Theme 2 |Advances in soil mapping and monitoring

Classification systems can influence salt-affected soil management

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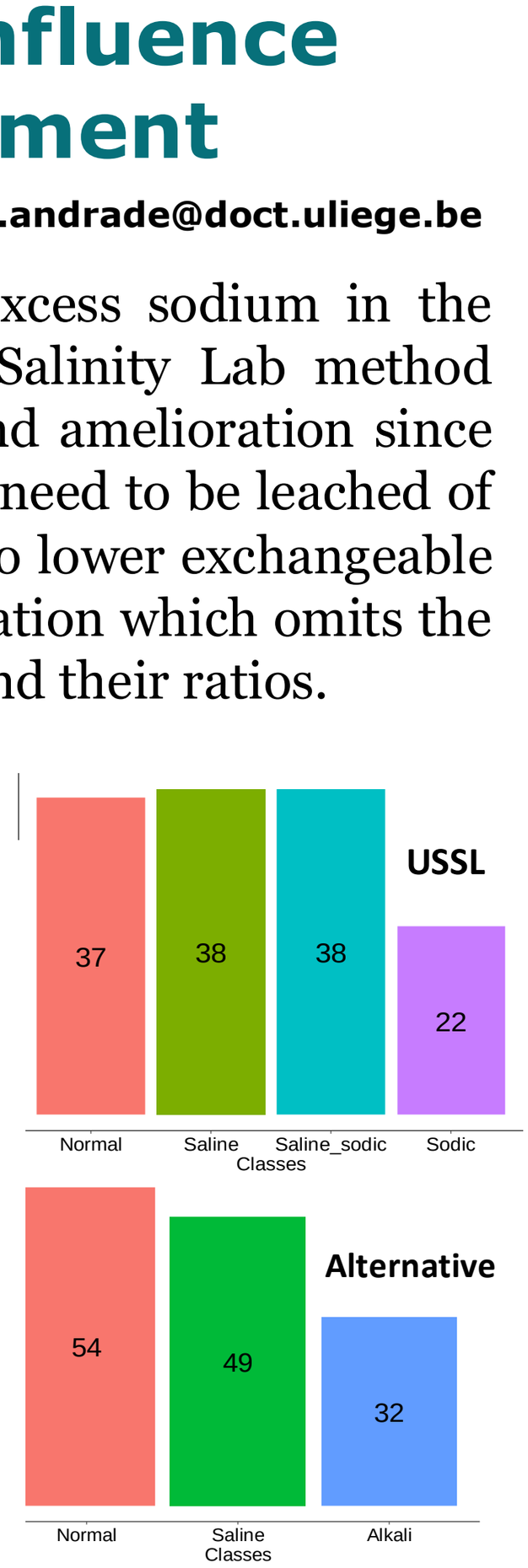
Salinity is related to high soluble salts and sodicity to an excess sodium in the exchangeable complex. The saline-sodic class from the US Salinity Lab method generates confusion and can impact the spatial distribution and amelioration since soils under this category mostly behave as saline or sodic, thus need to be leached of excess soluble salts or treated with amendments and leaching to lower exchangeable sodium. Such difficulty is addressed by the Alternative classification which omits the saline-sodic class and considers the nature of soluble salt ions and their ratios.

US salinity Lab and Alternative salt-affected soil classification systems

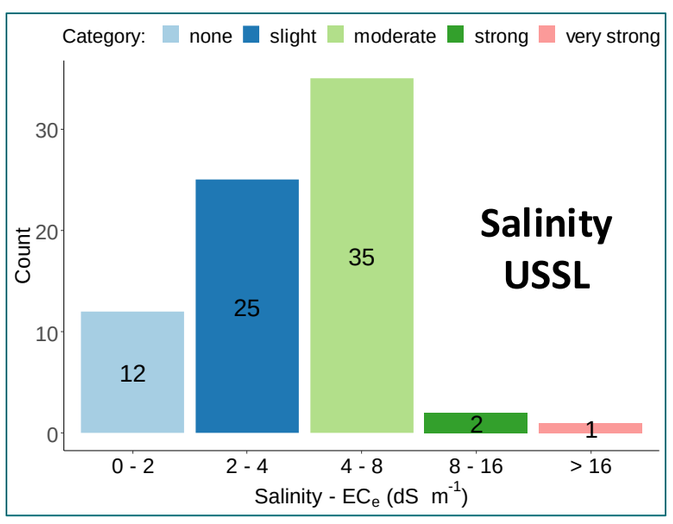
System	Categories	Variables / Thresholds values
US Salinity Lab[1]	Normal	ESP < 15%, EC_e < 4 dSm^{-1}, pH < 8.5
	Saline	ESP < 15%, EC_e > 4 dSm^{-1}, pH < 8.5
	Saline-sodic	ESP > 15%, EC_e > 4 dSm^{-1}, pH < > 8.5
	Sodic	ESP > 15%, EC_e < 4 dSm^{-1}, pH > 8.5
Alternative[2]	Normal	ESP < 15%, EC_e < 4 dSm^{-1}, pH < 8.2
	Saline	ESP < 15%, EC_e > 4 dSm^{-1}, pH < 8.2, Ratio 1* and Ratio 2† < 1
	Alkali	ESP > 15% (> 6% for vertisols), EC_e < 4 dSm^{-1} (variable), pH > 8.2, Ratio 1* and/or Ratio 2† > 1

