

## ABSTRACT

Depletion of nitrogen and phosphorus in terraced hilly areas of Rwanda has lowered maize (*Zea mays* L.) production. Trials were carried out in 2017 and 2018 in four-year-old-terraced Lixisols and Acrisols of medium and high altitudes to determine effect of nitrogen and phosphorus fertilizer application rates on maize yields. A factorial arrangement of four levels of nitrogen (0, 60, 120 and 180 kg N ha<sup>-1</sup>) and phosphorus (0, 40, 80 and 120 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>) in a randomized complete block design with 3 replications, was used. Results showed that combinations of 120 - 180 kg N ha<sup>-1</sup> and 80 - 120 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> resulted in significantly ( $P < 0.05$ ) higher increases in plant height (45 – 60 % and 56 – 70 % over the control), stem collar diameter (63 – 74 % and 43 % over the control) and grain yields (3 times over the control; i.e. 6.40 – 6.46 t ha<sup>-1</sup> and 6.02 - 6.12 t ha<sup>-1</sup>) in medium and high altitude sites. The optimum fertilizer rates are 176.6 kg N ha<sup>-1</sup> and 96.2 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> in terraced Lixisols of medium altitude area. Land use needs to adjust fertilizer application to these optimum rates for enhanced maize yields in this area and other regions with similar agro-ecological characteristics. Further studies on integrated effects of N and P fertilizers are recommended.