

Kingdom of Saudi Arabia

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         General Administration of Education in Tabuk Region

           Middle sixteenth

**Search title :**

**Tabuk well water and its impact on soil**

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**2019 M**

**Dedication**

In the name of of Allah the Merciful

(Say: "Do, and Allah will see your work, His Messenger, and the believers").

Great truth of God

My God is not the night except with your thankfulness and the daytime to your obedience .. The moments are not forgotten except your memory .. Do not wait after the hereafter but Afkoq .. Do not pray paradise only to see you

God almighty

To those who reached the letter and led the Secretariat .. And advised the nation .. To the Prophet of mercy and the light of the worlds .. Our master Muhammad peace be upon him

To whom God has given glory and glory .. To those who taught me tender without waiting .. To whom I carry his name with all pride .. I ask God to extend in your age to see the fruit has come harvested after a long waiting and will remain your stars Stars I promise today and tomorrow and forever. .

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**Acknowledgments**

To candles that melted in pride .......

To illuminate every step in our path .......

To overcome every obstacle before us ........

They were messengers of science and ethics .......

thank you all ........

Can anyone thank the sun because it lit up the world?

But I will try to return part of your beauty to be as you wanted me

((Before I was a professional))

We thank you all for your efforts with us

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**Abstract**

The study of the effect of well water in the city of Tabuk in the Kingdom of Saudi Arabia on the irrigation of farms and plants. The research was divided into two parts: theoretical and practical and also was The use of the experimental method for its relevance to the current study has reached the current study to the important results, :including

the value of high electrical conductivity in the well water of - Tabuk, which helps to increase and improve the properties of soil and its impact on soil permeability, which is a scientific phenomenon started in many countries of the world.

.The important role of well water in increasing soil fertility-

- Effectiveness of using well water to irrigate agricultural areas Tabuk region.

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**Among the recommendations of the study:**

Study of the effect of using well water on soil productivity in various areas of the Kingdom and benefit from agricultural techniques.

Hypotheses

- There is a relationship between well water and its validity to irrigate the soil.

- There is a relationship between water wells and the delivery of electricity.

Procedures:

A sample of well water was taken in the city of Tabuk and studied in terms of the quantity of oxygen and nitrate, and the connection of the current and the degree of ph and the degree of transparency.

**Main results:**

After the experiment, the amount of oxygen in the well water of Tabuk was found to be high. Nitrates were moderate, and it was noticed that the conductivity of the deep well water was higher in the surface wells, and the acidity in the well water was higher than the surface, Surface water.

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**an introduction:**

Water is of great importance to the life of all living beings on earth, and we need water in all agricultural development projects and other non - agricultural projects. Many of the world's countries have been affected by water scarcity and lack of rain. Groundwater has been an important source of water throughout the ages. The use of underground water has been due to the prehistoric times. Egyptians and Chinese dug wells to obtain water from their underground sources, However, because of the limited possibilities available at the time, their exploitation has been limited and is almost limited in some arid desert areas where there are no surface water sources.

But with the development of today's drilling tools, the use of groundwater has increased as populations around the world have grown and relied on to meet growing water needs.

Agriculture in the Kingdom of Saudi Arabia depends mainly on groundwater for irrigation purposes, due to the scarcity of rainfall and irregularity of quantities and times of fall. Groundwater is the water that is leaked through the permeable layers to the ground. It accumulates above a deaf layer forming the aquifers. Rain is the source Water, as well as surface water such as rivers, lakes or excess irrigation water leaking underground, and despite the exploitation of these water from underground reservoirs, they are automatically filled by the same sources.

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**the study Problem:**

There are many factors that must be met by the well water that is irrigated the soil to increase the agricultural production capacity, which ensures the safety of human and animal health and increase soil fertility.

Therefore, the present study aims at finding answers to the following questions:

1 - What is the effect of using the water wells in the irrigation of agricultural soil in the city of Tabuk in Saudi Arabia?

2. What is the effect of the use of well water on the soil in general?

3 - Is it possible to rely on well water in soil irrigation in Saudi Arabia?

Study Hypotheses:

There is a relationship between the amount of oxygen, electrical conductivity, nitrate, acidity, water transparency of well water and its effect on soil.

Objectives of the study :

1- Identify the effect of well water on the soil in general.

2 - Study the relationship between electrical conductivity in well water and its impact on the soil.

3 - Development of recommendations for the use of well water in soil treatment in Saudi Arabia.

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the importance of studying:

The importance of the topic is as follows:

Scientific importance:

1. This study adds a kind of knowledge to the Arab library in the field of knowledge of the impact of the use of water wells and their impact on soil in the city of Tabuk, the importance of this subject, which may benefit researchers in this area.

2. The current study is considered the nucleus of future local studies concerned with the knowledge of the water use of the wells and their effect on soil in the city of Tabuk

      Practical importance:

1. The researchers hope to benefit from their studies by researchers in Saudi Arabia and abroad.

2. It aims to guide the view of the effect of the use of water wells and their impact on soil in the city of Tabuk.

3. The current study helps to create a general perspective on the use of water in the wells and its effect on soil in the city of Tabuk.

