



GLOBE OMAN



Study About The Water Quality And Validity In Sa'ara Falaj After A break Of 16 Years

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Study the Water Quality and Validity in Falaj Sa'ara in Buraimi State After A break of 16 Years

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Abstract

This study aims to determine the Water quality and validity in Falaj Sa'ara in Buraimi State After a break of 16 years as the statement of the problem is that we noticed the fear of parents about the quality of water for drinking, especially after the period of long break in addition to the proximity of homes from the foothills of the streams, which may cause pollution of this water. The research questions are What are the efforts exerted to ensure the quality of the falaj water and its continuous flow, and what the extent of the water quality at Umm al-falaj, and at the Busandh tower and the falaj channels in the sharia area, and what the extent of the water validity for drinking.

It will be through interviews with officials of the Directorate General of the Regional Municipalities and Water Resources in the governorate and with the agent of the falaj and the application of the water protocol , taking measurements of salinity, acidity, conductivity, transparency, temperature and dissolved oxygen percentage in different locations (Umm al-Falaj, Busandh Tower, Falaj Sharia) In cooperation with the the Water Resources Department staff. We reached the following results: There are great efforts exerted by the Water Resources Department at the Directorate General of the Regional Municipalities and Water Resources in Buraimi to maintain the falaj continuously and to ensure that it continues to flow. After analyzing the water we found that the values of conductivity and soluble salts are good at Umm al-Falaj and at the tower of Bu Sanadh, while rising clearly in Falaj Sharia, The transparency values are more than 120, which means that the water is very transparent and the pH value is approximately 7 at Umm al-Falaj, but it ranged between 8.12-9.58 at the Busandh Tower and Falaj Sariah, which a

proportion that is not suitable for drinking, dissolved oxygen content (4-5 mg / L). Therefore, the water of the falaj is suitable for irrigating crops, but it is not suitable for drinking except in Umm al-Falaj. The recommendations of the research are: that the Directorate General of Regional Municipalities and Water Resources of the governorate to raise awareness of the community to maintain the cleanliness of the falaj, and not to contaminate the chemicals or detergents and guide them not to waste water, whether the distribution of pamphlets or through the media. And monitoring the sewage tanks (sinks) in the buildings near the Falaj Canal until the arrival of the sewage network in addition to the maintenance of the falaj and the inspection of water periodically.

Basic terms:

Falaj Aldawoodi: It is a falaj that derives its water deep from the surface of the earth.

Wakeel Al-Falaj : He is the person in charge of managing the falaj.

Umm Al-Falaj : The water source is from underground wells.

Alsa'ed : A branch of the same characteristics of falaj that helps to increase the amount of water.

Althaqiba: (Which are holes leading directly to the falaj), resembling wells.

Busndah Tower: It is an ancient tower that is estimated to be thousands of years old to guard the falaj.

Sariah: Its name of area in Alburaimi.

Research questions:

1. What are the efforts exerted to ensure the quality of the falaj water and its continuous flow?
2. What the extent of the water quality at Umm al-falaj, and at the Busendh tower and the falaj channels in the sharia area?
3. What the extent of the water validity for drinking ?

Introduction

Alfalaj is the most important heritage in Oman, which proved the ability of the Omani man and his great determination to build civilization. This unique water system achieved the prosperity of agriculture in Oman. Most of the falaj channel is hidden below the surface of the earth and holes are made every 20 meters called the match used to go down to the channel for cleaning. The falaj is kind of Falaj Aldawoodi, where the people relied on irrigation of their plantations and palms and in drinking, which had a large role in the flourishing of agricultural and economic activity in the state. The length of the falaj from sharia until the mother about 6500 m.

This falaj has been subjected to drought for more than 15 years and was followed by landslides in the falaj area, and they are considered a concern by the people of the state especially near Falaj, where their farms have been dehydrated and many palms and trees have died. Most of Al-Falaj channels

However, in 2016 the efforts of the people of the state of Buraimi to restore the maintenance of Falaj Sa'ara resulted in flow the water again. We have noticed that there is some fear from the parents about the quality of the water of the falaj for drinking, especially that the falaj period was long, that is, turned into stagnant water in addition to the proximity of houses - which have a system of sewage (sinks) Water, this falaj will also irrigate about 200 acres.

