

Preliminary study of Salt affected soils in the Zona Bananera, Magdalena (Colombia)



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INTRODUCTION

The Banana is one of the main exportation products in Colombia, it is sources of income in the economy of more than 120 countries in the tropics and subtropics. The agriculture is the main economic activity of the department of Magdalena, banana cultivation stands out with more than 12,776 ha, located in the north of the territory, specifically between Ciénaga and Fundación municipalities, become in the main sources of income, formal and informal jobs in the region (IGAC. 2009). The soils from study area are developed from quaternary alluvial deposits with abundant subangular rock fragments, quartz diorite and quartz monzonite. Most of the soils in the study area are well drained and depth, water table is far from the ground surface; except in areas close to the coastline or associated with wetland systems or mangrove ecosystems adapted for agricultural.



Fig 1.

METHODOLOGY

Spatially extensive digital data were used to describe the morphology and distribution of soils, especially refer with the distribution of salts in relation to soils and geomorphological relationship from Landsat 8 images (year 2020) Band 1 to 11 US Geological Survey ®. The images were processed using Grass GIS software version 7.8.5 Grass GIS®, to determine the different ranges of salt affectation into the soils for the study zone. The areas affected by salts were known, a supervised classification was carried out supported by 236 soil samples and field observations.

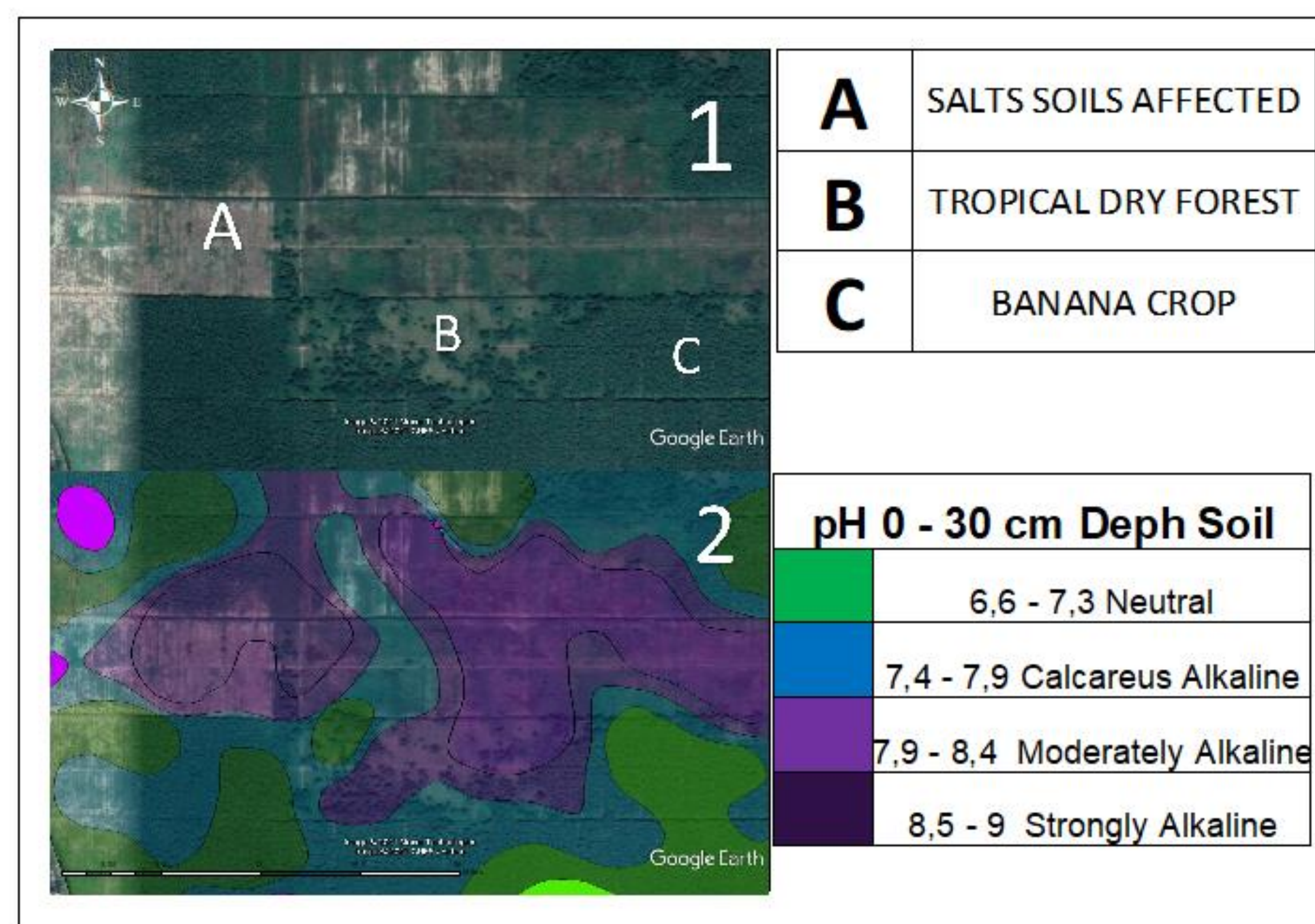


Fig 2.