4 -It is necessary to develop this important source. The exploration of water and the fact that groundwater is the main source of water especially in the desert areas, including Saudi Arabia, where it depends mainly on all different sectors.

underground water :

Is all the water under the surface of the Earth, whether in

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saturated areas (the area filled with water) or unsaturated soil (the area directly below the surface of the Earth and its geological material contains all the water, water and air in the distances Between soil granules). Water is found in underground aquifers, or in voids and cracks between soil, sand, gravel and rock granules. Groundwater moves slowly through soil or rock spaces compared to the surface flow of rainwater. The amount of water collected and the flow rate of water are dependent on soil quality, porosity and permeability of the rock. The water moves freely in the soil and rocks with high permeability, which is carried out and passed through the pores of large sizes, while remaining in the clay layers because the clay is characterized by low permeability where the water runs very slowly. The main underground areas filled with groundwater are called aquifers. It is a rock or sedimentary layer in the ground that is capable of containing a quantity of water, consisting of unstructured materials such as sand and gravel, or embedded rocks such as sandstone or limestone. (Huda Assaf, 2007). Theoretical Framework:

Introduction:

Water is the source of life on the earth's surface and the essential element for the survival of living beings. The Almighty said, "We make water from everything alive." It also plays a prominent role in all agricultural, economic and social activities of any society. The existence of water both on the surface of the earth and in the ground to establish its urban communities in these places.

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Location and extension: The composition of Tabuk extends south and east of the Jordanian border to the south of Wadi Rumah. Where it breaks under the great work at Shuaiba. This configuration may extend under the basin of Nafud.

Depth - Scope and Range: The thickness of the typical sector in the Tabuk region is 1070 meters. The composition descends eastwards from Tabuk and grows thicker. In the Qassim region to the north, the layers tend to be in the northeast direction, where the highest depth of the soil well reaches 930 meters below the surface of the earth.

Hydraulic properties: The Tabuk layer consists of three sandstone units known as Lower Tabuk, Middle Tabuk and Upper Tabuk. The Tabuk layer is known to be less abundant than the leg layer. The Lower Sand Tabuk is less important as a productive layer west of Tabuk. Production is only 1.3 liters per second at dawn, but in the Qassim region the production ranges from 5.6 to 10.5 liters per second. In addition, the productivity of Tabuk Middle as we turn east of Tabuk and in the city of Tabuk itself, the ideal production of wells that are 60 to 90 meters deep is 15 liters per second. Production is reduced to 7 liters per second as we move east. To the north of Breda, the production rate is about 11 liters per second. Upper sandstone is abundant in water only in Al-Jawf Sakaka area. In soil production reaches 6.9 liters per second.

Water level changes: Water flows from wells in the Tabuk and Qassim regions, but it is doubtful that the layer will tolerate excessive water withdrawals in the Tabuk region, given the

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limited availability of water. It may be a cone of decline in this area where the flow of water flows from east to northeast. If the amount of water abstracted increases, the water level will fall further.

Water quality: Water analysis reports have shown that the concentration of soluble solids in water from wells in Tabuk is between 500 and 600 mg per liter. The concentration of soluble solids varies from 2500 to 4000 mg per liter, and to the east of the Tabuk region, the water quality varies, with the concentration of dissolved solids ranging from 600 to 3,500 mg per liter

What is meant by: ph

The pH value is used as a standard measure for water characteristics. It is read in English "B" and in German "Bih Ha". Scientificly, the pH value expresses the concentration of hydrogen ions (H +) in a liquid. If the concentration of hydrogen ions (H +) in liquid is high, it is acidic. If the concentration is low, it is alkaline (alkaline). This means that when measuring the concentration of hydrogen ions it is possible to know the amount of acidity, equivalence and alkalinity, as well as the degree of each. For a pH scale of 0 to 14, where value 7 is the equivalent level and any value below 7 increases acidic level with low value, any value is higher than 7 alkaline and alkaline increases with increasing value. Liquids with bitter taste such as vinegar, juice, washing soda (alkali lye or dissolved ash in water) are alkaline. Equation (pH 7) means that the concentration of hydrogen ions is 10 raised to a force minus 7 (0.0000001) grammy molecule per liter. For example, in food

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production, modified food additives for pH (citric acid, tri-sodium citrate, etc.) are widely used and play an important role in maintaining the quality of foods. For microorganisms the pH value is ideal for multiplication, and the pH limit for acidic and alkaline propagation varies for each type of microorganism. The ideal pH level for most microorganisms is 7 to 8 (neutral or slightly alkaline), and if the pH level is out of this range, the proliferation and proliferation of microorganisms will be curbed.

For soil, the appropriate pH level for growing crops is usually 6.5 (slightly acidic), but some crops favor a more alkaline neutral environment and other acidic crops. In the manufacturing sector, pH is the standard measure to prevent oil damage. It is necessary to measure the pH value to prevent rusting of the materials. The pH of the liquid refrigerant is usually higher than 9 when the oil is fresh (fresh). Once the damage begins, the pH level decreases, but the ideal pH value of the oil should remain above 8.5. When the pH is below 8, the bacteria proliferate, multiply and cause damage.