Therefore, this topic was chosen for study and to ascertain the quality of the water of Falaj Sa'ara and its validity for drinking and the efforts made to maintain the falaj periodically.

In this study, we will try to analyze the water in all the falaj (upstream) waters and the holes at the Busndh tower in Ghurifa and Al Falaj channels in the Sharia area in cooperation with the General Directorate of Regional Municipalities and Water Resources in the governorate.

Research methods:

First: Research Plan:

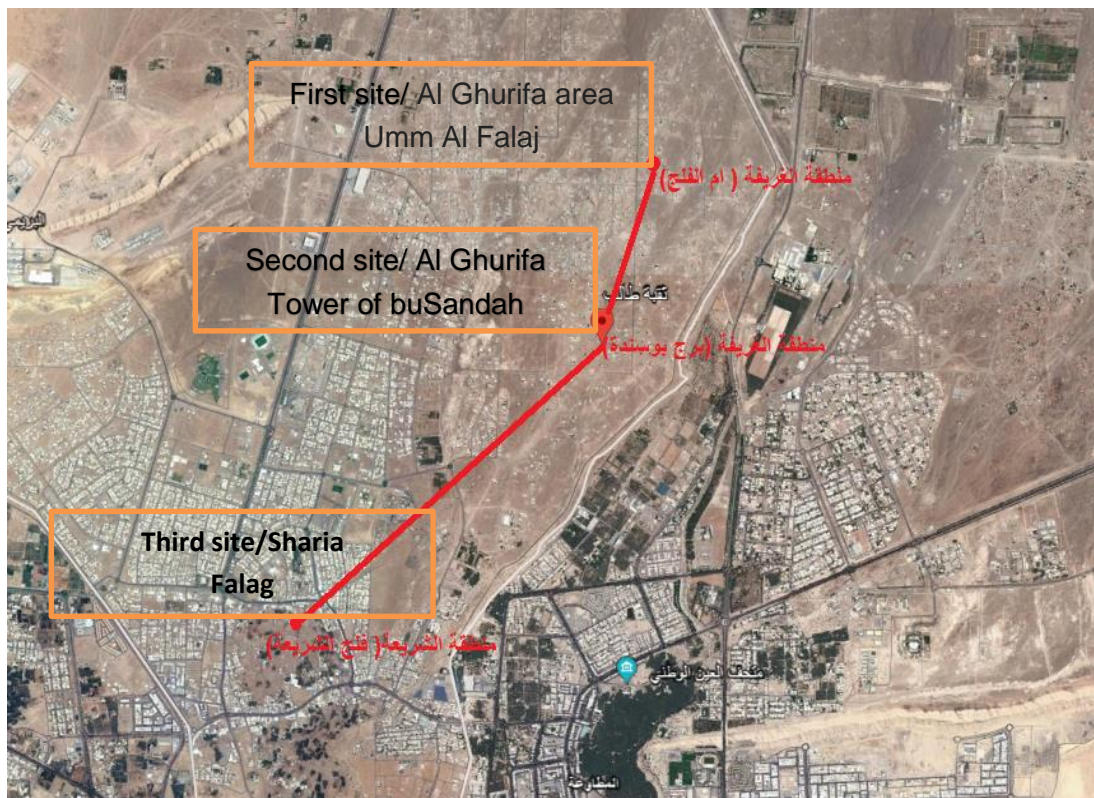
- 1- Choosing the research problem: Which was identified by the students and then discussed with the teacher and supervisor.
- 2 - Addressing the Directorate General of Regional Municipalities and Water Resources in Al-Buraimi Governorate
- 3 - Implementing a meeting with officials from the Water Resources Department to identify the sources of water and maintenance method and how to ensure the quality of water.
- 4- We have a meeting with Mr. Talib Al-Jabri, the Undersecretary of Al-Falaj, and his cooperation in visiting the study website.
5. Application of water protocol: Measurements (salinity, conductivity, transparency, temperature, acidity and dissolved oxygen ratio) are carried out in different locations (Umm al-Falaj, Busndh and Al-Falaj in Sharia) in cooperation with the Water Resources Department staff.
6. Comparison of results and writing recommendations.

