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INSECT-PEST DIAGNOSIS AND FORECASTING FOR ASEAN PADDY FIELDS



ASEAN IVO Forum 2018

Presented by:

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GROUP MEMBERS

Malaysia

Indonesia

Japan

Strength

- ✓ Smart Farming Technology Research Center (SFTRC)
- ✓ Research Centre of Excellence for Wireless and Photonics Network (WiPNET)
- ✓ Integrated Pest management Experts, Universiti Putra Malaysia (UPM)



- ✓ Asian Federation for Information Technology in Agriculture
- ✓ Agricultural Informatics Experts, Bogor Agricultural University (IPB)



- ✓ Agricultural and Environmental Engineering Experts, Faculty of Life and Environmental Sciences, University of Tsukuba



PROBLEM STATEMENT

- Farmers lose an estimated average of 37% of their rice crop to pests and diseases every year.
- Many of these pest has developed resistance to many pesticides.
- Pest counting were conducted by the officers manually, which are usually time consuming and required experts to determine the type of pest.





PROBLEM STATEMENT

- Pest population level may also be the resultant of weather parameters of several preceding weeks or months.
- There is a trend farmers uses social media platform but sometimes information given might not be accurate.
- Non DSS available in local languages make it hard for farmers to adopt.



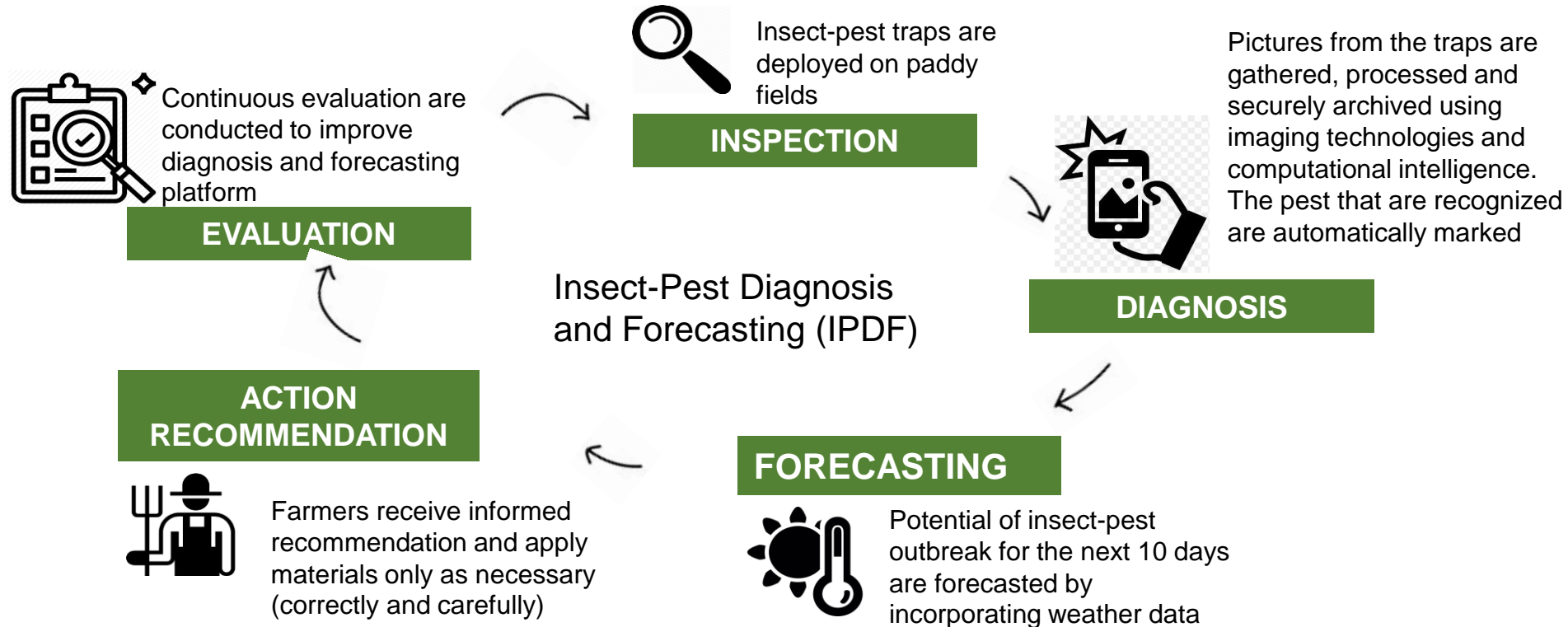


OBJECTIVES

Development of insect-pest diagnosis and forecasting (IPDF) mobile app, consist of two important menu: **diagnosis system** and **forecasting system**. The specific objectives of this study are:

- To develop a **diagnosis algorithm** of the insect-pest population on trap using imaging technologies and computational intelligence
- To incorporate **weather data in forecasting** the potential of insect-pest outbreak
- To translate IPDF system into a **mobile app** in local languages and assess the viability of the prototype

Solution/Approach





METHODOLOGY

Phases 1: Development of diagnosis algorithm for pest marking and counting (UPM)

- Insect-pest traps are deployed on experimental paddy fields at Sawah Sempadan, Tanjung Karang in the Integrated Agriculture Development Area (IADA), Barat Laut, Malaysia

Phases 2: Development of pest outbreak forecasting algorithm using weather data (University of Tsukuba)

- The weather data is collected from record book of local meteorological department or from the weather station installed at experimental sites
- Koshi Hikari rice production zone.



METHODOLOGY

Phases 3: Translating IPDF platform into mobile app (UPM, IPB)

- The app enable users to take images on insect-pest traps at their paddy fields, upload the images and receive instant diagnosis and informed recommendation of required actions to manage the pest in the fields

Phases 4: Implementation of IPDF platform at Block J, Sawah Sempadan, Tanjung Karang in Malaysia and along Pantura (north coastal territory) paddy fields in Jawa Island Indonesia (UPM, IPB, University of Tsukuba)

- Training and workshop will be conducted for IPDF usage trial
- Assessment of IPDF platform viability is conducted through uses cases, trials, user interviews and questionnaires



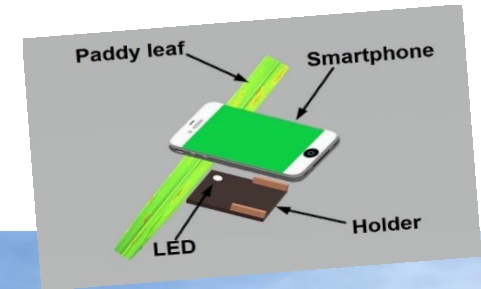
Leveraged Resources and Participants

	Malaysia	Indonesia	Japan
Roles	<ul style="list-style-type: none">➤ Development of diagnosis algorithm using imaging technologies and computational	<ul style="list-style-type: none">➤ Translation of insect-pest diagnosis and forecasting into mobile Apps	<ul style="list-style-type: none">➤ Development of model in forecasting the potential of insect-pest outbreak
	<ul style="list-style-type: none">➤ Deployment and viability study of IPDF system at local paddy field	<ul style="list-style-type: none">➤ Deployment and viability study of IPDF system at local paddy field	<ul style="list-style-type: none">➤ Consultation for IPDF system deployment for Malaysia and Indonesia



Members Expertise

- **SFTRC**
 - Involve in smart farming researches since 2006 and awakened ICT center called Smart Farming Community Center at Sawah Sepadan Malaysia, Urban Farming, etc
- **WIPNET**
 - Since 2010 involved with contract research on WSN-related projects: agricultural-precision, ICT infrastructure & monitoring, WSN standard development.
- **ITAFOS**
 - Since 2006: focusing on climate smart crop production
- **Bioinformatics Engineering Laboratory, IPB**
 - Center for research for engineering applications in agriculture
- **Agricultural and Environmental Engineering, Tsukuba**
 - Focuses mainly on human-environmental interactions, primarily in the field of agriculture, agricultural technologies, food science and environmental management



Facilities, Equipment and other Resources



- Existing Facilities

- Research laboratories at UPM, IPB, Tsukuba
- Meeting venues at UPM, IPB and Tsukuba
- Prior engagement with farmers corporation at Sawah Sepadan, Selangor; Pantura and Koshi Hikari.

- Equipment

- PC/computing hardware and software from UPM, IPB, Tsukuba
- Researchers from UPM, IPB, Tsukuba including support staff relevant to this project
- Smart Farming Community Center at Sawah Sepadan



EXPECTED OUTPUT

Technological Innovation

- Enhancing ICT technological advancement for agriculture;
- Enhancing IoT adoption and ecosystem development;
- Strengthening the local SMEs' capabilities to build innovative IoT solutions and services in agriculture;
- Empowering farmers

Social Innovation

- Conducting innovation programs for farming communities such as training/workshop and ICT-related entrepreneurship events.



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Terima Kasih | *Thank You / Arigato*

