



**SUSTAINABLE LIVELIHOODS FOR  
EVERYONE, EVERYWHERE**

2023 annual report





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# Letter from the CEO

I joined Precision Development (PxD) as a Research Associate almost a decade ago, motivated by its vision to support smallholder farmers in improving their lives. PxD was and is a unique organization—one that is passionate about delivering impact at scale, committed to continuous learning and iteration, and deeply rooted in our farming communities.

As climate change worsens and smallholder farmers continue to struggle with its effects, our work has never been more important.

I feel privileged to step into the role of CEO at PxD alongside a truly wonderful team that inspires and challenges me every day. I would also like to thank Owen Barder for his leadership of PxD over the last four years.

As for many organizations in the sector, 2023 was a year of ups, downs, and everything in between for PxD. Services built by PxD now reach over 10 million farmers; rigorous evaluations show that our programs drive massive benefits, especially for the poorest and most climate-vulnerable farmers; we tested and scaled new services and invested in strengthening organizational systems. At the same time, we made hard decisions about transitioning our work in Pakistan to government partners and saying goodbye to some wonderful colleagues and friends.

Looking forward, there is a lot to be done. As you can see in the report below, we have a new vision and mission statement. We are updating our strategy to reflect our deepened focus on helping farmers combat the effects of climate change, expanded ambition to double our impact and scale in the next five years, and plans to leverage innovations like artificial intelligence to improve our services, all while keeping the farmers we serve at the heart of what we do.

I am excited about what lies ahead for PxD and sharing our journey with our supporters. We remain grateful to our partners and funders for their continued support and look forward to working together to enable millions of people worldwide to live more dignified and productive lives.

I hope you enjoy this snapshot of our work in 2023. I am very proud of what the team has achieved.

Best wishes,

Niriksha Shetty  
Incoming Chief Executive Officer





# PxD at a glance



**10 052 109**

Total users served in 2023



**2 935 490** Women  
Users served in 2023<sup>1</sup>



**\$1.29** Average cost  
Per current user in 2023



**10** Active programs  
Reaching current  
users in 2023



**+38%** User  
Growth in 2023

**13:1 - 21:1**

Benefit-cost ratio  
Estimated through our  
flagship program in India<sup>2</sup>

1. Estimated from a subset of programs where we have data on user gender.

2. Estimated from PxD's flagship Ama Krushi program in Odisha, India.

## Vision

Sustainable livelihoods for  
everyone, everywhere.

## Mission

To scale innovations that millions of  
farmers can use to improve their lives.





# Improving the climate resilience of farming communities



## Impact spotlight: Evaluating PxD's digital agriculture services

From 2021-2023, PxD completed a rigorous impact evaluation of its flagship program, [Ama Krushi](#) with the support of the Bill and Melinda Gates Foundation (BMGF) and the Wellspring Philanthropic Fund. This program was designed as a “Build-Operate-Transfer” and initially co-financed by the Odisha state government and BMGF, before being fully transitioned to the state government in 2022.

Preliminary results from the evaluation<sup>3</sup> show:

### Food security & climate resilience:

- Ama Krushi increased total rice production by 100 kg per farmer per season (total value of US\$39 per farmer per season).
- Ama Krushi reduced the incidence of farmers experiencing severe crop loss by 10%.
- Farmers in areas hit by excess rainfall increased profits by \$30-\$48 per farmer with Ama Krushi during the “Kharif” main agricultural season (worth 15-23% of median Kharif income for a smallholder farmer in Odisha).

3. Working paper forthcoming



## Large ROI on investment

- We estimate that Ama Krushi generated an aggregate additional impact of \$13 million across 2 million farmers for the total investment of \$1 million in 2021
- The program resulted in additional agricultural profits of \$13 for every \$1 invested at the time of the evaluation.
- Ama Krushi's current scale of 6.9 million farmers and annual budget of \$1 million implies it is generating additional agricultural profits of \$38 for every \$1 invested in 2024 and onward.

These findings show that digital agriculture services can generate substantial agricultural profit gains at very low cost. For some farmers, receiving these services can mean the difference between suffering a catastrophic crop loss versus producing a healthy crop yield, feeding their families, and maintaining enough profits to support their households. These services are one of the very few global development interventions that directly increase the incomes and consumption of extremely poor households in an extremely cost-effective manner.



