Digital Green

Digital Green Trust

Annual Report

2022-2023

Inside

Trustee's Message

With great pleasure, I present our annual report for the year 2022-2023, showcasing the remarkable progress and impact of Digital Green Trust.

For 15 years now, Digital Green has worked to improve the income and productivity of small and marginal farmers in India and has reached over 2.5 million. Empowering farmers can have multiple layers of social and economic impact in rural India, directly contributing to our national priorities.

As the world faced its worst global crisis that brought everything to a standstill for two years, we witnessed the agriculture sector as the most persevering. Farmers continued to grow the world's food while being susceptible to unpredictable risks. In the last year, there has been a paradigm shift that has transformed the scope of digitalization in the agriculture and allied sectors. Our collective duty is to bring farmers to the centre of this discourse and enable them with digital technology to accelerate solutions to their pressing problems.

Digital Green has always believed that technology plays a catalytic role in achieving its mission of building prosperous farming communities. Emerging technologies like remote sensing, blockchain and artificial intelligence are redefining our food and agriculture systems. This has also brought in numerous private actors in agtech, agribusiness and agfin industries, thanks to an enabling environment being created in India. Our government is at the forefront of leading this paradigm shift, investing in data capabilities and digital platforms that can catalyze and propel modern agriculture.

Digital Green has always been known for its creative and innovative approach to finding lasting solutions at scale. We have demonstrated, time and again, the strength of digital solutions and transformative solutions. In the 2022-23 period, our work with chilli farmers of Andhra Pradesh demonstrated the power of digital to help farmers earn more, while a data-centric approach with paddy and wheat farmers in Bihar has enabled them to build resilience to climate change. Similarly, we are building a solid data and technology foundation for farmer collectives in India, a decision support system to negotiate better with markets and make farmer collectives profitable and sustainable institutions.

In February 2023, we signed a Memorandum of Understanding with the Ministry of Agriculture and Farmers Welfare, Government of India, for building a digital platform for extension services. This ambitious yet forward-looking initiative will make the Indian agriculture extension system future-ready and pave the way for demand-driven extension service, a role model for global agriculture extension.

We are thankful for the continued support of our donors and well-wishers who enable us to drive our mission forward. We thank all our government partners for believing in the common goal and institutionalizing our digital approaches at scale. We are also grateful to knowledge and implementation partners - through these collaborations, we have been able to create sustainable and scalable solutions that address challenges faced by farmers. Lastly, our achievements were only possible with the unwavering support and commitment of our employees, consultants, and everyone who contributed their time, resources and expertise to our cause.

In closing, I invite you to delve into the pages of this annual report and witness the stories of transformation and hope that lies within. Together, let us continue to champion the cause of smallholder farmers and build a future where their potential is fully realized.

Sincerely,

Tejesh Shah
Trustee, Digital Green Trust

Overview & Context

In India, one of the largest food-producing countries in the world, heavy rainfall and floods have damaged nearly 34 million hectares of cropped area between 2015 and 2022. A similar area of cropped land was damaged due to droughts. While these numbers are concerning when considering food security, they are even more alarming for smallholder Indian farmers. Climate-induced risks are reaching alarming proportions in India, a country that is extremely vulnerable to climate change.

Since 2000, India has been a food-secure country and has exhibited remarkable progress in its journey towards becoming a food-surplus sector, subsequently becoming a net exporter of valuable agricultural resources. Agriculture is India's most critical sector, employing 54.6 percent of the workforce and contributing to almost one-fifth of our GDP. Around 150 million farmers fueling our vast agricultural sector have the onus to ensure rural employment, productivity, and food security. In India, as anywhere across the world, three fundamental problems that they seek to address are – how to sustain or increase farmers' yield while lowering input costs, how to improve their incomes to meet their daily needs, and how to reduce their exposure to increasing climate risks and uncertainties. There is an urgent need to address these problems immediately, as farmers are the key to a prosperous future.

In the last 15 years, having witnessed the benefits of equipping extension agents with timely educational videos and digital tools first-hand to reach farmers, many of our partners have also invested their resources in scaling and sustaining a digital approach. This has helped strengthen the public extension system through convergence and building the capacities in digital extension with a strong feedback loop. This work will be carried forward at a larger scale in the coming years through the national-level platform for the digitalization of the extension system in partnership with the Ministry of Agriculture & Farmers' Welfare.

As we persevere in our journey to ensure that technology makes a positive difference to the last-mile farmer, we also recognize that individual farmers lack the agency to negotiate with market players for inputs and linkages. Working with farmer collectives has been a natural progression to realizing our ambitious goal of reaching millions of additional farmers over the next three years with a demonstrated and lasting impact on their agency, resilience, and income. We believe that farmer organizations are, by design, "by the farmers, for the farmers", making them an ideal conduit to build agency and resilience for farmer members. These groups can become the institutions that help farmers access better services and new income streams while ensuring that farmers have a more significant influence within the agricultural system.

Through the last decade, India has seen significant investments in the agtech sector, aiming to improve farmers' livelihoods. There is a need to ensure that farmers, and farmer organizations in particular, are active partners in co-creating an enabling agricultural ecosystem. As an organization, we recognize the critical role that farmer organizations play in aggregating farm produce and conducting business transactions to ensure higher value propositions for farmers. We are committed to building their capacities and helping them access capital, technology, and markets to become flourishing businesses.

FPOs are strategic intermediaries between farmers and multiple stakeholders like the private sector and the government. They have proven particularly beneficial to farmers regarding access to business opportunities and greater market linkages. They are also given greater visibility into output prices, big buyer availability, and credit facilities. Recognizing their ability to create a more gender-inclusive and climate-resilient agriculture sector is the first step towards increasing the remunerative potential of the farming community, facilitating seamless communication among multiple stakeholders, and improving agricultural outcomes.

A significant proportion of women are actively involved in the agricultural and allied sectors, with their participation reaching up to 75 percent in various crop production processes. Since our founding, Digital Green has actively promoted strategies that build women farmers' agency and enable effective partnerships between women and men to improve their farm and farming practices. Over the past year, our emphasis has shifted towards working with women farmer organizations and collectives to enhance their bargaining power and leadership skills to empower them as active decision-makers in economic processes. With increasing digitization aiming to enhance the efficiency of the agricultural ecosystem, we firmly believe that the power of collective agency through women's farmer groups can be the key to solving accessibility-related issues and ensuring impact.

At Digital Green, we also recognize that farmers are the custodians of the critical component in the agricultural value chain - data. Our work in India demonstrates that empowering farmers with ownership and control over their data can enrich agricultural productivity and vitalize markets. The technology solutions that we build are also open-source, co-designed with farmers themselves so that they can control their valuable and increasingly sought-after data. Farmer organizations are best suited to collectively build this data asset for a large group of farmers. This can catalyze sustainable growth within the sector and offer new solutions for long-standing systemic challenges.

Our Strategy

Digital Green's strategic roadmap for 2022 to 2025 establishes the groundwork for strengthening the extension system for improved access to trusted and verified localized and customized advisories for farmers and farmer-producer organizations. Access to extension services and the capabilities to utilize data can be a powerful asset that places the value proposition directly in the hands of farmers. Farmer organizations can play a crucial role in co-creating a digital agriculture ecosystem to address pressing challenges while leveraging the benefits of aggregated data and collective bargaining and allowing for improved negotiating power, leading to enhanced incomes.

As the farmer collectives flourish, a multitude of advantages can unfold for farmers. Digital access can bolster the value and confidence of local farming communities. Farmer groups can help small and marginal farmers employ economies of scale, enable access to relevant, targeted services, and explore diversified income streams through data-driven networks. This will change the position of the farmers not only as mere consumers of agricultural services but also as critical participants and decision-makers within the ecosystem.

