Sultanate of Oman

The Ministry of Education

AL-Rafea School for Basic Education

Study of the effectiveness of use sea gaff (mesquite) as fertilizer for soil

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Sultanate of Oman-Governorate of South Sharqia

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Contents:

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(Abstract):

The aim of this study is to study the effectiveness of the use of marine gaff trees in soil fertilization.

The research questions were as follow:

1-Can the sea gaff be converted to compost?

2-What is the effect of sea gaff (mesquite)on the properties soil chemical and physical fertility?

The research was carried out in the state of Jalan Bani Bou Hassan, where a plan of action was developed. We initially dried the leaves, fruits, flowers and branches of the sea gaff(mesquite) and then grinded and fermented them for a month afterwards mixed with the soil and used to grow the basil plant and compared its growth rates with another plant planted in the soil not Contains .fertilizer and another plant in soil containing organic manure

In addition, the soil was tested for soil by the Department of Agricultural Development, in addition to the application of the GLOBE soil protocol and the study of soil properties(pH, carbonate, soil texture, phosphorus, organic matter, (nitrogen, and E.C).

The results of the study indicated the effectiveness of the use of sea gaff in fertilizing the soil. The soil containing the mesquite fertilizer recorded an increase in the growth rate compared to the organic fertilizer and the results of the acidity

of the soils in accordance with the standards of PH = 7.2 and the salinity of E. C = 2.9 ds / m where Plants grow more in low salinity soils

According to studies, salinity should be less than 4ds / m and acid pH between (6.5_7).

Through the examination of soil in cooperation with the Department of Agricultural Development, we noticed an increase in the proportion of phosphorus and nitrogen and an increase in the amount of organic matter in the soils fertilized with mesquite trees and here is clear the positive role of trees mesquite (Sea gaff) The research recommends:

1.the need to exploit the trees Mesquite fertilize the soil .

2-The necessity of conducting a comprehensive study of the possibility of conversion of the marine gaf to effective organic fertilizer in the Sultanate of .Oman instead of burning and disposal

3- To search for and use other environmental uses of mesquite tree .

Basic terms:

1-Algae (Almskit): Evergreen forked tree belonging to the family legume leguminosae, which are perennial plants average height of 5-6 meters grow in hot climatic conditions dry or cold moist.

2- Fertilization is the process of adding fertilizers to the soil in order to .increase their fertility to raise agricultural production.

3- Organic matter: It is a substance that originates in plant or animal residues and its waste in the natural environment.

Research questions

Can mesquite be converted to compost?

What is the effect of mesquite fertilizer on the chemical and physical properties of the soil and increasing its fertilization rate?

Introduction and literature review

In the Sultanate of Oman, it is estimated that between 20 and 22 million trees are found in large quantities in the state of Jalan Bani Hassan. These trees negatively affect humans, animals and other plants through their rival. On the water and nutrients, by deepening its roots in the soil and the Ministry of Municipalities in most of the Sultanate of Oman to conduct campaigns to remove these trees and burning, which adversely affect the environment.

Studies have shown that mesquite improves the chemical and physical properties of soil (Ibrahim, 1992). As a family of legumes, it helps improve soil fertility.

The nitrogen content in the leaves is 2.29%, then the roots are 1.23% and the stems are 0.99% (Ousman, 1992). Mesquite also improves the level of phosphorus in the soil due to the symbiotic nature of the symbiotic life. Phosphorus content in leaves and fruits was 0.91% and 1.44% respectively (1966, Lanino).

Due to the spread of this plant and its ability to absorb water and competition of other plants on organic food, this research has sought to study the effectiveness of conversion of mesquite trees to organic fertilizer used in the fertilization of soil and increased fertility rather than burning and disposal, which can be used in the future Society and the environment.

Research method

First: Research Plan

1-Collecting information on the subject of research from books, the Internet and brochures issued by the Agriculture Authority

2- Setting a timetable for the implementation of the research plan.

3-Distributing roles to the research team.

4-The implementation of field visits to some areas where the trees are mesquite to identify their characteristics and take samples of their leaves and fruits and roots and flowers and legs to study.

5-Preparation of fertilizer and soil fertilization by and control the growth rates of basil plant in the sample of manure and mescite compost and the recording of measurements.