## Providing customized digital advice to smallholder farmers

With support from BMGF and the United Kingdom Foreign, Commonwealth and Development Office (FCDO), PxD continued to work with the Ethiopia Agricultural Transformation Institute (ATI) to provide outbound information on artificial insemination, calf and cow management, and customized animal feed rationing reaching 160,000 dairy farmers. PxD also supported ATI in strengthening its 8028 Farmers' Hotline inbound advisory service, which reached an additional 485,000 farmers in 2023 with advice on 21 crops and 5 livestock value chains. PxD collaborated with The Netherlands Development Association (SNV) to provide targeted advice to 3,000 dairy farmers and service providers, customized to each cow's stage on the lactation curve, as part of the Building Rural Income through inclusive Dairy Business Growth in Ethiopia (BRIDGE) project.

In Kenya, as part of the World Bank-funded One Million Farmers platform, PxD disseminated customized messages through its two-way SMS-based MoA-INFO service for the Long Rains season on five value chains (sorghum, irish potato, banana, tomato, and green gram) to over 17,000 farmers in three counties (Taita Taveta, Kericho, and Kwale) in partnership with the county governments. Feedback shows that 73% of respondents remembered at least one topic received from MoA-INFO, and 81% adopted at least one recommendation from the service. Of this, 41% were first-time adopters, suggesting their adoption was influenced by the MoA-INFO service.

With the generous support of the Walmart Foundation, PxD continues to scale its Coffee Krishi Taranga (CKT) service across four states in India (Karnataka, Kerala, Tamil Nadu, and Andhra

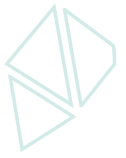


Pradesh) in partnership with the Coffee Board of India. In 2023, PxD expanded the service to reach more than 120,000 coffee farmers, providing advice on climate-smart coffee growing practices. In Q4, PxD began transitioning the CKT service to the Coffee Board of India, seamlessly transferring the core agronomy and call center functions to Coffee Board staff. PxD will continue scaling this service throughout 2024 and complete the transition to the Coffee Board by the end of the year, building on PxD's successful transitions of previous services in Odisha and West Bengal.

In 2023, PxD's voice- and SMS-based digital advisory service in Pakistan, designed and built on behalf of the Agriculture Department of the Government of Punjab (AD-GoP) in 2018, was transitioned to complete government management. This service reached ~1.5 million farmers in 2023 with digital advice and an additional ~200,000 farmers who received access to customized soil health cards (SHCs) through PxD's partnership with the AD-GoP. The Punjab government still continues to reach a subset of these wheat, cotton, and oilseed farmers through this service, and we expect this service to continue to be owned and operated by the AD-GoP, conditional on government resources.

## Improving the adoption of resilience-enhancing technologies

Several innovations can improve farmers' risk tolerance, profitability, and resilience to climate shocks. However, these technologies do not reach farmers when they need it the most. PxD is designing, testing, and scaling innovations that have been shown through rigorous evidence to protect farmers from the effects of climate change in partnership with government and private actors across several geographies.



## Asset Collateralized Loans (ACLs) for water tanks

Water tanks help dairy farmers increase their climate resilience, reduce vulnerability to rainfall fluctuations, reduce time spent fetching water, and increase milk yields and incomes. Studies show that farmers who purchased tanks increased their milk production by 20-31% on average, driven by much higher milk yield during the dry season (Jack et al., 2018). Because water tanks are long-lasting assets, farmers can expect to earn revenue from additional milk production for the entire lifetime of the water tanks, estimated at 30 years. We estimate that each water tank generates between \$2,500 and \$4,000 in additional lifetime net income per farmer, at a cost of only \$280 per tank, without traditional credit obligations.