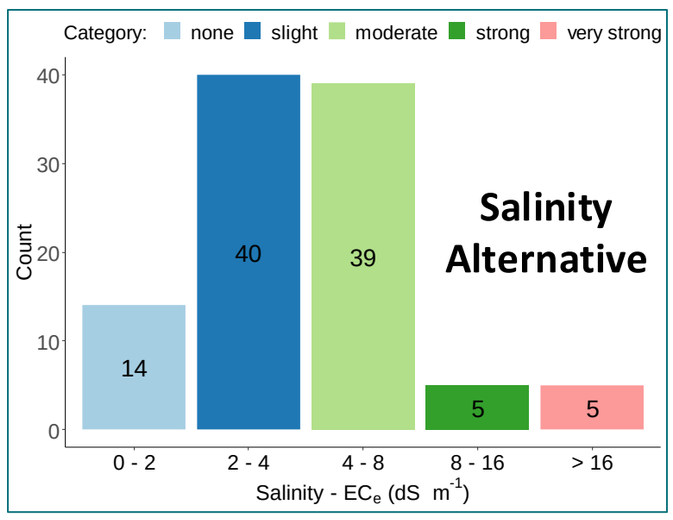
(1) Richards et al. (1954), (2) Szabolcs (1989); Chhabra (2004)

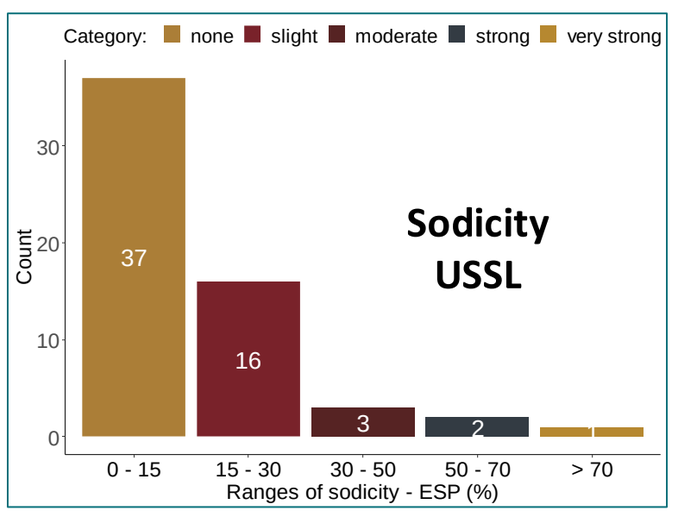
* Ratio 1 = $(2CO_3^{2-} + HCO_3^-) / (Cl^- + 2SO_4^{2-})$ † Ratio 2 = $Na^+ / (Cl^- + 2SO_4^{2-})$

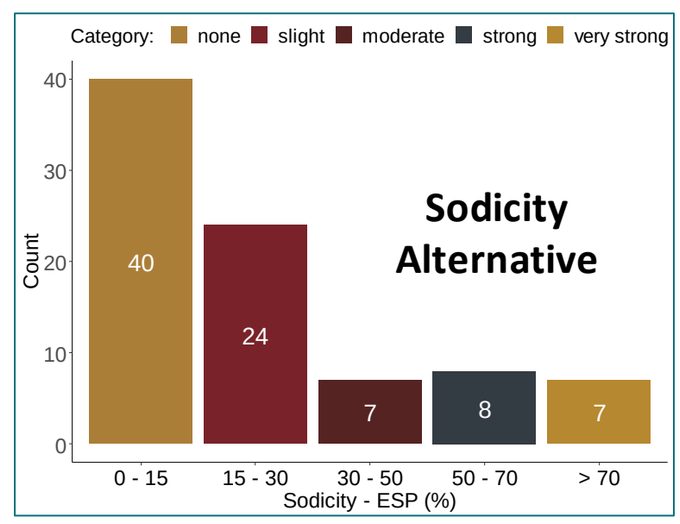


Both classification criterions were applied to some soil samples from the High Valley of Cochabamba - Bolivia for comparison purposes. Differences between both systems regarding their frequency counts of salinity and sodicity classification were found. The systems need further validation to define a site-specific classification for proper management of salt-affected soils.









Classification by intervals of salinity and sodicity, by using the USSL and the Alternative systems.

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