Food and Agriculture Organization of the United Nations

Salt-affected soils: threats and potentials

Leaching or reclamation, which one matters?

Joint meeting of
INSAS and SUSTAIN

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SUSTAIN

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Introduction

- Vast areas of Iran's wide land are covered by salt affected soils (SAS).
- Irrigated lands have a major contribution to agricultural products in Iran.
- The main portion of SAS are the irrigated ones.
- Irrigation water resources are increasingly salinizing.
- Improper application of these saline waters on soils accelerates soil salinization.
- The measures for management of different levels and kinds of salinity are not the same.

Introduction

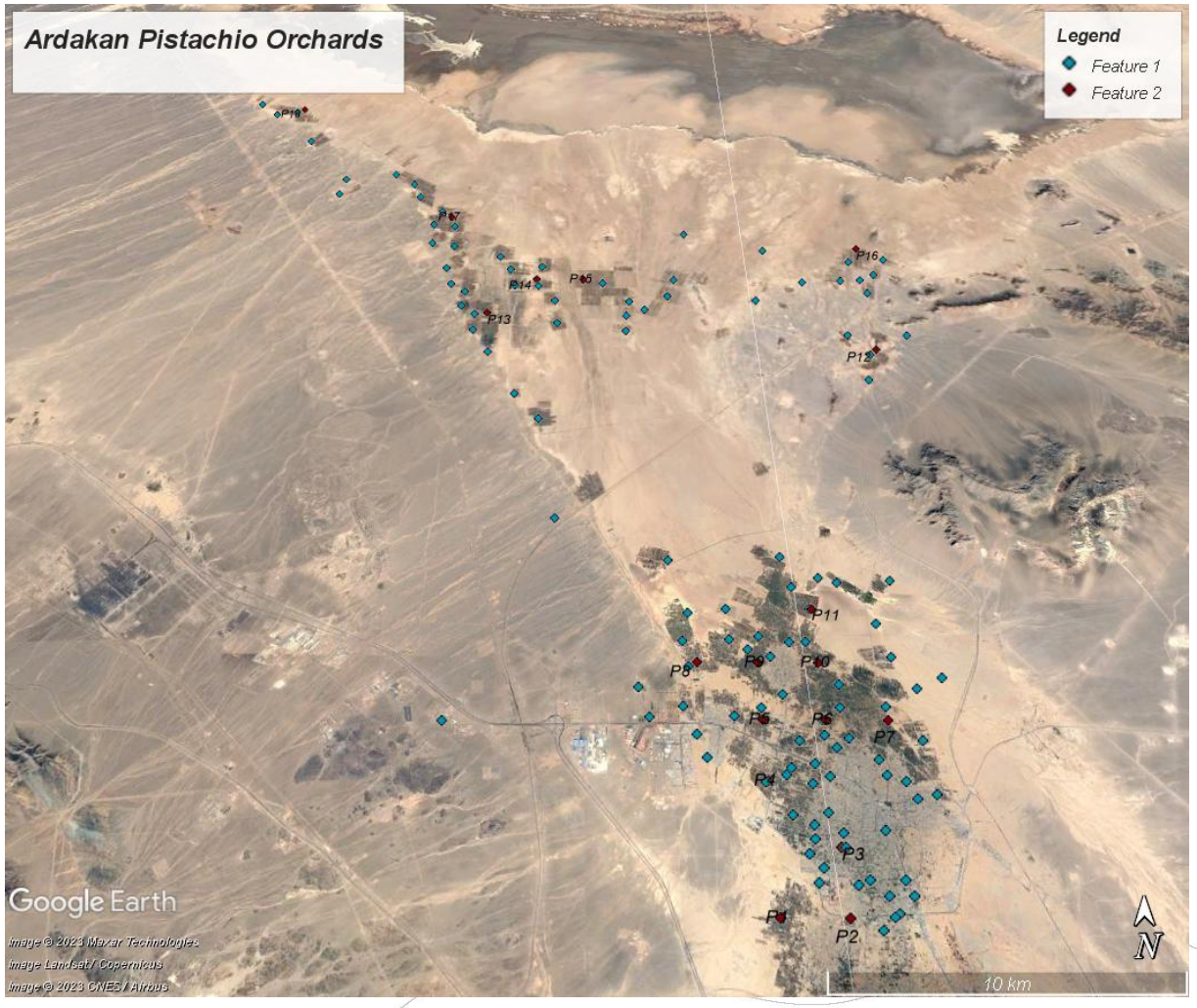
- Different classification schemes are proposed for soil and water quality assessment regarding the salinity/sodicity problems, among them the (Wilcox 1955), (Richards 1954) and (Ayers and Westcot 1985) are the most popular.
- Some local classifications have also been proposed for countries such as India and Iran (Abedi, Neirizi et al. 2002).
- These classifications rely on assumptions and prerequisites that restrict their utilization to a specific time or region. The validity of a part of these assumptions has been changed during the time or maybe remained valid on site-specific conditions (Asadi, Isazadeh et al. 2019) and their implementation for the current conditions of Iran is faced with the limitations, therefore it is necessary to be revised based on the new situation in the country.