In 2023, with support from the King Climate Action Initiative (K-CAI), Private Enterprise Development in Low-Income Countries (PEDL), the Dioraphte Foundation, and the Goldsmith Foundation, PxD

continued its work to advance the scaling of ACLs in Kenya, including (i) developing a pipeline of dairy cooperatives and local financial institutions that can support PxDs ambitions to make ACLs available to at least 10% of the 1.8 million dairy farmers in the next 3-5 years, (ii) continuing data collection for its ongoing impact evaluation of ACLs on water tanks with two dairy cooperatives in Kenya's Rift Valley region in partnership with the Development Innovation Lab (DIL) at the University of Chicago.

**“I have been a part of the agriculture sector for quite some time now but it’s been a loss-making endeavor. I haven’t been able to achieve significant crop yield since I wasn’t aware of any information or advisory on cultivation practices. I have been cultivating coffee for the last 13 years but due to other engagements, I was unable to provide the necessary time or advice to laborers who work for me. CKT provides crucial information like lime application, bordo application, at the right time and in detail. I feel all the farmers in every village should use CKT. The farmers who struggle to manage pests and diseases should use CKT and adopt the relevant advice. For me, CKT was very helpful in applying lime and fertilizer at the correct time and in the right quantity. Earlier I used to apply fertilizer when the soil was dry but after receiving information from CKT I apply fertilizer when sufficient moisture is available in soil. I am very happy with the service and I wish everyone can follow [the] CKT service.”** Farmer in the Kesagod block, Karnataka, India





“I am using the Coffee Krishi Taranga service provided by the Coffee Board of India. The staff visited us and registered our phone number on the CKT service. I encourage every farmer to register on this service. Via CKT, I receive weekly and monthly advisories on important operations such as de-suckering and pruning for better plant growth. I also receive immediate responses to the questions that I record on CKT. If we follow all the advisories and practices as recommended by the CKT service, yields shall increase. I appeal [to] all tribal farmers to follow this.” Farmer in Sitaramaraju district, Andhra Pradesh, India

## Improving adoption of stress-tolerant seeds

With support from the Innovation in Government Initiative (IGI), the King Climate Action Initiative (K-CAI), and the Digital Agricultural Innovations & Services Initiative (DAISI), PxD began work to improve farmers’ access and adoption of stress-tolerant seed varieties. With the West Bengal Accelerated Development of Minor Irrigation Project (WBADMIP), PxD is working to expand the distribution of flood-tolerant seeds and increase farmers’ awareness of these seed varieties. PxD is also exploring a market-shaping initiative in Gujarat to improve access to drought-tolerant seed varieties in partnership with government departments, seed retailers, private suppliers, and others. PxD is now fundraising to build an initiative to increase access to these stress-tolerant seed varieties across many value chains and geographies.



## Improving access to real-time weather information

In partnership with the Climate Forecast Applications Network (CFAN), in 2023, PxD piloted a WhatsApp-based rainfall [forecast information service](#) to provide 7-day forecasts to coffee farmers in India. The post-pilot survey showed positive results, with 73% of farmers taking active decisions based on the forecasts. In 2024, with support from the Asian Disaster Preparedness Center (ADPC), PxD plans to refine and scale this weather forecast service. PxD has expanded the service to include both WhatsApp- and voice-based advice, using an innovative text-to-speech approach to ensure it remains inclusive and accessible to all farmers. PxD also plans to apply what is learned from this weather forecast service in Karnataka to develop similar weather services for farmers across value chains and geographies.



