Simulation of mungbean productivity during the fallow phase on rainfed rice in Central Java, Indonesia

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Abstract

Legumes such as mungbean and soybean are generally grown to intensify the fallow phase in rainfed rice-based cropping system in Central Java. However information on how the processes and the potential for modification of legumes performance is limited. This study was aimed to evaluate the productivity of mungbean at different management practices across various agro-climatic conditions on a long-term scale during the fallow phase on rainfed rice in Central Java, Indonesia based on simulation. Four sites in Central Java (Jakenan, Brebes, Kebumen and Sukoharjo) were selected representing various agro-climatic conditions. Each study site was then examined using Agricultural Production System Simulator (APSIM) in response to sowing times, residue treatments, soil types, plant available water levels, and climate data from 1983 to 2013. The probability of mungbean yield for each site was calculated using cumulative distribution functions. The data were analyzed using two-way analysis of variance (ANOVA) and significant effect continued with Duncan's multiple range test ($p<0.05$). The results of this scenario analysis was firstly reported and indicated that mungbean yield was influenced by plant available water levels (10 to 70 mm) and sowing time (early, medium and late sowing time). The highest mungbean yield was achieved at high level of plant available water (70 mm) and late sowing time in August. Further, simulated mungbean yield resulted around 1000 to 1200 kg ha^{-1} in Brebes, Kebumen and Sukoharjo, whereas in Jakenan mungbean yielded less than 1000 kg ha^{-1}. The residue treatments however showed no effect on mungbean yield in this system. Based on these results, initial soil water and sowing dates are the prominent parameters for the successful of mungbean performance during the fallow phase in rainfed rice-based cropping system in Central Java, Indonesia.



Biography

Elsa Rakhmi Dewi has completed her PhD from University of Goettingen, Germany. Presently, she is a researcher who works at Indonesian Agroclimate and Hydrology Research Institute. She is interested and has experience in agronomy, agro-climatology, and crop modeling.

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