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BRIEFING PAPER

MOBILE APPLICATIONS FOR MONITORING AND EVALUATION IN AGRICULTURE

INTRODUCTION

This briefing paper is to help USAID missions and their implementing partners in sub-Saharan Africa use information and communications technology (ICT) more successfully—via sustainable and scalable approaches—to improve the impact of agriculture-related development initiatives, including Feed the Future projects.[1] It focuses on the application of mobile applications for monitoring and evaluation (M&E) in agriculture, including a few examples of how projects are, or could be, using mobile-enabled M&E tools.

USAID has emphasized monitoring and evaluation in recent years. In its latest Evaluation Policy released in January 2011, USAID Administrator Rajiv Shah says, "In an increasingly complex operating environment, the discipline of development demands a strong practice and use of evaluation as a crucial tool to inform our global development efforts, and to enable us to make hard choices based on the best available evidence." The paper goes on to define evaluation as, "the systematic collection and analysis of information about the characteristics and outcomes of programs and projects as a basis for judgments, to improve effectiveness, and/or inform decisions about current and future programming." This is where ICT can make a significant contribution to monitoring and evaluation. ICT implementation requires that a project rigorously define its requirements, rules and policies. By doing this, a project often identifies duplicate or inefficient processes and inconsistent data standards. ICT implementation, therefore, often results in more systematic processes and uniform data standards.

In addition, the USAID ADS Chapter 203: Assessing and Learning, section 203.3.5.1 Data Quality Standards states, "USAID Mission/Offices and Missions should ensure that the performance data in the performance management plan (PMP) for each development objective (DO) meet five data quality standards (abbreviated VIPRT)."[2] VIPRT stands for Validity, Integrity, Precision, Reliability, and Timeliness. Again, ICT tools such as mobile applications and data collection systems could play a critical role towards meeting these five data quality standards. In fact, in many cases ICTs are the best way to meet these standards at scale and volume.

ICT can help projects' M&E by making the process faster while providing higher data quality with fewer staff. Rather than spend days or weeks manually transcribing data from paper surveys into a spreadsheet or database, mobile data collection tools enable direct transfer of data to central databases where data can be immediately analyzed and acted upon. Several mobile data collection tools are now available and work in both online and offline modes. This enables field workers to collect data in remote areas and then synchronize the data into a cloud database when they return to an area with connectivity. In online mode, when the mobile device is within range of a mobile phone signal or connected to the internet, that data can be automatically transmitted to the server (similar to how one can draft emails in Outlook when offline and send them later when online).

As a result, data quality is improved because the transcription from paper surveys to an electronic data store is eliminated, significantly mitigating the opportunity for human errors in the data entry process. The mobile data entry forms offer numerous data validation options that can ensure that all required data is entered and that the data conforms to the correct formats and value ranges, again reducing the effort required to clean data. Periodic data audits may still be needed, such as against new users of the mobile app, and because people can still make typos and enter a response that is logically inconsistent with other responses. However, the data review effort becomes an occasional, instead of an ongoing, intensive activity.

[1] ICT includes cell phone and internet services, radio, digital devices and related tools including cameras, geographic information systems, and a wide range of hand-held computing devices.

[2] ADS 203, P. 32.

The trend with these tools is to store the data "in the cloud"—in a central database accessible from any internet-connected location. This makes the data more readily available to those who previously may have waited weeks or months for paper reports to be transcribed and summarized. Storing data in the cloud also makes the data more open and transparent, as it can be made accessible to stakeholders, from field workers to country and head office staff, governments, partners, and donors, all of whom may need the data for planning and decision-making.

Mobile tools also enable regular feedback and early insights that can be applied immediately for greater impact, whether to correct course or address emerging issues. Using these tools also allows timely data mining to monitor trends to inform program design and direction. Instead of traditional M&E efforts with intensive data collection and analytical periods, such as baseline and end of project analysis, the data can now be collected iteratively and continuously throughout the project.

With the emergence of GIS technology and GPS-enabled mobile phones, this information can now be presented on a map as another method for gaining early insights and detecting trends that have a geographic basis. With GPS coordinates for every village, farm, input supply store, and market, it is now possible to track and follow-up with beneficiaries and actors in the agriculture value chain.

