GLOBAL SYMPOSIUM ON SALT-AFFECTED SOILS

20 - 22
October, 2021
Virtual meeting

Soils, groundwater movements and floods in Argentina Lowlands

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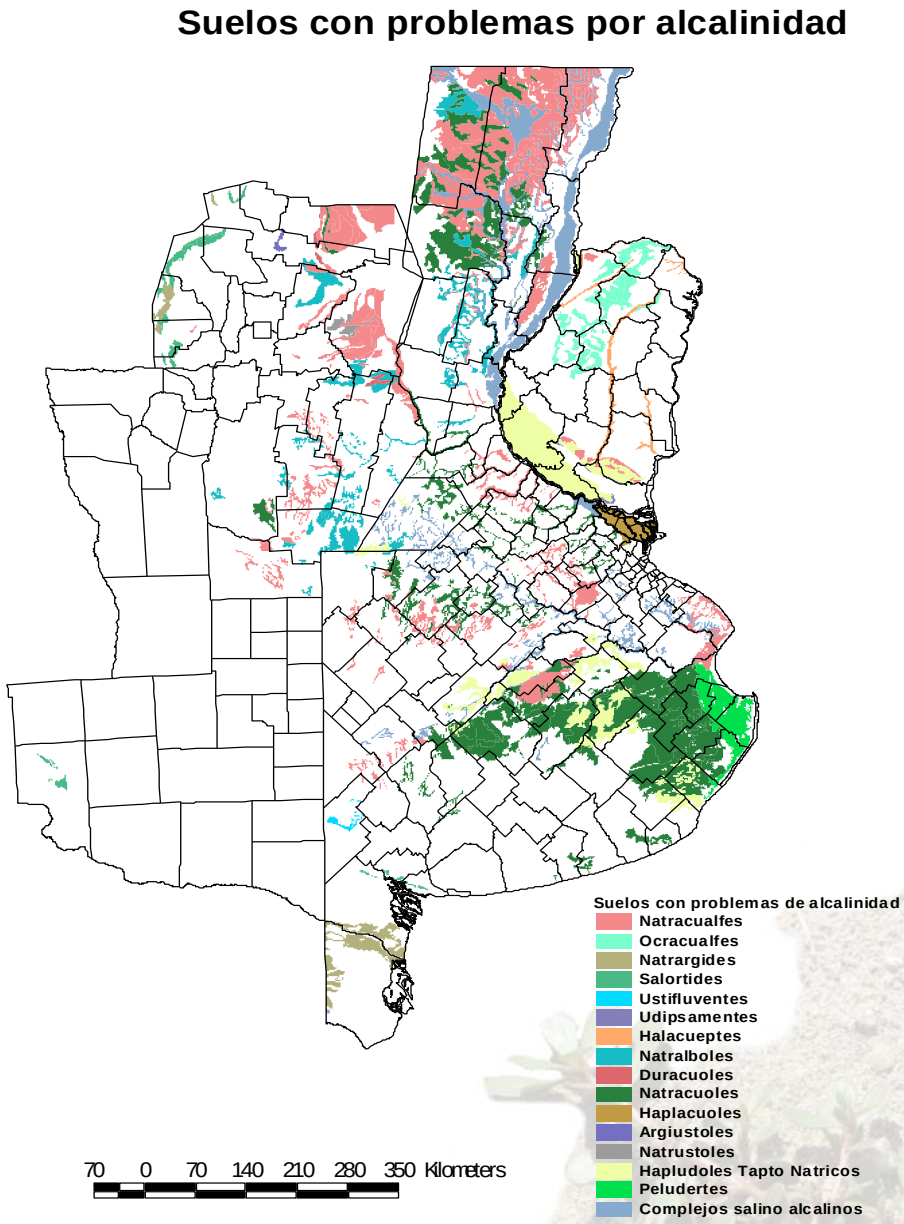
Soils with natric horizon (different kind of Solonetzes) cover more than 12 Mha in Argentina.

