Using soil plant analysis development chlorophyll meter for two growth stages to assess grain yield of Malaysian rice (Oryza sativa)

ABSTRACT

Problem statement: Proper yield management in rice influences grain quality and quantity. Nitrogen site-specific management is also effective on final product of crops because excessive nitrogen application at any growth stage can reduce yield and increase disease incidence. In contrast, suboptimal nitrogen levels at discrete growth stages may substantially reduce plant productivity. The nitrogen status at specific growth stages may be used for estimating supplemental nitrogen requirements and yield potential. The SPAD chlorophyll meter is a quick and non-destructive tool used for directly measuring leaf chlorophyll and indirectly assessing the proportional parameter of leaf, plant nitrogen status and finally, grain yield. Approach: Describing within-field variability in a typical Malaysian paddy field was conducted to show the temporal variability of SPAD readings and also grain yield. Furthermore, the study aimed to introduce the rice growth stage which SPAD readings show higher relationship with grain yield. SPAD readings data was collected at two different growth stages (55 DAT and 80 DAT) using a Minolta SPAD 502. Grain yield was then collected at the end of the season to compare results with SPAD values. Results: Analysis of variance, variogram and kriging were conducted to determine the variability of parameters and also their relationship. Conclusion: Variability maps of the aforementioned parameters were generated. Increasing of SPAD values with growth stage could be observed in this study. SPAD readings taken at 55 DAT had a better relationship to grain yield than those taken at 80 DAT; therefore assessment of grain yield status is better to be done at 55 DAT.

Keyword: Chlorophyll meter; Days After Transplanting (DAT); Grain yield; Integrated Agricultural Development Area (IADA); Paddy field; Site-specific management; Spatial variability; Statistical Package for Social Science (SPSS); Temporal variability