Digital Green

Goldilocks Toolkit
Innovations for Poverty Action
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Right-fit monitoring and evaluation (M&E) systems embody the principles of Credible, Actionable, Responsible, and Transportable, or CART. In the Goldilocks case study series, we examine the M&E systems of several innovative organizations and explore how the CART Principles can work in practice.

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Digital Green: Addressing Measurement Challenges in Agricultural Technology Programs

The use of information and communications technology (ICT) in agricultural services is becoming increasingly common. These technologies—radio, SMS, television, video, and Internet services—have the potential to help smallholder farmers increase their incomes[1] by making it easier for them to learn about and adopt new farming methods, grow higher-value crops, or connect with new markets.

Digital Green, an international non-profit organization based in India, uses locally-produced videos and in-person facilitation to share knowledge about improved agricultural and nutrition practices. The program aims to help rural communities across South Asia and Sub-Saharan Africa understand and adopt better agricultural and nutrition practices, and the ultimate goal of the program is to have a positive impact on individual well-being. Digital Green is currently working in nine states in India, and also in Afghanistan, Ethiopia, Ghana, Niger, Tanzania, Malawi, and Papua New Guinea. Since its start in 2008, Digital Green's program has produced over 4,000 videos reaching more than 800,000 viewers across more than 9,000 villages.

Digital Green is in the process of measuring the program's impact on farmer livelihoods and health status using randomized evaluations in both India and Ethiopia and its effect on improving nutrition-related behaviors in India. The organization has also invested in an activity monitoring system that reports data on program implementation and tracks the adoption of Digital Green-promoted practices from remote locations. One challenge in the activity monitoring system is its reliance on data from partner organizations, which varies in quality. Recognizing the issue, Digital Green has instituted a series of data quality checks and procedures to improve quality. The Goldilocks Initiative's recommendations for Digital Green focus on its agricultural activities, and include refining and consolidating the program's theory of change and conducting a systematic review of data quality.

What They Do

Digital Green produces and shares videos at the village level that are designed to educate rural communities about better agricultural and nutrition practices. They partner with existing agricultural extension and health delivery providers to develop the content for the videos, and they train extension workers on how to disseminate them. The videos are filmed with local community members in environments that are similar to those of individuals the videos target. Digital Green believes this approach makes it more likely individuals will trust the content, understand how to apply it, and adopt the new practices themselves.

Using battery-operated mobile projectors, village-level extension agents and community health workers hold screenings among community groups, like women's self-help groups and farmer groups, and lead discussions on the practices shown in the videos. The screenings typically include about fifteen individuals and are held every two weeks.[2] The sessions support frontline workers, who often are members of the same villages in which they screen videos, and are designed to be engaging and interactive, provoking questions and discussion among the participants. Community members can pause and re-watch segments, ask for more information from the frontline worker, and discuss how they could use the new practices.

During each screening, frontline workers record attendance and feedback. Afterwards these workers follow up with individuals and track which participants adopted practices featured in each video through physical observation on farmers' fields or individuals' households.

Theory of Change

Digital Green's program rests on the theory that existing agricultural training (extension) programs will reach more individuals and be more effective when supplemented with locally produced videos and group dissemination sessions.

The program has three components:

1. A content production process led by partner extension agencies and community members.

2. Content dissemination by partner extension agents who facilitate discussions using the videos among community groups.

3. A learning model that adapts the program based on data from monitoring individual feedback and adoption rates and then uses impact measurement to confirm effectiveness and further improve the program.

The intermediate outcomes of this strategy are agricultural extension agencies that operate more efficiently and effectively by providing better training and advising services for rural communities. As a result of the improved services, community members should retain knowledge on new practices and increase their adoption of the practices, which in turn increases their agricultural production, income, and overall well-being.

While the basic elements of the program's theory of change are well-defined, Digital Green's Monitoring, Evaluation, and Learning (MEL) team was concerned about whether all of the teams responsible for implementing the program, from headquarters to the field, had a good understanding of the theory of change (Figure 1).[3]

Although Digital Green has a number of foundational M&E documents, they were complex and may not fully inform the day-to-day data collection processes of partner staff and extension agents. For example, some of Digital Green's staff found it difficult to explain the theory of change, and field staff noted challenges in using the theory of change to inform decisions about what data to collect.