It has been meeting with the students putting of the research plan which has been involved everyone in the implementation of the water protocol and visit Umm al-Falaj area Ghurifa - and then Busandh Tower in Gharifa - and falaj Sharia in Sharia ,after that taking samples of water in coordination and cooperation with the Department of Water Resources Affairs staff . Then the labor was divided to examine samples and collecting and analyzing the results.

The time plan for the preparation of research are as follows:

the month	the program
December	Select and identify the problem, set the time plan for the search and divide the tasks Addressing the Falaj agent and conducting the interview
January	Addressing the Directorate General of Regional Municipalities and Water Resources in Al Buraimi Governorate and visiting the Department of Water Resources Affairs and the Municipal Laboratory and conducting interviews
February	Application of the water protocol in the specific sites of the study Analyzing data, making recommendations, writing research and reviewing

Second: Study site: (Sultanate of Oman, Buraimi Governorate), Al Ghurifa and Sharia area, January and February, cold weather, water protocol was used.



Third: Data collection and analysis:

The first question was collected through an interview with Eng. Mohammed Al Nuaimi, Director of Water Resources Department and Eng. Salem Al Jabri, Head of Monitoring and Studies Department, to identify the efforts of the General Directorate of Regional Municipalities and Water Resources in dealing with complaints from residents about the cleanliness of Falaj water. During the interview, we were able to know the efforts of the Directorate in maintaining the Falaj Canal and maintaining its cleanliness and the method of checking the samples periodically. The Municipal Laboratory was also visited to check the safety of the water protocol devices before starting the research.



An interview was also carried out with the Undersecretary of Al-Falaj, Taleb Al-Jabri, and the collection of data and information on the falaj and his efforts to maintain and re-flood the falaj.





Application of water protocol at Umm Al-Falaj

In order to answer the second and third questions in the research, the water protocol was implemented in different locations (Umm Al-Falaj in Al-Ghurifa area, Busendh Tower in Ghurifa area and Al-Falaj channel in Sharia area) in cooperation with the Department of Water Resources Affairs staff to find out the quality of water and its validity to drink and compare water quality Falaj and even its arrival to the farms through the channels of the falaj. And to find out the cause of the problem and educate the people.



Application of water protocol at Busandh Tower



Application of the Water Protocol at Falaj Al Sharia

Results

A. Interviews

- **Interview with Engineer Mohammed Al Nuaimi, Director of Water Resources Department**
- **Eng. Salim Al Jabri / Department of Aflaj Department**

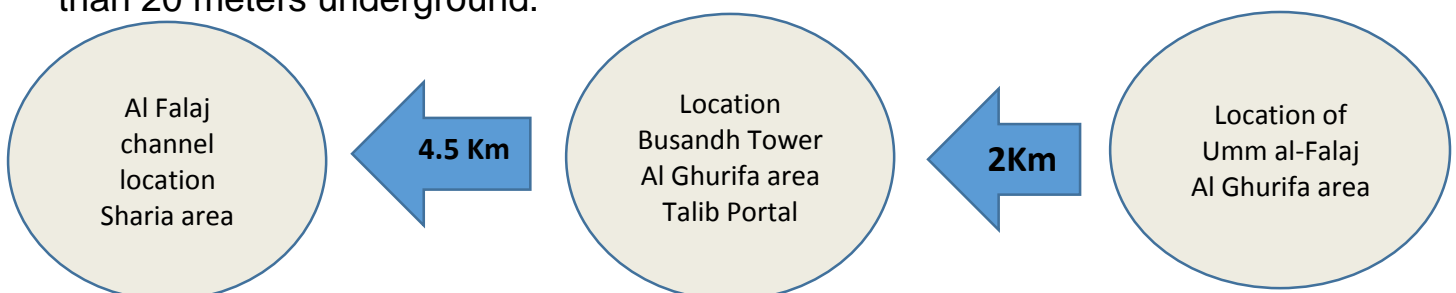
They said that the water of Aflaj private, which is estimated to be hundreds of years old, is a major source of water for drinking and watering plants. The Department of Water Resources Affairs of the Regional Municipalities shall take samples of the water of these falajes and examine them in the laboratories of the regional municipalities and water resources in Al Buraimi Governorate or through the Central Laboratory of the Ministry in order to ascertain the validity of drinking.

