Precision Agriculture for Development

PAD Q1 2020

QUARTERLY REPORT

DIGITALLY RESPONDING TO AND SURVEYING THE IMPACT OF COVID-19

At a time when movement of people, goods and services are restricted, digital extension is more important than ever -

The impact of the COVID-19 pandemic, and the physical limitations imposed by social distancing protocols, have severely limited and - in many instances - entirely halted traditional in-person extension services. Yet farmers continue to need information capable of empowering them to improve their incomes and sustain livelihoods. Precision Agriculture for Development's digital services avoid the need for in-person information provision, offering a two-way, low cost and impactful service at scale that empowers farmers despite the impacts of the pandemic.

As part of the Uganda Coffee Agronomy Training (UCAT) program, PAD is providing a Q&A service to coffee farmers via our Interactive Voice Response (IVR) platform. IVR allows for a two-way relay of information: each farmer has the opportunity to record questions that are answered by an agronomist, recorded in audio, and pushed back to the farmer via mobile phone call.

Below is an English translation of a message on PAD's UCAT service by one of our farmers:

My name is John Akello, I come from Rwampara. I want to ask about manure. The cooperative gave us manure, but before training us on how to apply it, COVID-19 or coronavirus disease broke out, so we didn't learn how to use it.*

I have the manure, but I don't know how to correctly apply it in my crops and coffee. I want you to teach me how to use it. How should I apply it? Is it yet time to apply it, is it past time to apply, or is it still not yet time to apply it?

Thank you for your advice, we appreciate it. I want to thank PAD for your service

In turn, our agronomist provided the farmer with the following advice:

Only apply manure when the soil is moist, or else nutrient losses can occur. Since we have had relatively good rainfall, it is a good time to manure.

OR else if you feel the soil is not moist enough, wait and apply at the start of the long rainy season between September and November. If kept, cover the manure or keep it under shade to prevent loss of nutrients.

Also ensure that your manure is dry before applying and not fresh, otherwise it will burn the coffee plant.

To apply manure, dig to a depth of three to four inches in a ring around the base of the coffee plant, two feet away from the stem. Apply one ten liter basin of manure to each coffee tree in the dug area to avoid direct contact and prevent damage to the coffee tree. Mix the manure with soil to avoid losses. Only apply manure when soil is moist or else nutrient losses can occur.

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As the example above illustrates, disruptions to the global and local movement of people and the functioning of supply chains associated with COVID-19 and social distancing protocols, are exacerbating the challenges that smallholder farmers already confront arising from informational gaps, financial hardship, and market failures.

We are gathering data on how COVID-19 is affecting farmers to inform policy-makers and program design -

A lack of systematic and reliable data on the evolving needs of smallholder communities acts as a significant constraint for policymakers in mounting an effective and targeted response to the crisis.

To address this information deficit, and to inform ongoing program design and content development, PAD is conducting a multi-country phone survey to understand how the pandemic is affecting agricultural production, food security and behaviour. In addition, we will collect data from agro-dealers in a subset of countries to monitor the impact of the COVID-19 outbreak on agricultural supply chains. Data and findings will be published on our website, contingent on obtaining the necessary approvals.

Specific research focus areas include:

- Current conditions in agricultural markets and the extent of disruptions experienced by farmers and agro-dealers, including changes in market access, prices, and goods availability
- Farmers' food security and changes in food availability
- The availability of information about coronavirus and related public health advice, as well as farmers' responses to that information
- The impact of COVID-19 on in-person extension systems (in Pakistan only)

*The farmer's name has been changed to ensure privacy.
The transcript edited for clarity

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Current Data Collection Activities:

PAD is currently conducting survey operations in India (three sub-national states), Pakistan, and Kenya. We plan to conduct panel data collection in selected locations and anticipate that data collection activities will span the period April 2020 - October 2020, and that additional countries and/or sub-national entities will be added following the fulfillment of review procedures and the commitment of funding.

Sampling targets:

- 1,000 farmers per week in India; 1,000 crop farmers, 100 dairy farmers and 500 agro-dealers in the first round of our survey in Kenya
- 300 Agriculture Officers (extension agents) and Field Assistants in Pakistan.

We are currently in advanced talks to expand data collection activities in several countries in Asia and Africa.

Please check our website and our social media handles for updates. We will share initial findings of these and other COVID-relared activities in our next quarterly report.

We are grateful for our ongoing collaboration with state government partners in India, the Provincial Government of Punjab (PK), and the Ministry of Agriculture in Kenya; our research partnership with the Centre for Economic Research in Pakistan (CERP); and the Kenya Markets Trust and the International Growth Center in support of these data collection activities.

