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THE ROLE OF GOVERNMENTAL AGRICULTURAL COMPANIES FOR SEEDS IN MEETING THE FARMER'S NEED OF WHEAT SEEDS IN SOME GOVERNORATES OF THE CENTRAL REGION OF IRAQ

Adnan Ali Ati Al-Furaiji[1]* and Hussain Khudair Al-Taiy[2]

Agricultural Extension and Technology Transfer Department, College of Agricultural Engineering Sciences, University of Baghdad, Iraq.

Abstract

The research aimed to identify the role of governmental agricultural companies for seeds in meeting the farmers' need for wheat seeds for agriculture. The study data were collected from, the concerned agricultural companies, and a stratified, non-proportional, random sample of 100 farmers distributed in the governorates of Baghdad and Babylon. The results concluded that: 1- The role played by governmental agricultural companies in meeting the farmers 'need for wheat seeds is an organized and planned process consisting of five stages A- Estimating the need for seeds. B- Providing seeds. C- Purifying the seeds. D-supplying seeds. E- Marketing. 2- The results of the research showed that the amount of seeds identified by the National Seed Council is 30 kg / dunum for the base and registered levels and 40 kg / dunum for the certification level, whereas the surveyed farmers use 40-80 kg seeds / dunum for the certification level, and that 64% Peasants use 60-80 kg seeds / dunum; and to deal with the characteristics of their agricultural lands, which suffer from problems of salinity and waterlogging and the weak use of modern technologies in sowing. 3- The companies adopted a variety of sources in providing seeds, namely: a- The program of increase the higher grade seeds, the seeds processed for governmental companies 2019/2020 amounted to 1105.5 ton. B - Contracting with farmers who produce seeds, and the total amounts of certified seeds marketed to them to agricultural companies for the 2016 / 2017-2018 / 2019 were as follows 13.8 ton, 100.3 ton, 228.7 ton, respectively. C- The Ministry of Trade / Grain Silos in some years with in limited amounts W - importing from outside the country in some years and in limited amounts in the event of a shortage of the available seeds. 4- The wheat seeds supplied by companies to farmers for the 2015 / 2016-2019 / 2020 amounted to 85.5 ton with an average of 23 kg / dunum, 91.7 ton with an average of 21 kg / dunum, and 90 ton with an average of 28 Kg / dunum, 127.6 ton with an average of 20 kg / dunum, and 263.2 ton with an average of 37 kg / dunum. The amount of seed processed from companies 2018/2019 covered 54% of the farmers' need, according to their estimates. Thus, there is a large gap between the needs of the respondent's farmers from wheat seeds and the amounts of seeds supplied for them from companies between 0.08 - 2 64 ton of seeds / farmer with an average of 0.7 ton / farmer. And that (60%) of them estimate their gap between 0.5-2.6 ton, which calls on farmers to resort to local sources - and the resulting problems in productivity and purity, as well as additional costs in the agricultural production process. The researchers recommended the importance of conducting specialized scientific studies to determine appropriate recommendations about the amount of seeds for growing dunums according to the characteristics of farm systems in different governorates and regions, and the need to develop the capabilities of companies in providing, producing and purifying seeds

Key words : Role, Governmental agricultural companies for seeds, farmers need, Wheat, Meeting the farmers need.

Introduction

Iraqi agriculture faces great challenges, foremost among which is achieving sustainable food security based mainly on local production, increasing the contribution of agriculture to gross domestic product GDP and improving its contribution to the national economy and its development (Ministry of Agriculture, 2015; Ministry of Planning, 2009). These challenges come within the outline of the challenges facing agriculture in the world, which were summarized by Food and Agriculture Organization FAO to achieve food security, preserve natural resources and face climate challenges (FAO, 2015), where these

***Author for correspondence :** E-mail: rq_baghdadi@yahoo.com

challenges will continue until the coming decades (FAO, 2018).

