

National study of soil degradation by salinization in Colombia

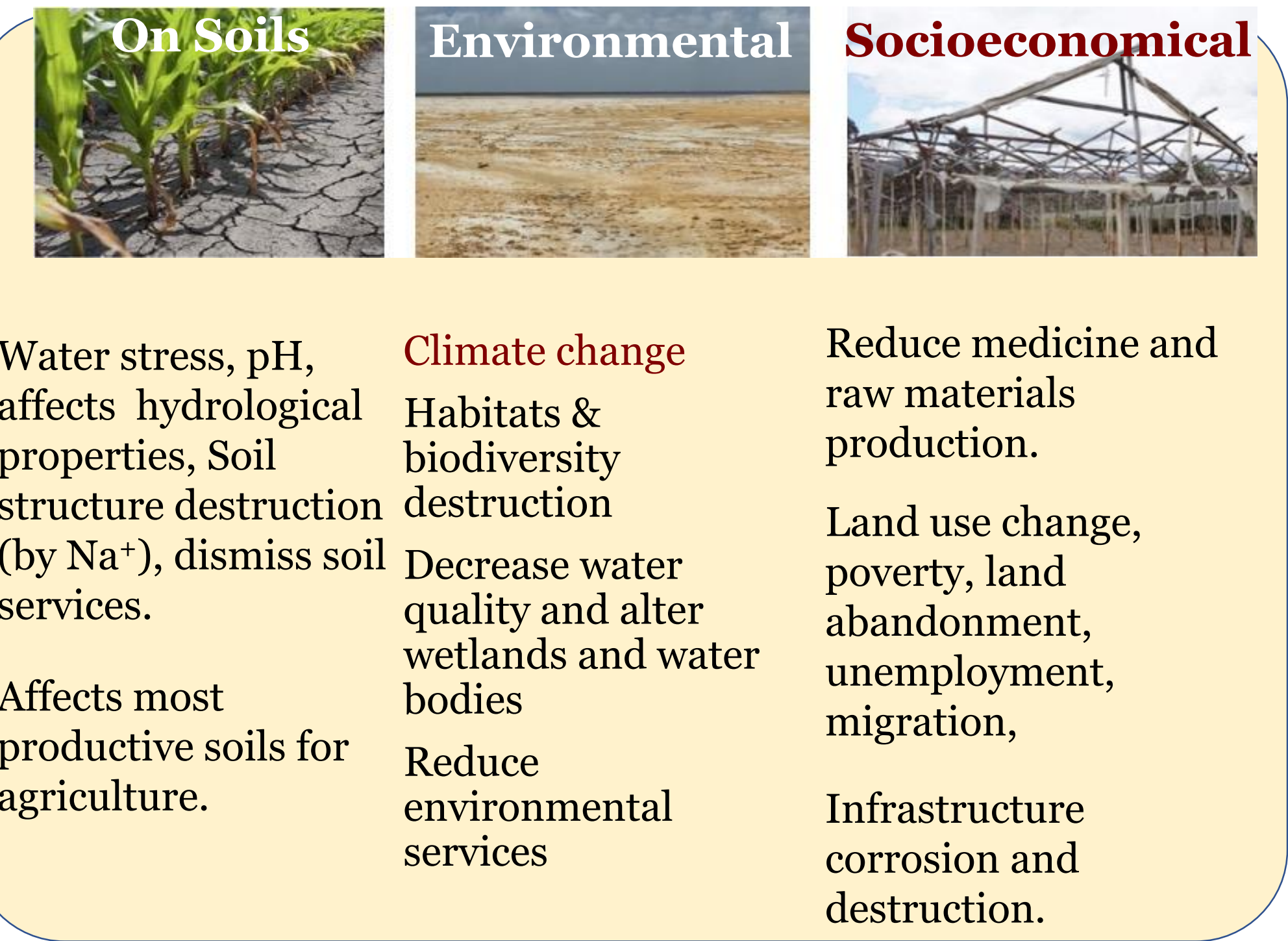
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INTRODUCTION

An approach to assess soil salinization for Colombia which includes a conceptual framework involving a salinization classification system based on environmental impacts on soil functions and services.

