

USE OF FERTILIZER PHOSPHORUS AT SUFFICIENCY LEVEL TO SUSTAIN SOIL FERTILITY WITHOUT ENVIRONMENTAL REPERCUSSIONS

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ABSTRACT

Ignoring or under-estimating phosphorus (P) in a fertilizer programme may decline P supplying capacity of a soil. While continuous application without caring soil test P may be a waste in economical terms as soil P levels are varied extensively. Build up of soil P level at higher plateau and its excavation, both may raise environmental repercussions. Therefore, a wise use of P is required to sustain its level in soil as well as economical yield. To accomplish this task, a comparative field study was conducted to evaluate a simple fertilizer prediction system by comparing with conventional blind P application. The study comprised of crop yield monitoring and P nutrient budgeting. Two system's P rates based on soil test P sufficiency levels of 14 and 21 mg kg⁻¹ target were variable in each crop season and were computed following equation, $P_f = (P_{st} - P_{et}) F_p$. These were compared to conventional continuous P rate i.e. 44 kg ha⁻¹. The symbols in equation represent, P fertilizer requirement, soil test P sufficiency level (to achieve target yield), soil test P existing level and P fixation factor (reciprocal of P recovered of that added). Yield (grain and straw) differences were non-significant in all five harvests of study period (1993-96) though P fertilizer applications were ranged from nominal (0.5 – 8 kg ha⁻¹) to a maximum of 86 kg ha⁻¹ in system's variable treatments. Soil test P remained at the lowest at each harvest in low P applied treatment. The P uptake ranged from 20 to 22 kg ha⁻¹. The sufficiency soil test P level of 21 mg kg⁻¹ (required to produce 99% relative yield) was found suitable to sustain soil fertility without environmental repercussions alongside economic aspects.