Although core indicators have remained largely similar over time and across regions, the MEL team at headquarters reported making other changes to data collection instruments without clearly understanding what information could be lost from data reports. Without a clear sense of what information Digital Green needs to collect, the organization gets stretched thin pursuing many different data collection tasks.

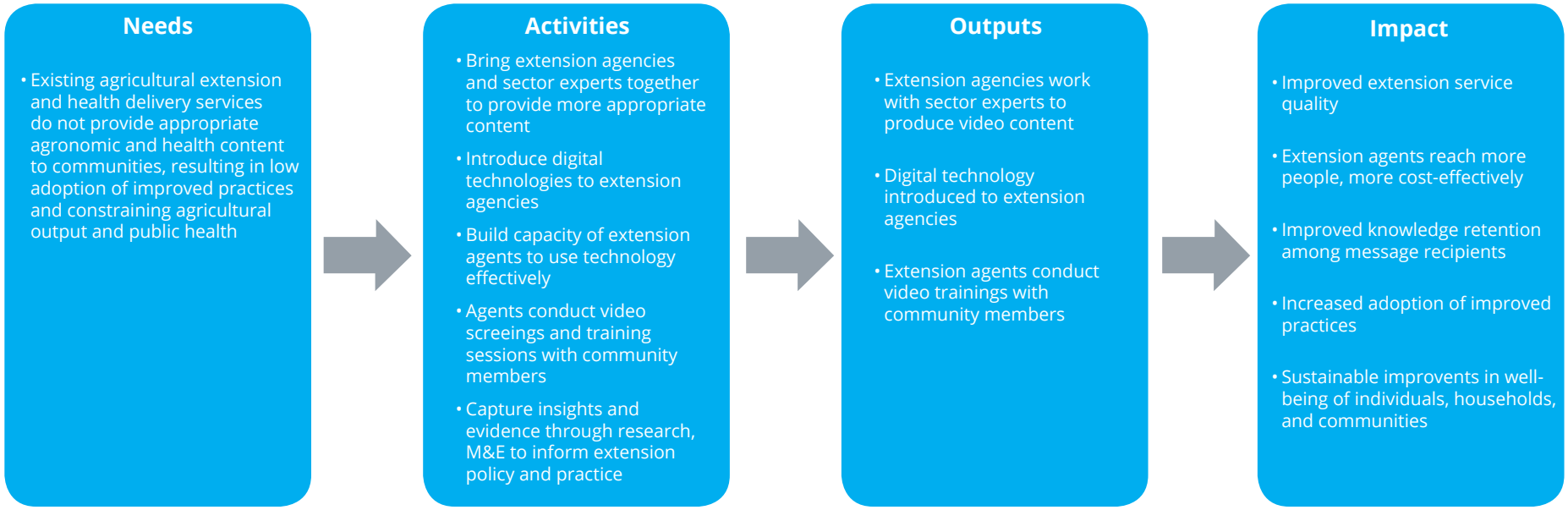

FIGURE 1. THEORY OF CHANGE*

*Organizations use a variety of methods to present their theories of change. To standardize our discussion of these cases, we present our own simplified version of Digital Green's theory of change here. Please see Figure 3 in the Appendix for the organization's full version.

Activity Monitoring

For data on program monitoring to be actionable, managers need timely and credible data reported in a format that helps them identify problems and successes in implementation, including whether programs are being implemented as planned, whether targeted individuals are being reached, and whether the mix of products and services is appropriate for client needs.

For Digital Green, agricultural extension agents from partner organizations, operating in remote locations with multiple responsibilities, are the first link in the data quality chain. They are responsible for collecting and entering data about the program into the organization's management information system, known as COCO (Connect Online, Connect Offline) after every video screening.[4]

These data include implementation indicators on the video screenings (topics covered, attendance and feedback asked), targeting indicators of the program's reach (total number of screenings, number of villages covered), engagement data (community feedback and questions), and uptake indicators (individuals adopting promoted practices or behaviors). Digital Green uses these data to support learning and demonstrate accountability. Community feedback and adoption per video are reported on Digital Green's website as part of its knowledge sharing effort, while frequently asked questions support learning that informs future video productions.