Moreover, the use of a mobile application for monitoring and evaluation can pay dividends beyond a single project. Survey designs, data management processes, and data definitions and standards developed on one project can potentially be leveraged on other projects, reducing the need to reinvent the wheel on each project.

ICTs, however, can still present challenges for implementation. There are constantly new mobile applications coming onto the market, which can make it difficult to know what the best fit is for your project needs. The mobile device sector is also highly competitive and therefore rapidly changing, from netbooks to mobile phones to tablets, and from Blackberry to Apple to Android mobile operating systems. Unfortunately, there is no easy, singular solution that will fit 100 percent of a project's needs. Nonetheless, quite a few off-the-shelf solutions exist today which offer a broad set of functionality that can meet a majority of a project's needs. It is also important to incorporate ICT into the budget, staffing plan, design, implementation, and management of M&E efforts at the beginning of the project. Doing so will likely increase the chances of successful ICT implementation.

This paper highlights a few projects using mobile applications for monitoring and evaluation in agriculture and draws insights from their experiences. These examples are by no means exhaustive, but will hopefully be useful to anyone planning to use ICT to enhance their monitoring and evaluation efforts.

EXAMPLES OF PROJECTS USING MOBILE-ENABLED M&E FOR AGRICULTURE

Great Lakes Cassava Initiative (GLCI).[3] GLCI, funded by the Bill & Melinda Gates Foundation and managed by Catholic Relief Services (CRS), was a four year initiative that ended in August 2012. Its objective was to strengthen capacity in six Great Lake countries—Burundi, Democratic Republic of Congo, Kenya, Rwanda, Tanzania and Uganda— to combat the already present cassava mosaic disease and the emerging cassava brown streak disease pandemics. These diseases threaten the food security and livelihoods of farm families in these six countries. GLCI worked with the International Institute for Tropical Agriculture (IITA) to increase the capacity of field agents and extension workers in disease diagnosis, monitoring and prediction. The program trained over 3,000 farmer groups and 60-plus partners, and collaborated with multiple cassava initiatives in each country, regionally, and across Africa.

When GLCI began in late 2007/early 2008, there was no ICT component in the project. This changed after a side conversation between CRS's chief knowledge officer, NetHope, and Intel, led to a proposal to rework the proposed M&E system with an ICT solution. As a result, the GLCI project manager gained approval to shift their M&E and logistics budgets to fund an ICT component at no additional cost to the project.

For their mobile device, CRS purchased nearly 300 netbooks (rugged nine-inch Intel 2 Go PCs) to share the data rich content across the six GLCI countries with its NGO partners. The main components tested in the ICT implementation of the project were distance learning training materials and data transfer. A standardized training program was deployed using the Agilix Learning Management System (LMS), then called "Go Courses", to be taken by GLCI managers, supervisors and field agents. The training software allowed participants to complete learning assignments, quizzes, and tests, which were submitted online and evaluated to assess training utility and course effectiveness.

The project also used the netbooks to conduct field-based data collection to assess project impact. This included

[3] Also see http://iglci.crs.org/Pages/UsingTechnology_CarlWalsh.aspx

forms for registering farmers, service delivery, and disease monitoring surveys. Field agents collected data on farmer groups, planting, disease, and seed distribution, all of which were geo-referenced and entered into custom forms built for the project. Data was gathered offline and then synchronized into a central database for analysis and onto a public website for reporting. The agents used a combination of WiFi zones, office networks, Bluetooth connections to smart phones, and GSM dongle modems to transmit emails and synchronize the data collected in the field and the course updates.

At the time, the netbooks were required to deliver the rich content needed for the distance learning software. By also using the netbooks for data collection GLCI received more utility out of the netbooks and did not have to buy and manage additional hardware in the form of mobile phones.