Fig 1. Salinization effects



METHODOLOGY

A model integrating information of factors influencing salinization:

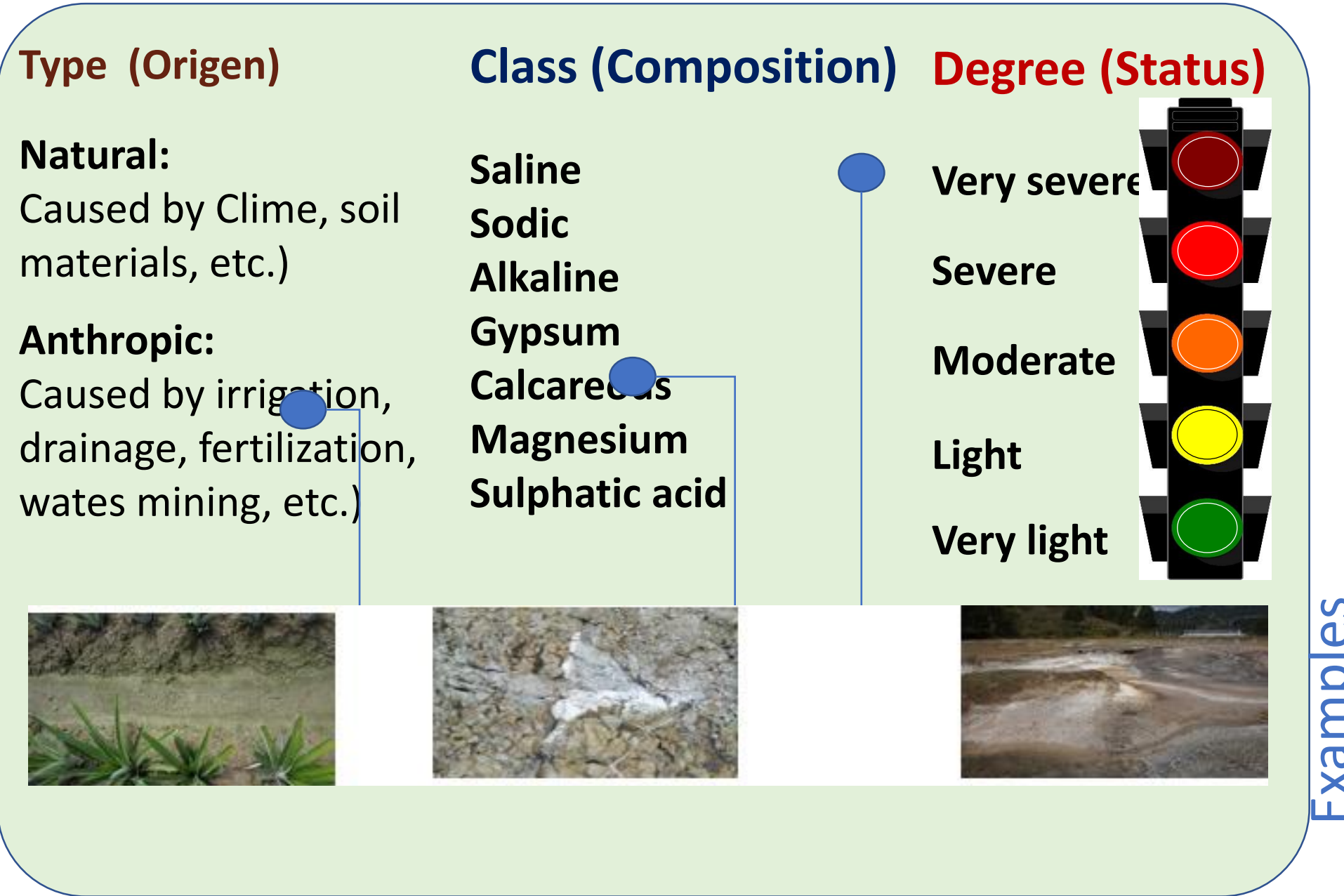


For each factor, available data from variables were analyzed and weighted according to its relationship with salinization processes. Using a GIS data was integrated, obtaining a map with five degrees of susceptibility to salinization.

Using a statistical design, soil samples were taken in 1037 sites, measuring pH, E.C, SAR, and Mg, Na, CaCO₃, CaSO₄ content, to identify **classes** and **degrees** of salinization.