COCO feeds program data from different sites into the Digital Green dashboards, allowing staff to map adoptions and generate graphs and other charts that visualize program operations. These data visualizations can show sessions conducted over time, by video topic, by region, and/or by partner.[5] These data and visualizations are targeted at various actors—district-level video production teams, state and national extension supervisors, and village-level extension agents—to create incentives for improving the program and to serve as a performance management system

for them more generally. Digital Green intends the dashboards to create healthy competition to stimulate performance improvement. Figure 2 is a sample report that shows the number of groups attending disseminations, total number of videos shown, adoption rates of agricultural practices, repeat adoptions, average number of disseminations per day, average attendance, etc. This report shows a steady increase in total adoptions.

To support data credibility, Digital Green requires partner extension agents to conduct in-person field verifications of adoptions on farmers' fields or in their households. However, ensuring the accuracy of data reported on this key indicator is challenging, and some field staff report difficulty in validating adoptions. The auditing process faces three key challenges. First, Digital Green staff audit only a small percentage of adoptions and selection of farmer adoptions to audit may not be entirely representative, resulting in a sample of audited adoptions that is likely biased, and limiting the overall accuracy of adoption data. Second, defining and

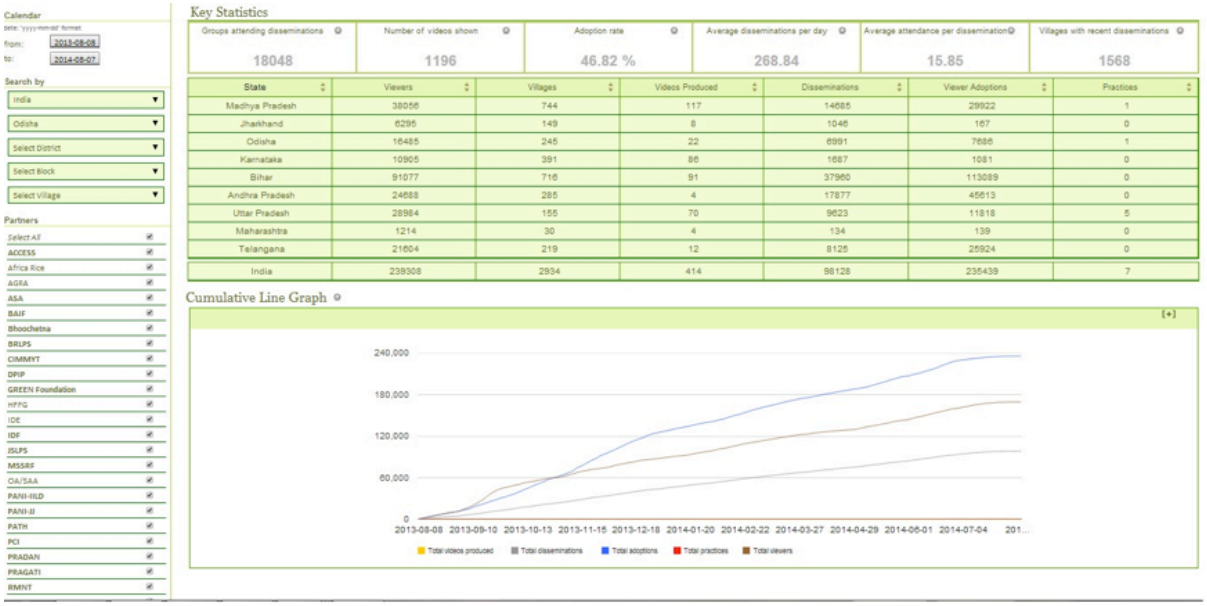

FIGURE 2: ANALYTICS DASHBOARD

implementing a consistent definition of what constitutes an adoption is challenging. Third, adoptions that cannot be verified do not appear in COCO – they are either never entered or are deleted, which means that valuable information about which adoptions cannot be verified and where these adoptions are is lost. Together, these challenges make it difficult to know the true adoption rate and can hinder effective performance management.

To conduct a validation exercise, Digital Green periodically engages independent survey firms to visit farmers' fields and individuals' households to check the reliability of adoptions reported by partner extension agents. After conducting the verification for the first

time, the independent check found that the adoption data recorded in COCO actually underreported the number of adoptions. Digital Green is now piloting a verification system that checks on individuals' practices through automated phone surveys using interactive voice response (IVR) systems, in expectation that this will reduce the cost of triangulating data between extension agents, auditors, and farmer self-reports.[6]

Actionability of the data is affected by time delays in reporting to headquarters. The COCO system makes data available quickly, but this system relies on partners entering data in a timely manner. Some capacity-constrained partners do not have dedicated staff for data entry, which means extension agents must enter data in addition to completing their regular field activities. This results in time lags in the reporting—the data-entry delay for adoption rates is just under two months—too long of a lag to allow extension agents to respond during a given planting cycle. Headquarters staff who use the data to make programmatic decisions may find that reporting delays make the system less effective as a management tool.