Digital Green's innovations and thought leadership are intended to invite other key players into this systems-level effort to build farmers' resilience and contribute to their lasting success. The technology solutions that we develop are open-source and co-designed with a farmer-centric approach. A core principle in this product design is that farmers maintain control over their valuable and increasingly sought-after data.

We are committed to approaching our product and design with a strong gender and climate lens. Key data on each of these pillars of our organizational strategy can attract the right partnerships to scale and deepen our impact.

Digital Green supports our overall strategy with three core methods:

- **Strengthening the Agricultural Advisory System:**
  Supporting grassroots-level agents with targeted, timely advisories, capacities, and feedback using multiple digital channels that promote climate-smart, gender-focused, and market-oriented content driven by farmer demand.

- **Facilitating Farmer Organizations:**
  Farmer organizations are the perfect conduit for the growth and resilience of small and marginal farmers, including women farmers. They can help channel capital, inputs, access to critical services, and market linkages for farmer members.

- **Open-source Digital Public Solutions:**
  Digital Green develops digital public solutions for direct access to farmers, FPOs, extension systems, and the agricultural ecosystem at large.

Advisory & Knowledge Sharing

Digital Green's community video-based approach to advisory delivery has shown a significant impact in the last fifteen years. Through our experience, we have discovered the importance of developing the digital capabilities of public extension systems in a responsible and sustainable manner. We have also gained valuable knowledge on a farmer-centric approach, even while working on a large scale. Furthermore, we have ensured that even the most vulnerable groups of farmers, from particularly vulnerable tribal groups (PVTGs) and women farmers, can access verified information that is relevant to them in a timely manner.

With digital advancement, the agricultural ecosystem has seen a significant shift in how technology is used for sharing advisories, capacity building, and overall outreach of interventions. Despite the challenges of the digital divide, Digital Green has strived, through the last year, to evolve the last-mile delivery frameworks and adopt a new content production and dissemination approach into our advisory design.

Through our community video-based extension using pico-projectors and hybrid digital approaches such as IVR, Chatbots, WhatsApp-based dissemination, SMS, and even Telegram, we have reached 17,31,749 farmers across five states - Andhra Pradesh, Telangana, Odisha, Jharkhand, and Bihar. Of the total number of farmers reached, nearly one million have been women farmers.

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Strengthening our digital direction, we have learned from our hybrid approaches that digital means of capacity building and advisory delivery have been well received. This year, we have employed the fast-spreading access and behaviour shift towards smartphones and internet connectivity. Mobile-based video production training and video sharing have become core components of our training modules. In Rajasthan, where we have been institutionalizing digital extension in partnership with Rajeevika since 2022, we have covered 9 districts and trained 54 frontline extension workers on mobile-based video productions and dissemination. In another project, partnering with Arghyam, we created a pool of 19 master trainers nationwide through digital courseware on a participatory approach to mobile-based content creation. These master trainers from various organizations will be responsible for building farmer-focused capacities and content through digital tools that will impact multi-directional programs across the country to create an efficient knowledge transfer pool.

Digital Green has evolved its advisory design to build gender-sensitive and climate-smart content.

Digital Green has evolved its advisory design in the last year to build gender-sensitive and climate-smart content. This will help us assess how integrating a gender and climate lens in content can lead to specific outcomes related to gender inclusion and adopting climate-smart practices. In addition, with our strategic shift of working with farmer organizations, we have connected the delivery of advisories, which are a critical need of farmers, as a means of engagement with the FPOs.

Since our founding, Digital Green has actively promoted gender-inclusive strategies that build women's agency and promote the effective partnership of women and men to improve their farms. Over 75 percent of the farmers we have reached with video-based advisories have been women, and all of these videos have featured women farmers and farmer groups. To mark a strategic shift towards making our work gender intentional and transformative, Digital Green has started focusing beyond access to information into building the agency of women farmers through capacity building and advisories that support women to negotiate at the household level, have better decision-making powers and build leadership skills. The ATLAS project in Odisha and Jharkhand marks a step in this direction that worked with more than 50,000 tribal women farmers and particularly vulnerable tribal groups. We coupled gender-based videos on women farmers' agency and collectivization with regular advisories to build their decision-making powers. We also developed training videos on gender for frontline workers to build their capacity to serve women farmers effectively and efficiently with a more targeted approach.

NATIONAL DIGITAL PLATFORM FOR AGRICULTURE EXTENSION

Based on our learnings, especially in the last two years of impact through digital interventions on the video-based approach, Digital Green took the path to scale up and expand the scope of digitalization of India's expansive agricultural extension system. Our learnings, reflected in our projects across 6 states and deliberations with our government partners, have indicated the critical gaps and opportunities of the agricultural extension system in India. This includes the lack of a targeted, timely, and reliable advisory delivery system, the opportunity for future-ready capacity building of frontline extension officers and agents, and the lack of a structured and effective feedback mechanism to inform course correction and the implementation strategy for key decision-makers of the country.

As a result of these learnings, Digital Green has invested in a national-level project on the Digitalisation of the Agricultural Extension System in partnership with the Ministry of Agriculture and Farmers' Welfare across all states in India. This ambitious project is a model of convergence across agriculture and allied departments at the central and state levels, including prestigious institutes like the Indian Council for Agriculture Research (ICAR) and the National Institute of Agriculture Extension Management (MANAGE).

We are currently working with our government partners and seeking partnerships with other stakeholders to design, develop and operate this ambitious project.

PROJECT EMIRCHA - TECHNOLOGY AND DATA INNOVATIONS AMONG CHILLI FARMERS

The EMIRCHA (Enhancing Markets, Income, and Resilience for Chilli Farmers) project in Andhra Pradesh and Telangana demonstrated a scalable model that leveraged digital platforms, AI-crop assessments, and secure data exchange to deliver customized, data-backed advisories to chilli farmers. EMIRCHA has successfully integrated community-based video extension into the larger extension systems of the Departments of Horticulture in Andhra Pradesh and Telangana to improve farmer productivity and incomes.

In Telangana, as part of the World Economic Forum's AI4AI initiative, Digital Green has also implemented the SaaguBaagu project under the EMIRCHA initiative to promote innovation in agriculture.

EMIRCHA has been a success story of collaboration and convergence among ecosystem players, public and private, to make digital innovations work for the prosperity of smallholder chilli farmers. A key learning through this initiative is that farmers need solutions across the value chain, in addition to advisories, for increased yield, better quality of produce, and a significant impact on their profit margins. Farmer-centric technology interventions like chilli quality assaying by AgNext Technologies, soil testing by Krishitantra, and digital marketplace by Kalgudi have helped farmers with scientific advisories, giving them the agency to make well-informed decisions for their benefit. Moreover, farmers who have access to mobile phones have preferred receiving advisories via WhatsApp as it is more convenient.

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We have reached over 63,000 farmers across five chilli-growing districts in Andhra Pradesh and Telangana, and more than 80 percent of chilli farmers have adopted one or more practices. Due to these interventions, an evaluation in Telangana reported an increase in productivity by 234 Kg per acre and an increase in net income by Rs. 61,391 per acre. There was also a significant reduction in the cost of chilli cultivation, especially in the use of pesticides and fertilizers, by Rs. 2666 per acre and Rs. 307 per acre, respectively.

Farmstack has also demonstrated the value of secure data exchange among agtech initiatives to provide targeted advisories and services to farmers, ensuring a higher value proposition for them. Most farmers have understood the purpose of their data being collected and subsequently shared it with different stakeholders.