RESULTS

The supervised classification shown the greater impact of salts in the western part of the Zona Bananera municipality. The unaffected soils are found in the foothills of the Sierra Nevada de Santa Marta under acids colluvial alluvial fans and granite materials. The salts affected soils are frequently found in the tidal planes, alluvial plains that mostly have a fluvial lacustrine and marine fluvial origin. These preliminary results showed that according to the supervised classification and the soil samples collected in the field 6.27% (2799 ha) of the total studied area is highly affected by salts, 30.07% (13,415 ha) report medium affectation, 29.9% (13,340 ha) has low salts affectation and the remaining 33.74% (15052 ha) did not report any type of risk of salt problems.

CONCLUSIONS

Preliminary results show the utility of easy acquisition data such as pH and EC together with information from free-use satellite images to determining and monitoring problems of salts soils affected.

It is possible to identify this problem at the general scale (1:100.000) with low precision due to the delimitation of the type of affectation, being necessary detailed scale information and complementary analysis.

In bare soils or without vegetal cover is easily identify affectation by salts, for areas under mechanization or urban areas, this methodology has limitations. For future studies it is necessary to generate geomorphological maps at more detailed scales, and give more attention to the soil-relief relationship in the area; considering other calibration parameters such as complete analyzes for salt content in the laboratory.