The use of pH value has become gaining importance in a wide variety of fields - from industry and food industries to soil and rivers.

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Electrical conductivity (electric conductivity) electric conductivity EC:

Electrical conductivity is a numerical term for the viability of a water solution to carry an electrical current

This capacity depends on the following:

• Type of ions

• Concentration of ions

• Ion equivalence

• The temperature of the solution

Most solutions of inorganic acids, bases and salts in general have good connections

The conductivity unit can be defined as:

The conductivity of the conductor has a unit length and a sectioned area unit

We demonstrate the conductivity of micromhoes on the centimeter umhos \ cm

For example, the conductivity of modern water distillation is between 1.5 to 2 umhos \ cm

The amount of conductivity increases to between 2 and 4 umhos \ cm after a few weeks of storage of water to absorb carbon dioxide from the atmosphere.

Pure water is a conductor of electricity, and increased solubility and solubility in water increases the amount of conductivity.

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Therefore, we sometimes use water conductivity to show the

purity or contamination of water because the conductivity is proportional to the solubility of dissolved solids (Mohammad Malik, Mohamed Hussein, 2017)

Water transparency (turbidity):

Solid solids in water, such as sand atoms, algae, bacteria, etc., cause water turbidity. This turbidity reduces the sun's entry into the water complex and thus reduces photosynthesis. Reducing photosynthesis reduces the concentration of oxygen and increases the concentration of carbon dioxide in water and this affects water-living organisms.

It is possible to measure the turbidity of a device that measures the light rays passing through water or by using a plate. This plate is covered with black and white triangles. The plate is inserted into the water so that we can not see the colors, then we measure the water depth when the colors disappear. The deeper the color disappears, the higher the turbidity. The turbidity is expressed in the NTU units. (Adnan Nizam, Syraoz Mohamed, 2013)

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Dissolved oxygen in water:

The ratio of dissolved oxygen in natural water depends on the chemical, physical and biological properties of water. Dissolved oxygen analysis is important in the process of control of water pollution treatment and methods used to estimate the dissolved oxygen method and the electric method using a membrane electrode. Drinking water should be at least dissolved oxygen concentration of 2 ppm (this concentration varies from book to book). High water temperature leads to the necessary oxygen deficiency of aerobic bacteria to decompose organic matter and increase biological activity of aquatic organisms and increase demand for oxygen (Jorge G. Ibanez, 2008)

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Study conducted

Temporal and spatial limits:

First sample site:

On 18/1/2019 on Friday at 4.30 pm.

Second sample site:

Dated 21/2/2019

Thursday - 5.15 pm

Date of study on sample 24/2/2019

Distribution of tasks:

- AlHanouf Raja Al-Enezi: I brought the sample, location and measurement of transparency.

- Raghad Sultan Saud Al-Enezi: Measuring the amount of dissolved oxygen and ph measurement of water.

- Shaima Hamad Hakmi: measurement of nitrate and conductivity measurement.

- Raghad Sultan: Measuring Transparency.

Tools used in the experiment:

- Measuring ph pH meter.

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- Conductivity measurement of electrical conductivity measuring device.

- Nitrate measurement Nitrate measurement group.

- Dissolved oxygen measurement.

- Measurement of the degree of water transparency - a hard disk and a rope length of 5 meters or more - measure the distance in meters.

- Also measure the transparency of water transparency tube and bucket tied with rope and cup.

Results of the study of the ratio of oxygen, nitrates, conductivity and pH of some wells in Tabuk region.

1- The first sample: from a depth well 750 meters.

Date of sample 18/1/2019 Friday at 4:30 pm.

Date of study of the sample: 21/1/2019 on Monday.

- Electrical conductivity measurement:

Water temperature for sample = 20 Electrical conductivity = 647

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- dissolved oxygen: 8.

- Nitrate: 6.

- Ph = 8.4.

 Measuring the degree of water transparency: The water of the sample taken from a deep well using a deep-water deep-water disk. This is done by removing the cord 200 meters away so that we can distinguish the colors in the Sikhi disk.

The second sample: from a deep well 300 meters.

   Date of sample: 21/2/2019 on Thursday.

  Date of study of the sample: Sunday, 24/2/2019.

1 - Measurement of electrical conductivity:

    - The temperature of the sample material = 25 m Electrical conductivity = 1471.

2. Dissolved oxygen = 8.

Nitrate = 9.

Ph = 7.3.

5 - measuring the degree of transparency of water as the sample taken from a deep well from a depth of 300 meters using a disk of deep water where the cord was removed at 180 meters did not clear the colors on the disk will be silent.

- It was found that the transparency in the second sample is less than the first.

