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Technology is driving data democracy at a fast pace. Used wisely, it will give voice – and access – to small farmers and the poor around the world, as the Committee on Sustainability Assessment argues

Small farmers in poor countries are often the last to benefit from new knowledge or technology. But very soon, they may no longer have to miss out on crucial learning that can transform their lives and environment.

After five decades of one-way data flow away from farms to researchers and policymakers, five technology factors have recently evolved that signal a major shift toward putting knowledge into the hands of small farmers everywhere:

- Data analytics and Artificial Intelligence have leapt forward as new techniques become possible, with access to big data and large computational capacity

- Novel big data streams are becoming available from some unlikely sources
- The accuracy of data gathering is improving, from learning how to standardize and measure better to sensor technology that makes it possible to get real data from small farms
- Penetration of smarter ICT (such as smartphones) allows data to come to the farmer in a targeted and curated manner that is fit for purpose
- The cost of data collection, storage, and sharing is plummeting

Recent work at the cutting edge of geospatial and information technologies that was unthinkable for any but the largest agribusiness just a couple years ago is becoming available for small farmers in places like Ghana and Colombia. It might alter their world – and yours – in surprising ways.

Imagine for the first time knowing precisely when to plant, what crops are best suited to your land, how best to treat diseases or pests, or the optimal fertilizer blend for your plot. How about instant analysis of specific parts of your farm to inform you where exactly you need more water, more fertilizer, or where disease is becoming active so you can target your efforts with unprecedented precision and save both time and resources?

Even financing opens up. What if past and current farmer performance could be made available to potential lenders who then offer competitive financing of a type that has never been feasible before, because they could not assess crop risk. All of this, and more, is now within reach.

And it is not just physical data that can be shared. Farmer data – now being gathered in new and exciting ways – can provide producers with insights into how to optimize efficiencies or make better economic decisions based on their specific, individual situations rather than generic guidelines.

Similarly, data about a farmer's education level helps better tailor interventions. Knowing the constraints of farm size and poverty levels can help policymakers better understand the drivers of deforestation.

Scaling up access

New initiatives, including pilot projects formulated by Innovative Solutions for Decision Agriculture, Rogers MacJohn and COSA, with Gates Foundation support, are seeking to scale up the access of smaller farmers to critical knowledge across Africa.

Leveraging existing technology-oriented businesses, these data partnerships in cotton, rice, coffee, and many other crops will test and evolve an array of models to deliver the most advanced knowledge to small farmers in new and highly functional ways.

With such innovations, the potential benefits are clear:

- Farmers can make better decisions when better informed by useful knowledge

- Greater access to a growing array of targeted services, from finance and inputs to virtual extension services and mechanization rental
- More informed policymakers and private firms who can better understand and selectively target issues from deforestation to disease outbreaks in record time.

The key to operationalize all of this potential is the skill to effectively integrate big data with local or small data (see Figure 2).

Technology is reducing the cost of gathering data and sharing knowledge back to farmers individually or through the co-operatives and communities that represent them. Farmers can truly become proactive participants in projects and supply chains when they understand the data. They are often best placed to drive the locally appropriate solutions to sustainability problems.

Making data user-friendly

Understanding the data on the farm can be a big hurdle. A pilot focused on Indonesian cocoa and involving the World Bank, Cargill, Nokia, and a local NGO¹ offered an important lesson: don't underestimate the challenge of ground level communication with farmers.

It goes beyond obvious factors such as literacy or education or even having intuitive graphics. It is critical to actually listen to the local community first and then devise the means that can deliver effective understanding and productive communication.

In Colombia, a partnership involving coffee giant Lavazza, Microsoft, other technology providers, and local NGOs is shattering barriers that had isolated the municipalities of Mesetas. With the support of the IDB Lab (SAFE Platform), they worked out how to first understand local needs and then configure a range of technologies to begin to address those needs.

To overcome a lack of connectivity, they tapped into the unused whitespace in TV bandwidth to provide broadband over kilometres of rough terrain where mobile and wireless has never gone before. Not only does this connect farmers but also local schools and it even provides the novel possibility of diagnostics via telemedicine to assist people in these remote communities.

How to achieve data democracy

Getting data back to farmers in a useful and cost-effective manner clearly requires human-centred design principles and adaption to local needs. For the world's small farmers, this can mean offering verbal messaging in a local language or simple visualizations that convey essential knowledge that farmers can grasp, or structuring knowledge specifically to facilitate decision-making. This works equally well with producer organizations where more sophisticated approaches can be applied to elevate their effectiveness with member farmers.

For example, working with several rudimentary co-ops in Kenya, and using their data, COSA with ISEAL Alliance demonstrated that when thoughtfully presented, even sophisticated calculations such as return on assets and debt-to-equity ratios, can be understood and used to reveal new and valuable insights about how to better use resources and manage risk exposure.

The process of democratizing data typically involves four discrete steps:

- Measuring or gathering only the data that matters using a Lean approach²
- Distilling data into useful knowledge (D2K) that is actionable
- Transforming how we communicate knowledge, making it intuitively accessible for decision-makers
- Sharing knowledge directly back to users and in a timely manner.

However, as its name suggests, democratization of data has greater implications. It can begin to alter the embedded inequality in market systems, where farmers are disconnected from valuable information. It is also the fundamental basis for improving the resilience of farmer communities to the inevitable stresses and shocks that many face from climate change to price volatility.

Could there be unintended consequences of this data-driven approach? Yes. Just providing more data does not ensure farmers will be better off. Something useful has to be done with it, so we need to invest in data literacy so that farmers can increasingly interpret and critique the data.

Rules need to be in place early to help ensure data equity wherein farmers get value for data they provide (that is used by others) and some control over data sharing. Markets will not provide such rules; they must be established early. Otherwise, in the words of tech-for-social justice authority Allen Gunn, we risk ‘data colonialism,’ where the absence of viable and transparent checks and balances means that data can be skewed to manipulate behaviours and can lead to more vulnerable farming communities.

The risk of data colonialism

To avoid these threats, we need to advocate and establish clear guidelines for data transparency, such that sources of any supplied data are traceable, just like the supply chain assets themselves. Technology such as blockchain can help in some respects but the issue is bigger than technology. Organisations COSA partners with such as Global Open Data for Agriculture and Nutrition (GODAN) and the Global Coffee Platform are thinking ahead and promoting agreements for data use, standards for data gathering, and data interoperability among members.

What does this mean for businesses and NGOs? If we do it well, the whole supply chain from farm to consumer is about to be brought into an informed process creating huge opportunities for sustainability advancement.

Credible data required

To do that, new levels of credibility are required. To get there rapidly, we’ll need more than blockchain. The vital information flows and learning will also require data standardization, starting with common indicators and metrics. Within a decade, nearly every company and every organization will be affected. Some will undoubtedly be left behind but others will use the opportunity to accelerate their competitiveness and their sustainability.

The systems to do this are increasingly affordable. They will benefit more than rural communities. Companies will better understand local needs. Their predictive ability will improve, freeing them to go beyond a limited checkbox compliance approach and aspire to true sustainability. ■ C&CI

1 See The Art of Listening to the Farmer <https://thecosa.org/art-listening-farmer/>

2 Link to Lean Research online: <https://thecosa.org/lean-research-field-guide-rigorous-respectful-relevant-right-sized-alternative/>

What is data democracy?

In its simplest form, ‘data democracy’ means making data readily accessible and easily digestible by an average user. Blending technology with human-centred design helps mine new levels of value for farmers and entrepreneurs. ■ C&CI



Figure 2. Dynamic between small data and big data elevates understanding to improve outcomes

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