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# Assessment of contextualized phosphorus recycling and its criticality

le Département INRAC

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# Why phosphorus recycling?

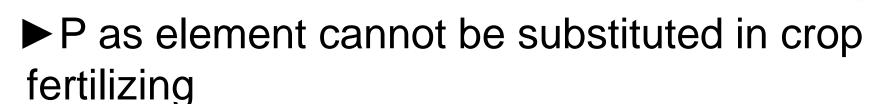
Phosphorus (P) is an **essential element for crop nutrition**. It plays a crucial role in global food security.



#### Phosphate rock: main source of phosphorus

- Critical raw material for European Union's (EU) economy
- ► Non renewable and exhaustible resource
- ► Long time scale for the exploration of new deposits
- ► Uneven distribution of global reserves







► High EU dependency on third party countries

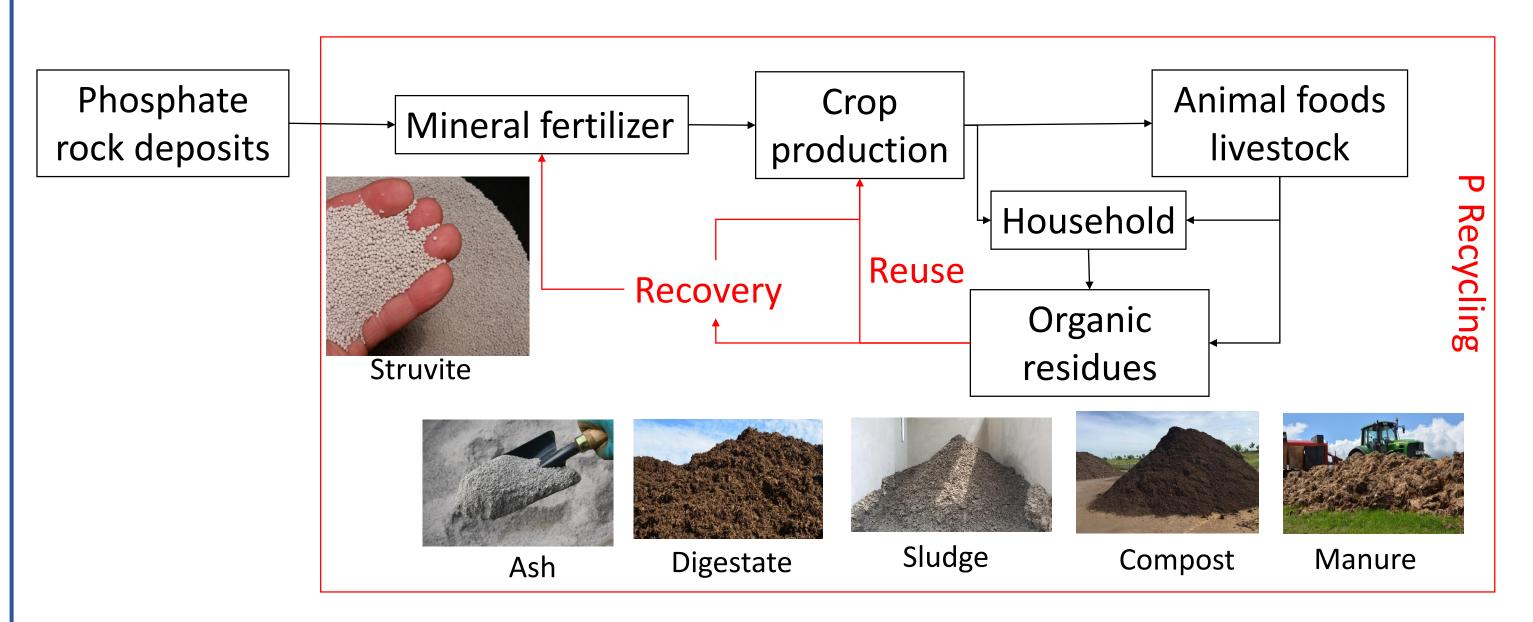




In the agricultural sector, providing P from recycling sources is currently the only way to mitigate phosphate rock criticality

# Main issues for phosphorus recycling

Phosphorus recycling refers to the reuse in agriculture of collected (i.e. organic effluent) or recovered phosphorus (i.e. struvite) which is contained in organic residues (OR) as digestate, manure, sludge...



- ► P content varies according to OR types, treatment processes
- ► OR diversity is a function of the economic activities present at the spatial scale
- ► OR reuse in agriculture is presided over by regulations
- ► Farmers may not use P recycled depending the characteristics of OR (price, agronomic value, location,...)
- => P recycling depends on the **geographical scale studied** and its context (regulatory, social, economic, agronomic,...).



