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TECHNOLOGY | GOVERNANCE | GLOBALIZATION

Digital Inclusion
The Vital Role of Local Content

ENTREPRENEURIAL SOLUTIONS TO GLOBAL CHALLENGES

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Digital Green
A Rural Video-Based Social Network for Farmer Training

Reality television programs and social media now offer a world stage for anyone who aspires to become a star. The window these platforms provide into the lives of others is inspiring people to pursue their dreams as they see peers dance, sing, invent, and cook their way to fame. People living in rural communities in emerging parts of South Asia and sub-Saharan Africa learn and are motivated by their peer in similar ways. Although they may not have access to the Internet or bandwidth or even electricity, these individuals learn by observing their neighbors' fields, by asking others about the crops they grow and how they grow them, or inquiring about neighbors' health issues and how they treat them. Development agencies, from government departments to the NGOs that work with these rural communities, are critical catalysts in this learning process.

The Digital Green approach, currently deployed in India, Ghana, and Ethiopia, is founded in the belief that video can be a powerful tool to increase the effectiveness of agricultural extension, but that its benefits cannot be fully realized unless it is instituted through a process of localized content creation, facilitated disseminations, and institutionalization within broader extension processes.

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HUB-AND-SPOKE SYSTEM TO ENSURE LOCALIZATION

At Digital Green, we train development agency employees and people in the communities where they work how to produce and distribute content, mainly in the form of videos. These videos, which primarily feature information about better farming techniques and nutrition practices, are shared in groups formed by motivated and talented community members. Produced by and for the community, the videos spur an ecosystem of educational, entrepreneurial, and entertaining content, acting as a kind of village social networking platform.

Those of us with regular Internet access are interested in the information that we see in our social media news feeds because it has been shared by people we know and trust. In a similar way, when farmers assess the relevance and trustworthiness of a Digital Green video, they consider not just its language but also factors like the clothes the featured farmer is wearing and the type of dwelling she lives in to determine whether that person is someone they identify with. Indeed, viewers often ask the name of the individual featured in the video and the village she lives in. Seeing is often believing for members of rural communities, especially women who have a low level of literacy, for whom visual cues about a practice pertaining to a person or a crop can be crucial in their determining its applicability.[2]

We use a hub-and-spoke approach in the production and distribution of content to mitigate the need to produce a video in every village while still ensuring a high degree of localization. Roughly 80 percent of the videos an individual views in her village are produced in the district where she resides; the other 20 percent might be from an adjacent district with a comparable linguistic, sociocultural, and agro-ecological context. Localization also means ensuring that farmers have access to all products or services (inputs) needed to convert the practices learned on the Digital Green videos into concrete action on their farms.

VIDEO AS AN AGRICULTURAL TEACHING TOOL

Traditional agricultural extension methods rely on highly trained experts who go out into the field to interact directly with farmers. Given the nearly 700 million Indians who live in rural areas, most of whom rely on agriculture as their primary source of income, the barriers to extension on a large scale are huge: there is not sufficient human capital available, farmers grow a variety of crops, they may not speak the same language as the mediator, and an inadequate transportation infrastructure can make it difficult for extension agents to reach the rural communities. Digital Green was conceived as a way to extend the reach of extension systems. We identified video as a primary tool for communicating with farmers, based on a rigorous testing process that compared cost and adoption rates when farmers were trained by experienced extension agents, viewed informational posters, listened to radio programs, watched training videos with a facilitator to mediate the experience, and watched videos without a facilitator.

We found that facilitated video viewing can spur farmers to adopt new agricultural practices for about one-tenth of the cost of traditional extension systems.[3] We believe that much of the success of facilitated video stems from its ability to demonstrate localization. Farmers featured in the videos are usually from the same district as the viewers, and because the videos are shot in the farmers' own fields, the viewers can compare the conditions in the videos to those in their own fields. This builds trust in the information shared.

