World Agricultural Forum 2017

Green Revolution 2.0: The Role of IT Connectivity

By Stella Liu

Synopsis

Projected levelling yields and a growing population forewarn a need for another Green Revolution 2.0. Mobile-enabled agri-technology in the developing world can be key enablers. It should be a priority that rural areas are not left behind.

Commentary

A SECOND Green Revolution is sorely needed. Evidence shows that the productivity gains from the first Green Revolution will begin to plateau amid accumulated environmental problems, as the effects of climate change and the expansion into marginal lands take their toll. For instance, a well cited study done by the International Rice Research Institute found that heat stress can cause significant reductions in rice production quantity in South and Southeast Asia.

Warmer night temperatures have a negative effect on rice yield. A +1°C increase above the critical temperature (more than 24°C) may lead to a 10 per cent reduction in both grain yield and biomass. To counter this trend new technologies, credit and sustainable agricultural practices must be effectively disseminated among farmers for productivity gains to occur.

Agricultural Extension Services and Financial Inclusion

The first Green Revolution enabled developing countries to experience large increases in crop production through the use of fertilisers, pesticides and high-yield crop varieties. Between 1960 and 2000, yields for all developing countries rose 208% for wheat, 109% for rice, 157% for maize, 78% for potatoes and 36% for cassava.

This success was most felt with rice growers in Asia and lifted many out of poverty. In Asia, it has been estimated that every 1% increase in crop productivity reduced the number of poor people by 0.48%.

In Asia, a focus on development through industrialisation has led an overall decline in investments and public interest with the agricultural sector. Capital investments and agricultural extension services are key for farmers to properly adopt new technologies and raise their farms' productivity.

Mobile banking and informal mobile-enabled information networks case studies are proving that mobile networks can meet these needs. For instance, mobile banking can allow smallholders to access microfinance, digital payments and financial markets. Sygenta and Mercy Corps have collaborated in Indonesia to provide microfinance for corn farmers. Mercy Corps used an Android Application and SMS services to collect data and develop farmer credit profiles for local banks.

Increasing the availability of individual farmer information enabled the banks to extend loans at more favourable interest rates. In the second phase, the project reached 640 smallholder farmers. Mobile networks have also been used to circulate farming advisory services and market information. For example, Reuters Market Light services over 200,000 smallholder subscribers in 10 different states in India for a cost of US$1.50 per month.

The farmers receive four SMS messages per day on prices, commodities, and advisory services from a database with information on 150 crops and more than 1,000 markets. Preliminary evidence suggests that the service may have generated $2–3 billion in income for farmers and over half of them have reduced their spending on agriculture inputs.

Mobile Networks and Early Warning Systems

During the first Green Revolution, farmers experienced a period of high productivity followed by plummeting yields due to water shortages and unprecedented pest and disease outbreaks. Sustaining crop production was a serious challenge as they lacked the knowledge to adequately prepare for these risks.

But with today's technologies, weather conditions can be predicted and mobile networks can help send early warnings to farmers so they can prepare for pest and disease outbreaks. For instance, in Colombia, smallholder farmers faced periods of drought that resulted in a decrease in rice yields from six to five tons per hectare over the past five years. This allowed them to predict that farmers in some regions could save themselves from crop failures by not planting at all.

The 170 rice growers who followed the recommendation to not plant ended up saving $3.6 million. Yet another is FarmerLink in the Philippines, an early warning system for pest and disease outbreaks. It combines both satellite and farm data to predict and detect potential outbreaks. When threats are identified, farmers receive warnings over their mobile phones. A year after the first pilot launch, nearly 7,500 farmers have joined this network.

Green Revolution 2.0. through Connectivity Revolution

Mobile-enabled agri-technologies are proving to be key enablers for a Green Revolution 2.0 by overcoming many of the challenges associated with the remote locations of many smallholder farmers and the exclusion of these smallholders from financial and agricultural extension services.

But many of these rural areas are still not connected, despite regional efforts to expand mobile and fixed broadband infrastructure. In the Asia and the Pacific region, 42% of the total population, have mobile broadband subscriptions and the majority of them live in the cities.

As countries in the region implement master plans for fixed and mobile broadband infrastructure, the rural areas must not be left behind. Alongside overall economic and social benefits of such connectivity, the tangential impact such changes can have on food security cannot be overlooked.

During the first Green Revolution, farmers needed capital investments to acquire new technologies, agricultural extension services to learn how to use them correctly, and early warning systems to prepare for pest and disease outbreaks. Because smallholders tend to live in remote areas, it was challenging to spread information and deliver these services in a timely manner.

Early case studies of mobile-enabled agricultural technologies demonstrate their potential to help farmers overcome these challenges. The next Green Revolution can be launched by a Connectivity Revolution that helps fix market inefficiencies and manage farming risks. However, as countries in the region create and implement fixed and mobile infrastructure master plans, rural areas are beginning to lag behind urban areas in connectivity.

Getting the ASEAN region connected has been primarily lauded for its innovation, social and economic benefits, but ensuring that progress is equally achieved in both rural and urban areas can have food security implications by spurring a much needed Green Revolution 2.0.

The World Agricultural Forum 2017, co-hosted by the S. Rajaratnam School of International Studies that will take place in Singapore on 6-7 July 2017, discusses these issues and the impacts of technologies on agriculture and food security in the region.

Stella Liu is a visiting US Fulbright Research Fellow at the Centre for Non-Traditional Security (NTS) Studies, S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University (NTU), Singapore. This is part of a series on the World Agricultural Forum 2017.