

# A Study on the Agricultural Use of Drones: Focusing on Jeonbuk State

Yeong-Ho Kang\* Young-seok Yu\* Hyo-Jin Kim\* Yu-Na Choi\*  
Dae-Ho Jo\* Seung-Hwa Yu\*\* Chun Gu Lee\*\* Kyoung-Won Seo\*  
\*Jeonbuk State Agricultural Research and Extension Services, Iksan, Korea  
\*\*National Institute of Agricultural Sciences, RDA, Jeonju, Korea  
e-mail:dudgh0414@korea.kr

## 농업용드론 연구현황:전북특별자치도를 중심으로

강영호\* 유명석\* 김효진\* 최유나\* 조대호\* 유승화\*\* 이춘구\*\* 서경원\*  
\*전북특별자치도농업기술원  
\*\*농촌진흥청 국립농업과학원

Recently, the rapid development of digital and intelligent information technologies such as artificial intelligence, big data, digital twins, and drones is accelerating the era of the 4th industrial revolution. In the agricultural sector, attempts to integrate advanced 4th industrial revolution technologies are steadily increasing. The Jeonbuk State Agricultural Research and Extension Services has been conducting various studies utilizing drones among these core technologies since 2017. First, in order to optimize agricultural work according to the spray nozzle of the pest control drone, the pest control performance and effect according to the spray nozzle of the agricultural drone during rice cultivation were analyzed. The analysis results were derived according to the droplet size of each nozzle. The AI series nozzle showed an average coverage rate of about 1.7 times higher than the XR series nozzle in crops. In addition, the results of the pest and disease outbreak investigation showed that the AI series nozzle showed an improved pest control effect of about 18.3% respectively, compared to the XR series nozzle. Second, the growth characteristics of rice aerial direct seeding by the structure of the seeder attached to the agricultural drone were investigated. The seeding uniformity (CV) was investigated to be 4.2% higher and more uniform for the direct injection type seeder than for the disc rotary type sprayer. The rice yield per 10a was investigated to be 605 kg for the direct injection type precision seeder and 564 kg for the disc rotary type sprayer. Third, a study was conducted to estimate the crop conditions for major rice varieties using drone image data. The vegetation index and ground survey data for each rice growth stage were collected using drones and multispectral sensors. The collected time series vegetation index data NDRE and the rice biomass, yield, and protein content investigated on the ground were analyzed through regression analysis, and a significant correlation was derived with a maximum determination coefficient (R<sup>2</sup>) of 0.92 or higher. In addition, the rice time series growth database for each nitrogen treatment was advanced to produce vegetation index data according to the nutrient status of the rice. In the future, Jeonbuk State is expected to contribute to the realization of sustainable agriculture through the advancement of agricultural RD that incorporates the 4th industrial revolution technology such as drones.