The videos leverage homophily, which is the human tendency to trust, associate, and bond with those who are similar to us. Farmers participating in the Digital Green approach report that viewing a practice on a video while being told about it by a facilitator boosts their recall, which improves the effectiveness of video in inspiring changes in rural behavior.

To build even deeper confidence, the facilitators, who typically live in the same village as the farmers viewing the video, are on hand to ensure that viewers understand the processes being demonstrated. These facilitators are a key element of the Digital Green approach, and they often vouch for the local applicability of the practices taught in the videos. Their similarity to the people viewing the videos also means that they are considered trustworthy. Equally importantly, they provide structure to the video screening process, which promotes engagement and learning. They ensure that all participants are present and engaged, and before starting a video, they pause throughout the screening process to ask questions, which helps to ensure that the participating farmers are grasping the information. Facilitators also help link farmers with necessary inputs (such as seeds and fertilizers) or provide information about markets.

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CHOOSING CONTENT FOR VIDEOS

The topics for Digital Green videos are selected in two ways. The first is through people participating in the Digital Green approach, who suggest topics they believe could create value for them. Through COCO, our in-house data management tool (discussed below), we are able to track all questions asked and comments made by farmers viewing the videos, which allows us to identify needs at the farmers' level.

Video topics also are selected by agricultural experts who work with our field partners and are familiar with the local context. These experts help to identify knowledge gaps and promote content that addresses them. For example, a farmer

Working with groups that have strong bonds apart from the Digital Green intervention provides a reliable venue for video dissemination. The women who attend these groups often lack other formal sources of farming information; although some information is available through newspaper, radio, and television, it often lacks local specificity.

Facilitators select videos from a library of seasonally appropriate content, and they also rescreen videos at the request of the farmers. It isn't uncommon for groups to view the same video multiple times, which helps them gain confidence in their ability to implement the practices seen successfully.

We also have learned that, when working through frontline village field workers, it's important that facilitators are screening videos in the most effective way possible. Therefore, Digital Green instituted a multilevel monitoring system to oversee and grade facilitators' presentations. The monitors use a checklist of desirable behaviors to grade facilitators, such as maintaining eye contact with farmers, asking follow-up questions, and maintaining proper attendance records. Digital Green partners conduct periodic checks, which are verified by Digital Green staff. We also periodically conduct large-scale quality audits using independent enumerators. This quality monitoring has allowed us to identify skill gaps rapidly, and we have provided refresher training to facilitators to ensure the quality of mediation in all locations.

OUTREACH TO MARGINALIZED COMMUNITIES

Traditional agricultural extension reaches out primarily to male heads of household in farming communities, reflecting the view that the man of the house is the primary farmer. However, the bulk of agricultural labor done on small farms in most of the developing world is in fact done by women. Another issue is that agricultural extension programs have long been plagued by "elite capture," which means that powerful segments of rural society are able to monopolize extension efforts. At Digital Green, we believe that one reason for our success is that we reach out to women and other marginalized farmers; in fact, women account for 79 percent of the people participating in Digital Green screenings. In keeping with our strategy of leveraging homophily to increase the effectiveness of our approach, most of our facilitators and the farmers featured in the videos are female. Digital Green also is active in many communities with predominantly tribal populations, particularly in the Indian states of Jharkhand and Odisha. By bringing these populations together and featuring their peers as role models in the community, we help to bolster their local social standing.

We're unable to quantify this particular effect of our efforts, but Digital Green program participants say that the knowledge they gain through our facilitated screenings has bolstered their decisionmaking power within their households. Although our workshops are largely focused on farming decisions, we believe that women who are better informed will have more productive farms. We also hope that our efforts will also help to promote gender equality in rural India.

may know she needs a low-cost solution to a pest problem, and her questions about that topic could guide our partners in creating new content. Or, farmers may not be aware of an improved seed variety, such as drought-resistant rice, and our agricultural experts can introduce them to it through a Digital Green video.

