



## The Role of Agricultural Extension in Developing and Sustaining School Gardens from The Point of View of School Managers in Kirkuk Governorate / Iraq

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**Abstract:** The study aimed to identify the role of agricultural extension in developing and sustaining school gardens in Kirkuk Governorate and to learn about its reality, as well as to know the most important problems facing school managers in developing and maintaining school gardens. The study included all government schools except kindergartens in the Hawija education department of the general directorate of Kirkuk governorate education, which numbered (170) schools distributed into three sectors: (Hawija, Al-Sakr and Al-Boujar sector), from which the Al-Sakr sector, which includes (61) schools, was randomly selected. For the purpose of collecting data for the study A special questionnaire form was prepared and designed using the Google Form program, and its link was circulated to school managers. Data was collected during the period (10/02/2022 until 16/3/2023), during which responses were received, which amounted to (61) responses, they represent the research sample. After that, the data was tabulated and analyzed using some statistical methods such as frequencies and percentages.

The results showed that (18%) of the schools follow a double permanence system, and (72.1%) of the schools fall into the small area category, whose area ranges between (200-3466) m<sup>2</sup>, and a number of schools do not have school gardens, and some of them have a small school garden whose area does not exceed (833.3) m<sup>2</sup>, with a percentage of (96.8%) of the total number of schools, 88.7% of school managers believe that the space specified for creating a garden within the total area of the school is not appropriate.

(98.3%) of school managers indicated that their schools do not have an agricultural worker concerned with planting and maintaining the school garden. It was also found that (31.2%) of the schools do not have a source of water to irrigate the school gardens. The results also showed (86.9%) of the schools do not own the equipment and tools for gardens, and (32.7%) of students' parents contribute to the maintenance of school gardens, The problem (the lack of a farmer "agricultural employee" who takes care of the crops and supervises their watering) came first from the point of view of school managers.

The study recommended activating the role of agricultural extension in providing school administrations' knowledge with modern agricultural information about designing and planting school gardens by allocating some agricultural extension activities for that purpose. It is also recommended that the school garden should be given attention by the directorate of education, and the employment of agricultural engineers as well as agricultural workers within the owners of each

school to take care of the school garden and identify plants that suit the climatic conditions of the city of Kirkuk, as well as the requirement that there be a suitable space for the model school garden within the future plans (Tendering). In establishing schools.

**Keywords:** agricultural extension activities, school garden, education directorate, students, garden design.

## Introduction

The school is the first stage of educational institutions because it is concerned with implementing the curriculum and responsible for the outcomes of the educational process (Al-Hiti, 2012: 3). Schools also constitute one of the main social frameworks in which knowledge, patterns of behavior, attitudes, values, and life skills such as (personal responsibility, self-esteem, and work) develop. Collective and planning), as well as being an effective transmission tool through which children and youth can be reached in the stage of forming their habits and attitudes (FAO, 2004: 3).

School buildings are an important factor in achieving success in the desired goals of education. The school, in its integration with the rest of its elements, represents the environment around which the educational process takes place. The school garden, its trees, flowers, and others are included within the school buildings, which is considered one of the important elements of the school's external environment (Al-Masoudi and Diao, 2019). : 2033 - 2034), and school gardens are designated spaces within schools usually planted with some types of fruit trees, forest and shade trees, and types of ornamental plants, in addition to green spaces, which can be taken advantage of and used for multiple purposes, including recreational and educational (i.e. used as laboratories for practical learning). The main subjects taught in school, such as biology, mathematics, physics, and chemistry, by linking them to gardens (this is called active learning), in addition to using them for some sports, artistic, and environmental activities, and achieving some other educational goals, including (teaching pupils and students how to prepare and care for home gardens, and improving their attitudes toward... Agriculture and rural life and raising their environmental awareness through their understanding of how to grow safe food without using chemical fertilizers and pesticides and the important and effective role that trees play in reducing climate change (Hussein & Kareem, 2023: 238-250).

