



Kingdom of Saudi Arabia

Ministry of Education

Administration of Education in Makhwah

Nawan Secondary Girls School



A study on of the physics prop of the soil of The Ain Ancient Village

Presented By

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To

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Abstract

Reservoirs are vital to the world's economy for their role in electricity generation, flood control, water supply, and recreation, which are all dependent on water storage capacity. However, dams are effective traps of sediment, and capacity is reduced as deltas prograde into reservoirs

Air, and soil from three area at The Ain Ancient Village were investigated. The tools that provided with Globe program were used to determine the properties of air, soil sample. The results of physical and chemical analysis of soil samples confirmed that some sample of soil are contaminated with Carbonate. In general, we can conclude the properties of the air and the soil in The Ain Ancient Village , .Al Makhwah area

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1-Introduction

Al Makhwah district is located on the coast the climate is warm in the winter and hot in the summer. Rainfall lies in the range of 229–581 mm; the average is 100–250 mm annually. Water and vegetables are essential for the human diet; in particular provide the trace elements, whereas they are vital for good health if they .come from plant or an organic source

Of all the natural resources, water is unarguably the most essential and appreciated. Life began in water and spirit is nurtured by water. It is a universal solvent and as a solvent it provides the ionic balance and nutrients, which support all forms of life. Water is one of the most abundant resources on earth, covering three fourths of the planet's surface. About 97% of the earth's water are saline water in the oceans and 3% is fresh water contained in the poles (in the form of ice), ground water, lakes and rivers, extremely valuable and with the country's rapid growth, the demand for .water is increasing

Water scarcity in Saudi Arabia is a major problem, due to the shortage of natural freshwater resources for domestic purposes. In addition, the demand for water in the Kingdom increases annually at a rate of 3% or more. In Saudi Arabia the major source of water used to meet the domestic, agricultural and industrial needs is the .ground water

As dams age they may become unsafe or no longer useful; as a result dam removal has become a viable management option in some cases. Old dams may become .structurally unsound and need to be removed for public safety reasons

In Saudi Arabia the recent source of water is dams. Dams are used to capture surface water after frequent flash floods. More than 200 dams collect an estimated 16 billion cubic feet of runoff annually in their reservoirs. This water is used for agriculture. Since no previous work has been conducted in this subject and thus no results have been published on this subject until now, this study could then serve as a guideline for further and thorough analyses of well waters in Almahwah, the .Kingdom

2- Materials and methods

2-1 Description of the sampling sites

Three areas were chosen for this study located within The Ain Ancient Village region, Al Makhwa, Table 1. Al Makhwah is a populated place in Saudi Arabia, Asia. It is located at an elevation of 448 meters above sea level and its coordinates are 19°46'46" N and 41°26'8" E in DMS (Degrees, Minutes Seconds) or 19.7794 and 41.4356 (in decimal degrees). It is an excellent agricultural region and has many valleys. In the western part of Saudi Arabia, the main source of water or almost the single source is groundwater. The Geographic location of the Al - Makhwah city is shown in Fig. 1. Figs .2 show the Geographic of The Ain Ancient .Village

The area of study was surveyed during 2022. Soil samples were collected by stainless steel drill. The soil was excavated up to 12-15 cm depth by an auger containing all layers. While the dust collected from special tools. The following . pictures show the tests for soil

Table 1

Name and coordinates of studied Dam

Name	coordinates						Heigh,m
	Latitude			longitude			
The Ain Ancient Village	19	41	477	41	23	211	92.1



