

Stagnation in grain production in the developing world has contributed to the current worldwide food crisis. The principle objective of this study was to evaluate the possibility of improving grain production in the tropical humid region by chickpea (*Cicer arietinum* L.) in rotation with wheat (*Triticum aestivum* L.). A 3-yr field experiment in Kenya included four short-rain-season (SRS) management practices (chickpea green manure [GM], mature chickpea grain crop [CG], tilled fallow [TF], and weedy fallow [WF]), and inorganic N fertilizer at three rates (0, 30, and 60 kg N ha⁻¹). The chickpea treatments decreased SRS water storage at wheat planting by 14 to 16% compared with TF, but this did not affect yield of subsequent wheat. The GM accumulated 77 kg N ha⁻¹ yr⁻¹, compared with 42 kg N ha⁻¹ yr⁻¹ for the CG. The chickpea treatments increased soil available N by 19% and N uptake by wheat by 39% compared with the fallow methods. Inorganic N applications of 60 kg N ha⁻¹ increased soil-available N at 30 d after sowing by 21.4% and N uptake by wheat by 47%. The CG and GM increased the average annual wheat grain yield by 14 and 31% compared with the WF and TF. Inorganic N applications of 30 and 60 kg N ha⁻¹ increased wheat grain yield by 20 and 7%, respectively. The combination of GM with 30 kg N ha⁻¹ gave the highest wheat grain yield, but CG with 30 kg N ha⁻¹ fertilizer was the most profitable practice.