DEVELOPMENT OF NEW WATER INDEX WITH MODIS AND AMSR-E FOR GLOBAL RICE PADDY FIELD MAPPING

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Abstract: Rice is one of the most consumed grains in the world and the important factor for human life. Since most of the rice is cultivated in paddy field, monitoring rice paddy field is necessary for damage prediction or measurement against abnormal weather condition. In previous research, few outcomes are obtained about the rice paddy field mapping in a global scale, although the scale of drought or abnormal weather may expand a state or country level. The objective of this research is to make a 500m resolution rice paddy field mapping in a global scale. To distinguish rice paddy field among other cropland, detecting the water covered sign in paddy field before rice planting is essential, but especially in rainy season of monsoon Asia use of optical sensor such as MODIS is limited by clouds. So we use Land Surface Water Index (LSWC) from AMSR-E which is relatively cloud free besides Normalized Difference Water Index (NDVI) from MODIS to detect the water covered sign. Firstly, three datasets such as 500m-resolution NDVI, 10km-resolution LSWC, and 500m-resolution NDVI are prepared. Secondly, a 500m-resolution cloud free water index is newly made by proportionally distributing LSWC value with NDVI value with unmixing method. Thirdly, by applying Fourier analysis to this new water index and NDVI datasets, we capture the rice paddy field phenology that NDVI increases as rice grow after the water index increase as paddy field is flooded before planting. Finally, 500m-resolution rice paddy field mapping and crop calendar of rice paddy field is made. Thanks to the result of our research, more precise prediction about the yearly rice production or water-damand for rice paddy field in a certain area.