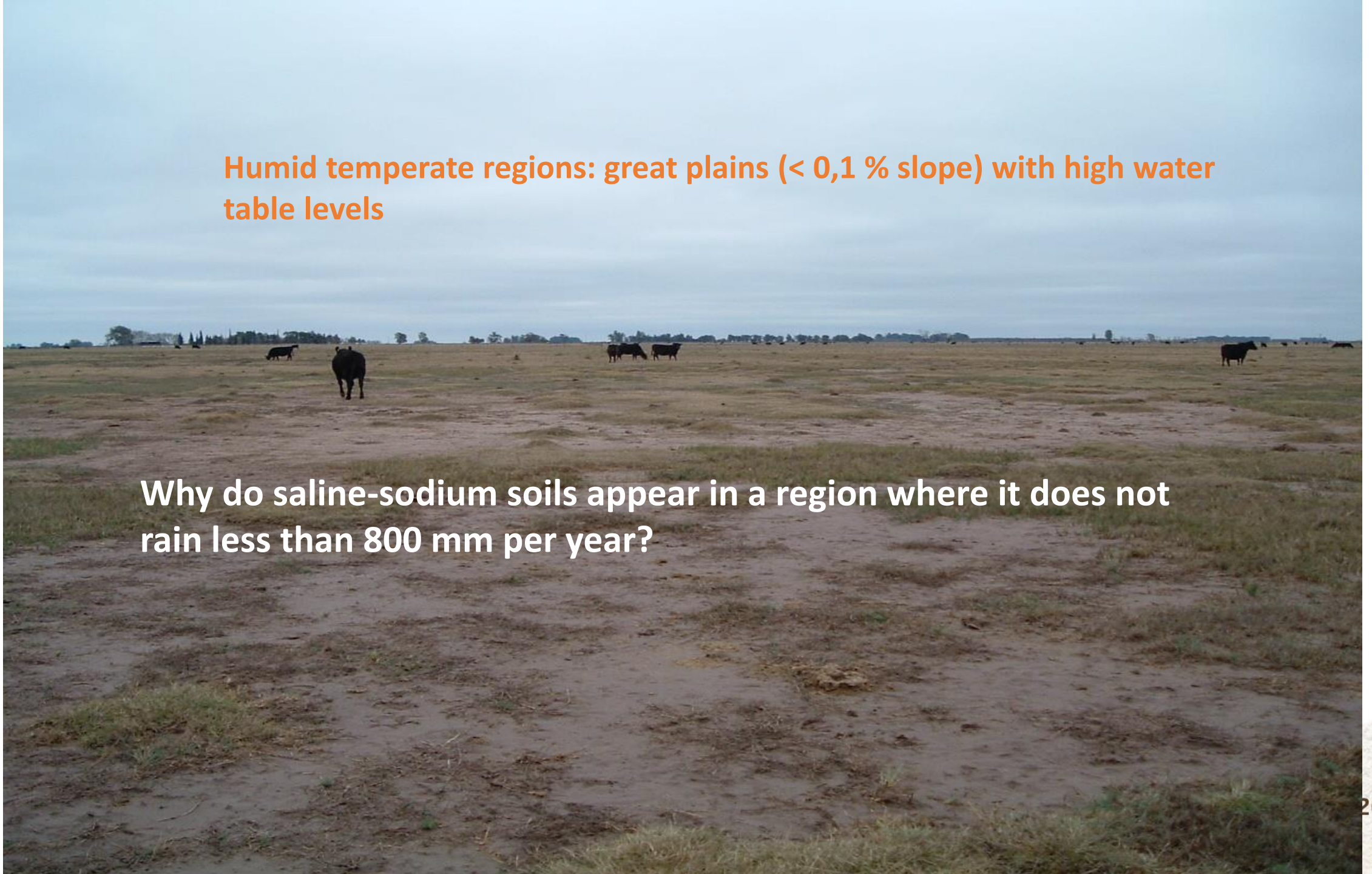
Low permeability and high ESP values, even from surface.

High water table levels and saline groundwater.

Low productivity of crops and pastures.



