[O24] Smart Farming (Remote Sensing, ITC)

*Sponsored by Asian Association of Agricultural Colleges and Universities (AAACU)
Chair: Yoshio Inoue (The University of Tokyo, Japan)
Chair: Sutkhet Nakasathien (Kasetsart University, Thailand)
Chair: Hiroshi Ehara (Nagoya University, Japan)
Fri. Sep 10, 2021 9:45 AM - 11:45 AM Room 2 (Oral) (Farming System)

10:05 AM - 10:25 AM

[O24-02]Satellite- and Drone-Based Remote Sensing of Crops and Soils for Smart Farming - Algorithms and Applications

(Invited Speaker)
○Yoshio Inoue (Graduate School of Engineering, The University of Tokyo, Japan)

Smart farming (SF) is an intelligent agricultural management approach based on the advances in sensing, robotic, and information technologies. This paper discusses the background needs for SF and the role of remote sensing and geoinformation. Recent advances in remote sensing technologies for diagnostic information of crops and soils are reviewed based on our leading case studies. We have developed the operational workflow to create diagnostic information on crops and soils from high-resolution satellite imagery. The constellation of micro-satellites allows the timely or frequent observations at high spatial resolution (～5 m). Results showed that the application of high-resolution satellite sensors would enhance the strategic decision making in SF in regional scales. On the other hand, we have developed an original drone-based remote sensing system equipped with visible, multispectral, and thermal sensors. The state-of-the-art algorithms derived from hyperspectral datasets were successfully applied to derive the diagnostic information on crops and soils (crop growth, water stress, soil fertility, weed, disease, lodging and 3D topography). The linkage between the remotely-sensed information and drone-based application of seeds, pesticides, fertilizers would greatly enhance the efficiency of labor and material applications. Drone-based remote sensing would allow low-cost, super-resolution, and flexible observations of crops and soils in individual farm scales.