Finding creative solutions to make data collection activities fit with partner capacity is a continuous process. Many of Digital Green's partners report data with relatively little delay, but some partners—such as government entities—lack the resources for equipment (such as computers) or staffing necessary to process the forms coming in from the field in a timely manner. Digital Green is currently deploying a mobile data collection system built on the COCO data entry platform. Mobile data collection is reducing reporting delays by decentralizing the data entry process, but the system still requires that partners provide agents with mobile phones.

Measuring Impact

Digital Green is currently measuring the impact of the program using randomized controlled trials (RCTs) designed to generate results that both validate the model and help improve the program. The evaluation design took advantage of program expansion in Bihar, India and in Ethiopia[1] to randomly select intervention villages to participate in the program, while control villages continue to receive the standard extension approach of a government department. The study in India measures the impact of one of Digital Green's promoted practices, the System of Rice Intensification (SRI) methodology, on farm households. Key outcomes in the study are cost-per-adoption, crop yields, and household consumption. Digital Green is also conducting an RCT in Odisha, India with the London School of Hygiene & Tropical Medicine to measure the impact of their agricultural program, with and without the nutrition component, on health indicators.

Digital Green undertook the evaluation after an earlier non-experimental study[7] using a small sample of villages suggested that Digital Green's model was effective at increasing the adoption of new agricultural practices. Digital Green wanted to confirm the results and more credibly measure impact using a larger-scale randomized evaluation. Baseline data collection began in June 2014, and the final data collection round finished at the end of 2015. In addition to questions aimed at determining impact, the evaluation will also answer operational questions, including how videos influence farmers' perceptions of risk and self-efficacy. Digital Green plans to use the results to improve the program and to provide evidence to external stakeholders of its effectiveness.

To build on the evidence, Digital Green is planning a second randomized evaluation in Ethiopia, set to start in 2016, to test the external validity of the results obtained from the RCT in India.

Goldilocks Recommendations

Digital Green has a well-established program and is rigorously measuring its impact. **Our main recommendation is to refine the framework for monitoring activities and to continue strengthening data credibility. However, we noted some internal confusion around a single theory of change and each component; at times, staff also struggled to link data collection activities to the theory of change.**

Digital Green has an extensive set of M&E documents. Refining the monitoring and evaluation framework would involve cutting out M&E components that do not add value to identify the key goals of data collection. This framework should be based on the theory of change and ensuring is used in a consistent way across partner organizations. Given the wide variety of individuals involved in data collection, this monitoring framework could be usefully distilled into a monitoring plan that would note the indicators needed to track progress, the risks in realizing each objective, the person responsible for collecting the data, and the timeline for doing so. This exercise would help build internal consensus and understanding of a single theory of change, which should focus data collection activities on indicators that derive directly from it. Because Digital Green activities are relatively consistent across programs, the organization can develop a single template that can be tailored to the needs of each program within the organization.

Credible: Collect high quality data and accurately analyze the data.

Digital Green has taken several measures to improve the credibility of its data collection and is currently in the process of conducting a randomized control trial that should provide a credible estimate of the program's impact as well as providing operational data for program learning and improvement.

However, ensuring the accuracy of data collected by Digital Green's partners

presents an on-going critical challenge for the MEL team. The new systems and processes to verify adoptions and other data collected is an important addition to the M&E system. We further recommend the MEL team undertake a systematic review of the data from partners to identify the most important measurement issues, understand where data quality breaks down, and identify which partners struggle the most with data reporting. This review should provide insights that can be integrated into partner training and verification processes.

Actionable: Commit to act on the data you will collect.

Digital Green uses the data it collects to inform program implementation and for performance management. Through its innovative use of targeted dashboards, the organization has made feedback and performance data available to Digital Green staff and partners for future programmatic improvements. However, uncertain quality and data entry lags—particularly on adoption data—are likely to limit the actionability of some of the data Digital Green collects from its partners. Without timely, accurate data, the organization cannot know which partners are doing well and which may need assistance to boost their adoption rates.

