An Analytical Study of Ground Cover, Soil and Water of Falag Al-Khafeeji in Al-Amerat State and its Impact on Neighboring Sewage Reservoirs

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Contentss

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Abstract:

What are the effects of sewage on the water of the falag? How does sewage affect soil fertility and quality? What is the effect of sewage on ground cover in the area?

The objectives of the research were to clarify the danger of establishing sewage near natural water sources and to alert the local people to the quality of the water and soil of Falag Al-Khafeeji. The research was carried out through the protocol of soil, water and the ground cover using the available equipment of the team and the Department of Health Affairs in Muscat Governorate.

The results were as the following:

Firstly: Water Results

We found all the water characteristics measured using the equipment's and tools of the program indicate that the water is good compared to the values obtained in the references and also found that the water contains coliform bacteria, which was detected by biological analysis of water by Department of Health Affairs in Muscat Municipality.

Secondly: Soil Results

Structure: Granularity, consistency: Fragile / easy to dissolve, root ratio: many, rock ratio: medium to low, carbonate ratio: many, PH 9.62, texture Clay loam, 10 YR4 / 1.

Thirdly: The results of the ground cover

The percentage of positive shadows 78.9, which is evergreen and the rate of greenery is high and the most common types of herb plants are GD. The conclusions were taken after taking measurements available for water proved that water characteristics are good compared with the values that we found in the references but biological analysis of water proved the presence of Coliforms bacteria that emphasize the inappropriateness of water for human use. After analysis of the soil data, we found that it is fertile and there is no negative effect of the current water on the soil because the bacteria in the water is a fecal coliform bacteria from the analysts, which analyze the organic matter and supply the soil with nitrogen, making the soil more fertile. After analyzing ground cover data, we found that most of the available trees are evergreen and that the percentage of high grasses that are used as animal feed in the area confirms soil fertility. The research suggested the following recommendations:

1. The population should be restricted to using falag water in agricultural activities instead of human use.
2. We recommend the people of the region to dig a new source of the falag away from the current water or the creation of engineering solutions to repair the damage in the original source of the falag.

Basic terms used in research:

Falag: A channel dug in the ground or on its surface may be covered or exposed for assembling groundwater, eye water, natural springs or surface water, or intercepting and collecting flood to flow from its resources in the Al-Falag Canal by natural flow.

Sewer: A separate underground transport system dedicated to the transportation of sewage from commercial buildings and houses for disposal or treatment.

Biological analysis is a process of micro-life analysis in which water samples are used for verification, including the determination of the percentage of bacteria and according to the proportion of bacteria in these samples is determined the extent of water adequacy or not.

Research questions:

- What is the effect of sewage on the falag water?
- How do sewage affect soil fertility and quality?
- What is the effect of sewage on the land cover in the region?

Introduction and literature review:

The problem of our research stemmed from the questions of the local residents in Al-Khafeeji area in the Wilayat of Al-Amerat about the impact of the water, soil and ground cover in their area of sewage near the source of the falag. Since it has recently been changed in the aquifer that nourishes the falag, after the falag was fed by the original source far from the inhabitant and the facilities, it was fed by underground water that had been dug by the residents and the local people.

Due to the obstruction and failure at the original source of the falag, note that the new source that feeds the falag currently located near the sewage of the area. Moreover, and after our communication with the residents we found that the nearest point of sewage water is only about 90 meters from the current falaj source, which raised the curiosity of the students residing in this area in order to suggest a study of this problem in the program of the scientific research for this year. Because this research study importance of the local people to answer their questions and then determine their life practices at the study site and also for the benefit of this study research and fun for the students in exploring the surroundings local natural specialists.

