

Digital Green

# Digital Green

# Annual Report

## 2023



## FY23 Impact and Metrics

Raising small-scale farmers' productivity and incomes are critical to improving rural livelihoods. However, most farmers lack access to relevant, timely, and actionable information that could help them to improve their productivity, gain leverage in market negotiations, and become more resilient to climate shocks. Digital Green bridges information gaps by building the capacity of extension providers to deliver localized advisory information and increase the adoption of good agricultural practices. Leveraging peer-to-peer learning and existing social networks, we have cost-effectively amplified our partners' reach and effectiveness through our core approach — using videos produced by and for farmers. Since 2008, Digital Green has been building the capacity of national government extension systems in India and Ethiopia, lowering costs and improving their reach and effectiveness.

### Key progress indicators

**4.1 million**

small-scale farmers reached with digital ag advisory information

**70%**

women farmers

**3 mil**

in India

**1 mil**

in Ethiopia

During FY23, Digital Green focused on enhancing community video advisory, promoting climate-smart and gender-inclusive practices and their adoptions, and enabling trusted data exchange to improve advisories and livelihood outcomes for farmers. Our government extension partners share advisory videos through a mix of in-person group-based interactions with farmer groups and virtual messaging via WhatsApp (in India), Telegram (in Ethiopia), and interactive voice response (IVR). Traditionally, these farmer groups have included women's self-help groups and farmer development groups made up of 20-25 members. Our partners, often with World Bank support, are increasingly aggregating these groups into farmer producer organizations and cooperatives of 500-1000 people, providing the groups with access to fertilizers and financing programs and providing training to build the capacity of the groups to negotiate with markets and access private sources of credit.

Over the last year, this work has reached more than 2 million farmers, of which **77% of those reached with video-enabled advisories have adopted promoted practices**. Details are shown in Table 1 below. Digital Green's cost per farmer reach in FY23 was \$5.00 and the cost per adoption was \$6.50.

## FY23 Targets and Actuals

| Indicator                           | FY23 Target India | FY23 Actual India | FY23 Target Ethiopia | FY23 Actual Ethiopia | FY23 Actual Total |
|-------------------------------------|-------------------|-------------------|----------------------|----------------------|-------------------|
| Number of farmers reached (total)   | 1,484,000 (60% w) | 1,728,749 (58% w) | 550,000 (35% w)      | 505,643 (30% w)      | 2,234,392 (51% w) |
| Project activities (India)          |                   | 1,214,499 (40% w) |                      |                      | 1,720,142         |
| Bihar scale-up (India)              |                   | 514,250 (100% w)  |                      |                      | 514,250           |
| Adoption of promoted practices*     | 54%               | 84% (70% w)       | 35%                  | 47% (39% w)          | 77%               |
| Number of frontline workers trained | 13,000 (47% w)    | 26,606 (44% w)    | 2,500 (30% w)        | 2,000 (24% w)        | 28,606(43% w)     |

\* Gender-disaggregated adoption data for India is available from two-thirds of project assessments. Adoption rates for Ethiopia are calculated for video only (not IVR). Organization-wide adoption rate is calculated based on India's adoption rate for project activities and Ethiopia's video.





**In FY23, project assessments found that 84% of farmers reached with advisory information in India adopted promoted practices.** This substantial increase in adoption is driven by the refinement of our approach that enables the development and delivery of location- and commodity-specific advisories most relevant to farmers' needs and circumstances. This more targeted advisory is made possible by 1) our work with our extension partners and farmer groups to digitize farm-level data, such as plot size and location, commodity and variety under cultivation, etc., and 2) our work with extension partners to use that farm-level data, in addition to large-scale datasets such as weather forecasts and soil data, to inform development and delivery of advisory information. This data digitization and integration is supported by our refinement of digital tools for farmer organizations and extension agents, as well as FarmStack.

Examples of how this work has contributed to increased adoption of advisories, **farm incomes, and climate mitigation** are summarized in this section and backed by studies listed in the Monitoring and Evaluation Summary section.