Cultivating Change - Tulasi Yeraveda's Journey from Marginalized Farmer to Advocate of Organic Farming and Women's Empowerment

Tulasi Yeraveda's journey from a marginalized farmer to an advocate of organic farming and women's empowerment is an inspiring tale of perseverance and impact. Growing up in Andhra Pradesh's Kothapalem, Tulasi overcame obstacles to education and single motherhood. Her transformation began when she embraced sustainable farming practices after weather-related and pest challenges affected her crops. Despite scepticism from her peers, Tulasi's dedication to organic farming led to gradual success.

Training as a Community Resource Person (CRP) with Digital Green, Tulasi became a catalyst for change in her community. She utilized technology, including videos on pico projectors and mobile phones, to educate herself and others about organic farming. By 2016, she was a certified CRP promoting organic farming and advocating for women's groups.

Embracing mobile technology, Tulasi became proficient in digital tools like WhatsApp chatbots. This proved vital during the COVID-19 pandemic, allowing her to share farming advice and market her produce remotely. "The smartphone was our lifeline during the lockdown. I shared advisories with farmers and addressed their queries via WhatsApp. Since then, the use of smartphones and other apps has grown manifold, and I even market my produce through WhatsApp." Her efforts extended beyond farming; she empowered women through self-help groups and imparted essential collective skills.

Tulasi's accomplishments earned her recognition, including showcasing her organic produce at a national event, the Kisan Unnati Mela of 2018. She acknowledged the challenges of organic farming, from increased effort to adapting land and market recognition. Armed with her smartphone, Tulasi remains resolute in her mission, ready to tackle challenges head-on. Her story exemplifies the transformative power of perseverance, education, and technology in driving positive change in rural India.

PROJECT DEEP - EMPOWERING TRIBAL WOMEN FARMERS

Digital Empowerment to Enhance Productivity (DEEP) in Jharkhand focuses on the technological skilling of frontline workers, agricultural practice skilling of women-led farmer producer organizations, and small and marginal farmer's collectives.

Through training in digital dissemination tools such as low-cost Pico projectors, WhatsApp-based video dissemination, and Chatbots, frontline workers can now efficiently convey essential information to farmers in a timely manner. During the first year of implementation, over 1200 FLWs have been trained, and they have reached more than 50,000 farmers by disseminating 30 season-specific videos on climate-smart practices.

Farmers shared positive feedback about attending the video dissemination sessions, finding the practices easy to adopt, and observing the yield increase from adoption. During the second year of the project, it is targeted to reach an additional 50,000 farmers (cumulatively 100,000 farmers).

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Digital Platform for Farmer Organizations

The lack of access to targeted, timely, actionable farming and market-related information, combined with a lack of agency in negotiating competitive prices, limit farmers' ability to invest in their farms' productivity. Pooling dispersed small and marginal farmers into organized groups can improve their price realization and resilience to shocks and stresses by serving as aggregation points for group purchases and sales, bolstering collective bargaining power and facilitating access to value-added services, technology and group assets for storage or processing.

In 2022, Digital Green worked closely with more than 50 farmer-producer organizations across geographies, commodities, and at various levels of maturity. We learned that they are typically fledgling enterprises that face pressing issues like low farmer engagement, lack of organized data for informed decision-making, and lack of skills to navigate markets. We have also learned that for farmers, data is the digital and social infrastructure that can enrich their agricultural productivity and vitalize markets in increasingly digitized value chains and the agriculture ecosystem.

We have developed a model that strengthens FPO engagement and increases the value proposition that FPO shareholders realize from participation. Our work with farmer collectives aims to provide FPOs with capacity building and digital tools to organize their farmer-level data to help them develop data-based business plans. The capacity-building exercise and digital tools enable FPO management to build and manage business plans, establish communication channels between members, and effectively negotiate with market players.

To scale our work, Digital Green has partnered with resource institutions, including CYSD, SSRDP, and SEWA Cooperative Federation. Additionally, in each of the FPOs we work with, 'data officers' have been trained and appointed to bridge the skill gaps for data literacy; currently, both the Saharpada FPO in Odisha and Megha Mandali FPC in Gujarat have appointed female data officers, and this will further be scaled up.

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PROJECT TARA - EMPOWERING FARMER ORGANIZATIONS FOR MARKET ACCESS

Under the Tech-Aided Resilient Agriculture (TARA) project, Digital Green worked with 35 FPOs across six districts of Andhra Pradesh to enable market linkages for smallholder farmers by providing digital solutions and market-oriented decision support. Digital Green piloted various activities and technologies to improve the operational efficiency of FPOs, held business development workshops, and onboarded FPOs onto the Kisan Diary Enterprise (KDE) application to aggregate farmer-level data.

In November 2022, IDinsight conducted a process evaluation to understand FPO operational efficiency and their access to market linkages and evaluate how digital innovations are received at the FPO and farmer levels. Through targeted advisories and business planning, FPO leadership helped farmers sell their crops and procure inputs. 78 percent of farmers primarily procured inputs from FPOs as it would be at a lower price and higher quality. More than 70 percent of farmers also stated that they preferred to sell a part of their primary crop to FPOs rather than directly in the marketplace or via intermediaries because of higher prices and reliable payment. Nevertheless, there were areas of improvement for FPOs to involve farmers more actively in decision-making, market linkages, and financial and infrastructural support. Learnings from TARA have reinforced the relevance of FPOs in supporting farmers to realize economies of scale. This has informed our work in Odisha and Gujarat.

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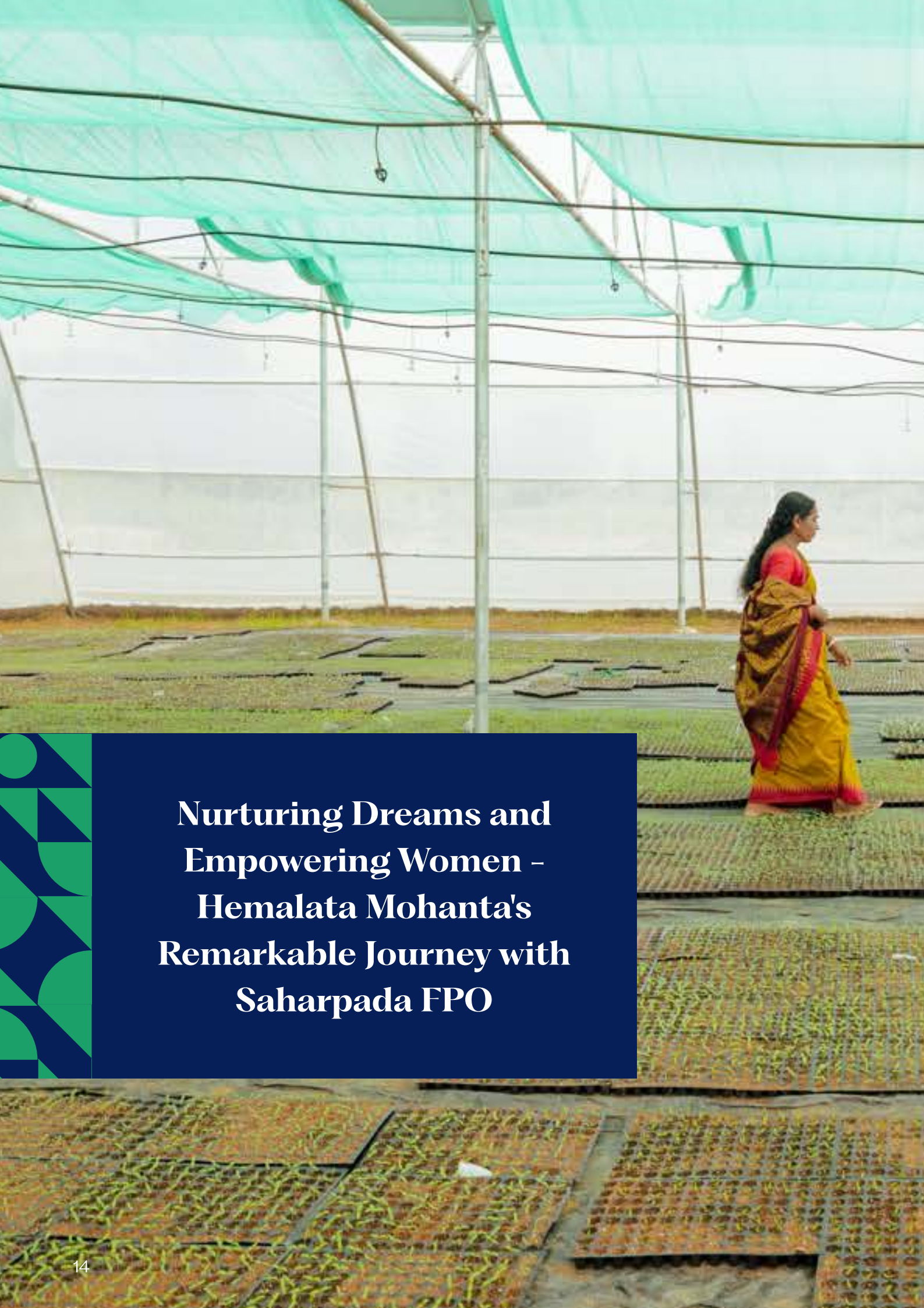
SAHARPADA FPO CASE STUDY