INDIA

PAD India transitioned the majority of operations to work from home in one week, ahead of the announcement of a national lockdown. Across all six states where we operate, our teams (field, call center, agronomy, program and research support) now operate from home offices. A significant achievement this quarter entailed moving 100 call center staff to home-based data collection which has allowed us to continue to add new farmers to our services at a time when traditional extension services are severely constrained and unlikely to reach farmers.

This quarter a majority of our farmers in India commenced the period of less intensive agricultural activity which spans the harvest of Rabi crops (~February) and the beginning of the Kharif planting season (~June). As the quarter unfolded we saw a decline in profiling activity, as we had expected. It is difficult at this point to disentangle seasonal variation from the impact of COVID and lockdown. However, pick-up and listening rates have remained relatively constant across our services, which suggests that farmers continue to engage with our advisory information regardless of new challenges.

In West Bengal the transition to work from home went smoothly, with minimal adverse impacts to ongoing farmer profiling efforts. Agricultural content has continued to be disseminated to farmers uninterrupted, and we have been able to fulfill our commitments to farmers, including answering their questions through the IVR hotline. We have finalized analysis of an A/B test we ran during Kharif season.

We learned that training and encouragement increase farmer engagement but the results on knowledge and adoption of recommended practices are inconclusive. The results seem to indicate that increased engagement did not translate to improved knowledge or increased adoption of recommended practices. However, these results need to be read with caution as the experiment was underpowered and the project has the potential to achieve impacts on behavior with improved messages.

The West Bengal field team supports in-person orientation and training sessions with farmers. However, social distancing protocols required the suspension of all field activities. Our field staff is now contributing to remote training and COVID-19 surveys to support the continuity of the service during the lockdown.

Next quarter, we hope to adjust our service in West Bengal to more specifically meet the needs of farmers arising as a consequence of COVID-19, extend our contract to reach 45,000 farmers by the end of the year, and design and implement experiments to improve the service and support farmers during the COVID-19 transition. We are currently exploring ways to encourage the use of organic fertilizers and pesticides as a way to overcome market constraints and input shortages. Similarly, we are scoping interventions that would allow us to support market linkages in a context of deep disruptions.

In Gujarat, we expanded our advisory crop portfolio to include coriander, onion, mustard, and potato, in addition to the original wheat, cotton and cumin crops, and we sent advice to farmers, customized by location, for each crop aligned with Rabi season (November to March) activities. Unfortunately in March, one of our telephone lines was disrupted. Due to lockdown protocols, we were unable to physically connect to the server and farmers did not receive any content for three weeks. Full service has since been resumed. In the next quarter we will add additional horticultural crops, and add new types of content to the service relating to market linkages, to support farmers through the COVID-19 crisis.

PAD's Q1 Highlights

Funder News: Thank you to Vitol Foundation and The World Bank for your commitments this quarter, and to the Hampshire Foundation for its renewal.

Financials: The total operating costs for the last 12 months as of Q1 was 4.3M. Further quarterly financial updates are available upon request.

Organizational Updates: In the first quarter of 2020, we welcomed the following new staff to our team: Tushar Singh (Research and Operations Associate, India), Jackson Abuli (East Africa Agronomist), Messay Sintayehu (Project Associate, Ethiopia), Mengistu Woldehanna (Livestock Specialist, Ethiopia), and Shalom Degfie (Admin and Finance Officer, Ethiopia).

INDIA (continued)

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In Odisha, PAD crossed the 700,000 mark for farmers profiled and included in our service. Our biggest challenge this quarter was the suspension of field activities due to COVID-19, which required pausing planning activities for a large Randomized Controlled Trial of the project, which we had been looking forward to. Content continued to be delivered to farmers. The tech and call center teams rolled out remote profiling functionality for agents, and we were able to continue profiling 18-20 farmers per call center agent per day (this is approximately one third of our usual capacity; primarily due to productivity losses associated with agents needing to become familiar with remote calling systems and dealing with sub-optimal connectivity).

Our live call center in Odisha was mentioned in the State Principal Secretary of Agriculture's press conference detailing the agriculture sector's preparedness for COVID. The Principal Secretary directed farmers to call the toll-free helpline for answers to technical questions related to agriculture. For three days after his announcement traffic on the line increased by approximately 1,500%. [The full clip see ~16 min 40 second. Text and speech in Odia]

In Karnataka our service reached over 29,000 coffee farmers this quarter, a 36.4% increase in reach over Q4 2019. New farmers were added to the service from a new district, Chamrajanagar, in addition to the three districts where we had previously been active. While farmers are appreciative of weekly advisory on growing practices and price information, in some areas, engagement due to poor telecom connectivity.