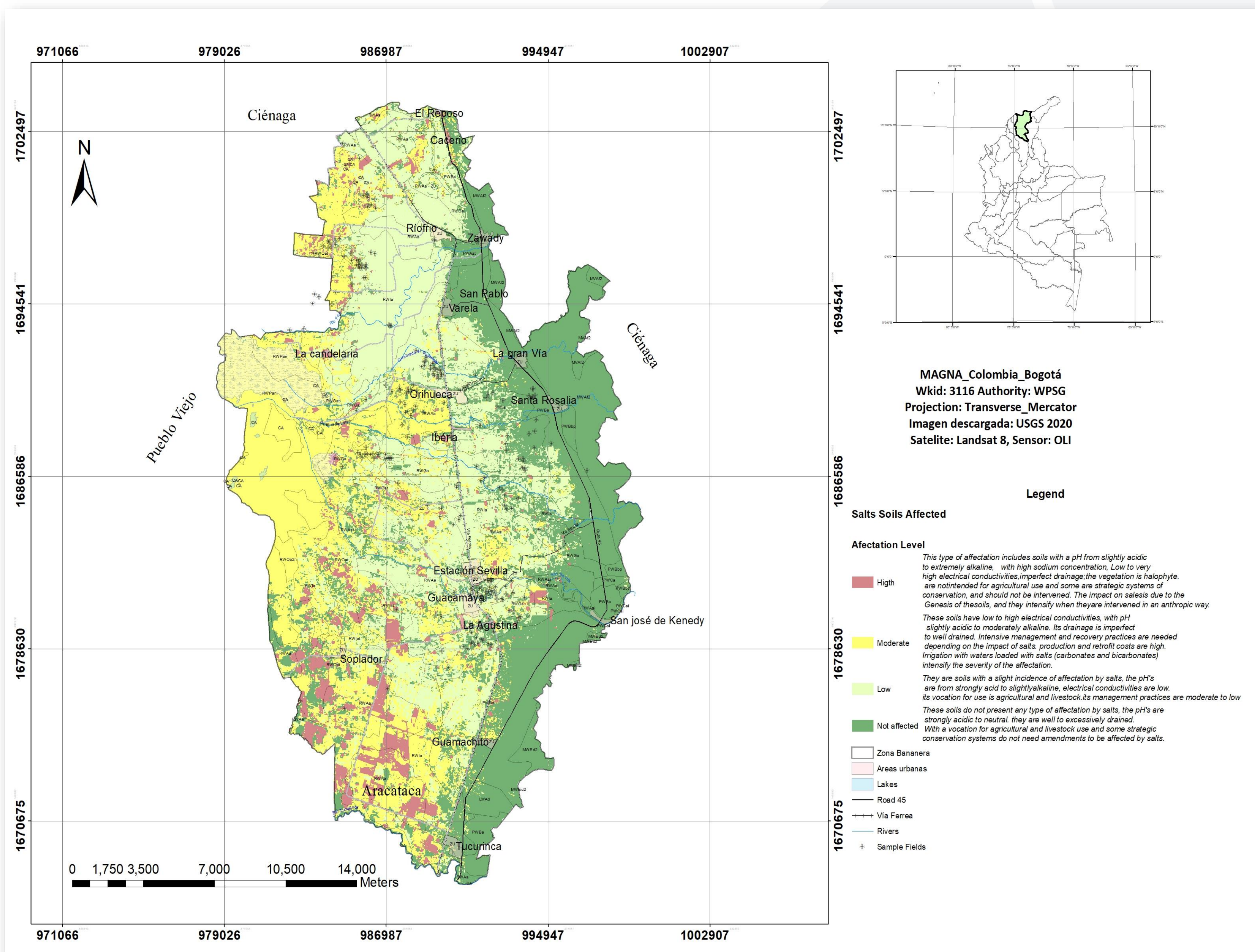


Fig 4.

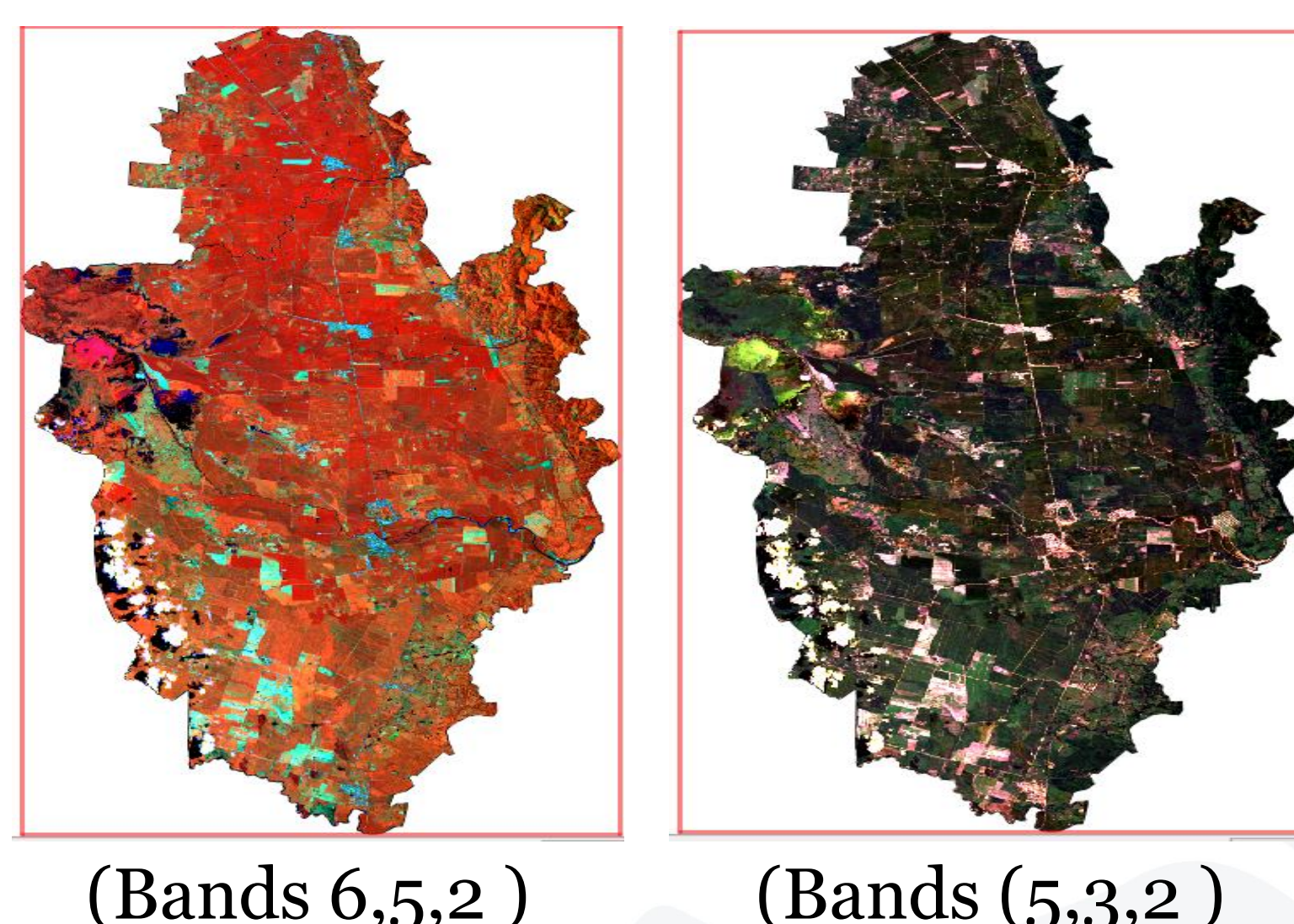


Fig 3.

GLOBAL SYMPOSIUM ON
SALT-AFFECTED SOILS

20 - 22 October, 2021