SOIL SENSITIVITY

McFee (1980), United States Environmental Protection Agency

Objective

To identify soils sensitive to acidic precipitation where sensitivity is defined by the fraction of exchangeable cations which would be leached from the upper 25 cm of a soil by 25 years precipitation with an average pH of 3.7 at a rate of 100 cm/year. This pH value can also be expressed as 100 kg/ha loss $CaCO_3$ equivalent.

Criteria

(1) Total buffering capacity or CEC provided by clay and organic matter

(2) Base saturation as estimated by pH

(3) Management system (cultivation, liming, flooding)

(4) Presence or absence of carbonates in the profile

Sensitivity Class Definitions

Sensitive	CEC(meq/100g)	Other Relevant Conditions
Non-sensitive	Any value	Free carbonates present or subject to frequent flooding
Non-sensitive	Over 15.4	None
Slightly sensitive	6.2 to 15.4	Free carbonates absent; not subject to frequent flooding
Sensitive	Less than 6.2	Free carbonates absent; not subject to frequent flooding

Map Product

Variable original data reduced to 1:2,500,000 for each state east of the Mississippi River.

Evaluation

CEC alone is not adequately related to buffering capacity of a soil to allow this kind of assessment. Buffering capacity is related to exchangeable bases, and bases in soil solution, and potential bases that can be released from the solid phase of soil. Buffering capacity can be estimated from exchangeable bases since the latter two components are either relatively small or slow to release (Wang and Coote, 1980). Soil pH and base saturation are described as sensitivity variables but are not defined in the class definitions.