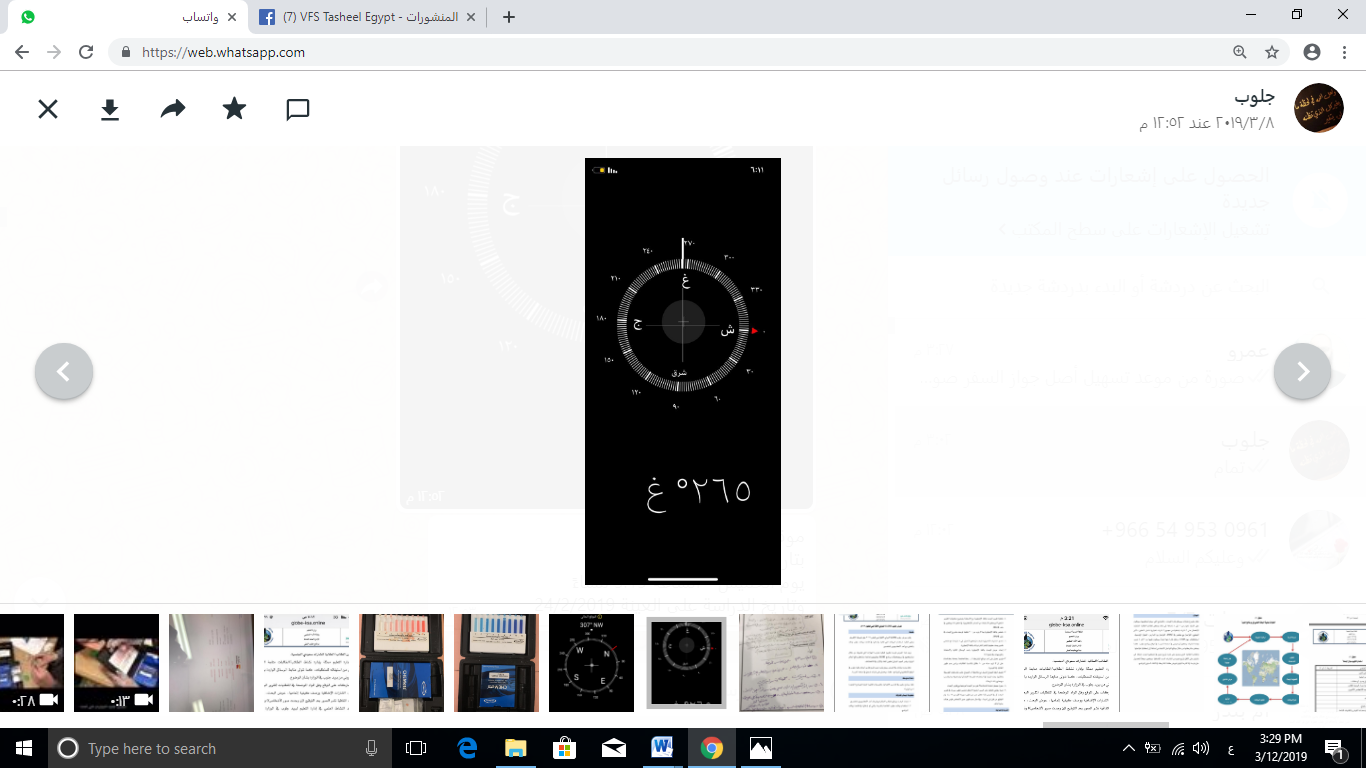
Nitrate was also found to be low

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Site of the first sample on 18/1/2019

