COMPARATIVE STUDY OF SOIL HUMIDITY IN FOUR ISRAELI REGIONS

Afek school exprimental school for sustainability Rosh Ha'ayin Israel

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INTRODUCTION

Soil moisture is a critical factor in environmental sustainability, agriculture, and water resource management. Understanding the connection between soil type and relative humidity is essential for optimizing irrigation, preventing land degradation, and supporting sustainable agricultural practices. This study examines four regions in Israel—Dimona, Dir Hanna, Rosh HaAyin, and Herzliya—utilizing the GLOBE SMAP protocol to analyze soil moisture retention and climatic factors.

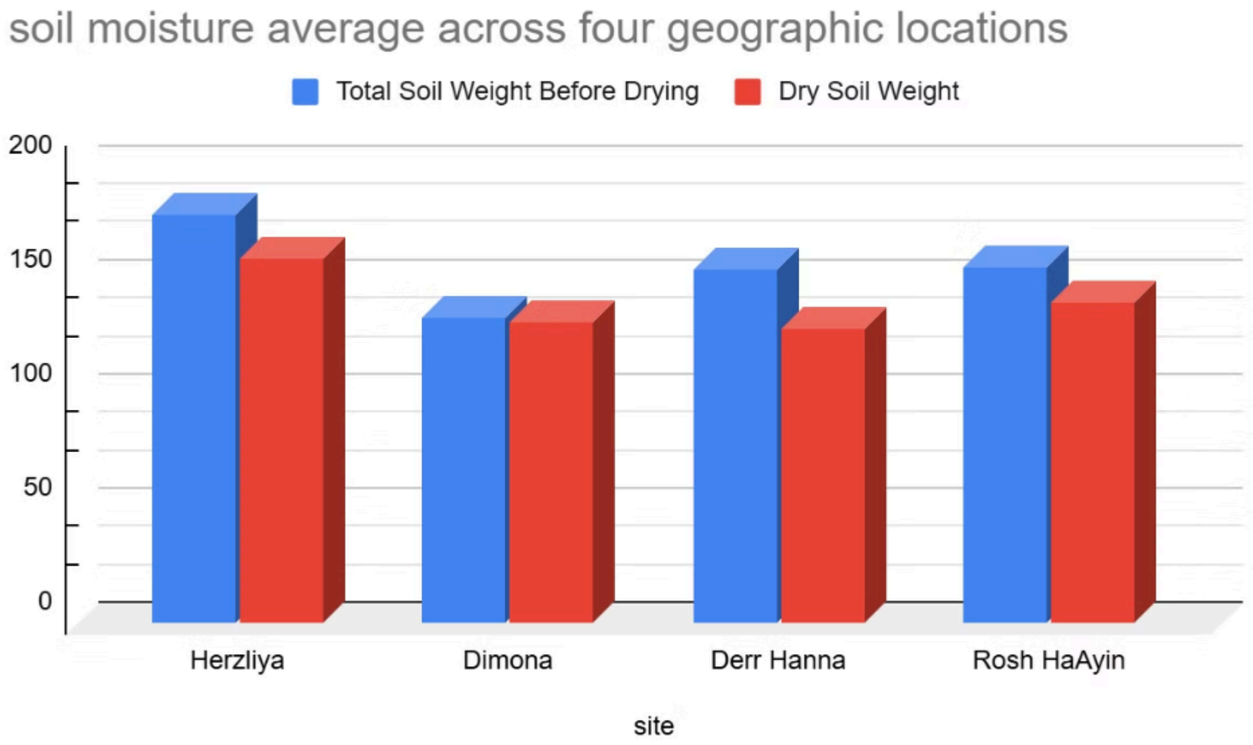
The research aims to contribute to global climate studies and support local applications in agriculture, irrigation planning, and water conservation. By bridging the gap between scientific research and real-world environmental challenges, this study provides valuable insights for informed decision-making in water management and agricultural practices.

RESEARCH METHODS

Soil and climate data were collected from Dimona, Dir Hanna, Rosh HaAyin, and Herzliya using the GLOBE SMAP protocol to ensure standardized global comparison.

- Soil Sampling: Multiple samples were taken from each site at 5 cm depth and classified by texture (clay, sand, loam, mixed).
- Moisture Measurement: Soil was weighed before and after drying under a heat lamp using a precision digital scale.
- Climate Data:
  - Temperature & Humidity: Measured with LABDISC ENVIRO multi-sensor.
  - Precipitation: Recorded using a GLOBE rain gauge.
  - Cloud Cover: Documented following the GLOBE Cloud Observation Protocol.
- Collaboration: Students from four schools conducted data collection simultaneously, fostering scientific engagement and cross-cultural collaboration between Jewish and Arab communities.

