Spatial variability of irrigation water percolation rates and its relation to rice productivity.

Abstract

Problem statement: Study on spatial variability of vertical saturated hydraulic conductivity or percolation loss was conducted within a plot of an area of 1.2 ha paddy plot to find out the relationship between percolation rate and rice productivity. A paddy soil condition that permits percolation rate of 10-20 mm irrigation water day\(^{-1}\) was recommended in order to get high yield of rice. This value is very high when compared to typical values from 1-4 mm day\(^{-1}\) for the Malaysian engineers practiced in paddy fields. Approach: This study presented results of a study that relate the distribution of percolation rates with respect to rice yield productivity. Soil samples at 36 sampling points were collected. DGPS was used to locate the sampling points and then rice yields of the same point were collected. The relationship was determined by statistical correlation factor. Kriging method was used to map the distribution of percolation and yield. Results: The results of the study showed that percolation loss was very low and varied even within a small area. Spatial variability maps show that the area of high percolation rates is the same area that produced high yield. Even though high yields can be obtained from the areas of high percolation rate, it may not be the optimum rate. Conclusion: Higher yield within the area of high percolation may be due to less toxic since it is easily be drained out.

Keyword: Hardpan layer; Kriging; Paddy soils; Soil water movement.