In Q2 our objectives include reaching 40,000 farmers in Karnataka, updating the crop advisory calendar based on analysis of last year's questions, and to roll out A/B tests to improve farmer engagement with PAD's Q&A services

Working with The Nature Conservancy (TNC) in Punjab and Haryana, we successfully completed an "End of Season" monitoring & evaluation (M&E) survey with 746 farmers to assess farmer feedback and to prepare for the upcoming season. We are currently analysing results. This quarter, we sent 35,810 messages to 4,981 farmers in five categories of advice: weed management, pest management, disease management, nutrient management and temperature mitigation. A total of 1,636 unique callers had placed 2,286 inbound calls to listen to previously recorded push messages. Unfortunately, the lockdown in India was implemented during the Rabi harvest, a critical time for farmers in Punjab and Haryana.

Our data collectors have moved to profiling new farmers from their homes, but we do see lower response rates from farmers. We hope the situation will improve as the lockdown is eased. While we typically see farmers engage with content that is 1-2 minutes in length, in the context of this project, we observed farmer listening rates dropping off dramatically after 45-50 seconds. Our team is adapting to design content that we can disseminate in under a minute.

Next quarter, we will continue to build our farmer database, add new villages and expand profiling activities to onboard new farmers. In addition, we will strengthen our monitoring and evaluation capabilities to ensure that farmer feedback continues to effectively inform service design and iteration.

PAKISTAN

This quarter, our efforts for a nationwide expansion in Pakistan are beginning to bear fruit. The success of PAD's initiatives and partnerships in Punjab and the consequent goodwill that we have developed with government stakeholders, has opened doors to expand our program to other provinces such as KPK and Gilgit-Baltistan. Tailoring our expansion in such a way that we are concurrently working with government departments in other provinces and including private sector and non-governmental entities in the partnership at the same time will enable us to develop a program that will deliver more comprehensive services to farmers on a national level. Engaging and establishing mutually beneficial partnerships with private sector and non-governmental organizations such as IFAD, CIMMYT, KADO, Nestle and DS Farms will allow us to expand our services outside of the government sector to new and under-served areas.

This quarter, PAD commenced our first pilot project outside of Punjab, in the district of Hunza in collaboration with Nestle, KADO and DS Farms. Additionally, PAD resumed Soil Health Card (SHC) distribution and setting up mechanisms to monitor progress and measure efficacy of SHCs. We continued sending out advisory SMS to 880K wheat farmers in Punjab, including two-way calls to obtain farmer feedback.

At the time of writing, the agriculture sector in Pakistan has not been subjected to a complete lockdown. For example, the Government of Pakistan has indicated that there will be no ban on movement of machinery and labor for wheat harvesting. The Department of Agriculture in Punjab has informed us that they will continue to operate in a "business as usual" fashion, although this could change in the foreseeable future.

We have invested significant time in exploring the use of satellite data to evaluate and increase agricultural productivity this quarter in line with a timeline to complete the project by the end of the year. However, due to the impact of COVID-19 this timeline is likely to be modified. We are in the process of initiating and implementing an RCT on remote sensing and targeted in-person extension, our first such experiment in Pakistan, in collaboration with a researcher at Princeton University.

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ETHIOPIA

This quarter, PAD Ethiopia worked towards finalizing a validation study of the dairy value chain, convening a validation workshop with all stakeholders, and prioritizing four use case studies for the dairy value chain (breed improvement, feed and feed management, preventive animal health care, and strengthening of market linkages and market information). The finalization of the validation study is a key step forward in the operationalization of the dairy value chain within the broader FarmStack project - a five-year project implemented by a consortium of partners including PAD to improve and coordinate digital agricultural advisory services nationwide.

COVID-19 required the suspension of all field work, including activities related to the collection of farmer profiles, the selection of M&E sites, and the conclusion of our project implementation agreements with regional bureaus of agriculture. The pandemic has severely slowed our ability to interact with national partners, and a number of in-person meetings at the Ministry of Agriculture, within the state's research apparatus, with NGOs and other stakeholders had to be cancelled. Virtual meetings have not been easy to arrange due to connectivity problems. PAD staff have concentrated their work in areas conducive to working from home, which provided an opportunity to focus on the refinement of the dairy use cases, and the development of a 'theory of change' in the dairy sector.

Next quarter, PAD Ethiopia hopes to develop further technological capabilities, including setting up its own digital advisory service and call center focused on the dairy sector to complement the government's existing crop-focused service.