Digital Green is currently deploying mobile data collection systems to reduce reporting delays by eliminating the separate data entry step. Switching to mobile data collection will help make data collection and transmission more efficient – and potentially allow Digital Green to react faster to implementation. Digital Green should continue to monitor accuracy of data from partners to ensure that assumptions around mobile data collection hold true, namely that mobile data collection will improve data quality and reduce staff burden.

Responsible: Ensure the benefits of data collection outweigh the costs.

Digital Green's approach to impact evaluation and continuous improvement of data quality serves a good example of the Responsibility principle. After promising results from a non-experimental study and monitoring data that suggested positive impacts for farmers, Digital Green decided to invest in three randomized evaluations that will both provide more credible impact but also provide information on potential improvements to the program by collecting data on farmer perception of risk and self-efficacy as well as test the external validity of Digital Green's approach across agricultural extension programs India and Ethiopia.

Transportable: Collect data that will generate knowledge for other programs.

The impact evaluations currently in progress are likely to generate valuable evidence for other programs designing agricultural extension programs. In addition, the feedback and adoption per video that are reported on Digital Green's website represent valuable public knowledge sharing. Efforts to further strengthen and clarify the theory of change will also support transportability for other programs.

Digital Green Responds

Since this case was written, Digital Green recruited a Deputy Director for M&E who is streamlining the organization's existing theory of change and logical framework and garnering buy-in across its teams at headquarters and across its field offices. The MEL unit has helped facilitate a process of co-defining the organization's annual strategic objectives in a manner that is tightly coupled with its theory of change and individual staff member goals. The organization established a committee, with representatives from across its team, to simplify and bring additional consistency to protocols and procedures for capturing and using data. They have introduced an M&E method called bottleneck analysis, in which villages with high rates of adoption are compared to those with lower rates. The comparison is conducted through intensive, on-the-ground investigations that aim to identify factors that drive adoption in order to improve the program. Digital Green added mechanisms in COCO to track data that has been validated by its own quality assurance staff, as well as that of its partners and third-party auditors. The organization also continues to experiment with mechanisms like IVR to improve the efficiency and reliability of collecting data from multiple sources.

Lessons for Others

1. Create a clear theory of change and instill it in the organizational culture.

Having a theory of change that is well understood throughout an organization and clear definitions for key indicators are important for ensuring that program staff understand the purpose of data collection and reporting. This is particularly critical when an organization has a number of implementing partners. Organizations that operate programs through multiple field offices face an extra challenge in consistently aligning data collection with the theory of change and key performance indicators, and may need to take extra measures, such as specialized staff training, to ensure that there is a common interpretation.

2. Pay particular attention to data credibility and reliability when using data from external entities.

Reliance on external entities for data collection requires the lead organization to develop internal capacity to audit data quality. One option is to reduce the amount of data that partners are required to report and to focus activity monitoring on the most essential operational indicators, building capacity as necessary.

3. Carefully assess when and how to engage in rigorous impact evaluations and develop a plan for using the results.

When possible, organizations should consider piloting an evaluation approach or pursue a vetting study to show that the theory of change is operating as expected. Such evidence helps organizations further refine program delivery and confirms that the organization is ready to measure impact.