6-Application of the soil protocol to study (soil temperature - soil texture - PH - the amount of carbonates).

Interview with one of the specialists in the Department of Agricultural 7 Development.

8-Examination of the soil in cooperation with the Department of Agricultural Development to measure (percentage of phosphorus - nitrogen ratio - the proportion of organic matter - salinity).

Timeline for the implementation of the research plan

Tim period	Implementers	steps
25/11/2018	GLOBE Team	Collection of information
25/12/2018	GLOBE Team	Collection of samples
10/01/2019	GLOBE Team	Application of the soil protocol
25/02/2019	Bayan Amer AL-Mashaiki	Conduct the interview
20/02/2019	Department of Agricultural Development	Soil examination
25/02/2019	Bayan Amer AL-Mashaiki Fatma Said AL-Sawai	Data collection and analysis
27/02l2019	Fatma Said AL-Sawai Zulfa Ahmed AL-Shaibi-	Conclusions and research writing
March/2019		Submit research

Second: Study site

Sultanate of Oman, South Sharkia Governorate, Jalan Bani Bu Hassan. The following pictures show the locations of mesquite trees in the state and places where samples were taken in January. The weather .is clear and the sky is clear and there is no rain and humidity is low Red color shows the location of the mesquite spread on the valleys in Figure(1).

Figure (2) shows its spread in the center of the state

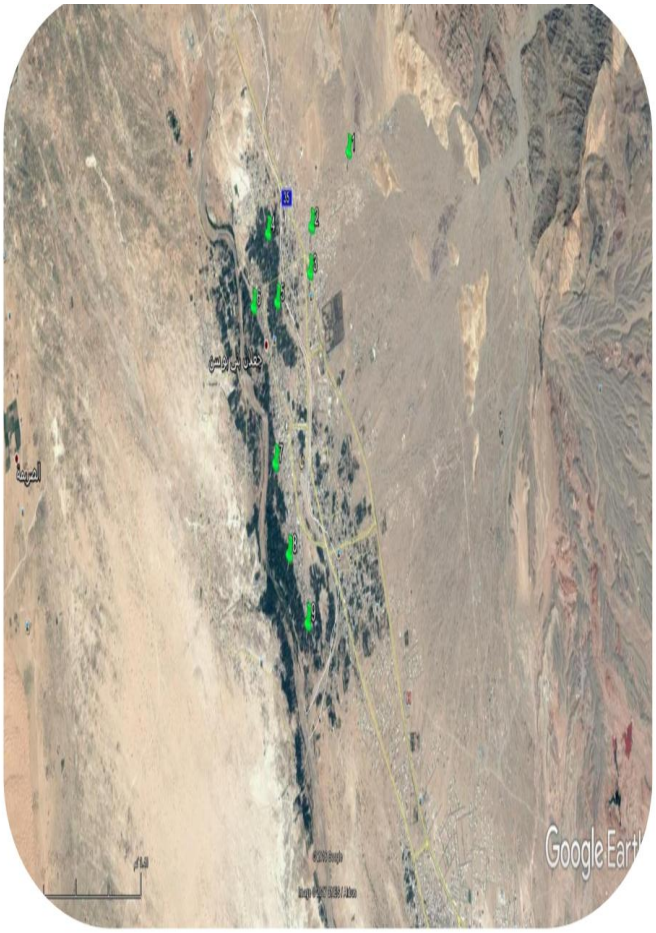


Figure (2

Figure1.

Data collection and analysis

Data on the first question were collected:

First stage: Preparation of mascot fertilizer through:

1-Dry the leaves, fruits, roots and twigs of mesquite trees.

2-and then grinding and dispersion.

3-It is placed on the soil through the rotation of fertilizer with soil and fermentation of a period of time to increase its effectiveness.

4-and then the cultivation of basil plant and compare the results with other basil plants were planted in the same soil, but mixed with different types of fertilizers (fertilizer only mesquite - organic fertilizer - without fertilizer

And then measure the growth of each plant and calculate the growth rates achieved by the samples studied and compared.