Research methods:

First: the research plan:

Day	Date	Work Done	Location	Notes
Thursday	14/12/2017	Meeting the teacher with the students of the team and selecting students for the task of scientific research	"Shifa Bent Auf" School	Final selection of the students
Sunday	17/12/2017	Make a meeting with local people	Al-Falag Location (Khafeeji)	Take a clear background on the problem
Wednesday	20/12/2017	Assign research time in the LRC for the research study references	Shifa Bent Ouf School (Learning Resource Center)	The research students wrote important data that will be useful for them in implementing the research.
Wednesday And Thursday	3/1/2018 4/1/2018	Measure the characteristics of the falag water and study soil samples from a close site to the falag and study the ratio	Al-Falag Location (Khafeeji)	**Yaqeen**: Collect needed devices for the work and search for location by GBS **Yumna**:

		of vegetation cover in a plot irrigated with falag water.		Perform the required measurements **Sundus**: Record the measurements and notes
Sunday	7/1/2018	Call a team from Muscat Municipality (Health Affairs Department) and go with them to the study site to take water samples for analysis	Study Location (Khafeeji)	Final access to the research manual
Sunday	14/1/2018	Find the bacteria type in the water sample	Shifa Bent Ouf School (Internet)	Bacteria damage and Reasons for their presence in water
Thursday	1/2/2018	Identify Research components accurately	"Shifa Bent Auf" School	Final access to the research manual

Second: Location of the Study:

(Sultanate of Oman Muscat Governorate) Al Amrat, Khafeeji Region, January and February, Cool to Moderate, had been used Water, Soil and Ground Cover Protocol

Falag Location

Shape (2) Location of the study

Thirdly: Data Collection and Analysis

Had been sued Excel program analyze ground cover data.

Results:

- Soil data collected by the soil protocol from the site. Location: Nearby soil to Falag Al Khafeeji

Structure	Consistency	Roots	Rocks	Carbonate	Acidity	Fabric	Color
Granularity	Fragile / easy to dissolve	Many	Medium	Many	9,62	Clay loam	10Y ¼R