In 2022, a heartening narrative unfolded as Digital Green, committed to empowering women farmers, supported an all-women's Saharpada Farmer Producer Organization (FPO) in Odisha. This collaboration was a beacon of empowerment as the FPO realized its vision of establishing a soilless saplings business. Across 38 villages, 602 women farmers joined hands to embark on a journey to set up a community nursery. The women of Saharpada FPO envisioned this business to distribute and sell saplings to the farmer members of their community as well as farmers of the nearby village.

Over the year, there have been concerted efforts to enhance the capabilities of the Saharpada FPO to build their business plans and digitize their data. With meticulous attention, the data officer of Saharpada FPO catalogued various records of their operations, such as purchases, sales, inventory, and financial data.

Empowered by data-driven insights, the FPO witnessed a substantial surge in revenue, an outcome of their soilless sapling sales. 232,975 saplings have been distributed to approximately 862 women farmers in one cropping season alone. The 30 percent reduction in seed costs was also a testament to their efforts. This venture, borne out of collaboration, innovation, and empowerment, has converged to weave an inspiring narrative for the women farmers of Saharpada and beyond.



Nurturing Dreams and Empowering Women - Hemalata Mohanta's Remarkable Journey with Saharpada FPO

Hemalata Mohanta, a Saharpada FPO Board of Directors (BoD) member, reflects on her journey with gratitude, stating, “Over and above increasing my skill and income over the years, I am grateful that through this platform, I could motivate other women to join us and increase their incomes too.”

For the women farmers in the Saharpada FPO, running their own Community Nursery business has fulfilled their aspirations. Established in November 2021 as a farmer-producer organization across 38 villages, it boasts over 1800 women members.

Hemalata recounted - “In 2003, despite my family’s objections, I joined an SHG, unsure of its benefits.” As part of the SHG, the initial ten members collected Rs. 50 each to start savings within the group. Inspired by this small step, ten more women from the village joined, creating a ripple effect in neighbouring villages. The SHG’s modest beginnings led to its incorporation as a producer group. “Producer groups gave us a platform to contact big buyers from nearby cities to sell our produce to them.” This grew further as producer groups merged into the FPO. Over time, various ventures like stitching, mushroom cultivation, cleaning products, and soilless saplings were undertaken. Notably, soilless saplings flourished due to Digital Green’s support, leading to a community nursery. Digital Green supported the FPO in terms of space, technology and funds to start their polyhouse to sell vegetable saplings at a larger scale to nearby villages so that farmers can have access to quality saplings to grow nutrient-rich vegetables at a low cost.

The FPO had a significant turnover in the first year alone. The Data Officer, Hemalata Mohanta, also a BoD member, shared that they maintain records of their inventory and transactions using the Kisan Diary Enterprise (KDE) app to collect the farmers’ demand and sapling sales. Having seen the value of digital data management, she expressed their aspirations to acquire a computer for comprehensive digitization.

Hemalata’s determination helped her overcome personal challenges and attend various training programs. Her financial independence now funds her son’s higher studies and contributes to her family income.

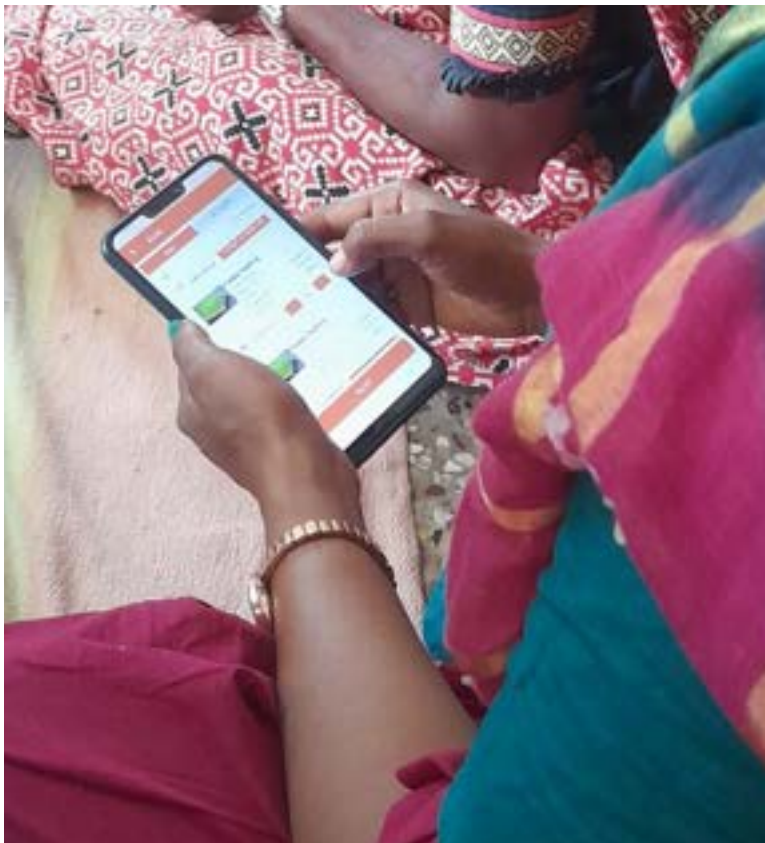
MEGHA MANDALI FPC CASE STUDY

In a narrative that intertwines empowerment with technology, the collaboration between Digital Green and the Megha Mandali Farmer Producer Company (FPC) in Surat, Gujarat, is a testament to the transformative power of digital skilling. Digital Green enabled Megha Mandali FPC members to harness the vast potential of agri-data collection with newfound efficacy through digital skilling and onboarding onto the farmer collective app.

The results of this endeavour were telling. As the FPC ventured into the realm of demand collection, the power of data assumed centre stage. With the availability of insightful data collected from over 3000 farmers, the FPC wielded newfound bargaining power in their input procurement processes, securing a notable 30 percent margin from input dealers. It was a resounding victory, underpinned by the strategic leverage granted by well-organized data.