GLCI achieved its goal of reaching approximately 1.15 million farm families (approaching 7 million persons). This program also marked the first time that CRS was able to answer basic service delivery questions with accuracy, such as the actual number of farmers reached, their location, composition of farmer groups, the services provided to the farmers and near real time disease mapping. The software forced discipline into the project's data management by using common indicators across all 60-plus project partners. This eliminated the proliferation of duplicative surveys.

The success of their first, scaled data management system has inspired CRS to implement the approach across the agency. CRS is currently in the second phase of a program to standardize their M&E across a number of larger projects, with an ultimate goal of using the digital platform across all CRS projects. The key attraction of the platform is its ability to provide timely, standardized information.
Although standardized, the system also allows for flexibility. For example, M&E questions can be asked in different ways but they are always mapped back to the same database field. Through this initiative, CRS realized that the value of ICT was not simply to enable faster, better, paperless data collection but to analyze and derive greater meaning from the data.

GLCI was a $21 million project, of which approximately $300,000 was for the ICT component, including technology, staff salaries and related ICT costs. CRS made the case to the Gates Foundation that by investing in an ICT solution they would save money in other parts of the project.

What was not factored into the calculation is that the ICT solution is providing so much more capability and tools than the original approach. Having a distance learning capacity provided a more sustainable and scalable solution for learning across the agency. CRS was able to develop courses in multiple languages and have built a second-generation version of the training modules. The LMS enabled GLCI to avoid the pitfalls of the past training approach in which information was expected to "trickle down" as the target field agents took the training and then informed the farmers, because the system tracked who was actually trained and their level of learning. This process was a powerful motivator for the field agents, who felt more empowered and could see how their learning was being used to improve their data collection.

The rapid collection and aggregation of data also made it much simpler to clean and use within the project. Again, this increased communication between managers, M&E managers and field staff. GLCI was able to collect much more detailed data as well as spatial data, allowing them to do new types of analysis. This enabled them to quickly act and make decisions based on the data, rather than waiting up to a year to get results based on paper systems.

Liberia Agricultural Upgrading Nutrition and Child Health Project (LAUNCH). LAUNCH is a USAID/Food for Peace (FFP) project, managed by ACDI/VOCA in collaboration with Project Concern, working in the Bong and Nimba counties of Liberia to improve food security and reduce chronic malnutrition of vulnerable women and children under five years old.[4] The project aims to reduce chronic malnutrition by providing food supplementation and nutritional information and improve maternal, infant and young child feeding and hygiene practices (breastfeeding). Each month about 9,000 beneficiaries participate in the food distribution, with the number fluctuating by season. Under LAUNCH there are food distributions once a month, at a designated point on a designated day. Although this project is primarily focused on nutrition, it does contain an agriculture component. In addition, its use of mobile data collection even within its nutrition component is relevant to agriculture development projects.

John Snow Inc. (JSI) provides technical assistance to strengthen the supply chain for the food distribution and enhance nutrition and health interventions within the project health component. The original strategy was to do beneficiary registration on paper, then send the paper to the office to enter in Excel. LAUNCH initially expected an average six-week wait time between beneficiary registration and

[4] JSI website. In Liberia, mobile phones are used to improve data flow for better nutrition interventions.

the first food distribution to the beneficiary. In practice, the wait time was actually twelve weeks on average once the project began. This was too long, as the first 1,000 days of a child's life, from conception to less than two years of age, are critical. In addition, no monitoring information could be collected to assess progress in improving women's nutrition and infant and young child feeding practices.

JSI suggested testing the use of mobile phones and EpiSurveyor for improving beneficiary registration and monitoring nutrition practices. EpiSurveyor—recently rebranded as Magpi—is a cloud-based platform that enables users to design and build data collection forms, collect data via a mobile phone and immediately upload and analyze the data.[5] JSI had already been using EpiSurveyor on two other projects in Liberia so they were confident it would improve project implementation. Prior to deciding on EpiSurveyor, a JSI team member reviewed several mobile data collection applications for functionality, cost, ease of programming forms, and other criteria. Through that analysis, they concluded that EpiSurveyor was the best fit and offered the most capability, without requiring JSI to create their own system.