The context and geographical scale are not taken into account in the evaluation of the recycling rate indicators used in the raw material criticality assessment (as EOL-RR, EOL-RIR,...)



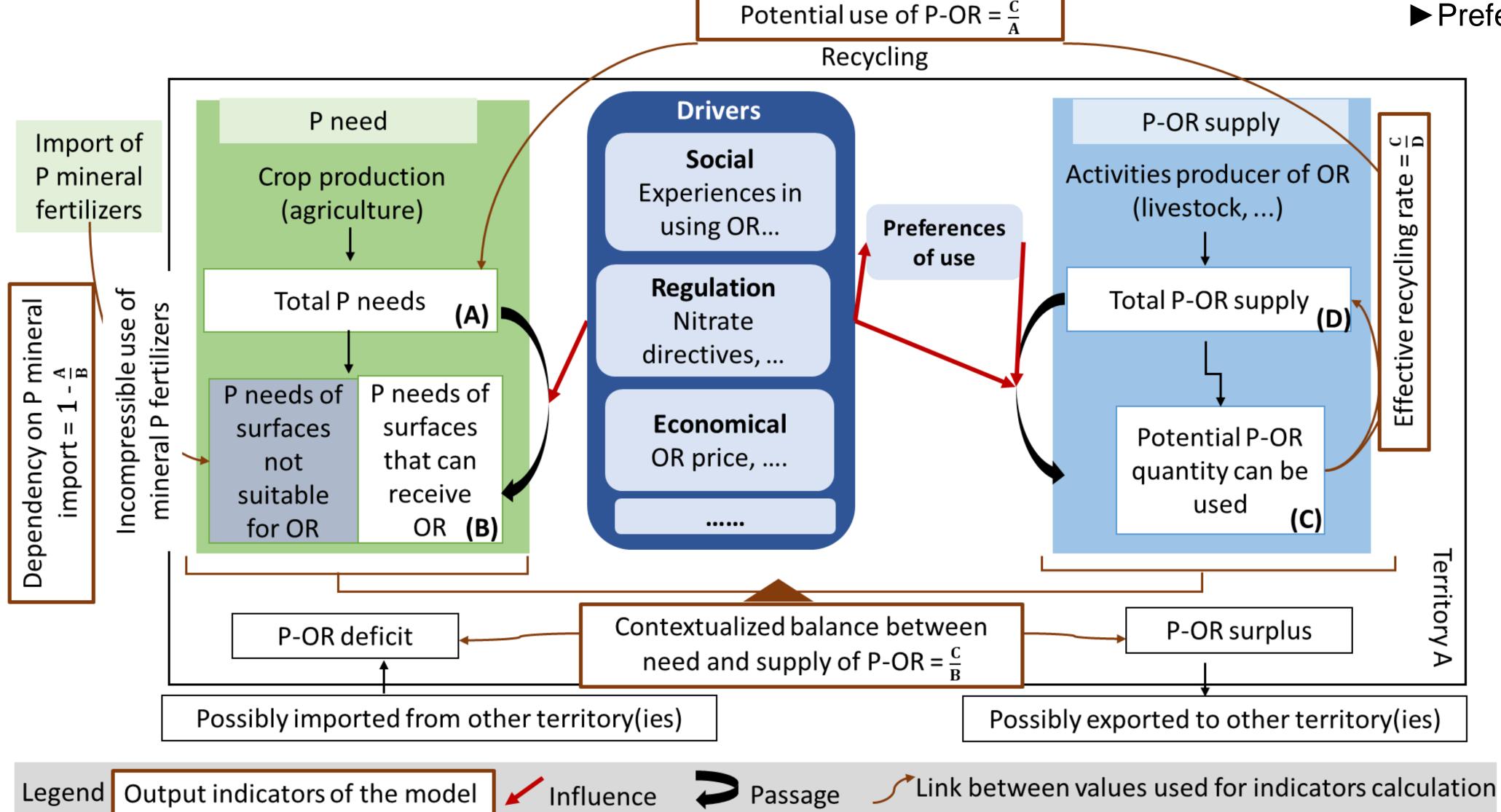
There is a need to contextualize P recycling at the local scale

# Conceptual model for contextualized phosphorus recycling

The conceptual model aims to put P recycling back into its context to assess the maximum recoverable and recyclable potential of phosphorus from organic residues deposits in the studied territory.

To build the model, four set of parameters are identified

- ► P-OR supply
- ► P needs
- ► Drivers, i.e. any factors that can influence the use of P from OR by farmers
- ► Preferences of use by farmers





Studied territories in France

# Conclusion

The proposed model will help to provide an effective recycling rate consistent with local context (fertilizer regulation, water framework directive, farmers preferences, agronomy context...). This promotes a better integration of the characteristics of phosphorus recycling into criticality assessment.