

Thank you for the opportunity to speak today.

With COVID-19 and climate change, we are currently in the midst of an unprecedented environmental, social and economic crisis. Historically, crises have spurred technological change and sometimes led to the adoption of new systems with long-lasting effects.

We now regularly hold meetings and conferences over Zoom. Maybe that will affect how we do things in future.

Similar changes could happen in agriculture. For example, it may be valuable to adopt digital approaches to deliver services such as agricultural extension.

During the pandemic, governments and international institutions have shown an increased interest in complementing overburdened in-person extension services. This also raises the question of whether digital extension could be useful beyond the current pandemic, to address long term as well as short term challenges.

There are currently over 1 million agricultural extension workers worldwide. But there are still many farmers who do not receive advice, and many technologies and approaches that farmers could adopt to improve their productivity.

Expanding in-person extension to reach more people may be challenging for low and middle income countries, because with in-person services the cost increases almost linearly with the number of people served.

Digital technology has great potential to augment and improve existing extension services by addressing this problem

Mobile penetration rates are rising in many low- and middle- income countries, and text and calling rates are extremely cheap. That means the cost of reaching extra farmers with digital extension is extremely low. Digital agricultural extension has other benefits too.

Information delivered through mobile phones can be made available on demand, can be customized to individual farmers' needs and even timed to the crop calendar. Extension services can be tested and made more effective through iteration, A/B testing, and data analysis.

There are reasonable grounds for skepticism about digital agricultural extension: maybe farmers do not need more information, or will not change their practices in response to it. Perhaps there are other barriers.

However, studies of pilot programs have found statistically significant positive effects of mobile phone-based extension services.

Randomized trials in several African countries have found evidence that very simple, informational text messages can improve input use, crop yields, and supply chains, and can have positive impacts on overall market efficiency.

In one experiment, simple text messages increased the odds of farmers adopting lime by 22%. Because it was so cheap to implement, this program had an estimated benefit-cost ratio of 9:1.

Meta-analyses that pool data from multiple studies show that basic messages increase adoption of fertilizer and nutritious crops, improving crop yields by 4% on average.

While the effects of digital extension are modest in absolute magnitude, they provide a large relative boost above other existing promotion efforts. And, because they are extremely low-cost, even modest impacts make them highly cost-effective.

There are also positive spillover effects of digital extension programs, such as improved input use and yields among farmers that live close to or interact with the farmers that receive services directly.

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There will also be many opportunities for innovation and improvement of digital extension services in the future, especially as smartphone penetration increases and other advances in technology become more widely available.

These can be used to address challenges posed by climate change, which are altering weather patterns.

For example, accurate local weather forecasts could be valuable for farmers (e.g. for decisions about when to plant/harvest based on the end of the rainy season). Forecasts could be made for a reasonably small fixed cost and disseminated through digital extension systems.

Advances in remote sensing could enable even more customized information; machine learning and artificial intelligence could improve personalization; and two-way communication could enable large-scale data collection from farmers to provide better overall recommendations.

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There have been many attempts to use subscription models to provide digital extension services, but most have been failures.

Economic theory suggests that classic market failures are responsible for this, including non-rivalry and non-excludability. This means that because information is a public good and can be shared freely, it is hard to make a profit from selling it.

The large benefit-cost ratio of digital extension and limitations of private sector interventions suggest a role for the public sector to provide these services.

In particular, governments can partner with NGOs, like Precision Development, that can provide research support and help implement an iterative approach to enable learning, innovation, and improvement of services over time. The key is identifying flexible institutional models that permit these partnerships to function and allow solutions to be taken to scale.

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To summarize: digital agricultural extension has enormous potential.

Thank you again for the opportunity to speak on this important topic. I am excited to observe IFAD's work on this area in the future.