



Tropentag, September 9-11, 2020, virtual conference

“Food and nutrition security and its resilience
to global crises”

Water Availability and its Interaction with Cropping Intensity Patterns of Rice-Based Systems in Southeast Asia

CHRISTIN HECKEL, CARLOS ANGULO

University of Bonn, Inst. Crop Sci. and Res. Conserv. (INRES) - Plant Nutrition, Germany

Abstract

Agricultural changes in cultivation patterns of rice-based systems in Southeast Asia have been investigated in the frame of the BMBF funded project “RICH-3P” coordinated by the University of Bonn. Six sites were considered, two in each of the listed countries: Cambodia, Myanmar and the Philippines. Alongside other changes, a shift from (rainy season) single rice cultivation to double rice cultivation (rainy and dry season) per year was observed at five out of six locations. For example, in the Central Dry Zone in Meiktila-Myanmar, 108 farmers (out of 160 respondents) indicated that they were producing rice twice a year in the present (2018), whereas about 20 years ago none of them were cultivating rice in both seasons. This development was made possible by the improved access to water in the respective regions. The present study aims to evaluate the external pressures and the (farming system) internal drivers leading to the change of single to double rice cropping. On the one hand, factors such as the improvement or installation of public irrigation infrastructure, cooperative work on municipal irrigation systems, advisory campaigns and assistance in the implementation of pumps, etc. are taken into consideration to explain the increase in water availability for farmers. On the other hand, we are investigating the thresholds of water quantity and availability that would lead farmers to definitely establish a second rice crop. For these purposes, apart from the evaluation of secondary sources, our work focuses on the acquisition and evaluation of optical satellite data (Landsat, Sentinel-2) from 1990 onwards in the corresponding study areas. A field-wise evaluation (polygon- and pixel-wise) of spatial and temporal water cover patterns during the flooding and transplanting status in the study areas will serve as proxy for the assessment of water availability and the determination of thresholds that induce farmers to shift from single to double rice cropping in the regions. The current state of research is taken into account and already implemented algorithms for the recognition of rice fields are applied using the data basis of the project, which also includes georeferenced boundaries of the farmers fields.

Keywords: Agricultural change, cropping patterns, irrigation, remote sensing, rice, water