Psychological studies indicate that seeing grass and trees continuously in the environment works to develop social relationships and contributes to improving the psychological health of students. Therefore, it is necessary to pay attention to harmony and diversity in the school environment by linking the learning environment with the general environment of the school, including the school garden, as diversity It attracts attention, keeps boredom away, and gives the environment its identity (Naser & Hong, 1999: 671-676). Designing good school gardens and activating them appropriately may help achieve positive results in the cognitive field and develop various emotional aspects among students (Ambosaidi, 2017).

Many international organizations were interested in the issue of school gardens, most notably the United Nations Educational, Scientific and Cultural Organization, which conducted field research in many modern schools, and through the results it reached, it confirmed the educational and psychological role of the school garden. Both the World Health Organization and UNICEF paid special attention to the issue of school gardens, and it was found that they contribute to the psychological and health education of children, and reduce pollution within educational institutions. As for the Food and Agriculture Organization of the United Nations (FAO), since 1997, it has provided its support through Its program, known as (TeleFood), includes more than 150 school

garden projects in more than 40 countries.” (Maqdoumen, 2007: 1) School gardens are among the programs that increase students’ love for educational institutions and thus their interest in them.

The school garden aims to create a generation that believes in agricultural work and to become accustomed to collective and cooperative work while working in the school garden and to unite their efforts as students at the present time and as individuals in society in the future. Since the work of the school garden is many and varied, it is the basis for creating agricultural awareness among students, as there are many Agricultural work that can be carried out within the home garden, such as raising ornamental plants of all kinds and having a complete knowledge of the type of plants and their different types (the name of the plant, the family to which it belongs, the quality of the soil, and the various agricultural operations within the school garden) (Ghobari, 1989).

The school gardens used to flourish and were surrounded with great care, and working hands were allocated to them, in addition to the hands of students and students and their teachers who contributed to this care in application of what they taught of theoretical material for agricultural education in the open air, and with the passage of time and the calamities and wars that Iraqi society went through that are not hidden from everyone, as well Due to the increase in the number of students in exchange for the narrowness of the school building, the school garden was neglected and was left behind and exploited by building additional classrooms to accommodate the increasing number of pupils and students. From here, the school garden began to suffer from neglect, marginalization and lack of interest from the Iraqi educational institution. Even if the appropriate space for the garden was available, it is not being exploited. In benefiting from it as a beautiful facade that gives the school building an aesthetic (Ahmed, 2016: 1373).

Since agricultural extension is the effective institution in the countryside and is entrusted with contributing to its development and working to develop it in all its agricultural, social, health and educational aspects (Al-Himyari, 2007: 762), it must have a prominent role in this. Creating a suitable educational environment for rural children, at least with regard to its field of work, through its integration with formal educational institutions, providing agricultural information and consultations to school administrations and enhancing students’ knowledge through their participation in growing and serving plants in school gardens as part of the school curriculum is one of the goals of agricultural extension. (Khaqani, 2017: 823). This is reflected in the families of these students by strengthening the students’ relationship with the land and the farm and perhaps contributing to helping their families with some simple agricultural work (FAO, 2004).

Hence, this study came to identify the reality of school gardens in Kirkuk Governorate and to ensure the existence of a healthy educational environment for students that conforms to the standards of quality of education that international organizations call for and encourage, and to find solutions that contribute to improving their reality, as well as identifying the role of agricultural extension in developing school gardens in the countryside of Kirkuk Governorate.

### **Research objectives:**

The study aimed to achieve the following objectives:

**First:** Identifying some of the distinctive characteristics of the school, represented by (Double permanence, the gender of the schools managers, the total school area, the area of the school garden, the suitability of the specified area for the garden, Existence of agricultural staffs (agricultural engineer + agricultural worker), and Existence of a water source to irrigate the garden, the existence of a school garden management program, the school owning garden equipment and tools, and the participation of students’ parents in maintaining the gardens.

