The need for a management tool to assess risks of phosphorus loss from sugarcane fields of Mauritius

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1. Introduction

Agricultural runoff has been identified as one of the potential threats to water quality in Mauritius. Non-point sources of P leaving the agricultural landscape can cause eutrophication of freshwaters.

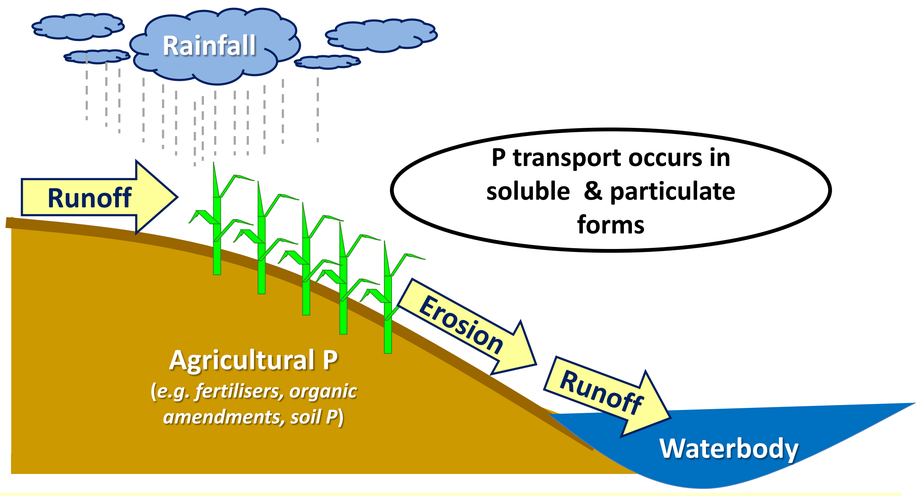


Fig 1. P movement from agricultural land to water resources.

Any mismanagement of P inputs to the fields can increase risk of incidental P losses during runoff events. Previous studies undertaken in Mauritius have shown that runoff P concentrations of limnological significance (>100 µg P L^{-1}) can occur particularly during high flow events.

2. Research approach

Rainfall simulation tests were undertaken on the five main soils under sugarcane in Mauritius.