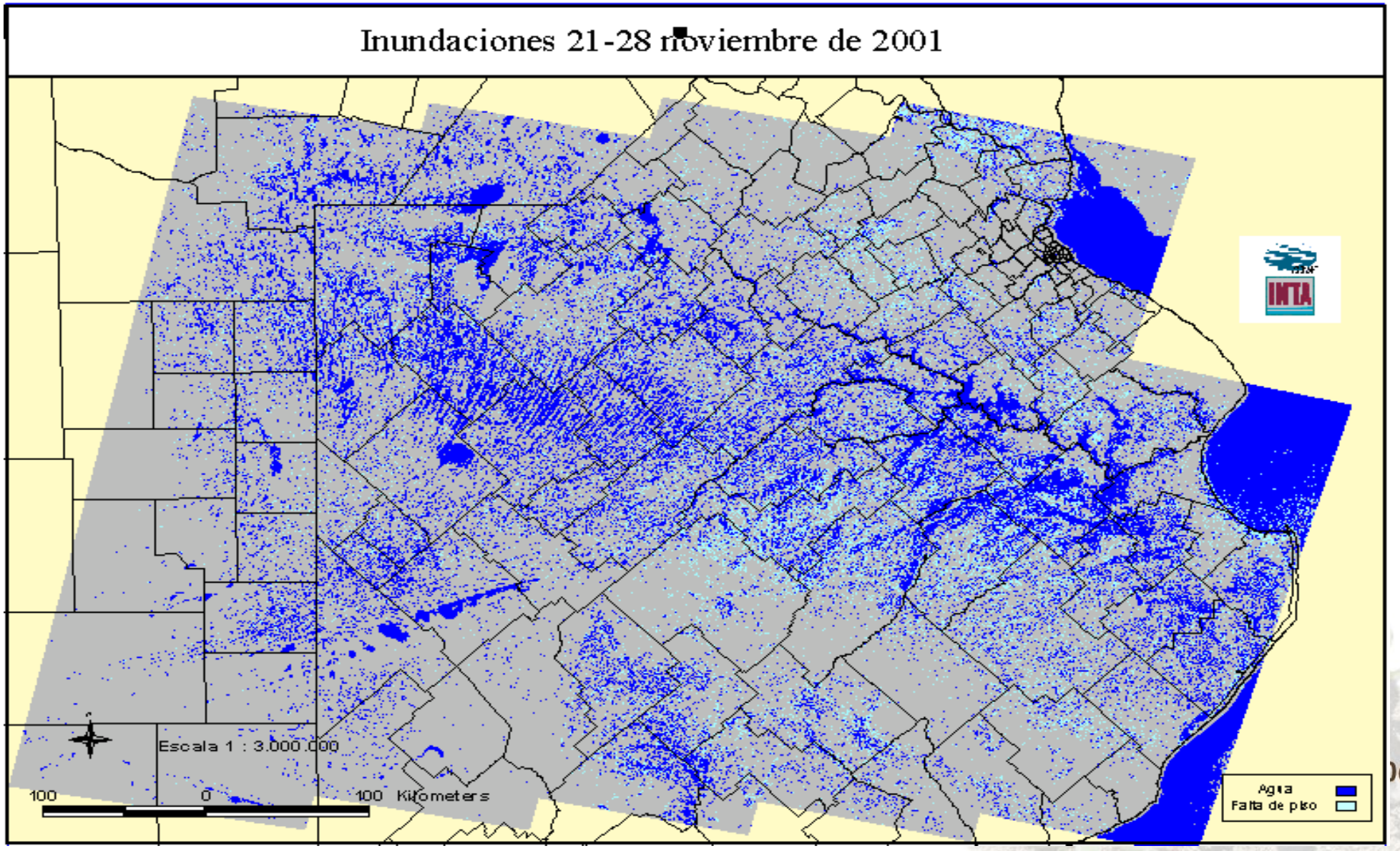
Alkaline soils of Argentina Lowlands (Moscatelli y Cruzate, 2000)


Humid temperate regions: great plains (< 0,1 % slope) with high water table levels
Why do saline-sodium soils appear in a region where it does not rain less than 800 mm per year?

1st factor: geomorphology and relief (large great plains)

- Landscapes shaped by the wind in paleoclimates drier than today.
- Evidence: There is no integrated drainage network in streams and rivers despite the high rainfall;
- Many lagoons are old wind deflation buckets, today filled with water.

FLOODS DURING HIGH RAINFALL AND STORMS. VERY POOR DRAINAGE




Periodic floods and waterlogging. Surface water is evaporated.

