



Kingdom of Saudi Arabia

Ministry of Education

Administration of Education in Makhwah

Nawan Secondary Girls School



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**A study on Impacts of The Rain on Environment in Nawan Area  
through years 2017 and 2022**

**Presented By**

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To

**GLOBE 2022 International Virtual Science Fair**

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## **Abstract**

Rainfall lies in the range of 229–581 mm; the average is 100– 250 mm annually..The air, water and soil from two farms at Nawan were investigated. Little information is obtainable for the estimation of health effects in relation to dust storms. The tools that provided with Globe program were used to determine the properties of air, water and soil sample. The results of physical and chemical analysis of water samples confirmed that some sample of water are contaminated with nitrite and nitrate. In general, we can conclude that the rainfall has affected by the environment (water, air, soil) in Nawan, Al Makhwah area through years 2017 . and 2022

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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.

Little information is obtainable for the estimation of health effects in relation to dust storms. Soil particles containing contaminants are thereafter entrained into the atmosphere as dust. Humans are exposed to dusts through three main ways, ingestion, inhalation, and dermal absorption. Various types of pollutants are carried by dust storm such as pesticides, by adsorbing them on the suspended particles as well as weathering products of rocks and soils. Interaction, transport, and emission of air pollutants within the city are the pertinent reasons for the increasing air pollution problems in today's urbanized society. Wind-blown mineral dust causes varied effects on health, environment and climate. The size of the effect depends on the amount and the physical and chemical properties of atmospheric dust that are largely controlled by dust sources.

The main objective of this study is monitoring impacts of the rainfall level on air, soil and water for some farms in Nawan region through 2017 and 2022 .

## 2- Materials and methods

### 2-1 Description of the sampling sites

Two farms are chosen for this study located within Nawan 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 (2-3) show the Geographic of different sites under study

The area of study was surveyed during 2017 and this current year 2022 . The samples from the study area were collecting by the same way in 2017. Soil samples were collected by stainless steel drill under the vegetable. The soil was excavated up to 12-15 cm depth by an auger containing all layers. The water samples were collected in polyethylene bottles (1.5 liters capacity). The sample bottles were covered immediately, after water samples from groundwater wells were taken by lowering the polyethylene bottles to about 0.5 m under the water . level. The following pictures show the tests for soil

**Table 1**

Name and coordinates of studied farms

Farm	Name	coordinates						Heigh,m
		Latitude			longitude			
1	Mohammed Barakat Al-Zahrani	19	32	0.53	41	07	9.25	74
2	Ahmed Ali Hassan Al-Zahrani	19	32	4.21	41	09	7.73	99






Fig. 1 Saudi Arabia map showing Makhwah city









Fig. 2 Location of Farm No. 1 (Mohammed Barakat Al-Zahrani).









Fig. 3 Location of Farm No. 5 (Ahmed Ali Hassan Al-Zahrani)

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

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	



Title	Pictures	Title	Pictures
4- Amount of roots		8-Secondary soil color	
9- pH for Soil			

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## **Results and discussion**

### **1-3 Analysis of atmospheric and climate**

Table 2 shows the date of investigation of atmospheric and climate in 2017 (A ) and 2022 (B). As shown the current temperature change from 31.4 to 30.7 °C, maximum temperature 37.9 to 30.3 °C and minimum from 25.7 to 25 °C. The humidity for all farms have 28-27 % mg/L for 2017 .while in this year 2022 the current temperature change from 30.1 to 31.4 °C, maximum temperature 30.2 to 31.6 °C and minimum from 22.3 to 31.4 °C. The humidity for all farms have 25 % mg/L in average

### **3-3 Analysis of water samples**

The physical and chemical properties of collected water samples from studies farms are filled in Table 3. It is clearly shown that the water from both farms has the same Transparency. Water from farms (2) has the minimum value dissolved .oxygen

The sample from farm (1) is more alkaline water. All samples have salinity increased to 500 mg/L that make the water in suitable for domestic uses. The chemical analysis were shown that water from farm (2) have high content from .nitrite and nitrate which increase about the local standard limits for water

### **3-3 Analysis of soil samples**

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

The amount of carbonate varies from one location to another

**Table 2-1**

**Analysis of atmospheric and climate in 2017**

Farm	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, %
1	24/2/2017	8:50 a.m	31.4	37.9	25.7	27.7	32.2	26.1	35.5	28	1013	sky	Clear	0
2	17/2/2017	9:05 a.m	30.7	33.3	25.0	30.8	32.1	25.7	39.4	27	1013	nat ura l	cirros tratus	40

**Table 2-2**

**Analysis of atmospheric and climate in 2022**

	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, %
1	13/2/2022	5:08 pm  14:08 pm	30.1	30.2	22.3	33.7	33.7	33.6	30.7	48	994.76	sky	Clear	0
2	18/2/2022	5:12 pm  14:12 pm	31.4	31.6	31.4	36.6	36.8	36.6	31.9	42	997.17	sky	Clear	0

Table 4-1

Physical Properties of Soil in 2017

Farm	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 3/4	10YR 4/4	Friable	Sand	Many	Many	None	8.3	27.7	32.2	26.1
1b	granular	10YR 5/4	10YR 6/4	Friable	Sand	Many	Many	Slight	8.8			
1c	granular	10YR 5/4	10YR 5/4	Friable	Silt	Few	None	None	8.5			
2a	granular	10YR 4/4	10YR 4/4	Firm	Sand	Many	Few	Slight	9.0	30.8	32.1	25.7
2b	granular	2.5Y 7/4	2.5Y 7/4	Friable	Sand	Many	None	None	8.9			
2c	granular	2.5Y 5/4	2.5Y 4/4	Firm	Sand	Many	None	None	8.1			

Table 4-2-1

## Physical Properties of Soil in 2022

Farm	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 4/4	10YR5/4	Friable	Silt	Few	None	None	7.9	33.7	33.7	33.6
1b	Single grained	7.5Y 4/6	7.5Y4/6	Loose	Silt	Few	None	None	8.0			

Table 4-2-2

## Physical Properties of Soil in 2022

Farm	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
2a	granular	10YR 5/4	10YR5/4	Friable	Caly	Few	None	None	8.0	36.6	36.8	36.6
2b	Single grained	2.5Y4/2	2.5Y4/2	Loose	Silt	None	Few	None	7.3			
2c	blocky	10YR 4/4	10YR5/4	Friable	Caly	Many	None	Slight	8.1			

## **1. conclusion**

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

1. The results of the analysis of well water showed that it contains various percentages of salinity,
2. The temperature and humidity of the climate have no different
3. The results of the analysis of well soile showed that it contains various type of particles,

## **Acknowledgement**

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## Badges

Cooperate	Contact a stem specialist	Communication between schools
<p>Students Ghadi Ahmed Al-Zahrani and student Joud Nasser Al-Zahrani</p> <p>1-Go to different farms in the area</p> <p>2-Taking different amounts of soil</p> <p>3-Use of instruments for weather measurements</p> <p>4-Conducting experiments for soil measurements at 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>

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## **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 Teacher Fatima Aladwani to conduct some specialized analysis, quality and consultation