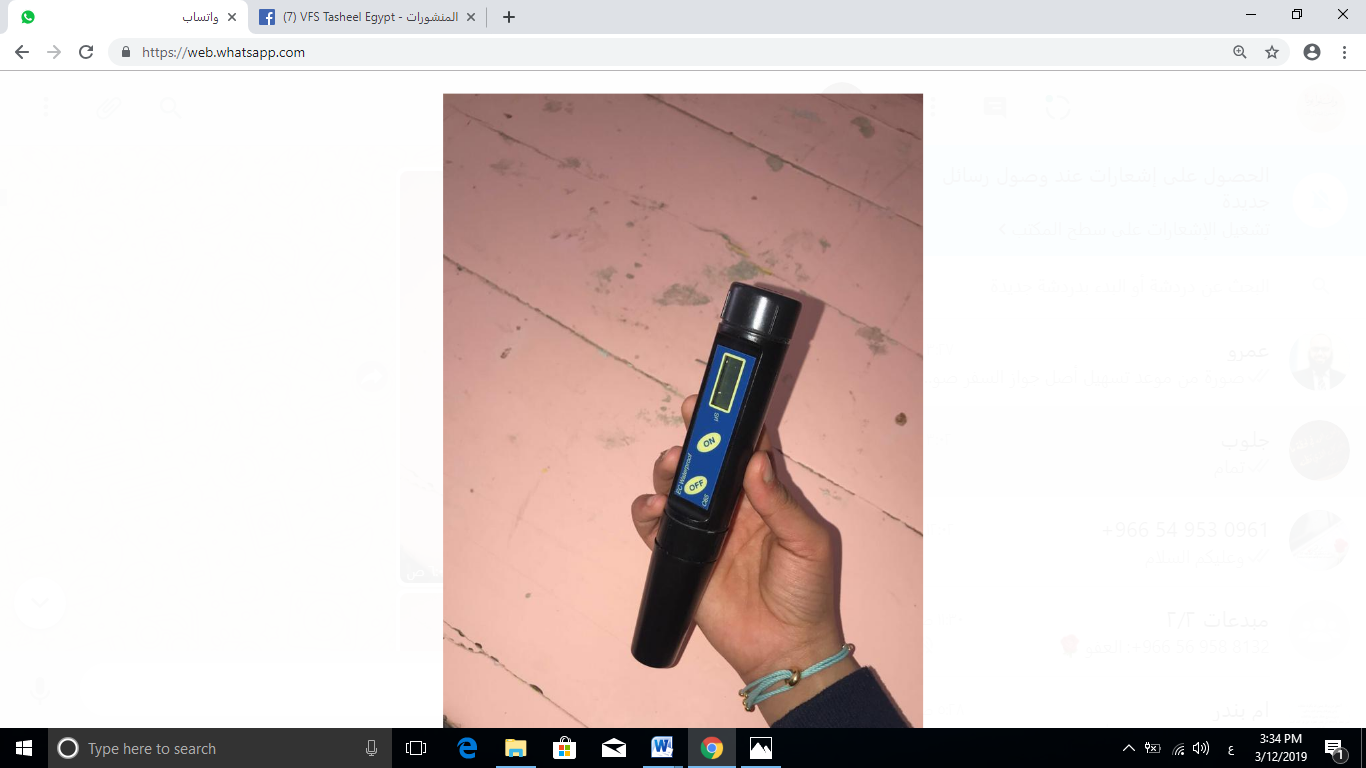
                  Friday at 4.30 pm

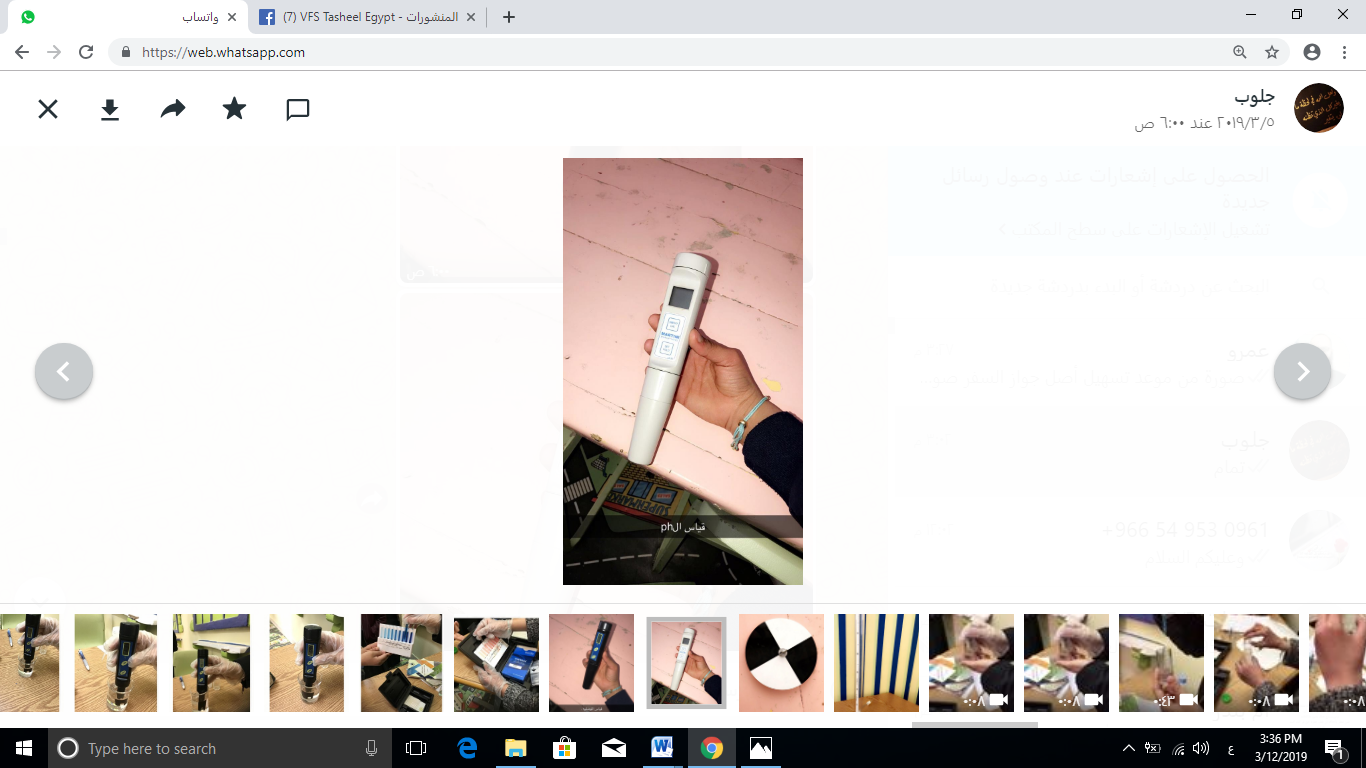