, 2021


Periodic drouhgts

During high rainfall periods, lagoons interconnect between them

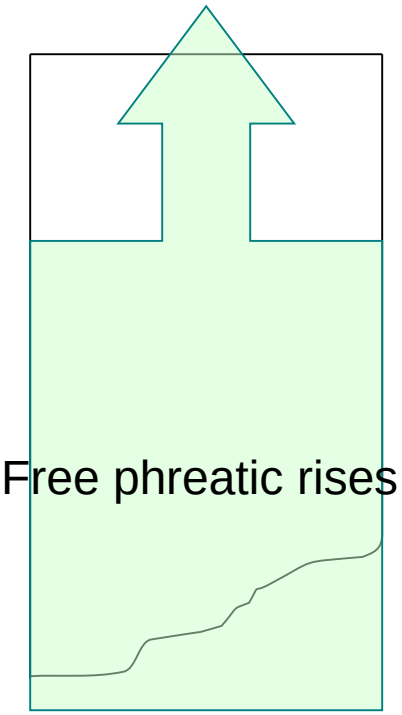
2021


Flat landscape: roads and clogged culverts dam water

2nd factor: soils with (or without) a tough natric horizon in depth

- Floods and droughts are the results of predominant soils
- Different types of floods, as a function of their origin: groundwater or rainwater
- This depends on the presence (or absence) of a tough natric horizon in depth
- Spatial distribution in patches

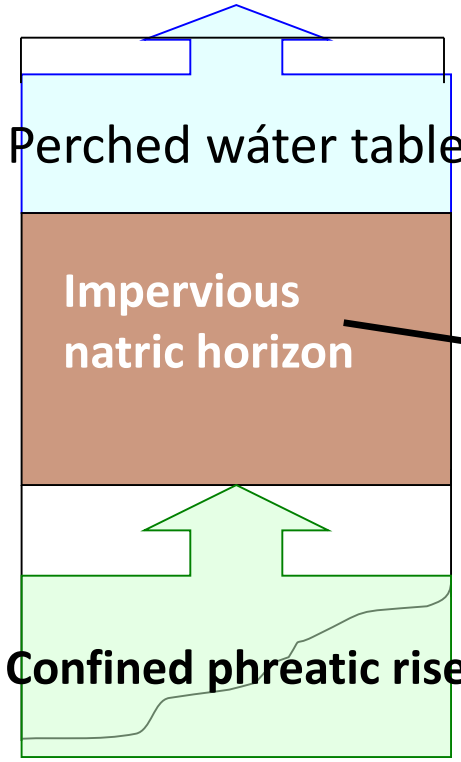
Sandy loams without tough natric horizon