# Putting farmers at the heart of climate mitigation efforts

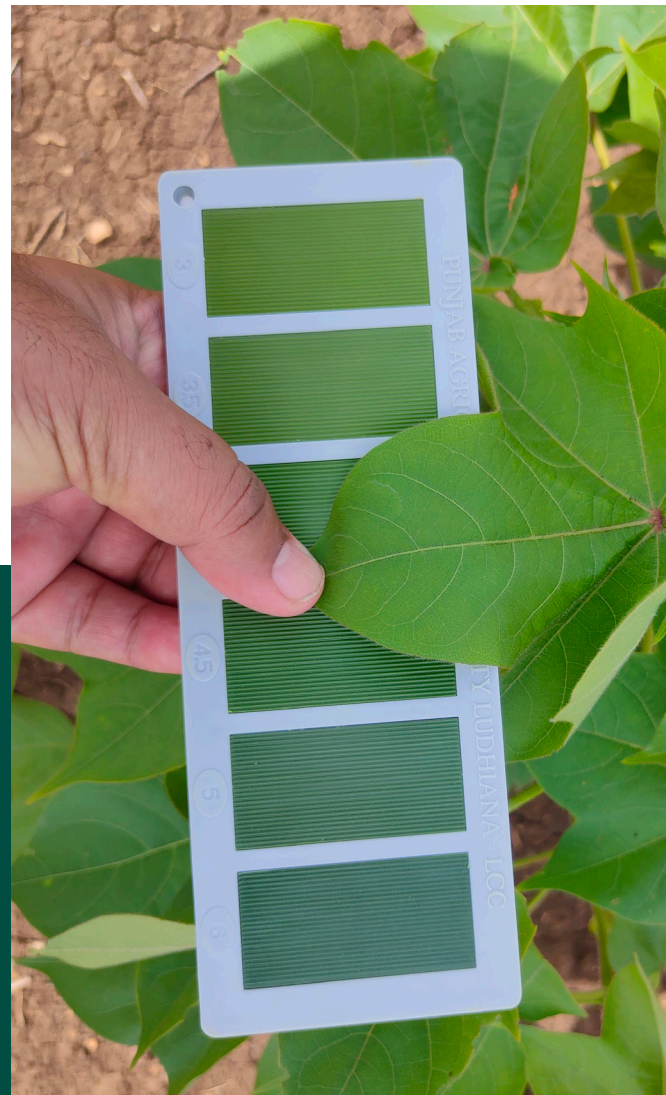
PxD's work on climate mitigation is guided by a farmer-first approach. Smallholder farmers cannot be expected to pay the price for climate mitigation. The adoption of climate-smart farming practices should first and foremost support farmers' livelihoods, and we focus on "win-wins" that have the potential to both mitigate the harmful effects of climate change and at the same time benefit farmers through higher yields or profits. In cases where it is difficult to understand a priori how a specific agricultural practice or technology might impact farmers' yields or profits, we commit to exploring ways to compensate farmers as payment for the social benefit that they are delivering to the planet.

## Scaling leaf color charts in India

With funding from Apparel Impact Institute's (Aii) Climate Solutions Portfolio, PxD launched a program exploring partnerships with various cotton-growing state governments in India to scale up the distribution of [leaf color charts \(LCCs\)](#), a decision-support tool that helps farmers optimize the use of nitrogen fertilizers. This promising technology can help reduce fertilizer overuse in South Asia, leading to reduced emissions of nitrous oxide, a potent greenhouse gas, and farmer input costs. The objectives of this program are to 1) create a scaling model with 40,000 farmers which can be replicated across the

"I received a leaf color chart from my agro dealer... he trained me on how to use the leaf color chart. I used a leaf color chart last year on my crops. Earlier I used to apply up to 10 kgs of urea per bigha [roughly 0.6 of an acre], but after using the leaf color chart I applied 5 kg per bigha, thus saving 5 kg urea per bigha. This helped me save 2,000 INR [roughly 24 USD] on urea and another 2,000 INR on labor cost, making it a total of 4,000 INR [roughly 48 USD]. I did not face any reduction in yield after reducing urea usage."