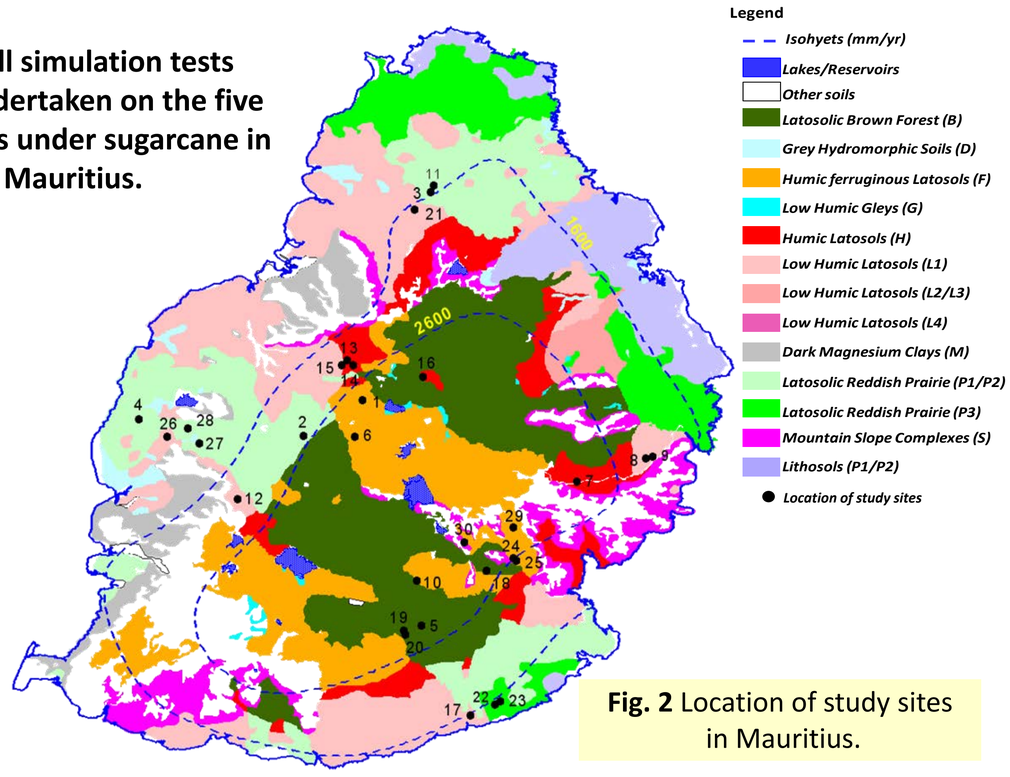
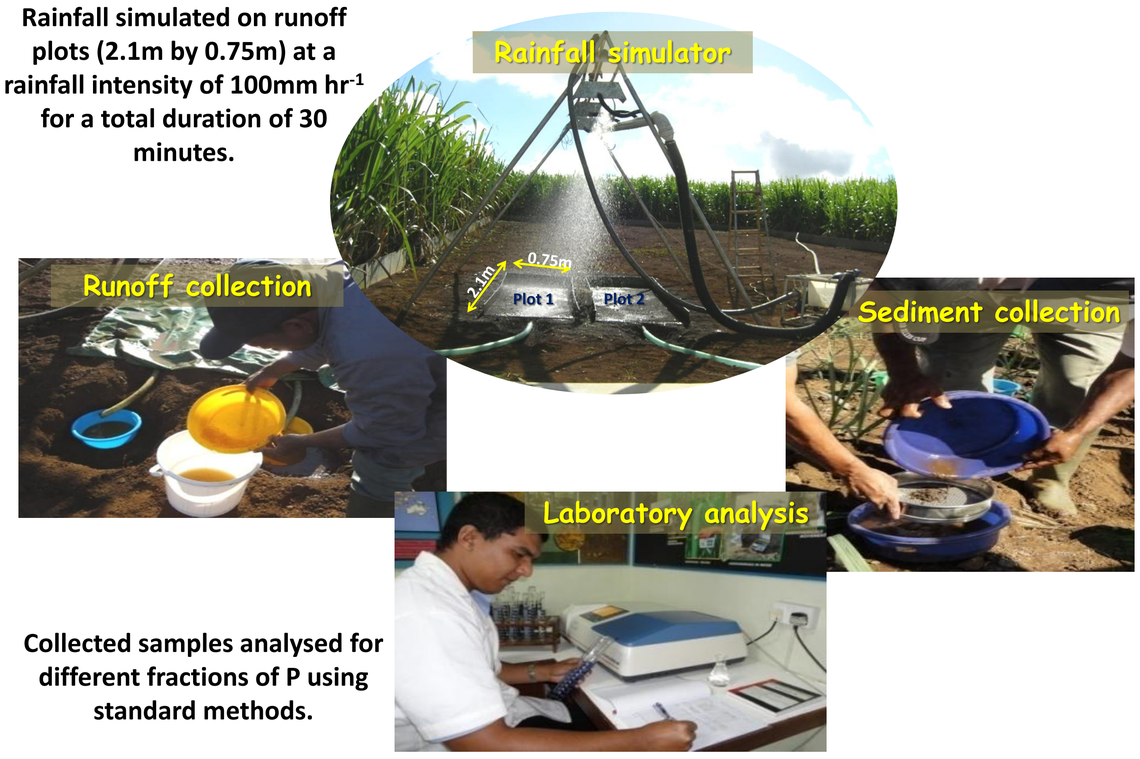


Fig. 2 Location of study sites in Mauritius.

Rainfall simulated on runoff plots (2.1m by 0.75m) at a rainfall intensity of 100mm hr^{-1} for a total duration of 30 minutes.



Collected samples analysed for different fractions of P using standard methods.

3. Results

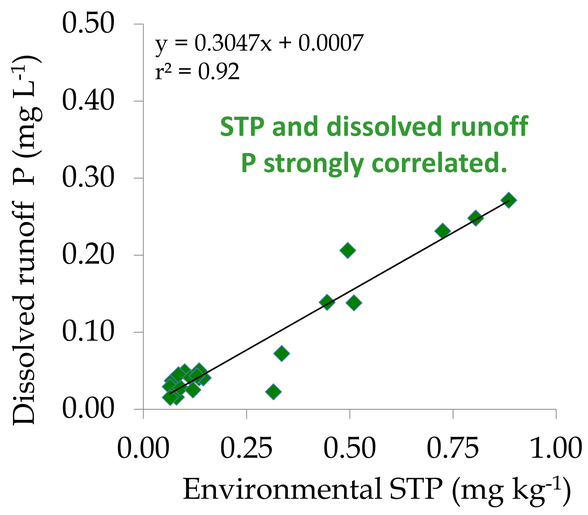


Fig 3. Relationship between environmental STP (0.01M $CaCl_2$ extraction) and dissolved P in runoff waters.

