Mali in Mali.

Digital Green: <http://www.digitalgreen.org>

Digital Green is a not-for-profit international development organization that uses an innovative digital platform for community engagement to improve lives of rural communities across South Asia and Sub-Saharan Africa. It partners with local public, private and civil society organizations to share knowledge on improved agricultural practices, livelihoods, health, and nutrition, using locally produced videos and human mediated dissemination.

IMARK Group: <http://www.imarkgroup.org>

The Information Management Resource Kit Group is a collaborative e-learning initiative involving more than 50 partner institutions, which have contributed to the curriculum design, content development,

dissemination, promotion or language adaptations. IMARK is led by FAO and coordinated through a Steering Group consisting of 13 organizations, amongst which the Agence Universitaire de la Francophonie (AUF), The Association for Progressive Communication (APC), the Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), and CTA.

ICTworks - Inveneo & FHI 360’s TechLab: <http://www.ictworks.org>

ICTworks™ is a good resource for sharing and expanding knowledge on appropriate information and communication technologies (ICT) and the implementation processes that can make them sustainable in rural and underserved communities across the developing world (ICT4D). Founded in 2009 by the US social enterprise Inveneo, in 2015 ICTworks became a partnership between Inveneo and FHI 360’s TechLab.

MEAS:**<http://www.meas-extension.org/resources/ict>**

The objective of Modernizing Extension and Agriculture Services (MEAS), supported by USAID and Illinois University, is to define and disseminate good practice strategies and approaches to establishing efficient, effective and financially sustainable rural extension and advisory service systems in selected countries. Our goal is to help transform and modernize these extension systems, so they can play a key role in both increasing farm incomes and enhancing the livelihoods of the rural poor, especially farm women.

ICTforAg: <http://ictforag.org/>

A consortium of large US-based development organizations (FHI360, DAI, ABT) working for USAID, organized this dedicated conference in Washington in June 2015.

ILEIA – The Agricultures Network:

<http://www.agriculturesnetwork.org/>

ILEIA, the Centre for learning on sustainable agriculture, is an independent organization based in The Netherlands that supports agro ecological approaches and family farming. ILEIA has over 30 years of experience in building knowledge through the documentation and systematization of concrete practices and disseminating these in Farming Matters magazine. ILEIA supports social movements and engages in advocacy in order to contribute to an enabling environment for family farming based on agroecology.

YPARD – The Young Professionals for Agricultural Development Network:

<http://www.ypard.net/>

YPARD is an international movement by Young Professionals for Young Professionals for Agricultural Development. YPARD operates as a network; it is not a formalized institution. This global on-line and off-line communication and discussion platform is meant to enable YPs all over the world to realize their full potential and contribute towards innovative agricultural development.

ARDYIS – Agriculture Rural Development and Youth in the Information Society:

<http://ardyis.cta.int/>

ARDYIS is a framework of actions which aims to raise the capacity and opportunities of youth in agriculture through ICTs in ACP countries (Africa, Caribbean and Pacific). Its key activities include the Youth in Agriculture Blog Competition (YoBloCo Awards) and the AgriHack Talent initiative.

Tech4Agri:

<http://www.tech4agri.com/>

This blog brings to light issues and success stories in agriculture along with general knowledge on Caribbean Agriculture while simultaneously bringing topics and other relatable stories in the global agriculture discourse to the Caribbean. It acts as a platform to assist persons in realizing the multitude of technological application that exist in agriculture, to assist in the development of young agropreneurs

and to assist the agriculturally inclined public through the provision of an interesting and innovative agri-information service.

Farm Radio International:

<http://www.farmradio.org/>

Farm Radio International is a Canadian charity working with more than 500 radio partners in 38 African countries to fight poverty and food insecurity. It develops radio scripts, information packages, a weekly electronic news service, and a special on-line community called Barza, and share them with thousands of African broadcasters. They, in turn, use these resources to research, produce and present relevant and engaging programs for their audience of tens of millions of farmers.

DrumNet:

The DrumNet Project plays a networking role by delivering market, finance, and information services to agricultural supply-chain actors in Africa. DrumNet is an ICT-enabled platform that delivers services to agro-buyers, banks, farm input retailers and farmers. Through its work in microfinance and the agricultural sector, PRIDE has been at the forefront of ICT use in Africa. DrumNet has operated in Kenya since 2004 and has expanded to Guinea, Malawi, Tanzania, Uganda and Zambia.

GODAN:

<http://www.godan.info/>

The Global Open Data in Agriculture and Nutrition initiative was launched in October 2013 at the Open Government Partnership Conference to build high-level policy and institutional support for open data across the public and private sector. GODAN supports the proactive sharing of open data to make information about agriculture and nutrition available, accessible and usable to deal with the urgent challenge of ensuring world food security. It is a rapidly growing group, currently with 169 partners from national governments, non-governmental, international and private sector organisations.

Alterra: <http://www.wageningenur.nl/en/Expertise-Services/Research-Institutes/alterra.htm>

Working in close collaboration with the Agriculture University of Wageningen (WUR) in The Netherlands, this Research Institute offers a combination of practical, innovative and interdisciplinary scientific research across many disciplines related to the green world around us and the sustainable use of our living environment. Aspects of the environment that Alterra focuses on include soil, water, the atmosphere, the landscape and biodiversity - on a global scale as well as regionally. The Institute has a highly specialized department on geo-data, -software and forecasting models which can be put to use for agriculture, environmental protection and food security.

Agriterra: <https://www.agriterra.org/en/index>

Agriterra is an agri-agency, an organisation for international cooperation that was founded by civil society organisations in rural areas and the agricultural private sector in The Netherlands. Agriterra aims to stimulate, support and finance the international cooperation between rural people's organisations in the Netherlands and those in developing countries.

Digital Development Principles Working Group: <http://digitalprinciples.org/>

This initiative is led by the Digital Development Principles Working Group with representation from a variety of donors, non-governmental organizations, companies and individuals working in international development. The Principles for Digital Development are "living" guidelines that can help development practitioners integrate established best practices into technology-enabled programs. They are written by and for international development donors, multilateral organizations, and implementing partners, and they are freely available for use by all.

Responsible Data Forum: <https://responsibledata.io/>

The Responsible Data Forum is a collaborative effort to develop useful tools and strategies for dealing with the ethical, security and privacy challenges

facing data-driven advocacy. RDF activities include organizing events; fostering discussion between communities; developing and testing concrete tools; disseminating useful information; and advocating for advocates and their supporters to improve the way they work with data.

The Forum is a collaboration between Amnesty International, Aspiration, the engine room, Greenhost, HURIDOCS, Leiden University's Peace Informatics Lab, Open Knowledge and Ushahidi.

The Open Source Initiative: <http://opensource.org/>

The Open Source Initiative (OSI) is a non-profit corporation with global scope formed to educate about and advocate for the benefits of open source and to build bridges among different constituencies in the open source community. Open source is a development method for software that harnesses the power of distributed peer review and transparency of process. The promise of open source is higher quality, better reliability, greater flexibility, lower cost, and an end to predatory vendor lock-in. One of its most important activities is as a standards body, maintaining the Open Source Definition for the good of the community. The Open Source Initiative Approved License trademark and program creates a nexus of trust around which developers, users, corporations and governments can organize open source cooperation.

Web2forDev – Participatory Web for Development: <http://www.web2fordev.net/en/>

Web2forDev is a Community of Practice around the issue of participatory web 2.0 for development - a way of employing web services, in order to improve information sharing and collaborative production of content in the context of development. Examples of Web 2.0 applications include RSS, VoIP (Skype), blogs, video / photo sharing sites and the entire Social Media family (Facebook, Google+, LinkedIn, Wikipedia, Dgroups, Foursquare, Whatsapp, Viber, etc.) which is accessible via fixed and mobile devices.

The Communication Initiative:

<http://www.comminit.com>

The Communication Initiative is a partnership and networking space where people using media and communication strategies for action on poverty and other major issues share, learn and converse. Comminit issues 'The Drum Beat', a monthly bulletin on global and local communication-related issues, themes and projects.

Relevant players and networks in ICT4Ag

Uganda I-Network: <http://www.i-network.or.ug/>

I-Network is an ICT for development (ICT4D) organization in Uganda. I-Network was established in 2002 and now has over 800 registered 'members' from the public, private and civil society sectors. Over time it has also developed expertise in ICT4D project implementation within Uganda with the support of its counterparts IICD in the Hague.

Uganda WOUGNET: <http://wougnet.org/>

Women of Uganda Network (WOUGNET) is a non-governmental organization initiated in May 2000 by several women's organisations in Uganda to develop the use of information and communication technologies (ICTs) among women as tools to share information and address issues collectively.

Ghana GINKS: <http://www.ginks.org/>

The Ghana Information Network for Knowledge Sharing (GINKS) is a constitution of a broad range of people drawn from various fields, but mainly involved in Information Communication Technologies (ICTs) and sustainable Development. Created in 2002, it has approximately 800 members from different countries, and 40 member organizations from Ghana. It hosts a mail-list and a web site, and (co-)organizes ICT4D events and training workshops.

Ghana Agricinghana: <http://agricinghana.com/>

The agricinghana blog is provided by Syecom

Business Services Ltd, a company offering agricultural consultancy services of in GIS/GPS Survey and Mapping, Research and Training. The blog highlights issues on agricultural development in Ghana and in the sub-region. It brings to the fore technological innovations and practices that can be shared and made relevant to farmers and other stakeholders in the value chain. The blog also promotes agricultural research works and provides information on various market access support services available to increase productivity, incomes and livelihoods of farmers.

Kenya i-Hub: <https://www.ihub.co.ke/>

The iHub catalyses the growth of the Kenyan tech community by connecting people, supporting startups, and surfacing information. Since inception in March 2010, the iHub has grown through overcoming challenges as well as consistently and fiercely adapting toward serving the Kenyan tech community. This has been through initiatives such as iHub Research, m:lab (with eMobilis and University of Nairobi), Consulting, the UX Lab; and Gearbox, a design and rapid prototyping facility to be strategically located in the industrial area of Nairobi, with a smaller location within the iHub at Bishop Magua Centre.

Burkina-Ntic Country Gateway du Burkina Faso:

<http://www.burkina-ntic.net/>

This local network on ICT4D and its sub-themes (ICT4Governance, ICT4Ag, ICT4democracy etc.) was created by Yam Pukri and IICD in 2001. Yam Pukri hosts the Burkina-Ntic web site and several lists and related web sites, develops web pages and software and organizes ICT4D-related activities and trainings in Burkina Faso and Niger.

Mali MaliNtic : <http://www.mali-ntic.com/>

MaliNtic was created in Mali in 2001 with the support of IICD as a local network for ICT4D-practitioners and interested organizations. While the national network has withered, some of its sub-networks like TIC-Santé, G@TIC and TIC-Genre are still active and accessible via the web site.

Western Africa Jokkolabs:

A nonprofit independent organization, JOKKOLABS is an open innovation ecosystem and a virtual cluster for a social change based on an organic entrepreneur community and a network of innovation centers. It has operations in Dakar, Bamako, Ouagadougou, Abidjan, Banjul and Casablanca.

Senegal eTIC.net: <http://www.e-tic.net/>

E-TIC is a program run by the Swiss organization ICVolunteers, which began implementation in 2009 in Mali and Senegal. The training program reaches out to farmers, herders and fishermen with locally adapted content and communication forums in different media like SMS, web, voice, community radio etc. The content includes information and learning tools on organic farming, sustainable agricultural production and productivity on crops management and income. Their AgriGuide of best practices for organic production is aimed at providing farmers with learning tools to increase their knowledge in order for them to ensure a sustainable agricultural production and productivity on crops management and income. It is not clear whether the programme is still active since 2013.

Senegal CTIC: <http://cticdakar.com/fr/>

ICT incubator and accelerator CTIC was founded in 2011 as a non-profit public-private partnership. Its team is aiming to become financially self-sustaining and independent from its funders (GIZ, infoDev, Orange-Sonatel & Senegalese Government) by 2016, mainly through percentages from the growth in revenue from the companies it follows in its incubation program, but also through offering other consultancy and event services.

Ethiopia iceaddis: <http://www.iceaddis.com/>

iceaddis is a tech innovation hub in Addis Ababa, which started as a GIZ supported project in 2011. It is aiming to open an ICT-oriented coworking space in an accessible location downtown, as a registered company from January 2015 on. In the architectural

campus of Addis Ababa, the rapid prototyping and entrepreneurship branch of iceaddis remains as a project targeting the students of architecture and engineering. A recent startup project incubated by iceaddis is called AgriVas. The AgriVas team is developing a prototype of an android mobile app for teff-farmers, that delivers content on modern farming methods, market prices and weather information by converting the delivered content to voice.

Ethiopia ESAI:**<http://preciseethiopia.com/incubator/>**

Ethiopia Sustainable Agribusiness Incubator (ESAI) is a USAID funded project jointly managed by Precise Consult International PLC in Addis Ababa and the Economic Transformation Group (ETG) in USA which began implementation in 2013. ESAI's goal is to transform Ethiopian agriculture sector-by-sector by enhancing the competitiveness of the entire value chains in the dairy, sesame and honey subsectors. By identifying and supporting existing pioneer firms and stimulating and promoting emerging dynamic entrepreneurs, ESAI aspires to enable and nurture the creation of innovative businesses whose primary mission involve addressing value chain problems, value addition and hence, bringing subsector transformations. These businesses will serve as test beds for the formation of new kinds of value addition and new models for farm to market linkage.

Ethiopia CIC: <http://ethiopiatic.org/>

The Ethiopian Climate Innovation Center (ECIC), launched in 2014, is funded by the UK and Norway as a part of infoDev's Climate Technology Program (CTP), which is currently implementing a global network of innovation centers across seven other countries. It provides financing, mentorship, and advisory services to local clean-tech entrepreneurs working in agribusiness, energy efficiency, renewable energy and biofuels.

Rwanda kLab: <http://klab.rw/>

As Rwanda strives towards establishing a knowledge based economy and achieving its Vision 2020 goals, fostering innovative ICT based SMEs becomes critically important. kLab (knowledge Lab) is a unique open technology hub in Kigali where students, fresh graduates, entrepreneurs and innovators come to work on their ideas/projects to turn them into viable business models.

Zambia Bongohive: <http://bongohive.co.zm/>

Lusaka's innovation and technology hub catalyses the growth of Zambia's entrepreneurial community. It provides entrepreneurship and startup support programmes, workshops and events all focused on making Zambia Africa's next hotbed of innovation.

Bolivia TICBolivia: <http://www.ticbolivia.net/>

La Red TicBolivia es una asociación multisectorial sin fines de lucro conformada por 25 organizaciones

afiliadas a nivel nacional, entre asociaciones de base, entidades no gubernamentales, empresas privadas, universidades y entidades gubernamentales, que aplican las Tecnologías de Información y Comunicación (TIC) en favor del desarrollo humano sostenible, principalmente en las áreas de Educación, Gobernabilidad y Género y Agricultura.