Statistical estimates indicate that the world, including Iraq, is witnessing continuous increases in the population, which results in increased demand for agricultural and food products. Iraq may have a population of 50 million in 2025 (Al-Hakim, Abdel-Hussein Nuri, 2013), which requires significant and continuous increases in agricultural production in the vegetable and animal sectors that may exceed 50% or more. As well as, it may reach 100% in some basic products compared to what they are now to meet the great demand for agricultural products and food. Also, it indicates that the amounts of wheat needed by Iraq in 2025 reach 8 million tons, 1.8 million rice, and 0.9 million tons of potatoes (Al-Hakim, Abdel-Hussein Nuri, 2013). The percentage of increases required to achieve in the country's agricultural production is consistent with the percentage of increases that should be achieved at the global level, which was defined by more than (50%) until 2050 (FAO, 2017).

Countries depend on multiple strategies and approaches to meet those challenges: horizontal expansion, vertical expansion, and sustainable intensification, which aims to achieve higher productivity in the same unit area while preserving natural resources (FAO, 2011). Despite the importance of these strategies, farmers are the decisive element in achieving the agriculture's objectives and in effectively addressing their challenges. The Director-General of FAO described them as natural leaders in responding to these challenges (FAO, 2015), which requires developing the capabilities and empowerment of farmers, especially in the field of meeting their needs and support. FAO considered that is the right way to face the challenges of agriculture, "If we give farmers the attention and support they deserve and need, we can all address these challenges".

The improved, good quality seeds are the main inputs to farm systems, and it is the fuel for agricultural development, and its availability in good quality from a wide range of crop varieties is the real key to achieving food security (FAO, 2018). Therefore, the world is witnessing great interest in developing seed systems, as the sustainable national seed system is the guarantee of producing high-quality seeds for wide varieties and crops and making them available to farmers and other relevant actors in a timely and affordable manner (Christinck, Anja *et al.,* 2018). The rapid leap in productivity and production in the green revolution in Asia and the rest of the world is the result of the development of improved high-quality seeds, and spread them widely in farmers' fields and meet their needs (Kathryn sebby, 2010). Wheat is at the forefront of basic food crops in most countries of the world, as the areas planted with the crop in 2010 reached 217 million ha worldwide, producing 651 million tons, at average productivity of 2999.8 kg/ha (International Center for Agricultural Research in the Dry Areas. 2012. Jordan). In Iraq, wheat is the first primary crop, both of its importance as food and in terms of the areas planted with it, which amounted to more than seven million dunum for the 2019/2020 (Ministry of Agriculture/National Seed Council, 2019). It is a winter crop grown in all governorates of Iraq in rain-dependent areas and the irrigation regions, where it occupies an important economic position in Iraqi agriculture in terms of its contribution to agricultural output and in terms of cultivated areas. It is also considered one of the most important food grains used to produce bread, which is the main element in human food, as well as its use in manufacturing and animal food (Al-Butani and Taher, 2011). Moreover, the crop cultivation in Iraq extends to thousands of years and is linked to the emergence of its civilization and the establishment of cultivation in it. The wheat and barley cultivation flourished during the ancient Babylonian era in the northern part of Mesopotamia, which depends on rain and then expanded in the central and southern regions depending on the field irrigation (Shahad and Jasim. 2004). The production of this crop is a very important part of the contribution of Iraqi agriculture to the gross domestic product. The country's third national development plan for the 2018-2022 has set the objective of agriculture to achieve the rate of non-oil activities of 5.2% in 2022 and achieve growth for the agricultural sector in the target year reached 8.4%. The contribution of the agricultural sector for the 2015 was (4.5%) without the oil sector and it was planned (5.6%) (Ministry of Planning, 2018). The agricultural sector in Iraq did not achieve the desired objectives of the 2013-2017 plan, as the performance was poor in achieving the objectives and the strategic plan of the Ministry of Agriculture 2015-2025 emphasizes the necessity of achieving sustainable increases in the productivity and production of this crop to reach one ton per dunum in general. Besides, 1.5 tons of dunum using modern irrigation systems and achieving annual sustainability in productivity and production (Ministry of Agriculture / Planning and Follow-up Department, 2015). However, in 2025, it must reach a cultivated area of wheat by about 8 million dunums and average productivity of 1 ton per dunum, and this requires meeting the farmer's need of wheat seeds in appropriate quantities.