In March 2012, under the paper registration system, the wait time between day of registration and food distribution was 21.4 weeks. By July 2012, after LAUNCH implemented EpiSurveyor to register beneficiaries, the wait time was reduced fourfold to 5.1 weeks.[6]

With EpiSurveyor, the Monrovia-based LAUNCH team is also able to monitor its staff in the field. EpiSurveyor allows the project to track when data is uploaded and by whom. LAUNCH set a policy that assumed that at food distribution points (FDPs) there is no connectivity. At night the staff are not allowed to take the phone home with them (Nokia E63 smart phones, purchased locally for approximately $200 each), so the staff are required to go to the office to upload data. Supervisors in Monrovia review and validate the data the next morning, correcting the data while it is fresh in the field staff's minds.

Monitoring of practices in nutrition programs are typically done through household surveys, which are very time consuming and expensive, therefore they are often done infrequently. LAUNCH beneficiaries—pregnant women, women who are breastfeeding, or have children under two years of age—live in remote areas, making it difficult to regularly meet them and track progress except through resource-intensive surveys. The LAUNCH program needs to identify progress in improving women's nutrition, breastfeeding, basic hygiene and complimentary feeding practices, using the internationally accepted nutrition indicators, which makes having access to accurate and timely information all the more important.

To facilitate this, project staff came up with the idea of conducting interviews with these women at the food distribution points, which are a convenient gathering place, using mobile phones. Therefore every quarter, LAUNCH staff collect approximately 350 interviews and analyze the data as if they were doing a quarterly household survey. This allows the project to promptly address issues indicated by this monitoring data. LAUNCH still conducts annual surveys but the intent of the interviews at the food distribution points is to supplement the annual surveys and generate monitoring data quarterly. LAUNCH conducted the first round of interviews for the April to June 2012 quarter. Out of 548 interviews, they included 534 in the analysis (14 were dropped due to missing or inaccurate data on children's birthdates). The project was able to use data collected using mobile phones loaded with EpiSurveyor to produce several conclusions and recommendations that allowed the team to better understand and address the needs of their beneficiaries and streamline project implementation.[7]

Community Knowledge Worker (CKW) Program. The Grameen Foundation's Community Knowledge Worker program in Uganda, previously documented by FACET and elsewhere, provides market price information, weather information, farming best practices, an input supplier directory, and Google Trader (a mobile platform where farmers with produce to sell can advertise to traders) through a network of over 800 village representatives or CKWs.[8] The program has developed a suite of mobile applications for the CKWs to use in their work with farmers: CKW Search, to search for information for a farmer; CKW Survey, which allows CKWs to conduct and submit surveys; and CKW Pulse, which allows CKWs to communicate with each other, make support requests, interface with the customer support system and track their earnings.[9] These mobile apps are based on open-source technologies and work with Android or Java-enabled phones.

[5] For more information read USAID's ICT and Ag profile on Magpi

[6] Brief from JSI titled "LAUNCH Mobile Phone Registration Brief-Aug 22.pdf" provided by JSI.

[7] LAUNCH Program 2012: FDP Interview Results Round 1 (April-June 2012), provided by JSI.

[8] World Bank, Two Birds with One Stone: Grameen's Mobile Data Collection and Extension Service.

[9] http://www.ckw.applab.org/section/ckw-technology

The apps collect usage statistics every time the CKW uses it, whether it is to search for information, to register a farmer, or conduct a survey. At the same time, the apps also capture GPS location coordinates of the CKWs or of other sites surveyed (such as farms). Grameen records all of these individual data points and transactions in a back-end database platform based on Salesforce.com.[10]

It uses a dashboard presentation that displays the detailed data in an aggregated and summarized form, in an at-a-glance format useful for monitoring, analysis, and decision-making. In the presentation on the dashboard, Grameen has grouped the data into four groups: scale, impact, quality and sustainability. Scale includes the total number of farmers reached, with a further breakout of percentage who are female or are very poor; total number of surveys submitted; total number of searches made; and total number of CKWs deployed and retained. For impact, the dashboard displays metrics such as the average number of repeat users of the CKW services, broken out again by female farmers and very poor farmers. Under quality, the dashboard presents the percentage of CKWs in the high performance category (meeting 75 percent of their performance target) and the percentage of surveys that meet quality standards. The sustainability metric measures client satisfaction based on client satisfaction surveys.

