Ministry of Education

Directorate General of Education in Al Dhahirah Governorate

Sawda umm Al Mu'minin Basic Education School (Grades 5-12)

Prepared by:

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enrolled in: Grade 8/2

Supervised by Professor: Fakhriya Al-Balushi

School:

Sawda Umm Al-Mu'minin Basic Education School(5 - 12)

Project idea:

Studying the water quality in wells in various locations in Al-Duraiz village, Ibri Governorate, by comparing it with (pH, salinity, turbidity, dissolved oxygen percentage)

Contents :

Abstract:

My research aims to study the water quality in wells located in different areas of Al-Duraiz village in the state of Ibri, and to identify the differences in the characteristics of water samples collected from these wells in terms of salinity, pH, dissolved oxygen ratio, and turbidity .

Samples were studied in the school's physics laboratory, and the results were analyzed to determine the suitability of the water for human and agricultural use in various locations with in the Wilayat of Ibri

Research Questions and Terms:

Research questions:

1. Do the characteristics of well water differ from one region to another?
2. Is there a change in water quality? And what is its effect on human and agricultural use?
3. Which regions are best for extracting and using well water?

Research terms :

- **pH:** A measure of how acidic or alkaline water is.
- **Salinity:** The amount of salt dissolved in water.
- **Transparency:** A measure of how clear or cloudy water is due to the presence of impurities.
- **The percentage of dissolved oxygen in water:** the amount of oxygen gas present in the water that is essential for aquatic organisms.

Introduction:

Groundwater is one of the most important sources of fresh water in arid and semi-arid regions, and wells are the primary means of accessing it. The Wilayat of Ibri is one of the Omani wilayats where wells are widespread due to it's geographical nature and diverse water sources .

With increasing water demand and the expansion of agricultural and urban activities, the need arose to study the water quality in these wells to ensure their safe and sustainable use. This research aims to analyze the water quality of wells in the village of Al-Duraiz in the Wilayat of Ibri by measuring specific physical and chemical indicators and comparing them across different areas to determine their suitability for various uses .

Research Methodology:

First: Timetable (1 (for implementing the research plan:

Implementation Dates	Task	Student Name
October	Gathering information about the research topic	Shams Mabrouk Moussa
October	identified the different areas in the village of Al-Duraiz to determine the wells that would be searched.	Shams Mabrouk Moussa
October	Sample collection	Shams Mabrouk Moussa
October	Start the tests and record the results	Shams Mabrouk Moussa
October	Note the final results and write the research based on them.	Shams Mabrouk Moussa

Second: Study Locations :

I conducted this research during the month of October after collecting water samples from different areas in the school's physics laboratory under the supervision of Professor Fakhriya Al-Balushi.

Temperature between

25-33°C

Location:

Picture 1

Picture 2

Third: Sample Collection and Analysis :

To answer the first question, I did the following:

First, I collected samples of well water from different areas in the village of Al-Duraiz (Al-Tuwayan, Al-Basra neighborhood, Al-Khatw) and prepared the tools used to conduct the research. After completing the extraction of the results, I compared each area and we concluded that the characteristics of the well water in each area differ from the others.

To answer the second question, I did the following:

After extracting the results, I selected the area suitable for using the available water for agriculture and other activities, based on the suitability of the well water's characteristics for these activities.

To answer the third question, I did the following:

I nominated the first region as the best based on the results obtained.

The results were as follows:

1. pH:

I measured the pH using a pH meter and found that the first area (Al-Tuwayan) = 7, the second area (Al-Basra neighborhood) = 6, and the third area (Al-Khatw) = 8

Picture 3

2. Salinity:

I measured the salinity using a salinity meter, and the results showed that the first area (Al-Tuwayan) = 285 ppm, the second area (Hay Al-Basra) = 707 ppm, and the third area (Al-Khatw) = 830 ppm.

