

# Studying the impact of certain agricultural experiments on soil health and biodiversity

Prepared by students: Sundus Al-Jaldaniyah and Azza Al-Daghishiyah  
Umm Hani Basic Education School (١٢-٨) – Sultanate of Oman/



## Abstract

The aim of this research is to study the impact of agricultural practice on soil health and biodiversity. This will be achieved by answering the following questions:

1. What is the impact of agricultural practices on soil health in the farms of the Wilayat of Samail?
2. What impact do agricultural practices have on biodiversity?

Four farms in the state were selected ( Al Mazraa – Siya 1 – Siya 2 – Al Nabhaia ) and the ground cover protocol was applied and data was collected.

The soil protocol was also applied to soil samples from the farms studied and studied to assess soil quality and record observations on biodiversity and biological diversity on site.

The study results indicated that the soil was generally healthy at the studied sites. The farms ( Siya 2 and Al-Nabha) were considered the best in terms of soil quality indicators related to ground cover density, as they recorded higher values for green ground cover density (85%), while the farm recorded the lowest value (50%).

The acidity values of the soil samples indicated a very slight alkalinity level that did not exceed a pH of 8.3, and the pH of the farm soil was very ideal ( 7.98 ).

The salinity values indicated ideal non-saline values for all studied samples, as they ranged between only ( 800-500 ppm)

The observation of the presence of different types of plants (herbs, shrubs, trees) , that the plants are bright green and have strong growth , the diversity of crops, the presence of decaying leaves on the surface , the movement of different worms and insects in the soil, and the use of organic fertilizers by the locals all gave a positive indication of soil quality and biodiversity.

## Research questions

1. What is the impact of agricultural practices on soil health in the farms of the Wilayat of Samail?
2. What impact do agricultural practices have on biodiversity?

## research methods

- The work roles were distributed among the research team, consisting of preparing the tools and carrying out the field application.

Applying the water protocol to the samples	female students
Applying the ground cover protocol and collecting data	Azza and Sundus in collaboration with the team
protocol application/soil	Azza and Sundus
Photographing the steps of the search	Azza
Data analysis and research writing under the supervision of the teacher	Sundus

- Identifying, reviewing, and documenting some sources of information related to the research topic.
- Selecting and identifying study sites in preparation for starting data collection.
- Identifying the appropriate protocols for collecting research data, which mainly consisted of the soil protocol and the land cover protocol.
- Identify the appropriate devices and tools to carry out the research plan ( GPS , cups, water, vinegar, pH meter, paper, pen, smartphone, stirring rod, ruler, sieve, tree density meter, slope meter, metric tape, camera).
- Implementing the protocols at the designated study sites.
- Collecting and organizing data into tables.
- Record observations related to biodiversity and the level of attention given to the farm on the observation card .
- Enter the newly collected data on the program's website. ( www.GLOBE.gov )

Analyzing the data and arriving at conclusions and recommendations

## Introduction

Agricultural practices :

The agricultural practices followed by farmers and farm managers are important in preserving the soil and ensuring its health. These practices include:

- Soil management : Timely tilling, use of organic fertilizers to improve soil properties and supply it with nutrients, and solar sterilization of the soil .
- Fertilization : The use of organic and mineral fertilizers to improve soil fertility and increase its ability to retain water .
- Irrigation : Using modern and efficient irrigation systems such as drip irrigation to increase water use efficiency .
- Pest control : Applying safe methods to reduce the use of chemical pesticides, and relying on biological control and crop rotation .
- Crop rotation : Growing different crops in rotation to maintain soil health and avoid depletion .

## Results

Sky cover		ground cover			the site
Without	□	Without a cover	brown	green	
81027	81054	81027	81014	81040	farm
93031	93062	93019	9304	93070	Siya 1
100047	100053	10003	10007	100035	Siya 2
87029	87058	87010	8703	87074	-Al abhiyyah

salinity	acidity pH	Carbonates	rocks	Roots	Soil texture	cohesion	the site
700 ppm	7.98	abundant	□	Many	sandy clay	fluid, soft	farm
800 ppm	8.25	abundant	□	Many	sandy clay	fluid, soft	Siya 1
800 ppm	8.25	abundant	□	Many	sandy clay	fluid, soft	Siya 2
500 ppm	8.3	abundant	□	Many	clay Green	fluid, soft	-Al abhiyyah

## Bibliography references

Agricultural Practices. Journal of Ecology Research .

<https://openaccesspub.org/journal/agronomy-research>  
Retrieved 2025/12/30 Al-Saleh, Aqaba. (2025).

Journal of Agriculture and Ecosystems.

What are the characteristics of arable soil ? altaleb blog

Des, Fanny (2023). Soil health: why it matters and how to protect it . BioProtection Portal GLOBE Programme Technical Office , (2012). GLOBE Programme Teacher's Guide Greeneage Middle East and North Africa (2024). What is biodiversity and why is it important ?

Harris and Bezidek (1994). The impact of agricultural practices on soil and water quality in the Mediterranean region and a proposed assessment method . Vol. 88, No. 2 Madou -Bier and McLaughlin- Allison (1995) . The impact of agricultural practices on biodiversity. Vol. 55, No. 3 Soil quality indicators . <https://metergroup.com/education-guides/ndvi-and-pri-the-researchers-complete-guide/> Retrieved 2025/12/30

Technical Office of the GLOBE Environmental Programme, (2012).

Land Cover Research in the GLOBE Environmental Programme Technical Office of the GLOBE Environmental Programme, (2012).

Soil research in the GLOBE Environmental Programme

## Discussion

Suitable soil for agriculture is soil that provides the optimal environment for plant root growth and absorption of water and nutrients, serving as a supportive medium and source of nutrition for the plant.

The soil protocol data indicated a high degree of similarity in the physical properties of the soil samples studied from the four sites. All were described as loose , fluid clay soils containing numerous roots and rocks. Clay soils are heavy soils, rich in The soil protocol data indicated a high degree of similarity in the physical properties of the soil samples studied from the four sites. All were described as loose , fluid clay soils containing numerous roots and rocks. Clay soils are heavy soils, rich in nutrients and minerals, and characterized by their high moisture retention capacity due to their fine texture. It is considered highly fertile and very suitable for field crops and fruit trees. This has been observed in farms in the presence of fruit-bearing palm trees, citrus trees such as lemons, quince, and others, papaya and fig trees

## Conclusions

has reached the point of studying the impact of some agricultural practices on soil health and biodiversity in farms in the state of Samail.

Four farms were selected for study, and soil quality was assessed using data collected on the land cover and soil properties of each site. Biodiversity was also observed in the farms.

Soil quality indicators from the data collected on ground cover indicated generally healthy ground cover for the farms studied, although there were some minor variations from farm to farm. The soil protocol data indicated a high degree of similarity in the physical properties of the soil samples studied from the four sites. All were described as loose , fluid clay soils containing numerous roots and rocks. Clay soils are heavy soils, rich in nutrients and minerals, and characterized by their high moisture retention capacity due to their fine texture. It is considered highly fertile and very suitable for field crops and fruit trees. This has been observed in farms in the presence of fruit-bearing palm trees, citrus trees such as lemons, quince, and others, papaya and fig trees