**Second:** Identifying the reality of school gardens by achieving the following sub-goals:

1. Existence of green spaces in the school and its area

2. Existence of forest trees in the school garden, their types and numbers.
3. Existence of fruit trees in the school garden, their types and numbers.
4. Existence of ornamental trees and plants in the school garden, their types and numbers.

**Third:** Identifying the most important problems facing the process of developing and maintaining school gardens in Kirkuk Governorate.

**Fourth:** Identifying the role of agricultural extension in developing and sustaining school gardens from the point of view of school managers.

### Research method

The current research relied on the descriptive method because it is the closest and most appropriate research method to achieving the research objectives, as the descriptive method is the most appropriate to reach detailed facts about the targets (Al-Asadi, 2008), and then classify and analyze the data accurately to reach results and generalizations about the subject of the study (Al-Rashidi, 2002).

### The research population and its sample

The study included all government schools except kindergartens in the Hawija education department of the general directorate of Kirkuk governorate education, which numbered (170) schools distributed into three sectors: (Hawija, Al-Sakr and Al-Boujar sector), from which the Al-Sakr sector, which includes (61) schools as shown in Table (1). A questionnaire form was prepared that included four parts. The first part was to identify the distinctive characteristics of in the Hawija education department of the general directorate of Kirkuk governorate education, which It is represented by (Double permanence, the gender of the schools managers, the total school circulated area, the area of the school garden, existence of agricultural staffs, existence of water source to irrigate the garden, existence of a school garden management program, the participation of students' parents in maintaining the gardens, and the suitability of the specified area for the garden. The school owns garden equipment and tools.

The second part included questions to learn about the reality of school gardens in the governorate center by knowing the existence of green areas and their area, as well as the existence of forest trees, fruit trees, and ornamental plants, and the type and number of each of them.

The third part was devoted to identifying the most important problems facing the process of developing and maintaining school gardens in Kirkuk Governorate. While the fourth part included a scale to identify the role of agricultural extension in developing school gardens, consisting of (16) items, in front of which the answer alternatives (always, sometimes, no) were placed and numerical values (2, 1, 0) were given respectively, thus providing the theoretical range. For the degree of agricultural extension role between (0-32) degrees, the questionnaire form was designed according to the (Google Form) program, and its link was circulated to the principals of schools affiliated with the Hawija Center through the supervisory body in the Hawija Education Department. The percentage of answers and responses reached (60) responses, as in the table. (1).

Table (1) Research population and samples

Sector	Research population	Research Sample
Hawija	44	-
Al- saker	61	61
Al-Boujar	65	-
Sum	170	61

### Data collection and analysis

The necessary data for the research was collected through an electronic questionnaire through the program (Google Form), and its link was circulated to the principals of schools affiliated with the Hawija Center through the supervisory body in the Hawija Education Department for the period (10/02/2022 until 16/3/2023). The data was tabulated and analyzed using a number of statistical methods, including percentages and frequencies, for the purpose of achieving the research objectives, and the results were as follows:

### Results and discussion

**First: Identifying some of the distinctive characteristics of the school, represented by (Double permanence, the gender of the schools managers, the total school area, the area of the school garden, the suitability of the specified area for the garden, the presence of specialized agricultural cadres (agricultural engineer + agricultural worker), and the presence of a water source. To irrigate the garden, the existence of a school garden management program, the school owning garden equipment and tools, and the participation of students' parents in maintaining the gardens.**

The results showed that (18%) of the schools follow a double permanence system (morning and evening) and that (3.2%) of the schools included in the study have a triple shift, meaning that there is a great momentum for the school to organize the permanence of three schools in one building during one day. This may come at the expense of the time required for each class, as well as the expected impact on school gardens.

It was also clear from the results that (81.9%) of the schools managers included in the study were male, while the percentage of females was (18.1%). Female schools managers may have a greater interest in school gardens, just as they are interested in arranging homes and home gardens and adding beauty to them.