Furthermore, digital literacy helped the FPC's leadership understand the intricate balance of demand and supply principles. Both data and digital literacy, coupled with the need to read and interpret market trends, will offer them a vantage point ahead of each cropping season. The partnership between Digital Green and Megha Mandali FPC represents how technology, when harnessed with intent, can amplify not only the harvests in the field but also the strength of those who toil to bring them forth.

Data and digital literacy of the women farmers at the Megha Mandali FPC have increased their understanding of demand and supply principles, ultimately enabling them to get a margin of 30 percent from input dealers.



Farmstack

While there have been brilliant innovations, the adoption of emerging technologies in the agricultural value chain activities has been slow due to fragmented services and platforms often operating in silos. There is a need to facilitate the ease of innovation in agriculture, improve farmers' income, have a positive effect on the environment, and enhance trust and transparency.

Farmstack is a unique and secure data exchange solution built by Digital Green as a digital public good. This solution demonstrates the value of data interoperability by agtech initiatives to ensure a higher value proposition to small and marginal farmers who otherwise remain at the periphery of the digital ecosystem. The Farmstack product suite consists of three aspects - 'data governance' that enables organizations, including governments, to run an agricultural data network, allowing them to invite different participants to publish their data sets and access it. The second aspect is 'data connectors' enabling farmer organizations and service providers to transfer data using peer-to-peer, end-to-end encrypted connectors, allowing them to securely share sensitive data for critical farm decisions. Finally, the 'data wallet' enables farmers to participate in data-sharing networks by enforcing individual consent rules for data. This allows them to decide who they share their data with, what data is shared, and how long it is shared.

Farmstack demonstrates the value of data interoperability by agtech initiatives to ensure a higher value proposition to small and marginal farmers who otherwise remain at the periphery of the digital ecosystem.

USE CASE - SAAGUBAAGU DATA INTEROPERABILITY

In the SaaguBaagu project in Telangana, we developed a data interoperability back-end platform enabled by Farmstack that allows for secure data exchange directly between different agtech partners to provide better services to farmers on a real-time basis. Farmers got their soil tested through this platform and accessed tailored and timely advisories within the chilli value chain by sharing their crop quality assessment data from AI-based crop assessment providers with online marketplaces. Critical actors from both the public and private sectors, such as Kalgudi, AgNext, the Department of Horticulture (Government of Telangana), and KrishiTantra, adopted Farmstack for this use case. More than 6200 farmers' data was collected with their consent and securely shared between ecosystem partners, and close to 15 data sets across categories like crop data, land record data, personal data, pricing data, insurance data, and credit assessment were collected and analyzed. Kisan Diary Enterprise (KDE), another digital product by Digital Green, aggregated and provided farmer-level data to all participants via DataHub. KrishiTantra did the soil testing and sent reports and advisories to KDE, the Department of Horticulture, and Kalgudi. Farmers planned for fertilizers and other inputs based on these targeted advisories, whereas Kalgudi readied itself to provide effective market connections to farmers well in advance. Post-harvest, the quality of the product was also certified by AgNext, which would ultimately help determine the selling price.

Gender

In India, nearly one of every two self-employed farmers is a woman. Despite their significant contribution to the agricultural sector, glaring gender gaps remain in their access to land, inputs, information, extension services, resources, and technology. Women's work in agriculture is also often denser and drudgery-inducing, particularly with tribal and lower caste women farmers who face exacerbated marginalization in agriculture. They are also disproportionately impacted by climate change for various reasons, including greater dependence on natural resources for their livelihoods.

Digital Green recognizes gender inequality as a substantial obstacle in eradicating poverty among smallholder farmers. Right from inception, we have worked on enabling women farmers' access to knowledge on agricultural practices through various digital communication channels. Of the 2.5 million farmers we have reached in India, 77 percent have been women. Recently, our strategic focus has augmented our existing work with women farmers through gender-intentional interventions that place them at the centre of the food and agriculture ecosystem. While we continue leveraging the transformative potential of digital tools and platforms, we envision that the collective strength of farmer organizations will increase women farmers' leadership capacities, decision-making, negotiation, and bargaining power.

In Odisha and Jharkhand, we worked with tribal women farmers from Adivasi and particularly vulnerable tribal communities to strengthen the collective bargaining power and leadership skills of women's farmer-producer organizations. Through digital tools and targeted advisories at the grassroots level, we reached over 50,000 women farmers. Insights from our work in Odisha and Jharkhand have since informed our pathway of working with women's farmer organizations to empower them as decision-makers in their economic processes. In 2022, Digital Green also supported all women's FPOs - Saharpada FPO in Odisha and Megha Mandali FPC in Gujarat - through digital innovations, business planning, and capacity building to enable them to make data-backed decisions for their micro-business enterprises. By digitizing their data, both women-led farmer organizations have significantly reduced their costs of inputs by 30 percent and seen a considerable profit margin.

We envision that the collective strength of farmer organizations will increase women farmers' leadership capacities, decision-making, negotiation and bargaining power.

In 2022, we carried out an internal gender assessment that has driven our efforts to build organizational capacities and focus on gender-sensitive policies. This also began a comprehensive approach to implementing gender-aware and intentional programs, training and capacity-building initiatives, technology solutions, and gender-disaggregated evaluations. The core of women's empowerment will be founded on data-based decision-making in the hands of the women farmers. Digital Green has employed a 'gender-tagging' tool to enable this empowerment.

The 'gender-tagging' tool identifies the projected impact of gender-intentional advisories by classifying them through the gender lens. This will help with data-based understanding and consequent decision-making on how the intentionally designed advisories have different levels of impact on women farmers. With the national scale-up of our video-based extension work, this tool will guide the production and presentation of all videos by Digital Green in a gender-sensitive manner.

Digital Green also held a roundtable discussion on 'Innovations & Lessons on What Works to Empower Women Farmers' that brought together several organizations that have made significant strides towards integrating a strong gender lens into their work. This was a dialogue to enhance our collective understanding of strategies, innovations, and measurement tools that can empower women farmers. In the future, these dialogues will translate into convergent working groups that further discussions, solutions, and interventions that can have a sincere and lasting impact on women farmers along with the entire ecosystem surrounding them.

PROJECT ATLAS - ADVANCING LIVELIHOODS FOR TRIBAL WOMEN

With support from the MacArthur Foundation, Digital Green introduced its first-ever gender-intentional project to empower tribal women farmers in Jharkhand and Odisha. Of the 53,581 tribal women farmers we reached, over 50 per cent of the women were from particularly vulnerable tribal groups (PVTGs), which are the most susceptible even among tribal groups. The intersectional approach of this project enabled us to understand the complexities of their challenges and tailor solutions accordingly.

Digital advisories were shared on improved participation in FPOs, targeted agricultural practices, livestock management, market access, and decision-making in the household-level and public spaces to enhance their negotiation powers and leadership capacities to achieve greater economic empowerment. FPO assessments and buyer interfaces also helped women farmers connect with potential buyers and get their produce market-ready.

1032 frontline workers (FLWs) were trained in video production and dissemination, and 130 FLWs were trained in using Kisan Diary Enterprise to help women farmer groups aggregate their data. Nearly 30 percent of the farmers onboarded onto the KDE platform could effectively aggregate their data to estimate the availability and quantity of produce, which helped them negotiate and sell their produce. Farmers realized an 18 per cent increase in their incomes in one year.

