

Evaluation of Drainage Performance by Reduction of Excess Soil Moisture on Corn Fields Converted from Rice Paddy Using Satellite Remote Sensing

著者	SAITO Masaya, YONEZAWA Chinatsu, MATSUNAMI Toshinori, KANNO Tsutomu, UCHINO Hiroshi
journal or publication title	Journal of Integrated Field Science
volume	17
page range	44-44
year	2020-03
URL	http://hdl.handle.net/10097/00128810

P-7. Evaluation of Drainage Performance by Reduction of Excess Soil Moisture on Corn Fields Converted from Rice Paddy Using Satellite Remote Sensing

Masaya SAITO¹, Chinatsu YONEZAWA², Toshinori MATSUNAMI³, Tsutomu KANNO³
and Hiroshi UCHINO³

¹Faculty of Agriculture, Tohoku University

²Graduate School of Agricultural Science, Tohoku University

³National Agriculture and Food Research Organization

Satellite remote sensing data observing three corn fields which attempted different methods of reducing soil-moisture damage were analyzed in this study. Test fields were located in Shinchi Town, Fukushima prefecture. The near-infrared band was extracted from Sentinel-2 satellite data obtained on 9 March, 13 April, 18 April, and 23 April in 2019 to estimate soil moisture. These data were acquired one to two days after the heavy rainfalls. GeoEye-1 satellite images obtained on 29 July, corn growing season, were used for calculation of Normalized Difference Vegetation Index (NDVI). Comparison between the near-infrared band reflectance by Sentinel-2 and the NDVI from GeoEye-1, a relationship between the estimated drainage performance and crop growth was investigated. In addition, the plant height and SPAD values obtained by field surveys and positions of the survey points were used for the analysis. As the result, the near-infrared band reflectance shows the effectiveness of the ridge-farm method and cut-drain method to reduce soil-moisture damage. The NDVI on crop growing stage shows a response to the observed drainage performance in the same way as the actual plant height and SPAD value. In some cases, the NDVI disagrees with the plant height and the SPAD value. However, improvement of the analysis method, as the change of a calculating buffer size could solve this disagreement. Calculation of other types of vegetation indices also could solve the discrepancy. The result of this study shows the usefulness of satellite remote sensing data for the evaluation of the soil drainage performance and the crop growth for the response to the wet damage control measures.