

Loss of surface horizon of an irrigated soil detected by radiometric images of normalized difference vegetation index.

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The use of the soil in the Humid Pampa of Argentina has changed since the mid-1990s from agricultural-livestock production (that included pastures with direct grazing) to a purely agricultural production. Also, in recent years the area under irrigation by central pivot has been increased to 150%. The waters used for irrigation are sodium carbonates. The combination of irrigation and rain increases the sodium absorption ratio of soil (SARs), consequently raising the clay dispersion and reducing infiltration. This implies an increased risk of soil loss.

A reduction in the development of white clover crop (*Trifolium repens* L.) was observed at an irrigation plot during 2015 campaign. The clover was planted in order to reduce the impact of two maize (*Zea mays* L.) campaigns under irrigation, which had increased soil SAR and deteriorated soil structure. SPOT-5 radiometric normalized difference vegetation index (NDVI) images were used to determine two zones of high and low production. In each zone, four random points were selected for further geo-referenced field sampling. Two geo-referenced measures of effective depth and surface soil sampling were carried out in each point. Texture of soil samples was determined by Pipette Method of Sedimentation Analysis.

Data exploratory analysis showed that low production zone had a media effective depth = 80 cm and silty clay loam texture, while high production zone had a media effective depth > 140 cm and silt loam texture. The texture class of the low production zone did not correspond to prior soil studies carried out by the INTA (National Institute of Agricultural Technology), which showed that those soil textures were silt loam at surface and silty clay loam at sub-surface.

The loss of the A horizon is proposed as a possible explanation, but further research is required. Besides, the need of a soil cartography actualization, which integrates new satellite imaging technologies and geo-referenced measurements with soil sensors is emphasized.

Key words: soil use change, satellite images, erosion.