Food and Agriculture Organization of the United Nations

Salt-affected soils: threats and potentials

Projects, Policies and Actions in the Sustainable Use of Saline Soils in Turkey

Joint meeting of INSAS and SUSTAIN

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International Network of Salt-Affected Soils

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SUSTAIN Sustainable use of salt-affected lands

VNIVERSITAT DE VALÈNCIA

International Union of Soil Sciences

Valencia, Spain
May 27-31, 2024

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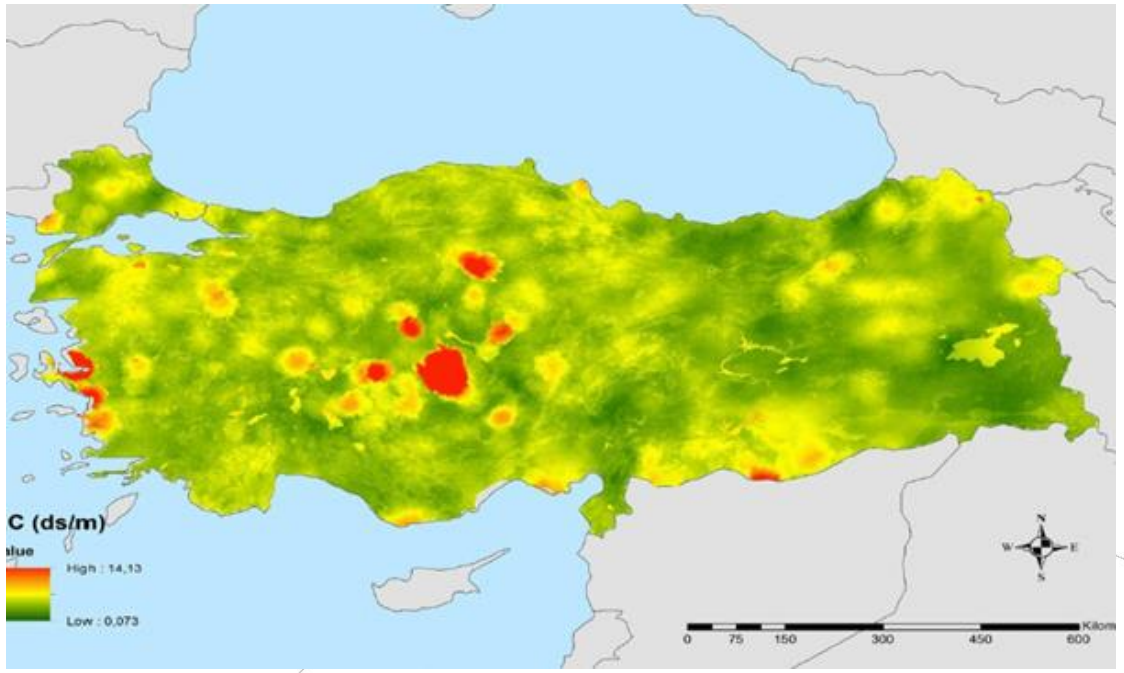
Introduction: Saline Soils in the Turkiye

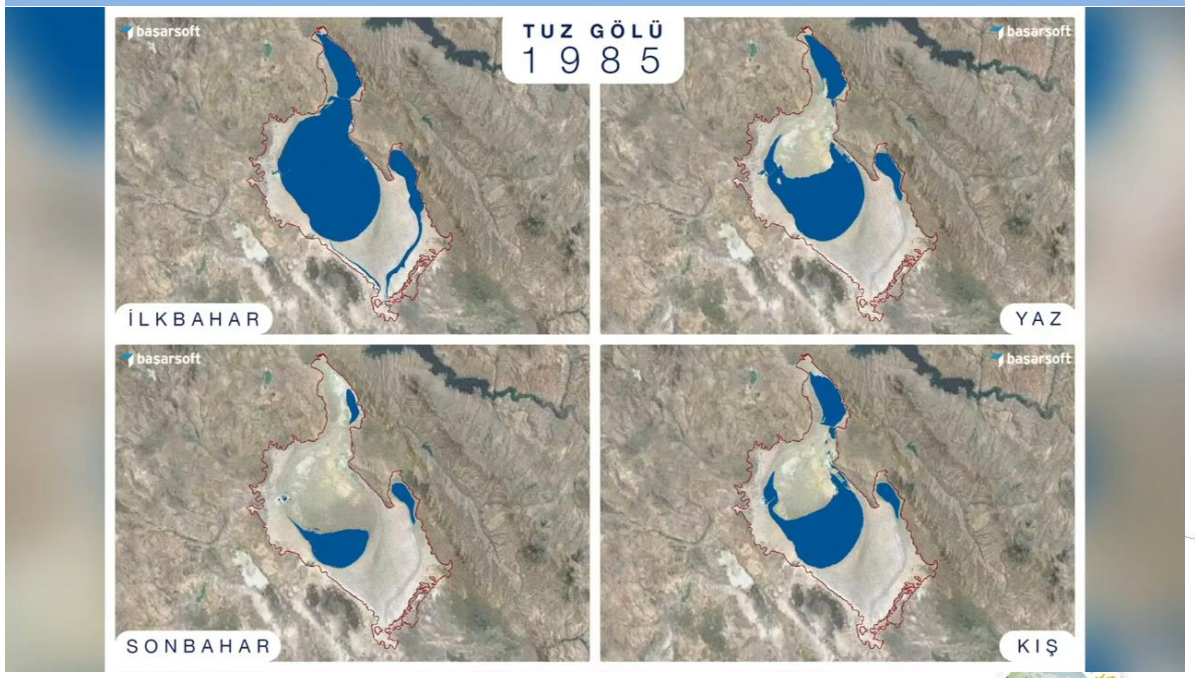
According to Turkey's soil resources inventory, approximately

