



# Quarterly Progress Report - Q2 2023





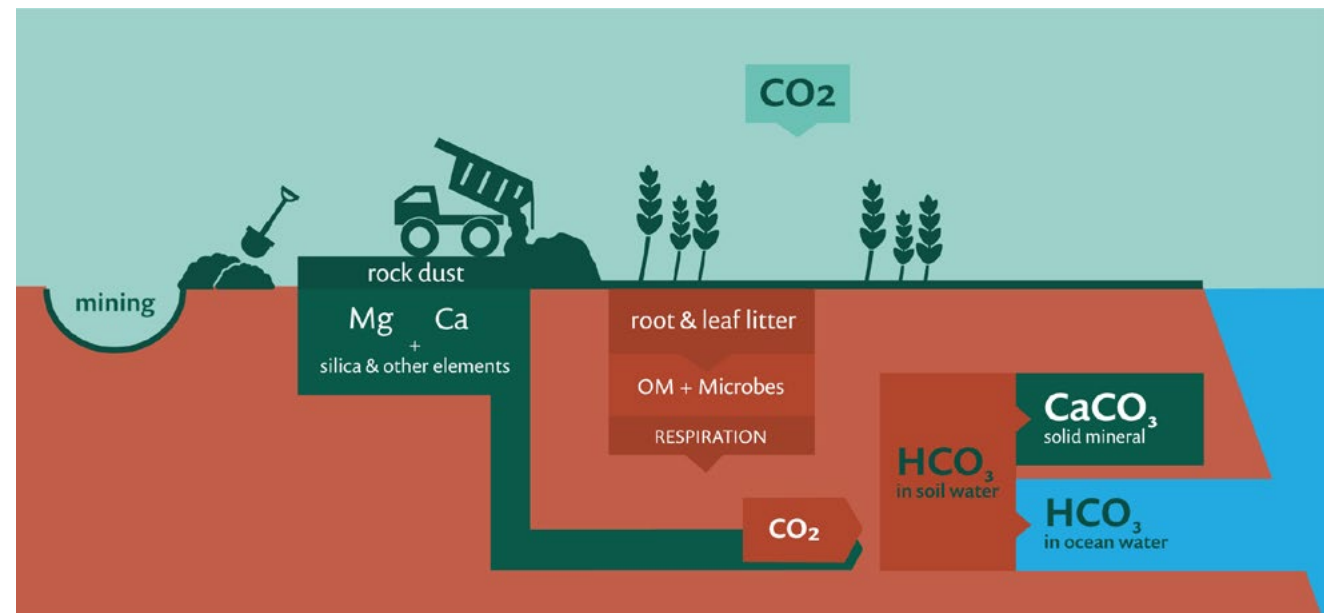
# Quarterly Highlight

## Quarterly Highlight: Shaping the Market for Innovative Climate Change Mitigation Technologies - PxD's Work on Enhanced Rock Weathering

Food systems are responsible for one-third of global anthropogenic greenhouse gas (GHG) emissions, primarily through agriculture and changes in land use ([Crippa et al, 2021](#)). However, some strategies for managing land and growing food, including emerging technologies, can remove carbon dioxide from the atmosphere (e.g., soil carbon sequestration). Last year, Precision Development (PxD) and the [Institute for Governance & Sustainable Development \(IGSD\)](#) partnered on a unique initiative to collaboratively identify opportunities for climate change mitigation for the greenhouse gasses most problematic in agriculture – methane and nitrous oxide – as well as ways to leverage agricultural land for large scale carbon removal. The results of our joint initiative are published in a [series of white papers](#) and includes a discussion of a particularly high potential carbon removal opportunity: [enhanced rock \(or silicate\) weathering \(ERW\)](#). PxD is now embarking on a project to shape the emerging ERW market so it can work for smallholder farming

communities in low and middle-income countries and enable smallholder farmers to not only contribute to climate change mitigation but also be properly compensated for their efforts. This market-shaping work is a departure from PxD's traditional model of providing digital information services to meet our users' needs, as we are identifying new solutions and opportunities to address the emerging needs of smallholder farmers and the broader agricultural ecosystem posed by the climate crisis. Our mission, however, remains the same: to empower people living in poverty to improve their livelihoods, mitigate risks, and advance environmental sustainability.

