

# AGRICULTURE AND FOOD SECURITY



**D**EVELOPING PRECISION FARMING BASED ON ROBOTICS, AI AND IOT, AND INCORPORATING CLIMATE RESILIENCY WILL SUSTAINABLY DEVELOP AGRICULTURE SECTOR & ENSURE FOOD SECURITY

The agricultural sector faces enormous challenges in feeding 9.6 billion people by 2050 as predicted by Food and Agriculture Organization (FAO). Food production must increase by 70% by 2050, and this will have to be achieved despite limited availability of arable lands, increasing demands for fresh water (agriculture consumes 70% of the world's fresh water supply) and other less predictable factors. Climate change is expected to put 132 million more people at risk of hunger by 2050, and will disrupt life cycles of many plants and animals. Agriculture is also known to be a major contributor to greenhouse gas emissions, so there is also a need to develop practices that reduce emissions of carbon dioxide, and methane and other short-lived climate pollutants.

As farmers have adopted different technologies in their pursuit of greater yields, the belief that 'bigger is better' has come to dominate farming, rendering small-scale operations impractical. But advances in **robotics, artificial intelligence (or AI) and sensing technologies** are threatening to disrupt today's agro-farming model, and solve problems as old as farming itself.

In greenhouses for fruit and vegetable production, engineers are exploring **automation** as a way to reduce costs and boost quality. Devices to monitor vegetable growth and robot pickers are already in use. **Sensing technologies** are helping livestock farmers to manage the health and welfare of their animals. Work is also underway to improve monitoring

and maintenance of soil quality, water use, and to eliminate pests and disease without resorting to indiscriminate use of agrichemicals.

The FAO estimates that 20-40% of global crop yields are lost each year to pests and diseases, despite the application of around two million MT of pesticides. **Intelligent devices like robots and drones** already allow farmers to slash agrichemicals use by spotting crop enemies earlier to allow precise chemical application or pest removal.

**Precision agriculture** (or PA) and **Internet of Things** (or IOT) are the next waves of agricultural innovation. The impacts of PA and IOT technologies on the size and organization of agriculture are just starting to be felt, and an integration of those offer more sustainable and effective alternatives. For example, robotic equipment can farm efficiently around trees, rocks, and villages; while microdosing fertilizer, water and pesticides can reduce environmental impact.



## What AIT offers



Experts with research and academic services



Laboratories and field stations for hands-on training



Network with relevant universities, institutions and private companies

## Projects/Programs



**“Consultative Meetings and a Scoping Workshop on Developing a Post-Secondary Professional Development Program in Agriculture for Timor-Leste”**, supported by GIZ and the Ministry of Agriculture, Timor-Leste.



Supported by professional development course on **“Agricultural Extension Practices”** was developed for the Indonesian Agency for Agricultural Research & Development (IAARD).



A professional development course on **“Delivering Quality Extension Services”** was also developed with the support from the Indonesian Agency for Agricultural Research & Development (IAARD), where participants from IAARD, Indonesia and Sugar Regulatory Authority (SRA), Philippines also joined.



A professional development course on **“Livestock Production for Sustainable Livelihoods”** was specially designed for Punjab Resource Management Program (PRMP), Pakistan where participants were the District Livestock and Veterinary Officers from Government of Punjab of Islamic Republic of Pakistan.



With support from the Ministry of Water, Irrigation and Electricity (MoWIE), Ethiopia, a professional development course on **“Utilization of Solar Energy for Rural Water Supply and Small-Scale Irrigation”** was developed and implemented in Thailand for participants the MoWIE, Ethiopia.



Supported by USAID, a professional development course on **“Smallholder Agriculture Transformation and Good Practices in Thailand”** was developed and implemented in Thailand for participants from the Capacity to Improve Agriculture and Food Security Project in Ethiopia.

**Contact us:**

☎ : +(662) 524 5338 | +(662) 524 6333 📠 : +(662) 524 6332 ✉ : extension@ait.ac.th

[www.extension.ait.ac.th](http://www.extension.ait.ac.th)



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