A Women Empowerment Evaluation study (July 2022) in Jharkhand also reported an increase in women farmers' ability to take decisions, with 88 percent of respondents expressing the confidence to take significant decisions independently. Women reported their ability to make household-level decisions, with 33 percent reporting that they did not have to seek permission to make agriculture-related decisions. In a December 2022 follow-up evaluation, these findings were reiterated. This study reported a 21 percent increase in the participation of women farmers in FPOs, wherein they perceived themselves as capable of performing a wider range of activities from farming to marketing and becoming influential FPO officials.

88% of tribal women farmers expressed their confidence to take significant decisions independently.

Climate Resilient Agriculture

Digital Green recognizes climate change as a global phenomenon that has localized consequences exacerbating the vulnerabilities of smallholder farmers. In response, we employ a farmer-centric approach to address these vulnerabilities and promote practices that build the resilience of smallholder farmers, with particular attention to women farmers, their farms and the environment. Digital Green has developed a climate strategy to drive positive change in agricultural systems and build upon past and current efforts to combat climate change.

Our climate strategy aims to empower smallholder farmers and enhance their well-being by integrating digital solutions into agricultural transformation. It applies a climate lens to the challenges farmers face and promotes the adoption of climate-smart agricultural practices at the farm level.

Built upon three pillars - data exchange, climate advisories, and farmer collectives, Digital Green's climate strategy ensures localized digital solutions for farmers, emphasizing community integration. The approach relies on collecting and utilizing primary data at the smallholder farmer level. Consequently, the strategy offers policymakers, researchers, and development practitioners an opportunity to understand better the daily challenges a smallholder farmer faces due to climate change. By employing a data-driven approach, informed-decision making is facilitated, successful practices can be scaled up, and smallholder farmers' resilience and adaptive capacity against climate change can be enhanced. Furthermore, our climate strategy will enable farmers to embrace digital tools and learn from each other's farming experiences, thereby improving their livelihoods and fostering climate-resilient, inclusive practices within their respective communities.

As Digital Green has placed a particular emphasis on building a robust and well-informed climate and gender vertical in its portfolio, internal capacity-building efforts have been made to prioritize our strategic focus. Integrating the climate inclusion tool ensures that all extension services incorporate a dedicated climate lens in their design and content. Additionally, the organization rigorously examines all existing and planned activities from a climate perspective, adhering to the principles and guidelines outlined in the climate strategy.

In 2022-23, Digital Green created 1,100 farmer scorecards and piloted 100 for close monitoring of its utility among farmers.

PROJECT FRAME - ACCELERATING CLIMATE-SMART AGRICULTURE OUTCOMES

Since 2021, Digital Green has been implementing FRAME (Fostering Resilience in Agriculture through MRV Experimentation) across 11 districts in Bihar in partnership with JEEViKA (Bihar Rural Livelihood Promotion Society) and our technical partners Tata Cornell Institute and Cereal Systems Initiative for South Asia (CSISA). This initiative aims to empower farmers by offering climate-smart agriculture (CSA) to minimize greenhouse gas (GHG) emissions from the rice-wheat cropping system. We reached approximately 17,000 farmers with wheat crop advisories.

Digital Green also conducts extensive training and capacity-building programs for the frontline extension workers to enhance their understanding of promoting low-carbon emission techniques in agricultural activities. 132 frontline workers were trained to gather data from 5160 farmers for the wheat crop during the winter season of 2022-23, and these data sets are expected to be utilized by our partner to develop a model that can estimate GHG emissions.

A farmer scorecard is a unique tool that is contextualized to the practices of farmers and provides specific recommendations to them. This scorecard has been designed in consultation with the farmers, JEEViKA, and Tata Cornell Institute (TCI). It compares several parameters such as yield, crop variety, sowing date, and quantity of fertilizer used. Not only does the scorecard give farmers visibility of their consumption, but it also prompts them to adopt good practices based on evidence. During the Rabi season of 2022-23, Digital Green created 1,100 farmer scorecards and piloted 100 for close monitoring of their utility among farmers.

By combining these efforts, Digital Green endeavours to create a positive impact by reducing agricultural land carbon footprints and increasing farmers' income levels.

Thought Leadership and Strategic Outreach

'Always learning' and 'Farmer-focused' are two of Digital Green's core values that guide our work and thought leadership. As we continue to innovate and strive to leave a lasting impact on the farmers we partner with, we also value the insights that our partners and experts in the ecosystem bring in. In 2022, Digital Green organized two events bringing together key stakeholders, including policymakers, practitioners, entrepreneurs, experts, and farmers themselves, to discuss the current realities, challenges, and opportunities to build prosperous farming communities.

NATIONAL WORKSHOP ON DIGITAL INNOVATIONS FOR CHILLI FARMERS

The EMIRCHA and SaaguBaagu projects in Andhra Pradesh and Telangana demonstrate a scalable and replicable digital model based on Digital Green's video-based extension approach. A public-private partnership approach to these projects offers an opportunity to scale up – AgNext Technologies provides certification on chilli quality, KrishiTantra conducts soil testing, and Kalgudi offers a digital marketplace for farmer organizations. Appropriate technology platforms provide data-driven insights that farmers can adopt to increase their incomes and productivity. Since 2021, we have reached more than 63000 farmers, 80 percent of whom have adopted one or more practices. They have also experienced 16.4 percent savings on their inputs and realized a benefit of Rs. 1250 per quintal through digital market linkages.

In February 2023, Digital Green, in partnership with the Department of Horticulture, Andhra Pradesh, organized a national-level workshop with the participation of all project consortium partners, the Bill & Melinda Gates Foundation, and farmers. This was a platform to share learnings on digital innovations that have enhanced farmers' productivity and resilience to further collective thinking and action on how ecosystem players can converge to unlock the potential of digital agriculture. The Commissioner of Horticulture, Andhra Pradesh, Dr SS Sreedhar, IFS, was the chief guest who expressed interest in expanding the scope of the digital innovations to other commodities and geographies. Farmer representatives also spoke about the differences digital technologies have brought into their lives and communities. A key takeaway was that technology is indeed an enabler in the hands of farmers and can unlock a gamut of opportunities. Collaboration, convergence, and coordination are vital in making innovations work for small and marginal farmers.

ROUNDTABLE DIALOGUE – INNOVATIONS AND LESSONS ON WHAT WORKS TO EMPOWER WOMEN FARMERS

In March 2023, Digital Green organized a roundtable dialogue that brought together several organizations that have made significant strides toward integrating a strong gender lens in their work by leveraging innovative solutions. This was aimed to bolster our efforts to spotlight women farmers and their challenges and enhance our understanding of strategies, approaches, innovations, and measurement tools that have worked to empower women farmers.

The chief guest was Mr Charanjit Singh, IFS, Additional Secretary at the Ministry of Rural Development. He shared that the government is keen to explore and utilize the power of digital technologies to empower women farmers through the expansive network of community resource people and grassroots infrastructure. The roundtable dialogue also invited organizations such as PRADAN, Project Concern International (PCI), Sewa Cooperative Federation, Grameen Foundation, TrickleUp, Rockefeller Foundation, ICRISAT, IFPRI, IRRI and more. The key takeaway was that while empowerment is a complex concept, programs and technologies must take on an intersectional lens and be designed for inclusivity in gender interventions that consider their unique needs and contexts. Secondly, interventions must also focus on the ecosystem around them, such as family, community, and state, to create allies as women's identities are relational. Lastly, digital access is a right, and there must be convergence between experts to advance the meaningful use of digital technologies, increase confidence, and sincerely impact women farmers' empowerment.

