Table 37 Summary of TAPs for precision farming technologies

Item	Barriers	Solutions	Technology Action Plan			Involved Parties
			Short-term (3 yr)	Medium-term (5 yr)	Long-Term (10 yr)	
Technology Capability	• The unsuitability of imported technologies or software to the Thai context	• Self-developing precision farming technologies that best suit the needs for Thai agricultural sector • Promoting a collaboration mechanism between public and private sectors	• Promoting technology transfer and collaboration between local, regional, and international institutes			NSTDA /KU /Public and private research institutes
	• Limited application of remote sensing and GIS technologies	• Developing or using open source GIS software	• Developing or using open source GIS software	• Developing and applying remote sensing and GIS technologies to small and medium sized farms		GISTDA /NSTDA /Public/Private research institutes
	• The use of technology only in large companies. • Unequally distribution of the technology to local farmers	• Promoting applications of precision farming technologies to increase productivity and reduce production input	• Arranging seminars, focus group to stimulate learning process , sharing ideas and experiences	• Building a network of model farmers through trainings across the country		OAE /KU /DOA /DOAE /Royal Initiative Discovery Institute /Universities around the country

Item	Barriers	Solutions	Technology Action Plan			Involved Parties
			Short-term (3 yr)	Medium-term (5 yr)	Long-Term (10 yr)	
	• Inaccessibility of high-quality analytical tools	• Promoting R&D of soil nutrient sensors that are easy to use and affordable to Thai farmers • Disseminating soil-sampling knowledge and innovation through the "soil doctor" network	• Promoting the use of soil test kit and smart fertilizer through the "soil doctor" network	• Developing a soil test kit that can measure soil nutrients accurately and precisely, with a focus on ease-of-use and affordability		KU/LDD /GISTDA /OAE /Public and private research institutes
	• Lack of necessary skills to use agricultural technologies	• Providing training courses for farmer, focusing on how to collect and analyze data	• Providing training courses for farmer, focusing on how to collect and analyze data	• Providing small and medium sized farmers throughout the country with training courses/workshops on precision farming	• Ensuring that small and medium sized farmers throughout the country have a farm-based database and can apply it to its fullest potential	OAE /KU /DOE /DOAE /Universities and research institutes around the country
	• Lack of research networks and collaborations	• Helping researchers/practitioners to enhance their skills necessary for precision farming • Building a network of relevant researchers, stakeholders, and organizations • Developing curriculum on precision farming	• Enhancing the skills of researchers/practitioners through training workshops and seminars • Building a research network through public and private partnership	• Providing research grants and scholarships in the area of precision farming		

Item	Barriers	Solutions	Technology Action Plan			Involved Parties
			Short-term (3 yr)	Medium-term (5 yr)	Long-Term (10 yr)	
Infrastructure and database development	• Limited data and the lack of a biological database that can be used in a decision support system	• Developing the hub for compiling biological/agricultural database • Developing DSS software that links biological/agricultural databases	• Building a network of biological/agricultural data which include scientific knowledge, technology and innovation • Building a portal/clearinghouse/ gateway that provides biological data in a digital format • Setting a data standard and write a manual of data exchange for relevant organizations	• Regularly collecting and compiling biological/agricultural data in a digital format and ensuring that such data are complete, nation-wide, and in the same standard format. • Developing DSS software that links biological/agricultural databases and ensuring that they are easy access to farmers.	• Updating the biological/agricultural database that contains data from the whole country and provides full data services • Ensuring that small and medium sized farmers can access high-quality DSS • Ensuring participation from governmental agencies, private organizations, and general public (farmers)	DOA /DOAE /MU /KU /Royal Initiative Discovery Institute
Market mechanisms	• Lack of competitiveness in the agritronic market which leads to the high cost of precision farming technology	• Promoting the country's agritronis industry for technological advancement and reduction in the costs of acquiring technology	• Conducting a cost-benefit analysis/project feasibility study for precision farming in various types of farms	• Promoting the country's agritronic industry both technologically and commercially	• Developing model farmers who have successfully tried and tested precision farming technologies, throughout the country	MICT /OAE /NSTDA