



Research article

Knowledge Needs of Agricultural Employees in the Nineveh Agriculture Directorate and its affiliated agricultural divisions in the field of managing the harvesting and marketing process of wheat crops

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ABSTRACT

This research aimed to identify the knowledge needs of agricultural employees within the Nineveh Agriculture Directorate and its affiliated divisions concerning the management of wheat harvesting and marketing. Also, it is sought to measure the correlation between these knowledge needs and several variables. The study population consisted of 374 agricultural employees, from which a sample of 100 respondents (27%) was selected. Data were collected using a questionnaire whose face validity was confirmed and reliability was measured using the Cronbach's Alpha method, yielding a value of 0.82. For data analysis, arithmetic mean, frequencies, Pearson's correlation coefficient, and Spearman's rank correlation coefficient were employed. The findings revealed that approximately 97% of the respondents exhibited moderate to high knowledge needs in the domain of wheat harvesting and marketing management. Several items were ranked highest in terms of knowledge needs, while others were ranked lowest. The results also indicated a significant correlation between the respondents' knowledge needs and the variables of academic specialization and level of exposure to agricultural information sources. The paper concludes with several findings and recommendations

1. Introduction

To contribute of achieving sustainable food security in Iraq. Nineveh Governorate holds a leading position in production of this crop which places a great responsibility on the Nineveh Agriculture Directorate and its affiliated agricultural divisions to provide extension and technical support to farmers and develop their skills (Al-Jammās and Al-Sabawī, 2025; Al-Sultan and Al-Bakri, 2024). Despite of the growing interest in raising production efficiency. The harvesting and marketing processes remain critical stages accompanied by significant quantitative and qualitative losses. This requires equipping agricultural staff and employees with the latest scientific knowledge and extension skills to manage these processes efficiently and reduce post-harvest losses (Food and Agriculture Organization [FAO], 2024; Mahmood and Jaddoa, 2026).

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Several recent studies indicate the existence of varying knowledge and training gaps among agricultural employees in the governorate regarding modern agricultural practices and technologies. As well as the methods of transferring and applying them to farmers (Al-Hadidy and Al-Ubaidy, 2025; Al-Obaidi and Al-Mallah, 2020; Al-Taaleb, 2017). Humanity's knowledge of cultivating and managing crops was a pivotal step toward settlement, liberating people from the arduous tasks of foraging for wild plants and hunting animals. Over time, crop cultivation has evolved to become a fundamental component of development (Hassanin et al., 2021). Rural development programs are a major focus for governmental institutions, particularly in developing nations, which view agricultural advancement as the cornerstone of broader societal development (Al-Jubouri et al., 2025). In this context, agricultural extension plays a crucial role through intensive efforts to develop rural populations, expand their cognitive and cultural horizons, and equip them with agricultural knowledge and skills (Al-Jubouri et al., 2021). The agricultural sector, especially grain crops, constitutes a significant portion of Iraq's national income and is vital for ensuring food security for its citizens (Altalib et al., 2024). The progress of this sector relies on two primary factors: financial and human resources (Al-Dulaimi et al., 2020). Agriculture is a key pillar of economic development, and a major aspect of this is the cultivation of essential crops like wheat, a staple food in most parts of the world (Altalib et al., 2021). It is therefore imperative to advance all facets of the agricultural sector, as it is the primary source of food and employment for a large segment of the population (Kumar & Ankit, 2020). Consequently, individuals have sought various sources to acquire agricultural knowledge pertaining to crop production, from cultivation and crop servicing to harvesting and marketing, to maximize yields (Al-Abbasi et al., 2018). Recently, researchers have observed significant challenges in the harvesting and marketing of agricultural crops, particularly wheat, which is produced in large quantities in the study area. Empirical evidence demonstrates that technical and cognitive gaps among agricultural extension personnel directly contribute to substantial post-harvest quantitative losses. For instance, studies reveal that grain losses during mechanical harvesting alone can reach up to 17.81% due to inadequate technical knowledge regarding the calibration and operation of combine harvesters (Nath et al., 2024), while operational speed and height miscalculations cause additional total losses ranging between 6.32% and 7.42% (Hussein et al., 2025). Furthermore, a lack of extension-led training on timely harvesting and moisture control accounts for overall post-harvest crop losses between 20% and 40% in developing contexts (Abrehet, 2018; Deepak & Prasanta, 2017). The challenges are further exacerbated by climate-induced hazards such as sudden crop fires and delayed rainfall. Given that agricultural employees are the primary source of information for farmers on wheat harvesting, loss mitigation, and marketing, this study was undertaken to identify the knowledge needs of these employees in the study area regarding the management of the wheat harvesting and marketing process. Furthermore, developing effective marketing and extension programs depends primarily on the competence of these employees and their ability to meet field-based knowledge needs (Al-Guburi et al., 2017; Sharma and Kumar, 2024). Hence, an urgent need emerges to determine the knowledge needs of agricultural employees in the Nineveh Agriculture Directorate and its divisions in the field of managing the harvesting and marketing process of the wheat crop, aiming to bridge these cognitive gaps and develop specialized training programs that contribute to improving the efficiency of value chains and agricultural marketing (Hassan and Jasim, 2026).

