

## Estimation trial for rice production by simulation model with unmanned air vehicle (UAV) in Sendai, Japan

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### Abstract

We developed a rice simulation model for remote-sensing (SIMRIW-RS, Homma et al., 2007) to evaluate rice production and management on a regional scale. Here, we reports its application trial to estimate rice production in farmers' fields in Sendai, Japan. The remote-sensing data for the application was periodically obtained by multispectral camera (RGB + NIR and RedEdge) attached with unmanned air vehicle (UAV). The airborne images was 8 cm in resolution which was attained by the flight at an altitude of 115 m. The remote-sensing data was relatively corresponded with leaf area index (LAI) of rice and its spatial and temporal variation, although the correspondences had some errors due to locational inaccuracy. Calibration of the simulation model depended on the first two remote-sensing data (obtained around one month after transplanting and panicle initiation) well predicted rice growth evaluated by the third remote-sensing data. The parameters obtained through the calibration may reflect soil fertility, and will be utilized for nutritional management. Although estimation accuracy has still needed to be improved, the rice yield was also well estimated. These results recommended further data accumulation and more accurate locational identification to improve the estimation accuracy.

Keywords: leaf area index, multispectral camera, rice, remote-sensing, yield.

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