

## **A controlling and monitoring tool for fertilizer usage for paddy cultivation: “PADDYPAL”**

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Paddy cultivation depends on fertilizers to obtain high yield. Thus, the demand for fertilizers has been increased. It is required to choose suitable fertilizers in correct quantities to get maximum yield while minimizing harmful effects. Sri Lankan farmers face difficulties when selecting proper fertilizers and quantities based on environmental conditions of paddy field (soil and climate) and paddy variety. Agricultural Instructors (AIs) are responsible to give advices to determine correct fertilizers. But, AIs face many difficulties when analyzing individual farms with various conditions (pH value, soil moisture, nitrogen content of soil). It is also difficult to visit each farm because each AI is assigned to many farms. Some studies attempt to find a solution to determine soil nitrogen level using leaf color code. However, it is not completely correct to determine required fertilizer because leaf color depends not on only soil nitrogen level but also on other factors such as insect and disease attacks. As a solution, we have developed mobile-based and web-based applications to help farmers to make decisions by themselves. Mobile application provides required fertilizers in correct quantities by considering both leaf color code and environmental factors. Through this application farmers are able to view fertilization schedule in terms of tentative dates of applying fertilizers (Urea, TSP, MOP) and relevant amounts with respect to planting dates. Further, it displays the accumulative composition of Urea, TSP, MOP used for the cultivation and total cost for fertilizers. It also facilitates real time communication. Web application is mainly used for decision marking by AIs and other agriculture authorities. By analyzing real time data collected through mobile application, decision makers can take important decisions about paddy production, fertilizer usage, cost for fertilizers based on districts, provinces, or island wide. Both applications were evaluated using questionnaires. More than 80% of participants satisfied with core functionalities of both applications. The work reported here is an attempt towards developing a complete fertilization schedule for paddy cultivation in Sri Lanka.

**Keywords:** mobile-based applications, web-based applications, management dashboard, applying fertilizer

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