Farmer in Amreli district, Gujarat, India

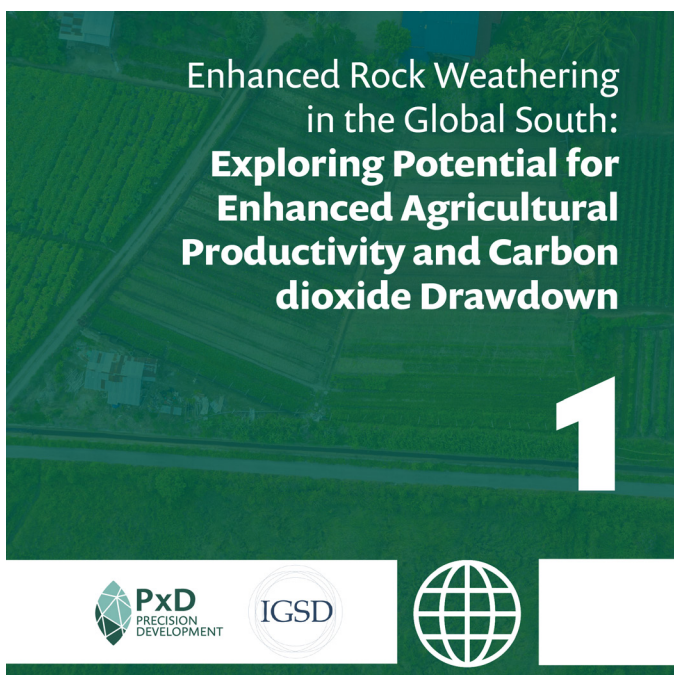




country and 2) generate insights on the effect of LCCs on fertilizer use and GHG emissions. PxD is distributing LCCs to 10,000 cotton farmers in Maharashtra in partnership with the Vasantrao Naik State Agricultural Extension Management Training Institute (VANAMATI) and the Ambuja Foundation (AF). Maharashtra is the largest cotton-producing state in India, accounting for approximately 36 per cent of the nation's cotton cultivation area and contributing around 22 per cent of its production.

## Identifying the potential for enhanced agricultural productivity and carbon dioxide removal through Enhanced Rock Weathering (ERW)

We published the first [analytical paper](#) in our climate mitigation series in January 2023, focusing on Enhanced Rock Weathering (ERW). ERW is an emerging climate mitigation technology to remove carbon dioxide from the atmosphere, leveraging the natural weathering process of certain types of rocks. The application of ERW has significant potential for permanent carbon dioxide removal, which is especially relevant on agricultural land where there is evidence of agricultural co-benefits. Research focusing on global croplands estimates the removal of up to 9 Gt of CO<sub>2</sub> per year (e.g. [Kelland et al., 2020](#)). ERW is a nascent technology with many remaining scientific and feasibility questions, in high-income geographies where research and development (R&D) has been focused. Without a concerted, parallel R&D effort in low-income countries, it is likely that any future economic benefits accruing to farmers from ERW in the form of carbon offset payments will disproportionately benefit farmers in rich countries. PxD aims to shape the ERW market to achieve more equitable scaling in low-income countries.



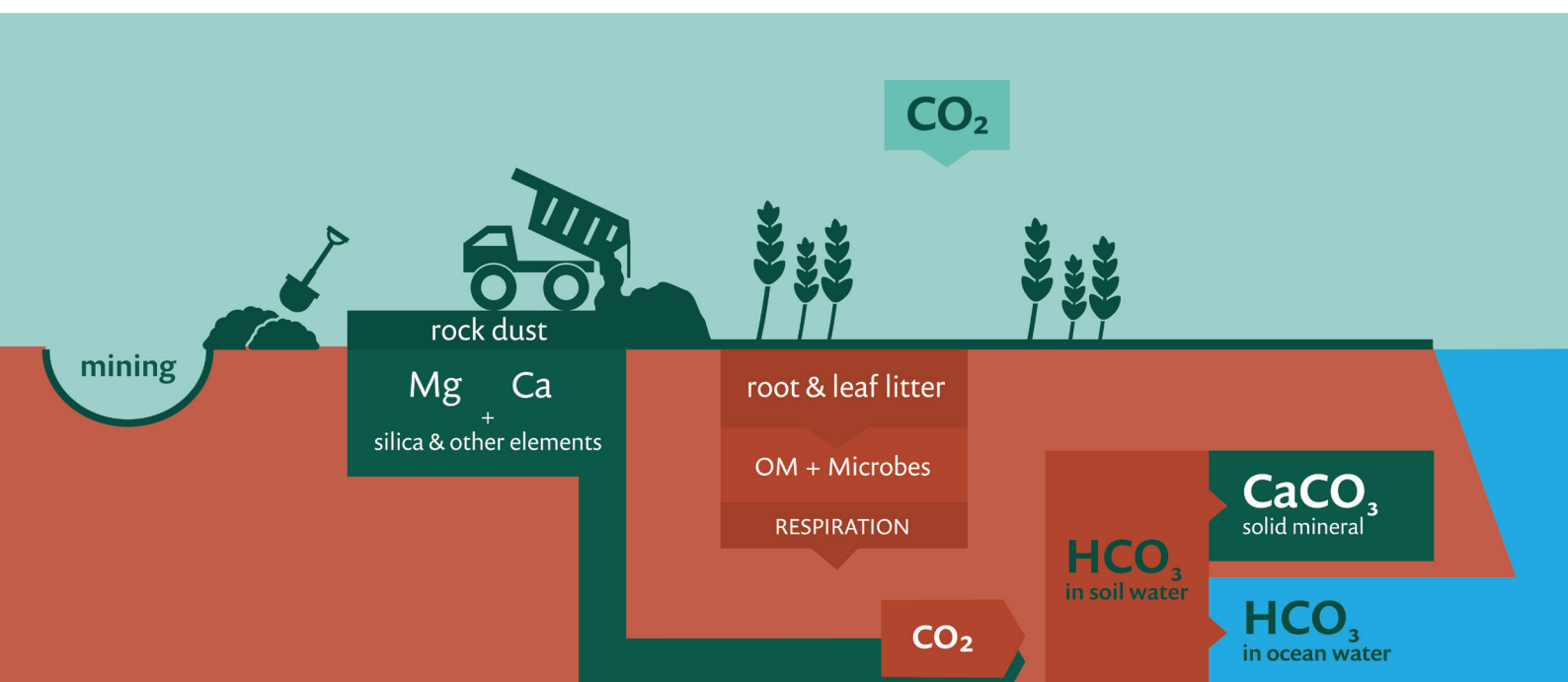
PxD is exploring an Advanced Market Commitment (AMC) focused on ERW innovation in low-income countries with support from the Wellspring Philanthropic Fund. The proposed AMC will create incentives for firms and other actors to conduct R&D and invest in the measurement, reporting, and verification (MRV) systems needed to measure the impact of ERW on carbon dioxide removal and agricultural co-benefits in geographies where ERW has high potential for climate change mitigation and improved livelihoods.