Site of the second sample, dated 21/2/2019

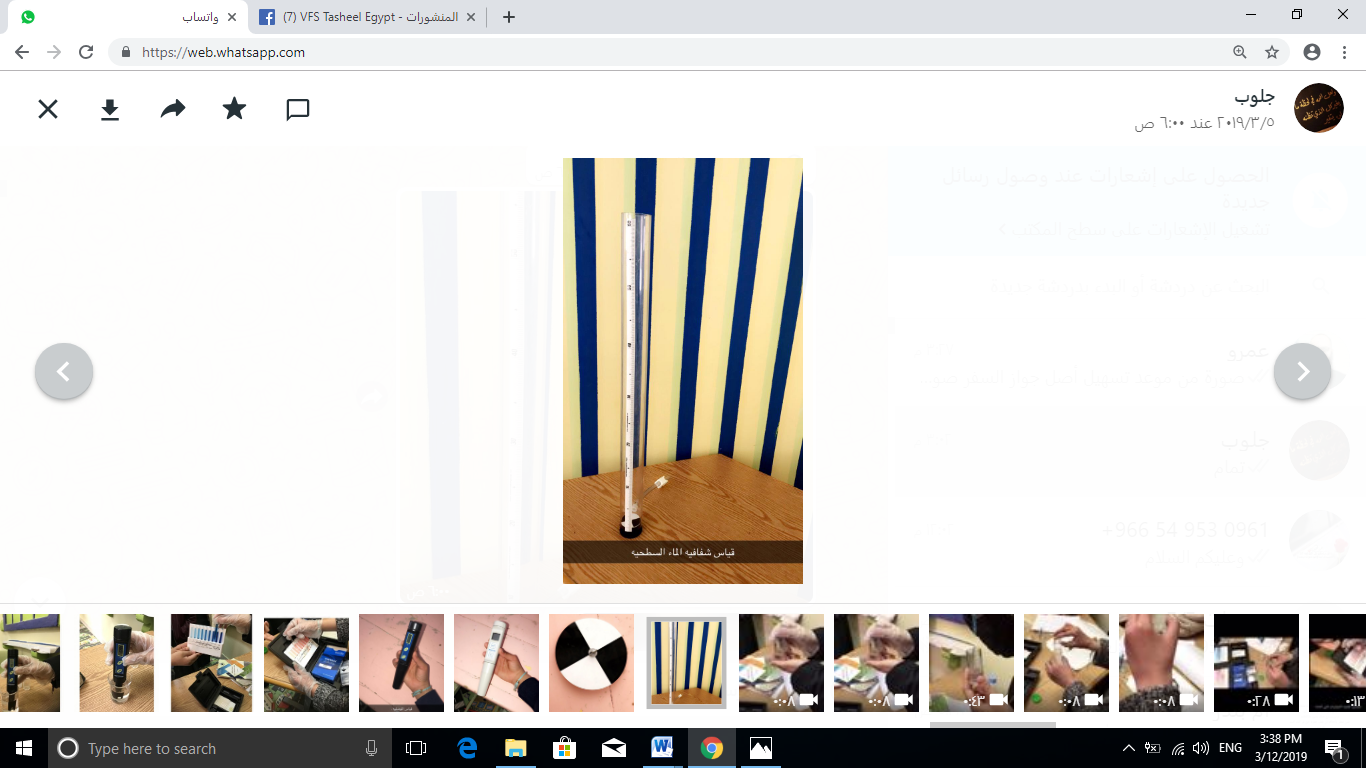
                                 Thursday - 5.15 pm