Lab results were interpolated to homogeneous land units in terms of soil, climate and use, obtaining a map with the current state of salinization. Applying the conceptual FPSIR model by LADA (FAO, 2007), the driving forces, pressures, status, impacts and responses were correlated with economic, social and environmental indicators. A new approach of salinization classification system by Type, Class and Degree is proposed

Figure 2. Classification of soil salinization



RANGES	DEGREE
RAS ≥ 13 or CE ≥ 16 dS/m	VERY SEVERE
CE ≥ 4, pH < 4 y [SO ₄] ²⁻ ≥ 0,05%* o PSI ≥ 15	SEVERE
CE 8 - 16 dS/m or [CaSO ₄ .eq] ≥ 10% or PMgl ≥ 40; PSI 10 - 15% or [CaSO ₄ .2H ₂ O] ≥ 15%	MODERATE
CE 4 - 8 dS/m or PMgl 30 - 40; PSI 7,5 - 10 [CaCO ₃ .eq] < 10% or [CaSO ₄ .2H ₂ O] < 15%	LIGHT
CE 2 - 4 dS/m or pH ≥ 7,4	VERY LIGHT
CE < 2	

*For sulphated acid soils

RESULTS

Colombian soils susceptible to salinization are mainly lowlands and dry areas in the Caribbean and inter-Andean valleys and some Andean highlands and scattered areas in the Orinoco basin and the southwestern Pacific.

11,7% of the country soils are affected with some degree of salinization, from which 1.671.175 ha, are on critical to irreversible state of degradation, causing desertification.