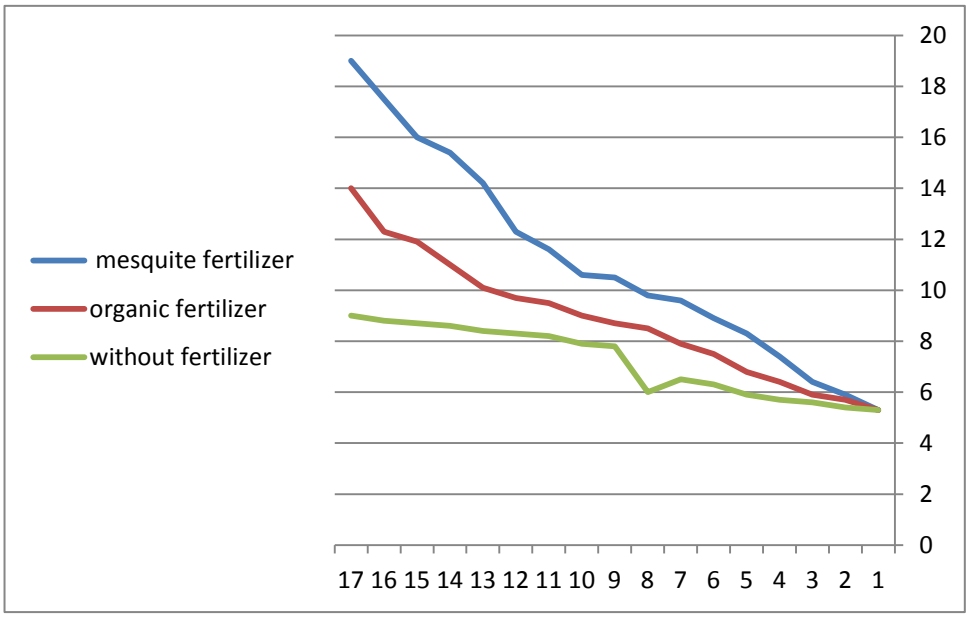
The data on the second question were collected through the application of the soil protocol and the study of the properties of the soils in the soil (PH - soil texture - soil type - the amount of carbonate - salinity). In cooperation with the Department of Agricultural Development, the soil test (phosphorus ratio - nitrogen ratio - organic matter ratio) and compared with compost.

Results

The results shown in Table (1) showing the growth rates of basil plant according to the type of fertilizer were obtained

without fertilizer	organic fertilizer	mesquite fertilizer	Date
5.3	5.3	5.3	05/01/2019
5.4	5.7	5.9	08/01/2019
5.6	5.9	6.4	11/01/2019
5.7	6.4	7.4	19/01/2019
5.9	6.8	8.3	٢٢-يناير
6.3	7.5	8.9	25/01/2019
6.5	7.9	9.6	28/01/2019
6	8.5	9.8	30/01/2019
7.8	8.7	10.5	04/02/2019
7.9	9	10.6	07/02/2019
8.2	9.5	11.6	12/02/2019
8.3	9.7	12.3	14/02/2019
8.4	10.1	14.2	17/02/2019
8.6	11	15.4	20/02/2019
8.7	11.9	16	23/02/2019
8.8	12.3	17.5	25/02/2019
9	14	19	28/02/2019
7.2	9.1	11.11	Average(growt

(table(1)



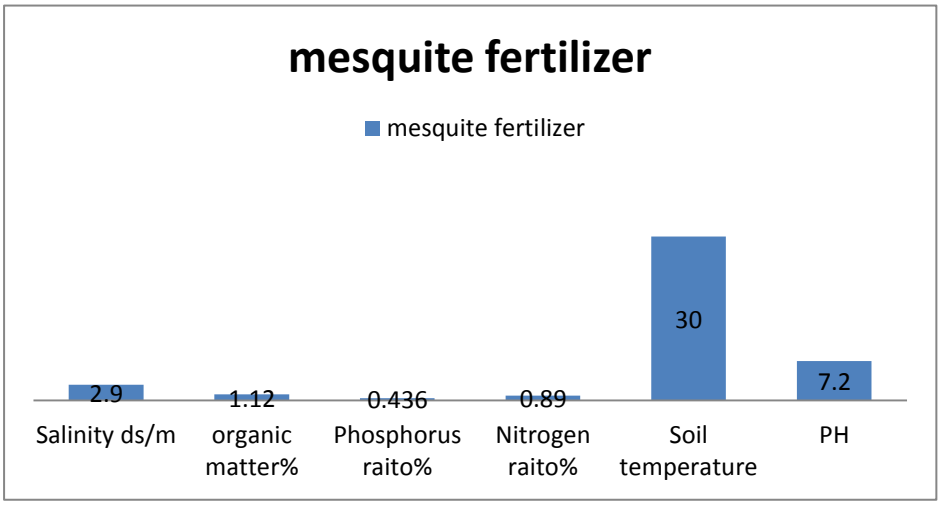
Figure(1)Graphical representation of basil growth rates