Ecuador Red Info Desarrollo Ecuador:

<http://www.infodesarrollo.ec/>

Corporación Red Infodesarrollo es la Red Ecuatoriana de Información y Comunicación para el Desarrollo, conformada por 35 organizaciones, cuya misión es promover la generación e intercambio de información, metodologías, experiencias y conocimientos sobre Tecnologías de Información y Comunicación (TIC) para el desarrollo, y fomentar procesos participativos multisectoriales en políticas públicas alrededor de este tema en el Ecuador.



Lilongwe
Sunny

31°

Day	High	Low
Today	31°	15
Tuesday	31°	16
Wednesday	31°	17
Thursday	29°	17:42
Friday	28°	Sunset
Saturday	32°	19
Sunday	32°	19
Monday	32°	19
Tuesday	32°	19

Annex 2 – List of existing ICT4Ag Applications and Services

The here provided list of digital services and applications related to agriculture and rural development is intended to provide an overview on the existing richness and variety in this field. The list is by far not extensive – there are probably hundreds of other services and apps that are being offered in various parts of the world.

The main focus of the list is on Africa and on agriculture-related solutions –there are many more in sectors such as Climate Change, Environment and Water (Management) that deserve further scrutiny as traditional sector boundaries increasingly start to fade. These sectors have also been earlier in adopting geo-spatial and earth-monitoring technologies which are now quickly becoming more affordable and accessible in the so-called ‘Smart-Agriculture’ field – but of which it is just too early to establish whether and how they will serve smallholders.

The solutions that are already in use by GIZ projects in one or more countries are marked in yellow, the ones that are being considered are marked in green.

The list is also a momentary glimpse – technology moves so fast that the solutions and the solution providers of today may be forgotten tomorrow. The Technical Centre for Agricultural and Rural Cooperation (CTA) from Wageningen (Netherlands) is currently working on an online dynamic database which will cover all existing ICT4Ag apps and services worldwide, and which should be launched by mid-2016. <http://www.cta.int/en/>

The proposed apps and services in the list are not ranked or evaluated in terms of quality for different reasons:

- » Depending on setting, purpose and level of expectations, the functionalities and the

performance of an app/service can be perceived as satisfactory in the eye of a particular client, while considered insufficient in the eye of another.

- » The type, range and complexity of the offered solutions varies strongly: some service providers offer complete platforms with multiple functionalities (e.g. Esoko, Manobi, SAP) while others address only one or a few specific issues.
- » The same accounts for pricing: what is being considered as costly by one client, may be ‘worth its price’ for another. Price may also strongly vary over time.
- » The performance and quality of service of a service provider can vary over time – depending on human resources, technological evolutions, state of the surrounding infrastructure etc.
- » Many apps and services are only being offered in a specific country or region, their performance is not relevant for other geographic areas.

It is recommended that GIZ projects interested in certain applications and services contact current users and try and find out what their opinion is about the performance or the quality of the specific service. However, a number of indicators can be also used to evaluate whether an application or service is worth the try:

- » Outreach: how many farmers can effectively be reached?
- » Current uptake (number of users) and growth rate?
- » Type of users (if known)?
- » Location and geographic spread/availability (urban, rural, national, regional, etc.)?

- » Accessibility (on what type of devices is the app or service being provided)
- » Affordability (what does the service cost) ?
- » Adaptability: can the app/service easily be modified/localized (and by whom, for what price)?
- » Interface, ease of use?
- » Offered support: training (materials), online/ phone help-desk, debugging?
- » Quality and provenance of content (if applicable)?
- » Stability (bugs, 'downtime')?
- » Pricing model (free, subscription, pay per message etc.)?
- » Financial sustainability: how solid is the underlying business model (if any)?
- » Data storage (if applicable): 'cloud-storage' can still be problematic in some developing countries
- » Variety of supported platforms: web, Java, Android, Apple, Windows etc.?
- » Technological continuity (is the app being further developed, supported, how 'solid' is the owner)?
- » Current language(s) and facility of translation into other languages?
- » Possibility of interactivity?
- » Is the service provider open to partnerships?



1. Extension Services, Productivity, Learning, Capacity Development

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Access Agriculture	Access Agriculture	Online Training videos in multiple languages	Global	http://www.accessagriculture.org/	muchina@accessagriculture.org florent@accessagriculture.org	In collaboration with Digisoft Education, accessagriculture now also proposes a small portable and solarpowered projection unit (DCS smart projector) which can be used for video projections in non-connected rural areas. See: https://vimeo.com/154777076
AfricaRice	RiceAdvice	Decision support app for rice farmers regarding increase of yield or reduction of inputs	Global	https://www.riceadvice.info/en/	k.saito@cgiar.org	RiceAdvise has to be calibrated per region during 1-2 crop seasons - solution is not very apt for regions with unpredictable climatic circumstances. The business model for this app is not yet fully worked out - rice mills should be the purchasers, extension workers the users. Input companies (seeds, fertilizers, pesticides) could be subsidizers.
IRRI	Rice Knowledge Bank	A digital extension service that provides practical knowledge solutions, specialized for (rice) small-scale farmers in developing countries.	Global	http://www.knowledgebank.irri.org/		RKB showcases rice production techniques, agricultural technologies, and best farming practices based on IRRI's pool of knowledge from research findings, learning and media resources, and in-country projects.
SAWBO Scientific Animations Without Borders	SAWBO	Mobile app with instructional animations	Global	http://sawbo-illinois4.org/		
The organic Farmer	The organic Farmer	Multimedia agro content (radio, online, etc)	Global	http://theorganicfarmer.org/		

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Toto Agriculture	Toto	Online dashboard - database of databases (agric content, weather, prices, ...)	Global	http://www.totoagriculture.org	Prof. Phil Parker	The concept of Toto Agriculture - a dashboard to a huge number of agricultural databases, knowledge repositories and geo-datasystems as well as a gateway to different dissemination systems - is quite good. Its weaknesses are its outmoded interface which limits its useability, its under-representation of local datasources, and the absence of a business model which would make the system sustainable.
WeFarm	WeFarm	Peer to peer learning	Global	http://wefarm.org/		
FARA	e.Rails	Online Community of Practice	Global	http://www.erails.net/		The strength of the eRails network is its proximity to farmers and farmers' organisations. Its online platforms however are not all regularly updated.
Rural Universe Network	RuN	Rural Universe Network (RUNetwork) started in 2000 in Uganda and is currently covering most of Sub- Saharan countries, Jamaica and Iran. The main goal is to give farmers a voice and to strengthen the dialogue between the farming community and science.	Global	http://www.runetwork.org/html/en/index.html	marc.bernard@ble.de	One of the innovative features of RUN is the voucher system, which drives an information exchange service between farmers and researchers. Farmers receive answers to their problems through face-to-face visitation by field officers using images, and text. The process is also facilitated by access to mobile phones by the farmers to reach the officers.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
FAO-Virtual Extension and Research Communication Network	VERCON	VERCON aims to harness the potential of the Internet and apply it to strengthening and enabling linkages among the research and extension components of the national agricultural knowledge and information system.	Global	http://km.fao.org/vercon/		VERCON is a global initiative by FAO since 2000. Its overall goal is to improve the agricultural advisory services provided to farmers and in particular to resource poor farmers through strengthened research-extension linkages.
Farm Radio International	FRI	Radio scripts, interactive radio content related to agriculture	Global	http://www.farmradio.org/		Farm Radio has evolved from proposing radio scripts to supporting and piloting interactive community radio programmes on agricultural production.
Agrifone	Agrifone	AgriFone is a “mobile-phone” based closed box “procurement chain” solution /platform for Agribusiness and farmers. AgriFone is a voice-based advisory solution that allows for peer-to-peer, on-demand, and community-driven exchange through the entire Agribusiness value chain.	Global			AgriFone is a social platform using mobile phones to help farmers easily interact with each other, share information, get help, seek information, sell produce, etc. Farmers can post voice messages to appropriate local social groups, and review voice messages posted by others. Not clear whether the service is still provided.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
CABI	Plantwise	Pest mgt advise	Global	http://www.plantwise.org/	plantwise@cabi.org	Plantwise is a global programme which helps farmers lose less of what they grow. Working with countries CABI establishes and supports networks of plant clinics run by trained plant doctors, where farmers can find practical plant health advice, and backs this up with a knowledge bank of plant health resources.
WOCAT (World Overview of Conservation Approaches and Technologies)	WOCAT Knowledge base	Information and training video repository	Global	https://www.wocat.net/en/knowledge-base.html		
Microsoft	Nokia Life Tools	Agric advise	Nigeria, India, Indonesia, Pakistan, China			NLT has reached over 100 million people since 2009, but hard data on impact and satisfaction are difficult to obtain. The willingness of farmers to pay the monthly subscription rate for the content via NLT may be a good indicator to assess its perceived usefulness.
Agri Pro Focus	AgriProFocus	Community of practice	Africa, Indonesia	http://agriprofocus.com/intro	info@agriprofocus.com	Agriprofocus's strength lies primarily in its physical local networks - the virtual platform is a good support for knowledge sharing and for teaming of resources.
Africa Soil Info Service	EthioSIS, NiSIS, GhaSIS	Soil, soil fertility	Ethiopia, Ghana, Nigeria			Large public Soil Information Systems which can provide geo- and other related data.
HNI/Airtel	3, 2, 1	IVR national on- demand public information service platform for mobile phone	Kenya, Malawi, Zambia, Ghana, Nigeria, Madagas- car	http://hni.org/what-we-do/3-2-1-service/		The 3-2-1 service is not dedicated to agriculture only, its' content differs from country to country. It is unclear whether the proposed content really matches the needs of farmers.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
ATA (Agricultural Transformation Agency)	80-28 hotline	IVR-based agronomic advice and info hotline	Ethiopia	http://www.ata.gov.et/highlighted-deliverables/8028-agricultural-hotline/	info@ata.gov.et	According to ATA, the hotline received more than 7.5 million calls since its' start mid 2014. User satisfaction data are not available.
AhadooTec	M4DA	e-extension platform for extension workers, Android	Ethiopia		info@ahadootec.com	Ahadootec is a startup company, capable of working on 'a la carte' solutions next to its' current products
AhadooTec	Fidel	Web and mobile learning platform, Android	Ethiopia	http://www.fidel.et/	info@ahadootec.com	
Digital Green	Digital Green	Extension content via multimedia and video by/for farmers	Ethiopia, Kenya, Ghana, India, Niger, Afghanistan	http://www.digitalgreen.org	http://www.digitalgreen.org/contact/	DG has built a good reputation with its' farmer-led video-creation methodology. Overall, image-supported farmer-to-farmer learning seems to be a successful approach, leading to faster and more sustained behavioural changes than traditional extension.
IC volunteers	e-TIC Agriguide	Guide on ICT and organic farming	Senegal, West-Africa	http://www.e-tic.net/		The guide is a useful tool for farmers who want to go organic. It is unclear whether the initiative is still ongoing.
IIT Kanpur	Agropedia	Agric community knowledge portal	India	http://agropedia.iitk.ac.in		
Jayalaxmi Agro Tech	Jayalaxmi Agro Tech	Agro-advisory apps, decision support	India	http://www.jayalaxmiagrotech.com/		

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Grameen Intel	Ankur	Ankur is a seed selection and recommendation application.	India	http://www.grameen-intel.com/products/ankur/		This application analyses the season and farmer's land condition and prescribes the best seed. It offers knowledge based and customized information to the farmers on crop, soil type and season based seed selection, recommended practices for seed preparation and planting, local sources of recommended seeds offering competitive prices, enabling ease of selection and procurement of quality seeds from reliable sources.
Grameen Intel	Protikār	Protikār is a crop software for managing plant diseases, weeds and pest organisms that damage agricultural crops.	India	http://www.grameen-intel.com/products/protikar/		Protikār provides crop protection recommendation from harmful insects and numerous diseases that afflict crops. It provides curative measures to prevent crop losses from herbicides, insecticides and fungicides. It offers customized information to the farmers on measures to avoid plant diseases, specific pesticides recommendations, quantities, dosage and application procedure, pesticides available at local sources, selection of pesticides from reliable sources.
Reuters Market Light Information Services	MyRML	Price, weather, news, advisory services via mobile (SMS, WAP, Android)	India	http://www.myrml.in/	enterprise@ rmlglobal.com	Available for android smart phones and feature phones, the application is also available through WAP on Java phones. Option of 9 languages, 450 crop varieties, 1300 markets and 3500 weather locations.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
AGRISNet	AGRISNet	AGRISNET is one of the initiatives by the Indian Government to provide improved services to farming communities through the use of ICT for farming.	India	http://agrisnetodisha.ori.nic.in/		Web-based provision of information to farmers on inputs (quantity and its supply chain, government schemes in Odisha, recommendations based on soil test results), and updates on latest technology for improved productivity.
CABI	Direct2farm	Mobile-enabled agriculture infomediary service	India	http://www.cabi.org/projects/project/32881	s.banerjee@cabi.org	
CABI	mKISAN	Mobile-based agric services	India	http://www.cabi.org/projects/project/33029	s.banerjee@cabi.org	CABI (Centre for Agriculture and Biosciences International) is an international not-for-profit organization that improves people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment.
CABI	mFarmer	Phone-based agricultural information, advice and support	Kenya	http://www.cabi.org/projects/project/33024	l.karanja@cabi.org	CABI (Centre for Agriculture and Biosciences International) is an international not-for-profit organization that improves people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
FIT Resources	Agricultural Information through ICT and Media	FIT supports the development of a commercially sustainable ICT led interactive media framework that targets and responds to business and market access issues of smallholder farmers among Kenya's rural farming communities.	Kenya	http://www.fitresources.org/?portfolio=agricultural-information-through-ict-and-media	info@fitresources.org	Services Provided by FIT: • Training of production staff of the stations, • Training and linking radio station staff to advertisers, • Backstopping and technical advise • Support in the development of content for the weekly programmes and marketing.
FIT Resources	Business Development in Agriculture information.	FIT enhances media broadcasting organisations to deliver business development information through various channels like Internet and WAP (feature phones) next to broadcasting.	Kenya	http://www.fitresources.org/?portfolio=availing-business-development-content-to-msmes	info@fitresources.org	FIT worked with a number of vernacular stations to develop their capacity to provide Business Development Services to their audience, especially those in the Agricultural Value Chains, over various platforms.
Mediae.org	iShamba	Mobile SMS, video, call centre, radio, television.	Kenya	http://www.shambashapeup.com/ishamba	shambashapeup@mediae.org	Mediae.org is an organisation dedicated to improving the livelihoods of large audiences in Africa through the development of educative, entertaining and effective media. It uses radio, television, social media and mobile phone in different setups.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
NAFIS	NAFIS	The National Farmers Information Service (NAFIS) is a voice information service intended to serve farmers in Kiswahili, especially in rural areas where Internet access is limited.	Kenya	http://www.nafis.go.ke/		Farmers can receive and exchange timely news and information on agriculture, weather patterns and related issues via their mobile phones. No extra costs on top of the normal phone fee. Field officers update the system via the web and the info is automatically put on the IVR (interactive voice response) via a Text-to-Speech engine in both Kiswahili and English.
Literacy Bridge	Talking Book	Audio content via audio device	Ghana	http://www.literacybridge.org/talking-book/	info@literacybridge.org	"The talking book is a low-cost audio computer designed for the learning needs of illiterate populations. Simple and actionable instructional messages are stored on the device, can be played and repeated and interactive audio quizzes can be incorporated. The main weakness of the system is that it works on specific hardware which may not be available and/or repairable anywhere.
GAINS Online	GAINS Online	The Ghana Agricultural Information Network System (GAINS) was established in 1991 to revitalize the library and information system in the agricultural sector of the economy.	Ghana	http://www.gains.org.gh/		GAINS acts as the point of referral for information requests and coordinates activities of 18 libraries and information centers of agriculture-related research institutes and faculties of agriculture of the universities in Ghana.
Savannah Young farmers Network	SavaNet	Agricultural extension community of practice	Ghana	http://savanet-ghana.blogspot.nl/	info@savsign.org savsign@gmail.com	Savana Signatures is a Ghanaian ICT4D NGO, offering different services in Northern Ghana.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Ojovoz	Ojovoz	A mobile app specifically designed with underrepresented and marginalized communities with a simple-to-use interface that allows users to take photographs and record audio.	Tanzania	http://ojovoz.net/en/index.htm	ojovoz@sautiyawakulima.net	OjoVoz is being used in the Sauti ya wakulima project, created by rural farmers in Bagamoyo, Tanzania. Not clear whether it is still functional.
Kulima	Kulima	The Kulima application features an agricultural library with information on both organic and non-organic farming techniques, across different value chains.	Zambia, Ethiopia, Togo, Burkina Faso, Cameroon	http://kulima.com/		The content database describes Best Agricultural Practices and Critical Activities for production and post-harvest handling, information on common pests and diseases and strategies to combat them, and recommendations based on local knowledge and traditional agricultural practices.
ICT4Dev.ci	Lor Bouor	Web portal on agriculture, good practices, innovations and ICT for agriculture in Ivory Coast.	Ivory Coast	http://lorbouor.org/	info@ict4dev.ci	ICT4Dev.ci is an ivorian start-up dedicated to agriculture, focusing on young farmers.
Zambia National Farmer Union	ZNFU e-extension	Menu based mobile platform (USSD) with extension advise, market prices, weather info and agric stakeholder contacts	Zambia		extension@znfu.org.zm	A small fee is asked for registration, further interactions are charged according to normal mobile tariffs for USSD.



