

# A conversation with Professor Shawn Cole and Megan Sheahan, August 9, 2017

## Participants

- Professor Shawn Cole – Board Member, Precision Agriculture for Development
- Megan Sheahan – Director of Operations, Precision Agriculture for Development
- Andrew Martin – Research Analyst, GiveWell

**Note:** These notes were compiled by GiveWell and give an overview of the major points made by Professor Cole and Ms. Sheahan.

## Summary

GiveWell spoke with Professor Cole and Ms. Sheahan of Precision Agriculture for Development (PAD; <http://www.precisionag.org>) as part of its investigation into potential giving opportunities in agricultural development. Conversation topics included the rationale for the program, product design, evaluation, and use of additional funding.

## Background

### Mission

PAD's mission is to support smallholder farmers in developing countries by using mobile phones to provide customized information and services that increase productivity, profitability, and environmental sustainability. The program is implemented in collaboration with local partners, and its impact thoroughly evaluated.

Additional benefits of the program may include:

- Creation of a global agricultural development network.
- Development of a platform for gathering data and delivering multiple interventions.
- Improvements to evaluation methodology.

### Origins

PAD was born out of two randomized controlled trials (RCTs) conducted in 2011-2013: the first carried out in India by Professor Cole and Professor Nilesh Fernando, and the second in Kenya by Professor Michael Kremer and others (draft papers available here: <http://precisionag.org/our-findings/rcts>). Both papers demonstrate that agricultural information delivered by mobile phone can change farmers' behavior and improve yields.

While working in Kenya and India, it quickly became clear that there was very high demand for help with information communications technology (ICT) for agriculture. Governments were particularly enthusiastic, but many in the private and not-for-

profit sectors were keen as well. However, it was also clear that capacity for carrying it out was limited as well.

In Professor Cole's experience, academics working on impact evaluation are often very interested in causal mechanisms. That is important but it can lead to the neglect of excellence in product design and delivery. He therefore saw a need for an organization that would not only conduct rigorous evaluations but also pay attention to unglamorous details that would not get published in economics journals, such as whether the voice providing information should be male or female, and sound like a farmer or an expert.

PAD now has live programs in Gujarat and Orissa in India, and is discussing a similar intervention with the Principal Secretary of Agriculture of the state of Punjab, Pakistan. PAD also works in Africa, although Professor Cole's focus is primarily on activities in Asia, so he tailored most of this conversation to programs there.<sup>1</sup>

## **Product research and development**

PAD's program generates a considerable amount of user data, allowing it to do A/B testing, data analytics, etc., with a large number of users. The product therefore can improve iteratively as more people use it.

The inaccessibility of existing information on agricultural best practices is a major barrier in some places. For example:

- A short paper in India showed that only 6% of farmers could figure out from the official government soil health card how much fertilizer they should use (see draft paper here: <http://precisionag.org/our-findings/other-evidence>). PAD is therefore using focus groups in Pakistan to find out how soil test results can be communicated most clearly.
- Well-respected international organizations have funded and researched alternative crop models and better recommendations in Orissa, but are still looking for cost-effective ways to deliver this advice for the last mile.

## **Context**

PAD's program varies somewhat in different locations. For example:

- In Kenya, and elsewhere in Africa, text messages are a significantly cheaper means of communication than voice messages. In Pakistan and

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<sup>1</sup> Not included in the initial conversation but part of subsequent interactions was an overview of some of PAD's work in Africa. In addition to two pilot RCTs with farmers in Western Kenya, which show statistically significant increases in lime purchases on account of receiving text messages from PAD tailored to local soil tests, PAD is also working with One Acre Fund to design and evaluate research and scale up activities around mobile phone-based advisory services with their farmer base in Kenya and Rwanda. PAD also signed a Memorandum of Understanding with Ethiopia's Agricultural Transformation Agency regarding the evaluation and upgrade of their nationwide IVR/SMS agricultural advisory service. More information is available on PAD's website: <http://precisionag.org/where-we-work>

India, language and literacy barriers can inhibit the effectiveness of text messages, so PAD is exploring the use of voice messages, both over cellular network and via WhatsApp or other applications.

- In Kenya, the primary focus is on soil fertility management; in India, pest management has been a majority of the content provided to date, but the system also covers other topics.

## **Global network**

Research in this area could be considered a global public good, since knowledge gained in one context – such as developing technological solutions, figuring out how best to respond to queries, and testing behavioral biases – may be very useful in other contexts. For this reason, and to improve external validity, PAD saw the value of a global agricultural development network, with multiple implementations in multiple contexts.

This network is still an aspiration; PAD has not yet done coordinated multi-site studies. However, PAD has generated lists of behavioral biases that might impede farmer behavior change, and is testing various methods for overcoming these in various contexts.

## **Other uses**

One priority is establishing a trusted channel of communication with farmers, which can be used for any kind of intervention: health, early warning, etc. Agriculture is the motivating factor, but the platform could provide information in other sectors in the long run.

## **Impact evaluation**

### **External validity**

There is an interesting dichotomy: On the one hand, there are a lot of commonalities in human behavior, such as the importance of building trust and being responsive, and those are easy to replicate in multiple settings. Likewise, plant biology is fairly similar across locations, so a pesticide is likely to work in most areas. On the other hand, the best seed variety may vary across districts as well as countries, so for now farmers have to rely on agronomists' best measures and guesses.

Eventually, PAD hopes to create a database to help understand what maximizes profits in agriculture for different types of farmers, soil, crops, etc., which would assist the delivery of customized information. However, gaining knowledge on this can be very expensive, so PAD does not expect anyone to develop a comprehensive database valid in multiple geographies within the next five to ten years.

### **Multi-purpose platform**

PAD's product can serve as a platform that may lower the cost of doing evaluations. For example, when working with cotton farmers in Gujarat, someone approached PAD interested in using mobile phone services to improve dairy productivity. Using PAD's system, he will soon do a minimum viable product test with 500 farmers,

potentially followed by expansion to a few thousand to address any remaining issues, after which the service would be ready for an impact evaluation. This will take far fewer resources than if he had done it on his own.

### **Evaluation methodology**

PAD is also figuring out how to do the most effective and lowest-cost evaluations. For instance, during the last trip to India, Professor Cole learned that every state government has at least in principle been doing local (e.g., 5x5m) crop cuttings, which are usually geotagged. Once the data have been cleaned and matched to satellites, they might help PAD get much better yield measurements at very low cost. This is important because household surveys are expensive, noisy, and subject to attrition.

PAD is extremely focused on achieving a high benefit–cost ratio. The social cost of its project would be extremely low at scale because cell towers in rural areas are not congested. The challenge is that crop yields are rather stochastic, e.g., due to rain and pests, requiring larger, more expensive impact evaluations. Within a few years, it will have several large evaluations but it also wants to figure out how to lower the cost of the studies as much as possible.

Around the world it seems governments are already moving to ICT-based agricultural expansion, so PAD hopes to assist them to build in evaluation and testing to ensure they are doing it well.

### **Use of additional funds**

Professor Cole wants to do as many RCTs in as many contexts as possible. However, investment in data acquisition and analytics may have a higher return on investment regarding PAD's overall strategy. For example, it could be very valuable to place a good person with the Gujarat government for a few months to figure out how to best design the next RCT.

*All GiveWell conversations are available at <http://www.givewell.org/conversations>*