Research Objectives

The objectives of this research are as follows:

- 1.To determine the overall knowledge needs of agricultural employees regarding the management of the wheat harvesting and marketing process.
- 2.To rank the specific knowledge-need items for agricultural employees in this area according to their relative importance.
- 3.To identify the correlation between the knowledge needs of agricultural employees and some of their personal and professional characteristics, including age, educational attainment, length of service, academic specialization, and level of exposure to agricultural information sources.

2. Materials and Methods

The research population comprised all 374 agricultural employees in the Nineveh Agriculture Directorate and its affiliated divisions. Data were collected from a sample of 100 employees (27% of the population) by using a structured questionnaire. The development of the items was based on a review of previous literature and scientific studies. The dimensions and concepts were designed to measure exposure to agricultural information sources and the knowledge needs in wheat harvesting and marketing management. No factor analysis (exploratory or confirmatory) was conducted; Cronbach's alpha coefficient (0.82) was used instead.No statistical evaluation of the construct's validity was performed; instead, content validity was assessed through expert and specialist opinions.The questionnaire was divided into two parts. The first part collected data on independent variables:

1. Age: Measured in years.
2. Educational Attainment: Categorized as intermediate/preparatory agriculture, agricultural institute, agricultural college, Master's degree and Doctorate with corresponding numerical values of 1 through 6.
3. Length of Service: Categorized into three groups: 1-10 years, 11-20 years, and 21 years or more.
4. Specialization: Classified as plant production, animal science, extension, or economics.
- 5.Exposure to Agricultural Information Sources: Measured using 7 sources with three response options (contact, sometimes, no contact), assigned values of 3, 2, and 1, respectively, with total scores ranging from 10 to 30.

The second part of the questionnaire consisted of 27 items related to the management of wheat harvesting and marketing. These items were developed based on a review of scientific literature. The knowledge need for each item was measured on a five-point scale (very high need, high need, medium need, low need, no need), with values from 5 to 1. The total knowledge need score for each respondent was calculated by summing the scores for all items.The questionnaire's validity was established by consulting with specialists in field crops and agricultural extension. Based on their feedback, three items were removed, and two were modified, resulting in a final list of 24 items. The reliability of the questionnaire was determined using the Cronbach's Alpha coefficient on the pilot sample data, which yielded a value of 0.82, indicating high reliability.Data were collected from May to the end of June 2025. The collected data were coded, tabulated, and analyzed using the Statistical Package for the Social Sciences (SPSS). Analysis included calculating arithmetic means and frequencies, as well as Pearson and

Spearman correlation coefficients to examine the relationships between knowledge needs and the independent variables, assuming a normal distribution of the data.

3. Results and Discussion:

First: Level of Knowledge Needs

The theoretical range for the knowledge needs scale was 68 to 110. This range was categorized into low (68-81), medium (82-95) and high (96-110) knowledge needs. Table 1 presents the distribution of respondents according to their level of knowledge needs.