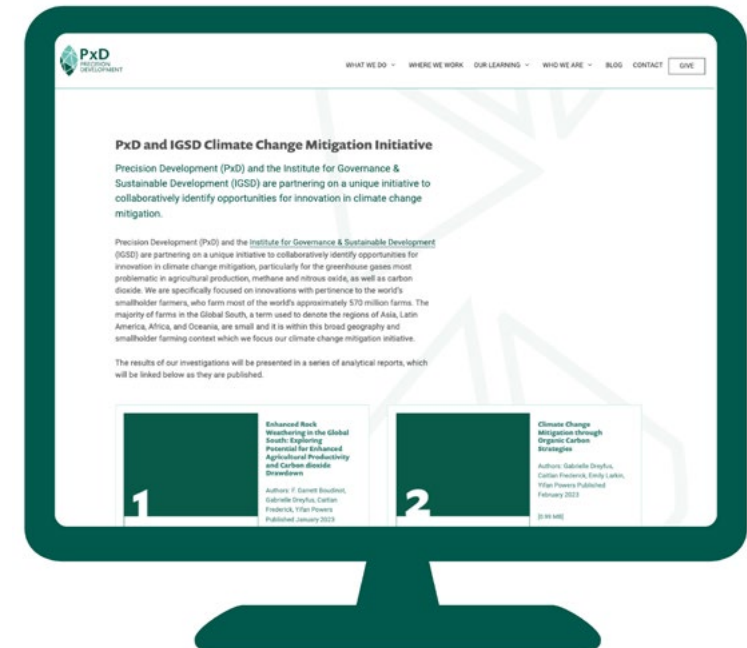
ERW is an emerging technology for **permanent carbon removal** that works best in high temperature and humidity conditions, like those in tropical landscapes, and can be incorporated into farming operations. In the ERW process, finely ground silicate rocks – usually basalt



– are applied to soils. The ground basalt then reacts with atmospheric carbon and converts it into stable, water-soluble forms which can flow out through groundwater into the oceans. Estimates of ERW carbon removal potential indicate that if applied across all global croplands it could remove 5x the amount of carbon compared to other nature-based carbon drawdown strategies (global scale extrapolation of basalt estimates of [Strefler et al., 2018](#); [Paustian et al., 2019](#)). Carbon captured through ERW is stored for thousands of years, which distinguishes it from other nature-based carbon removal strategies (e.g. conservation agriculture practices), and there is evidence that the process may also improve the productivity of agricultural land ([PxD, 2023](#)).

Despite its potential, however, ERW innovation and implementation is limited in some of its most promising geographies, such as equator and near-equator geographies where there are ideal soil pH, temperature, and moisture conditions for the technology. This is partly due to misaligned incentives between potential buyers/funders of climate change mitigation innovations and potential providers of R&D and market services, like the monitoring, reporting and verification of carbon removal outcomes (MRV). For example, although overall ERW could be more cost-effective in geographies in the Global South, there may be larger set-up costs in these countries due to less developed infrastructure and smaller farm sizes. There is unlikely to be sufficient commercial incentive to invest in the technological and market infrastructure needed to establish ERW at scale across the developing world, despite the significant public benefits (climate mitigation) and private benefits (income for smallholder farmers). It is critical to develop the ERW technology for Global South contexts in parallel to existing Global North efforts, as there are unique challenges that can affect ERW effectiveness. For example, supporting the development of local MRV institutions will drive the long-term cost of implementation down and avoid an equilibrium where Global South countries must rely on their Global North counterparts for technical assistance ([PxD, 2023](#)). In addition, experience in agronomic innovation shows even the most promising technologies can fail if not properly tested and customized for local contexts and implementers ([Laajaj et al., 2020](#)).

To reach ERW's potential for carbon removal as quickly as possible, we must understand and address these operational bottlenecks as early as possible. With support from the Wellspring Philanthropic Fund, PxD is now embarking on a market-shaping project aiming to motivate innovation in solving these bottlenecks for the Global South context by crafting



a fit-for-purpose climate finance mechanism, such as an Advance Market Commitment (AMC) which will properly value the high potential benefits of ERW, especially when implemented in Global South geographies. PxD is especially well placed to work on such finance mechanism innovation as our CEO, Owen Barder, helped pioneer the [framework for the first AMC for vaccine development](#). Creating a similar mechanism for investment in climate change mitigation in the Global South will contribute to reducing net greenhouse gas emissions from agriculture, securing global food security, biodiversity, and sustainable resource use, and ensuring that those who rely on agriculture for their livelihoods can continue to do so.





