Identification of Technical Practices for Climate-Smart Agriculture (CSA) in Indonesia

Project Reference: CTCN 22-011

Stakeholder Working Group Meeting

Date: 22 November 2023 (9.00 am to 4.00 pm)
Place: HARRIS Suites fX Sudirman, Jakarta

Participants:

Present

Dr Ir Dudi Iskandar (Mr)	Project Proponent
Rizki Amelgia, S.Hut. M.Sc. (Ms)	National Designated Entity (NDE)
Dr M Nasir Rofiq (Mr)	National Research and Innovation Agency (BRIN) *(online)*
Dr Lukita Devy (Ms)	National Research and Innovation Agency (BRIN)
Sostenes (Mr)	Regency of Sukabumi
Dr Ir Joko Pitoyo (Mr)	Ministry of Agriculture
Fathan Oktisaf (Mr)	Partnership for Indonesia's Sustainable Agriculture (PISAgro)
Rahmad Gunawan (Mr)	Ministry of Agriculture
Trista Fristovana (Ms)	Ministry of Agriculture
Maria Rosalin (Ms)	Ministry of Agriculture
Asep Sukmara (Mr)	DHI Indonesia
Dina Ariani (Ms)	DHI Indonesia
Dr Satyanto Krido Saptomo (Mr)	*IPB University*
Dr A. Faroby Falatehan (Mr)	*IPB University*
Sriwulan Ferindian (Ms)	*IPB University*
Dr Arien Heryansyah (Mr)	*UIKA Bogor*

Absent

Haryo Istianto (Mr)	Ministry of Public Works and Housing

Agenda:

1. Opening of the meeting.
2. Identification of relevant technologies for automatic irrigation and fertiliser application.
3. Feasibility analysis for the integration of the two systems.
4. Closing of meeting.

Notes:

Item	Discussion Notes	Remarks
1.0	The meeting was conducted in both English and Bahasa Indonesia. The workshop was moderated by Mr Asep Sukmara and started at 9.30 am (Jakarta time). It was officially opened by Ms. Rizki Amelgia on behalf of the NDE.	-
2.0	A presentation on the identification of existing technologies for automatic irrigation and fertiliser application was done by Dr Satyanto Krido Saptomo with the following main points:	-
	a) List of technologies: • Surface (furrow) irrigation - The application of water to the soil surface by gravity flow. It includes methods such as basin, border, furrow, and wild flooding. • Sprinkler irrigation - The application of water to the soil surface by spraying it through nozzles or sprinklers. • Drip irrigation - The application of water to the soil surface or root zone by dripping it through emitters or drippers. • Subirrigation - The application of water to the soil below the surface by raising the water table or flooding the root zone.	
	b) Advantages and disadvantages of technologies: • Surface irrigation - Advantages ▪ Lower initial investment of equipment and lower pumping costs per acre-inch of water pumped. ▪ Can save water and money by recirculating irrigation runoff water and reducing chemical leaching. ▪ Can ensure higher crop yields by providing adequate moisture and aeration to the root zone. - Disadvantages ▪ Requires more labor and skill to maintain water flow and avoid surface runoff or excessive infiltration. ▪ Not suitable for sandy soils or soils with high salinity, as they can cause uneven water distribution and salt accumulation.	

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	▪ Can cause soil erosion and compaction by the repeated movement of water and farm equipment in the furrows. • Sprinkler irrigation - Advantages ▪ Water Efficiency: Direct water delivery to plants reduces runoff and evaporation. ▪ Uniform Water Distribution: Enhances crop yields and quality. ▪ Reduced Soil Erosion: Eliminates the need for soil tillage, reducing erosion. ▪ Versatility: Applicable to various crops, soil types, and uneven surfaces. ▪ Automation: Systems can be automated, saving time and labor costs. - Disadvantages ▪ Cost: Installation can be more expensive than other methods. ▪ Wind Susceptibility: Systems vulnerable to wind, affecting water distribution. ▪ Disease Susceptibility: Increased risk of plant diseases due to prolonged leaf wetness. ▪ Salinity: Can elevate soil salinity, reducing crop yields. • Drip irrigation - Advantages ▪ Water Efficiency: Conserves water resources. ▪ Fertilizer Efficiency: Reduces nutrient runoff and pollution. ▪ Reduced Soil Erosion: Less likely to cause erosion compared to traditional methods. - Disadvantages ▪ Installation Cost: Can be more expensive than traditional methods. ▪ Maintenance: Requires more maintenance. ▪ Susceptibility to Clogging: More prone to clogging.	
	c) Fertigation	

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	• Fertigation is the process that combines fertilizer with irrigation, in which fertilizer is added to an irrigation system. • Two groups of technologies: - Electroconductivity and pH-based fertigation: ▪ Monitors EC and pH to determine the dose of fertilizer. ▪ Uses a venturi injector to inject fertilizer into the irrigation in system. - Irrigation discharge-based fertigation: ▪ Fertilization dose is a function of irrigation discharge. ▪ More fertilizer is given when the discharge is large. • Benefits of fertigation: - Improves crop yields. - Increases water uses efficiency. - Reduces fertilizer costs. - Improves nutrient uptake.	
3.0	A presentation on feasibility analysis for the integration of the two systems was done by Dr Satyanto Krido Saptomo with the following main points:	
	a) The primary aim of this technology is to enhance efficiency, effectiveness, and consistency in water and nutrient delivery to plants, thereby potentially maximizing crop yields. b) Macrosystem of soil moisture and chemical monitoring system: • Infrastructure: The system utilizes a SCADA-based architecture, combining land-based sensors, actuators, and alert systems. Data is gathered, processed, and stored on local or cloud servers. • Human resources: Operators, technicians, and programmers are involved in the management, installation, security, and maintenance of the system. • Gender-responsive approach: The proposed system promotes gender equality by ensuring that both women and men have equal opportunities to access and benefit from the irrigation practices introduced by this new technology innovation.	
4.0	Discussion main points: a) Although drip irrigation needs high maintenance, it is the most practical and easy to use.	

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	b) The proposed system should also consider existing regulations. c) The review of technologies should also include those that have been applied in Indonesia.	
5.0	The meeting ended at 4.00 pm (Jakarta time).	