Introduction

Advent of new problems and prospective on utilization of SAS and water resources, also reveals the necessity for an upgrade in the available classifications:

- the development of magnesium affected soil and water resources which is reported from Iran, Central Asia and Pakistan (Qadir et al., 2018),
- development of desalination plants for agricultural purposes (Rahimi et al., 2021),
- recycling of drain water in Haloculture plans (Khorsandi et al., 2020)
- and environmental/ non-agricultural use of saline soils and water resources (Salehi, 2020) are examples of new features in implementation of these resources.

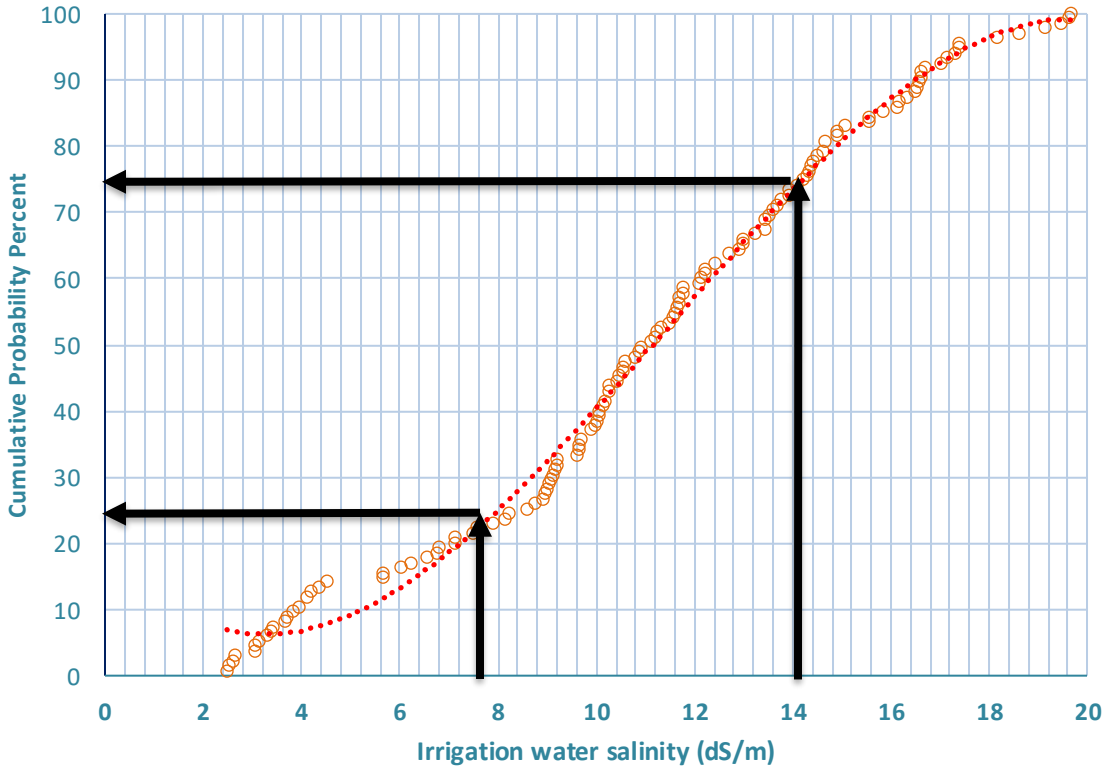
Materials and Methods

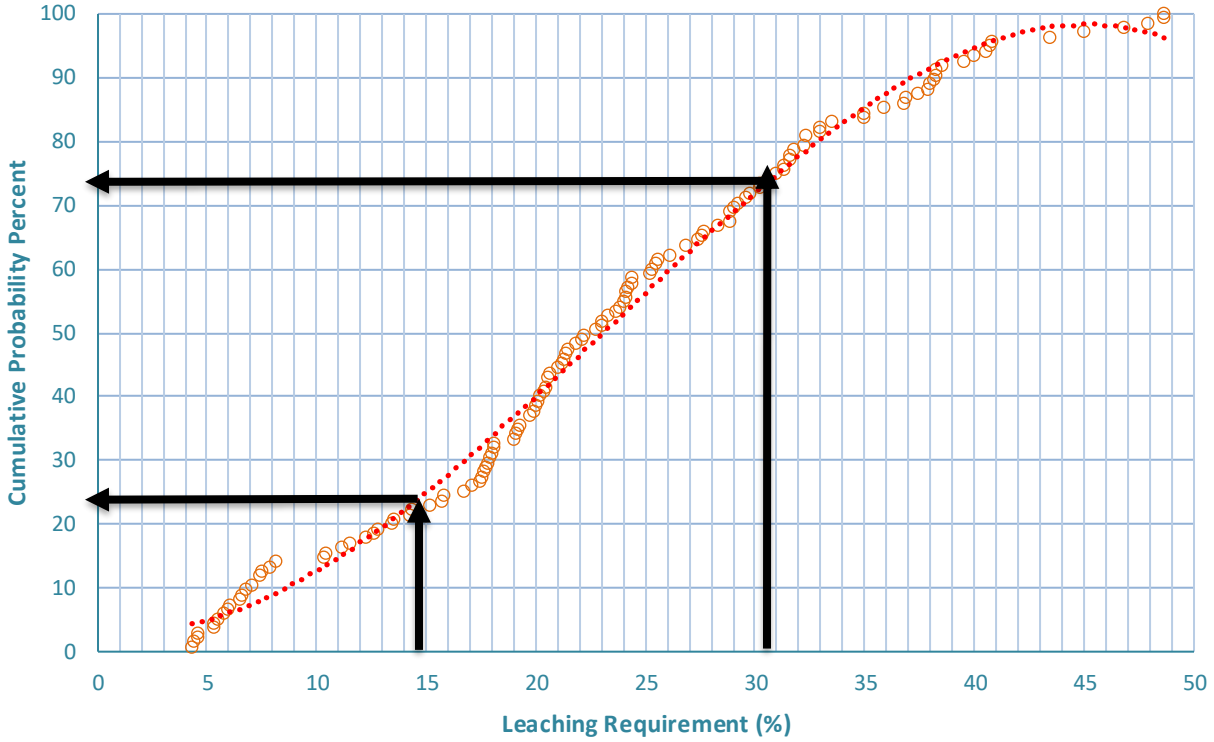


135 water samples which are used for irrigation of pistachio orchards in the North Ardakan area are evaluated in different classifications. Among these water samples, 18 fields were selected for which soil samples are augered down to 90 cm depth in 30 cm increments. The situation of these samples in different soil classification schemes is also evaluated. Figure 4 shows the location of soil and water samples in the north Ardakan area of Yazd province.