An evaluation of our work in Odisha, which brought community video to women belonging to nascent farmer producer organizations in remote tribal communities, showed support by both the government partners who provide advisory services and the farming communities. A key feature appreciated by all extension workers was that the language and content were very easy to comprehend and adapted to the local setting. Featuring farmers from marginalized communities (i.e. women and particularly vulnerable tribal groups) in the videos makes the content more relatable and fosters increased adoption of practices. Of the interviewed respondents who received advisory information, 100% reported adopting one or several non-pesticide management and post-harvest management practices, and 67% reported adopting one or several promoted livestock management practices. In response to the question of whether the farmers had implemented any of the practices prior to receiving the advisories, the survey found a 24 percentage point increase in those adopting livestock management practices. All of the women surveyed who received livestock management advisories reported that the advisories helped them to maintain the health of their goats and they expected to receive higher prices for their sale, which they directly attributed to the project

In India, we are working with our government extension partners in Bihar to promote farm practices that are backed by strong evidence for reducing yield-scaled emissions. Optimizing the application of nitrogen-based fertilizer, which reduces average emissions and delivers immediate and tangible cost savings without compromising yields, is one example. These recommendations are informed by data collected by the extension agents — including plot size and location, commodity and variety under cultivation, and use of farm practices related to land management, water use, chemical application, and crop residue management. The initial phase of this work reached 14,511 farmers who improved their fertilizer use efficiency and reduced their nitrogen application rate by 16%. In parallel, we are working to calibrate a model to estimate the change in yield-scaled CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions that result from this change in the Indian context. These calculations will be used by our research partners to further inform the development of targeted advisory content to reduce emissions from agriculture..

In Ethiopia, field validation results showed that location-specific fertilizer advisories increased grain yields by 8–17% and biomass yields by 8%, compared to standard practices, and also resulted in higher profitability. Integrating extension agent and farmer location data, farmers' crop information, and soil and terrain maps to customize the recommendations was enabled by FarmStack and work undertaken at the request of the Ministry of Agriculture to create accessible registries containing this critical extension agent and farmer data. In the coming year, we will build on this experience of formulation and delivery of location-specific fertilizer recommendations to optimize fertilizer use to increase yields while decreasing yield-scaled CO<sub>2</sub>-equivalent emissions.

Delivery and uptake of targeted advisory recommendations have resulted in both **cost savings and better sales prices for farmers**. A Digital Green project in India combined rapid quality assessment of physical and chemical characteristics of farmers' crops with crop management and market-related advisory information and data sharing (via FarmStack) of the quality assay, advisory, and market-related data. Of the farmers who received quality assay services and post-assay advisories to improve quality, 90% adopted the recommendations. Ninety percent of surveyed farmers reported improvements in crop quality, and 82% reported receiving higher prices for their sales. Farmers who sold their crops via online platforms, which listed the quality assay data and farmers' location, commanded higher (and transparent) prices and savings on transportation, packaging, and commissions, resulting in **a net gain that averaged 10% higher than traditional market sales**. In addition, aggregating data to facilitate group purchases of products to protect crops allowed farmers to negotiate prices 16.5% lower than market prices.



# FY23 Monitoring & Evaluation Summary

The studies in the section below offer additional insights into how our video approach and digital tools are instrumental in helping extension agents to reach more farmers more effectively.

## Ethiopia

### **DEVELOPING AND PILOTING LOCATION-SPECIFIC FERTILIZER AND AGROCLIMATE ADVISORY SERVICE FOR WHEAT IN ETHIOPIA: THE DIGITAL GREEN USE CASE**

Third party evaluator: International Center for Tropical Agriculture (CIAT)

- Significant effects of video-based extension combined with site-specific advisory, on wheat yield and profits: grain yield increased by 8-17%, while biomass yield increased by 8%.
- Even when accounting for the relatively higher input costs, the intervention resulted in higher profitability.