PARTNERSHIP WITH ONE ACRE FUND IN KENYA, RWANDA AND ZAMBIA

This quarter, we completed an initial analysis of the OAF Nutrition Project in Kenya and shared the results with our partners at OAF. We are imminently expecting the delivery of a dataset that will allow us to update estimates to account for inputs delivered as opposed to inputs ordered (input delivery was not completed by OAF until April). Results will be updated in Q2 and we are preparing a contingent paper to be circulated externally.

In Q1 we also completed enrollment for the sample for the OAF tomato pilot in Kenya. PAD has developed advice on tomato pest and disease management, with a focus on the two pests and four diseases that are most destructive in Kenya. This content will be sent by PAD to 8,910 OAF farmers throughout the season. Moreover, we conducted a baseline survey with 364 users of our OAF tomato service to measure knowledge and practices relating to tomato pest and disease management. Data collection for the baseline survey was done remotely due to the impact of COVID-19.

Our other projects are in earlier phases of planning and progress has been slowed down by an inability to travel to Rwanda or Zambia and not being able to conduct focus group discussions. However, the manifestation of the pandemic also means that digital extension is a particularly important medium for communication with farmers, and we have been communicating with OAF about ways in which we might be able to support or complement their digital efforts during the pandemic.

Despite early favorable results from Rwanda, the results of experiments run through the Kenya nutrition trial and analyzed this quarter suggest that message variation - either within farmer groups or among messages sent to the same farmer over time - does not significantly improve the adoption of recommended inputs. We will continue to synthesize these results as part of our meta-analysis this quarter. We will also plan our next set of trials, including opportunities to work with OAF in Zambia on reducing overuse of fertilizer and the promotion of input adoption in Rwanda. Progress in planning new trials has been slowed by the COVID-19 outbreak, but we remain optimistic about potential opportunities.

Next quarter, we will complete the implementation of the tomato pest and disease pilot in Kenya and conduct an endline survey to collect feedback from farmers. We hope that this pilot will serve as proof of concept and will provide impetus for the expansion of our digital extension activities with OAF. Moreover, we aim to conduct a meta-analysis of all our OAF trials to date, to extract generalizable findings that can be applied to other projects with regard to message content, framing, repetition, variation, etc.

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KENYA

During the 2019 short rainy season, PAD and CABI collaborated on a Fall Armyworm (FAW) information campaign to provide farmers with recommendations on identifying, preventing, and managing FAW, including location customized advice on the optimal time to apply pesticides. The advice was generated by CABI's PRISE (Pest Risk Information SErvice) model using various sources of satellite data. We found that the SMS intervention significantly boosted farmers' engagement with PAD's digital extension platform (MoA-INFO) and modestly shifted farmers behaviors toward recommended practices.

In Q1, on MoA-INFO, we launched the Long Rains (LR) 2020 Cropping Series with more targeted messaging which resulted in a substantial increase in farmer engagement (31% in Q4.19; 47% in Q1.20). We have improved our targeting so that we are sending messages to more engaged farmers, but we are also sending messages to fewer farmers compared to the last season. We are currently testing different strategies to re-engage "sleeper" users. This quarter we also collected feedback from farmers about new crops (pigeon peas, sweet potatoes and bananas) that were added to the MoA-INFO service during the Short Rains (SR) 2019 season to further improve the service going forward.

We have found it challenging this quarter to provide actionable advice to the many Kenyan farmers affected by locust infestation. Spraying pesticides is generally ineffective against locusts. A bio-pesticide has shown some promise, but is relatively expensive and not widely available in Kenya. The most common recommendation has been for farmers to wait for the government to conduct aerial spraying, which is usually more effective. Unfortunately, this means that when farmers ask what they can do about locusts, there is not much that we can recommend beyond reporting infestations to county agricultural officials.

The number of farmers active on the MoA-INFO system declined this season. We have focused on user engagement while expanding content on the platform. We have observed that there is a significant drop in farmers from the previous season continuing to engage on the platform. We are exploring new approaches to reach more farmers and hope to re-engage some of the farmers who have not engaged with our systems over the last 1-2 seasons.

All in-person operations (Focus Group Discussions, in-person interviews) had to be suspended due to social distancing protocols. However, we have been able to seamlessly transition our phone survey data collection team from our Kakamega office to a work-from-home set up. Using tablets, our team of enumerators has successfully collected data over the phone from farmers and we plan to expand our surveying capacity in Q2.