Once a video topic is identified, it is put into production by teams that operate at the district level, as there is likely to be a greater degree of homogeneity among farmers within a given district in terms of class, linguistic, and agro-climatic characteristics. Members of the video production teams, who are typically high-performing farmers or Digital Green partners' frontline extension staff, are trained by Digital Green staff, with support from our partners. Our training is increasingly supplemented by facilitated video training modules—in a sense, we're using the Digital Green approach in our own training regime.

When a team gets ready to produce a video, they work with our subject matter specialists to create storyboards, which are then vetted by our scientists within our partners. After the videos are shot and edited by the production team, they are again vetted by subject matter specialists and cross-checked by Digital Green staff to ensure their technical clarity and soundness before being disseminated in the community.

LOCAL FACILITATORS

When paired with human facilitators, people in rural communities readily recognize the value of the video content, as the facilitators put the practices demonstrated in the videos into the context of the farmers' daily lives, provide follow-up support, and connect information with the inputs needed to take action. Even sophisticated Internet users with broadband connections and access to abundant information look to informed peers to help process their experiences. This kind of guidance is especially crucial in rural communities where people have a low level of self-efficacy and education.

The facilitators we work with are typically already engaged with our partners as community health workers or agricultural extension agents, and they are core constituents of our approach. We began by embedding our team members in the offices of our partners to train the facilitators to handle a mobile projector and use videos to stimulate interactive discussions.

This approach helped us appreciate the local context, but our ability to scale was limited until we made our partners responsible for driving the Digital Green activities themselves. We established regional offices to provide training and support to our partners and saw the rollout of our approach accelerate. Within the next two years, we expect to increase the number of facilitators we work with from 5,000 to 10,000.

Facilitators typically work through self-help groups led by women. The groups Digital Green works with tend to be previously formed, although in some locations it has provided video content to help form and strengthen groups. The groups meet regularly and often are involved in activities like group savings.
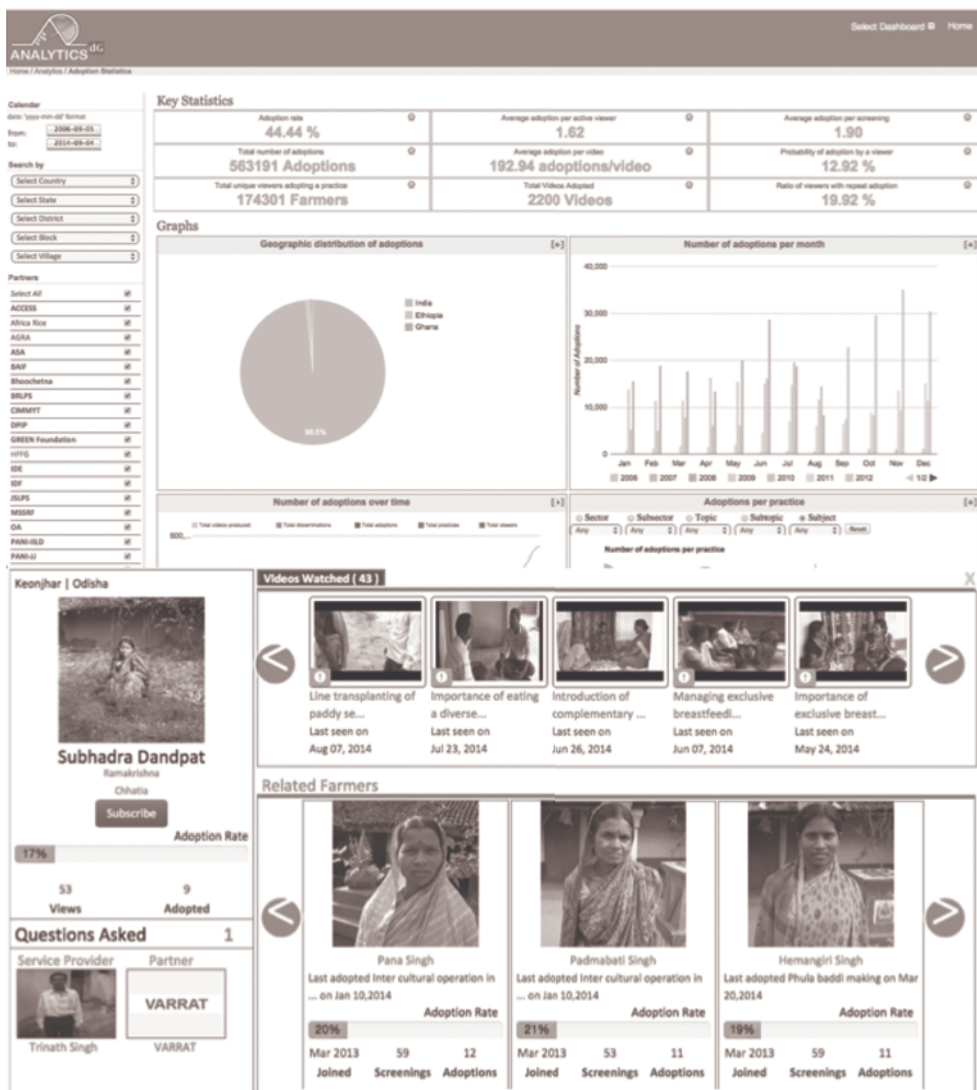
Figure 1. Digital Green analytics dashboards