Fig. 1 Saudi Arabia map showing Al Makhwa city

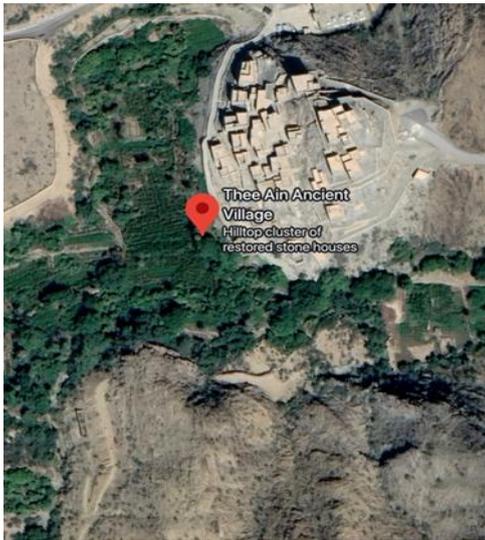


Fig. 2 Saudi Arabia map showing Deh ain vallage

Results and discussion

3-1 Study Area and Sample Collection

Since no previous work has been conducted in this subject and thus no results have been published on this subject until now, this study could then serve as a guideline for further and thorough analyses of well waters in Almahwah, the Kingdom

2-3 Analysis of atmospheric and climate

Table 2 shows the data of investigation of atmospheric and climate. As shown the current temperature is 28°C, maximum temperature 30 °C and minimum is 20 °C. . % The humidity for all spots has a value 36

3-3 Analysis of soil samples

Soil analysis results showed that the samples have a various structure. In addition, most samples have a color degree close to each other. All soils have a sandy .texture structure except one sample

The highest amount of carbonate was in the first sample while the second had .non

Title	Pictures
1-Determination of air temperature	
2-Determination of soil temperature	
3-Humidity apparatus	
4-Clouds	

Title	Pictures	Title	Pictures
1- Soil structure		5-Quantity of rocks	
2- Soil consistency		6- Amount of carbonates	
3-Soil texture		7- The primary soil color	
4- Amount of roots		8-Secondary soil color	
9- pH for Soil			

Table 2
Analysis of atmospheric and climate

Date	Time	Air Temperature °C			Soil temperature °C			Heat and humidity		Relative atmospheric pressure, mabr	Clouds		
		Current	Maximum	Minimum	Current	Maximum	Minimum	Ambient air temperature, °C	Humidity, %		Cloud cover	Type	Proportion, %
11/2/2022	4:15 pm 13:15 pm	28.3	31.0	20.5	25.2	32.6	21.2	27.9	36	928.94	natural	cumulus	50

Table 3

Physical Properties of Soil

	Soil structure	Soil color		Soil consistency	Soil texture	Amount of roots	Quantity of rocks	Amount of carbonates	PH	Soil temperature ,C		
		The primary soil color	Secondary soil color							Current	Maximum	Minimum
1a	granular	10YR 3/3	10YR 4/3	Loose	Silt	Many	Many	Strong	7.4	25.2	32.6	21.2
1b	Single grained	2.5Y 3/2	2.5Y 3/2	Loose	Clay	None	Many	None	7.9			

1. Conclusion

We can summarize some of the results as the following:-

1. The results of the analysis of well soil showed that it contains large deferent type with strong carbonate .

Acknowledgement

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Badges

Cooperate	Contact a stem specialist	Communication between schools
<p>Students Jana Ahmed Al-Abdali and Wejdan Ali Al-Zahrani</p> <p>1-Go to the traditional to The Ain Ancient Village</p> <p>2-Taking quantities of water and different types of soil</p> <p>3-Use of instruments for weather measurements</p> <p>4-Conducting experiments for water and soil measurements in the school</p> <p>5-Searching and reading about books that help in the research</p>	<p>1-The teacher: Fatima Al-Adawani, a master's degree in Biology and a Biology teacher, translating research into English</p> <p>2-The teacher: Aida Al-Rashidi, the chemistry teacher, supervising the experiments and research of the students</p> <p>3-School lab teacher: Alia Al-Zahrani</p> <p>4-School Principal: Aisha Al-Zailai provided support and assistance</p>	<p>Contacting Professor: Fayza Bahri at El-Matn Intermediate and Secondary School to assist in the Globe research</p>