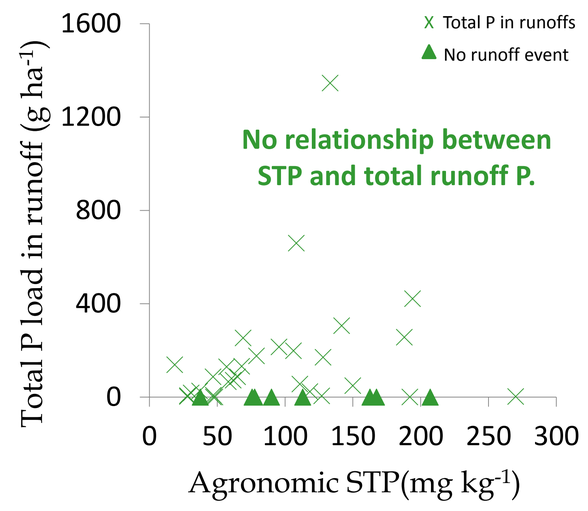


Fig 4. Relationship between agronomic STP (0.1M H_2SO_4 extraction) and total P loads in runoff waters.

Soil test P (STP) provides a reliable indication of desorbable P in soils but does not assess the degree to which runoff waters become enriched in P.

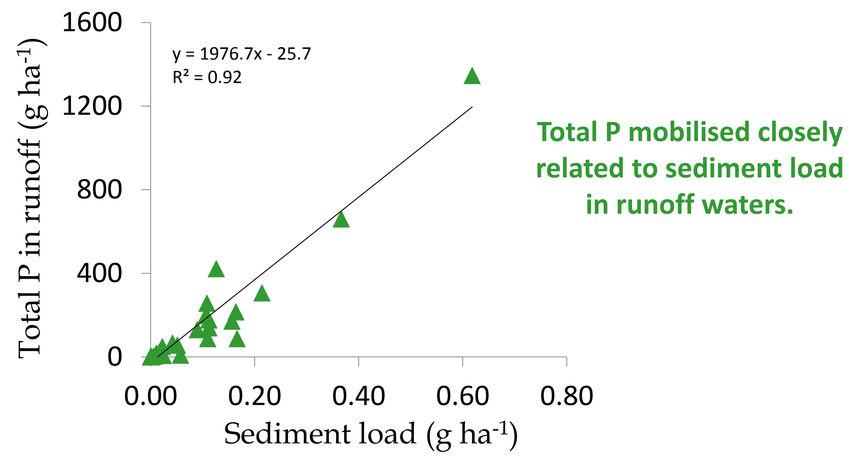
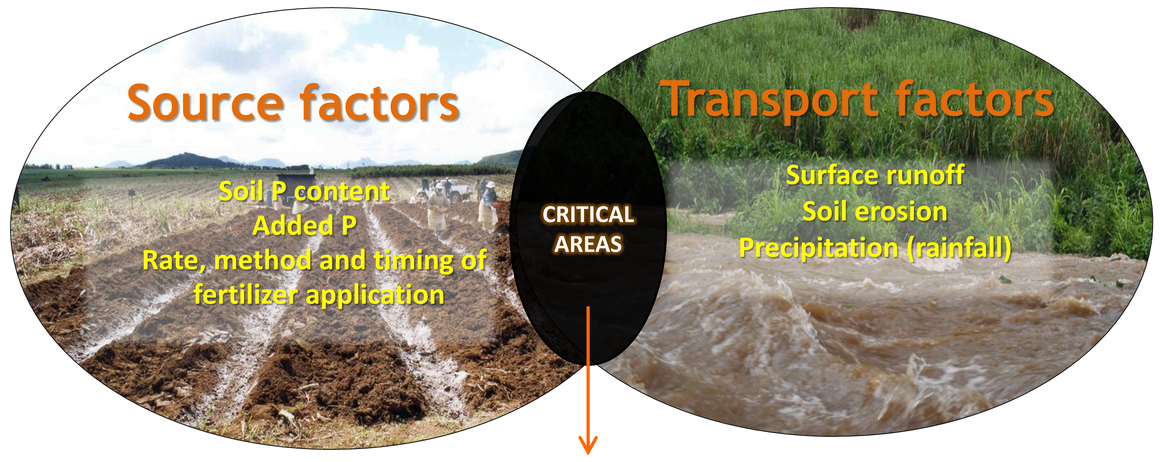


Fig. 5 Relationship between total P and sediment load in runoff waters.

4. Conclusion

Research findings indicate that an integrated approach such as the P index risk assessment tool, which includes all factors influencing P losses will be most suitable to assess the vulnerability of fields to P transport from sugarcane fields.



Improved management practices will be targeted to those critical areas so to reduce the risks of P losses from sugarcane fields.

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