All of this information is grouped by quarter where applicable. Targets and actuals met that quarter are displayed and compared against the previous actuals achieved for the metric. The metrics in the dashboard are updated at different intervals: daily, monthly, quarterly or biannually. The dashboard also displays maps showing the geographic distribution of CKWs by gender, poverty level, and status (active/inactive).

This collection of data is powerful in several ways. It gives stakeholders the ability to understand the effectiveness of program execution (such as where to allocate resources or what further training is needed for farmers or the CKWs) and understand the needs of farmers and stakeholders and act accordingly. For instance, information based on the types, volume, date of searches, and calls to the call center can be combined to determine whether a disease outbreak is emerging in a specific area, and therefore what resources need to be applied and who may need assistance.

The CKW program appears to be having a positive impact on farming in the Mount Elgon region of Uganda. Early results from a recent study shows a 22 percent increase in maize prices in areas served by a CKW and that CKWs increase farming knowledge by 17 percent on average.[11]

CONSIDERATIONS FOR INTEGRATING ICT TOOLS INTO PROJECT M&E

One persistent question that both donors and implementers ask is, 'How can projects use ICT effectively to help with their M&E?' There are more factors to consider than can be covered in this briefing paper, but a few core elements are covered here.

Selection of ICTs: Both Software and Hardware. CRS went through a few changes in technology while working on GLCI and other programs. This is not unusual and should be planned for. A technology implementation is never really "done", because (1) technology itself evolves, and users and other stakeholders will want to take advantage of improved technology and (2) a rollout of an ICT solution is often done in phases, both to manage risk and also to deliver a functioning system in a timely manner, rather than wait years for the perfect, comprehensive solution.

GLCI first used netbooks and Adobe Air as the forms tool, but on subsequent projects they moved to iFormBuilder.[12] Adobe Air was not quite as flexible as iFormBuilder but it was a standard form that could be used by field technicians. With Adobe Air only a few people could make changes to the form or database. In contrast, iFormBuilder is a cloud-based product that allows almost anyone to build a form. As the form is built, the database is built to match it. CRS started using iFormBuilder because they needed a tool that worked offline. iFormBuilder works primarily on Apple products, and CRS uses it mostly with iPods and the iPod Touch because of their long battery life.

Similarly, LAUNCH uses the Nokia E63 mobile phone because it has a decent size screen and a full QWERTY keyboard, so people are able to learn to use it fairly easily. However, Nokia is no longer selling this phone model. JSI is looking to pilot an Android and Apple phone because these are becoming the dominant mobile operating system over the older J2ME platform upon which the Nokia E63 is based.

[10] US-based technology company that has been providing "software as a service" or cloud-based database solutions for over a decade.

[11] Van Campenhout, B., "Mobile Apps to Deliver Extension to Remote Areas: Preliminary Results from Mnt Elgon Area", (Grameen Foundation and IFPRI, July 5, 2012).

[12] For more information read USAID's ICT and Ag profile on iFormBuilder

Type of Environment Conducive for ICT-enabled M&E. CRS wanted to test the flexibility of the technology, and GLCI offered a lot of variation by region and country. If the ICT could work across a wide range of conditions, it could work almost anywhere CRS works. They wanted to test a range of variables and needed to run a robust test of connectivity, capacity to use computers, power, language, social/cultural, and other issues, so they deployed the ICT across the six GLCI countries and adapted the solution according to each country's condition.

As a result of GLCI, CRS has changed their thinking about ICTs in the development context. Instead of asking, 'Is the environment conducive to ICT?' they now know that there are different solutions for different challenges. For example, if there is no access to grid electricity, solar might be an option. If there is no internet connectivity, data can be stored locally on a USB flash drive or external hard drive. Over time, many of these challenges may subside somewhat, as the constraints due to lack of power, connectivity, and capacity are diminishing every day in many parts of the world.