2. Market Price Systems, Commodity Exchange, Trading

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Orange-Mali	Senekela	Market prices and advisory via USSD, SMS and call-centre	Mali		fatoumata.doucoure@orangemali.com	Beginning 2016, market prices are limited to two regions in Mali, and the number of callers is not impressive yet. But the call-centre element may allow Orange-Mali to easily extend the content of its farmer-oriented service and attract more customers.
Afrique Verte	SIMAgri	Market prices, stock and offer&demand via Web and SMS	Burkina Faso, Mali	www.simagri.net	afrique.verte@gmail.com	The particularity of the SIMAgri platform is that it allows producer and trader organizations (maize, rice, sesame, shea, cattle) to use it as an internal communication and management tool, while its' owner Afrique Verte also uses it to disseminate information on market prices and stocks (web, SMS) and to bring together offer and demand. Its strength is that it is trusted by the main value chain actors.
FAO Food Price Monitoring and Analysis tool	FPMA	FAO Price Tool is a database that currently includes over 1000 monthly domestic retail and/or wholesale price series of major foods consumed in 78 countries and 11 international cereal export price series, covering a total of 20 different food commodity categories.	Global	http://www.fao.org/gIEWS/pricetool/		The tool allows the analysis of different data series both in nominal and real terms, and for the conversion of quotations from national currencies to US dollars and/or to a common unit of measure (kg or tonnes), as well as comparisons of domestic and international price trends. The first version of the GIEWS Food Price Data and Analysis Tool was released in March 2009.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
RONGEAD	N'Kalo	Market information and advisory via mobile	Mali, Burkina, IC, Tchad, Gambia, Senegal, Cameroon	http://www.nkalo.com	jgonnet@rongead.org	RONGEAD has had good results in the cashew sector in Cameroon, where its' market price analyses and forecasts helped smallholders to gain up to 10% more on their products. RONGEAD currently provides qualitative market price analyses over a series of crops.
Orange-Niger	Labaroun Kassoua	Market prices and advisory via USSD, SMS	Niger			The service has been functional for 5 years - not clear whether it reaches its target group.
Agricultural Commodity Exchange Africa	ACE	The Agricultural Commodity Exchange for Africa (ACE) is a project that facilitates trade in agricultural commodities with the objective of including the small-scale agricultural sector in national, regional and international markets.	Malawi - South-East-Africa	http://www.aceafrica.org/default.aspx	ace@aceafrica.org	ACE promotes structured trade components such as warehouse receipts system, electronic trade and market information dissemination technologies. It gives small-scale farmers leverage in negotiating for their crops by providing farmers with reliable market information, both pre- and post-harvest, and ensures higher prices for higher quality. It is run from Malawi since 2006 but has users in South Africa, Zimbabwe, Tanzania, Kenya and Zambia.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
esoko	Marketplace	Market price and commodity exchange platform	Kenya, Malawi, Rwanda, Ghana, Nigeria, Cameroon, Benin, Burkina	http://www.esoko.com		Esoko is one of the oldest private companies proposing its' technologically advanced platforms and services related to markets, trade and prices to an increasing range of countries in Africa. More oriented on large traders and companies, the platform may be less interesting for smallholders. There is an annual individual membership priced at US\$35*(10 SMS alerts per week); a small business membership at US\$250* (users can market their goods via personalized pages). Full membership costs US\$1,500* (*data from 2009).
Livestock Information Network Knowledge System (LINKS)	LINKS	Market info on Livestock	Tanzania, Kenya, Ethiopia	http://www.lmistz.net/Pages/Public/About.aspx	ps@mit.go.tz	Livestock prices and volumes are collected through interviews with traders during the peak of a market day. A trained livestock market monitor collects data on five cases of each of the dominant animal breed, class and grade combination on that market day. Average price by animal kind, breed, class and grade is then calculated along with the total volumes of livestock by animal kind. The data is coded and sent into the database system using SMS email or posted directly on the web into the database system. It is not clear whether the system is still operational.
Hydroponics Kenya	M-fodder	Market info (fodder)	Kenya			

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Agrilife limited	Agrilife	Value chain linkage	Kenya	http://www.agrilife.co.ke/the-agrilife-solution	info@agrillife.co.ke	
Grameen Foundation	e-warehouse	Market information, financing	Kenya	http://www.grameenfoundation.org/what-we-do/financial-services/agricultural-finance		
Kenya Agricultural Commodity Exchange	MILS	SMS, IVR, radio market linkage system and trading platform	Kenya			
M-Farm	M-Farm	Mobile market prices and group sales linkage platform	Kenya	https://mfarm.co.ke/	info@mfarm.co.ke	Mfarm is a Kenyan agri-service provider which provides market prices via mobile phone on approximately 50 products in 5 major Kenyan markets. The application also facilitates group sellings.
mLouma	mLouma	mLouma is a web and mobile service which connects farmers to food purchasers by displaying real-time market prices and localizations. The solution is based on Web, SMS, APP and USSD.	Senegal	https://www.mlouma.com	contact@mlouma.com	mLouma allows farmers to collect their produce and also gives them information on the market in real time. mLouma has positioned itself as a regulator between producers and buyers of agricultural products.
Grameen Intel	Vistar	Vistār is a software application that helps farmers to get direct access to market or buyer information so that they can sell their crops at an optimum price.	India	http://www.grameen-intel.com/products/vistar/		Vistār offers market information to the farmers on: - improving buying and selling service by offering crops to potential buyers at the beginning the season - centralizing bids and offers. Farmers can contact buyers directly through SMS or email.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
AMITSA	AfricaFertilizer	National and international inputs information and prices online and via mobile.	Africa	http://africafertilizer.org		The web- and mobile phone-based AMITSA system utilizes both private and public sector agro-input stakeholders to collect and process market data and information, such as the prevailing wholesale prices of the most common fertilizers, seeds and CPPs.
Infotrade Uganda	AGMIS	AGMIS is an on-line platform built to integrate collection, analysis and dissemination of agricultural and other market information in Uganda.	Uganda	http://www.infotradeuganda.com/	infotrade@fituganda.com	This platform is also used by field officers to carry out on spot data entry from wherever they are allowing you to access real time data the moment it is added.
Agrinet	Agrinet	AgriNet offers web-based and SMS Market Information and Transaction Security Services, market linkage solutions and services for agribusiness value chain actors including smallholder farmers, traders, and large-scale process and exporters.	Uganda	http://www.agrinetug.net/	admin@agrinetug.net	Agrinets products and service include agricultural market intelligence, transaction security service, product marketing, agro-processing and value addition.
PanAfrican Exchange	PANEX	Web-based platform that improves mobility in trading	Africa	http://panexchange.com/		

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
APPOSIT	ECX - Ethiopia Commodity Exchange	Africa's first market data dissemination system using multiple communication channels such as short message services (SMS), interactive voice response (IVR), fax and email	Ethiopia	http://www.apposit.com/clients.html	info@apposit.com	
AGMarknet	AGMarkNet	AGMARKNET is an agricultural marketing information system network initiated by the Union Ministry of Agriculture in India.	India	http://agmarknet.dac.gov.in/		Launched in 2000 as a web-based service that aims at empowering farming community with market information. It helps improve information access and advisory services. It links over two thousand important agricultural markets all over India and a large number of commodities.
Farming &Technology for Africa Group	Rural e-Market	eMarket is a web based market information system for laptop, tablet or smartphone	Madagascar	http://rural-emarket.com/		The software has been developed and tested, but it is unclear whether the system is operational. A minus point is that it demands web connectivity.



3. Value Chain/Farm/Herd Management

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Yam Pukri	Agrico	Farm organisation/ cooperative mgt system	Burkina Faso	http://www.faso-dev.net/Agrico-progiciel-de-gestion.html	sylvestre.ouedraogo@gmail.com	This software was developed in collaboration with small farmer organisations and cooperatives. It covers the basic management functionalities of a farmer organisation: membership, production, stocks and sales.
Cojengo	VetAfrica	Herd mgt, disease monitoring for Windowsphone	Ethiopia, Kenya	http://www.cojengo.com/2014/06/flagship-app-vetafrica-available-online/	contact@cojengo.com	
FarmERP	FarmERP	Farm mgt system	India	http://farmerp.com/it-in-agri.html	info@shivrai.co.in	
Food Traceability India	Farmsoft	Farm mgt and traceability system	India	http://www.farmsoft.com/fresh-produce-software/fresh-produce-traceability-india/		
Green Dreams Tech Ltd	iCow Soko	Cow/poultry mgt	Kenya	http://www.icow.co.ke/		This mobile application allows registered livestock farmers to get text messages about the breeding, nutrition, milk production efficiency and other best dairy practices through periodic SMS messages. It has been off the air since the end of 2015, but hopes to get back on track by mid-2016.
Octagon Data Systems Ltd	EasyWay ERP	Dairy, Tea farm mgt	Kenya	http://www.octagon.co.ke/home/		

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Sokopepe	FARMIS	Farm Records Management Information System (FARMIS) is a farm management and diagnostic tool based on the use of farm records. It was developed for use by diverse stakeholders in the agriculture sector, aimed at identifying productivity trends, profitability of different farm enterprises and producing evidence for use in decision making at the farm, County and National levels.	Kenya	http://www.sokopepe.co.ke/		Sokopepe is a social enterprise supporting the agricultural sector by offering market information and farm records management services. Farmis is based on the idea that with farm records, a farmer or other stakeholders can have access to various reports which highlight husbandry practices, market trends, weather conditions and on-farm challenges. It can be used in risk assessment, insurance, extension and access to finance.
Sokopepe	Soko+	A digital commodity trading and information system, linking small scale farmers to end retailers/ bulk purchasers of produce.	Kenya	http://www.farmis.co.ke/		Soko+ is designed to address transactions and extension needs along the entire value chain - from farm inputs to the buyer of the final products - thus enhancing the space of the farmer, by-passing the numerous brokers between the farmer and end consumer. The net effect is that farmers through commodity aggregation can have more power in price negotiation, bulk discounting of inputs and further reach into desirable markets.
Tabreimas	Tabreimas	Mobile retail mgt	Zambia, Kenya, Malawi	http://www.tabreimas.com/		

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
mFarms	mFarms	Web, SMS, IVR, USSD communication platform for value chain stakeholders	Ghana	http://www.imagead.net	Tel: 233302432546	
mFarms	MIPAD	Communication platform for agro-input supply chain actors	Ghana	http://www.imagead.net	Tel: 233302432546	
Syngenta Foundation	FarmForce	Farmforce is a web /mobile application that is used to manage outgrower schemes and large farmers remotely. The system captures data from remote sites (off/online). Technical/agronomy teams are able to monitor the farmers performance and crop growth remotely, capture pesticides, fertilizers and seeds info and compliance online.	Ghana, ...	http://www.farmforce.com/	info@farmforce.com	The Farmforce solution is a typical product for outgrower schemes involving smallholders - and the data generated by the system may be useful for enhancing the financial credibility of participating farmers. Its large uptake will depend on its price and the strength of its underlying business model.
SAP	Rural Sourcing Mgt	Mobile-enabled product mgt platform, market prices	Ghana, Uganda, Ethiopia, Ivory Coast		carsten.friedland@sap.com	The software is in the pre-commercial phase, will probably be launched commercially in 2016. Pricing model not known yet, but it will probably be the exporting company and/or other private stakeholders who will need to pay for the system. The collected data from the farmers provide opportunities for integration of financing and insuring bodies as well as input suppliers in the business model.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Manobi	Magri: T2M, GIS, Fresh Food Trace	Traceability, plot measurement, product tracking, Market information	Senegal, Burkina, Benin, Mali, Ivory Coast, Niger	http://www2.manobi.com	daniel.annerose@manobi.net	Manobi offers a wide set of tools related to agric information: market information systems, standards, guides for good practices; trade assistance: exploitation management, graphs and plots, resources management; supply chain management: directories of suppliers, access to loans, analyses and controls, expertise; marketing: invitations to tender, negotiations, transactions; and communication: messaging, forum and alarms. Despite its advanced technology, reactions from users are mixed: content and technical support are sometimes below expectations.
Infotrade Uganda	FARMIS	FARMIS [Farmer Record Management System] is an online application that provides farmers with tools to carry out production data management for better planning.	Uganda	http://www.infotradeuganda.com/index.php/products/farmis.html	infotrade@fituganda.com	FARMIS includes improved automated record keeping, current Market Information, Access to credit services, Access to genuine inputs at affordable prices, Market linkages to buyers and sellers, Promotional services through the radio, Access to relevant farming tips. Pricing Farmer Account- Shs 20,000 /year.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Agrinfo	Agrinfo	Agrinfo is an online database that documents the farmlands ownership in Tanzania. The database records location of the agricultural investment and its related information including ownership, area size, type of investment and expected outputs.	Tanzania	http://agrinfo.co.tz/		Agrinfo's main advantage is the ability to utilize the geo information system to record farmland ownership. The web site is up - but it is not clear how far the system is operational.
APPOSIT/ Technoserve	Coffee Initiative	An IVR and SMS mobile data collection system that is being used by farmers to register in the program and also to record cherry collection volumes, operating costs and wet mill performance indicators	Ethiopia	http://www.apposit.com/clients.html	info@apposit.com	
M-Shamba	M-Shamba	Farm management	Kenya	http://www.mshamba.net/	info@mshamba.net	