# Programmatic Updates

## Ethiopia

In Q2, PxD completed the first phase of its partnership with The Netherlands Development Association (SNV) on the Building Rural Income through inclusive Dairy Business Growth in Ethiopia (BRIDGE) project. Through this project, we provided customized dairy advisory services to roughly 3,000 dairy farmers and 100 service providers (artificial insemination technicians, animal feed suppliers, veterinarians, etc.) through push calls, customized to the lactation curve of each cow. In Q2, we also completed the development of a 13-minute advisory video which is being disseminated to the same 100 service providers. We are now in discussion with SNV on potential collaboration in the next phase of the project, BRIDGE+.

PxD also continues to support livestock and crop farmers through the Digital Agricultural Advisory Services (DAAS) project funded by the Bill and Melinda Gates Foundation (BMGF) and the United Kingdom Foreign, Commonwealth and Development Office (FCDO). In Q2, we continued to scale our push call service, which has now reached more than 130,000 dairy farmers in the last 12 months with information on artificial insemination, animal feed rationing, and veterinary services. We have also continued to work with local agricultural extension officers called development agents (DAs) who collect and enroll farmers' phone numbers into the service. So far, we have collected more than 200,000 profiles of female dairy farmers across 46 woredas (districts), all of which will be enrolled in the push call service in subsequent quarters. Through the DAAS project, we also continued to work with the Agricultural Transformation Institute (ATI) to strengthen their 8028 Farmers' Hotline inbound advisory service, which has reached more than 540,000 farmers in the last 12 months with advice on 21 crops and 5 livestock value chains.

We also made progress towards launching our global PADDY platform in Ethiopia, which will complement ATI's 8028 platform and the existing push call service, and allow us to add additional functionality and reach more users. We have now completed the importation process of servers and uninterrupted power source (UPS) equipment, and in the next quarter, we will complete the installation of the servers and registration of the necessary phone lines with Ethio Telecom, the national telecom authority.



## India

In partnership with the federal Department of Agriculture and Farmers Welfare (DA&FW) and the Development Innovation Lab (DIL), we have established a Government Innovation Unit (GIU) which currently includes a two-person team from PxD. We have plans to augment this team by engaging external experts and providing guidance to the government on evidence-based innovations pertaining to soil health, weather forecasting, and digital agricultural extension.

### Gujarat

We continued to provide advice to more than 100,000 farmers in Gujarat growing cotton and other crops through our Krishi Tarang service. In Q2, we supplemented our usual customized agricultural advice with alerts and precautionary advice to farmers for the extremely severe cyclone storm 'Biparjoy' in sensitive districts in Gujarat. We have also identified three drought-tolerant seed varieties (two for chickpea and one for maize) and are in the process of exploring the possibility of launching a market-shaping initiative to improve farmers' access and adoption of these seed varieties in partnership with the government, seed retailers, private suppliers, and others. In a recent scoping survey, we find that while 56% of farmers in Gujarat reported experiencing damage to their chickpea crops in the past decade due to drought, only 4% of farmers are aware of the existence of drought-tolerant seed varieties, indicating the potential promise of such interventions.

### Coffee Krishi Taranga

PxD continues to operate the *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, reaching approximately 100,000 farmers in the last 12 months. PxD is continuing to enroll more coffee farmers into this service, particularly in remote areas, by working with the Coffee Board extension officers and field coordinator, Krishi Vigyan Kendras (KVKs - a network of agricultural extension offices), coffee Farmer Producer Organisations (FPOs), curing houses, the Integrated Tribal Development Agency, and the Coffee Board.

In Q2, PxD piloted a WhatsApp version of the CKT service for 500 coffee farmers in Karnataka, which allows more sophisticated multimedia content than our original



voice-based service. We developed a video advisory on leaf rust management and circulated it via Whatsapp to farmers. In collaboration with the Coffee Board, we plan to develop 5 more videos that will be posted via WhatsApp and on the Coffee Board's One Stop Mobile App.

During field visits, one farmer in Kesagod block of Karnataka reported:

*"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 take suggestions. 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 soil was dried 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."*





In continuation of our plans to deliver weather information to farmers to support climate adaptation efforts, PxD piloted a lab-in-the-field experiment to investigate whether accurate, relevant-for-context, probabilistic medium-range weather forecasts can aid farmer decision-making, and to understand their willingness to pay for a service of this kind. PxD also launched its first WhatsApp-based rainfall forecast information service in partnership with the Climate Forecast Applications Network (CFAN) across a small sample of farmers in time for the monsoon. This was done to help gauge farmer comprehension and gather insights on how to iterate on message design and service delivery, with the intention of scaling to a voice-based weather service in the coming months.