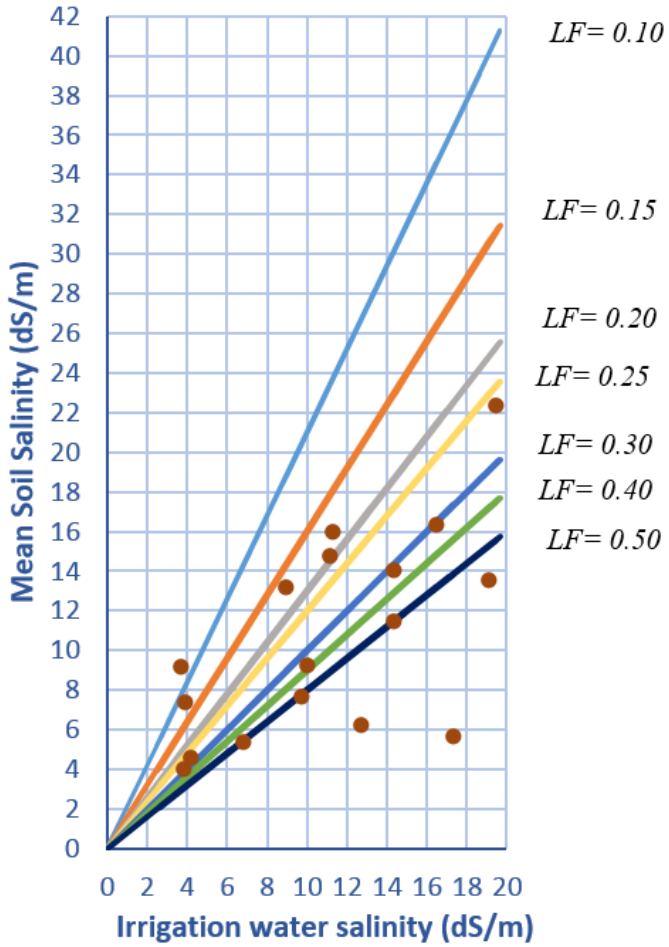
Results and Discussion

Salinity Problem

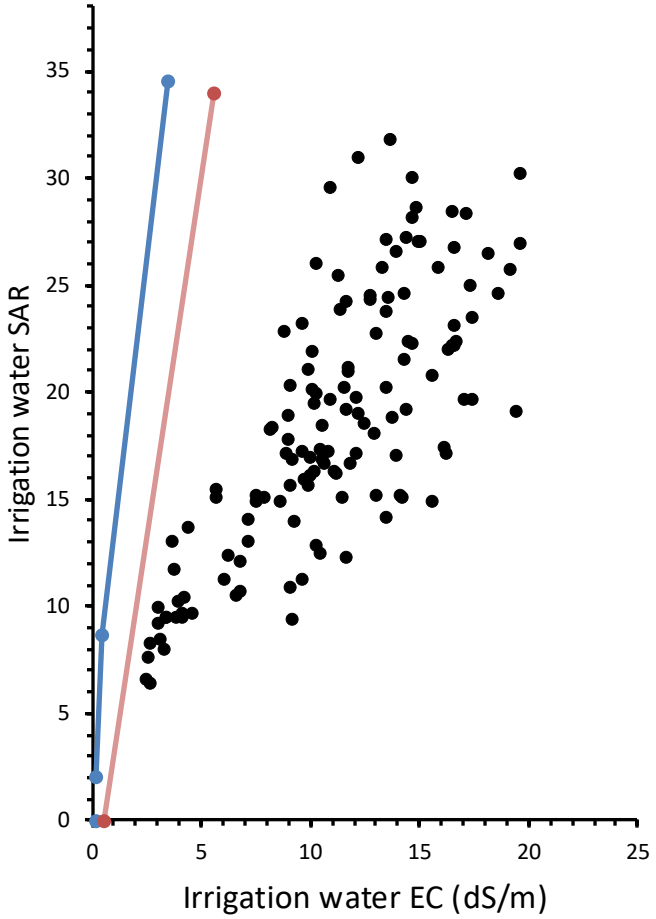


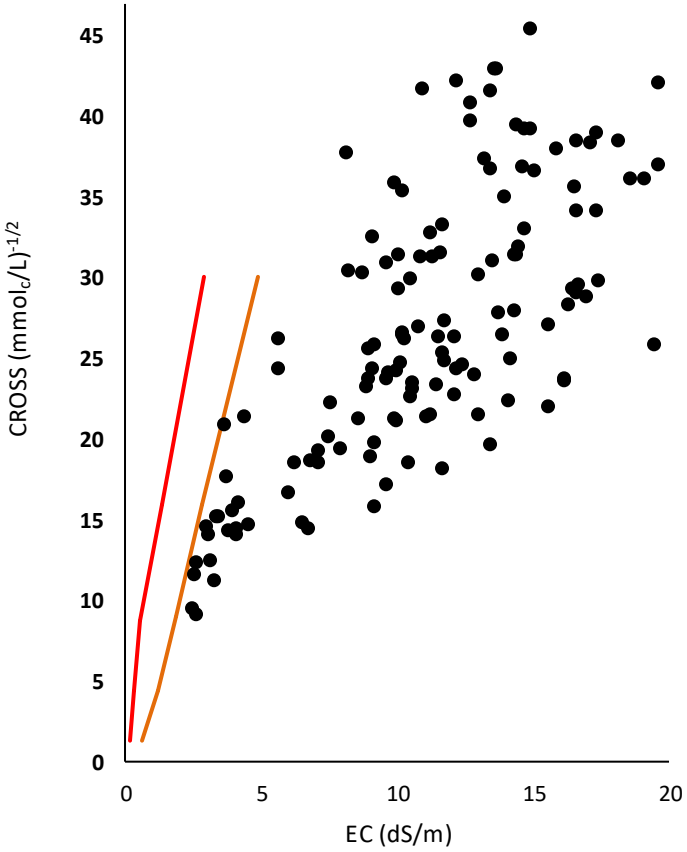


Salinity Problem

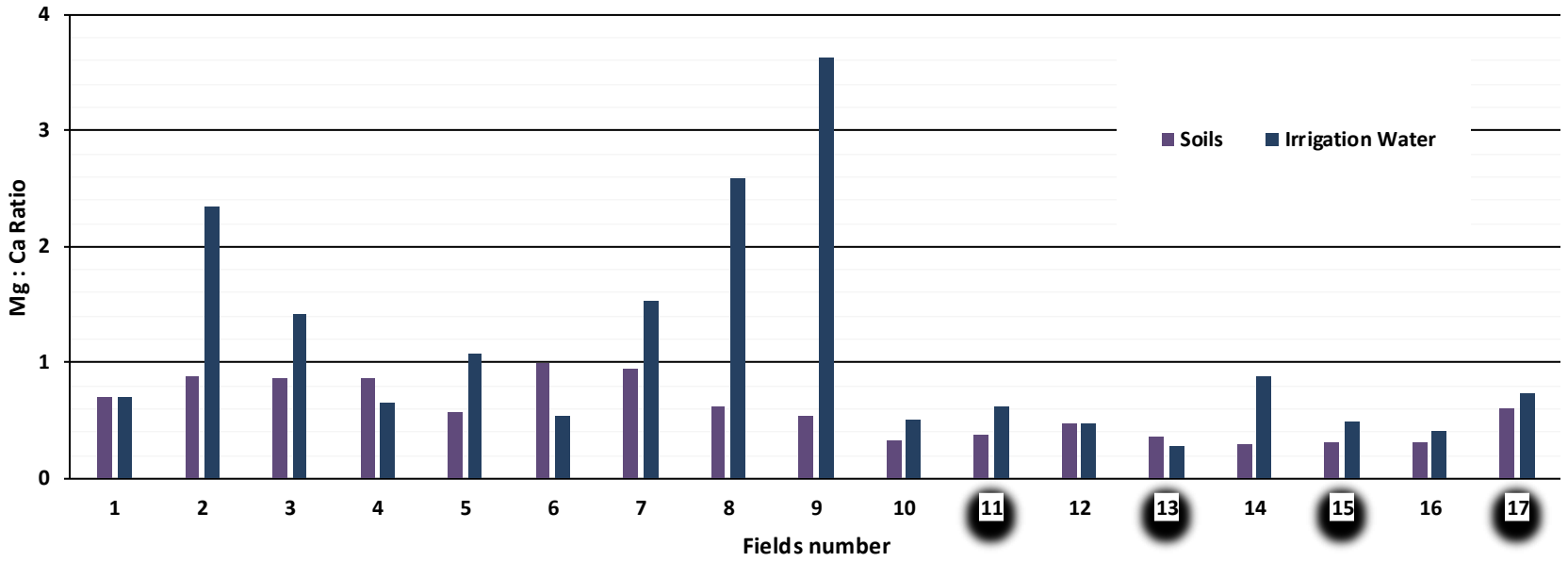


Infiltration Problem

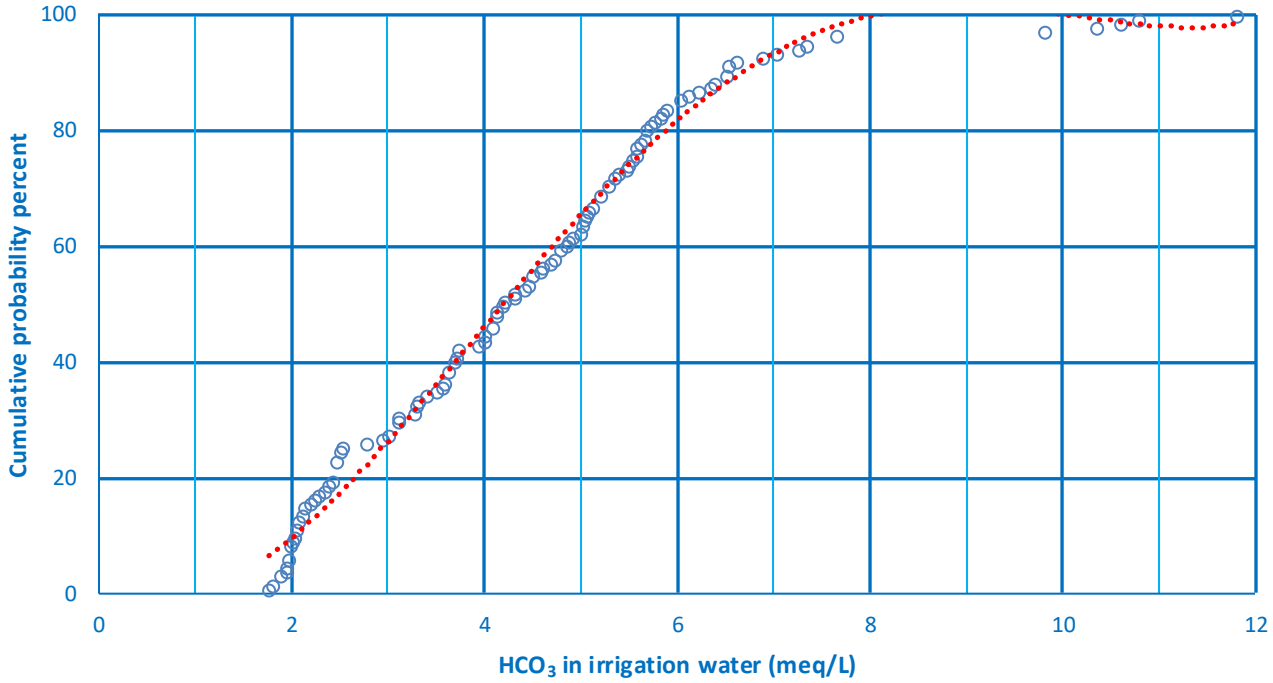




Magnesium Problem



Bicarbonate Problem



Conclusion

- The problem of high salinity in the irrigation water and the buildup of salts in the root zone, seems to be the main obstacle for the sustainability of pistachio production in the area.
- Although the farmers were successful in partially controlling soil salinity through leaching, but their leaching practices will waste considerable volume of water as deep percolation in LF values of higher than 30 percent as indicated by former studies (Hasheminejhad 2011).

Conclusion

Sodicity were not common among irrigation water and soil samples evaluated in this study, based on analysis of the literature the chemical amendments which are common for reclamation of sodic soils could not reduce soil salinity or increase the efficiency of leaching practices.

Magnesium and bicarbonate induced soil and water resources are developing in the irrigated pistachio orchards, which need more detailed consideration to take on appropriate management practices.

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Thank you

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Sustainable use of salt-affected lands

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