 4. Diagnostic and Collaborative Tools, Early Warning, Weather						
Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Agricorner	mAgricorner	The core purpose is to provide actionable information including Market Prices, Weather Forecasts, Farm Advisory, Government Policy news, Trade information, insurance plans directly on farming and associated communities' smart phone.	Pakistan	http://www.agricorner.com/magricorner-mobile-app/		Not clear whether the app is actually providing actionable content.
PestNet	PestNet	PestNet is an email network that helps people worldwide obtain rapid advice and information on crop protection, including the identification and management of plant pests.	Global			PestNetwelcomes anyone interested in crop protection anywhere in the world. It's free to members. Illustrated fact sheets on major pests and pathogens of Fiji, Samoa, Solomon Islands and Tonga (but useful globally), the damage they cause, their biology and life histories and management. It can be downloaded free from Google Play Store, and Apple App store.
PEAT	Plantix	Plant disease diagnostic tool	Mali, ...	http://peat.technology/	simone@peat.ai	
Toto Agriculture	Toto	Toto can provide access to weather forecasts	Global	http://www.totoagriculture.org		

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Ibihingwa_ diseases	Ibihingwa_ diseases	A windows phone 8.0 app which deals with plant diseases.	Global	https://www.microsoft.com/en-us/store/apps/ibihingwa-diseases/9wzdnrd2ffq		This app gives information by means of images on how to protect and prevent plant diseases, on each image you get the full description of what the disease is and what to do in order to address the problem. This app is easy to use because of its straight forward information about plant diseases.
eLeaf	PiMapping®	PiMapping uses remote sensing data as input to tools like SEBAL and ET Tool which can deliver actionable information for farmers.	Global	http://www.eleaf.com/news#technology-pimapping	info@eleaf.com	As input, the PiMapping® Technology uses different types of data sources from different information providers - satellite imagery, weather information (e.g. wind, temperature, humidity) and precipitation data. The technology is able to make a pixel intelligent ('smart pixel'). These smart pixels enable application developers to make applications that are very useful to different end users, e.g. the agricultural sector.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Grameen Intel	Mrittika	Mrittikā is a soil nutrient analysis and recommendation software that offers soil testing services to farmers and analysis of results to recommend fertilizer for achieving cost effective and optimum productivity.	India	http://www.grameen-intel.com/products/mrittika/		Mrittika offers knowledge based and customized information to the farmers on required nutrients based on specific crops and current state of the soil, specific fertilizer types, quantity, dosage and application procedure, local sources of fertilizers offering competitive prices, bringing expert advisory services of crop and soil based nutrient selection to the doorstep of the farmers.
Mobile Assay	Lab-on-Mobile Device platform	Mobile aflatoxin diagnostic tool	Kenya	http://mobileassay.com/tag/kenya		
PACA (Partnership for aflatoxin control Africa)	PACA	Community of practice	Africa	http://www.aflatoxinpartnership.org/	paca@africa-union.org	
Hello Tractor	Hello Tractor	SMS-based tractor rental service - a cloud-based booking system allows farmers to request, schedule and prepay for tractor services, from nearby Smart Tractor owners, through SMS messaging and mobile money.	Nigeria	http://www.hellotractor.com/		HelloTractor designed a low-cost "Smart Tractor" specifically for small farmers needs. Equipped with a GPS antenna (a.o.) the tractor's usage can be tracked, and data on location, market trends, and uptake can be gathered.


 5. Finance, Payments, Insurance

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Orange	Orange Money	Mobile money transfer	13 countries			Cheap money transfer system, operational in 13 countries. On the longer term, it may allow transnational transfers.
Orange	MicroCred	Mobile Microcredit	Madagascar, Mali, Niger, Ivory Coast, Senegal			
Eko India	Eko	Cash mgt, microfinance & payment	India	http://eko.co.in/		
Ensibuuko	Ensibuuko	Mobile and web application that integrates SMS and mobile money services to enable saving and credit associations (and other financing organisations) to handle savings and make loans to smallholder farmers.	Uganda	http://ensibuuko.com/	info@ensibuuko.com	Ensibuuko was established in 2012 as a farmer centric social enterprise before pivoting into a Tech social enterprise building digital finance solutions to address the exclusions of Uganda's poor from financial services. The Ensibuuko system allows farmers to register and apply for loans using SMS, and save, receive and repay loans using mobile money.
Kifiya	Kifiya m-VAS	Voucher system for food aid	Ethiopia	http://enclidesolutions.com/engagements/kifiya-financial-technology-plc/		
FarmDrive	Farmdrive	FarmDrive expands access to credit to underserved smallholder farmers by providing modern tech-driven credit assessment tools.	Kenya	http://farmdrive.co.ke/	info@farmdrive.co.ke	

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Kilimo Salama	Kilimo Salama	Insurance service for farm inputs against drought and excess rain.	Kenya	https://kilimosalama.wordpress.com/		The project, a partnership between Syngenta Foundation for Sustainable Agriculture, UAP Insurance, and telecoms operator Safaricom, offers farmers who plant on as little as one acre insurance policies to shield them from significant financial losses when drought or excess rain are expected to wreak. A mobile application is installed on managed phones and distributed to the stockists contracted. Each stockist pays a deposit for such a managed phone. Kilimo Salama was released in 2009.
Tangaza Pesa	Tangaza Pesa	Mobile money transfer	Kenya	https://www.facebook.com/Tangaza-Pesa-Page-188326444589214/		
Musoni	Musoni	Microfinance	Kenya	http://musoni.co.ke/	info@musoni.co.ke	
Mobipay Kenya Limited	Agrilife	Cloud-based technology platform designed to use mobile phone and web platforms to enable groups of smallholder farmers to access financial services, markets and other services	Kenya, Uganda, Zimbabwe	http://www.agrilife.co.ke/	info@agrilife.co.ke	Agrilife enables players in the agricultural sector – including banks, micro-finance institutions, insurance companies, cooperatives, investors, and agricultural input providers – to have access to data about farmers’ financial and physical supply chain. This enables farmers’ credentials to be established, minimises risk and gives the farmer easier access to affordable credit. Farmers are able to use the technology to make requests from their mobile phones/web platforms. Mobipay, on signing up service providers, agrees on a commission, which is transaction based, enabling Agrilife to be sustainable. So far, Agrilife has turned over US\$18 million.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
ScopeInsight	ScopeInsight	Virtual assessment of the financial credibility of farmers' organizations - delivers a rating and concrete recommendations for improvement to organizations.	Kenya	http://www.scopeinsight.com/	info@scopeinsight.com	This Dutch company has local offices in Kenya, but has been doing over 500 assessments in a large number of countries since 2013. The tool is currently mainly web-based, but should become available as a mobile app during 2016.
Grameen	Mpesa	Mobile money transfer	Kenya			M-PESA is an innovative mobile transfer solution that enables customers to transfer money. Even though the app is designed for the general public, local farmers use the application to facilitate transactions related to their farm activities from production through marketing. The app was developed and launched in Kenya as a partnership between Safaricom and Vodafone in 2003.
Juhudi Kilimo	Juhudi Kilimo	Provides asset based loans and basic business and finance training to smallholder farmers	Kenya	http://juhudikilimo.com/		
Umati Capital	Umati Capital	Financing, mobile money transfer	Kenya	http://www.umaticapital.com/		
Zoona	Zoona	Zoona's eVoucher platform provides organisations and govt agencies with a method to send Easy Quick Safe bulk payments for specific purposes, including fertiliser and seed subsidies, short-term savings for farmers, and in-kind donations such as food or other agricultural inputs.	Zambia, Malawi, Zimbabwe and Mozambique	http://www.ilovezoona.com/	info@ilovezoona.com	Zoona is a social enterprise that helps micro and small enterprises grow by enabling Easy Quick Safe payments and financing in emerging markets. eVouchers can be delivered via SMS or scratchcards, and are managed through Zoona's online administration site. The service is currently used by partners in Malawi, Mozambique, Zambia and Zimbabwe.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Zambia National Farmers Union	MIS	Mobile lay-away system (prepaid eCard for inputs)	Zambia		extension@znfu.org.zm	
myAgro	myAgro	Mobile lay-away system, extension advice	Mali, Senegal	http://www.myagro.org/	admin@myagro.org	Beginning 2016, MyAgro is reaching approximately 40.000 smallholders in Mali and 12.000 in Senegal. It helps farmers to gradually and easily save a fixed amount for qualitative inputs - thus improving the farmers' yield and income.
Vestfarm ltd	FinSP	Vestfarm specialises in implementing financial business solutions in the agriculture, financial services, and payment industries. Vestfarm has re-engineered the FinSP platform and is currently used effectively in the agricultural environment for grant, credit and transaction management of smallholder farmers through a controlled spend or closed-loop interface via cards or SMS.	Tanzania, Zambia, South-Africa	https://vestfarm.wordpress.com/	info@vestfarm.com	In the agricultural environment the FinSP platform is implemented to manage and control spending of credit and grants by smallholder farmers through a closed-loop payment system. Vestfarm uses the platform to aggregate smallholder farmers through various Farming Organisations. In turn the closed-loop eco system allows smallholders to purchase inputs from preferred suppliers at preferential prices. Suppliers and smallholder farmers are loaded onto the FinSP platform and an individual account is opened and allocated to each farmer. Farmers make use of either cards or SMS services to facilitate transactions.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
EARS	FESA Microinsurance	FESA Microinsurance is a Meteosat based drought and excessive precipitation index insurance system	Senegal, Mali, Burkina Faso, Benin, Kenya, Tanzania, Rwanda, Uganda, Malawi, Mozambique, Botswana	http://ears.nl/fesa.php?lang=en	Andries Rosema	The main challenges that crop insurance in Africa has been facing are related to scale and costs. Low costs are considered mandatory and would be enabled by using index insurance. But throughout Africa index insurance has been frustrated by lack of data. EARS, specialized in satellite data for climate, water and food, has processed 32 years of Meteosat data to evaporation and precipitation data fields that cover the entire African continent at 3 km resolution. Based on these data, EARS designs index insurance solutions for any location in Africa.

 6. Data Collection, GIS, Field Survey, M&E						
Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
AKVO	Akvo Flow	Android-based field survey tool/training	Global	http://www.akvo.org		AKVO is operating in a growing number of countries. Its' Android-based data collection tools are easy to use, and AKVO provides training if necessary. In areas which are not 3G-covered, data need to be stored on the device and synchronized later on. Pricing is to be negotiated.
KoboToolbox	Kobocollect	Toolbox contains Forms Builder, Datacollect and Data analytics	Global	http://www.kobotoolbox.org/tags/kobocollect		Kobocollect was primarily developed for humanitarian interventions, and designed for field data collection for use in challenging environments. The software is free and open source. Most of its users are people working in humanitarian crises, as well as aid professionals and researchers in developing countries.
OpendataKit	OdK	Mobile survey tool	Global	https://opendatakit.org/	contact@opendatakit.org	Open Data Kit (ODK) is a free and open-source set of tools, which help organizations author, field, and manage mobile data collection solutions. It helps build data collection forms or survey protocols, collect the data on a mobile device and send it to a server, and aggregate the collected data on a server and extract it in useful formats. ODK is an android-based tool developed at the University of Washington in 2008.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
EpiCollect	EpiCollect	EpiCollect is a generic data collection tool that allows you to collect and submit geotagged data forms (along with photos) to a central project website (hosted using Google's AppEngine) from suitable mobile phones (Android or iPhone).	Global	http://www.epicollect.net/		
Zerion software	iFormBuilder	The iFormBuilder mobile platform is a complete out-of-the-box mobile data collection solution. The platform is compatible with the iPhone, iPod touch, or iPad.	Global	https://www.iformbuilder.com/		iFormBuilder helps manage data, forms, and users from any browser. It is a data collection tool capable enough for any sized project. Features include quick turn-around with over-the-air form distribution, real time data upload, and offline data collection (out of service, no wifi). iFormBuilder was released in 2009 in the US but has been used all over the world.
DoForms	DoForms	DoForms is a mobile app for collecting info directly on your smartphone or tablet, and web dashboard for building forms and accessing complete and accurate data back at the office.	Global	http://www.doforms.com/		

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Frontline	Frontline SMS, Frontline Cloud	FrontlineSMS is a free open source software that turns a laptop and a mobile phone into a central communications hub. Fronline Cloud is a subscription-paid, cloud-based version.	Global	http://www.frontlinesms.com/		Frontline (launched in 2005) enables users to send and receive text messages with groups of people through mobile phones. It helps users to create and manage all SMS-related contact groups, view incoming and outgoing message history, collect data via SMS, and export data for easy analysis, run SMS information service using auto-replies. The free version has limitations in terms of total numbers of people it can include in the database.
RapidSMS	RapidSMS	RapidSMS is a toolset for rapidly building SMS (text message) services for data collection, streamlining complex workflows, and group coordination using basic mobile phones.	Global	https://www.rapidsms.org/		RapidSMS is a free and open-source framework for rapidly building mobile services for scale. RapidSMS is built with Python and Django and is designed for building robust, highly customized mobile services with web-based dashboards. RapidSMS provides a flexible platform and modular components for large-scale data collection, managing complex workflows, and automating data analysis.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
MagPi	MagPi	Mobile Information Platform (MIP) is a website where users can enter or import short messages and then have them transmitted automatically to any group of people with mobile phones.	Global	http://home.magpi.com/	info@magpi.com	Farmer cooperatives and small SME use MIP to find out information about prices - supply prices, product prices, the weather, and what's going on in international markets. Being operated from Chile, MIP provides localized agricultural information on topics such as weather updates, crop prices, agriculture innovation techniques, crop illness and alerts on plagues, etc. It was launched in 2003 and is mainly being used in Latin America.
Trac FM	Trac FM	Online software platform serving Radio stations, NGO's and Government bodies with the ability to hold citizen centered interactive Radio polls through a visualization dashboard that creates unique crowd-sourced Feedback Loops.	Global	http://tracfm.org/	info@tracfm.org	
Esoko	Esoko surveying tool	Field survey tool	Africa	http://www.esoko.com		

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Farmerline	Mergdata	Field survey tool - the MERGDATA platform and mobile app enables farmers to receive messages through voice in all local languages and SMS anywhere in the world.	Ghana	http://farmerline.org/	team@farmerline.org	The MERGData platform reduces the cost of communication and data collection for small-scale farmers and organizations working with them. Through the platform, agric workers can send messages such as weather forecast alert, market prices, new farming techniques, agrochemical applications, inputs, and financial tips to small-holder farmers and fishermen.
mFarms	MSurvey	mSurvey is designed to allow projects and organizations to create their own surveys, load onto mobile phone and collect data.	Ghana	https://msurvey.co/		Data can be collected using multiple mobile phones running on android operating system. Compatible with Smartphone and tablets. The application has a back-end system that allows to view collected data, elaborate statistics and export data to Excel, CVS, SPSS, includes a statistics section and allows spatial analysis using Google maps.
Kubatana Trust	FreedomFone	Freedom Fone allows to create two-way phone-based communication services, in any language, at any time and without recourse to internet or other media.	Zimbabwe	http://freedomfone.org/	Brenda Burrell	Freedom Fone is free and open source software that enables to create and share audio content using Interactive Voice Response (IVR), voicemail and SMS. Freedom Fone can be used in any country with mobile network coverage. Audio content can be easily organised in multiple Voice Menus which callers can navigate using their phone keypad.

Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Syecom Ghana Ltd	Syecom	GIS/GPS survey, mapping, soiltesting	Ghana	http://syecom.com/drupal/	Tel: 233 20 144 21 91	
ILRI	N'Gombe Planner	Ng'ombe Planner is a more efficient data collection system for researchers. It relies on the farmers to record their farm production and incidences via their mobile phones and site coordinators to do a follow up of any cases or incidences.	Kenya	http://azizi.ilri.org/ngombeplanner/		Developed by researchers at ILRI, the tool is designed to work with any mobile telephone that the farmer has. It runs on three platforms – Android, Java and on any other mobile phone through the USSD application.
Dimagi	Commcare	Android-based field survey tool	Senegal, Malawi, Zambia, South-Africa, Mozambique, India	http://www.dimagi.com/	info@dimagi.com	The Commcare suite was primarily built for Community Health Workers, but it can also be used by extension workers. Dimagi provides training if necessary. In areas which are not 3G-covered, data need to be stored on the device and synchronized later on. Pricing is to be negotiated.

 7. Farmers' Voice, Lobbying, Advocacy						
Company/ Organisation	Product/ service/tool	Type/description	Availability	Web site	Contact	Remarks
Agchat Foundation	AgChat	Peer-to-peer and exchange platform for farmers	Global	http://agchat.org/	execdir@agchat. org	The AgChat Foundation helps those who produce food, fuel, fiber and feed to tell their stories about agriculture from their point of view. It has a web-based platform with a moderated chat where people with agricultural background can discuss difficult issues, tell their farm stories and identify ways to connect with people outside of agriculture.
Cadre Regional de Concertation des Ruraux (CRCR)	Systeme d'Informa- tions Agricoles (SIA)	Family farm based observatory on food production, for lobby purposes	Mali	http://www.crcr-mali.org/	bkydiarra@yahoo. fr	Datacollection system using paper, Internet and mobile data collection. The data are being shared with the Regional Assembly of Sikasso in order to improve its view and its policies on food security issues.
Ekgaon	OneVilla- geOneWorld Network	Mobile platform encouraging sustainable development of women-self-help- groups (SHGs) and small farmers	India	http://www.ekgaon.com		
Ushahidi	Ushahidi	Crowdsourcing tool, can collect and aggregate data from multiple sources (SMS, Twitter, app, email)	Global	https://www.ushahidi.com/		Ushahidi, was developed to map reports of violence in Kenya after the post-election violence in 2008. But it can be used in many other cases to collect and visualize evidence and data upon which citizens can raise their voice.

Annex 3 – References and Literature

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A very recent must-read report, exploring the internet’s impact on economic growth, on social and economic opportunity, and on the efficiency of public service delivery. It analyzes the factors that have allowed some businesses, people, and governments to benefit greatly from the internet—and others not. And to help countries better leverage the internet for development, it identifies the policy reforms in the information and communication technology sectors, in complementary sectors, and in the development community.

“Why the future is bright for the world’s poorest farmers”, Bill Gates Jan 2016:

https://www.gatesnotes.com/Development/The-Future-of-Farming?WT.mc_id=01_20_2016_20_FutureofFarming_BG-LI_&WT.tsrc=BGLI

Short blog by Bill Gates, explaining his view on the potential of digital technology for poor farmers.

“The Global Information Technology Report 2015, ICTs for Inclusive Growth”, Soumitra Dutta, Thierry Geiger, Bruno Lanvin, World Economic Forum 2015:

http://www3.weforum.org/docs/WEF_Global_IT_Report_2015.pdf

Since 2001, The Global Information Technology Report series published by the World Economic Forum in partnership with Cornell University and INSEAD has measured the drivers of the ICT revolution using the Networked Readiness Index. For each of the 143 economies covered, it allows areas of priority to be identified to more fully leverage ICTs for development.

“Embracing Web 2.0 and social media: A life-changing pathway for agricultural development actors”, Pedrick C., CTA 2015:

<http://publications.cta.int/en/publications/publication/1816/technology-innovation/>

Featuring a range of examples from ACP countries, this booklet includes testimonies on how Web 2.0 and social media have contributed to improved policy dialogue and advocacy in agriculture, to value chain development and to the provision of information services.

“ICTs in linking farmers to markets: Innovative mobile applications and lessons learned from the past and the future”, Y. Mammo, CTA 2015:

<http://publications.cta.int/en/publications/publication/1874/information-communication/>

Mobile phones are more than tools for communicating; farmers consider them as a status symbol in society. Mobile money provides complementary services to farmers in the areas of banking, insurance and microfinance. Farmers need mobile applications that can meet their changing information needs and suit their information seeking behaviour.

“Linking rural farmers to markets using ICTs”, M.M. Magesa, CTA 2015:

<http://publications.cta.int/en/publications/publication/1875/information-communication/>

Access to markets and marketing information by smallholder farmers depending on agriculture in developing countries have always been challenging. Factors such as poor road infrastructure, illiteracy, financial constraints, poor communication means and lack of access to information, all limited their access to markets.

“Horizon Scan: ICT and the Future of Food and Agriculture”, Ericsson 2015:

http://www.ericsson.com/news/150217-ict-and-the-future-of-food-and-agriculture_244069647_c

This document outlines the possible roles of ICT

within the food and agriculture industries, with a focus on food production and supply chains. Through understanding the thresholds within this industry, several possible ICT interventions are identified that may enable a transition to sustainable food systems.

“Youth Sustaining Family Farming Through ICTs”, CTA 2015:

http://knowledge4food.net/topic_posts/youth-sustaining-family-farming-icts/

A key message of this report is that engaging youth in family farming will require stronger focus on agribusiness and relevant ICTs.

“Youth in Agriculture”, Africa Agriculture Status Report 2015, AGRA 2015:

<http://www.agra.org/media-centre/news/africa-agriculture-status-report--2015-/>

The chapters in this year’s narrative section deal with the current status of youth in sub-Saharan Africa and present the opportunities and potential that the region’s ‘youth bulge’ and ‘youthening’ generation brings to agriculture. Opportunities as the use of improved technologies (high-yielding varieties and hybrids, organic and inorganic fertilizers, conservation farming methods, and appropriate mechanization), the rapid penetration and uptake of ICTs, innovative and inclusive financing programs and investments, entrepreneurship and agribusiness initiatives, formal and informal education and training, and the steps being taken towards a more conducive policy environment are presented.

The Data Revolution for Agriculture, ICTUpdate Issue 79, CTA Feb 2015:

<http://ictupdate.cta.int/en/content/view/full/7712>

Complete issue of ICTUpdate dedicated to the challenges and potential of (open) data for agriculture.

“Open Data and smallholder food and nutritional security”, Jellema et al, CTA February 2015:

<http://www.cta.int/images/>

[Opendataforsmallholders-report_.pdf](#)

This report by Alterra aims to provide a better understanding of the actual impact of the open data movement on the food and nutrition security of smallholders and highlight the areas of potential unfilled opportunity.

“Who owns agricultural data?”, the Open Data Institute 2015:

<http://theodi.org/blog/odi-futures-who-owns-open-agricultural-data?>

Article by Head of Data Data at CABI Martin Parr.

“How can we improve agriculture, food and nutrition with open data?”, Liz Carolan et al, ODI May 2015:

<http://www.godan.info/wp-content/uploads/2015/04/ODI-GODAN-paper-27-05-20152.pdf>

“From satellite to farm: getting open data to farmers”, CTA March 2015:

<http://www.cta.int/en/article/2015-03-23/from-the-satellite-to-the-farm-getting-open-data-to-the-farmers.html>

Open data presents both challenges and opportunities for agriculture as moves get under way to unlock information and make it available to a wider audience. That was the verdict of a roundtable session during the recent Global Forum for Innovations in Agriculture (GFIA) 2015, held in Abu Dhabi.

“What If African Nations Operated as One Big Innovation Ecosystem?”, Africa Insider 2015:

<http://www.itnewsafrika.com/2015/05/what-if-african-nations-operated-as-one-big-innovation-ecosystem/>

Argues how increasing innovation, especially data about the agriculture sector can drive job growth as well as improve agricultural productivity.

“Why Don’t Farmers Use Cell Phones to Access Market Prices”, Wyche and Steinfield, May 2015:

<http://www.tandfonline.com/doi/abs/10.1080/02681102.2015.1048184>

An analysis of the factors that impeded farmers from

greater adoption of the cell phone market tools that are available in Kenya. The outcomes underline the need for participatory design in order to better guarantee uptake of ICT-solutions by farmers.

“AgTech is the New Queen of Green”, Tech Crunch 2015:

<http://techcrunch.com/2015/04/01/the-new-queen-of-green/>

A breakdown of the different technologies being used in agriculture and the amount of investment in the different sectors.

“How High Tech Farming Will Reshape Agriculture”, Farm Industry News 2015:

http://farmindustrynews.com/precision-farming/how-high-tech-farming-will-reshape-agriculture?utm_content=bufferf7661&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer

A report based on interviews with farmers on what they think will be the most important technology in the future.

“Agritools : l’Afrique de l’agriculture, des start-up et de ses jeunes dirigeants”, LeMonde.fr 2015:

http://www.lemonde.fr/afrique/article/2015/08/04/agritools-l-afrique-de-l-agriculture-des-start-up-et-de-ses-jeunes-dirigeants_4711580_3212.html

Article on the upcoming phenomenon of start-ups on ICT for Agriculture.

“ICTs for Agriculture – Making it Happen”, Charles Pye-Smith, CTA 2014:

http://publications.cta.int/media/publications/downloads/1817_PDF.pdf

Overview of the main outcomes of the international ICT4AG-conference in Kigali, Rwanda in 2014. Issues addressed include developing better partnerships to improve the impact of ICTs in agriculture, strengthening the role of young women and men in ICT initiatives, supporting ICT4Ag entrepreneurship

and promoting adequate infrastructure for ICTs in rural areas.

“ICTs for Agriculture”, CTA 2014:

<http://www.cta.int/en/article/2014-12-19/icts-for-agriculture.html?hootPostID=468ab5e86ab22eb489da42dead4d8ff2>

A list of ten recommendations taken from the Kigali conference on ICT4Ag.

“Farming for the Future, Communication Efforts to advance Family Farming”, FAO 2014:

<http://www.fao.org/3/a-i4223e.pdf>

This document (...) includes an analysis of examples of Communication for Development approaches applied to smallholder farming and rural development and the issues that they encompass: food security, natural resource management, rural livelihoods, agricultural innovation, and capacity development.

“ICT solutions for inclusive agricultural value chains”, IICD 2014:

<http://iicd.org/documents/ict-solutions-for-inclusive-agricultural-value-chains/>

This position paper discusses solutions for inclusive agricultural value chains and explains how IICD strengthened farmer organisations to use technology to increase agricultural growth and income. It includes solutions for a) improving management and administration of farmer organisations, b) improving production through access to quality extension services, agricultural inputs and geo-data, c) improving access to markets and information on market prices and demand, and d) improving access to finance and financial information.

“Youth, ICTs and agriculture: exploring how digital tools and skills influence the motivation of young farmers”, IICD 2013:

<http://iicd.org/documents/youth-icts-and-agriculture-exploring-how-digital-tools-and-skills-influence-the-motivation-of-young-farmers/>

This research investigates the linkages between

the introduction and use of ICT in farming and the interest of youth in farming and value chain development.

“Digitaler Wandel – Die Kluft wird kleiner”, Akzente Magazin GIZ 2014:

<https://www.giz.de/de/downloads/giz2014-de-akzente-2-schwerpunktthema-digitaler-wandel.pdf>

FESA MicroInsurance – Crop insurance reaching every farmer in Africa, EARS 2014:

http://ears.nl/user_files/FESA%20Micro-insurance%20-%20reaching%20every%20farmer%20in%20Africa.pdf

Final technical report on the FESA Micro-insurance project, a Meteosat based drought and excessive precipitation index insurance system developed by EARS. The project started in 2009 and was co-funded by the Netherlands Ministry of Foreign Affairs as a contribution to the UN Millennium goals. FESA has been successful in developing and providing low cost drought and excessive precipitation insurance in Senegal, Mali, Burkina Faso, Benin, Kenya, Tanzania, Rwanda, Uganda, Malawi, Mozambique and Botswana.

“ICT uses for inclusive agricultural value chains”, FAO 2013:

<http://www.fao.org/docrep/017/aq078e/aq078e.pdf>

This document provides examples of three types of ICT solution, categorized in terms of the end result for the consumer: ICT for production systems management, ICT for market access services, and ICT for financial inclusion.

“Information and Communication Technologies for Sustainable Agriculture”, FAO 2013:

<http://www.ictinagriculture.org/sites/ictinagriculture.org/files/Information%20and%20communication%20EAP.pdf>

These papers outline how various organizations in Asia and the Pacific are addressing the challenges faced by agriculture with the help of technology-mediated solutions.

“Connect the BoP”, Sonja Oestmann, Steve Esselaar, Andy Dymond, GIZ 2013:

https://www.giz.de/Wirtschaft/de/downloads/GIZ_Connect_the_BoP_Webversion.pdf

A guide aimed at companies that either already serve BoP markets or are interested in doing so. It provides guidance on how companies can make their business models more inclusive by leveraging Information and Communication Technologies (ICT).

“The ICT in Agriculture Sourcebook”, Infodev 2012:

<http://www.ictinagriculture.org/node/105>

A good and quite complete overview of the use of ICT in agriculture, with concrete examples from the field.

“The Transformational Use of Information and Communication Technologies in Africa”, Enock Yonazi, Tim Kelly, Naomi Halewood, Colin Blackman, World Bank and African Development Bank 2012:

<http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIESResources/282822-1346223280837/MainReport.pdf>

This report captures the existing use of ICT in six sectors (agriculture, climate change, education, health, financial services, government) and two cross-cutting themes (regional trade and integration, ICT competitiveness) in Africa. It further examines the immediate potential that could be realized with further attention by both the private and public sectors and makes recommendations for policy makers and development practitioners.

“eTransform Africa – Agriculture Sector Study”, Deloitte 2012:

http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1346223280837/Agriculture_FullReport.pdf

Full Agriculture sector study of the Transformational Use of ICT in Africa.

