

APPLICATION OF RADIO FREQUENCY IDENTIFICATION TECHNOLOGY IN AGRICULTURE: A CASE WITH DRAGON FRUIT

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INTRODUCTION

Global and local concerns about food safety are turning food traceability into a trade requirement. Typically, a Food Traceability Scheme (FTS) discloses information about food production and its distribution process. A reliable FTS will increase consumer trust in the quality and safety of farm produce. In Malaysia, dragon fruit is a profitable commodity that is growing in export value. Hence, dragon fruit is an excellent candidate for FTS solution development.

METHODOLOGY

We performed a pilot trial to establish an agronomic information storage and retrieval system using Radio Frequency Identification (RFID) technology. The system consist of the following components: i) RFID tags (laminated with polyethylene plastic) that carry unique identification numbers, ii) RFID reader, iii) notebook computer, and iv) customized RFID software.

Each observation point, which comprised a cluster of four dragon fruit plants, was fitted with an RFID tag. Agronomic information such as crop geo-referenced location, soil physical and chemical attributes, fertilizer input rate, flowering date, harvesting date, and fruit quality were collected using in-situ recordings and laboratory analyses.

RESULTS AND DISCUSSION

The customized datasheet is given in Figure 1. The agronomic information was stored into a customized database, built using VB.NET, in a notebook computer. The notebook computer was connected via USB to an RFID reader. The RFID reader functions as a communicator between the RFID tag and the notebook computer. As such, the agronomic information corresponding to a particular observation point (i.e. cluster of four plants) can be stored into the designated RFID tag. Agronomic information stored on each tag can later be retrieved on the notebook computer in real time using the RFID reader. The database can be updated or expanded to include other necessary crop production data.

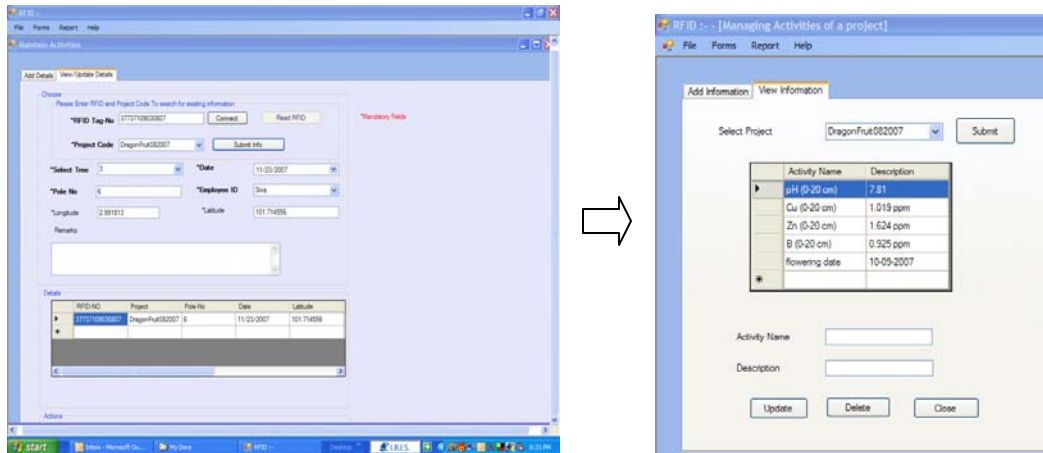


Figure 1: Customized datasheet for dragon fruit production data

This system allows the farm operator to monitor crop progress in real time and initiate appropriate intervention strategies. Importantly, it enables site-specific crop and soil management, a key component of Precision Agriculture.

CONCLUSION

This work demonstrates the ability to store and retrieve agronomic information using RFID technology. Further work on expanding the information set and refining the hardware are ongoing.