## Kenya

### MoA-INFO

We have now come to the end of the Long Rains 2023 season in Kenya, in which we sent customized cropping series messages for 5 value chains (Sorghum, Irish Potato, Banana, Tomato, and Green Grams) to over 17,000 farmers in 3 counties (Taita Taveta, Kericho and Kwale). This work is part of the World Bank-funded One Million Farmers platform, in collaboration with two other World Bank funded projects, the Kenya Climate Smart Agriculture Project (KCSAP), and the National Agricultural and Rural Inclusive Growth Project (NARIGP).

In July 2023, we engaged with World Bank farmers through phone surveys to get feedback and testimonials on the usefulness of cropping series messages, adoption of recommended practices, and engagement with the platform. Through this feedback, we learned that unfavorable weather (drought) affected both the decision to grow the target crops and the implementation of PxD's recommendations, which suggests that providing weather forecasts and weather-based recommendations could add value to the service. One farmer reported:

*“Receiving the messages [from] MoA-INFO has transformed my potato farming to a big extent and reduced so many challenges. I used to plant Irish potatoes in trenches but now I use ridges which are making the crops to bear more. Spacing and control of weeds are other very important practices I have learnt and implemented. I am expecting to harvest around 35 bags on my half acre piece where I previously harvested 10 bags.”*

## Asset Collateralized Loans (ACLs)

We continued our project in collaboration with the Development Innovation Lab (DIL) providing Asset Collateralized Loans (ACLs) to dairy farmers to finance the purchase of water tanks, helping them reduce vulnerability to rainfall fluctuations, reduce time spent fetching water, and increase milk yields. Lack of water access is a central challenge for small-scale farmers in Kenya, with 76% of households in rural Kenya lacking access to piped water (Kenya Integrated Household Budget Survey, 2015-16). PxD, in collaboration with DIL and two dairy cooperatives, is currently running a randomized controlled trial (RCT), with key outcomes including milk sales, milk production, cow health, household well-being, and gender outcomes (time spent by girls and women fetching water, girls school enrolment, etc). This evaluation will provide evidence on the use of ACLs more generally to finance investment in productive assets. If successful, we intend to explore the use of ACLs for other asset types in the future.

In Q2, we rolled out offers of the ACL for water tanks to a new batch of 100 farmers. Farmers were randomly offered a “standard” ACL contract with fixed monthly loan repayments or an “income-sharing” contract with flexible monthly loan repayments based on the quantity of milk sold to the dairy cooperatives (the more they sell, the higher the loan repayments, and vice versa, with minimum and maximum repayment amounts). While this is still preliminary, demand for the “income-sharing” contract seems to be higher than for the “standard” contract. The research team is currently reviewing whether to extend these two types of contracts to the rest of the sample or make further product design changes.



**Development  
Innovation  
Lab** at University  
of Chicago

**LESSOS** **LEPESA Sacco** **PxD PRECISION DEVELOPMENT**

**Maji Mengi Maziwa Mengi**

**PATA MIKOPO YA MATANKI YA MAJI  
YA LITA 5,000 KUTOKA LESSOS  
FARMERS' COOPERATIVE/LEPESA  
HIVI KARIBUNI**

**Chap chap! Mikopo ni chache!**

**Piga simu au tuma ujumbe kwa  
0796 420 980 ili kuuliza kuhusu tanki!**

Itapatikana kwa wote ambao hupeleka maziwa yao kwa Lessos dairies Shilingi 36,800 pamoja na riba lipa mkopo ndani ya miezi 24 (miaka miwili)

Huhitaji msimamizi (guarantor) Utahitaji kulipa 20% kwanza (weka akiba pole pole)

Lessos Farmers Cooperative Society and LEPESA Sacco  
Precision Development and Development Innovation Lab



## Pakistan

In Q2, PxD transitioned its voice- and SMS-based digital advisory service in Pakistan, which it designed and built on behalf of the Agriculture Department of the Government of Punjab (AD-GoP) in 2018, to complete government management. Through this service, the Punjab government is now continuing to reach ~100,000 wheat, cotton, and oilseed farmers, who now become graduated users for PxD. We expect the number of graduated users served by the Punjab government to increase significantly after the next elections in November 2023 following the mitigation of the ongoing political and fiscal crises in Pakistan. Following this transition, PxD closed its active program in Pakistan and will continue to work with our partners, the AD-GoP and the Centre for Economic Research in Pakistan (CERP), to ensure the sustainability of this service and incorporate more graduated users into the service, and to look for new opportunities to have continued impact in Pakistan.

