Title: Cultivating the Future: IoT-Driven Smart Agriculture Systems

1. English Abstract

This presentation examines the transition from intuition-based traditional farming to data-driven "Smart Agriculture" through the integration of **IoT, AI, and Blockchain**. It explores the "Internet of Living Things" (IoLT), where a mesh network of sensors monitors critical telemetry like VPD and N-P-K soil composition. The session highlights innovations in **Farm Robotics**, including autonomous weeding and multispectral aerial GIS , while detailing a roadmap for creating "Digital Twins" of farms for predictive feedback loops. Finally, it addresses the critical pillar of **Agri-Tech Cybersecurity**, emphasizing Zero Trust Architecture and encrypted telemetry to protect global food systems. By 2050, these BBIT systems will be essential for feeding 10 billion people using 70% less water.

2. Kiswahili (Muhtasari)

Wasilisho hili linachunguza mabadiliko kutoka kwa kilimo cha kienyeji kuelekea "Kilimo Mahiri" kinachoendeshwa na data kupitia uunganishaji wa **IoT, AI, na Blockchain**. Inajadili "Mtandao wa Vitu Hai" (IoLT), ambapo vitambuzi hufuatilia viwango vya N-P-K na unyevunyevu wa udongo. Kipindi hiki kinaangazia uvumbuzi katika **Uroboti wa Mashambani**, ikiwa ni pamoja na palizi ya kiotomatiki na picha za ndege zisizo na rubani (drones) , huku kikielezea mpango wa kuunda "Pacha wa Kidijitali" (Digital Twins) wa mashamba kwa ajili ya utabiri wa mavuno. Hatimaye, linaangazia **Usalama wa Mtandao wa Kilimo**, likisisitiza

Usanifu wa "Zero Trust" ili kulinda mifumo ya chakula duniani. Kufikia mwaka wa 2050, mifumo hii ya BBIT itakuwa muhimu kulisha watu bilioni 10 kwa kutumia maji kidogo kwa 70%.

3.Kikuyu (Abstract)

Mũtaratara ũyũ ũrathoma ũgarũrũku kuuma kũrĩ ũrĩmi wa ndũire wa gwĩthuurĩra nginya "Ũrĩmi Mũgĩ" wa gwĩthuurĩra na ũhoro kũgerera ũnyitanĩri wa IoT, AI, na Blockchain. Kũgerera "Internet of Living Things" (IoLT), netiwaki ya sensors nĩ ĩroraga ũhoro ũrĩa ũkoragwo thĩinĩ wa thĩ ta VPD na N-P-K. Kĩgomano kĩu nĩ kĩarĩrĩirie maũndũ merũ ma ũtuĩria wa maroboti ma ũrĩmi, o hamwe na kũhanda mĩtĩ na kũhũthĩra GIS cia rĩera-inĩ, na gĩgĩtaarĩria njĩra ya gũthondeka "Mĩhĩrĩga ya Digito" ya mĩgũnda ya ũrĩmi ĩrĩa ĩngĩteithia kũrĩha mathirĩ. Macũngĩrĩro-inĩ, nĩ ĩtaarĩirie maũndũ ma bata megiĩ ũgitĩri wa thekinolonjĩ cia ũrĩmi, ĩgĩtĩtĩrithia ũhoro wa kũhũthĩra tekinolonjĩ cia ũgitĩri wa thitima na kũhũthĩra tekinolonjĩ cia kũbanga ũhoro na njĩra ya thimũ nĩguo kũgĩe na ũgitĩri wa irio thĩinĩ wa thĩ. Gũkinyĩria mwaka wa 2050, indo icio cia BBIT nĩ igũkorũo irĩ cia bata mũno harĩ kũhe andũ bilioni 10 irio na njĩra ya kũhũthĩra maĩ manyihĩte na icunjĩ 70 harĩ 100.