References

- [1] Ma, C. J., Kasahara, M., Höller, R., & Kamiya, T. (2001). Characteristics of single particles sampled in Japan during the Asian dust–storm period. *Atmospheric environment*, 35(15), 2707-2714.
- [2] USEPA (2006) United States Environmental Protection Agency.
- [3] Ali, M. H., & Al-Qahtani, K. M. (2012). Assessment of some heavy metals in vegetables, cereals and fruits in Saudi Arabian markets. *The Egyptian Journal of Aquatic Research*, 38(1), 31-37.
- [4] Aldjain, I. M., Al-Whaibi, M. H., Al-Showiman, S. S., & Siddiqui, M. H. (2011). Determination of heavy metals in the fruit of date palm growing at different locations of Riyadh. *Saudi journal of biological sciences*, 18(2), 175-180.
- [5] Al-Farhan, B. S. (2013). Determination of trace elements in nutrition materials in Kingdom of Saudi Arabia. *International Journal of Physical Sciences*, 8(37), 1830- 1835.
- [6] Alshammary, S. F., & Al-Horayess, O. S. (2014). Appraisal of mineral and heavy metal contents in Peach and Grape grown at Some Major Agricultural Companies in Saudi Arabia. *Oriental Journal of Chemistry*, 29(4), 1515-1522.
- [7] Kim, D., Chin, M., Yu, H., Eck, T.F., Sinyuk, A., Smirnov, A., Holben, B.N., 2011. Dust optical properties over North Africa and Arabian Peninsula derived from the AERONET dataset. *Atmos. Chem. Phys. Discuss.* 11, 20181–20201.
- [8] Maghrabi, A., Alharbi, B., & Tapper, N. (2011). Impact of the March 2009 dust event in Saudi Arabia on aerosol optical properties, meteorological parameters, sky temperature and emissivity. *Atmospheric Environment*, 45(13), 2164-2173.
- [9] Suleman, N. M., Mohammad, I. A., Almesned, S. S., & Aljaghwan, A. A. (2012). Measurements of Some Trace Elements in Street Dust in Zilfi Province at Saudi Arabia Using Inductively Coupled Plasma-Mass Spectrometer. *World Environment*, 2(6), 135- 139.
- [10] Cao, Z., Yang, Y., Lu, J., & Zhang, C. (2011). Atmospheric particle characterization, distribution, and deposition in Xi'an, Shaanxi Province, Central China. *Environmental Pollution*, 159(2), 577-584.
- [11] Al-Awadhi, J. M., & AlShuaibi, A. A. (2013). Dust fallout in Kuwait city: deposition and characterization. *Science of the Total Environment*, 461, 139-148.
- [12] Gokhale, S., & Raokhande, N. (2008). Performance evaluation of air quality models for predicting PM 10 and PM 2.5 concentrations at urban traffic intersection during winter period. *Science of the total environment*, 394(1), 9-24.
- Xuan, J., & Sokolik, I. N. (2002). Characterization of sources and emission rates of mineral dust in Northern China. *Atmospheric Environment*, 36(31), 4863-4876.
- [13] Li, R., Shu, K., Luo, Y., & Shi, Y. (2010). Assessment of heavy metal pollution in estuarine surface sediments of Tangxi River in Chaohu Lake Basin. *Chinese Geographical Science*, 20(1), 9-17.

Work Plan

The project's head, Aisha Khader Mohammed Al Zaili, distributed the work to the team as follows

.Students collect samples from various sites over a period of days

Field studies were carried out for five different farms in the Nwan area and measurements of different weather conditions at each site

.Test and analysis the samples (water, soil and air) on Globe program devices

Make reports about each site

Assigning the Globe program coordinator, Ida Ali Hussein Al-Rashedi, to follow up the students during the experiments on the environmental globules and to establish sites for field studies on the school's Globe website

The project leader communicates with the academic supervisor to conduct some specialized analysis, quality and consultation