## Ethiopia

### **WHEAT ADVISORY IMPACT EVALUATION MIDLINE RESULTS (DIGITAL AGRICULTURE ADVISORY SERVICES - DAAS)**

Third party evaluator: American Institute for Research

- Preliminary findings align with previous studies showing video-based extension driving farmer-level adoption of practices. Layering IVR messages on top of video has not yet shown an additional effect when compared to video alone. Data collection continues and final results will be available in 2025
- Farmers in video advisory groups are more likely to report adopting optimal planting practices such as planting lower seed densities (28% increase relative to the control mean) and row planting (12% increase relative to the control mean).
- Purchase rate of certified seeds is 12-13% higher for farmers than control groups.

## Ethiopia

### **KNOWING THE FARMER: DIGITAL FARMER REGISTRY AND TAILORED EXTENSION AND ADVISORY SERVICES IN ETHIOPIA**

Third party evaluator: International Food Policy Research Institute (IFPRI)

- Report shows strong buy-in for the digital farmer registry application by DAs and users at woreda level
- Application was instrumental in building overall DA capacity, knowing farmers better, and improving their skills and motivation
- More time and experimentation needed before scale up

Ethiopia

## **ACCELERATING TECHNICAL CHANGE THROUGH ICT: EVIDENCE FROM A VIDEO-MEDIATED EXTENSION EXPERIMENT IN ETHIOPIA**

Third party evaluator: International Food Policy Research Institute (IFPRI)

- Video mediated approach led to 35% increase in extension reach and increased adoption of improved ag practices 13-35%
- Targeting both spouses with video messaging increases women's access to extension by 24% and increases their knowledge of agricultural practices by 3% on average
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- Video-mediated approach led to less conclusive yield change due to noisy yield measures

Ethiopia

## **DAIRY FARMERS' EXPERIENCE WITH IVR MESSAGES: IVR EFFECTIVENESS STUDY**

Third party evaluator: 60 Decibels

- Study records high level of user satisfaction with IVR among dairy farmers; overall farmers give a Net Promoter Score of 49; only 7% report challenges in experience
- 8 in 10 listeners report improved quality of life; 4 in 10 listeners were unable to apply the information
- Only 7 in 10 female farmers (in comparison to 8 in 10 male farmers) applied the information, but female listeners are more likely (79%) to share info with other farmers

Odisha, India

## **A STUDY TO UNDERSTAND EFFECTIVENESS OF PROJECT ON ADVANCING TRIBAL LIVELIHOODS AND SELF RELIANCE**

Third party evaluator: IMPACT Partners in Social Development

- 18 percentage points increase in adoption of improved pest management practices
- 15 percentage point increase in adoption of improved post-harvest management practices
- 24 percentage point increase in adoption of improved livestock management practices

Andhra Pradesh, India

## **MIDTERM ASSESSMENT OF E-MIRCHA PROJECT**

Third party evaluator: IMPACT Partners in Social Development

- 93% received advisory post chili quality assaying of which 90% adopted improved chili agronomic practices;
- 90% reported improved chili harvest quality and 82% farmers reported receiving higher prices;
- Online marketing proved economically beneficial. On average, by selling online, farmers realized 10% higher profits in comparison to other channels, a result of both higher prices and savings on transport and other costs.



## SAAGU BAGU BASELINE ASSESSMENT

Third party evaluator: IMPACT Partners in Social Development

- 67% of farmers who'd received advisories for nursery management, disease control, and other best practices for chili production on WhatsApp confirmed that they would like to receive the information through WhatsApp in the future;
- Farmers in the intervention group are selling at wholesale markets and to commission agents. In comparison, selling at online markets is expected to lead to cost savings (market access, labor, transportation) of at least 6%.



## Internal Operations Updates

### Human Resources

Our organization grew in FY23 to a team of 153 full-time employees (as of April 1, 2023) across functions and regions. We made key hires in our global teams by bringing on a Head of Global Gender Programming and a Chief Product Officer. We saw the most growth across product and engineering, program, and strategy functions. We established a Career Architecture Framework to facilitate avenues for professional and personal growth within the organization.

- We currently have 40% female employees (62 female employees) across the organization, of which 29% are in the USA, 50% are in India and 21% are in Ethiopia. In the future, we aim to layer this aspect across all career stages, titles, and Compa Ratio to further our organizational equity.
- Our current attrition rate is 20% across the organization. Of the 28 departures, 17 were voluntary attrition, primarily due to other employment, higher education, or relocation. We are planning to roll out the Career Architecture Framework and re-evaluate our performance management philosophy while focusing on building a thriving workforce.