In the LAUNCH project case, JSI already understood that internet connectivity outside of Monrovia, the capital of Liberia, was poor and inconsistent, so they use the GPRS network offered by the mobile operator. They provided four days of training including field practice to their staff to learn to use EpiSurveyor.

Gender Issues. Gender issues with technology may arise in unexpected ways. When the netbooks were introduced to GLCI, men who were field agents asked for a 100 percent salary increase or else they would not use the computer. The men backed down when CRS responded by saying they would hire more women. The men's attitudes also changed when they heard the women's response. In the same meeting, the female field agents asked if they could use the technology at home to help their children learn. To which CRS agreed. Women also said that when they went to the field, the computer helped them garner more respect, so they felt it was an empowering process. The field agents' attitudes changed over time as they realized that they were gaining transferrable skills and could get a job at other NGOs. The gain in skills did not lead to higher staff turnover, because the project was constantly updating and upgrading their usage of ICT so that staff were constantly learning.[13]

Types of Resources Needed. ICT is a specialized, complex field and the people who have one set of ICT skills do not necessarily have expertise in other areas. Projects should look for someone ideally with experience managing, designing, and implementing mobile applications, someone who has technical skills and enjoys working with people, and is truly interested in the development objective. In the case of GLCI, CRS realized that they needed to change their staffing approach in order to support frontline field work. They would have to work with service providers and roll out technology to the field. They had to hire new staff that could provide localized training to all the partners, and had to set up basic support for continuous support and maintenance. A diverse set of skills was needed, not only technical skills but project management, training, and data analysis, to name a few.

On LAUNCH, in addition to the eight staff who regularly use EpiSurveyor for beneficiary registration and FDP interviews, there are also another nine staff members who were trained to use EpiSurveyor for an annual survey several months ago. These staff members will soon use EpiSurveyor for monitoring the agriculture component of LAUNCH.

CHALLENGES

Instead of dwelling on the usual challenges with deploying a mobile or ICT application in general in rural, agricultural environments, such as screen visibility in bright sun or battery life, both GLCI and LAUNCH noted the potential extra burden that deploying a mobile solution can impose on the project team. They used various strategies to introduce the solution to the teams and gain buy-in and acceptance.

For GLCI and CRS, it was a disruptive process because the ICT was not introduced at the start of the project and the M&E and logistics budget had to be reworked to accommodate its usage. At first, it was considered an imposition on the team. One thing that helped smooth things over was that CRS won a grant, which they gave to GLCI as a sort of subsidy for having to change their project, through new and modified trainings and new staff hires. Even though the project leader saw the value and opportunity for ICTs, it was still necessary for the rest of the team to not view the ICT component as an imposition. Ultimately this led to a transformation at CRS, leading to the creation of an "ICT for development" (ICT4D) group within their IT department.

When LAUNCH started, there was some initial skepticism and caution, even with JSI's successful past experience with EpiSurveyor on several previous projects including two in Liberia. They did not want to overburden the staff, who were already doing multiple jobs. They also were

[13] For a further discussion of gender issues, see Gender Mainstreaming in ICT for Agriculture.

cautious as only a few projects in Liberia were using mobile phones and they were still waiting to see success. They overcame hesitation by starting off slow, showing that it could work, and it would help the staff work efficiently rather than add extra burden. The results have been so good that the team has totally embraced the tool and are looking to apply it to other objectives of the project.

LESSONS LEARNED

With CRS, the ICT solution showed staff the value of standardized information. CRS project leaders now advise entities to buy commercial off-the-shelf, cloud-based solutions, rather than to build them as they did back in 2008. After GLCI, CRS now feels more capable to implement ICT solutions and more strongly positioned to do so in the future. They no longer see the challenges in the same way as the skeptics within their organization may have viewed them a few years ago.

CRS has also realized that there is a lot of focus on activity monitoring but not as much on impact. For example, how does one measure if the field agent is actually using the training materials and whether the information is getting to the farmer? Generally there's an end-of-project deep dive, but very little focus on impact. They have learned from GLCI that different types of data and tools can be joined for routine monitoring to meet objectives, and that there is a linkage between doing baseline surveys, delivering education to farmers, and then mapping and tracking progress.