The cultivation and development of wheat seed varieties have received attention and focus in the research centers of the ministry and other institutions such as

universities, science, and technology, which operate in a wide range. As wheat varieties have been distinguished with, qualitative and quantitative characteristics amounted to 30 varieties (Ministry of Agriculture / National Seed Council. 2018. The seed system in Iraq was classified into a formal seed system, which is the result of a series of activities starting with plant breeding and ending with seeds that are supplied by propagation companies. As well as, the informal seed system that includes all how informal farmers obtain seeds such as local markets and neighbors (FAO, 2016). In Iraq, the focus is on attention to developing its capabilities in the formal seed system through the production, extraction, and development of varieties and the presence of an integrated system with its legislation (the seed law). In addition to an organizational structure represented by the National Seed Council and the government agricultural companies for seeds are falling under it, as well as introduced the program for the propagation of the seeds of higher classes. This system is working to achieve sustainable seed security in Iraq, the meaning of seed security is the situation in which farmers have access to seeds in sufficient quantities and quality acceptable and in time (FA0. 2010). Furthermore, the security of seeds is characterized by several characteristics, including the availability of seeds in sufficient quantities and access to seeds, as well as the appropriate varieties of seeds to the desires of farmers as well as the quality of seeds (FAO, 2016). The governmental agricultural companies for seeds are one of the main components in the formal Iraqi seed system and one of the actors in seed security, some of these companies (Mesopotamian and Iraqi companies) are linked to the Ministry of Agriculture, while the Center for Seed Technology is linked to the Ministry of Science and Technology. These companies have long been working to meet the farmers' need for seeds. The process of meeting the need is a planned and organized process involving several related institutions, and that this process goes through several stages, including estimating the need, providing seeds, purification where you have several refineries to eliminate impurities and soil, supplying where it is done according to a specific mechanism and procedures, marketing. Therefore, the research aimed to identify the role of these companies in meeting the farmers' need for wheat seeds.

Materials and Methods

The descriptive method was used in conducting the study, as it is appropriate to obtain data and information about the needs of individuals (Al-Jadri, Adnan Hussain. 2015). The research included all governmental agricultural companies for seeds, which are: the Mesopotamia Company For Seeds, the Iraqi Company For Seed Production, Seed Technology Center / Ministry of Science and Technology. According to the stages of the process of meeting the needs of farmers with seeds, five areas or tasks have been identified for the role of companies: first, estimating the farmers' need for seeds, second, providing and producing seeds. Also, purifying seeds, providing farmers with seeds, and fifth is Marketing. The research plan was presented to several arbitrators in light of the triple agreement scale - agree, agree with modification with writing the modification, and disagree, where the components of the plan obtained an arbitrators approval percentage of more than 80%. The governorates of Baghdad and Babylon were chosen as the study area due to the wide range of wheat cultivation in each of them, and data were collected from a disproportionate stratified random sample of 100 farmers distributed by 50 farmers from each governorate. These farmers were distributed on two agricultural divisions in each of them was chosen randomly: the two divisions of Nahrawan and Abu Gharib in Baghdad, and the Shomali and Medhatia divisions of Babylon. The data were collected utilizing an interview, using a questionnaire for farmers, as well as a questionnaire for the relevant agricultural companies, analyzing reports and conducting interviews. Finally, the data were collected in December 2019 and January 2020, where the percentages, arithmetic mean, and weighted average were used to analyze the results.

Results and Discussion

The process of meeting the farmers 'need for seeds is a planned and organized process managed by the National Seed Council, which established under Seed Law No. 50 of 2012, in which the governmental agricultural companies for seed are falling under it. Besides, it consists of five stages: estimating the farmers' need for seeds, producing and providing seeds, purifying seed, providing farmers with seeds, marketing.

Estimating farmer's need for seeds

Research data showed that there are two methods for estimating farmer's need for wheat seeds for cultivating them:

1. The central (planning) method: It is the method used by the Ministry of Agriculture represented by the National Seed Council headed by the Minister of Agriculture. They aim to estimate the total need of wheat seeds for all farmers in all provinces of the country (except for the Kurdistan Region) for each Agricultural season based on the following indicators A; The number of seeds prescribed for planting one dunum of the crop. As well

as, the National Seed Council set it at 30 kg/dunum (a dunum of 2,500 m^2) for the foundation and registered classes, which is a fixed amount for the general governorates and 40 kg/dunum for the certified class of irrigated areas that include (rivers, irrigation projects and wells with rain guaranteed). B, the area to be planted with the crop, which is the agricultural plan for each season at the country level and it consists of the total agricultural plans for the governorates, which consist of the total areas that the farmers decided to plant with the wheat crop, they vary from season to season according to the circumstances.

