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Chemical spraying using unmanned aerial vehicle technology in wetland rice cultivation in Malaysia

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Mechanisation Index (or MI) of 0.59 for Wetland Rice Cultivation in Malaysia can be considered very low as compared to other major cereal crops in most developed countries. Chemical spraying (MI of 0.19) with fertilizing and seeding (MI of 0.17 and 0.25, respectively) have been prioritized as the three critical field operations that need to be mechanized. Currently, knapsack power blower or knapsack mist blower were used by the service providers to the farmers in doing the seeding, fertilizing and chemical spraying operations. Being, manually operated, these modes of operation give low effective field capacities (0.72 to 1.25 ha/hr) and low work qualities in accordance to Good Agriculture Practices (GAP). Unmanned Aerial Vehicle (UAV) technology for chemical spraying is now getting much interest among farmers in the Rice Scheme Areas. Until December 2018, UAV has been used for 4 rice planting seasons in the Muda Agricultural Development Authority (MADA) Rice Scheme area to cover the spraying processes of herbicide, pesticide and foliar. Although the utilization is still in the earlier stage, it is optimistic that the UAV technology will be the best option for chemical spraying operation for rice. This paper describes on the pioneer R&D work by the research team of Universiti Putra Malaysia (UPM) in building an indoor test facility and formulating the test standard for testing UAV for agricultural field operations. Also, works by the team in formulating the spray chemical for optimum spray pattern and minimum spray drift that is specifically for UAV is presented in this paper.

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