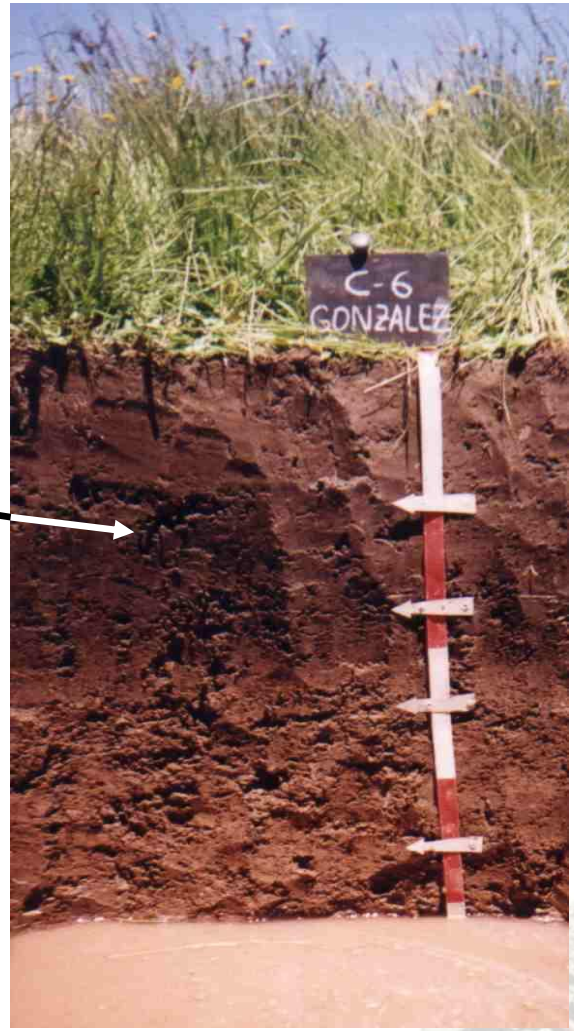


free, unconfined groundwater rises

Salt deposits in surface from groundwater rises

Solonetzes with a clayey, natric subsoil





A

2Bt1

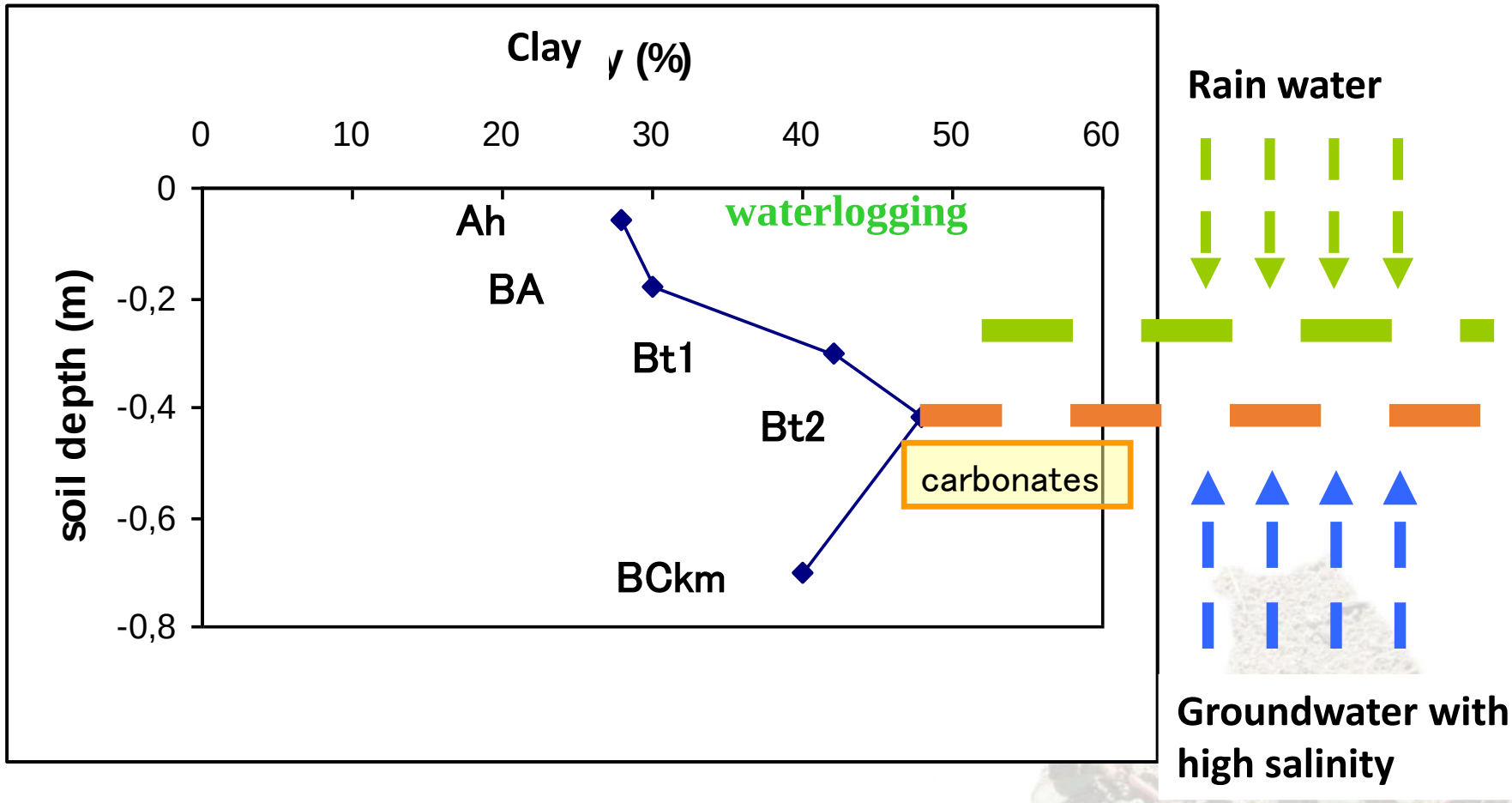
2Bt2

2BCk

2C

Floods are the result of accumulation of perched water table of rain water over the soil