2. The local method (the farmer estimation): The farmers estimate their need from the seeds of the wheat crop for planting in each season based on the following indicators:

a. The amount of seeds that estimated to grow in one dunum, where the answers of the respondent's farmers showed that the number of seeds, which the farmers used was ranged between 40-80 kg/dunum, and that 64% of them used 60-80 kg/dunum as shown in table 1.

Table 1: Distribution of respondent's farmers according to the number of wheat seeds they use in planting (kg/dunum).

Amount of seeds used	Farmers number	%
40	11	11
45	7	7
50	17	17
55	1	1
60	47	47
65-80	17	17
Total	100	100

b. The area that the farmer decided to grow with the crop, where the areas cultivated for the respondent's farmers for the 2019/2020 ranged between 4-120 dunums and 77% of them ranged from between 4-40 dunums as shown in table 2.

Table 2: Distribution of the respondent's farmers according to the land area they decided to cultivate with the wheat crop for the 2019/2020 (dunum).

Area	Farmers number	%
4- Less than 20	38	38
20- Less than 40	39	39
40- Less than 60	14	14
60-120	9	9
Total	100	100

According to their estimates, the farmers' need for seeds during the 2019/2020 ranged between 0.2 - 5.2 ton, with an average of 1.5 ton, and 44% of them were their needs falling within the category of 1-2 ton as in table 3.

Table 3: Distribution of the respondent's farmers according to their needs of wheat seeds for the 2019/2020 (ton).

Category of need	Number	%
0.2 - Less than 1 ton	31	31
1 - Less than 2	44	44
2 - Less than 3	13	13
3 - Less than 4	5	5
4 - 5, 28	7	7
Total	100	100

It concludes from the method of estimating the farmers' need of wheat seeds for cultivation as the Ministry of Agriculture represented by the National Seed Council adopts one recommendation for seeds needed to grow one dunum according to the class across the country in all its provinces and for all farmers. However, most of the agricultural lands in the country, especially the two regions and the south, are described as having various problems in their lands as salinity and waterlogging are common, and the weakness or lack of use the modern technologies in sowing, in addition to the different characteristics of other farm systems for farmers. As well as, there is a difference between the estimates of the respondent's farmers for their need of seeds to grow one dunum of wheat and the Ministry of Agriculture's estimation, where the difference (increase) may reach double or 50% or more in most cases compared to the estimate of the Ministry of Agriculture. This difference is not due to the farmers' lack of knowledge of the Ministry of Agriculture's recommendation, but rather due to a variety of reasons, foremost among which are the problems of their agricultural lands - salinity, waterlog, desertification, and poor use of modern sowing technologies and other characteristics of their farm systems. Besides, most of the respondent's farmers have to resort to local resources - their farms, neighbors, local markets to supplement their needs of wheat seeds for cultivation, and this may result in problems that affect the characteristics of the resulting crop - productivity, purity, infection with pests, etc. The difference of the respondent's farmers among themselves for seeds that they use to grow one dunum of crops, due to the different characteristics of their farm systems. Finally, most of the respondent's farmers describe their wheat areas as rather small because they are smallholders who need to focus on government agricultural services to them - their priority

in providing services.

Providing and producing seeds

The Ministry of Agriculture represented by the National Seed Council and their affiliated agricultural companies for seeds provides the amounts of wheat seeds necessary for the implementation of the country's agricultural plan, which consists of agricultural plans for the governorates for each agricultural season on four sources:

1. The program of increase the higher grade seeds. The program was formed in 2015/2016, which is currently linked to the Agricultural Research Department within the Ministry of Agriculture, and it is one of the National Seed Council branches in the country. It produces wheat seeds for the higher classes in research stations of the Agricultural Research and Seed Certification and Testing Departments / Ministry of Agriculture and stations of the Seed Technology Center / Ministry Science and technology, and supplies governmental agricultural companies with seeds in many varieties and classes. The amounts of wheat seeds supplied from the program for companies during the 2019/2020 amounted to 1,105,3 ton distributed by 920,870 ton in foundation class and 184,700 ton in registered class as shown in table 4.