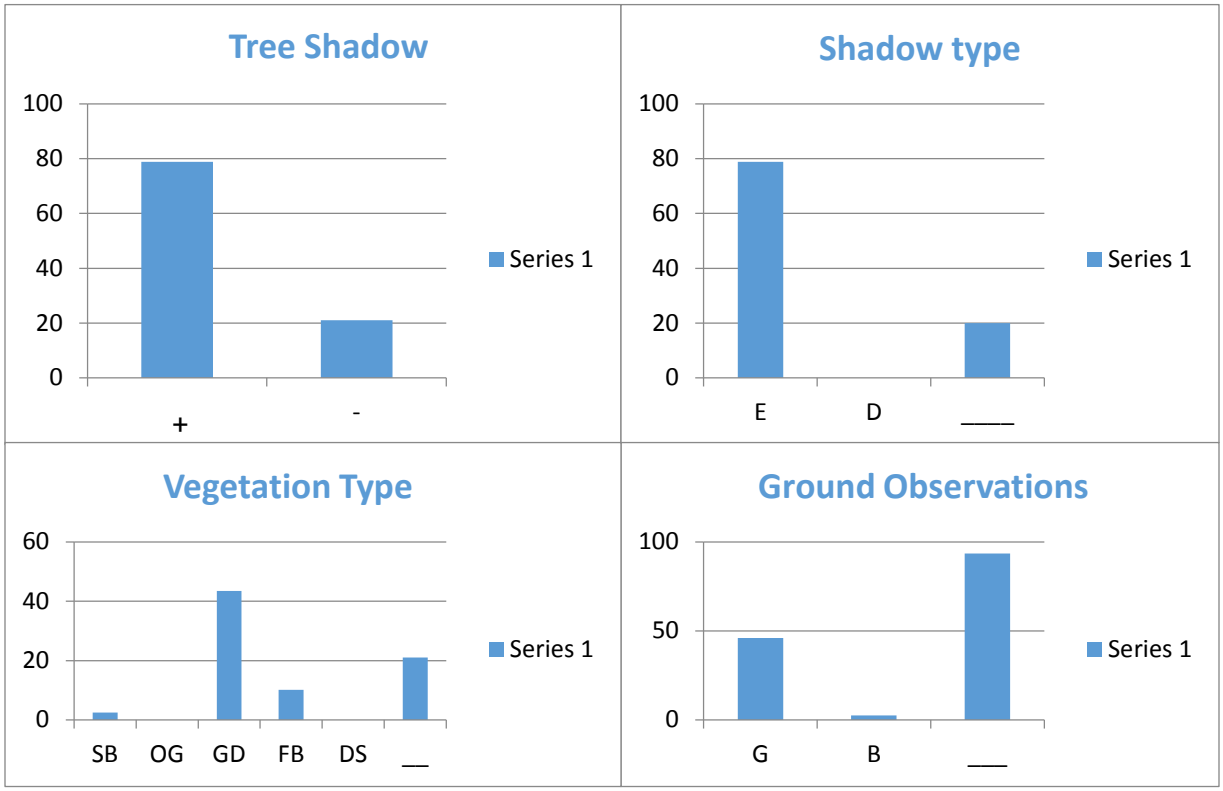
Shape (3) Soil data location

- Water data collected by water protocol (hydrological) from the falag.

Acidity	Conductivity	Salinity	Transparency	Percentage of dissolved oxygen
8,25	1831	1281,66	Transparent water 120	8

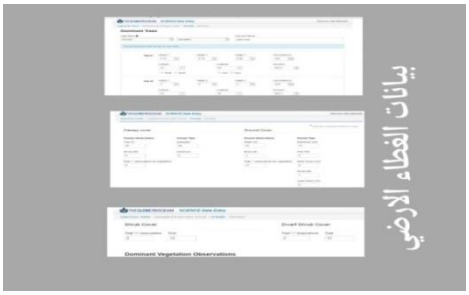
Shape (4) Water Data of the Location

- Ground cover data collected by the students from one of the farms that irrigated by alfalag water.

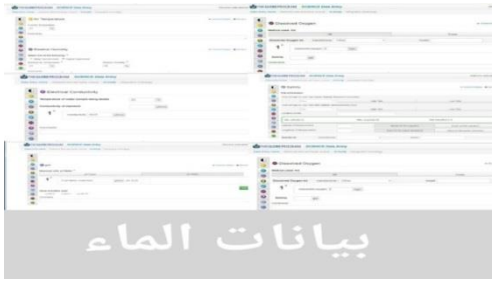


Shape (5) Ground Cover Data at

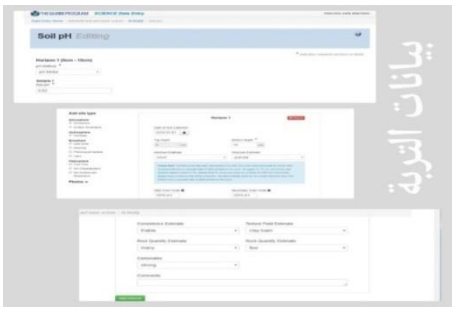
- Enter data in the program site.



Shape (7) enter ground cover



Shape (6) enter water data



Shape (8) enter soil data in

- Collect Protocols Data

Shape (10) collect data of soil protocol

Shape (9) collect data of water protocol

Shape (12) meeting local people of the state

Shape (11) collect data of ground cover protocol

Discuss the data:

Data Analysis:

Firstly: water data analysis: After analyzing the water data, after researching, and surveying in several pastures we found that water salinity is 281.66, which is a good rate, compared to the data we found according to the websites of the Internet and that the PH is 8.24. In fact, as a PH ratio is drinkable because it is within the range of PH (6.5 to 8.5), which is good for drinking water. The percentage of dissolved oxygen in water = 8, that is the ratio is sufficient for living organisms and micro-living in water and the conductivity of water is 1831, consequently this means that water is good compared with WHO manual which we obtained at the World Wide Web sites.

However, after the water biological analysis has been proved that the water contains coliform bacteria, a bacteria living in the intestines of humans and animals, thus they come out with what comes out of human waste and the flexing of the process of exit. Therefore, the presence of these bacteria in water is a clear proof of the recent pollution of sewage water. These bacteria reach the water of Falag al-Khafee with sewage water.

This means that water is suitable for agricultural use and is not suitable for human use.

