IoT solutions for the agriculture sector

The Internet of Things (IoT) could be a game changer for agriculture in this country. Supported by cloud computing and 5G, IoT has the potential to improve agricultural ventures, big and small. It is a relatively cheap technology, and it is smart, pervasive and transformative. In general, it is rare for people to think about the Internet in connection with agriculture. But IoT technology allows farmers to connect to the Internet to improve management and operations to reduce waste, better control pests and disease, efficiently use farm inputs and streamline livestock management, thus, raising productivity.

What is IoT? There is no universally agreed upon definition of IoT. In simple terms, it is a technology that connects any device to the Internet. It describes networks of objects or "things" that are not themselves computers but have embedded components that connect to the Internet. "Things" include agricultural equipment, cows or sheep in the field implanted with chips, home appliances and almost anything one can think of, including people. The core of this wave of innovation is data and the interconnectedness of devices and equipment. The IoT is a giant network of connected "things". These networks allow communications or establish people-to-people, people-to-things and things-to-things relationships.

How does it affect agriculture? IoT is the embedded or attached computer chips that give an object both a unique identifier and internet connectivity. These objects are considered "smart" objects. Internet connectivity allows a smart object to communicate with computers and other smart objects, exchanging data between them. These data can be transformed into information to facilitate decision-making. This unique feature of IoT has much potential for industry, particularly agriculture. A farm must maximise output per hectare, minimise operating cost and sell produce at the highest possible price. What this entails is effective management of inputs and resources like fertiliser, water and seed quality while minimising the risk of uncertainties due to climate and market changes and shocks as well as pests and disease.

The reality for agriculture in Malaysia is far from optimal. Most farms, particularly the small ones, are still using traditional farming practices due to structural problems. These include small farm size and remote locations with limited access to the latest knowledge and technology, inadequate institutional support and vulnerability to a wide range of uncertainties such as pest attacks and disease, climate change and market swings.

Many farmers have not kept abreast of the latest standards of good practice, in particular, in efficiency and sustainability. They tend to overseed macro-fertilisers and miss the benefits of micro-fertilisers appropriate to the cropping system and soil.

They lack an understanding of pest life cycles, hence, they are vulnerable to crop failure due to insect pests infesting the environment, the former farm, crop inspection rarely take place and the insights and information obtained are subjective to the perceptions vary between individuals. The margin of error is large. In most cases, pest and disease control and labour intensive work, many farmers take decades of sluggish growth.

IoT is no longer an option but a necessity for Malaysian agriculture to transform itself after decades of sluggish growth.

IoT technologies provide a cost-effective and efficient way to monitor and control various aspects of agriculture, including water management, pest control, and crop monitoring. By using sensors and remote monitoring systems, farmers can quickly detect and respond to problems, reducing waste and improving yields. In addition, IoT technologies can help farmers to make data-driven decisions, improving efficiency and reducing costs.

To realise this, there must be further investment in infrastructure such as for data, applications, analytics, hardware, software and connectivity, content, integration of data, information systems and applications and governance. Changing the mindset of the farmers and industry players is the prerequisite of a successful IoT implementation.

At the current speed of ICT advancement, IoT is no longer an option but a necessity for Malaysian agriculture to begin a much-needed transformation after decades of sluggish growth. Doing otherwise would mean an opportunity lost, which grows bigger as ICT advances to a new frontier. By then, it will be too late.

Fatimah Mohamed Arshad is head of the Bioresource and Environmental Policy Laboratory, Institute of Agricultural and Food Policy Studies, Universiti Putra Malaysia.