# Exploring carbon mitigation through organic carbon strategies

We published our second climate mitigation [analytical paper](#) in February 2023, focusing on soil organic carbon (SOC) sequestration. Our findings indicate that practices such as conservation agriculture, agroforestry, and biochar amendments can result in a net sequestration of CO<sub>2</sub> through soils and plants, i.e. the increase in carbon stocks exceeds the losses from microbial decay processes, fire, etc. - though this carbon sequestration is impermanent. The net amount of carbon stored and the impact on yields depends on various environmental factors, like soil texture, climate, and humidity, as well as land and agronomic management. [Paustian et al. \(2019\)](#) estimate a technical potential of soils in global cropland and pasture land to store 2-5 Gt of CO<sub>2</sub> per year. Ensuring organic carbon strategies, such as SOC sequestration, meaningfully contribute to climate mitigation will require coordination and mutual investment in MRV protocols and pathways, and careful consideration of how carbon mitigation projects impact small farmers' profits.

The [voluntary carbon credit market](#) faces several challenges including a lack of alignment on carbon standards, measurement methods, guidelines for project developers, etc. Carbon credit prices are volatile, and for nature-based projects, existing projects range from \$5-\$15 USD/tonne ([World Bank, 2022](#)). With support from the Swiss Re Foundation, PxD is looking to build partnerships with voluntary carbon market stakeholders, i.e. Verra, and other relevant research organizations to determine fair and equitable protocols to engage with smallholder farmers on carbon credit projects in the future, including an equitable payment system.





# Providing strategic advice to governments

In 2023, PxD launched a new service offering to complement its direct service delivery to farmers: strategic advice to governments on designing and optimizing their nationwide portfolios of digital agriculture services and creating the enabling ecosystem to deliver these services effectively.

## Collaboration with the Ministry of Agriculture in India

In 2023, PxD established a Project Management Unit (PMU) embedded within the Ministry of Agriculture & Farmers Welfare (MoA&FW), Government of India, with the support of BMGF. The PMU will support MoA&FW and its partners to deliver high-quality, customized, and actionable digital agriculture services and drive improved profitability, productivity, equity, and climate resilience for tens of millions of farmers across India. As part of this work, PxD will support MoA&FW in prioritizing and coordinating across its digital agriculture initiatives, in testing the effectiveness of services, identifying opportunities for innovation, and institutionalizing mechanisms for oversight within government.