Appendix

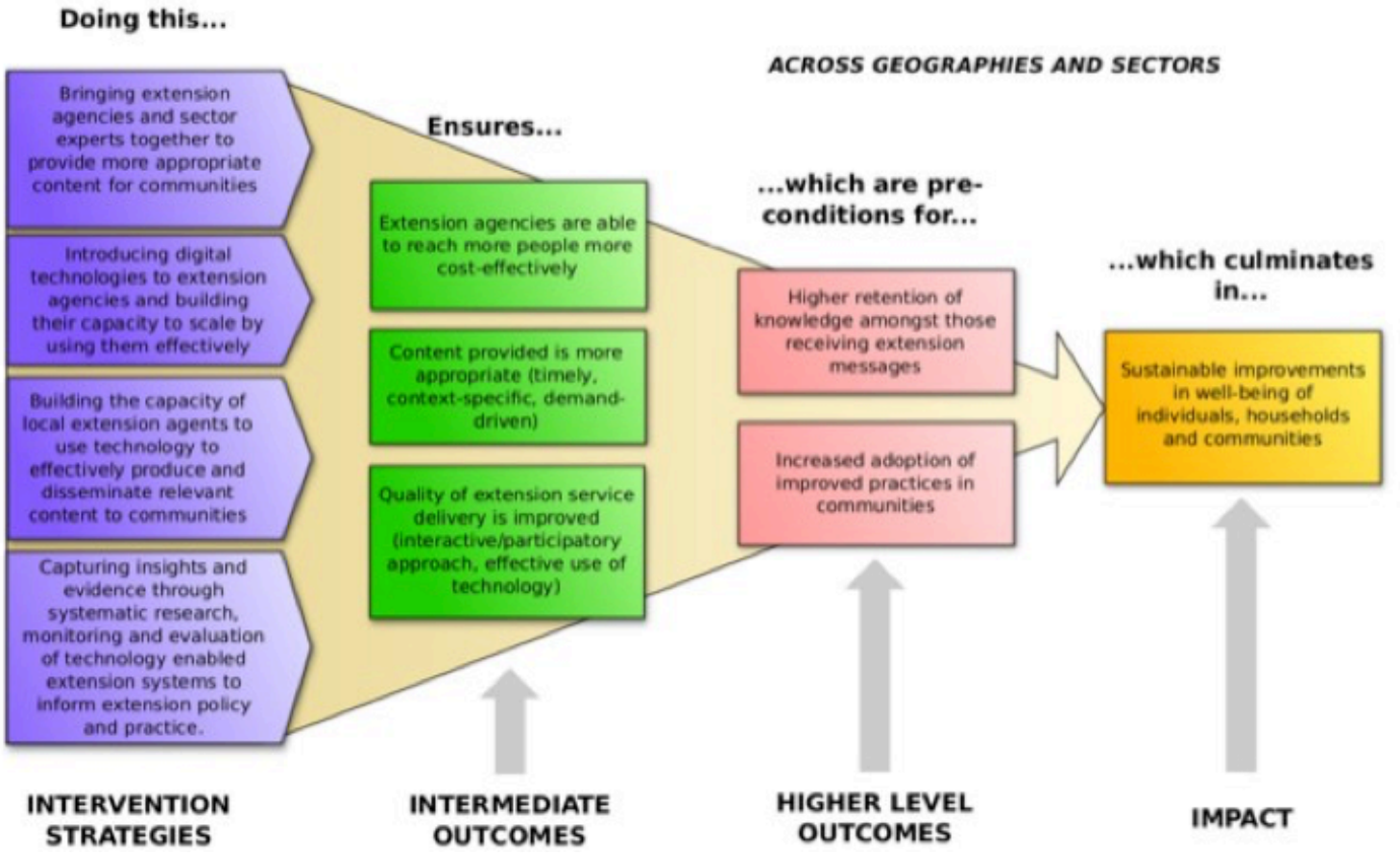

FIGURE 3. DIGITAL GREEN THEORY OF CHANGE

Endnotes

1. World Bank. (2011). ICT in Agriculture. Connecting Smallholder to Knowledge, Networks, and Institutions. Available at: http://www.ictinagriculture.org/sites/ictinagriculture.org/files/final_book_ict_agriculture.pdf.

2. The gender split varies. In India, the groups, often self-help groups, are almost exclusively comprised of women while groups, typically development groups, in Ethiopia are mostly comprised of men.

3. During the Goldilocks review, staff in field offices noted different versions of the theory of change and were unclear on their purposes and uses.

4. COCO is a browser-based application that captures data on the key parts of the program – video production, dissemination, and adoption of practices. Users can also input data while offline, which makes it convenient for use in areas with intermittent internet connectivity. Digital Green also has a mobile version of COCO (compatible on Android-based phones) and uses Dimagi's CommCare application for data entry via basic feature phones.

5. See examples and use the tool at http://www.digitalgreen.org/tools/.

6. Digital Green now has a mechanism to track whether data was verified correctly. Data that is not verified is still kept in the system but does not appear on the public analytics dashboard.

7. Gandhi, R., Veeraraghavan, R., Toyama,K, & Ramprasad, V. (2009). Digital Green: Participatory Video and Mediated Instruction for Agricultural Extension, *Information Technologies and International Development*, 5(1): pp. 1-15. Available at: http://itidjournal.org/index.php/itid/article/view/322/145.

8. Gaur, S. (2014). Investigating Bottlenecks in our Agriculture-centered Project in Bihar. Available at: http://www.digitalgreen.org/blog/investigating-bottlenecks-in-our-agriculture-centric-project-in-bihar/.