(organic fertilizer sample)

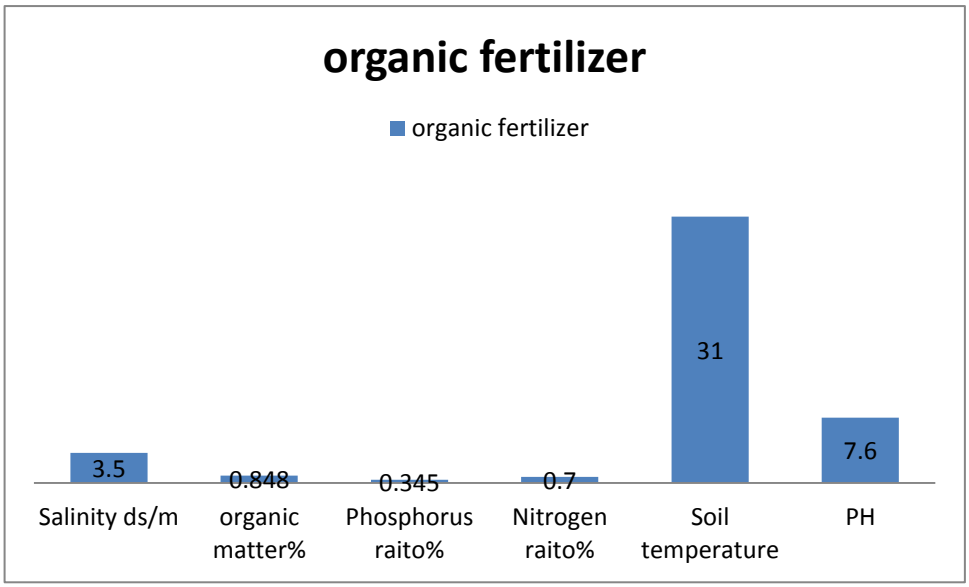
(The basil plant in the (mesquite fertilizer sample)

2-The results of the examination of the properties of the soil with Mesquite fertilizer and organic fertilizer:

organic fertilizer	mesquite fertilizer	Characteristic
Clay	Clay	Fabric
7.6	7.2	PH
31	30	Soil temperature
0.7	0.89	Nitrogen raito%
0.345	0.436	Phosphorus raito%
0.848	1.12	organic matter%
3.5	2.9	Salinity ds/m



(Figure(2 Illustrates the characteristics of the soil(sample of mesquite fertilizer)



Figure(3) Illustrates the characteristics of the soil(sample of orgaic fertilizer)

Discussion of results

Through the previous results we can answer the research questions

Question 1: Can mesquite be converted to compost?

Figure (1) and Figure (1) shows that the soil fed by mesquite trees recorded a higher growth rate (11.11) cm followed by soil fertilized with organic fertilizer (9.1 cm) and soil that did not contain fertilizer has the lowest growth rate (7.2) cm.

These results give a good indication of the possibility of conversion of mesquite to compost of the soil, which works to increase the growth of plants.

The mesquite trees compete with other plants on water, food and organic, which makes the stability of these materials on the composition of the plant an opportunity to obtain a rich source of organic materials can be exploited in soil fertilization and increase fertility.

Studies have shown that mesquite improves the chemical and physical properties .of soil (Ibrahim, 1992). As a family of legumes, it helps improve soil fertility

The nitrogen content in the leaves is 2.29%, then the roots are 1.23% and the stems are 0.99% (Ousman, 1992). Mesquite also improves the level of phosphorus in the soil due to the symbiotic nature of the symbiotic life.

Phosphorus content in leaves and fruits was 0.91% and 1.44% respectively (1966, Lanino).

second question

What is the effect of mesquite fertilizer on the physical and chemical properties of the soil?

