THE GLOBE PROGRAM
فريق GOLBE بمدرسة الشفاء بنت عوف (1 - 10)
التعلم والملاحظة العالمية من أجل إفادة البيئة

Sultanate Of Oman
Ministry Of Education

Study of the Effect of Burning Agricultural Wastes on Agricultural Soil Properties in Al - Hajer Area - Muscat Governorate.

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Al Shifa Bent Awf Primary School (4-10).

March 2017.

Contents:

Thanks:

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 distinguished Professor Wafaa Bint Abdullah Al-Tamtmiyeh and Professor Badriya Mohammed Al-Ismaily, and to thank ourselves for the efforts we have made in the success of scientific research.

Research Summary:

Study of the effect of burning agricultural wastes on the properties of agricultural soil in Al-Hager area, Muscat Governorate

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The aim of the research is to clarify the effect of the burning of agricultural waste on agricultural soil in farms. The problem of the research was concentrate on the phenomenon of burning agricultural waste on the farms because the farmers believe that the residue of burning (ash) increases soil fertility and disposal of agricultural pests. Research Questions were why do farmers burn the agricultural waste inside farms? What are the effects of burning agricultural waste on agricultural soil fertility? How can we reduce the phenomenon of burning agricultural waste in farms? .This research was done by the soil protocol .The conclusion of the research were found the following. The rang of an acidity of the soil that we measure on our research was between (8-9) acidity. This rate was preferred by many of the plants in that area according to evidence of coexistence with this soil for a long time. After measurements the color on the soil we found the following the burnt soil was rich in alkaline materials. The soil closest to the incineration site is soil with a color range (2.5 Y 4/2) which means that it is often not fertile because the farmers always avoid plantations on that area as shown in the pictures below. The soil away from the incineration site is soil bearing a color range (10 YR 4/2) which means it is rich in Iron Oxide. Finally, the research recommended the following recommendations: Farmers should not burn inside farms and recycle agricultural wastes because they have economic value. . We also mention some of the weaknesses of the difficulty finding standard values for the soil and finding a far area from the place of burning.

Research problem :

Highlighting the phenomenon of burning agricultural waste on farms as farmers believe that the residue of ash increases soil fertility and eliminates agricultural pests.

Research questions:

- Why do farmers resort to burning agricultural waste in farms?

- What is the negative and positive impact of the phenomenon of burning agricultural waste on the fertility of agricultural soil?

- How can we reduce the phenomenon of burning agricultural waste within farms?

Hypothesis:

The process of burning agricultural residues has a negative effect on the fertility of agricultural soil and makes it unusable. Farmers should not burn and recycle wastes because of the elements they contain.

Search limits :

This research was carried out from the beginning of January 2017 until the end of March 2017 in Al-Hager area in Amirat Governorate in Muscat Governorate.

Search procedures:

We have developed a clear and specific research plan by:

- Gathering information from different sites on the phenomenon of burning and whether it has an impact on the soil.

- The location of the study was (Al-Hager) in the state of Amrat in Muscat.

- *** Support and assistance from others:** First: continuous communication and provide advice and instructions from the teacher

Second: An interview with agricultural engineer Hamad al-Hashemi.

Third: The people of Al-Hajar area (Hilla Seih Altamam) located near the farms.

- We have identified the data we will need:

*** Soil protocol data**: color - consistency - structure - texture - roots - rocks - acidity - carbonates.

***Available resources and devices:**

Team equipment.-

- Scientific evidence of the program for the soil protocol.

Notes	Site	Work dane	Today	**Date**
The final selection of the research students	School "Shifa Bent Auf"	Meeting of the teacher with the students of the team and the selection of students for the task of scientific research	16/10/2017	Sunday
The students wrote the important data that will benefit us in the implementation of the research	School "Shifa Bent Auf"	take a clear background on the protocol and know the steps we will work	10/01/2017	Tuesday
Fatima: Compiling the hardware needed to operate and search the site by GBS Hafsa: Doing the required measurements Yumna : Make notes and write data	The farm	The farm studied soil samples in both	19/02/2017	Sunday
We included information in the conclusions	at home	interviewing an agricultural engineer	06/03/2017	Monday
See the scientific research manual for the program	School "Shifa Bent Auf"	The final look at the research manual The accurately identify the components of the research and work	06/03/2017	Tuesday

The research procedures were using the following steps, materials and tools:

* **Materials measuring soil characteristics:**

- Rubber gloves.
- shovel.
- Acid (vinegar).
- Measurement ruler.
- Apparatus for measuring acidity.
- Cups.
- Distilled water.