## Digital agriculture roadmap in Ethiopia

PxD served on the Technical Steering Committee that advised the Government of Ethiopia's Ministry of Agriculture (MoA) and ATI on their Digital Agriculture Roadmap, which will determine future investments by the government into the digital agriculture sector over the next ten years (2025-35). PxD plans to continue to support the MoA and ATI to implement the Roadmap over the coming years.



# Partners

## Kenya

Development Innovation Lab (DIL)  
Lessos Farmers Cooperative Society  
Ministry of Agriculture and Livestock Development (MoALD)  
Sirikwa Dairies and General Limited  
World Bank

## Pakistan

Agriculture Department of the Government of Punjab (AD-GoP)  
Centre for Economic Research in Pakistan (CERP)

## India

Ambuja Foundation  
Climate Forecast Applications Network (CFAN)  
Coffee Board of India  
Integrated Tribal Development Agency (ITDA)  
IDH, The Sustainable Trade Initiative  
Vasantrao Naik State Agricultural Extension Management Training Institute (VANAMATI), Maharashtra  
Ministry of Agriculture and Farmers' Welfare (MoAFW), Government of India  
West Bengal Accelerated Development of Minor Irrigation Project (WBADMIP)

## Ethiopia

Agricultural Transformation Institute (ATI)  
Digital Green  
Ministry of Agriculture (MoA)

## Global Partnerships

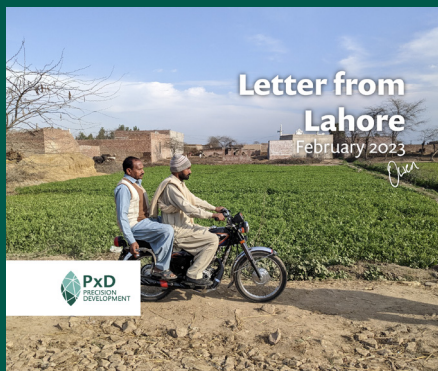
Abdul Latif Jameel Poverty Action Lab (J-PAL)  
Climate Action for Smallholders (CASH) Coalition  
Dasra, and the Women on Board program team (run in partnership between ISDM, Dasra, and Governance Counts)



# Communications and events

## Published blog posts and articles

PxD published several [blog posts and articles](#) in 2023. These publications covered topics including LCCs, weather forecast information services, and climate change challenges and opportunities for smallholder farmers.





## International Women's Day

On March 8, 2023, PxD Special Projects Lead Claudia Carbajal joined the Digital Innovation and Technology for Gender Equality Panel for International Women's Day hosted by the Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD), and the World Food Programme (WFP). Claudia discussed PxD programs and approaches to including and targeting women in our services with the panel.



## DataDotOrg

In Q2, the PxD India team participated in a roundtable discussion on data for social impact at the launch of the India Data Capacity Accelerator Program, a joint initiative by DataDotOrg and J-PAL South Asia, aimed at equipping emerging professionals with interdisciplinary data skills to tackle challenges at the intersection of climate and health.

## Centre for African Leaders in Agriculture

In August, Freyhiwot Nadew, PxD's Ethiopia Country Director, participated in the third cohort of the Centre for African Leaders in Agriculture (CALA) Advanced Leadership Programme. As a member of the cohort, she was joined by other executive leaders and rising stars in Africa's agricultural sector from across eight countries, with a focus on increasing leadership and collaboration capabilities to advance national agriculture priorities. Freyhiwot took part in the annual Africa Food Systems forum (AGRF), which was hosted by AGRA in Dar es Salaam, Tanzania, from September 3–7, 2023, alongside other CALA leaders.

## Climate Resilient Coffee and Spices

In August, the PxD team participated in the Multi-stakeholder Meeting on Climate Resilient Coffee and Spices Landscape, facilitated by IDH in Bangalore. The gathering explored topics like climate resilience and adaptation, the European Union Deforestation Regulation (EUDR), and building inclusive, transparent value chains.