It can be concluded from table 4 that the variety of wheat varieties whose seeds are propagated in the country in agricultural research stations, within the framework of the National Seed Council aim to develop the formal seed system.

2. Contracting with farmers producing wheat seeds. They are a group of the elected farmers that have certain characteristics, including those related to the cultivation area, experience, and adherence to technical instructions. The governmental agricultural companies for seeds have always contracted with them to produce seeds in their fields and marketing to companies according to a contract between the two parties, to cover their plans in the area of seed provision. Table 5 shows the amounts of wheat seeds marketed by farmers and seed producers of agricultural companies for the years 2016/2017-2018 / 2019.

Table 5 concludes the importance of farmers the seed producers as a source in the country's seed system and in the role of agricultural companies in meeting farmers' needs for wheat seeds.

3. Ministry of Trade / Silos. Governmental agricultural companies resort to coordination with the Ministry of Trade to provide them with limited amounts of wheat seeds that farmers sell to the Ministry of Commerce silos. This procedure is limited in case of a shortage of available seed for companies from other sources, where the amounts of wheat seeds that agricultural companies received from silos in the 2018/2019 amounted to 40 ton (Mesopotamia Company, 2018).

4. Import: The Ministry of Agriculture / Seed Companies, in some years, imports quantities of wheat seeds through the General Company for Agricultural Supplies in case of a shortage in the amounts of seeds needed to cover the agricultural plan. 336,487 ton of wheat seeds were imported for the 2018/2019, var Jihan of certified class 1 from the Turkish-Dutch company (Lucas) (National Seed Council, 2017).

It is concluded from the above that, despite the multiple sources adopted by the Ministry of Agriculture / State seed companies, there is a need to develop the capabilities of these companies to meet the farmers 'need for wheat crops.

Table 4: Amounts of wheat seeds / higher grade supplied from the program of increase the high grade seeds to agricultural companies for the 2019/20 (ton).

Company / Variety	Mesopotamia Company	Iraqi	Seed Technology	Total
IPA 99	458k410	21k500	11k500	491k410
Bohooth 22	354k590	9k710	-	364k300
Rashid	-	20k550	3k600	24k150
Adana	-	12k450	-	12k450
Babylon	-	-	5k500	5k500
Baghdad	-	-	7k860	7k860
Bohooth 10	-	-	4k100	4k100
Abu Ghraib 3	11k100	—	-	11k100
IPA 99 registered	70k000	-	-	70k000
Bohooth 22 registered	114k700	-	-	114k700
Total	1008k800	64k210	32k560	1105k570

Seed purification

Agricultural seed companies are purifying wheat seeds, where this process aims to remove the soil, barley seeds, and weed from wheat seeds before preparing them to farmers, and the purification process includes several stages and procedures. These companies have 16 factories to purify seeds with a total capacity of 150,000 ton distributed by 6 factories in the Mesopotamia Company with a capacity of 56.000 ton, 7 factories in the Iraqi company with a capacity of 75.000 ton, and 3 factories in the Seed Technology Center with a

Table 5: Amounts of wheat seeds marketed by farmers, seed producers of government agricultural companies for the 2016 / 2017-2018 / 2019 (ton).

Year/Companies	2016/2017	2017/2018	2018/2019	Total
Mesopotamia Company	75864	64275	156989	297128
Iraqi	28968	50038	97366	176372
Seed Technology	4215	7116	21743	3304
Total	109047	121429	276098	506574

Table 6: Amounts of wheat seed supplied from governmental agricultural companies for seeds to farmers in all governorates of Iraq for the 2015 / 2016-2019 / 2020.