Over the year, Digital Green also took part in the United Nations Conference on the Least Developed Countries (LDC5) and several G20 side events, including the Global Dialogue on Food Systems Transformation (organized by the Confederation of Indian Industry) and conferences organized by industry leaders such as National Conclave on Market Access for Smallholder Farmers (organized by Grameen Foundation), Yojana Sabha (Haqdarshak's Annual Summit), and AVPN Global Conference.

Our Work in India

EMIRCHA - Andhra Pradesh
FARMERS: 18,764 FLWs: 8

SaaguBaagu - Telangana
FARMERS: 23,485 FLWs: 42

TARA - Andhra Pradesh
FARMERS: 129,237 FLWs: 20,222

Partnership with RySS - Andhra Pradesh
FARMERS: 743,746 FLWs: 14,286

DEEP - Jharkhand
FARMERS: 51,594 FLWs: 1242

ATLAS - Jharkhand and Odisha
FARMERS: 59,936 FLWs: 55

Partnership with JSLPS - Jharkhand
FARMERS: 41,911

Partnerships with OPELIP & OLM - Odisha
FARMERS: 122,685 FLWs: 476

FRAME - Bihar
FARMERS: 14,511 FLWs: 132

CIP - Bihar
FARMERS: 8,630 FLWs: 248

Partnership with JEEViKA - Bihar
FARMERS: 514,250 FLWs: 8571

D2FO - Odisha, Gujarat, Karnataka
FARMERS: 3,000

Impact & Evidence

PROGRAM REACH

17,31,749

Farmers Reached

995,970
Female Farmers

735,779
Male Farmers

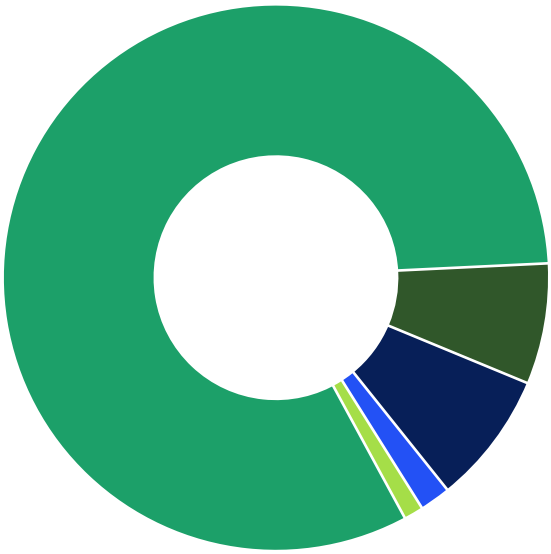
FRONTLINE WORKERS (FLWs) TRAINED

27,082

Frontline Workers Trained

11,981
Female FLWs

15,101
Male FLWs

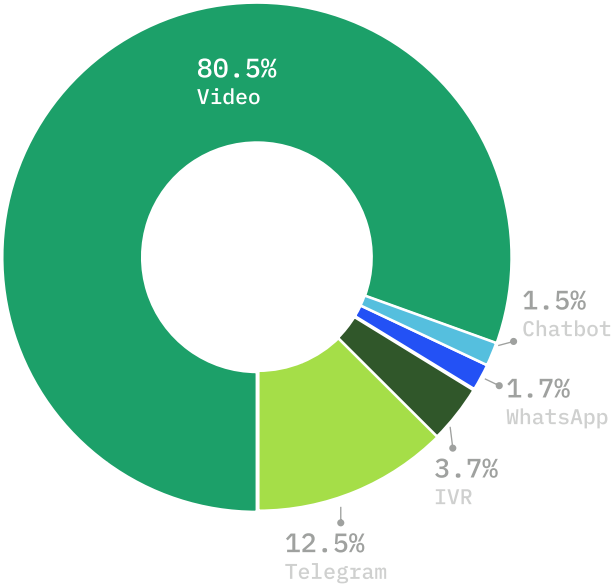


PLATFORM-WISE REACH

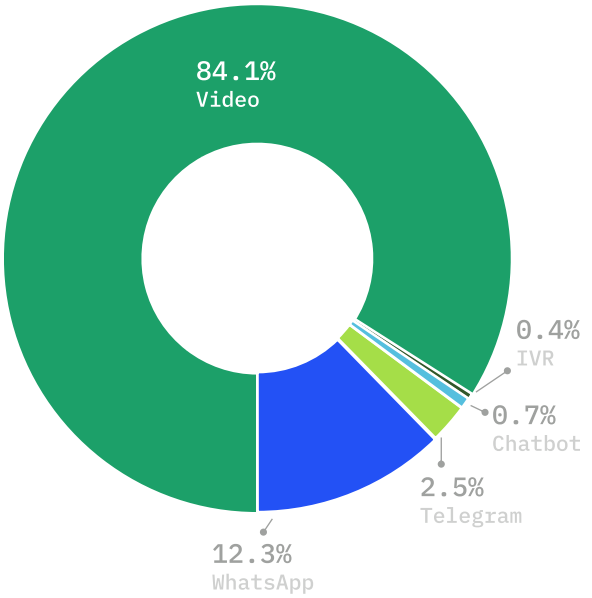
- Video: 83%
- WhatsApp: 8%
- Telegram: 7%
- IVR: 2%
- Chatbot: 1%

Gender-wise reach across major channels

MALE REACH



FEMALE REACH



VIDEO

866,221
Female Farmers

585,918
Male Farmers

WHATSAPP

126,623
Female Farmers

12,481
Male Farmers

TELEGRAM

25,741
Female Farmers

91,263
Male Farmers

Research Publications & Evaluations

PROCESS EVALUATION OF FARMER PRODUCER ORGANIZATIONS (OCTOBER 2022 - JANUARY 2023), IDinsight

From October 2022 to January 2023, IDinsight conducted a process evaluation to assess the receptiveness of Digital Green's activities by FPOs and member farmers and understand FPO operations and capacities. The study highlighted that FPOs effectively engage in input and output activities with Digital Green's support. Both FPOs and farmers gain advantages from activities like advisories. More actively led FPOs participate extensively in such activities. While CEOs and BoDs guide FPO decisions, farmers are also involved via General Body Meetings (GBMs). Yet, farmers, especially women, lack complete awareness about FPO-level meetings, harvest selling, and input purchasing. Strengthening FPO leadership and management necessitates additional investments and capacity-building.

VIRTUAL TRAINING METHODS TO ENHANCE CAPACITY OF AGRICULTURE EXTENSION WORKERS IN ANDHRA PRADESH AND JHARKHAND, INDIA (AUGUST 29, 2022)

Chaudhary, Himanshu and Kumar, Sanjeev and Kumar, Ritesh

This study evaluated the quality and effectiveness of virtual training platforms for extension workers in Andhra Pradesh and Jharkhand. Data from 100 and 72 extension workers from Andhra Pradesh and Jharkhand, respectively, showed completion rates of 82.74 percent and 40.09 percent. The study indicated that virtual trainings were valuable, aligning with crop seasons, offering flexibility and proving especially useful during COVID, with potential for further expansion as internet access improves.