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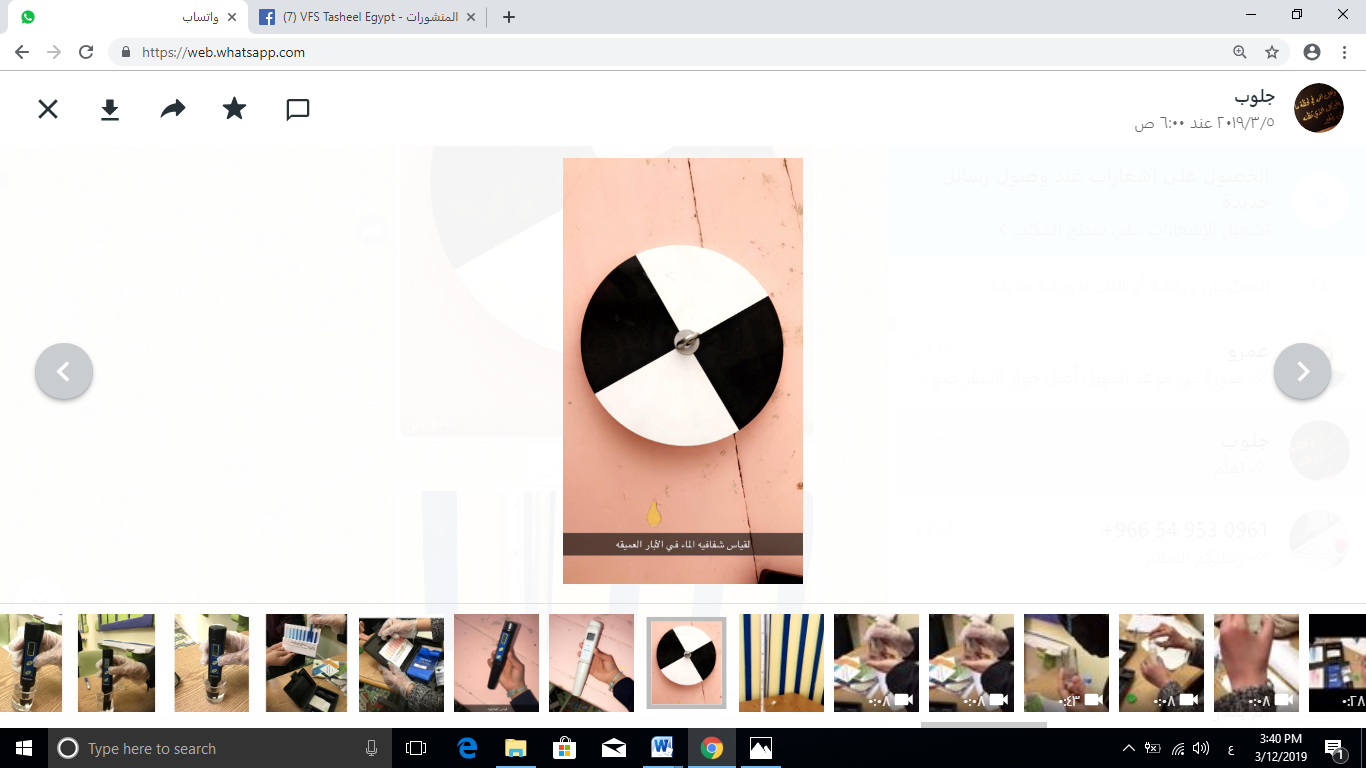