**Table (2) Some distinctive characteristics of schools in Kirkuk Governorate**

Variables	Number	%
<b>Double permanence</b>		
single	42	68.8
bilateral	11	18.0
tripartite	2	3.2
<b>School manager gender</b>		
Male	50	81.9
Female	11	18.1
<b>Total school area (m<sup>2</sup>)</b>		
(200-3466)	44	72.1
(3467-6733)	16	26.2
(6734-10000)	1	1.7
<b>School garden area (m<sup>2</sup>)</b>		
(0-833.3)	59	96.8
(833.4-1666.7)	1	1.6
(1666.8-2500)	1	1.6
<b>Suitable for the specified area of the garden</b>		
Yes	35	57.4
No	26	42.6
<b>Existence of agricultural staffs</b>		

<b>Yes</b>	1	1.7
<b>No</b>	60	98.3
<b>Existence of water source to irrigate the garden</b>		
<b>Yes</b>	42	68.8
<b>No</b>	19	31.2
<b>Existence of a school garden management program</b>		
<b>Yes</b>	39	63.9
<b>No</b>	22	36.1
<b>The school owns garden equipment and tools</b>		
<b>Yes</b>	8	13.1
<b>No</b>	53	86.9
<b>Participation of students' parents in maintaining the gardens</b>		
<b>Yes</b>	20	32.7
<b>No</b>	41	67.3
<b>Sum</b>	61	100

The smallest total area of schools was (200) m<sup>2</sup>, and the largest area was (10,000) m<sup>2</sup>. It was distributed into three categories. It turned out that (72.1%) of the schools fell into the small area category, whose area ranges between (200-3466) m<sup>2</sup>, while it was found that (28.9%) of the schools had an area of more than (3466) m<sup>2</sup>, and this may affect the availability of suitable space for planting school gardens. It was found that there are a number of schools that do not have school gardens, and that some of them have a small school garden whose area does not exceed (833.3) m<sup>2</sup>. percentage of (96.8%) of the total schools. It was also found that the percentage of schools that have a garden area ranging between (833.4-2500) m<sup>2</sup> amounted to (3.2%) of the total schools, and that (42.6%) of schools managers believe that the area specified for establishing the garden is within The total area of the school is not suitable.

(98.3%) of the schools managers indicated that their schools do not have an agricultural worker interested in cultivating and maintaining the school garden. It was also found that (31.2%) of the schools do not have a water source available to irrigate the school gardens, which means that it will be dirt land that cannot be to grow any plants, the results showed that (36.1%) of the schools do not have a specific program for the management of the school garden and that is not within their plans, and that (86.9%) of the schools do not have the equipment and tools for the gardens.

The results indicated that (32.7%) of the students' parents contribute to maintaining school gardens and assisting school administrations in that.

### **Second: Identifying the reality of school gardens by achieving the following sub-goals:**

#### 1. Existence of green spaces in the school and its area:

The results showed in Table (3) that (71.5%) of the schools included in the study do not have green spaces in their gardens, while green spaces are found in the gardens of (29.5%) of them, and it was found that (83.3%) of those schools have green spaces in their gardens, its areas ranging from (12-181) m<sup>2</sup>, and (11.1%) of these schools the area of green spaces in their gardens ranges between (182-351) m<sup>2</sup>, while the percentage of schools whose gardens include green spaces its area exceeds (352) m<sup>2</sup> only (5.6%) out of the total number of schools that include green spaces.

which means that the school garden environment is not suitable for students and is not clean, due to its lack of green spaces that contribute to softening the atmosphere and creating a suitable environment for students and places to play and rest in, especially in the free time between school classes.

