

## **Drones, Sensors and AI enable Farmers to Produce More and Adapt to Climate Change**

The heart of Southeast Asia's economy beats to the rhythm of agriculture, as Asia Fund Manager's [Namrata Sen Chanda](#) puts it, contributing 10 percent of the region's GDP and more than 30 percent of [jobs](#) in some countries. Those benefits are, however, threatened by climate change. And, equally alarming, agriculture is one of the top causes of carbon and methane emissions that cause climate change in the first place. Agtech start-ups are leveraging IoT, sensors, drones and more to create solutions to reduce emissions and help farmers adapt.

### **Climate Change Impacts Southeast Asia Massively**

Southeast Asia is indeed one of the regions most vulnerable to climate change, the USAID [says](#), as it faces rising sea levels, heat waves, floods, droughts and increasingly intense and unpredictable weather events. Those changes negatively impact crop yields, biodiversity, forest harvests, and the availability of clean water, the ADB [adds](#).

The challenge is exacerbated by farmers carrying on traditions that have existed for centuries, Brinc [explained](#), as current agricultural practices "guesstimate" the need for water, labour and other critical inputs.

### **Technology is Solving the Agricultural Conundrum**

While educating farmers and creating regulations can reduce some problems temporarily, the only real long-term solution is front-end agricultural technology (agtech) that provides meaningful results. Fortunately, Chanda said, the adoption of agtech is gaining popularity in Southeast Asia and elevating farming practices. Rural and urban farmers are adopting innovative technologies that deliver better efficiencies and higher incomes, especially for smallholder farmers.

The technology enables precision agriculture which can cut costs, optimise yields, minimise environmental impact and improve decision-making, Brinc noted. It enables crop and soil monitoring, irrigation management and planning software for inputs such as fertilisers and pesticides. Drip irrigation enabled by internet of thing (IoT) devices and software, for instance, can cut water usage by 80 percent, increase fertiliser efficiency by 50 percent and double yields.

Moreover, NL [noted](#), digitisation can contribute to sustainable farming practices by optimising resource use, minimising environmental impact, and improving the efficiency of the agricultural supply chain. Sensors and precision fertilisation, for example, enable farmers to control their CO<sub>2</sub> and nitrogen emissions. Technologies such as smart water generators for arid land, smart crop pollinators and smart crop lighting can enhance productivity and sustainability, BRIN Centre researcher Joko Pitono said.

The key, of course, is getting farmers to use the technology. Start-ups will need to show that their solutions are cost-effective and improve yields without causing harm. Relationships with cooperatives, government agencies, advisors or influencers will be critical.

### **Start-ups Leading the Transformation**

A multitude of start-ups are indeed moving fast and developing front-end technology such as drones and sensors as well as software to enable farmers to select seeds, plant, irrigate, fertilise, manage their farm and sell their crops more effectively. While these solutions would help any farmer, they are especially important for helping them adapt to climate change and reduce emissions.

One set of solutions uses software and internet of things (IoT) devices such as sensors to monitor everything from weather to plant health. Several examples highlight the impact.

[Mimosatek](#) in Vietnam links its cloud computing platform to IoT such as sensors on farms, for instance, which helps monitor the health condition of both plants and animals. The

data it sends to farmers real-time via mobile apps can optimise agriculture, Tracxn [explained](#), and reduce costs.

Agrihub, also in Vietnam, offers end-to-end services ranging from IoT to agribusiness consulting. Its IoT platform leverages smart devices and connects to its app, which customers can use to control their farms automatically. It also uses computer vision and AI to identify health and environmental changes for dairy farmers and deliver actionable insights.

In Indonesia, Mertani has created data-driven precision farming solutions. Its IoT sensor integration, cloud data storage and software enable plantation managers to monitor and analyse agricultural data instantly through laptops and mobile phones. It also uses observation equipment to monitor weather and climate so it can generate agro-climate data for farmers.

Along with delivering insights via technology, Agribuddy in Hong Kong enables conversations among previously unconnected farmers and can also help them build credit profiles. It uses ground-level granular data collection to track weather, soil conditions, hydrology, market conditions and infrastructure, which enables it to help reduce unpredictability in the agricultural value chain.

Eratani has also gone beyond crop management by offering supplies, farming education and access to agricultural products at standardised prices so that farmers in Indonesia can manage their business more efficiently. It digitises practices ranging from upstream services such as financial support and supply chain management on through to downstream services for crop sales and distribution.

Along with using smart sensors, Demeter offers solar and wind energy solutions as well as power management and power saving insights. It can analyse data such as weather forecasts, environmental information, images and video real-time to give alerts and predictions to optimise farming activities such as irrigation, water, electricity, fertiliser and feed. They can also predict and prevent diseases, help farmers improve yield and quality, and provide advice to optimise resource usage. Farmers can also connect with experts, suppliers and other farmers.

A number of companies also leverage drones to enhance the solutions provided by sensors and analytics so that they can offer weather prediction, disaster management, crop mapping and yield enhancement.

Chloropy, for instance, uses robotics, computer vision and AI to solve issues around indiscriminate use of crop inputs. It interprets images from drones, mobile phones or other camera devices to deliver actionable insights. Farmers can then apply precise dosages of agrochemicals so they can reduce costs, increase efficacy and prevent the pests or diseases which can reduce yield by up to 30 percent. Its next step will be to develop a semi-autonomous rover for the precise application of crop inputs.

In Singapore, Polybee leverages drones, AI, computer vision and machine learning for cutting-edge digital phenotyping, precise yield estimation and autonomous pollination. Its solution incorporates aerodynamically controlled pollination using off-the-shelf drones.

### **Leading Front-End AgTech Solutions Help Farmers and the Planet**

While farmers may be reluctant to replace centuries-old farming traditions, sensors and drones as well as AI and other solutions can help them adapt to climate change and also increase crop yields. At the same time, the solutions reduce the fertiliser input and emissions output that is a cause of the climate change damaging their crops.