Secondly: After comparing them with the properties of good agricultural soil in various references, we found the following:

Soil structure: granularity, soil consistency: fragile / easy to dissolve it is easier for the roots and plows to move in. The PH rate is 9.62, which means that it is a base soil, Of the cultivated plants in the region evidence of their coexistence with this soil long ago and texture is clay loam, which means that fertile soil to grow some types of crops, including palm. Additionally, the range of color is about 10YR4 / 1, which means it is rich in iron oxide and it is suitable for the cultivation of fruit. Furthermore, the proportion of rocks is medium to Low while, the ratio of roots to many, which helps the abundance of plants and the ease of moving roots to soil and the proportion of carbonate is many.

This confirms the validity of water for agricultural use.

Thirdly: Ground cover analysis data of land cover data: After analyzing land cover data, we found that most of the available trees are always evergreen and that weeds are high and are used as animal feed in the area This confirms soil fertility.

Conclusion:

In conclusion, we accomplish this research study and conclude from the fact that the water is actually affected by sewage water and that the local people questions were in their proper place according to the findings, conclusions and analysis that were carried out by the team's equipment and the results of the sample analysis using the local community institutions. (Muscat Municipality Health Affairs Department)

We are pleased to indicate our research strengths, namely, that we implemented three program protocols to support and strengthen our protocol practices. Moreover, our research provided useful benefits to the local community. We also would like to mention that it is good to apply this research study again to find out the size of research problem.

In addition, whether it has increased or decreased in the level.

We also recommend the following recommendations to the population:

1 - The population should be limited to use the falag water in agricultural activities instead of human use.

2 - Recommend the region people to dig a new source for the falag away from the current water or the establishment of engineering solutions to repair the damage in the original source of the falag.

Thanks and appreciation:

We would like to extend our sincere thanks and appreciation to those who had a role in contributing to the success of the research, especially our:

1) **Virtuous Teacher**. **Badriya Bint Mohammed Al-Ismaili.**
2) **Ms. Wafaa Bint Abdullah Al-Tamtmiyah**

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We also thanking **Mr. Sami Al-Wahaibi**, Assistant Director, Department of Health Affairs, Muscat Municipality, for his cooperating with us in completing the water biological analysis.

We also thank the local residents of Al-Khafeeji region:

1) **Mr. Nasser bin Saif Al-Hadi and Al-Fadel.**
2) **Mr. Fahad Saeed Al-Hadi.**
3) **Ms. Banan Bint Salem Al-Hadia** and other women Al Khafeeji area to provide support and assistance to us in the research study and to provide us with information that helps us in our research.

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Attachments:

Sultanate of Oman
Muscat Municipality
Directorate General of Health Affairs

سلطنة عمان
بلدية مسقط
المديرية العامة للشؤون الصحية

Microbial Analysis Report تقرير التحليل الميكروبيولوجي للعينات
Drinking water مياه الشرب

Reference no:	رقم العينة : ٣٠٧٧
Submitted by:	الجهة المرسلة: بلدية العامرات
Date received:	تاريخ الإرسال: ٢٠١٨/ ٢/١٥
Type of sample:	نوع العينة: مياه فلج ٢٥٠٠ مل
Trade mark:	الاسم التجاري: مدرسة الشفاء
Country of manuf.	بلد المنشأ: عمان
Date of manuf.: **Expir:**	تاريخ الإنتاج: – تاريخ الانتهاء: –
Number of samples:	عدد العينات: ١
Date of report:	تاريخ التقرير: ٢٠١٨/٢/١٨
Remarks:	ملاحظات أخرى:

TYPE OF TEST	RESULTS
Total aerobic plate count(optional)	-
Colifom bacteria(MPN)	+180
E. coli	Nil
Pseudomonas aeruginosa	-
Others	-

عثر في العينة وجود بكتريا الكوليفورم + ١٨٠ ، تعتبر العينة غير مطابقة للمواصفة القياسية العمانية رقم (٨٦/١٩٨٥) للمياه الطبيعية الغير المعبأة.. والرجاء احضار عينة ثانية للتاكيد

توقيع المحلل: ك.م

وتعتمد
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هاتف: ٢٤٨٦١٢٢١، ٢٤٨١٦٢٤٦ - فاكس: ٢٤٨٦١٢٠٠، تلكس: ٥١٣٢ بلدية أوان