



THE GLOBE PROGRAM



وزارة التعليم

Alharith Bin malik School

Temporal Analysis of Vegetation Cover Change in Bahla City

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Introduction

This research aims to study the temporal change of vegetation cover in Bahla City and its relationship with local climate, focusing on the impact of temperatures, relative humidity, and rainfall amounts on plant density. Bahla City is an arid and semi-arid region, where vegetation cover serves as a sensitive indicator of climatic fluctuations and directly affects ecosystem stability and hydrological balance.

Research Procedures (Methodology)

The research was conducted in Bahla City located in the Al Dakhiliyah region of the Sultanate of Oman. Field data were collected using GLOBE protocols, which are as follows: Temperature, humidity, and rainfall protocols for the study site and Satellite images of vegetation cover known as False color.

Results

Climate data were collected from the Agricultural Research Center in Jama'h. During 31 days of monitoring: average temperature 26.4°C, average relative humidity 44.1%, total rainfall 0 mm.

Statistical analysis showed a clear improvement in vegetation cover between 2023 and 2024:

These results indicate a clear improvement in vegetation cover density in the study area, which may be attributed to improved climatic conditions or water resource management practices.

No rainfall was recorded during the study period (November-December 2023)

Discussion of Results

NDVI index results showed clear improvement in vegetation cover density, represented by increased statistical values between 2023 and 2024, indicating positive development in the region's vegetation status.

Results did not show a direct relationship between rainfall and vegetation cover, due to the absence of rainfall during the study period, and it is likely that vegetation cover is supported by non-rainfall water sources.

Moderate temperatures contributed to providing a suitable environment for vegetation cover growth without recording clear negative effects.

Results showed that relative humidity plays a supporting role in improving vegetation cover density by reducing water stress on plants.

Conclusion

The research also found that moderate temperatures within the range of 24–28°C provided a suitable environment for plant growth, supporting physiological processes such as photosynthesis, positively reflected in vegetation cover health and NDVI values. Additionally, relative humidity played a supporting role in reducing water stress, enhancing vegetation cover stability under dry climatic conditions.

These results confirm the effectiveness of using remote sensing techniques, and NDVI index in particular, as an accurate tool for monitoring vegetation cover health and analyzing its temporal and spatial dynamics. They also highlight the importance of integrating field climatic data with satellite analyses to provide a comprehensive view of the relationship between vegetation cover and local climate.

Summary

this study's results that vegetation cover in Bahla City shows clear temporal and spatial variation reflecting its influence by local climatic factors, particularly temperature and relative humidity. NDVI index results showed improvement in vegetation cover density between 2023 and 2024 despite the absence of rainfall during the study period, indicating the agricultural system's dependence on alternative water sources, such as artificial irrigation or soil-stored moisture from previous periods.

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