Year	Governmental companies			Total (ton)	Cultivated area Million (dunums)	Average dunum share (kg/dunum)
	Mesopotamia Company	Iraqi Company	Seed Technology Center			
2015/2016	46,159	30,324	9,052	85,535	* 3,697	23
2016/2017	58,530	32,427	0,781	91,738	* 4,216	21
2017/2018	59,629	27,602	2,964	90,195	3,154**	28
2018/2019	72,607	48,375	6,617	127,599	6,33**	20
2019/2020	149,385	93,457	20375	263,217	7	37

* Ministry of Planning, 2017.

** Ministry of Planning. 2019.

capacity of 19,5 000 ton. These purification sites are considered centers for receiving seeds from producers, as well as centers for supplying farmers with wheat seeds for planting.

Supplying farmers with seeds

1. At the beginning of each agricultural season, agricultural companies supply farmers with the amounts of wheat seeds according to the agricultural plan for each farmer and the governorate, according to a formal mechanism and procedures. The agricultural division and the directorates of agriculture in the governorates are involved and according to the available varieties, the first the variety IPA 99, Abu Ghraib, and other varieties. However, the average dunum share of wheat seeds for the years 2015-2016 2016-2020 supplied by companies to farmers ranged between 21-37 kg/dunums, as shown in table 6.

2. According to the data of the respondent's farmers, the number of wheat seeds supplied for the respondent's farmers from the agricultural companies for the 2019/ 2020 amounted to 86 tons, covered 54% of the farmers need, according to their estimates (local method), which amounted to 158.7 ton. Thus, it covered 54% supplied and forming 54.16% of the actual need of farmers from wheat seeds, where the amount of gap between the number of seeds needed by farmers according to their estimates. Also, the amount of seeds that they obtained from companies according to the formal estimate ranges between 0.08 - 2.64 ton seeds proportional to the amount of area planted with the crop, and that 60% of the respondent's farmers the amount of gap they have ranged from 0.5 - 2.6 ton of seeds as shown in table 7.

Table 7: The gap between the number of seeds needed by the farmers and the number of seeds supplied for them from agricultural companies for the season 2019/2020.

Gap category	Number	%
0.08 - less than 0.5	40	40
0.5 - less than 1	37	37
1- Less than 1.5	15	15
1.5- Less than 2	6	6
2- 2,6	2	2
Total	100	100

It is can be concluded from table 7 that the amount of gap between the number of seeds needed by farmers, according to their estimation, and the amounts supplied to them from companies are considered large. This makes farmers resort to local (informal) sources to supplement their needs of seeds, as well as additional costs because of buying from local markets.

Marketing

Agricultural companies receive wheat seeds from farmers who produce seeds annually in the framework of the contract between the two parties, which companies adopt as inputs in the implementation of the country's agricultural plan.

Conclusions

1. Despite the obvious role of the Iraqi government agricultural companies in meeting the farmers need in the country from wheat seeds as a basic input in crop cultivation, productivity, and production. There is still a significant gap in meeting that need, which makes farmers cover this gap from other non-governmental sources whose effects are reflected in the quality and productivity of seeds and production costs. This indicates that the formal seed system did not fully meet the needs of the farmers from the seeds, which created an informal seed system to complement the needs of the farmers from these inputs.
2. The formal seed system in Iraq adopts a unified recommendation for all governorates, regions, and fields from north to south and from east to west regarding the number of wheat seeds for growing dunums, regardless of the characteristics of farm systems.

Recommendations

1. The research centers for the Ministry of Agriculture and the Faculties of Agriculture must study the dunum need of wheat seeds for cultivation according to the characteristics of farm systems and the characteristics and problems of the land. As well as, the technologies used in leveling, seeding, irrigation, etc. in different regions and submit their recommendations to the National Seed Council for approval in estimating the farmers need of seeds in every season in a way that achieves their needs from their official sources.
2. Working to develop the capabilities of agricultural companies to provide and produce wheat seeds and purify them as a strategy for developing the seed system and its security in the country.
3. The Agricultural Research Department and the Faculties of Agriculture conduct studies on the quality of the seed purification process in a way that aims to develop it.
4. Develop the capacity of agricultural companies to provide and produce wheat seeds and purification as a strategy for the development of the country's seed system and security.
5. The Department of Agricultural Research and the Agricultural Faculties (DARS) is conducting studies on the quality of the seed purification process with a view to its development

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