- As a recipient of the \$500k Rippleworks Talent Top Up grant, we aim to build our internal operations capacity by investing in our learning and development function, increasing recruitment capabilities, and ensuring that our policies align with staff growth and retention.



## Finance & Operations

Our finance & operations teams evolved in FY23, with a combination of expansion, restructuring, and rebuilding. Most notably, we:

- Established an internal IT function with our first IT staff hire in May 2022. The function is fully set up to support our staff globally with enhanced security. We aim to strengthen this function by hiring a full-time IT staff member in India in the coming months.
- Brought on our first Financial Planning & Analysis (FP&A) hire, which led to a revamp of our budgeting process at the end of FY23 (for FY24), and preparation for improved sophistication of budgeting & tracking, incorporating departmental budgeting.
- Had transitions with the departure of our Global Finance Director and India Finance Head. We used the opportunity to restructure the teams by creating the role of Controller to oversee Accounting & FP&A globally, elevating an internal staff member into that role. We adapted the Finance & Operations team structure in India to 1) separate Finance from Operations in India with separate leads who were hired in the 2nd half of FY23, and 2) centralize reporting of those roles into the global functions to enable support to both program and India's growing product & engineering function.

The Ops and Communications teams undertook our first-ever internal communications survey to gain feedback on existing communication channels, common challenges around collaboration, and suggestions. A cross-functional team came together to review the survey results, identify priorities for action, and brainstorm solutions. This work will continue in FY24.

Although the Finance & Operations teams had planned to identify a new, integrated accounting/ERP system for Digital Green, this work was deprioritized given key transitions in the finance team. The teams have taken steps by identifying key systems and processes that could be tackled in the meantime, beginning with strengthening travel support, which is underway with revised travel rates and a search for better travel software and agents.

## Legal & Governance

We developed a legal function in FY23 by hiring our first in-house counsel and bringing on a Legal Affairs Senior Manager mid-way through the year. The function has focused on contract review and management, global legal entity structuring management, and board strengthening. We prepared and submitted the registration documentation to establish a branch office in Kenya and began working with a local law firm in India to review and restructure our legal presence in India, particularly to set up for the growth of our Product & Engineering teams to better support the evolution of Digital Green.

Sonja Kotze, CFO of Living Goods based in South Africa, joined the board in April. Sonja has a strong background in finance and operations, healthcare non-profits, and working with international organizations across sub-Saharan Africa. Between April 2022 – April 2023, we onboarded seven new board members, restructured committees and drafted committee charters, conducted a board self-assessment process, and developed a board leadership structure and succession plan.

In April 2023, Dr. Kentaro Toyama and Dr. Rajesh Veeraraghavan stepped down from our Board of Directors. Kentaro and Rajesh both worked at Microsoft Research India, where Digital Green began as a research project in 2007, and played instrumental roles in founding Digital Green and in our organizational development and growth over the last 15 years. With Kentaro's departure, Dr. Melissa Ho, Senior Vice President for Freshwater and Food at World Wildlife Fund, is stepping into the role of board chair. Deepali Khanna, Vice President at Rockefeller Foundation, continues as vice-chair.





# Digital Green at the UN

Digital Green's founder and CEO, Rikin Gandhi, addressed the United Nations General Assembly on April 12, 2023, as a participant in a panel discussion on "Food Security and Sustainability Transformation." His opening remarks can be viewed [here](#), and our accompanying policy paper [here](#).



**We need to marry digital technology with on-the-ground extension systems and farmer organizations, and continue investment that increases access to timely, relevant, actionable advisories.**

Rikin Gandhi

Co-founder & CEO, Digital Green



## Looking Ahead

In FY24, we will continue to work to boost the impact and efficiency of our government extension partners by facilitating development and dissemination of high-quality, relevant, and actionable agricultural and market-related advisory information for small-scale farmers. This work builds on the success of our community video model, which is centered on localized production and facilitated dissemination of short videos that feature local champion farmers teaching agricultural practices to their peers in an easy-to-understand format. The modes we are integrating into our video approach will continue to enable our extension system partners to reach more farmers more effectively (increasing adoption of recommended practices) while driving down the cost of their per-farmer reach and adoption. As our government partners aggregate 20-25 person farmer groups into 500-1000 person farmer producer organizations and cooperatives and build the capacity of those groups to engage with markets and financial service providers, this work will improve farmers' productivity and climate resilience as well as their overall incomes.