Figure 3. Susceptibility to soil salinization

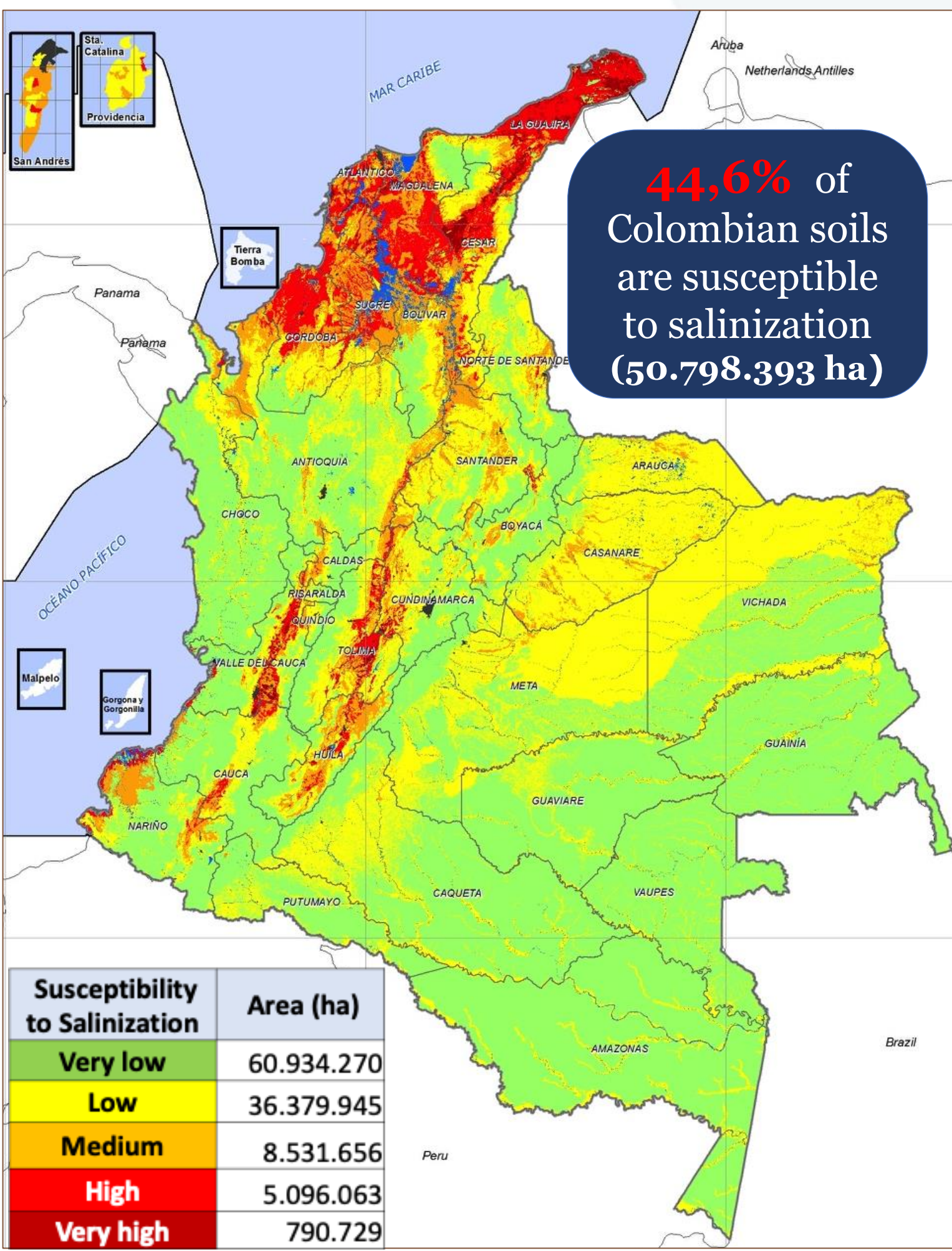
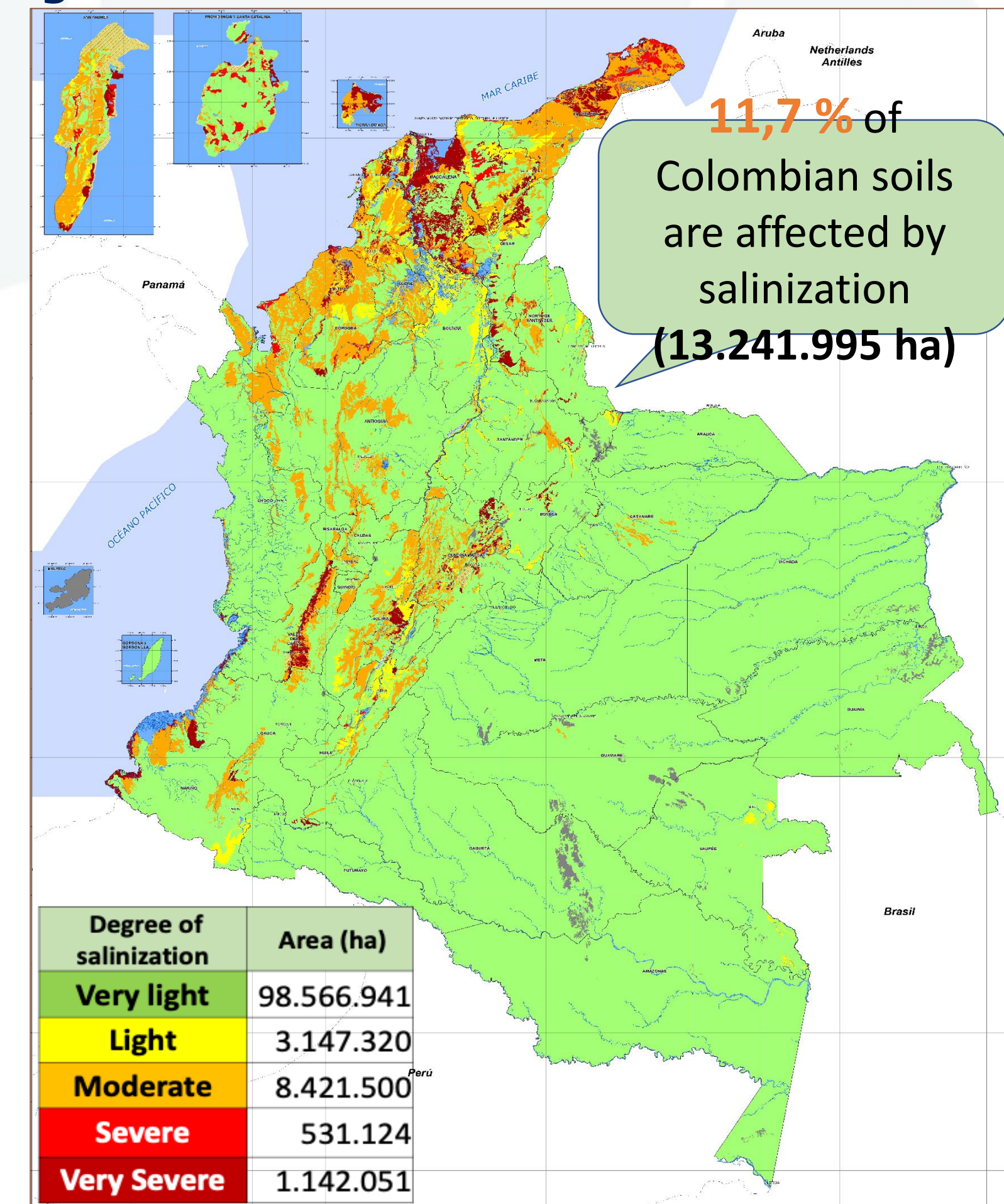
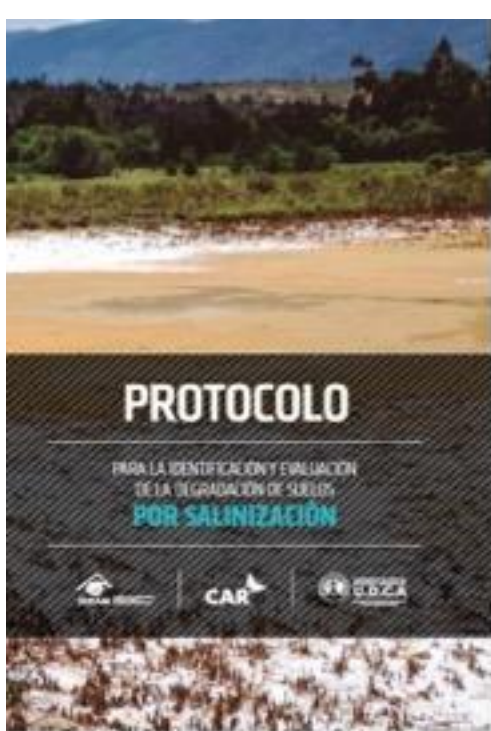


