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Transitions to Sustainable Management of Phosphorus in Brazilian Agriculture

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Brazil's large land base is important for global food security but its high dependence on inorganic phosphorus (P) fertilizer for crop production is not a sustainable use of this finite resource. Nowadays Brazilian Agriculture is responsible for 12% (2.2 Tg P yr⁻¹) of current Global demand for P but it is predicted to rise to 4.6 Tg P yr⁻¹ in 2050, representing 22% of global demand. During the buildup of soil fertility in Brazilian P-fixing, the use of higher fertilizer rates is justified but in agricultural soil under long-term fertilization, the P inputs should be similar to P exports, however, it is not the current management used. A new strategic analysis of current and future P demand/supply concluded that the nation is secondary P resources which are produced annually (eg livestock manures, sugarcane processing residues) could potentially provide up to 20% of crop P demand by 2050 with further investment in P recovery technologies. However, the much larger legacy stores of secondary P in the soil (30 Tg in 2016 worth over \$ 40 billion and rising to 103 Tg by 2050) could provide a more important buffer against future P scarcity and enable a transition to a more sustainable P use. In the longer term, farming systems in Brazil should be redesigned to operate profitably but more sustainably under lower soil P fertility thresholds, adopting management strategies to reach a better input/output balance.



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