Is application rate the only driver of P phytoavailability in tropical soils receiving mineral and organic fertilizers over an extended period?

1- Usual P fertilization guideline

Fertilization guideline usually determines the annual application rate of fertilizer to meet plant requirement while accounting for fertilizer efficiency. This implies to evaluate soil P availability:
- With adequate soil P tests
- By accounting for changing soil properties induced by long-term fertilizer application

2- Adequacy of soil P tests

5 field experiments in Réunion with decadal no, mineral or organic fertilization

Phosphate availability in Réunion soils is:
- Intensity controlled in andosol 2, nitisol and cambisol as usually observed in tropical soils
- Quantity controlled in arenosol as usually observed in temperate soils
- Both intensity and quantity controlled in andosol 1

3- Fertilizer-induced changes in soil properties and P (phyto)availability

Beyond the increase in total soil P:
- Mineral fertilization decreases soil pH
- Organic fertilization increases soil pH

In addition to total soil P, fertilizer-induced changes in soil pH drive:
- P availability in soil
- Plant P uptake

References