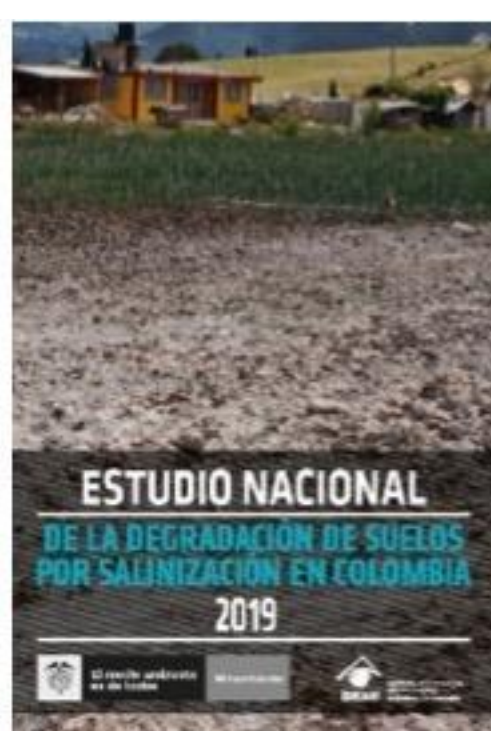
Figure 5. Current state of soil salinization



A **protocol** with the methodology to assess and monitor soil degradation by salinization and a **baseline (national study)** are available, in order to develop guidelines and strategies to halt salinization.



