Using Smart Agriculture-as-a-Service to secure tomorrow's food supplies

As the backbone of developing economies, agriculture not only serves to feed a nation but creates employment and, often, contributes significantly to the GDP.

Thomas Fuerst, WING Marketing at Nokia

According to the Food and Agriculture Organisation of the United Nations (FAO), feeding a world population of 9.1 billion people in 2050 will require a 70% increase in overall food production, highlighting the need for increased, and more efficient, agricultural activities globally.

Additionally, the FAO states that 80% of farmland in Asia and sub-Saharan Africa is managed by smallholders working on 10 hectares or less.

According to Thomas Fuerst, WING Marketing at Nokia, while research clearly shows that technology can add tremendous value to South African farmers, the uptake has not been what it should be, particularly among subsistence and small-scale farmers.

"This is likely due to the perceived costs associated with technology," he says.

Technology in agriculture

The adoption of technology in agriculture also requires that various stakeholders work together. In a report done by the University of Stellenbosch for the Western Cape Department of Agriculture, while agricultural technology will result in higher yields, reduced costs and improved nutritional value of foods, it needs the farming sector, government and education institutions to work together.

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Samuel Hinneh 9 Apr 2019

"Crop disease, pests, and drought are some of the biggest issues facing agriculture in sub-Saharan Africa," says Fuerst.

According to CAB International crop pests and disease account for close to half of the total crop losses in developing countries and in a 2017 UN report, it was stated that about 200,000 people, mostly from developing countries, die every year from pesticide poisoning.

"By using technology, and more particularly the Internet of Things (IoT), we can arm farmers with more detailed data about their farm as well as the macro environment to assist them in planning their crops more accurately and thereby driving a better yield, while eliminating risk," he says.

Face the challenges

Fuerst says there are three key challenges that need to be solved, the first of which is data availability and integrity.

"The farmer has a small plot and can't necessarily afford to buy different types of sensors to measure moisture, temperature or pests and put them on their small farm. Even if they could afford it, they need to know about weather and other conditions from a macro or wide area perspective, so that can predict what the impact of these will be on them in the future."

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The second challenge is what do they do with the data. They need tools that help them know what the weather is, what pests are coming, etc. and enable them to make decisions based on that information. The third challenge is the business model – it must be affordable for both the operator and the smaller farmers for it to be successful.

"If you look at developing economies, you don't always have the large commercial farms that you find in developed countries. You have lots of smaller farmers who are working a small plot of land and operate in almost subsistence mode. That means that they have a limited budget available to spend on rolling out technology solutions, even if those will make their farms run more efficiently and save them costs. They require a solution that is packaged as an affordable 'as-a-service' package that will enable them to gather data to drive more intelligent decisions. This is where IoT comes into play," he says.

In comes Smart Agriculture-as-a-Service

Nokia's Smart Agriculture-as-a-Service solution runs on the Nokia Worldwide IoT Network Grid (WING), which is a global horizontal platform which allows telcos to not only roll out IoT services more quickly on their network but gives them the flexibility to scale globally when they need to.

"They don't have to rely on the cost and complexity of things like roaming agreements that you have with traditional mobile phone services. It allows operators to roll out IoT services much quicker and scale their network much faster without investing huge amounts of CAPEX," says Fuerst.

Nokia works with the operator to roll out sensors that detect moisture, temperature, wind speed, and pests and deploy them across their whole network, not just in one province or town.

"This way they are gathering data about the weather, pests and climate conditions across a far wider area and provide this data to the farmers as a service. There's a smartphone, tablet or a computer application where they can access and leverage that data. It gives them access to data on weather conditions, pest trends, etc. and they can make smarter decisions about irrigation, applying pesticides, when to harvest or not and things like that. The farmer then also has the ability, if there's some specific problem they have, they can send an SMS to an advisory centre and get advice on how to solve a specific problem."

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The operator, on the other hand, doesn't have to invest a lot of CAPEX to roll out this IoT network and then put all these sensors on it – they can leverage WING to keep their costs low for the infrastructure and all they have to do is buy these sensors and put them across their network. Then they can access all that data and it can allow them, with minimal CAPEX, to now offering a service to their farmers at a low enough price so that the business model works for both parties.

Addressing the issue of future food requirements resides not in trying to find and develop new agricultural lands but in transforming current farms into more 'intelligent' ones for sustainable agriculture.

"A successful smart agriculture program can be achieved through collaboration between the various stakeholders – technology providers, device manufacturers, platform providers, governmental entities, non-governmental organisations, agricultural cooperatives, agricultural companies, and farmers," Fuerst concludes.

"Critical to this, however, is finding the right business model, which works for both the farmer and the network operator. The WING smart agriculture as-a-Service is unique in this regard because it allows farmers to benefit from IoT technology without the need to invest in it while giving the operator a pay-as-you-go business model that limits investment demands while offering a clear path to new revenues."

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