***In all locations we have:**

1) Locate a suitable location for drilling, and remove the vegetation.

2) We used the shovel to remove 10 cm from a small area on the soil surface and put it on the ground.

3) Take a sample of the soil and since it was dry we wet it with water

4) Divide the sample and compare it with the color scheme so that we stand and back to the sun to shine on the color scheme and soil sample we are watching.

5) We tried to form a long strip of soil sample and record notes.

6) We were able to note both: the presence of rocks.

7) the presence of roots and quantify if any.

8) The presence of carbonate:

1 - add acid (vinegar) on the soil particles to be studied.

2 - control the occurrence of the eruption or bubbles and then determine the amount of carbonate.

Figure (2) Soil types in the three research sites

Soil at the site of burning

Soil far from the site of burning

Soil near the burning site

The way:

Field Application Location (Sultanate of Oman Muscat Governorate).

Used proteins:

Soil properties (structure, texture, consistency, carbonates, roots, rocks, color), soil acidity)

Method of work and data collection:

1- Implementation of soil soil in Al-Hager farms (three soil sites) and taking soil measurement data at the three sites

2. Collecting, organizing and analyzing data in the form of tables and graphs

3 - A questionnaire for the people of the region and an interview with agricultural engineer Hamad al-Hashemi to collect more information about the problem of research

4 - We have an awareness capacity for farmers containing alternative solutions for the disposal of agricultural waste.

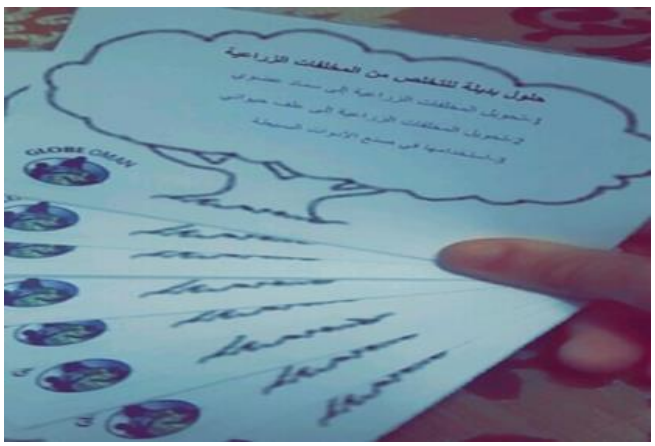

Figure (3) Awareness Card

Data collection and analysis:

Data collection :

- Soil data collected by the Soil Protocol from three sites. The first site: soil near the site of the burning, the second site: soil away from the site of burning, the third location: the soil that was burned on them.

site	Soil structure	color	consistence	Texture	Rocks	Roots	Carbonates	pH
near the site of the burning,	granular	2.5 Y4/2	Friable	Clay loam	Less	more	Less	**9.4**
soil away from the site of burning	granular	10 YR 4/2	Friable	Clay	Less	Too much	Less	**9.11**
soil that was burned on them	Single - grined	N3	Friable	Loamy sand	Less	less	Less	٨,٥١

Figure (4) soil data

بيان درجات الحموضة في التربة	
رقم ال pH	حالة التربة
10-11	شديدة القلوية جداً
9-10	شديدة القلوية
8-9	قلوية
7-8	ضئيلة قلوية (خفيفة)
7	متعادلة
6-7	ضئيلة الحموضة (خفيفة)
5-6	حامضية
4-5	شديدة الحموضة
3-4	شديدة الحموضة جداً