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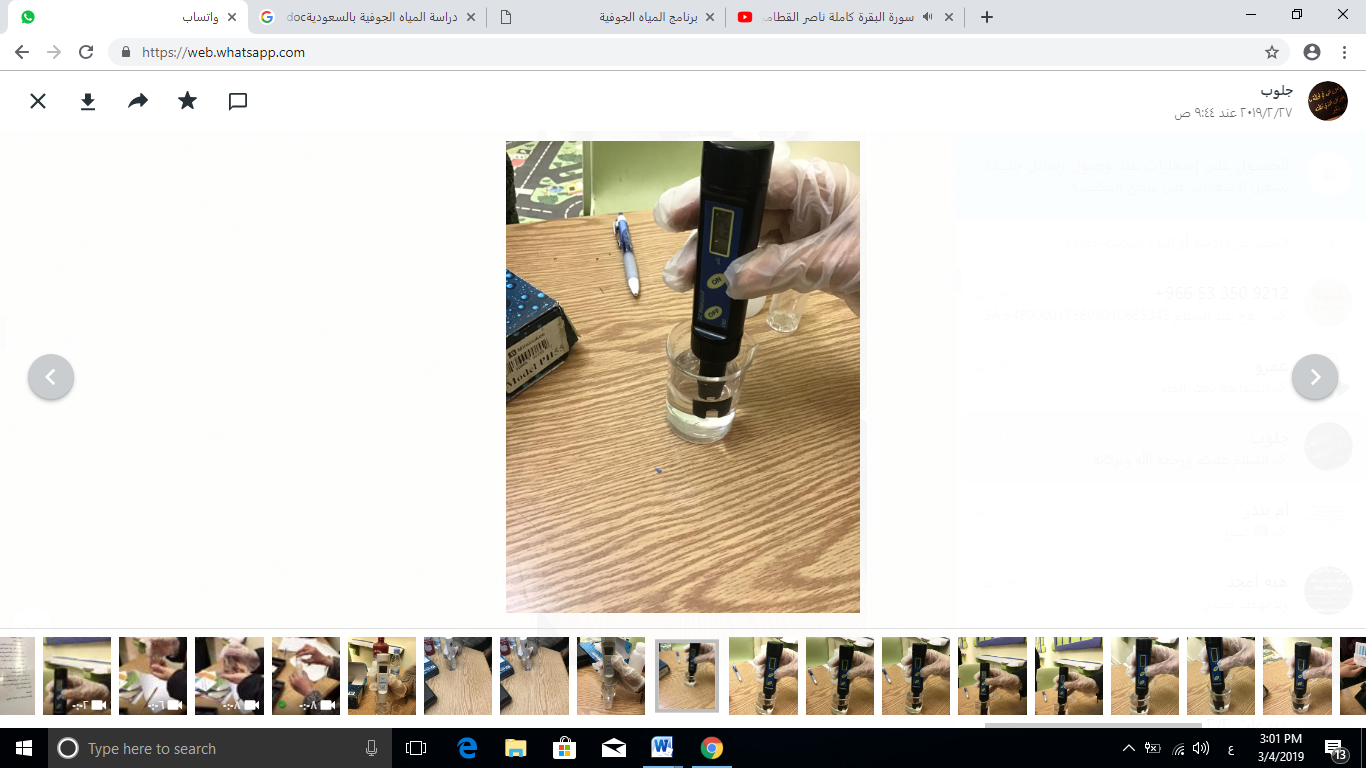
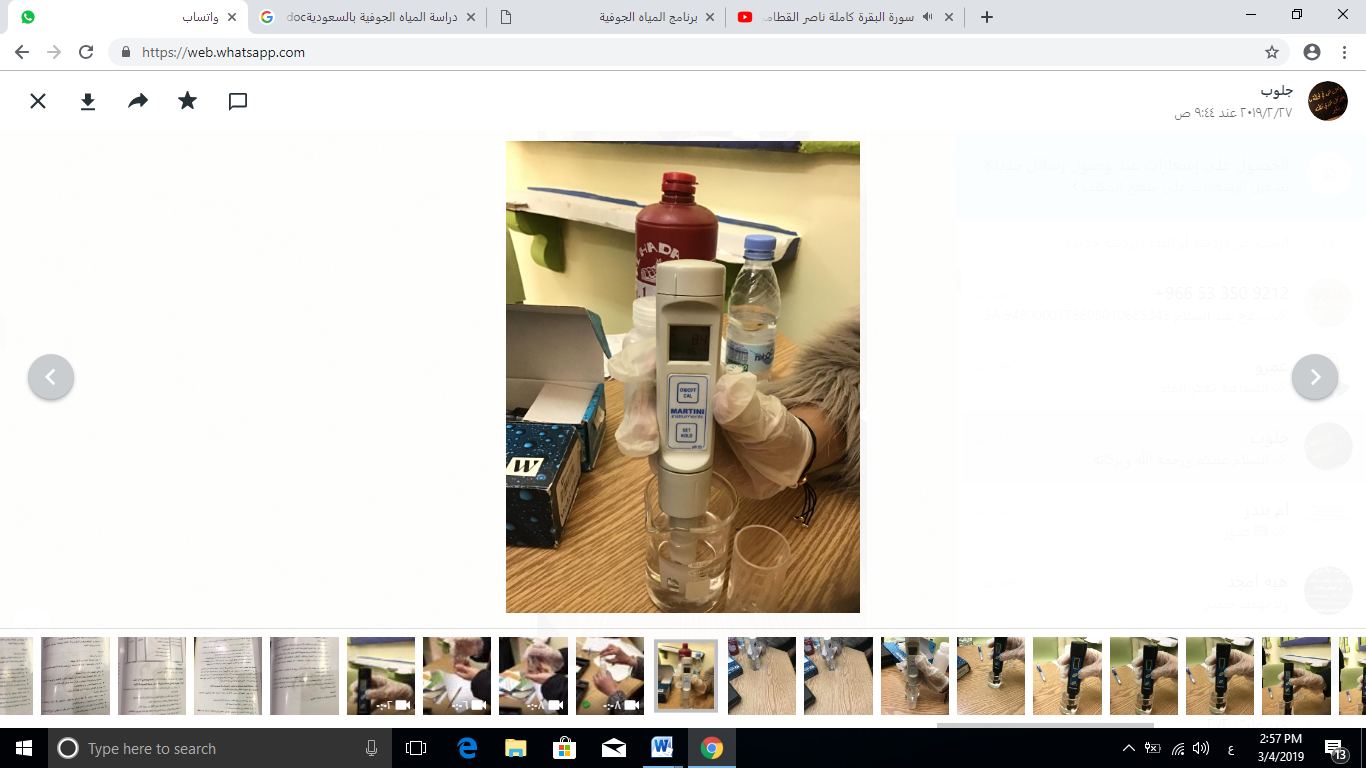


Measuring surface water transparency



To measure water transparency in deep wells

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Conclusions:

1- There is a relationship between well water and its validity to irrigate the soil.

2 - There is a relationship between water wells and the delivery of electricity.

Second: Recommendations and Proposals:

   The researcher recommends the following recommendations and suggestions:

1. Interest in conducting further studies on the impact of the use of water wells in soil irrigation in various areas of the Kingdom.

2. Further studies on the usefulness of well water in soil irrigation.

3. Conduct a study on the effect of using the water of wells in soil irrigation to increase agricultural production.

4. Conducting a study on the effect of irrigation of soil with well water to increase soil fertility.

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**List of references:**

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**3 - Adnan Ali Nizam and Syra'ab Mohamed, Assessment of Water Quality in Lake Al-Mazayrib, Damascus University Journal of Basic Sciences, 2013.**

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**- G. Ibanez, Discover the worlds reasearch** **Jorge, 2008.**

**-** Nancy Mesner and John Geiger, Dissolved Oxygen, June 2005.

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