Table (2) shows a comparison between the properties of soils with sludge and soils fertilized with organic fertilizer. Note that Figure (2) and Figure (3) indicate that the soil fertilized with recorded higher values in organic matter, phosphorus and nitrogen compared to organic fertilizer. Such as organic fertilizer.

We also note that the soil fertilized with mesquite gave a lower pH value of 7.2 compared with the compost 7.6 where the best absorption rate of the nutrients is at the highest rate at pH = 6.5-7 according to the standard specifications.

As well as the soil fertilized with mesquite recorded a lower value of 2.9ds / m compared with the compost 3.5ds / m and the plants need a soil with a salinity less than 4ds / m according to the standard specifications as high salinity affects the plant absorption of water.

The low rate of acidity and salinity in soils with silt indicates that mesquite may contribute to the absorption of salts and substances affecting the rate of acidity of the soil, which encourages us to invest and exploit it in the appropriate environmental uses.

Conclusion

Through the application of the soil protocol and the examination of the sample of soil fertilized with mesquite and the sample of soil fertilized organic fertilizer in cooperation with the Department of Agricultural Development we have reached the effectiveness of the use of sea gaff (Mesquite) as fertilizer, where the higher growth rates of cultivated plants in soil fertilized mesquite also worked to improve the soil and increase Fertility by increasing the proportions of phosphorus, nitrogen and organic matter in the soil and reduce the rates of salinity and acidity of the soil PH, which makes the trees of mesquite suitable for fertilization.

These conclusions lead us to further research and study to study the possibility of exploiting mesquite spread in the Sultanate of Oman to fertilize the soil instead of burning and disposal and the search for new areas for exploitation in other environmental uses.

Another study was carried out to study the effect of mesquite trees by Umm Kulthum School in South Batinah Governorate

The strengths of the research were: to obtain effective results in the soil survey

Research can be developed by expanding the scope of research and using modern technologies.

Thanks and appreciation

We are very pleased to extend our sincere thanks and appreciation to GLOBE for opening new scientific horizons. We thank teacher Siham Al-Hassani, Program Supervisor at Al-Rifaa School for Basic Education for her efforts with us and .guidance to us to get the research done

We extend our sincere thanks to the Department of Agricultural Development for the valuable information provided to us and teacher Mona Al-Rajhi, Director of Al-Rafa School for its role in providing scientific and scientific advice and guidance related to research and development