Figure (5) pH data

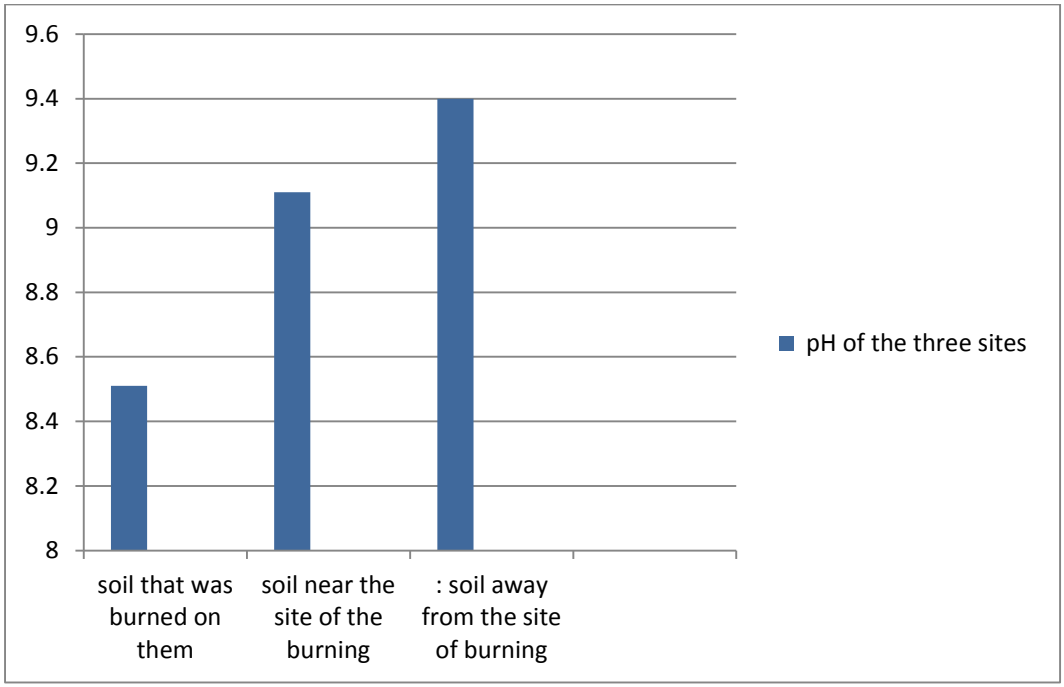

Figure (6) pH of the three sites

Figure (7) Interview with Agricultural Engineer

Results :

We've been able to answer all of our research questions.

As shown in Table (4), we found that the soil soil is acidic soil (8-9), which is preferred by many of the cultivated plants in this area for long time.

After soil color measurements, we found that the burnt soil was rich in alkaline materials. Soil near the burning site is soil with a color range of 2.5 Y 4/2, which means that it is often not fertile. Above. The soil away from the incineration site is soil with a color range (10 YR 4/2) which means it is rich in iron oxide.

- After we distributed a questionnaire to the people of the region we found the following:

1. 50% of the population does not believe that the burning benefit accrues to agricultural soil

2-80% of the population believe that burning affects humans and living organisms

3- 70% of the population did not affect the respiratory system

4- 90% of the population does not support the phenomenon of burning

Recommendations:

- Farmers should generally avoid burning on farms and benefit from the burning area in the cultivation of crops instead of damaged by the burning process and we noted that burning is not desirable for the population.

- Find a better way to get rid of waste instead of burning it. And take advantage of the alternative solutions we have provided to GLOBE farmers in this region.

- We recommend the use of ash resulting from the burning of agricultural waste through its use as fertilizer by adding to the soil in small quantities and not mix with organic manure so as not to increase concentrations of phosphorus and potassium.

Conclusion :

In conclusion, our research ends by mentioning the strengths of this analytical study, the first of which was the application of the program protocols in the collection of data, which supported our previous knowledge of the steps of application of this study and there was some kind of ease, confidence and pleasure during its application. Our research is also characterized by providing useful benefit to the local community. We also mention some of the weaknesses of the difficulty finding standard values for the soil and finding a far area from the place of burning.

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