Next quarter, we plan to launch an IVR pilot to offer advice on pests and diseases for banana producers. PAD will also develop plans for the SR 2020 including potentially a follow-up PRISE trial; the collection of information pertaining to planting dates; adding content to the MoA-INFO system to support the cultivation of tomatoes, sorghum and green gram; and launching a seed Decision Support Tool for bean farming. In Q2 we plan to commence data collection on the LR 2020 Cropping Series Randomization Trial, which should help us generate more evidence about the impact of the platform, and set up a new system for farmers to report their planting dates and to collect feedback from farmers.

ZAMBIA

In partnership with the Ministry of Agriculture and CABI, we have successfully completed an SMS campaign which was being run entirely from ZIAMIS (Zambia Integrated Agriculture Management Information System), a Government-owned e-subsidy platform for farmers in Zambia (as detailed in our last report). The SMS campaign was completed on February 10. We also learned that the Government ran their own SMS campaign in the remaining six provinces, using 18 messages developed by PAD.

We had hoped to commence a phone survey with a sub-sample of 3,000 farmers randomly drawn from the ZIAMIS platform following the completion of the SMS campaign, but were unable to commence the phone survey due to delays in procurement and approval processes.

COVID-19 prevented PAD staff from traveling to Zambia to meet partners and address service related challenges (appointment of a survey firm, IRB and Ministry approval, etc). Next quarter, PAD aims to obtain and analyse delivery reports and conduct a phone survey for users.

RWANDA

In Rwanda, IVR and SMS messages were successfully sent to the pilot sample with Root Capital. Resends and recalls were made where appropriate to reach as many farmers as possible. PAD prepared a delivery report for Root Capital on progress with regard to treatment saturation for both SMS and IVR sends. We reported that farmers received an SMS message on average 57.3 percent of the time, when including resends. The average IVR pick up rate among all farmers was 85.6 percent, with 69.7 percent of farmers that picked up listening to the complete audio recording.

Unpredictable outages, and delays in reporting telecommunication outages between the aggregator and the telecommunications company, are assumed to have affected delivery rates – although it is difficult to determine the magnitude of these effects. Resends were conducted both for SMS and IVR to attempt to connect with farmers not reached during initial sends.

In late March, Rwanda closed its international borders to outside travel and in early April went into lockdown. These restrictions have not affected weekly IVR and SMS sends, but will affect endline focus group discussions and survey data collection that were scheduled for the beginning of May. Focus group discussions will likely have to wait until restrictions are loosened.

This quarter our operational objective for One Acre Fund (non-members) was to launch our Q1 2020 pilot with RAB's e-subsidy platform - SNS and BK TecHouse. We will launch the pilot hopefully next season. Travel restrictions have impacted efforts to advance this workstream as we have no PAD staff in-country. Moreover, our One Acre Fund/RAB extension partners cannot travel to parts of the country where we need to collect data and to speak to farmers.

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UGANDA

As in Rwanda, our work in Uganda encountered significant problems due to connectivity issues. Our Q+A platform in Uganda went down for several months, and we also experienced disruptions to our regular push call services. PAD's Uganda team worked tirelessly with the aggregator to get the Q+A platform up and running again. After several false dawns, the platform, including all Q+A and push call capabilities, has been working again since March. To ensure that solutions are sustainable, PAD has identified a backup aggregator to use if our current vendor experiences habitual outages again.

Unfortunately, pick-up and listening rates decreased during the course of Q1. On average, stand-alone and reinforcement farmers have answered the phone 71 and 72 percent of the time, respectively. These rates fell to 65 and 66 percent during the course of March. For farmers that pick up the phone, stand-alone and reinforcement farmers, on average, complete the call 76 and 77 percent of the time respectively compared to 74 and 73 percent in March. This could be an indication of some user fatigue and/or because some topics have been repeated.

As of April 1, Uganda has been in lockdown which has included transportation restrictions, restrictions on large gatherings, and a curfew. Due to these new restrictions, implementers (HRNS and TechnoServe) have not been able to carry out the farmer field schools (FFS) which is the primary intervention in two of the RCT treatment arms. PAD's ICT intervention is being allowed to continue as normal. Due to the fact that there is no FFS to 'reinforce', HRNS has allowed their reinforcement farmers to receive stand-alone content from PAD. PAD has also prepared messages containing COVID-19 advisory content that were sent to HRNS reinforcement and all stand-alone farmers.

Next quarter, the team's goal is to complete an A/B test measuring the impact of dramatized versions on farmers' pick-up and completion rates. It is our hope that the use of dramatized calls will pique the interest of farmers and we will observe a subsequent boost in pick-up and completion rates.

PAD BY THE NUMBERS

*At the end of 2019, PAD changed its methodology for calculating average cost per farmer. The methodology calculates the average number of farmers reached in a year by taking into consideration both the number of farmers reached at the starting and ending point in a year, rather than just the ending point.