## World Coffee Conference

In September, PxD participated in the 5th World Coffee Conference, organized by the Coffee Board of India in Bangalore. Niriksha Shetty, PxD’s incoming CEO, delivered a speech titled “Enhancing Digital Education to Empower Coffee Professionals at Origin,” emphasizing the importance of utilizing basic technologies like IVR and WhatsApp to disseminate information to farmers efficiently.

## Lewis and Friends Podcast

In November 2023, Owen Barder, then CEO of PxD, was featured on the Lewis and Friends podcast with Lewis Perkins, President of the Apparel Impact Institute (Aii). They discussed PxD’s work supported by Aii’s Climate Solutions Portfolio to scale up the distribution of leaf color charts (LCCs) in India to reduce greenhouse gas emissions and improve farmer net incomes.

## Enhanced Rock Weathering Advisory Group

On November 9, 2023, PxD convened its Advisory Group of stakeholders on ERW, a promising climate mitigation technology. With the generous support of the Wellspring Philanthropic Fund, PxD hosted a virtual workshop to share its problem hypothesis for ERW catalyzation in low-income countries with the Advisory Group, consisting of prominent carbon credit buyers, policy initiatives, private ERW companies, and scientific experts. PxD also published a blog post outlining the problem hypothesis and incorporating a cost-benefit analysis of ERW deployment comparing low-income and high-income countries.



## Partners Convening in Ethiopia

On November 14-15, 2023, PxD's then CEO, Owen Barder, and Ethiopia Country Director Freyhiwot Nadew attended a partner convening in Addis Ababa, Ethiopia, hosted by BMGF. The convening brought together many BMGF partners working in the agriculture and livestock sectors in Ethiopia to share lessons and identify opportunities for collaboration.

WEBINAR

### BRIDGING THE GAP:

CENTERING CLIMATE CHANGE INNOVATIONS AROUND THE REALITIES OF GLOBAL SOUTH SMALLHOLDER FARMERS

**Tomoko Harigaya**  
Chief Economist and  
Director of Research

**Yifan Powers**  
Senior Research  
Manager, Climate

**Owen Barder**  
Chief Executive  
Officer

## Webinar on Climate Change Innovations

On November 16, 2023, PxD hosted a webinar titled "Bridging the Gap: Centering Climate Change Innovations around the Realities of Global South Smallholder Farmers." At this webinar, PxD's team shared learnings on the importance of centering climate initiatives on the incentives and realities of smallholder farmers in low-income countries and maximizing the benefits of evidence-based solutions for people and the planet.

## UN Climate Change Conference (COP 28)

In December 2023, Jonathan Lehe, PxD's Chief Strategy Officer, attended the 28th session of the UN Climate Change Conference of Parties (COP 28) in Dubai, United Arab Emirates. The conference included critical commitments to "transition away from fossil fuels" and highlighted the important role of sustainable and regenerative agriculture in combating climate change. PxD is increasingly focused on exploring ways to help the 10 million smallholder farmers it works with in Africa and Asia mitigate and adapt to climate change.



# Funders



## We are grateful to the many funders who supported our work in 2023:

- Apparel Impact Institute (Aii)
- Agency Fund
- Asian Disaster Preparedness Center (ADPC)
- Bill and Melinda Gates Foundation (BMGF)
- Dioraphte Foundation
- Foreign, Commonwealth and Development Office (FCDO)
- GiveWell
- The Horace W. Goldsmith Foundation
- ICARE Innovations Fund (ADPC)
- J-PAL Digital Agricultural Innovations & Services Initiative (DAISI)
- J-PAL Innovation in Government Initiative (IGI)
- J-PAL King Climate Action Initiative (K-CAI)
- Mulago Foundation
- Private Enterprise Development in Low-Income Countries (PEDL)
- Sall Family Foundation
- SNV (The Netherlands Development Association)
- Swiss Re Foundation
- Walmart Foundation
- Wellspring Philanthropic Fund



# Financials



- 35% **SOUTH ASIA** (India, Pakistan)
- 14% **GLOBAL PROGRAMS**
- 9% **FUNDRAISING**
- 19% **ADMIN**
- 23% **SUB-SAHARAN AFRICA** (Ethiopia, Kenya)



[precisiondev.org](http://precisiondev.org)