**Table (3) Distribution of schools according to existence of green spaces**

Existence of green spaces	Number	%
Yes	18	29.5
No	43	71.5
<b>Sum</b>	<b>61</b>	<b>100</b>
<b>Green spaces (m<sup>2</sup>)</b>		
(12-181)	15	83.3
(182-351)	2	11.1
(352-520)	1	5.6
<b>Sum</b>	<b>18</b>	<b>100</b>

## 2. Existence of forest trees in the school garden, their types and numbers.

The results, as shown in Table (4), indicated that (62.3%) of the schools included in the study did not have forest trees in their gardens, while the percentage of schools that had forest trees in their gardens was (37.7%). It was found that among those trees, the most widespread are Eucalyptus, pines, cypress, acacia sp., and Albizia lebbek. It was found that (14) schools have (1-3) Eucalyptus trees in their gardens, and (4-6) trees are found in (5) schools. It is the most widespread among the forest trees in school gardens, and perhaps This is due to the cheap price of purchasing seedlings of these trees or their resistance to environmental conditions, which contributed to their planting in abundance in school gardens compared to other types of forestry trees.

It was found that only (11) schools have (1-3) Acacia sp. trees in their gardens, while there are Cypress trees in a number ranging between (1-3) in (7) schools only, while there are Pines and Albizia lebbek trees in a number ranging from (1-6). ) Trees in (6) and (3) schools for each tree type, respectively.

In spite of the importance of the presence of trees in school gardens and their importance in contributing to a great extent in softening the atmosphere and providing shade for students to sit in, as well as raising the percentage of oxygen in the air, reducing its pollution and reducing noise, their presence in school gardens is very limited and does not amount to creating a suitable educational environment for students.

**Table (4) Distribution of schools according to existence of forest trees in their gardens, and its types and numbers.**

Existence of forest trees	Number	%			
Yes	23	37.7			
No	38	62.3			
<b>Sum</b>	<b>61</b>	<b>100</b>			
Type of tree	Number of trees				
	Zero	(3-1)	(4-6)	(7-9)	(10-12)
Eucalyptus	38	14	5	2	2
Acacia sp.	50	7	3	1	0
Cypress	53	7	1	0	0
Pines	55	6	0	0	0
Albizia lebbek	57	2	1	1	0

## 3. Existence of fruit trees in the school garden, their types and numbers.

The results in Table (5) indicate that (43) schools, representing (61.5%) of the total schools included in the study, do not have fruit trees in their gardens, and that (29.5%) of those schools have fruit trees in their gardens.

Olive trees came at the forefront of fruit trees in school gardens in terms of number, as the number of schools reached (6) schools that have olive trees in their gardens with a number ranging between (1-3) olive trees, and (5) schools have olive trees in gardens. Its schools have (4-6) trees, while the number of schools does not exceed (7) schools that have olive trees in their gardens, ranging from (7-12) trees.

In second rank in terms of number were citrus trees in school gardens, but they were found only in (13) schools out of (61) schools included in the study, and they were distributed in number ranging between (1-3) trees in (11) schools only, and in number (4-6) trees were found in (3) schools only, while (7-12) trees were found in (1) school only.

Although palm trees are not widely cultivated in Kirkuk Governorate, they came in second rank too in terms of number, as the number of schools with palm trees in their gardens reached (13) schools, while in the gardens of (11) schools there are (1-3) trees. While palm trees were found in numbers ranging from (4-6) in the gardens of (2) schools only.

As for the trees of the apple and the grape vine, they were found in a small number of school gardens, which are only (5) and (3) schools, respectively, out of the total number of schools included in the study.4. The presence of ornamental trees and plants in the school garden, their types and numbers.

**Table (5) Distribution of schools according to Existence of fruit trees in their gardens, and its types and numbers.**

Existence of fruit trees	Number	
	r	%
Yes	18	29.5
No	43	61.5
<b>Sum</b>	61	100

  

Type of tree	Number of trees				
	zero	(3-1)	(4-6)	(7-9)	(10-12)
Olive	43	6	5	4	3
citrus	48	9	3	1	0
palm	48	11	2	0	0
grape	56	5	0	0	0
Apple	58	3	0	0	0

#### 4. Existence of ornamental trees and plants in the school garden, their types and numbers.

Ornamental trees, shrubs and plants are supposed to be widely planted in school gardens. However, the results of the study showed, as in Table 6, that (59%) of the schools included in the study were found to have their gardens planted with these types of ornamental trees and plants, while they were not planted. In (41%) of schools.

