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The Use of Unmanned Aerial Vehicle (UAV) in Pesticide Application and Its Future

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Pesticide application is one of the most important techniques for crop protection in agriculture. Pesticides should be applied with proper dosage, time, place and precisely in order for efficient spraying. Physical damages occur such as soil compaction in field, branch braking, and crop deformations due to increasing of field traffic with sprayers. To minimize these problems, manned aircraft applications are used. However, in this application, the flights should be made in wide and unobstacle fields. Carelessness might cause airworthiness problems and end up with fatal accidents. Recently, to solve these problems, Unmanned Aerial Vehicles (UAV) are used in pesticide application. UAVs are categorized as fixed-wings, rotary-wings and small aircrafts. Each classes have their own advantages and disadvantages. For instance, while fixed-wings UAVs fly long and fast, rotary wings UAVs hover. UAVs have first been used for the purpose of surveying in agricultural land. UAVs can be used even in small and obstructed fields. They also have high maneuverability even in narrow turns. Moreover, UAVs do not need strips, big spraying equipments and spare parts. In the pesticide applications via UAVs, precision spraying is applied and non-target organisms are protected from pesticides. For these reasons, UAVs are advantegous over sprayers and manned aircrafts.

In Japan, the number of farms in which rice production is applied is about 2.0 millions. The farms have approximately 0.66 ha rice field. In these area, UAVs are being used for crop protection. UAVs are extensively used due to the fact that the rice farming is made in water and that the fields are small. The pesticide application of agricultural crops which are grown in sloping land is difficult. Studies aimed at usage of UAVs are carried out in such agricultural products. In these researches, parameters such as flight speed, swath, work efficiency, droplet distribution etc are investigated. Researches on usage of UAVs for weed control are also being made in Australia.

In 2006, aerial pesticide applications in agricultural land in Turkey are banned. In Turkey, 35% of 27 million ha land is slopy and UAVs can be used in such areas. So, the start of UAVs in Turkey might be started to be used in agricultural crops in slopy land. With the start of UAvs usage, authorised operators will be assigned, the number of trained labour will increase and therefore, unemployment will decrease in rural.