We are prioritizing promotion of climate-smart advisory content, particularly those practices that reduce CO2 equivalent emissions and offer a win-win for farmers in terms of reduced costs and increased productivity, such as efficient fertilizer use, livestock feed formulation and reduced tillage. We will scale up use of our community video approach through our ongoing partnerships, and layer two additional means to significantly increase reach.

- Had transitions with the departure of our Global Finance Director and India Finance Head. We used the opportunity to restructure the teams by creating the role of Controller to oversee Accounting & FP&A globally, elevating an internal staff member into that role. We adapted the Finance & Operations team structure in India to 1) separate Finance from Operations in India with separate leads who were hired in the 2nd half of FY23, and 2) centralize reporting of those roles into the global functions to enable support to both program and India's growing product & engineering function.
- We see promise in integrating use of a multi-lingual, voice-enabled chatbot to amplify the capability and reach of agricultural extension agents to reach farmers with higher quality information, and gather feedback they can use to iterate and inform development of advisory content most needed by farmers. We are testing a content-powered chatbot that enables frontline extension agents to triage problems by interacting with the chatbot to draw answers with location-specific nuance (i.e., factoring location, language, etc.) from our extensive video library. This AI solution draws from our curated videos, automatically transcribing them, making them searchable, and providing summarized responses and links to associated videos, to provide actionable advice to farmers.



# FY23 Financial Statement (unaudited)

## P&L Statement (cumulative FY data)

| Income                      | As of 3/31/2023    |
|-----------------------------|--------------------|
| Revenue                     | 9,547,828          |
| <b>Total Income</b>         | <b>9,547,828</b>   |
| <b>Expenses</b>             |                    |
| <b>Direct Costs</b>         |                    |
| Personnel & Fringe Benefits | 3,149,740          |
| Travel                      | 644,515            |
| Consultants                 | 721,420            |
| Subawards                   | 3,078,184          |
| Other Direct Costs          | 1,506,911          |
| <b>Total Direct costs</b>   | <b>9,100,770</b>   |
| <b>Indirect Costs</b>       |                    |
| Overhead                    | 2,441,889          |
| <b>Total Indirect costs</b> | <b>2,441,889</b>   |
| <b>Total Expense</b>        | <b>11,542,658</b>  |
| <b>Net Income</b>           | <b>(1,994,831)</b> |

## Balance Sheet (cumulative FY data)

| Current Assets                            | As of 3/31/2023   |
|---|-------------------|
| Cash & Cash Equivalents                   | 7,874,750         |
| Investments Accounts                      | 11,705,343        |
| Other Receivables & Advances              | 1,349,568         |
| <b>Total Current Assets</b>               | <b>20,929,662</b> |
| Fixed Assets                              | 20,910            |
| <b>Total Assets</b>                       | <b>20,950,572</b> |
| <b>Current Liabilities</b>                |                   |
| Liabilities (AP & accrued liability)      | 327,291           |
| Refundable Advances                       | 446,501           |
| Loans                                     | -                 |
| <b>Total Liabilities</b>                  | <b>773,792</b>    |
| <b>Net Assets</b>                         |                   |
| Restricted Net Assets                     | 4,361,996         |
| Unrestricted Net Assets*                  | 15,814,785        |
| <b>Total Net Assets</b>                   | <b>20,176,780</b> |
| <b>Total Liabilities &amp; Net Assets</b> | <b>20,950,572</b> |
| Reserve Requirement                       | 4,100,000         |
| <b>Unrestricted Net Assets*</b>           | <b>11,714,785</b> |

Note: FY2023 numbers presented in this statement are unaudited and subject to change.