“Young Peruvians use social media to promote agro-ecological production”, IICD 2012:

<http://iicd.org/documents/young-peruvians-use-social-media-to-promote-agro-ecological-production/>

This article describes the work of the National Association of Ecological Producers in Peru (ANPE PERÚ), who promote organic farming and an ecological approach towards agriculture using of social media and other ICT tools.

“ICT for rural economic development: five years of learning”, IICD 2012:

<http://iicd.org/documents/ict-for-rural-economic-development-five-years-of-learning/>

This learning report presents IICD’s interventions, results and a selection of the key lessons learned from IICD’s ICT4Economic Development and ICT4Agriculture programmes over the 2006–2011 period. It shares lessons on i) Empowering and connecting individuals, ii) Strengthening and connecting organisations, iii) Strengthening and linking sectors in agricultural and economic development related work areas.

“Strengthening Rural Livelihoods, The impact of information and communication technologies in Asia”, IDRC 2011:

<http://idl-bnc.idrc.ca/dspace/bitstream/10625/45947/1/IDL-45947.pdf>

Collection of academic papers on the use and the impact of ICT in rural livelihoods in Asia.

“Africa Transformation-Ready: The Strategic Application of Information and Communication Technologies to Climate Change Adaptation in Africa, IISD 2011:

http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1346223280837/ClimateChange_Fullreport.pdf

This report explores the transformative potential of

ICTs in addressing the major economic, environmental and social challenges facing the African continent due to the impacts of climate change.

“OP-TIC : Organisations Paysannes et Technologies de l’Information et de la Communication », Laureys, Schrader et al. Agriterra/IFDC/ROPPA/IICD 2009:

<http://www.agrifeeds.org/fr/news/op-tic-organisations-paysannes-et-technologies-d’information-et-de-communication>

Field study on the use of ICT by farmers’ organizations in Mali and Burkina Faso. Contains recommendations on the type of ICT-solutions and the type of organizations that seem most suitable to help advance (other) FO’s.

“Framework on Effective Rural Communication for Development”, Riccardo Del Castello, Paul Mathias Braun. GTZ/FAO 2006:

<http://www.fao.org/nr/com/gtzworkshop/a0892e00.pdf>

A slightly older, but still actual publication. The Framework on Effective Rural Communication for Development is the result of an inter-institutional expert consultation workshop organized by the FAO and GTZ in 2007. It sets the scope and operational basis for the role of communication in rural development.

« ICTs for Agricultural Livelihoods – Impact and Lessons Learned from IICD- supported activities”, IICD 2006:

<http://iicd.org/documents/icts-for-agricultural-livelihoods-impact-and-lessons-learned-from-iicd-supported-activities/>

Early lessons from ICT4AG projects 2001–2006. This booklet describes IICD’s experiences, achievements and lessons learned in using ICT to enhance agriculture and economic development from projects implemented in Jamaica, Ghana, Zambia, Burkina Faso, Tanzania, Uganda, Ecuador and Mali, and provides examples of the many ways in which ICTs contribute to poverty alleviation in the agriculture

sector. It also shares IICD's and partners' experiences in taking a learning-by-doing approach.

ICT4D, Social innovation:

[A guiding framework for digital change at GIZ 2015-2018, GIZ 2016](#)

Internal GIZ-document defining the broad outlines of the agenda and the strategic framework for the integration of ICT within GIZ and its programmes and projects.

[Ten Trends in Open Innovation, GIZ 2015:](#)

<https://10innovations.alumniportal.com/>

This website accompanies a reader commissioned by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on how social networks spur innovation through collaboration. The contributions cover the emergence of technology innovation hubs in Africa, the innovation power of software start-ups, crowdfunding, the mobile boom in Africa, the prospects of global peer-to-peer learning, and others.

[How Information and Communications Technology Can Achieve The Sustainable Development Goals, The Earth Institute Columbia University/Ericsson, 2015:](#)

<http://www.ericsson.com/res/docs/2015/ict-and-sdg-interim-report.pdf>

[“The Advantages of Digital Monitoring and Evaluation Solutions”, IICD 2014:](#)

<http://iicd.org/documents/the-advantages-of-digital-monitoring-and-evaluation-solutions/>

This position paper discusses IICD's approach to ICT-enabled Monitoring and Evaluation (M&E).

[“The Social Innovation Process, From Need to sustainability – Empowering people to use ICT for their Development”, IICD 2013:](#)

<http://www.iicd.org/documents/from-need-to-sustainability-empowering-people-to-use-ict-for-their-development/>

This publication describes IICD's participatory and multi-stakeholder approach to identifying, developing and implementing ICT4D programmes. It describes the phases of IICD's ICT-led Social Innovation Process, including project formulation, capacity development, ICT4D networking, M&E and policy influencing.

[“5 steps to Social Innovation with ICT”, ICTWorks 2013:](#)

<http://www.ictworks.org/2013/12/04/5-steps-to-social-innovation-with-ict/>

A good synthesis of IICD's social innovation process.

[“Open Development: a New Theory for ICT4D”, Matthew Smith et al, ITD, IDRC spring 2011:](#)

<https://idl-bnc.idrc.ca/dspace/bitstream/10625/46446/1/132933.pdf>

This volume of ITD addresses the fundamental 'issue of "openness" in IT systems, policy, and development sectors, (which...) seemed to permeate every element of our ICT4D programming. From access to use, and from content to creation, it appeared that some form of openness was a component of much of the research we supported, including open participation in use, open licensing to provide services, open content, open source, and open government.'

[Richard Heeks, “The ICT4D 2.0 Manifesto - Where Next for ICTs and International Development” \(2009\):](#)

<http://www.oecd.org/ict/4d/43602651.pdf>

This paper explains the phase change – from "ICT4D 1.0" to "ICT4D 2.0" – and its implications. It looks at necessary new worldviews to guide our thinking and our policies in this field; integrating perspectives from computer science, information systems and development studies.

[Digital Principles \(2013\):](#)

<http://digitalprinciples.org/>

[GovUK Design Principles:](#)

<https://www.gov.uk/design-principles>

“The ICT RoundTable Process: Lessons learned from facilitating ICT-enabled development”, IICD 2004:
<http://www.iicd.org/documents/from-need-to-sustainability-empowering-people-to-use-ict-for-their-development/>

This publication describes IICD's participatory and multi-stakeholder approach to identifying, developing and implementing ICT4D programmes. It describes the phases of IICD's ICT-led Social Innovation Process, including project formulation, capacity development, ICT4D networking, M&E and policy influencing.

“Uniting through networks – The art of fostering ICT for development networks”, IICD 2006:
<http://iicd.org/documents/uniting-through-networks-the-art-of-fostering-ict-for-development-networks/>

Lessons from experiences with establishing and supporting ICT4D Local Networks.

Digital Opportunity Channel:

www.digitalopportunity.org

News on ICT4D projects.

Gender and ICT(4Ag):

“Promoting Equal Chances for Women and Men to Use and Benefit from ICT-enabled solutions”, IICD 2015:

<http://iicd.org/documents/promoting-equal-chances-for-women-and-men-to-use-and-benefit-from-ict-enabled-solutions/>

This publication explores issues of gender in ICT4D projects and is based on case study research conducted among projects in Kenya, Uganda, and Tanzania. The publication pulls together insights and learnings around the effects of ICT uptake and use on women's empowerment and gender relations in agricultural value chain development, maternal and child health, and hospital management information systems projects, and includes the 3 case studies as separate and stand-alone documents for more information.

Transforming Women's Livelihoods Through Mobile Broadband, GSMA 2014:

<http://www.gsma.com/connectedwomen/wp-content/uploads/2014/02/transforming-women-s-livelihoods-through-mobile-broadband.pdf>

This study is based on more than 1,000 structured interviews with working women across five countries: Brazil, China, India, Indonesia, and Nigeria. The research was designed to uncover and characterize the various forms of value that mobile broadband provides to working women in the developing world and identify the barriers that block feature phone owners from upgrading to smartphone use.

“Gender and agricultural value chains - A review of current knowledge and practice and their policy implications”, Coles & Mitchell March 2011, FAO:
<http://www.fao.org/3/a-am310e.pdf>

This paper introduces value chain analysis and development as tools for addressing gender inequities in markets.

ICT statistics:

Internet World Stats:

<http://www.internetworldstats.com/>

Internet World Stats is an International website that features up to date world Internet Usage, Population Statistics, Travel Stats and Internet Market Research Data, for over 243 individual countries and world regions.

ITU Yearbook of Statistics:

<http://www.itu.int/en/ITU-D/Statistics/Pages/publications/default.aspx>

The ITU Yearbook of Statistics provides the most authoritative source of data about the evolution of the telecommunication sector.

Also at ITU:

<http://www.itu.int/ITU-D/ict/statistics/>

GSMA data and analysis for the mobile industry:

<https://gsmaintelligence.com/>

Mobile Active.org:

<http://www.mobileactive.org>

Directory of major mobile phone deployments for development.

The Global Information Technology Report 2015 (World Economic Forum):

<http://reports.weforum.org/global-information-technology-report-2015/>

This report features the latest iteration of the Networked Readiness Index, which assesses the factors, policies and institutions that enable a country to fully leverage information and communication technologies (ICTs) for increased competitiveness and well-being.

Tools and Toolkits:**Participatory design, Innovation approach:****Design Research for Media Development:**

<http://digitalprinciples.org/wp-content/uploads/2015/05/Design-Research-for-Media-Development.pdf>

Field guide to human-centered design:

<https://www.ideo.com/work/human-centered-design-toolkit/>

The WHO MAPS toolkit:

<http://digitalprinciples.org/wp-content/uploads/2015/12/The-MAPS-Toolkit.pdf>

The e-Guide on Innovation in Agriculture (2015):

<http://prod.worldagroforestry.org/itaacc>

An excellent reflection on the learnings of four projects on the promotion of widespread uses of innovation in agriculture. The e-Guide provides practical approaches that projects might take to achieve the uptake and the promotion of scaling innovations in agriculture, and include tips on project formulation, engaging the private sector, partnerships, project management, capacity building and communication. The recommendations are not

specific for ICT-innovations, but they do provide a good framework for the integration of ICT in agriculture-related projects.

Local ecosystem analysis:**Local Systems: A Framework for Supporting Sustained Development:**

<http://digitalprinciples.org/wp-content/uploads/2014/10/LocalSystemsFramework.pdf>

Upscaling:**Designing Systems at Scale:**

http://digitalprinciples.org/wp-content/uploads/2015/05/Rotman_SAS_IDEO_Winter09.pdf

Scaling Up – From Vision to Large-Scale Change, Tools and Techniques for Practitioners, MSI 2012:

<http://www.msiworldwide.com/wp-content/uploads/MSI-Scaling-Up-Toolkit.pdf>

Gender:**Empowering Women Entrepreneurs through Information and Communications Technologies - A Practical Guide, UNCTAD, 2014:**

http://unctad.org/en/PublicationsLibrary/dtlstict2013d2_en.pdf

This guide attempts to bring clarity to some of the key underlying ICT dynamics that are of relevance for women's entrepreneurship.

Sustainability and Scaling up:**Invaneo ICT Sustainability Primer:**

http://digitalprinciples.org/wp-content/uploads/2015/05/Invaneo_ICT-Sustainability_Primer0910.pdf

CRS Organizational Guide for ICT4D:

http://digitalprinciples.org/wp-content/uploads/2015/05/Oct23_NetHope_GuideLayout.pdf

MSI Scaling-up Toolkit:

<http://www.msiworldwide.com/wp-content/uploads/MSI-Scaling-Up-Toolkit.pdf>

Open Source and Creative Commons:

The Global Open Data for Agriculture and Nutrition Initiative:

<http://www.godan.info/>

Primer on Open Source and the Creative Commons for Aid and Development Code Innovation:

<http://digitalprinciples.org/wp-content/uploads/2015/11/Primer-on-Open-Source-and-the-Creative-Commons-for-Aid-and-Development-Code-Innovation.pdf>

The Open Source Initiative: <http://opensource.org/>

The Open Source Initiative (OSI) is a non-profit corporation with global scope formed to educate about and advocate for the benefits of open source and to build bridges among different constituencies in the open source community.

The Open Source Definition:

<http://opensource.org/docs/osd>

The Open Data Institute: www.theodi.org

Privacy and Security:

Seven Foundational Principles of Privacy by Design:

<https://www.ipc.on.ca/images/Resources/7foundationalprinciples.pdf>

Privacy by Design:

<https://www.ipc.on.ca/images/Resources/PbDReport.pdf>

The OECD Privacy Framework:

http://digitalprinciples.org/wp-content/uploads/2015/12/oecd_privacy_framework.pdf

Partnerships and Networking:

Global Multi-stakeholder Partnerships (Independent Research Forum):

<http://digitalprinciples.org/wp-content/uploads/2015/11/IRF-Global-Multistakeholder-Partnerships.pdf>

LOCUS: <http://www.locusworld.org>

Building electronic communities and networks module (IMARK Information Management Resource Kit):

<http://publications.cta.int/>

Participatory Learning - Change at hand: Web 2.0 for development, CTA/IIED 2010:

<http://publications.cta.int/en/publications/publication/1531/information-communication/>

ICT4AG – the digital springboard for inclusive agriculture:

<https://dgroups.org/cta/ict4ag>

A large (+1100 members) D-group community dedicated to ICT4AG, moderated by CTA.

D-groups – Development Through Dialogue:

<http://www.dgroups.org>

A joint initiative of organizations like DFID, ICA, Oneworld, UNAIDS Online, IICD, FARA, CTA, HIVOS, ECDPM, FAO etc. An online and email platform offering tools and services that bring individuals and organizations together in the international development community. Dgroups supports 700+ communities of practice, with more than 150.000 registered users. It delivers around 460.000 email messages each day, half of which are exchanged with and within low-income countries.

Financial access for smallholders:

A guide for Small holder Farmers on Saving, Accessing Credit, and effectively Managing Money for Improved Livelihoods:

http://www.fsnnetwork.org/sites/default/files/a_guide_for_small_holder_farmers_on_saving_accessing_credit_and_effectively_managing_money_for_improved_livelihoods.pdf

Policy development:

E-Agriculture Strategies, E-agriculture.org:

<http://e-agriculture.org/e-agriculture-strategies>

Provides advice and materials for developing e-agriculture strategies at the national level.