RESULTS


soil moisture average across four geographic locations
Total Soil Weight Before Drying
Dry Soil Weight
200
150
100
50
0
Herzliya
Dimona
Derr Hanna
Rosh HaAyin
site

RESULTS

Soil moisture retention varied across four geographic locations in Israel, reflecting differences in soil type and climate:

Herzliya (Coastal - Mixed Sandy-Clay Soil) retained moderate moisture, influenced by sea humidity.

Dimona (Arid Desert - Sandy Soil) had the lowest moisture retention, due to rapid drainage and high evaporation.

Dir Hanna (Mediterranean - Loamy Soil) showed balanced retention, ideal for agriculture.

Rosh HaAyin (Transition Zone - Clay Soil) retained the most moisture, due to high water absorption capacity.

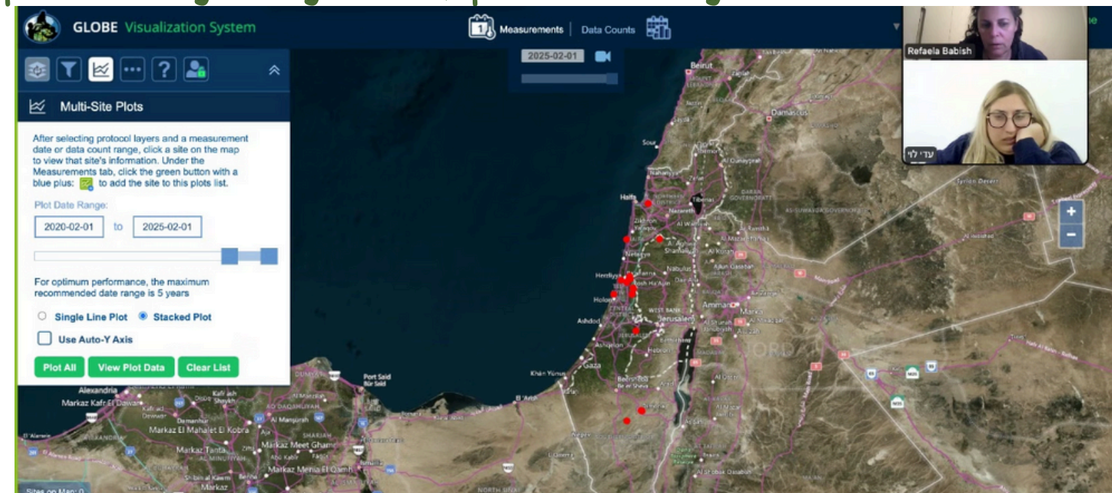
These findings confirm that clay soils hold the most moisture, sandy soils drain quickly, and coastal soils fluctuate based on humidity levels, reinforcing the importance of soil type in water conservation and land management.

DISCUSSION

This study highlights the strong link between soil type and moisture retention across different regions of Israel. Soil characteristics play a key role in water retention, affecting agriculture, water conservation, and environmental sustainability.

- Clay soils retain the most moisture, making them ideal for water-intensive crops.
- Sandy soils drain quickly and evaporate more, requiring efficient irrigation in arid areas.
- Loamy soils offer a balance of absorption and drainage, creating optimal farming conditions.
- Coastal soils, influenced by sea humidity, show fluctuating moisture levels, impacting land management.

Understanding soil-moisture interactions is crucial for optimizing irrigation, preventing land degradation, and promoting sustainable agriculture.



CONCLUSION

This study confirms that soil type significantly affects moisture retention, influencing agriculture, water conservation, and climate interactions.

- Clay soils (Rosh HaAyin): High retention, ideal for water-dependent crops.
- Sandy soils (Dimona): Low retention, requiring efficient irrigation in arid areas.
- Loamy soils (Dir Hanna): Balanced absorption and drainage, optimal for farming.
- Coastal soils (Herzliya): Fluctuating moisture due to humidity and sea proximity.
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These findings emphasize the role of soil characteristics in environmental planning. Understanding soil-moisture interactions can improve irrigation, prevent land degradation, and promote sustainability. Future research should explore seasonal variations, vegetation impact, and long-term climate trends.

GLC

This study demonstrates the value of collaborative learning and scientific inquiry in addressing real-world environmental challenges. By engaging students from diverse backgrounds in data collection and analysis, the project fostered scientific literacy, environmental awareness, and cross-cultural understanding. The findings contribute to global climate studies and provide valuable insights for local applications in agriculture, irrigation planning, and water conservation.

OUR TEAM

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