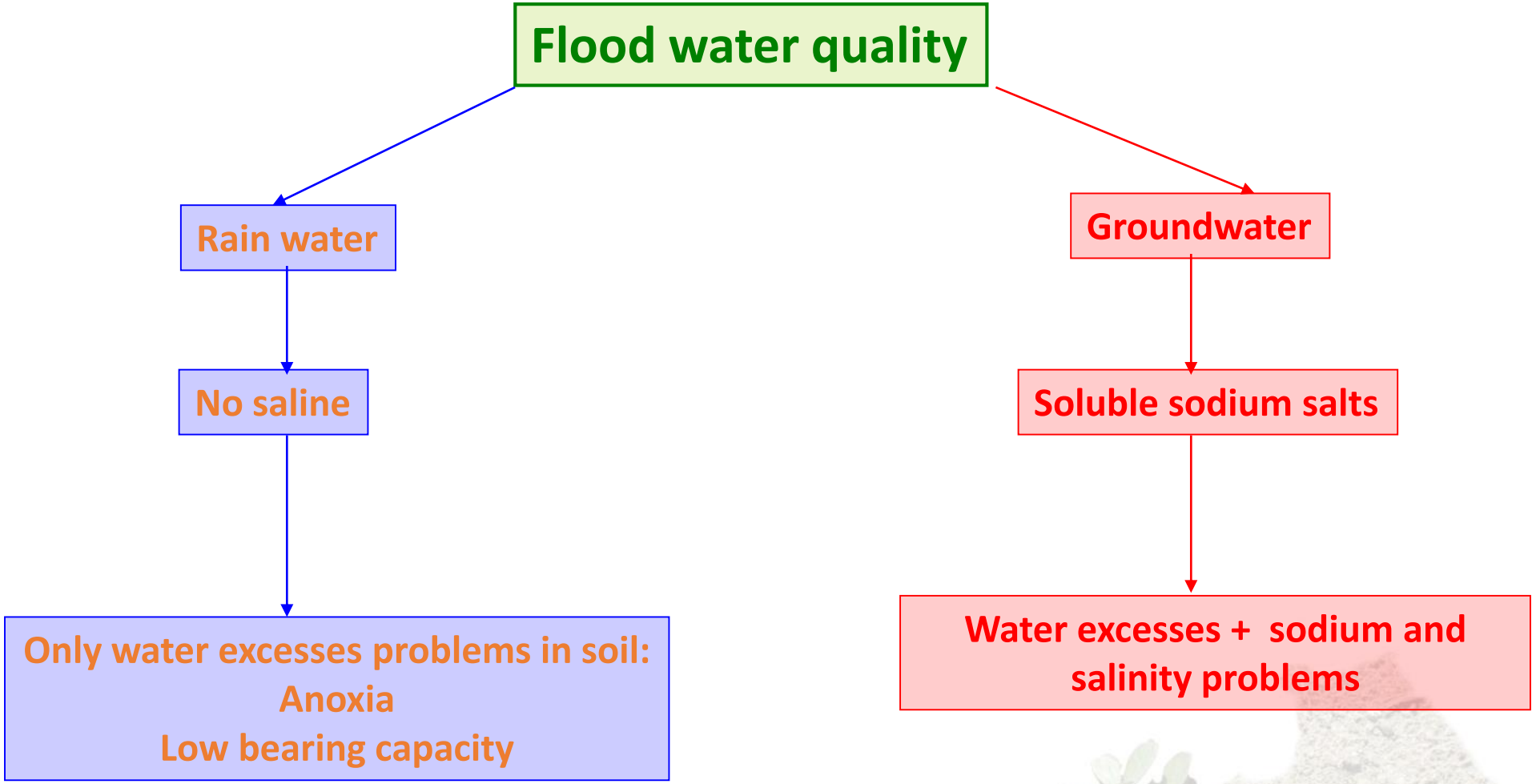
Cumulation of illuvial clay in depth



Dominant Soil Orders (US Soil Taxonomy) of Argentina

S.I.G.: Ing.Agr. Maria Ines Puentes
Fuente: Atlas de Suelos de la Republica Argentina
Instituto de Suelos - INTA - Castelar

The dashed line separates (roughly) where sandy soils (at the West) and fine-textured soils (at the East) occur.


Flood water quality
Rain water
No saline
Only water excesses problems in soil:
Anoxia
Low bearing capacity
Groundwater
Soluble sodium salts
Water excesses + sodium and salinity problems

Criteria for soil differentiation and soil capability:

- **depth from which main problems appear: hydromorphism, salinity and high ESP values;**
- **thickness and quality of the surface horizon**
- **type of waterlogging and type of salt;**
- **frequency and duration of flooding;**
- **spatial distribution in patches (which soil dominates?).**

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Thanks!