LOOKING FORWARD

Beneficiaries are constantly surveyed and interviewed but do not necessarily receive any value in return. CRS wanted to change that equation by giving value back to farmers and has started to do so through a tool for farmers called FarmBook.[14] FarmBook provides training on market planning and business analysis as well as tools to run various productivity and profitability analyses. FarmBook is also used to help manage field agents and support data sharing by remote field agents with their project managers. According to Shaun Ferris of CRS, there are many gross margin analysis tools for an individual farmer but not for groups of farmers. This is one unique aspect of FarmBook in that it also provides analytical tools for groups of farmers.

CRS describes the tool as follows: "FarmBook was primarily developed to provide information to farmers. In many cases extension workers provide training but little data analysis of farm performance and sharing of this analysis with farmers. FarmBook provides farmers with customized business plans that provide individual farmers with details about their costs, revenues, sales and profits, including the costs of their loans for investments in a particular product from planning to sales. The business plan report is of considerable interest to farmers, who may not have access to this type of information. For the project, the information generated provides a rich source of data that can be integrated into the overall monitoring and evaluation process."[15]

FarmBook examines the entire business cycle, as opposed to the conventional approach of conducting discrete M&E efforts. FarmBook is currently in field testing in Zambia, Zimbabwe, Madagascar and Malawi.

The dashboard created by the Grameen CKW program is another example of the more sophisticated analytical tools now becoming available to agricultural initiatives in developing countries. Tools and systems such as FarmBook and the CKW dashboard help a program take a holistic approach to monitoring and evaluation, bridging pure indicator measurement with results and insights for business and program planning, design and direction. Another example of private sector approaches to the agriculture business being applied to the development sector is a company called Agro-Tech, an agriculture information systems and services provider operating in Malawi and several other African countries.[16] Their technology, models, and frameworks were developed and paid for by the tobacco and mining industries but are now being used by NGOs working in agriculture.

Mobile applications and other ICTs may also play a role in fostering more private sector involvement in initiatives to strengthen the capacity of farmers and agriculture extension agents as the technology to generate the business metrics that the private sector typically requires is increasingly available and feasible to deploy in developing countries. CocoaLink, a farmer outreach program in Ghana using mobile technology, is one example of a partnership led by a private sector

[14] FarmBook is being developed and tested at the request of a consortium of NGOs who work together as part of the Southern African Agro-Enterprise Learning Alliance. Members of the Alliance include: CRS, ACDI/ VOCA, World Vision, CARE, Land O'Lakes, Emmanuel International, World Fish, and WFP's P4P, among others.

[15] "What is Farmbook" provided by Shaun Ferris, CRS.

[16] For more information read USAID's ICT and Ag profile on Agro-Tech

actor.[17] It is a public-private partnership between the Ghana Cocoa Board, the Hershey Company and World Cocoa Foundation, with no traditional donor involvement. The pilot phase, which runs from 2011-2014, is funded solely by Hershey.

Over the next few years, ICT platforms will become a fundamental component of most monitoring and evaluation efforts. The tools are becoming simpler and easier to deploy, and the benefits over paper-based manual systems are becoming more apparent. Feasibility in developing countries is less and less of a concern, especially with respect to mobile phones. Developing countries are now driving growth in mobile telecommunications worldwide. Total mobile cellular subscriptions in Africa grew almost five times between 2005 and 2011, the highest growth rate of all regions, compared to growth of 1.35 in Europe.[18] At least ninety percent of the world's population is now covered by a mobile signal, compared to 61 percent in 2003.[19] The power of mobile technology to enable farmers, field agents, and other value chain actors to communicate with each other and collect and share information is too powerful to ignore. It is a capability that development practitioners should exploit.

As the project examples in this briefing paper illustrate, initiatives in Africa and elsewhere are starting to make strategic use of ICT to drive core operations and support analytical and decision-making functions. Demand to show effective use of donor funds and for transparency is likely to continue and will be another driver to increase the use of ICTs. Projects will be well served to consider this now and start to make the necessary adjustments to incorporate ICT into their monitoring and evaluation approach.

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