Protocol



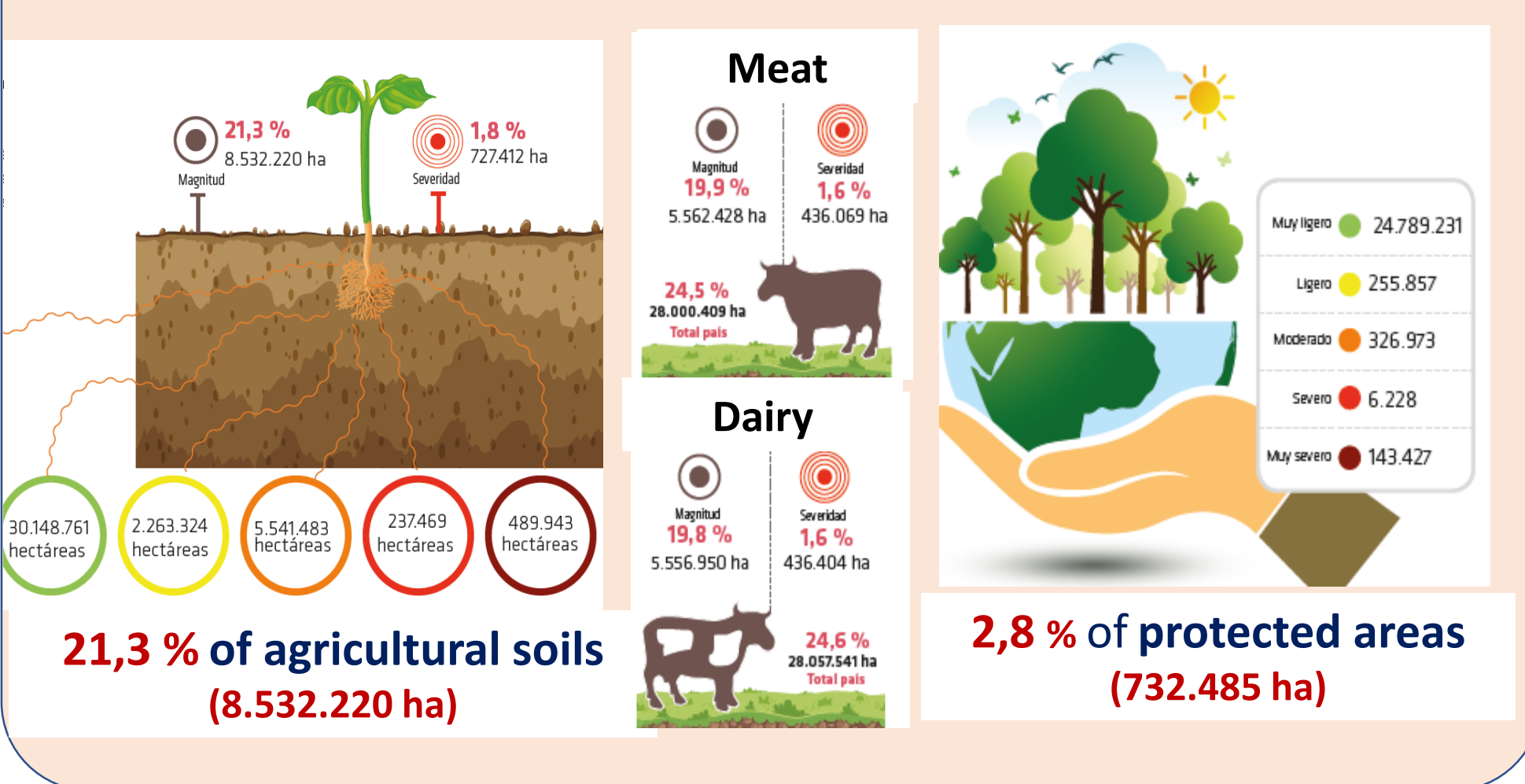
National Study

A regional Atlas by Environmental authorities and departments with the State of salinization and FPSIR indicators was obtained

Salinization occurs due mainly to drainage, irrigation, fertilization, amendments and deforestation.

Forces Pressure State Impact and Results Indicators were evaluated at national level

Figure 6. Impact Indicators (example)



DISCUSSIONS

Susceptibility to salinization becomes the first strategy to address the problem, identify and prioritize areas, establish early alerts and to propose management guidelines.

CONCLUSIONS

This study provides valuable information about soil degradation due to salinization in Colombia. Results are important for decision-makers who deal with the Sustainable Soil Management at diverse temporal and spatial scales and to contribute with the Colombian national and international compromises and goals.

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GLOBAL SYMPOSIUM ON SALT-AFFECTED SOILS



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