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World Agricultural Forum

Knowledge Intensive Agriculture: The New Disruptor in World Food?

By Paul Teng

Synopsis

New digital media are fast becoming available to convey new technology and new knowledge to farmers. Agricultural technology (“agtech”) and new financing modalities (“fintech”) have great potential to meet the needs for increasing agricultural production globally. Knowledge intensive agriculture (KIA) is increasingly becoming the next big disruptive innovation.

Commentary

MODERN FARMING depends on technology such as seed, fertiliser, pesticides, water, and machinery. These have formed the basis of the world’s food production systems for staples. However, it has become increasingly clear to scientists, policymakers and development agencies that physical inputs alone did not guarantee that farmers can make best use of these inputs. Knowledge is required to make farms productive, farming practices efficient, and farm productivity more targeted.

At the same time, information-communication technology (ICT) has also increasingly affected the farming community. ICT is increasingly recognised as the means to capture and share knowledge and in the process, improve the efficiency of using production inputs. For farming, a major challenge has been how to empower all farmers with the knowledge to use inputs effectively. Agricultural technology (agtech) together with new digital knowledge capture techniques and new financial technology (fintech) groups is fast changing farming by creating a new knowledge intensive agriculture.

Making Technology Knowledge Intensive

In recognition of this phenomenon, the Asian Development Bank in Manila, Philippines, convened a workshop on 15-16 June 2017 to enable exchange of experience and ideas on how to design and implement *knowledge intensive agriculture* among the more than 300 million small farmers in Asia.

Smallholder farmers remain the foundation for Asia's food security. These small farmers were responsible for using the first set of "disruptive innovations" in the 1960s, such as high yielding crop seeds, fertiliser and pesticides to significantly increase food supplies. However, the large, disparate smallholder population in Asia is geographically spread out and farmers work in diverse farming situations. Each farmer in effect practises farming in his/her own way based on knowledge either newly learnt or inherited.

The recent report on "The Future of Food and Agriculture" by the United Nations Food and Agriculture Organisation (FAO) highlighted the urgent task of assuring the world can meet the 50% increase in demand for food by 2050. So it is important not only to ensure smallholders have access to farming inputs, but also that they have the knowledge to use the inputs effectively.

Apart from the above, the new impetus for KIA is the increase in myriad tools to practise "data enabled agriculture" – environment sensors, mobile computing, satellites and imaging, drones, wireless communication and even genetics. The growth of knowledge in digital form, AND the increasing capacity of small farmers to access digital information provide opportunities not possible before to share timely information on farming environments and the required management knowledge.

With knowledge, physical inputs and technology, KIA democratizes the sharing of knowledge. It also has the added attraction of luring millennials and other new entrants into agriculture at a time when almost all countries are faced with the twin problems of an ageing and declining farming population.

Agtech and Fintech as New Economic Sectors

Two new words, "agtech" and "fintech" have crept into the discourse on modern farming. But are these "old wine in new bottles" or are they truly "new wine in new bottles"? Admittedly the growth in KIA offers opportunities for new technologies, new physical inputs and new financial mechanisms to ensure these become socialized into the farming sector

Agtech collectively means the individual technologies or a combination of technologies related to farm equipment, weather, seed optimisation, fertilizer and crop inputs, irrigation, remote sensing (including drones), farm management, and agricultural big data. Agtech has gained widespread attention and considerable investment, with one pioneering company, AgFunder estimating that in 2014 and 2015 alone, investments totalled US\$7 billion.

Urban farming is one sub-sector that has seen some "new wine" in the form of indoor farms using fully integrated technology for growing vegetables in controlled environments of artificial light, temperature, carbon dioxide, water and fertilizer. In

Singapore, PANASONIC has delivered such high tech vegetables to supermarkets. Korea and Japan together have over a hundred indoor high tech farms. South Korea even has a government agency to provide oversight and promote agtech.

Fintech includes companies that use new technology to provide financial services for innovations in farming. Fintech companies consist of both new as well as established financial companies. Industry monitoring gives estimates of billions of dollars of fintech investments, with Europe leading the way. But it is the synergy of agtech and fintech that is causing great excitement for KIA.

New fintech entities will either bypass or complement traditional financial and technology players such as development banks and multi-national companies as the main suppliers of physical technologies and knowledge to small farmers. Countries with active financial centres coupled with proper governance such as intellectual property protection for new technology, will find that the changed landscape provides many opportunities to create new avenues of economic growth. An example is Singapore.

Knowledge Intensive Agriculture as Disruptive Innovation

Historically, farming has seen many disruptive innovations, such as hybrid corn in the 1920s, biotech crops in 1996, and now digital agricultural technologies and genome edited crops and animals in the 2010s. And, as the ADB Workshop noted, KIA has potential to become the latest and most impactful game-changer because it “connects the dots” to link technology, knowledge, the farmer and the financier.

The same FAO Report cited above also proposed that new investments and new technologies are needed to meet the 50% increase in food demand by 2050, and to do so will require \$265 million per year in investment. It is unlikely that all this investment will be met by governments, pointing further to an important complementation role of fintech companies.

A further recognition of the important role that new technologies will play in the future is its inclusion as one of the four sessions in the upcoming World Agricultural Forum to be held in Singapore, on 6-7 July 2017. This event will see key industry players share their assessment of its role in agriculture, global food trade and security.

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