The Rose spp. plants are the most widespread among the trees, shrubs, and ornamental plants in school gardens It was found in the gardens of (30) schools, distributed by (1-3) shrubs in (19) schools, and it was found in a number ranging between (4-6) shrubs in (8) schools, with a number ranging from (7-12) trees in (3) schools.

It turned out that Dodonaea shrubs came in second rank among the trees, shrubs and ornamental plants in terms of the number of schools, as they were found in the gardens of (26) schools. They were distributed in numbers of (1-3) trees in (12) schools, and (4-6) shrubs in (5). Schools.



As for Nerium Oleander, its plants were found in the gardens of (14) schools, most of which did not exceed (1-3) shrubs in the gardens of (9) schools. Although Nerium Oleander are among the poisonous plants whose use in gardens is prohibited, they were found in the gardens of (13) schools. Nerium Oleander shrubs are considered one of the poisonous plants that are prohibited from being used in school gardens, especially for the primary stage, and which may affect the health of school students when some parts of their plants are eaten by the students. As for the Myrtus Communis plant, it was found only in schools, and their number ranged between (1-3) trees.

Bougainvillea and Callistemon plants were found in the gardens of (6) and (4) schools each, respectively, but they did not exceed much more than (1-3) shrubs.

The lack of trees, shrubs and ornamental plants in school gardens creates an environment that is not suitable for the educational process and negatively affects the health of students. The careful selection of these plants is also very important to maintain the safety of students and provide appropriate shade for students to sit and rest between school lessons, as well as adding aesthetics to school gardens.

**Table (6) Distribution of schools according to Existence Ornamental trees in their gardens, their types and numbers of.**

Existence of trees	Ornamental	Number	Number of trees				
			zero	(1-3)	(4-6)	(7-9)	(10-12)
Yes		36					
No		25					
<b>Sum</b>		61					
Type of tree		Number of trees					
Rose spp.		31	19	8	2	1	
Dodonaea		35	12	5	6	3	
Nerium Oleander		47	9	4	1	0	
Myrtus Communis		51	7	2	1	0	
bougainvillea		55	6	0	0	0	
Callistemon		57	6	0	0	0	

### **Third: Identifying the most important problems facing the process of developing and maintaining school gardens in Kirkuk Governorate.**

The results, as shown in Table (7), which relate to the most important problems facing the school administration in the process of developing and maintaining school gardens, showed that the problem (lack of continuous water source to irrigate the garden or lack of available water) came in the first rank, It is one of the important problems facing the cultivation and maintenance of school gardens, because water is the secret of life and plants cannot grow without it, so providing it is an important factor in the success of gardening and should be Those in charge of school administration follow up on providing a continuous source of irrigation water.

While the problem of (the lack of a farmer "agricultural employee" who cares for the crops and supervises their watering) came in second rank, and this result is consistent with what He found it (Ibrahim, 2014: 206). The reason for this may be due to the failure to appoint agricultural employees to the school owners, whether agricultural engineers or agricultural workers. The responsibility for this falls on the Directorate of Education in the governorate. It is its duty to request the appointment of agricultural employees to the school owners and distribute them to the schools. Their job is to take care of And developing the gardens of these schools in terms of the process of coordinating the

garden, planting it with appropriate plants, irrigation, removing weeds, combating the pests that infect it, and maintaining it continuously. The problem (lack of financial allocation for planting and servicing the gardens) came in third rank in terms of importance, and this requires the Education Directorate to allocate part of its financial budgets. To provide supplies for planting and maintaining school gardens.