PROCESS EVALUATION OF THE FARMSTACK CONSENT TOOL (JUNE - AUGUST 2022), IDinsight

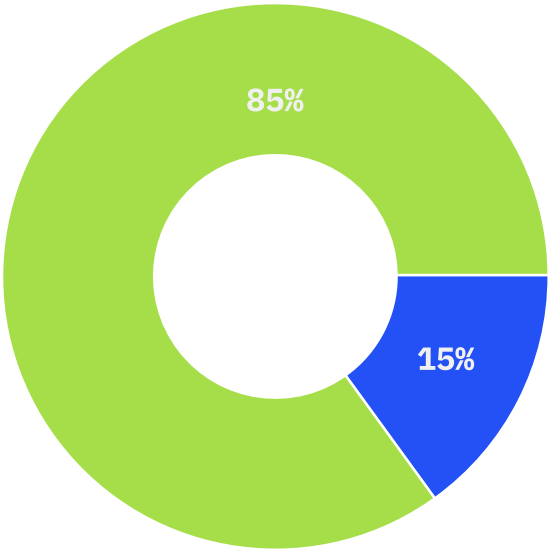
In June-August 2022, IDinsight conducted a process evaluation for Digital Green. The study aimed to assess farmers' experience in giving consent to share personal details with the FarmStack platform and understand the related influencing factors. Results showed around 50% of farmers knew their data was being collected to develop new schemes that may benefit them. However, the understanding of consent was low, with only half of consenting farmers watching a video on this. The study concluded that trust between FLWs and farmers is vital for obtaining consent. Thus, targeted training and process enhancements are needed for better informed and more likely consent.

UNDERSTANDING THE FEASIBILITY OF A DIGITAL INTERVENTION FOR SOCIAL BEHAVIOUR CHANGE TO PREVENT COVID-19 AND IMPROVE HEALTH AND NUTRITION OUTCOMES (MAY 6, 2021)

Kumar, Sanjeev and Narayan, Vir and Chaudhary, Himanshu and Bennett, Gelsey

A telephonic survey gathered data from 299 community members and 224 frontline workers in Bihar, Jharkhand, Odisha, Chhattisgarh and Uttarakhand. Our analysis revealed that more than 70 percent of community members and frontline workers had access to phones and exposure to WhatsApp videos. To improve health and nutrition outcomes, there needs to be a focus on expanding the phone database, improving frontline worker training, and promoting digital literacy within the community for better effectiveness of digital media tools.

Financials



EXPENSES

183,630,315

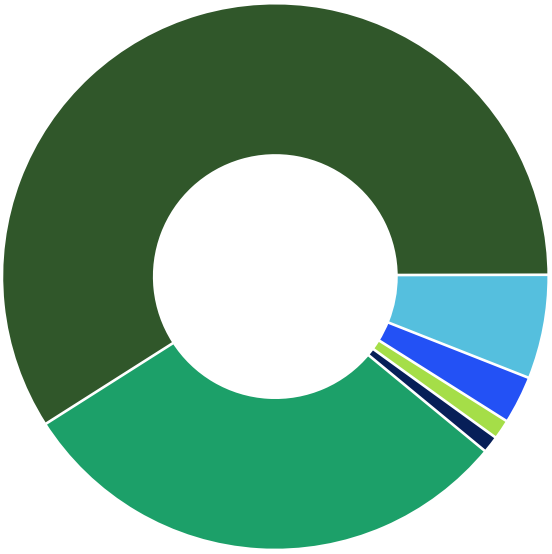
Total Expenses

156,757, 237

Program Expenses

26,873, 078

Management & General Expenses



REVENUE

- DGF Grant 30%
- Institutional Funding 59%
- International Corporate Funding 3%
- Investment 1%
- Local Corporate Funding 6%
- Unrestricted 1%

Digital Green Trust 2022-2023

Assets	60,563,022
Liabilities	9,180,625
Net Assets	51,382,398

Our Governance

Trustee

Tejesh Shah
DGT Board Chairman

GNS Reddy
Trustee

Board Members

Anirban Ghose

Neeraj Jain

NM Prusty

Namita Vikas

Priyanka Singh

Leadership

Ravi Shankar Sharma
Director, Programs

Gautam Mandewalker
Director, Product Management

Ayushi Singh
Senior Head, Training & Capacity Building

Ronali Pradhan
Senior Head, Odisha & Jharkhand Region

Akash Asthana
Head, Bihar Region

Narendra Kandimalla
Head, Andhra Pradesh & Telangana Region

Avinash Kumar
Head, Country Finance & Accounting

Prita Das Gupta
Lead Gender Specialist

Rohit Sharma, PhD
Senior Climate Specialist

Digital Green Trust *is a public charitable trust registered under a trust deed, under Section 12A of the Income Tax Act.*

The registered address is: Flat No T4, 4th Floor, #33, Race Course Road, Swiss Complex, Bangalore, Karnataka, 560001.

In Gratitude

Ministry of Agriculture & Farmers' Welfare
Ministry of Fisheries, Animal Husbandry and Dairying
Indian Council of Agricultural Research (ICAR)
Krishi Vigyan Kendra Knowledge Network
Bihar Rural Livelihoods Promotion Society (JEEViKA)
Department of Agriculture, Telangana
Department of Horticulture, Telangana
Telangana State Technology Services (TSTS)
Society for Eliminating Rural Poverty, Andhra Pradesh (SERP)
Department of Agriculture, Andhra Pradesh
Department of Horticulture, Andhra Pradesh
Spices Board, Andhra Pradesh
Andhra Pradesh Academy of Rural Development (APARD)
Rythu Sadhikara Samstha (RySS)
Society for Eliminating Rural Poverty, Andhra Pradesh (SERP)
Jharkhand State Livelihood Promotion Society (JSLPS)
Mahila Kisan Sashaktikaran Pariyojana, Jharkhand
Odisha Livelihoods Mission (OLM)
Odisha PVTG Empowerment and Livelihoods Improvement Programme (OPELIP)
Rajasthan Grameen Aajeevika Vikas Parishad (RGAVP)
Accenture
ACT Grants
AgNext Technologies
Amaravathi University
Arghyam
Bill & Melinda Gates Foundation
Centre for Fourth Industrial Revolution, World Economic Forum
Centre for Youth and Social Development (CYSD)
Cereal Systems Initiative for South Asia (CSISA)
Cisco Foundation
ColoredCow
Dalberg
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Digital Green Foundation
EFFORT India
EkStep Foundation
Environmental Defense Fund (EDF)
Food and Agriculture Organization of the United Nations (FAO)
Gooey.AI
IDinsight
Impact PSD
International Maize and Wheat Improvement Center (CIMMYT)
International Potato Centre (CIP)
Jattu Trust
Kalgudi Digital Pvt Ltd
Krishitantra
LAM University
MacArthur Foundation
Malyal University
NP Research and Development Agency (NPRDA)
Professor Jayashankar Telangana State Agricultural University (PJASTU)
Sequoia Climate Fund
SEWA Cooperative Federation
Societal Platform
Sri Sri Rural Development Program (SSRDP)
Sunbird
Tata Cornell Institute
Tekdi Technologies
Velugu Charitable Trust
Walmart Foundation

About Digital Green

Digital Green is a development organization committed to creating a world where farmers use technology and data to build prosperous communities. Since spinning off from Microsoft Research in 2008, we have fostered partnerships with several government and non-governmental organizations to reach over 2.3 million farmers across six states in India.

Over the years, we pioneered, tested, and successfully scaled our digital approach to agricultural extension. We have worked to augment existing support systems by building the capacities of a vast network of extension agents in the use of scalable, cost-effective technologies to make their work among rural communities effective, efficient, and impactful. Witnessing the positive impact of digital tools, many of our partners have also invested their resources in scaling and sustaining this approach. We will continue to collaborate with various stakeholders in the ecosystem to sustain our systems-level effort to benefit farmers' resilience and success.

As we advance, Digital Green envisions farmer organizations as micro-enterprises that control their data and lead their digitalization efforts to ensure the utmost benefits for smallholder farmer members. We are working to build open-source technology solutions co-designed with farmers to provide enhanced opportunities for them to access improved services and new income streams.

Notes

Digital Green

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Digital Green

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