Applications and good practices of ICT in Agriculture:

Global Good Practices Note series, GFRAS:

<http://www.g-fras.org/en/download.html>

Online Kopernik catalogue of digital tools for development NGO's:

<http://impacttrackertech.kopernik.ngo/>

Social Media Handbook for Agricultural Development Practitioners:

<http://ictforag.org/toolkits/social/index.html#Vns3gEorJCA>

Interactive Radio for Agriculture Development Projects (USAID):

http://pdf.usaid.gov/pdf_docs/pnaea277.pdf

Integrating Low-cost Video into Agriculture Development Projects (USAID):

<http://ictforag.org/toolkits/video/index.html>

A guide to producing farmer-to-farmer videos, MEAS 2013:

https://dl.dropboxusercontent.com/u/15810717/Methods%20and%20Tools/MEAS-AA%20Guide%20to%20Producing%20Farmer-to-Farmer%20Training%20Videos%202013_04.pdf

A guide to editing farmer-to-farmer videos, MEAS 2013:

https://dl.dropboxusercontent.com/u/15810717/Methods%20and%20Tools/MEAS-AA%20Guide%20to%20Editing%20Farmer-to-Farmer%20Training%20Videos%202013_04.pdf

Toto Agriculture:

<http://www.totoagriculture.org/>

Toto Agriculture, developed by researchers at INSEAD and funded by (a.o.) BMGF, GSMA and Grameen Foundation, is a public access, non-commercial, portal providing access to a collection of (localized) agriculture-related information such as weather forecasts, soil health, planting tips and pest management. It is an agricultural content engine that uses more than 750 sources of agricultural knowledge to produce on-demand information in as many as 60 different formats, with 180 countries represented.

AppsforAg:

<http://www.apps-for-ag.com>

Apps for Ag is a US-based volunteer organization, organizing agricultural hackatons. Its' purpose is to bring together the seemingly disparate worlds of software development and commercial farming into a collaborative event. Its' mission is to develop useful technology to address the needs of today's grower.

Exploreit@ICRISAT:

<http://exploreit.icrisat.org/>

ICRISAT is a non-profit, non-political organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world, and a member organization of the CGIAR. EXPLOREit@ICRISAT

is a new form of information management called MultiProfiler developed by ICRISAT that gives the public an opportunity to explore and benefit from all of ICRISAT's 40 years of publicly-funded global agricultural research, knowledge and information. Information is categorized on the basis of Topics (such as nutrition or climate change); Specific crops; Geographic locations; Type of farming systems; and Resource types such as projects, publications, videos, PPTs, Stories and Data.

KSI Connect:

<http://ksiconnect.icrisat.org/>

This platform allows experts across the globe to share their project experiences and cutting-edge research activities contributing to global food security. It shares information and educational video resources, face-to-face virtual training and learning sessions, and virtual expert-farmer interactions globally.

Capacity Building:

“Organizational Guide to ICT4D - Leveraging Technology for International Development”,

Nethope, CRS, Microsoft 2015:

http://solutionscenter.nethope.org/assets/collaterals/Oct23_NetHope_GuideLayout.pdf

This guide gives some practical guidance to building organizational capacity in ICT4D. Drawing from the experience of the international development community, the guide connects established principles with processes for implementing new technology.

The SCALE approach Toolkit (ICRA):

<http://www.icra-edu.org/resources>

The 2SCALE learning modules have been developed by ICRA for coaches from Business Support Services who are to support agribusiness clusters within the 2SCALE project. Each module is a package containing: 1) Facilitators' Guide on how to conduct a training session/workshop 2) Reference sheets, commonly referred to as hand-outs, and excerpts from educational films 3) Exercises.

The publication of these manuals was supported by the Dutch Ministry of Foreign Affairs. The manuals were developed by technical experts of ICRA, partner within the 2SCALE Project.

1. **Module 1** [Introduction to the CASE Approach](#) (166 pages)
2. **Module 2** [Financial Education, 2SCALE Module 2](#) (54 pages)
3. **Module 3** [Building Business Relationships](#) (35 pages)
4. **Module 4** [Introduction to Marketing for Agricultural Products](#) (81 pages)
5. **Module 5** [Economics Analysis and Crop Budgeting](#) (90 pages)
6. **Module 6** [Developing a Business Plan](#) (39 pages)
7. **Module 7** [Warrantage of agricultural products](#) (47 pages)
8. **Module 8** [Negotiation and contracting](#) (43 pages)
9. **Module 9** [Supporting rural organisations](#) (72 pages)
10. **Module 10** [Brokering in value chain partnerships](#) (42 pages)

The AgEd Open Courseware platform:

<http://www.aged.icrisat.org/moodle23/>

The AgED Open Courseware Platform offers a research infused curriculum providing life-long learning opportunities to students, faculty members, extension agents, smallholder farmers, etc. through open educational resources - anywhere and anytime - in a cost effective manner. The platform not only hosts ICRISAT courses but also allows partners to host their own courses. Currently, the AgEd Open Courseware has 7 ICRISAT courses, 11 Food and Agriculture (FAO) short courses, 1 Self-Employed Women's Association (SEWA), India learning module,

and more than 6300 learner-participants from around 160 countries.

Monitoring and Evaluation:

“Smart Toolkit for evaluating Information projects, Products and Services” (Second Edition), CTA, IICD, KIT 2009:

<http://publications.cta.int/en/publications/publication/1557/>

The Smart Toolkit focuses on the evaluation of information projects, products and services from a learning perspective. It looks at evaluation within the context of the overall project cycle, from project planning and implementation to monitoring, evaluation and impact assessment, and then at evaluation process itself, the tools involved and examples of their application. The theme running throughout the toolkit is: participatory evaluation for learning and impact. The emphasis is on internal evaluation - or 'self evaluation' - rather than external evaluation.

“The Advantages of Digital Monitoring and Evaluation Solutions”, IICD 2014:

<http://iicd.org/documents/the-advantages-of-digital-monitoring-and-evaluation-solutions/>

ICT solutions for M&E is a broad field with a wide range of possible tools and applications. It may include diverse types of infrastructure, hardware and software solutions applicable for a variety of M&E activities, from outreach to data collection and validation to data storage, analysis, visualization, dissemination and more.

Selection of videos:

The economics of the Internet, World bank Feb 2016:

<http://www.worldbank.org/en/news/video/2016/02/01/the-economics-of-the-internet>

ICT and Sustainable Development Goals, Ericsson 2015:

<https://youtu.be/IRhl40rXOgs>

Jeffrey Sachs on the Sustainable Development Goals and ICT.

« Quinoa 2.0 », IICD 2015:

<http://iicd.org/documents/quinoa-2-0/>

On the use of ICT by Quinoa-growers in Peru.

The DCS Smart projector, 2016:

<https://vimeo.com/154777076>

Short promotion clip of the solar-powered portable projection unit which was designed by AccessAgriculture in collaboration with Digisoft Education. This unit allows to project videos in non-electrified and non-connected rural areas with minimal equipment.

Video report of the ICT4Ag conference, Nov 2013 Rwanda, CTA 2013:

<https://vimeo.com/78593726>

All videos from the ICT4Ag conference, Rwanda 2013:

<https://www.youtube.com/user/ICT4Ag13>

« The @griculture Revolution », CTA 2013 :

<https://vimeo.com/78629755>

SIMAgri platform Burkina Faso, 2014:

<https://youtu.be/GId3b3vbnl8>

Short video documentary on the web-to-SMS platform operated by Afrique Verte for market prices, stocks, offer and demand for the maize, sesame, shea and cattle chains in Burkina Faso.

eTIC – L'agriculture de demain, 2012:

<https://youtu.be/EsPFjF3bo8?list=PL5318D1B8C767EAF0>

L'AgriGuide élaboré par le programme E-TIC propose des questions et réponses aux agriculteurs, éleveurs et pêcheurs de la région du Sahel (Sénégal et Mali).

“How ICT helps entrepreneurs in Africa and Latin America”, IICD 2012

<http://iicd.org/documents/how-iicd-helps-entrepreneurs-in-africa-and-latin-america-via-ict/>

Video clip on SAP sourcing mgt application (Ghana, 2011):

<https://www.youtube.com/watch?v=k32D7UrgkCw>

“The IICD Approach”, IICD 2010

<http://iicd.org/documents/the-iicd-approach/>

« Ghanaian farmers get better prices for their crops by using mobile phones”, IICD 2009

<http://iicd.org/documents/ghanaian-farmers-get-better-prices-for-their-crops-by-using-mobile-phones/>

Annex 4 – Checklist : Successfully plan and implement ICT4Ag in GIZ projects



The integration of ICT in a project/programme can best be seen as a prototyping process, whereby one goes through a number of steps which lead to new situation, which then can be taken as the start for a next phase etc. Many things can go wrong throughout the whole process, but one can avoid some problems or surprises by conducting good preliminary analysis, and iterative learning is an inevitable part of any ICT-trajectory.

The points mentioned here below can be used as a general checklist for the steps one can/should make during the process – though the order of the different steps can differ from situation to situation, and the detail/extent in which they are executed can highly depend on the local context.

Information and Communication analysis

A good Information and Communication analysis should ideally be done together with the involved stakeholder(s) – this can be the user(s), the information provider(s), the solution/service provider(s), and/or the beneficiaries.

- » What are the information needs of the user (what type of information would he like to have, what type of information would he like to share)? Establish a complete list, and prioritize together with the user.
- » What are the communication needs of the user (with whom would he like to communicate, with how many others, how often, etc.). Establish a complete list, and prioritize together with the user.
- » How does information currently reach the user (via which channels, both analog and digital), and what channels does he use to reach others?
- » How does the user currently communicate with his environment and with the 'outside world'?
- » What channels does he use, how often, and at what price?
- » What are the advantages and disadvantages of the current information and communication channels in use (think of timeliness, speed, reliability, reach, distance, cost etc.)?
- » If the user's intention is to reach a number of other 'beneficiaries', also do an analysis of their information/communication needs, current information/communication channels and patterns, etc.

Situational analysis:

A situational analysis can generally be done (together) with a baseline/field study and some desk research.

- » **What is (the state of) the infrastructure the user currently uses?**
 - * Office – what electronic hardware is already in use, is there air-conditioning, electricity, access to fixed or mobile network, access to the Internet?
 - * If access to power and connectivity is not available or limited, what alternative options do exist (diesel generator, solar power, nearby town etc.)?
 - * What type/level of network/bandwidth is available (e.g. 2G/3G/4G etc.) at the level of the user?
 - * Technical support – are there hard-/software suppliers, repair shops, technicians in the neighborhood?
- » **Climate and geography:**
 - * How warm/cold can it get, how humid, how dusty?
 - * Do mountains/valleys/high buildings limit connectivity?
- » **Security:**
 - * Can the user's home/office be closed/well-secured/guarded? Is theft common?
- » **Capacity:**
 - * What is the capacity of the intended user/beneficiary to use the ICT-solution, and/or to receive/send information via it?
 - Look at illiteracy, computer literacy, phone use, advanced ICT-capacities, etc.*
- » **Regulation:**
 - * Are there limitations/regulations regarding the use of specific ICT's (e.g. licenses for use of radio/tv/VSat, licenses for broadcasting, prohibited content etc.)?
 - * Are there promoting measures for the use of ICT (e.g. detaxation of ICT-equipment, subsidies, etc.)?
- » **ICT infrastructure:**
 - * What is the state of (the use of) ICT in the country?
 - * How many people are using mobile phones, the Internet?
 - * How many network operators, internet providers, ICT solution/service providers, hardware vendors are there, and in how far do they cover the entire country?
 - * Are there local software developers?
 - * Are there local networks or communities of practice of ICT(4Ag) stakeholders (users, enablers, service providers)?
 - Look at ITU year report (see Annex Literature).*

Solution design:

Do not only look at technological solutions – in most cases, a combination of traditional and modern/technological channels is the best way to guarantee a large uptake, and in some cases one can even better refrain from bringing in technology!

Solution design can be done in different ways, but if possible it should be done together with the stakeholders.

A good way to develop and try out different ICT-solutions is ‘rapid prototyping’ – bring together users and developers in a safe environment and determine what minimal functionalities the solution should encompass, how the user interface should look like etc. Have different developers build similar solutions and confront the users with the results – reiterate and improve after feedback, until the functional design is considered optimal. Once a prototype is accepted, the developers can start working on a rugged version.

- » **Look for existing solutions:**
In many cases, using an existing (ICT-) solution is the easiest way to overcome basic/generic Information and Communication problems:
 - * Which existing solution is most in line with the Information and Communication habits/patterns/uses of the user or beneficiary?
 - * What services/solutions are already locally used, or locally/internationally being offered and under what terms?
- » **Adapt/localize an existing solution** *in order to suit the needs/habits/patterns of the user/beneficiary:*
 - * Do you have sufficient knowledge of existing and upcoming technologies, of software and of programming languages to efficiently supervise the adaptation process?
 - * Do you have enough flexibility in your project planning to cope with unexpected delays?
- » **Create an entirely new solution:** *this can be interesting if the given need/problem is very specific and if existing solutions fail to respond to current or foreseen ‘next-phase’ issues.*
 - * Do you have sufficient knowledge of existing and upcoming technologies, of software and of programming languages to efficiently supervise the development process?
 - * Is the proposed solution compatible with other platforms and other software, now and in the future?
 - * Do you have enough flexibility in your project planning to cope with unexpected delays?
- » **Support:**
 - * Will the company/person who builds the solution still be available in the near future if problems arise or adaptations need to be made.
 - * Is the source code available?
- » **Embedding:** *in all cases, a solution does not stand on its own; it should be ‘embedded’ in an existing information system, or make part of a new system.*
 - * Does the solution tap into existing patterns of information exchange?
 - * If the solution replaces existing information habits, what measures will you take to overcome resistance to the new solution?
 - * What measures will you take to promote the adoption of the new solution?

- » **Ownership:** *who is/will be the owner of the application/solution?*
 - * If it is GIZ, do you envisage to transfer the ownership later on, or to make the solution publicly available?
 - * Is the source code open?
 - * If it is the user(s), does he have the technical (and financial) capacity to maintain and potentially further develop the solution?
 - * If it is the service/solution provider, what are/will be the terms of use (during and after the project)?
- » **Design for Scale:**
 - * Did you consider the potential for larger roll-out after/during your anticipated project?

Scale is not a necessary criterion in all cases. However, try to avoid that your ICT-solution has no or little ability to scale or to replicate, and thus assess and mitigate dependencies already during the design phase. You can do this by employing a 'systems' approach, considering implications of design beyond an immediate project, and by analyzing your technology choices through the lens of a larger geographical scope than your direct intervention zone.
- » **Sustainability:**
 - * How can the ICT-solution economically and socially be sustained by the user(s)/beneficiaries after your intervention?
 - * What is the value proposition, can the solution create revenue, and if so, is it possible to develop a business model?
 - * If revenue is generated indirectly (e.g. via a higher yield or via a better market price for products), does that outweigh the cost?
 - * Does the ICT-solution involve regular updates/upgrades, equipment renewal etc. – and what is the evaluated cost of that?
 - * Who is the user (type), and how likely is it that this user will continue to use the ICT-solution?
- » **Privacy and Security:**
 - * Did you look into the risks to the security of your user(s) and his/their data?
- » **Gender:**
 - * Who will be the direct user(s) of the ICT-solution?
 - * Are there (social, educational, economic or cultural) factors that may hinder their access to, and/or their adoption of the ICT-solution?
 - * Can the way in which the ICT-solution is designed positively influence the potentially limiting factors?

Indicators for the choice of a particular application or service provider:

The choice of a service provider or a specific application is a critical step in any ICT-project.

A number of indicators can help you determine whether the service provider and/or the application is appropriate for your purposes.