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4-The Internet

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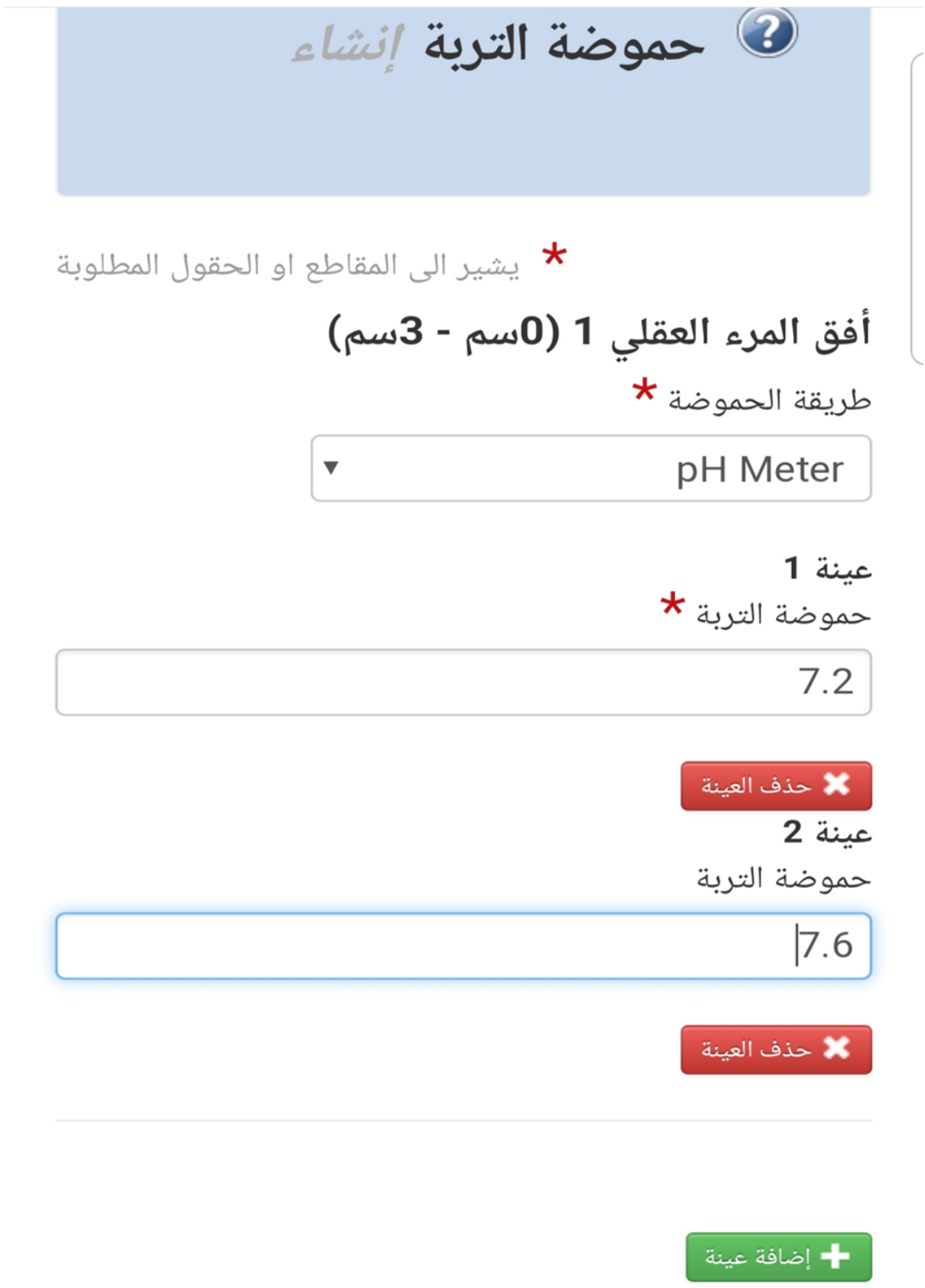

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خصوبة التربة تحرير

* يشير الى المقاطع او الحقول المطلوبة

أفق المرء العقلي 1 (0سم - 3سم)

*.At least one sample is required

عينة 1

نترات النيتروجين

Medium

الفوسفور

Medium

بوتاسيوم

Unknown

حذف العينة

(1)Supplement

بسم الله الرحمن الرحيم

سلطنة عمان
وزارة التربية والتعليم
المديرية العامة للتربية والتعليم لمحافظة جنوب الشرقية

الرقم: ت/ح/١٨
التاريخ: ٢٠١٩/٣/٦
الموافق:

الأخ الفاضل / مدير دائرة التنمية الزراعية المحترم
بولاية الكامل والوافي

السلام عليكم ورحمة الله وبركاته

الموضوع/ تسهيل مهمة أعضاء فريق GLOBE المدرسي .

بداية نشكر جهودكم ونثمن دوركم الذي نلمسه من خلال العمل الذي تقومون به والمشاركة في تنمية وطننا العزيز وتقديم وتسهيل الخدمات والإجراءات لمدارس المحافظة .

وبالإشارة الى الموضوع أعلاه ،نود إفادتكم بأن مدرسة الرفعة للتعليم الأساسي التابعة لولاية جعلان بني بوحسن وتقرب فترة تقييم اعمال الفريق البحثي الخاص بفريق GLOBE .

نغدو شاكرين منكم بالتعاون مع المدرسة لانجاز مهمتها وتسهيل مهمة أعضاء الفريق وتوفير كافة الأدوات والمستلزمات المخبرية الخاصة باجراء البحث لاجراء تجاربهم وذلك ضمن جهود وأنشطة المدرسة ببرنامج GLOBO البيئي .

شاكرين ومقدرين لكم جهودكم الطيبة .

وتفضلوا بقبول فائق الاحترام ،،

سلطنة عمان
وزارة التربية والتعليم
مكتب الاشراف التربوي بجعلان

محمد بن حمد السنيدي
مدير مكتب الاشراف التربوي بجعلان