The problems (Lack of support in developing school gardens, including equipping schools with garden service requirements) and (Not enough space for the garden) ranked fourth and fifth, respectively, while the problem (There is no cooperation between school administrations for the dual shifts) ranked last. As there are a number of a double and triple permanence schools, and the weak coordination between the administrations of those schools and the dependency that may result from this may cause a lack of interest in planting and serving school gardens.

Table (7): The most important problems facing the process of developing school gardens in Kirkuk Governorate

No.	problems	Repetition
1	Lack of a continuous source of water to irrigate the garden or lack of available water	23
2	The absence of a farmer who takes care of the crops and waters them	15
3	Lack of financial allocation for garden cultivation and service	14
4	Lack of support in developing school gardens, including equipping schools with garden service requirements	13
5	Not enough space for the garden.	9
6	The General Directorate of Education's lack of follow-up to planting gardens and its lack of interest in green spaces.	7
7	Lack of attention and specific watering of plants.	5
8	Lack of a person specialized in agriculture (agricultural engineer).	5
9	There is no cooperation between school administrations for the dual shifts	2

#### Fourth: Identifying the role of agricultural extension in developing and sustaining school gardens from the point of view of school managers.

The results in Table (8) showed that the lowest actual value for the role of agricultural extension in developing and sustaining school gardens from the point of view of school managers was (0) degree, while the highest numerical value for the role of agricultural extension was (32) degree. The respondents were distributed into three categories. Based on the law of range and class length, the results were as follows:

Table 8: Distribution of respondents according to their viewpoint on the role of agricultural extension in developing and sustaining schools gardens

Category	the role	No.	%
(10-0)	Low	20	32.8
(21-11)	Middle	28	45.9

(32-22)	High	13	21.3
Sum		61	100

The results show that (32.8%) of school managers believed that the role of agricultural extension in developing and maintaining school gardens was low and ranged between (0-10) degrees, while (45.8%) of them indicated that the role of agricultural extension in developing and maintaining school gardens was moderate. It ranged between (11-21) degrees, while it became clear that (21.3%) of them believed that the role of agricultural extension was great. This means that agricultural extension had a low role in developing and maintaining the school gardens of the Hawija Education Department, and perhaps the reason may be due to This is due to the lack of extension personnel in Kirkuk Governorate in general and Hawija District in particular, or the failure to give importance to developing and maintaining school gardens, or the failure to develop extension programs and activities directed towards school administrations and students and restrict them to farmers.

### Conclusions

Through the results obtained, we conclude the following:

1. Although there are designated areas as gardens in most schools of varying sizes, they are often neglected or randomly planted with different types of trees and shrubs without planning or coordination.
2. The school garden is an essential pillar of educational institutions and cannot be neglected for whatever reasons.
3. The lack of availability of water or the poor supply of its source causes significant damage to the school garden and to the growth of the plants planted in it.
4. The lack of clear plans by school administrations for designing gardens, choosing suitable plants for planting, and raising awareness about the need to avoid planting large trees whose falling branches may cause harm to students, as well as avoiding planting poisonous plants in school gardens.
5. The lack of financial allocation to maintain school gardens is largely a reason for the lack of interest in them.
6. The lack or absence of specialized agricultural employees to work on coordinating and caring for the school garden.
7. The weak role of agricultural extension and the lack of extension programs and activities directed towards developing and maintaining school gardens

### Recommendations

1. The need for the school garden to be given attention by the Directorate of Education, and to allocate cash sums to sustain and preserve it.
2. Working to appoint agricultural engineers, along with agricultural workers, within the staff of each school. Their job or mission is to take care of the school garden only, and they have no relationship with the educational and teaching staff.
3. Identify plants that suit the climatic conditions of the city of Kirkuk, and not plant plants randomly without knowing their needs or the harm they may cause to students.
4. Requiring the presence of a model school garden within the plans (tenderness) in the event of establishing schools in the future.
5. Intensifying agricultural extension activities aimed at developing and sustaining school gardens through the extension training center in Kirkuk Governorate.

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