- 1.5 million hectares are affected by salinity and alkalinity
- 2.8 million hectares have drainage problems
- 32.5% of irrigable lands in Turkey face issues with salinity, alkalinity, and drainage

Tuz Lake, area of 11,900 km², is a closed basin lake with no outflow. The presence of the Oligocene formation containing gypsum and salt layers…



SALT LAKE



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Causes of salinity in Turkey

The cause of salinity in Turkey include;

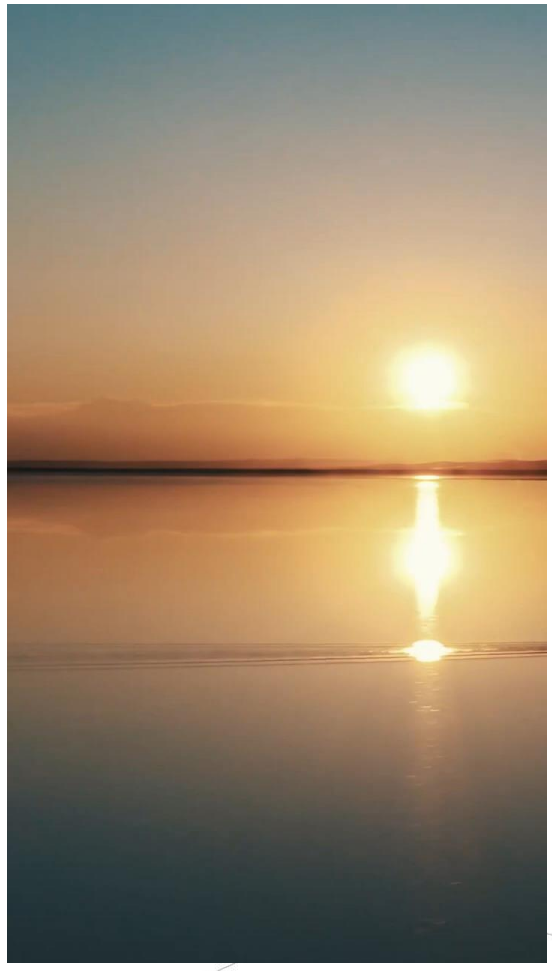
- parent material,
- topography,
- excessive irrigation,
- land drainage conditions,
- irrigation water quality,
- improper soil management practices,
- monoculture farming, etc.

The largest area affected by salinity in Turkey is located in the Konya Basin.

Challenges Faced in Managing Saline Soils

- Managing saline soils presents several challenges that need to be addressed effectively:

1. **Soil Degradation:** Saline soils are often degraded, with high levels of salts that can negatively impact soil structure, nutrient availability, and plant growth. Restoring soil fertility and structure requires targeted interventions.
2. **Water Management:** Saline soils are typically associated with poor water drainage and high water table levels, leading to waterlogging and salt accumulation. Effective water management strategies, such as drainage systems and irrigation practices, are essential but can be costly and complex to implement.
3. **Crop Selection:** Limited options for crop selection in saline soils due to salt sensitivity of many crops. Identifying and promoting salt-tolerant crops and cultivars is crucial for sustaining agricultural productivity in salt-affected areas.
4. **Cost and Resources:** Saline soil management often requires significant financial resources for soil amendments, drainage infrastructure, and ongoing monitoring. Limited funding and access to resources can hinder effective management efforts.
5. **Technical Expertise:** Implementing effective saline soil management practices requires technical expertise in soil science, agronomy, hydrology, and engineering. Building capacity among farmers, extension workers, and stakeholders is essential but can be challenging in some regions.
6. **Environmental Impact:** Improper management of saline soils can lead to environmental consequences such as groundwater contamination, soil erosion, and loss of biodiversity. Balancing soil health improvements with environmental sustainability is a key challenge.
7. **Climate Change:** Climate change can exacerbate salinity issues through changes in precipitation patterns, sea-level rise, and increased evaporation rates. Adaptation strategies that account for climate variability and resilience are needed in saline soil management plans.