DATA TRACKING AND ITERATION

We constantly track and use data and feedback to inform the production of our videos and target their distribution more effectively. Digital Green's Connect Online, Connect Offline, affectionately referred to as COCO, is an open source data management tool that allows us to monitor which farmers are attending viewings, which videos they've viewed, which they've asked questions about or expressed interest in, and which agricultural practices they've adopted after viewing one of our videos. These data are important, as they allow us to understand

both the successes and the challenges faced by each region, group, facilitator, and farmer.

Working in areas with limited electricity and telecommunications infrastructure can complicate technology-based solutions, and relying on paper-based forms that are entered into COCO at a central hub can slow our access to timely data. To improve the timing and accuracy of our data reporting, we have worked to make COCO simple to use, even by those with limited computer literacy, and have developed a mobile version. To enable uninterrupted data collection in areas with intermittent Internet connectivity, COCO has been built using technologies enabled through the HTML5 standard. The capabilities of this architecture make COCO accessible across browsers, whether a tablet, laptop, or smartphone. The tool also serves as a generic library, which enables the open source community to use other programs and organizations to collect data, both online and offline. We are currently deploying COCO on the mobile phones of facilitators across our project sites, and we have seen a fall in reporting time where it has been implemented.

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COCO feeds data into Digital Green's analytics dashboard (see Figure 1), which provides a detailed snapshot of the progress of our programs.[4] This allows us to monitor the pace at which presentations are carried out, attendance at those presentations, and adoption rates, whether by country, state, village, group, farmer, or practice, as well as other project data, such as types of practice or participants' gender. Moreover, these data are publicly available, like all Digital Green videos, so other organizations working on changing agricultural and health behaviors are able to learn from our successes and failures by viewing the adoption rates of various types of practices and videos.

COMMUNITY USAGE AND FEEDBACK

The Digital Green intervention has reached about 420,000 farming households through 296,000 video screenings, and had induced 167,000 farmers to adopt at least one new practice. We estimate that the adoption of Digital Green practices will increase farmer incomes output (yield) by 20 percent or increase their input costs by 15 percent. In one early study of an NGO that adopted the Digital Green approach, we found that a typical farmer who changes just one practice due to the Digital Green intervention will earn an additional $175 annually. We are currently

conducting a large-scale randomized control trial to evaluate wellbeing, income, and productivity measures among our participating farmers.

"Previously we weren't even able to grow 800 kilos of grain," remarks Sugna Bai, a farmer in Madhya Pradesh. But after watching a video on organic pest control methods for wheat cultivation, her yields increased substantially. "Now we harvest 3,000 to 3,500 kilos of wheat. When we see videos and do it, then we can believe in it. Belief comes by doing, not just by seeing. So after seeing the video we have to practice it. Then we can believe."