It receives numerous communications, observations and complaints concerning the cleanliness of the falaj, where a lot of dirt was found dumped in the falaj through matches of dead animals and building material residues during the dry period. And its negative effects on groundwater as a result of the discharge of their residues into the aquifers, the Ministry had to enact regulations and regulations to protect limited fresh groundwater.

The purpose of this study is to protect the water resources, especially the fresh groundwater, and to ensure that these resources can continue to meet the current and future needs in quantity and quantity. To achieve this goal, protection zones were established around the wells of the water supply in Al- Other new protection zones are under construction.

-Interview with Wakeel Al-Falaj Talib Al-Jabri,

He said that the maintenance of the falaj was started 16 years after the runoff since 2000 and its return to run in 2016 in three locations in Buraimi Governorate (Umm Al-Falaj in Gharifa area, Busendh Tower in Al Ghurifa area, Al-Falah Canal, sharia area 4.5 km). It has a length of 6500 meters and a depth of more than 20 meters underground.



He said that one of the causes of drought or breakage of falaj is the collapse of the trucks because of the passage of channels on the subterranean Falaj underground and near the residential plans and the maintenance of the falaj periodically. When the maintenance work began, a lot of dirt was found dumped in the falaj through matches and dead animals. The water was in a state of stagnation with the presence of an underground stock of water. However, all together, the Falaj Canal was repaired, cleaned and returned to run again.



Maintenance works for the falaj

B- Application of water protocol:

The water protocol has been applied to (water of the falaj in Ghurifa area and the water of the Busandh tower in Gharifa area and the water of the Falaj channel in the sharia area). The following are the results of the measurements taken:

25/02/2018	10:20 am		10:20 am		11:25 am	
	Umm Al-Falaj		Busndh Tower		Falej Al - Sharia channel	
	Al - Khwarizmi Primary School	Water Resources Affairs Department	Al - Khwarizmi Primary School	Water Resources Affairs Department	Al - Khwarizmi Primary School	Water Resources Affairs Department
(pH)	6.99	7.95	9.21	8.12	9.58	8.14
conductivity, Salinity (Ec)	735	631	603	604	1389	1194
temperature (T ⁰ C)	28.8	28.5	28.3	28	32	32
Transparency	120 <	120 <	120 <	120 <	120 <	120 <
Percentage of dissolved oxygen (mg/l)	5		5		4	

