A Bridge for the Knowledge Gap

By Benjamin Kessler, Web Editor

An innovative content platform is starting to put the world's most advanced agricultural data into the hands of its poorest farmers.

Smallholder farmers in developing nations such as Uganda have it rough. Many struggle to eke out a living using equipment and techniques similar to those of past generations, even as the effects of climate change are altering once-familiar rhythms of agricultural life. Though small-scale farming provides most of sub-Saharan Africa's food and employment, and is critical to the economies of many countries in Asia and Latin America, farmers in these areas face a substantial yield gap. In addition, unsustainable land management practices are contributing to a soil degradation problem that costs, for example, Uganda's economy 225 billion shillings (US$75 million) annually. Meanwhile, a search for "Uganda agriculture" on Google Scholar yields a vast 216,000 results.

Clearly, the problem for governments and NGOs is not a lack of relevant information but the difficulty of getting it out of academic journals and universities and into the hands of the poor. That difficulty is compounded by the rarity of published materials in the languages spoken by great numbers of rural people in the developing world. "It's a classic case of market shortfalls. If you go to most of the African languages, there's simply nothing

published," says Philip Parker, INSEAD Chaired Professor of Management Science. "The people who are the absolute poorest intersect with the people for whom nothing is published in local languages."

Parker has made headlines around the world for his groundbreaking computer algorithms capable of producing books and industry reports on highly niche business topics (for example: **The 2013 Import and Export Market for Cigarettes in Japan**). With the sales proceeds from these print-on-demand B2B titles, Parker's company has funded production of computer-generated local-language textbooks for schools in Uganda and other African nations. A few years ago, The Bill & Melinda Gates Foundation approached Parker to see whether his knack for automating content could be adapted to benefit Africa's farmers. Parker saw potential in the proposal: "Algorithmically, you could do something in this area. And maybe to a level of quality slightly higher than when people do it."

The TotoGEO platform

One resulting platform, **TotoGEO**, gives users access to a massive storehouse of aggregated, hyper-localised agricultural data, where structured text is translatable across more than 100 languages and downloadable in an array of digital formats. Describing the initial development process for the platform, Parker says, "We threw vetted sources into an automated content system, it then populates the cloud which then redistributes to all the different people who require different formats who then redistribute to the farmers."

Operators at agricultural call centres in Uganda use the TotoGEO dashboard to help farmers deal with setbacks such as pest infestations (most small-scale African farmers cannot afford pesticides), outbreaks of disease among livestock, and marketing issues such as storage and obtaining the best price.

To communicate directly with illiterate farmers *en masse*, the best medium to use is radio. Internet penetration in Uganda as a whole is around 16 percent; it's much lower in rural areas. Few farmers in sub-Saharan Africa own televisions. So TotoGEO has formed partnerships with radio networks in several African countries to supply geo-targeted content at a fraction of what it used to cost, complete with weather reports that are often the first ever delivered to villagers in the local language.

"Most of the world's languages don't have a word for 'weather'," Parker observes. "So you almost have to explain what 'weather' is, contextually, but then you have to explain who and what 'Celsius' is…there are all these indices that farmers in developed countries use, that we tried to bring into these languages."

Training the trainers

Farmers aren't the only ones who need education, however. One observer of sub-Saharan Africa notes that "**a missing generation of scientifically trained agronomists and agricultural extension workers**" has left the region playing an urgent game of catch-up. TotoGEO is helping to fine-tune this effort by hooking up with agriculture students at Gulu University in Northern Uganda. Still reeling from a quarter-century of bloody civil strife, Gulu is one of the country's poorest districts, with more than 61 percent of the population living in extreme poverty. "I decided to go for the hardest area first," Parker says. "If I could work there and accomplish things, it would probably work elsewhere."

As part of their coursework, the Gulu students run a TotoGEO-equipped call centre built from scratch at the university for just US$2,000. They also use TotoGEO smartphone apps on field visits with local farmers, gathering data on local practices in order to refine their recommendations. Dr. Basil Mugonola, a senior lecturer in the university's agriculture department, says that the apps have been used in more than 8,000 student-farmer interviews so far. "It is still small, but growing," says Mugonola. "I would like to see this nationwide."

Customisation and empowerment

Unlike many of the reports and books Parker has "authored" that appear on Amazon, you won't find a creator's name or copyright anywhere on TotoGEO. "If entrepreneurs can make money off this thing, that's great," Parker says. For example, one startup in Ghana has his blessing to repackage the TotoGEO weather feed across its own mobile network.

Thanks to integration with blogging tool WordPress, it's fairly painless and totally free to build your own **customised TotoGEO website** with full access to the platform's news feeds and factsheets. "Fundamentally, what we're trying to do is minimise the actual incremental cost of setting up a new call centre, radio station, extension service, or government portal," Parker

says.

Combining high-tech and low barriers of entry has been a winning strategy for Parker. Soon after TotoGEO officially launched, he says, "we had about 18,000 institutional users and 130 unsolicited letters of intent or proposals saying 'we want to work with you'."

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2020

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