3. Dissolved oxygen levels:

I measured the oxygen levels and found that the first area (Al-Tuwayan) = 10, the second area (Al-Basra neighborhood) = 8, and the third area (Al-Khatw) = 5

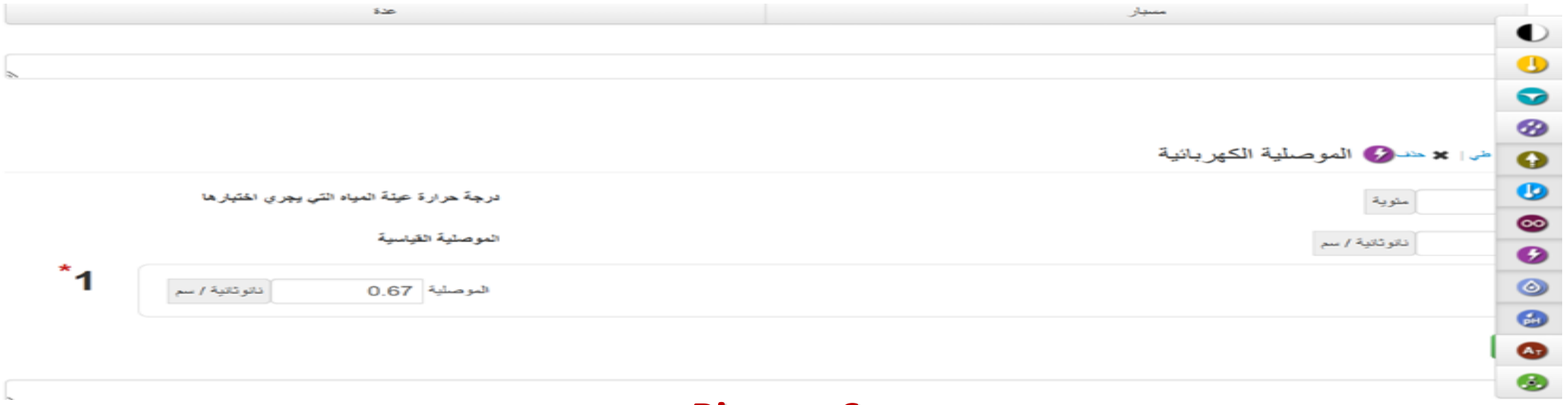
Picture 4

Picture 5

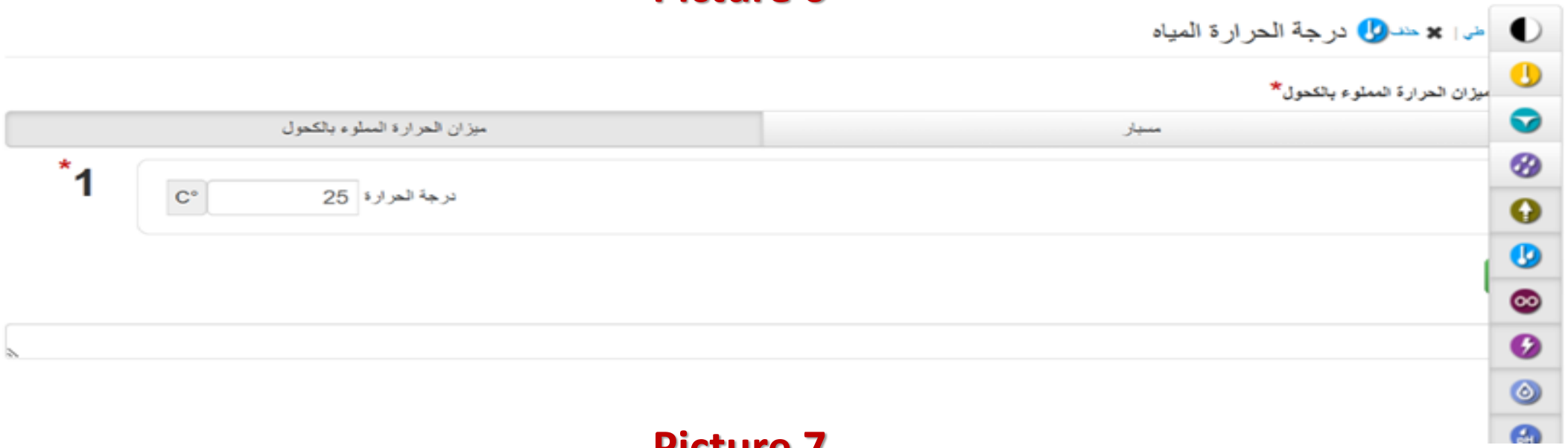
4. Transparency percentage:

All areas have the same transparency percentage = 120

Fourth: Entering data into the program's international website :



Picture 6



Picture 7

Results:

I noticed that the Al-Tuwayan area is the best, and the results show that: pH = 7, which is evidence of neutrality, salinity = 285, transparency = 120, and oxygen = 10. This is the best result because the closer we get to the ratio of dissolved oxygen to 12, the better, unlike other areas.

District 1 Al-Khatw	District 2 Al-Basra District	District 3 Al-Tuwayan	Points of Comparison
8	6	7	pH
830ppm	707ppm	285ppm	Salinity (ppm)
5	8	10	The percentage of dissolved oxygen in water (L/mg)
120	120	120	Transparency

Discussion of the results:

Regarding the first question: 1- Do the characteristics of well water differ from one region to another? Based on the results obtained upon completion of the research, we compared three regions and found variations in salinity, dissolved oxygen, and pH. It was thus established that the characteristics of well water do differ from one region to another.

Regarding the second question: Is there a change in water quality and what is its impact on human and agricultural use?

It was found that there is a significant variation in water quality between regions.

In agricultural activities: High salinity leads to decreased crop yields and deterioration of soil fertility, and increased transparency can cause blockages in irrigation systems.

In human use: High salinity or low oxygen levels may render water unfit for drinking, necessitating treatment or a change of water source.

Regarding the third question: Which areas are best for extracting and using well water?

The results showed that the Al-Tuwayan area is the best, with the following indicator values:

PH = 7 (perfectly neutral)

Salinity = 285 ppm (lowest salinity)

Dissolved oxygen = 10 (relatively high; the closer to 12, the better)

Transparency = 120 (acceptable)

These values indicate water quality suitable for agricultural and domestic use

Conclusion, Acknowledgments

Conclusion:

The study revealed that well water quality in Al-Duraiz village varies from one area to another, with the Al-Tuwayan area exhibiting the best pH balance, low salinity, and high dissolved oxygen levels.

These findings highlight the importance of regular water quality monitoring to ensure the sustainability of water resources and mitigate practices that lead to pollution.

It is also recommended to maintain and clean wells regularly, avoid discharging agricultural pollutants near them, and encourage the use of modern irrigation methods to preserve water quality.

Conclusion, Acknowledgments

Acknowledgments:

I extend my sincere thanks and gratitude to Professor Fakhriya Al-Balushi for her supervision and guidance during the implementation of this project. I also thank the school administration for providing the necessary equipment to conduct this study, and everyone who contributed to the completion of this scientific research...

Notes :

Badge 1	Badge 2	Badge 3	Points of Comparison
I AM A STUDENT RESEARCHER	I AM A COLLABORATOR	I AM A STEM PROFESSIONAL	Badge name
			Badge shape
I deserve this recognition because I conducted thorough and distinguished scientific research on the quality of well water, contributed to raising environmental awareness in my community, and because I made a great effort in implementing my environmental research project within the GLOBE program.	I deserve this recognition because I completed my first research project in the GLOBE program through my own personal effort, with some constructive collaboration from my friends participating in the program and the supervision of my teacher who also helped me.	I deserve this recognition because I completed my first research project in the GLOBE program in the field of science, engineering, mathematics, and technology, with some constructive collaboration from my friends participating in this program	Why do I deserve it?

the reviewer:

1. World Health Organization. (2017). Guidelines for drinking-water quality (4th ed.). WHO Press.

2. APHA. (2017). Standard methods for the examination of water and wastewater (23rd ed.). American Public Health Association.

3. United States Environmental Protection Agency. (2023). Water quality parameters and standards

4. Al-Harthy , S., Al-Busaidi , A., & Al-Rawahy , S. (2020). Assessment of groundwater quality for irrigation and drinking purposes in northern Oman. Environmental Monitoring and Assessment, 192(4), 1–15