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Knowledge Sharing and Capacity Building Workshops for Precision Agriculture using UAVs techniques in the South and Southeast Asian Region

Proponent's Information

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Project Information

Thematic Areas	CC&V, RUSD, SPL
Topic	Smart agriculture (particularly resource allocation, livestock, food, technology transfer, innovation, extension, etc.)
Relevant SDGs	
Duration	2 years
APN Funding Request	USD 80,000 (total) USD 40,000 (year 1), USD 40,000 (year 2)
Other Funding Secured	USD 31,000 (total) USD 10,000 (cash), USD 21,000 (in-kind)
Total Combined Funding	USD 111,000
Countries Involved	Bangladesh, India, Japan, Malaysia, Indonesia, Viet Nam

Abstract

Developing countries in South and Southeast Asia primarily consist of agrarian economies. However, the agriculture sector in this region is vulnerable to climate change and faces increased water scarcity, soil degradation and water pollution, partially due to conventional farming techniques. A significant transformation is needed to (a) achieve food security, (b) meet the projected 70% increase in market demand of agriculture production by 2050, and (c) respond to climate change. Precision Agriculture (PA) would be an appropriate strategy to achieve such a transformation. This project aims to promote PA techniques in proposed countries, where paddy is a common crop. PA techniques, which include technologies like Unmanned Aerial Vehicles (UAVs), can help to improve agricultural productivity through the management of fertilizers and irrigation, pests/diseases control, and yield estimation. Specifically, UAVs provide low-cost, high spatio-temporal data for users to treat a field as a heterogeneous entity and make appropriate interventions to increase productivity. The aim of the proposed project is to (1) develop the technical capacity of multiple stakeholders (Farming Industry-Academia-Government and farming practitioners) to

use UAVs for PA; (2) improve the sustainability of paddy cultivation using UAV-based information and decision making. This project will transfer the knowledge about common challenges and effective solutions and lead to best practices for PA using UAVs.

Major Collaborators' Information

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1. Introduction

1.1 Description of the Proposed Project

With the need to feed a global population by 2050, there is a need to implement Precision Agriculture (PA) techniques (Ehrlich et al., 2015) because conventional agriculture practices are vulnerable to climate change and have noticed many instances of overuse, underuse and misuse of fertilizers or water. PA techniques help farmers to make their enterprises more profitable and sustainable by improving the control of input resources such as fertilizers or water. The techniques provide spatial information to reduce uncertainty using remote and on-field sensors that allow farmers to manage the field as a heterogeneous entity to improve productivity. Recently, UAVs or drones have gained popularity in PA, as they can be used to monitor crop conditions at a high spatial resolution (compared to satellite imagery) and at low cost (Mogili and Deepak, 2018).

Despite their widespread implementation in developed countries, PA techniques have failed to gain traction in South and Southeast Asia, where they could significantly improve agricultural productivity and address some of the pertinent environmental issues facing the region's agriculture sector. This happened because of a variety of issues related to (1) lack of knowledge among farmers and technical complexity of PA systems, (2) historically high implementation costs of PA techniques, (3) insufficient policies that stimulated industry developments, and simplified the use of PA equipment like commercial UAVs. The slow adoption of these technologies was thus multi-faceted and was influenced by different stakeholders.

To promote the use of UAVs as part of PA in this region, it's necessary to actively engage various stakeholders, including farmers and local government. There is a need to generate awareness and develop technical expertise in UAVs, so that these stakeholders can collaboratively develop locally suited solutions. At the same time, the government should be provided with a knowledge framework of local challenges and