To bolster our data management system, we have instituted a series of in-depth perceptual workshops with our partners and participants. In these workshops, we consult with farmers, mediators, and partner staff to enrich our quantitative data through detailed discussions of what does and doesn't work in the intervention. Farmers have reported that they overwhelmingly prefer video to other types of agricultural extension, due to several factors:

- The ability to view videos repeatedly aids recall of the practices taught
- The opportunity to discuss featured practices with facilitators makes farmers more comfortable adopting them
- Illiterate farmers report that they are more likely to participate in video-led extension than other forms
- Allowing farmers' family members to attend screenings increases practice recall, as multiple members of a household can reinforce one another's memory
- Videos that include shots of packaging for required inputs increases farmers' ability to ensure that they are buying the appropriate type and quantity of inputs from agricultural dealers

INSTITUTIONALIZATION

Community facilitators and forums that nurture peer-to-peer sharing, such as women's self-help groups, engender a level of trust and understanding by flipping the traditional top-down process of content production and delivery. Broadcast television and mobile services have great capacity to scale to the masses, but viewers' ability to translate the information these services provide into actions in their fields or households can be limited. We have found that a decentralized content production and distribution process that is integrated into existing public, private, and civil society development efforts can be more efficient than approaches that rely on high-cost high-quality, one-size-fits all content.

Recording a one-to-one demonstration of a new practice on video and taking it to many improves the efficiency of an extension service, but the process of producing and distributing videos can improve the quality and systemization of our partners' development efforts more broadly. Videos become an artifact of the information that our collaborators are already sharing through costly face-to-face means, like demonstrations and group trainings, and bring consistency to their knowledge bases. Feedback and usage data recorded at each video screening help target content and guide our partners' interventions to address the needs and

interests of individuals in a community more efficiently. The Digital Green video screenings also introduce a dimension of knowledge-sharing to self-help groups that are involved in other activities, such as microcredit and savings. Moreover, the content, data, and feedback hosted on Digital Green's website foster sharing and collective learning among our partners. With nearly one million views of the videos posted online in the last year, our open-access platform stimulates account-ability and transparency between partners and external audiences, like researchers and the general public, who in turn can contribute knowledge and leverage the data shared by our growing grassroots network of communities to support their own work.

Digital Green also creates tools that help our partners become more respon-sive to farmers' needs. As we've grown, we've discovered that many extension organizations want to institute processes for bottom-up content development, but they lack the capacity to do so. To address this, we and our partners have conduct-ed stakeholder workshops in which we consult with farmers, facilitators, and part-ner staff about content. We and our partners have also used our COCO monitor-ing data to conduct bottleneck analyses that help identify gaps in our outreach to farmers. By helping our partners incorporate consultative processes, we are sup-porting a model of rural development that's grounded in farmers' needs and desires. And we don't do this only because with think it has intrinsic value; we know that farmers are more likely to adopt our solutions when they solve the problems they consider most pressing.

Over the last five years, Digital Green has engaged more than 380,000 farmers in 5,000 villages across India, Ethiopia, and Ghana. At the same time, technology and content are only good at magnifying human intent and capability. Digital Green has been successful because it has developed its videos using local content attained through a bottom-up selection, which ensures that the messages in our videos are accessible to all farmers, and we have been institutionalizing our approach within established extension systems. When a video sparks the curiosity of people in rural communities, it can help them take small steps toward improv-ing their lives and that of those around them.

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1 Agricultural extension is a general term meaning the application of scientific research and new knowledge to agricultural practices through farmer education.

2 Available at http://www.worldbank.org/content/dam/Worldbank/Feature%20Story/Africa/afr-tanguy-bernard.pdf.

3 R. Gandhi et al., "Digital Green: Participatory Video and Mediated Instruction for Agricultural Extension." *Information Technologies & International Development,* 2009.

4 The analytics dashboard is available at http://analytics.digitalgreen.org.