Diagram (1) Comparison of the pH score between the three sites

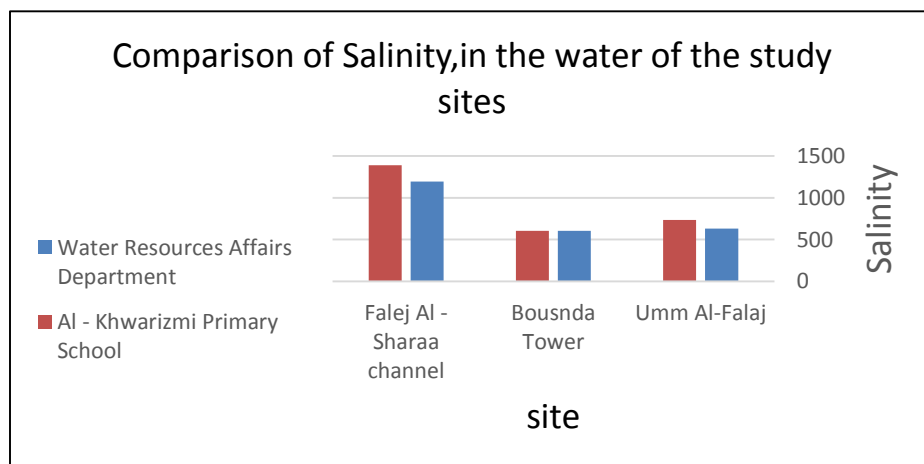
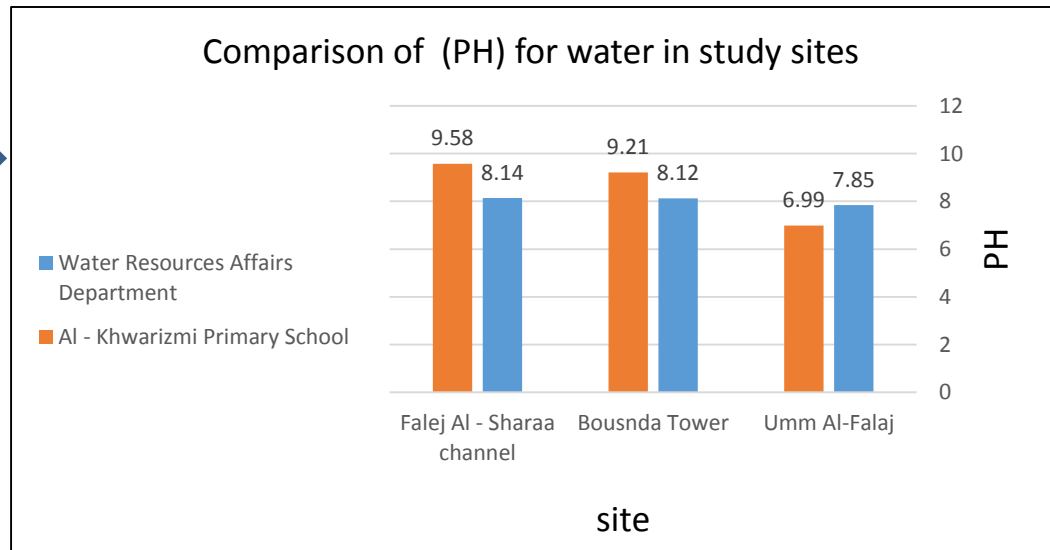


Diagram (2) Comparison of conductivity Salinity between the three sites

The data was entered and sent at the program site (www.GLOBE.gov) via the Data ENTRY application where a new location was added and the data collected in the search was entered.

The screenshot shows the 'Site Definition' form in the GLOBE Data Entry application. It includes fields for 'Site Name', 'Coordinates' (Latitude, Longitude, Elevation), and a map. The 'Hydrology' section is expanded, showing options for 'Name of Body of Water', 'Water Quality for Spring', 'Name of Spring', 'Water Sample Location', 'Can you see the bottom?', 'Channelbank Material', 'Streambed Material', 'Floodplain Material', and 'Substrate Material'. A comment is entered: 'The site of Falaj Al Sharakh in the Sharakh area in the Falaj water channel, which falls trees'.

The screenshot shows the 'Integrated Hydrology' form, which is used for entering hydrological data. It includes fields for 'Date and Time', 'Water body state', and 'Normal State'. The 'Clouds' section is expanded, showing 'Transparency' data for two tests. The 'Temperature' section is expanded, showing 'Temperature' data. The 'Electrical' section is expanded, showing 'Conductivity' data. The 'pH' section is expanded, showing 'pH' data. The 'Dissolved' section is expanded, showing 'Dissolved Oxygen' data.

Discussion of results:

We note from the above as a response to the first question that there is great efforts exerted by the Water Resources Department in the Directorate General of the Regional Municipalities and Water Resources in Al-Buraimi for the maintenance of Falaj continuously and to ensure that it continues to flow and to inspect the water samples to ensure its safety and quality for human use,

whether for drinking or irrigation of crops. Because it is located under and near residential houses. Therefore, there is fear of water contamination by sewage, so the water is periodically examined. The agent follows up everything related to Al-Falaj and the quality of water and discusses what is related to the officials and the people of the state.