Best Practices for Sustainable Management

1. **Improving Drainage:** Implement effective drainage systems such as tile drainage, subsurface drainage, or contouring to remove excess salts and prevent waterlogging. Proper drainage enhances soil aeration and reduces salt accumulation.
2. **Salt-Tolerant Crop Selection:** Choose salt-tolerant crops and varieties adapted to saline conditions. Examples include barley, certain types of wheat, saltbush, and some varieties of rice. Rotate crops to diversify nutrient uptake and reduce salt stress.
3. **Improving Soil Structure:** Use soil amendments like gypsum, organic matter, and lime to improve soil structure, enhance water infiltration, and reduce salt toxicity. Incorporating organic materials also promotes microbial activity and nutrient cycling.
4. **Preserve Natural Ecosystem:** The salt lake provides the opportunity for the Marsh Swallow (Glareola prantincola), Shelduck (Tadorna tadorna), Sheep Sheep (Tadorna ferruginea), Teal (Anas crecca), Swordbill (Recurvirostra avocetta), Bigeye (Burhinus oedicnemus) and seagull species (Larus sp.) to incubate.

Projects

•Many projects are being carried out in Turkey regarding the determination of the spatial distribution and management of saline soils.

•Many Salinity projects are carried out as the Agricultural Irrigation and Land Reclamation Working Group in Turkey, groundwater changes, forage crops in saline soils and soil salinity distribution research, etc.

•The international multi-collaboration PRIMA project, called Halo-sheep-Agroecological sheep/goat production system, is being carried out, investigating the utilization of halophyte plants grown in saline soils through animal consumption.

•HORIZON Project were submitted (April 26 2024) Agroeological accelerator at the landscape level (ACE) focused on keep soil health including combat to desertification, salinization, acidification, wrong landuse etc.

Policy Framework for Saline Soil Management in Turkey

According to Turkey's development plan reports, key highlights for protecting agricultural lands include:

1. Establishment of agricultural systems focusing on soil, water, and vegetation conservation to combat salinization and inefficiency due to improper land use.

2. Identification and implementation of common standards in soil studies and land evaluation, aligning with international standards to meet the needs of all sectors.

3. Integration of intersectoral plans to prevent misuse of agricultural land and effectively solve salinization problems.

4. Advocating for necessary amendments to Law 5403 on Soil Conservation and Land Use Plan to support these conservation efforts.

Law 5403

Building Partnerships for Collective Action

Building partnerships for collective action on salinated soil management involves several crucial steps:

1. Stakeholder Collaboration: Engage a diverse group of stakeholders including government bodies, agricultural organizations, environmental NGOs, researchers, and local communities. Each stakeholder brings unique insights and resources to tackle salinity issues effectively.

2. Integrated Planning: Develop integrated plans that combine scientific research, practical expertise, and community input to address salinity challenges comprehensively. This includes assessing the extent of salinity, identifying its causes, and designing targeted solutions.

3. Knowledge Exchange: Facilitate knowledge exchange platforms such as workshops, seminars, and forums where stakeholders can share best practices, innovative technologies, and lessons learned in salinity management.

4. Technical Assistance: Provide technical assistance and capacity-building support to farmers, land managers, and agricultural extension services. This includes training in soil testing, irrigation management, crop selection, and salt-tolerant farming practices.

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Building Partnerships for Collective Action

5. Research and Innovation: Encourage collaborative research initiatives to develop new technologies, crop varieties, and soil amendments that can mitigate salinity impacts and improve soil health in salt-affected areas.

6. Policy Advocacy: Advocate for supportive policies and incentives that promote sustainable land management practices, saline soil rehabilitation, and investment in salt-affected areas. This may involve lobbying for funding, regulatory reforms, and awareness campaigns.

7. Monitoring and Evaluation: Implement monitoring and evaluation frameworks to track progress, assess the effectiveness of interventions,

and make data-driven decisions for continuous improvement in salinity management strategies.

By building strong partnerships and fostering collective action, stakeholders can work collaboratively to address salinity challenges, enhance soil health, and promote sustainable agriculture in salt-affected regions.

Community Engagement and Stakeholder Involvement

Community engagement and stakeholder involvement are critical aspects of effective salty soil management. Here are some key strategies to engage communities and stakeholders in addressing salinity challenges:

Community Awareness Programs: Organize awareness campaigns, workshops, and seminars to educate local communities about the causes and impacts of salinity on soil health and agriculture. Use simple language and visual aids to make complex concepts understandable.

Participatory Workshops: Conduct participatory workshops that involve farmers, landowners, and community leaders in identifying salinity hotspots, sharing local knowledge about saline soil management practices, and co-designing solutions that are culturally and socially acceptable.

Collaborative Decision-Making: Foster collaborative decision-making processes where stakeholders actively participate in developing and implementing salty soil management plans. This can include setting priorities, allocating resources, and monitoring progress together.

Conclusion: Moving Towards a Sustainable Future

•Moving towards a sustainable future in salty soil territories in Turkey requires a concerted effort from all stakeholders. By implementing the following strategies, we can work towards mitigating salinity challenges and ensuring long-term soil health and agricultural productivity:

•Collaborative Partnerships
•Community Empowerment
•Integrated Approaches
•Capacity Building
•Policy Support
•Monitoring and Evaluation

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Thank you

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