- » Current user satisfaction and feedback
- » Outreach: how many farmers can effectively be reached
- » Current uptake (number of users) and growth rate
- » Type of users (if known)
- » Location and geographic spread/availability (urban, rural, national, regional, etc.)
- » Accessibility (on what type of devices is the app or service being provided)
- » Affordability (what does the service cost)
- » Adaptability: can the app/service easily be modified/localized (and by whom, for what price)
- » Interface, ease of use
- » Offered support: training (materials), online/phone help-desk, debugging
- » Quality and provenance of content (if applicable)
- » Stability (bugs, 'downtime')
- » Pricing model (free, subscription, pay per message etc.)
- » Financial sustainability: how solid is the underlying business model (if any)
- » Data storage (if applicable): 'cloud-storage' can be problematic in some developing countries
- » Variety of supported platforms: web, Java, Android, Apple, Windows etc.
- » Technological continuity (is the app being further developed, supported, how 'solid' is the owner)
- » Current language(s) and facility of translation into other languages
- » Possibility of interactivity
- » Is the service provider open to partnership?

Implementation:

Once you have identified the ICT-solution/service, you can start 'implementing'. Depending on the type of solution, the order of planned activities can highly vary. In your planning, take into account that some activities will be dependent on the well-functioning of the ICT-solution.

- » **Existing capacity:**
 - * Do you/the user(s) have sufficient 'IT'-capacity to follow-up on next steps regarding solution development, procurement, installation, testing, debugging, maintenance, etc.?
 - * Do you go for 'in-house' expertise, or do you rely upon external support?
 - * Is reliable technical support locally available?
- » **Planning:**
 - * Have you/the user(s) built in sufficient flexibility in the planned consecution of your activities?
 - * Did you determine 'learning moments' throughout the process?

N.B. Count with the probability of delays, and avoid high dependency of your other planned project activities on the ICT-solution.
- » **Partnering:**
 - * Have you/the user(s) considered to partner with specific service/solution provider(s) and/or other enabling organizations?
 - * Do you go for local partners or international organizations, or both?
 - * Did you assess whether similar local user (organization)(s) have had experiences with the use of ICT-solutions? What were their experiences and lessons learnt?

N.B. International ICT-companies/organizations may bring in advanced and state-of-the-art technology and/or strong change management advice, but local companies/organizations may be better aware of the local circumstances and the conditions in which ICT can be applied!
- » **Contracting:**
 - * Have you/the user(s) established who will be the solution/service provider?
 - * Can you establish a Service Level Agreement (SLA) with the provider, and is it possible to take sanctions if the terms of the agreement are not respected by the provider?
 - * Do you have access to legal assistance in order to check upon the completeness of the SLA(s), and/or to follow-up on delivery of the SLA(s)?
- » **Testing:**
 - * Have you/the user(s) established a testing period for the ICT-solution?
 - * Have you established a testing protocol (who will test what, how long, who will provide feedback on what, etc.)?
 - * Given the fact that an ICT-solution is never 'ready', what are your minimum requirements to give it a green light for roll-out?
- » **Procurement:**
 - * Have you/the user(s) established a complete list of necessary equipment/hardware/software – also think of spare parts/replacement hardware, and 'protective' equipment (power regulator/stabilizer(s), batteries, anti-lightning etc.)?
 - * Do you have a list of preferred suppliers?
 - * What service and guarantee terms does the supplier offer?
 - * Do you have technical support to check on the quality of the delivered goods?
- » **Installation:**
 - * Who will install the ICT-solution?
 - * Do you/the user(s) have technical support to check on the quality of the installation(s)?

» **Capacity building:**

* What capacities to engage with/use/maintain the ICT-solution are necessary at the level of the user(s) and beneficiaries?

* Did you assess the existing ICT-capacities (e.g. basic office, basic maintenance, advanced office, specific applications etc.) of the user(s)?

* Can capacity building/training be provided locally (are there well-equipped training venues)?

* Can capacity building/training be provided by a local partner?

N.B. Consider identifying and training local trainers/champions/power-users, who will be able to assist/train/coach other end-users.

» **Monitoring and Evaluation:**

* Did you conceive a specific monitoring (and evaluation) methodology to assess the user satisfaction/results/impact of the ICT-solution?

* Did you identify the user(s) and beneficiaries you want to involve in the M&E-process?

* Did you consider using ICT-tools to enhance your M&E (e.g. online survey, feedback survey via phone/SMS, SMS-quizz, etc.)?

N.B. Mobile network operators and/or aggregators often have very powerful tools to analyze their clients' satisfaction/use patterns – but they can be reluctant to share these data. Look into this issue before signing a contract with a service provider!

» **Equipment monitoring and maintenance:**

* Do you/the user(s) have technical support to regularly check on the state of the equipment, to replace malfunctioning hard- and software, to maintain the equipment etc.?

N.B. Consider using local trainers/champions/power-users, who are able to monitor/assist/advise/coach other end-users.

» **Sectoral and cross-sectoral collaboration:**

* Apart from your own value chain/sector/domain, did you look into other sectors and other disciplines/domains when considering collaboration and learning with other actors?

Engaging diverse expertise across disciplines and industries at all stages, and working across sector silos to create coordinated and more holistic approaches may prove enriching – but it can be fastidious and derive you from quick results.

» **Mutual learning:**

* Did you incorporate learning opportunities with sector peers and other stakeholders in your activities?

* Can you tap into the potential of ICT-enabled networking, learning and sharing (e.g. consider supporting expertise networks and communities of practice, learning platforms, mail lists etc.)?

N.B. - Also consider facilitating physical peer sharing and exchange visits among organizations, locally and cross-country.

» **Data and proprietary rights:**

* Did you establish what approach you will have towards proprietary rights on content, software etc.?

From a development perspective, an “open” approach to technology-enabled international development provides a framework for using Open Data, Open Standards, Open Source, Open Innovation, and investing in software as a public good. However, this ‘open’ approach may not coincide with the interests of your (private) partner(s), and it may make it difficult to build business model(s) based on selling content products.

Annex 5 – The Nine Digital Principles

ONE: DESIGN WITH THE USER:

- Develop context-appropriate solutions informed by user needs.
- Include all user groups in planning, development, implementation, and assessment.
- Develop projects in an incremental and iterative manner.
- Design solutions that learn from and enhance existing workflows, and plan for organizational adaptation.
- Ensure solutions are sensitive to, and useful for, the most marginalized populations: women, children, those with disabilities, and those affected by conflict and disaster.

TWO: UNDERSTAND THE ECOSYSTEM:

- Participate in networks and communities of like-minded practitioners.
- Align to existing technological, legal, and regulatory policies.

THREE: DESIGN FOR SCALE:

- Design for scale from the start, and assess and mitigate dependencies that might limit ability to scale.
- Employ a “systems” approach to design, considering implications of design beyond an immediate project.
- Be replicable and customizable in other countries and contexts.
- Demonstrate impact before scaling a solution.
- Analyze all technology choices through the lens of national and regional scale.
- Factor in partnerships from the beginning, and start early negotiations.

FOUR: BUILD FOR SUSTAINABILITY:

- Plan for sustainability from the start, including planning for long-term financial health, e.g., assessing total cost of ownership.

- Utilize and invest in local communities and developers by default, and help catalyze their growth.
- Engage with local governments to ensure integration into national strategy, and identify high-level government advocates.

FIVE: BE DATA DRIVEN:

- Design projects so that impact can be measured at discrete milestones with a focus on outcomes rather than outputs.
- Evaluate innovative solutions and areas where there are gaps in data and evidence.
- Use real-time information to monitor and inform management decisions at all levels.
- When possible, leverage data as a by-product of user actions and transactions for assessments.

SIX: USE OPEN DATA, OPEN STANDARDS, OPEN SOURCE, OPEN INNOVATION:

- Adopt and expand existing open standards.
- Open data and functionalities, and expose them in documented APIs (Application Programming Interfaces) where use by a larger community is possible.
- Invest in software as a public good.
- Develop software to be open source by default with the code made available in public repositories and supported through developer communities.

SEVEN: REUSE AND IMPROVE:

- Use, modify, and extend existing tools, platforms, and frameworks when possible.
- Develop in modular ways favoring approaches that are interoperable over those that are monolithic by design.

EIGHT: ADDRESS PRIVACY & SECURITY:

- Assess and mitigate risks to the security of users and their data.
- Consider the context and needs for privacy of personally identifiable information when designing solutions and mitigate accordingly.
- Ensure equity and fairness in co-creation, and protect the best interests of the end-users.

NINE: BE COLLABORATIVE:

- Engage diverse expertise across disciplines and industries at all stages.
- Work across sector silos to create coordinated and more holistic approaches.
- Document work, results, processes, and best practices, and share them widely.
- Publish materials under a Creative Commons license by default, with strong rationale if another licensing approach is taken.



Annex 6 – Quotes from interviews and survey related to use of ICT in GIZ-projects

“For many functionalities regarding communication and information-sharing, it is best to simply look at what existing solutions people are already using. Many young farmers in my country already use Whatsapp and Facebook for instance, so it would be futile to try SMS with them or to push other channels.”

“There is a world out there that we often do not know about. I was surprised to find out how dynamic and engaged this new IT-ecosystem of young developers and start-ups is in my country. There is a huge potential for development agencies to collaborate with, and further stimulate this young generation. We need to dive more into these local ecosystems, find out who is doing what and why, and join existing networks or contribute to new ones.”

“Sometimes, it is important to accept the need for investments in hardware – especially regarding the core equipment for the platforms one wants to pilot: a good and stable technical environment allows the implementers to spend less time on overcoming technical issues and more time on piloting the change processes that are needed for fundamental innovation.”

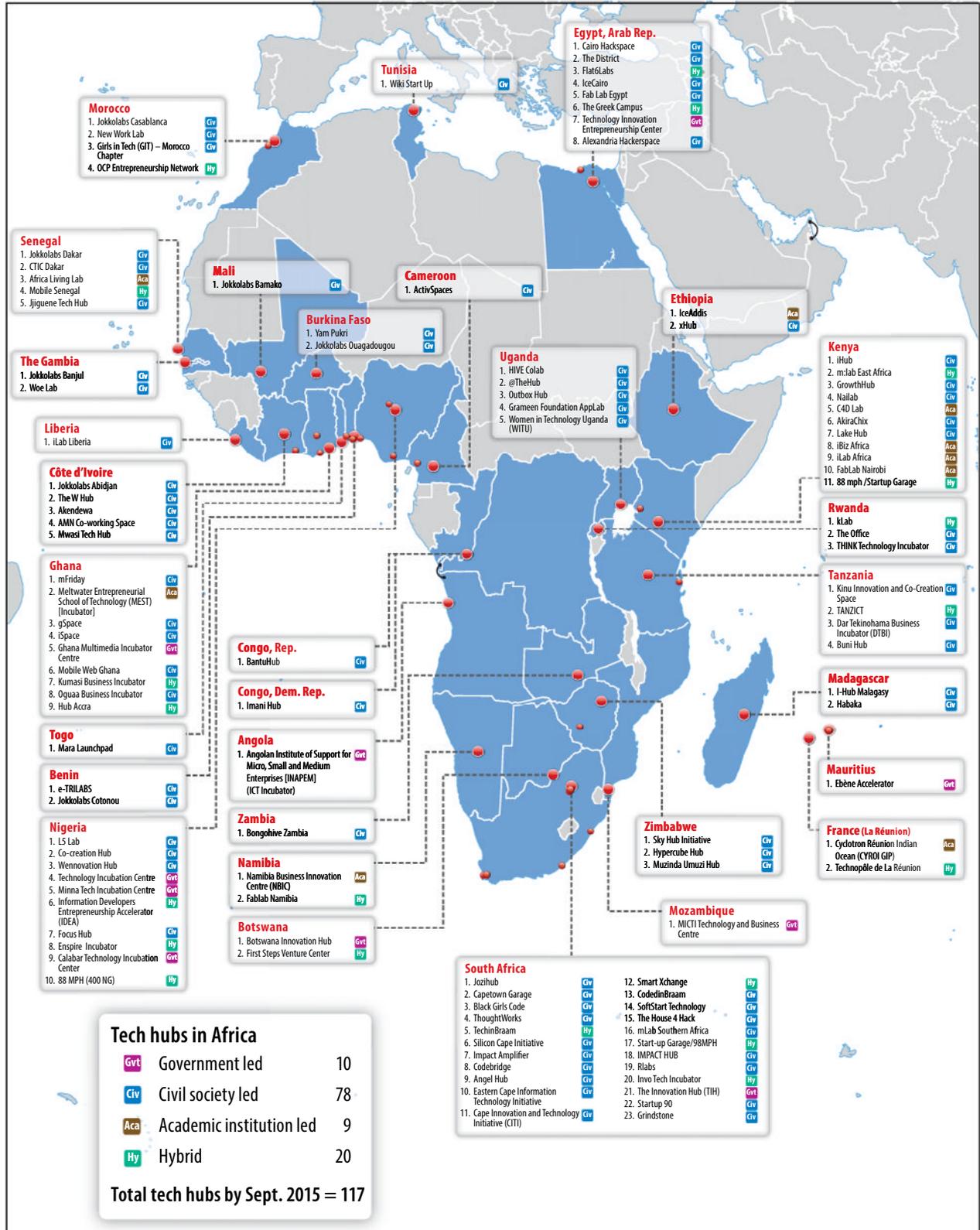
“Don’t start with the technology, we should avoid proposing ‘solutions looking for a problem’. Look at the potential for scale and the pricing of existing solutions. The price related to the value brought by the solution can become better when scale is reached.”

“We do probably not need more specific technical support on ICT from HQ. But it would be good to have more easily access to a type of generic ICT4D-knowledge, like ‘what options are there currently available worldwide regarding ICT-solutions for the rice sector’. We’re now often stumbling on things by accident or coincidence, but often we cannot compare. Knowledge management around ICT4D should be better structured within GIZ.”

“Expectations should be realistic: it is good to have big ideas but the 3 year timespan for a project is probably too short to develop stable and sustainable ICT-systems. It requires long-time efforts to get an ICT application well-functioning, let alone a complete system.”

“We need to have more clear principles and guidelines on some fundamental issues regarding ICT’s. What is our stand on data ownership, on data security, on open data, on intellectual property? Where do we put the emphasis: invest in technology and technology firms to deliver content and services, or invest in people’s capacity to use technologies? Or both?”

Annex 7 – Map of African tech hubs



Source:

WDR 2016 team. Interactive map and source data available at http://bit.do/WDR2016-Map4_3

Map 4.3 'African tech hubs' p230 - World Development Report 2016 Digital Dividends | World Bank Group



Graphics/Illustrations:

p.9: 'Global ICT developments, 2000-2015'

Source: ITU World Telecommunication/ICT Indicators database

p.9: 'Global Mobile Data Traffic Growth / Top-Line'

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2014-2019

p.14: 'Some services and sectors are more amenable to digital technology than others'

Source: WDR 2016 team

p.16: 'The smallholder ecosystem and its actors, including the upcoming mAgri services'

Source: Freely adapted from Fonzi and Chau (2012)

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