The measurements and readings taken from the application of the water protocol from Umm al-Falaj to sharia were answered in the second question. The value of salinity is good at Umm al-Falaj and at Busandh Tower. (Table 1, Diagram 2).

The transparency values are more than 120, which means that the water is very transparent. There is also a significant increase in the value of pH (ph) in the sites of the Tower of Busandh and sharia (Table 1) and (Diagram 1) to the extent that the water becomes unfit for drinking (basal) only at Umm al-Falaj. This is due to the presence of calcareous and clay rocks in Al- After the 4.5-km-long Bu Sendh Tower, which is rich in minerals, which increases pH and conductivity, water will be alkaline, and the presence of houses near the falaj stream contributes to sewage contamination. Proportion of dissolved oxygen (4-5 mg / L).(Table 1).

So the water of the falaj at the time of the law of the law is not suitable for drinking is suitable for irrigation of plantations, but it is fresh and suitable for drinking at Umm al-Falaj and Busandh Tower. This is the answer to question(3).

Conclusion :

Through the cooperation of officials in the Department of Water Resources at the General Directorate of Regional Municipalities and Water Resources in the Governorate, we have been able to obtain accurate and clear information about the Directorate's efforts in maintaining the Falaj Canal and maintaining its cleanliness and method of checking the samples periodically, As well as its role in the protection of groundwater reserves fresh water to meet the needs of the current and future community, as well as the great cooperation with the representative of Al-Falaj contributed greatly to our knowledge of the sites of the passage of the falaj and thus determine the locations of the study is (Umm al-Falaj area Ghurifa - Tower Busandh area Ghurifa -), As well as information on the causes of dryness of the Falaj and the stages of maintenance of the Falaj and return to flow after a break of 16 years.

By applying the water protocol to samples at specific locations, we have obtained accurate information about the water characteristics and thus deduced the quality of the water and its suitability for drinking. Our findings are that there is a great effort exerted by the Water Resources Department at the Directorate General of the Regional Municipalities and Water Resources in Al-Buraimi to keep the falaj continuously and to ensure that it continues to flow and to check the water samples to ensure its safety and quality. The values of conductivity and soluble salts are good at Umm al-Falaj and at Busandh Tower, while they rise clearly in Falaj al-sharia. The values of transparency are more than 120, which means that the water is very transparent and the pH value is approximately 7 at Umm al-Falaj but ranged between 8.12-9.58 at Tower Busandh and Falag sharia, which is not suitable for drinking. Dissolved dissolved oxygen content (4-5 mg / L). Therefore, the water of the falaj is suitable for irrigating crops, but it is not

suitable for drinking except in Umm al-Falaj. These findings are important for the people of the state, especially the sharia area, to answer their questions about the quality of the water for drinking water, particularly since the falaj period was long, in addition to the proximity of the houses, which have the sewage system, from the path of falaj, this falaj will tell about 200 acres.

The strengths of the research were the cooperation and welcome of all officials of the Water Resources Department and their transparency in answering our questions and cooperating with us in conducting water quality measurements from the three study sites, in addition to allowing us to visit the Municipal Laboratory and see the tools used for them. Al-Falaj's agent was also very helpful and helped us to visit the study sites and give us a detailed explanation of the steps to re-run the falaj and maintenance and thus facilitate the task of research. In addition to encouraging the technical team to maintain this research and provide the necessary tools. The weaknesses from our point of view are our inability to go down to Umm al-Falaj and check the temperature of the water directly because it is located at a depth of 24 m below the ground and so we took the same sample of water only for examination.

We see that the water protocol was suitable for research, but the coming years can be re-implemented by adding the Soil and Vegetation Protocol to observe the effect of the presence of falaj water on the growth of plants after the long dry period, especially in the sharia area, in addition to its effect on soil.
Environmental benefits for the community

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Eng. Salem Al Jabri-Head of Monitoring and Studies

Abdul Hakim al-Farisi- technician of the municipal laboratory .

Mr.Talib Al-Jabri wakeel al-falag

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