As we say goodbye to our friends and colleagues on the PxD Pakistan team, we are extremely grateful for their countless contributions to PxD's work and their tireless service over the last five years to the millions of farmers in Pakistan that we serve. We wish them the best in their future endeavors, and we look forward to seeing the huge positive impact that they will continue to have in the world.





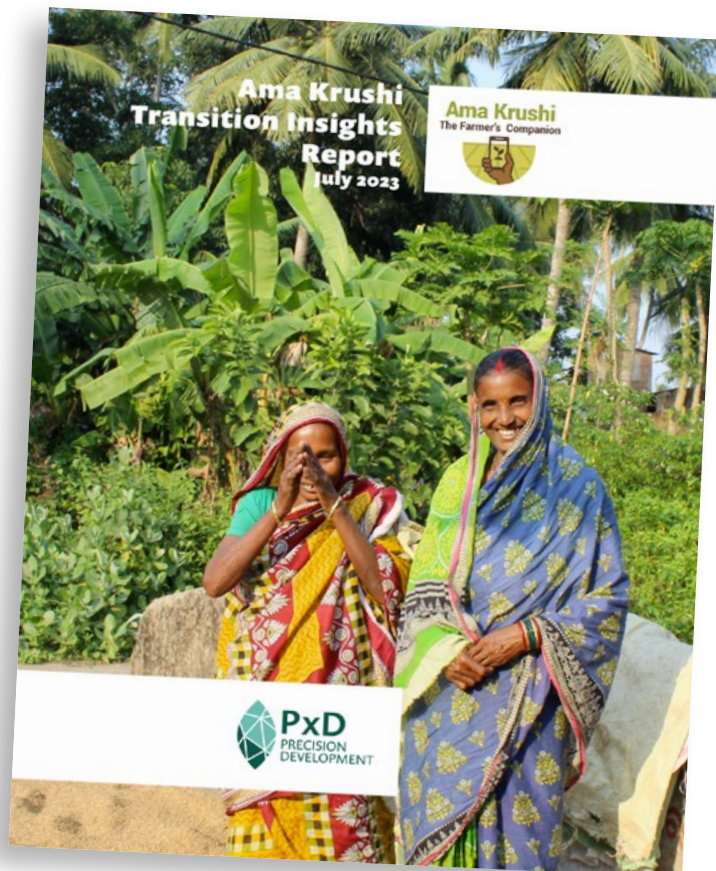
## Global Partnerships

PxD was privileged to be a part of the recent 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.

Niriksha Shetty, Tomoko Harigaya, Owen Barder, and Nicholas Milne visited existing funders and potential partners in San Francisco and presented the transition report on the Ama Krushi project to the Gates Foundation in Seattle. Billy Diggin attended Planet Explore 2023 in Washington DC. Yifan Powers presented PxD'S climate research at a CASH Coalition meeting in London and Nicholas Milne attended the Skoll World Forum in Oxford.

## Publications in Q2

[Reducing Nitrous Oxide Emissions From Smallholder Farmer Agriculture Through Site Specific Nutrient Management](#)





## User reach Q2:

PxD's active programs reached **2,677,062** users in the last 12 months, with an average cost per farmer per year of ~\$1.77 <sup>1</sup> (excluding graduated users) <sup>2</sup>

Platforms built or improved by PxD reached a total of **8,730,763** users in the last 12 months, with an average cost per farmer per year of ~\$1.40 since PxD's inception (including graduated users)



Unaudited actual expenses for last 12 months: **\$6,812,887**

## Funding updates

We are very grateful for the following commitments received in Q2:

- A \$100,000 unrestricted grant from the Sall Family Foundation
- A \$350,000 grant to support our Enhanced Rock Weathering project from the Wellspring Philanthropic Fund
- A \$165,279 grant to support our Asset Collateralized Loans (ACLs) for Water Tanks project in Kenya from the Dioraphte Foundation

1. Cost per farmer per year has increased slightly this quarter due to the reduction in direct users (and corresponding increase in graduated users) resulting from the transition of our service in Odisha, India.

2. We define graduated user reach as “the number of unique farmers receiving services developed, enhanced, or improved by PxD and managed by partners without our direct involvement in the last 12 months.” We do not directly interact with graduated users but they continue to benefit from our work.





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