Table 1. Level of Knowledge Needs of Agricultural Employees in Wheat Harvesting and Marketing Management.

Knowledge Need Category	Frequency	%	Mean
Low Need (68-81)	3	3	74.500
Medium Need (82-95)	64	64	88.500
High Need (96-110)	33	33	103.000
Total	100	100%	

Table 1 indicates that 97% of the respondents have knowledge needs that are medium to high. This suggests that the current knowledge level of the employees is relatively insufficient, and they require further training and professional development to enhance their expertise in managing the wheat harvesting and marketing process. The elevated knowledge needs observed among farmers (97%) may be attributed to limited access to training opportunities, resulting from weak or inconsistently implemented agricultural extension services, particularly in rural areas. Institutional constraints such as inadequate coordination between governmental agencies and farmers, as well as the absence of policies supporting the transfer of agricultural technology may further account for this finding. These results are consistent with previous studies linking deficient extension services to lower levels of farmer knowledge; however, the present study offers a distinct scientific contribution by focusing specifically on the harvesting and marketing stages, which have received comparatively limited attention in the existing literature. On the other hand, the researchers' findings of Hamed and Dawood (2026) focused on identifying the level of knowledge needs among agricultural workers in Nineveh Governorate. Their results revealed that the ranking of knowledge needs and their relationship to certain personal and professional variables was generally moderate. Furthermore, this study identified several obstacles facing workers in the agricultural sector, highlighting the need to strengthen training and technical support programs to improve their knowledge and facilitate the effective transfer of technology to farmers.

Table 2: Ranking of Knowledge Need Items for Agricultural Employees.

No	Item	Mean	Rank
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1	Knowledge of estimating crop moisture content before harvesting	3.7475	1
2	Knowledge of awareness methods related to wheat harvesting	3.5253	2
3	Knowledge of coordination mechanisms with the Ministry of Trade for crop marketing	3.1515	3
4	Knowledge of preparing informational posters for wheat harvesting	3.1313	4
5	Knowledge of procedures for educating farmers about fire prevention	3.0808	5
6	Knowledge of procedures for providing combine harvesters to farmers at the end of the season	3.0606	6
7	Knowledge of conditions requiring the cessation of the harvesting process	3.0202	7
8	Knowledge of coordination mechanisms with rural leaders to facilitate harvesting	2.899	8
9	Knowledge of pests that can be transmitted with grains post-harvest	2.8889	9
10	Knowledge of necessary methods for seed cleaning after harvest	2.8485	10
11	Knowledge of the importance of educating farmers to avoid crop damage from late rains during marketing	2.8283	11
12	Knowledge of coordination mechanisms between agricultural divisions and farmers during harvest season	2.8182	12
13	Knowledge of the specific dates for wheat harvesting	2.8182	13
14	Knowledge of coordination mechanisms with other ministries to facilitate marketing	2.8081	14
15	Knowledge of methods for providing transport for crop marketing	2.7778	15
16	Knowledge of procedures for marketing the crop in batches to avoid congestion at receiving centers	2.7778	16
17	Knowledge of supply and demand dynamics in the market during wheat marketing	2.7677	17
18	Knowledge of procedures for educating farmers on marketing to local markets	2.7677	18
19	Knowledge of mechanisms for unifying efforts among farmers to facilitate marketing	2.7576	19

20	Knowledge of extension methods for wheat crop marketing	2.7576	20
21	Knowledge of procedures for crop storage in case of marketing delays	2.7374	21
22	Knowledge of procedures for implementing the agricultural plan related to marketing	2.7273	22
23	Knowledge of teaching farmers the use of farm records related to marketing	2.7273	23
24	Knowledge of mechanisms for implementing the agricultural plan for harvesting	2.7071	24

The ranking presented in Table 2 highlights the specific areas in which knowledge needs are most pronounced among the surveyed participants. Knowledge of estimating crop moisture content prior to harvesting ranked first, reflecting its considerable importance to respondents, while knowledge of mechanisms for coordinating efforts among farmers to facilitate marketing emerged as another highly ranked area. The elevated mean scores associated with these top-ranked items further reflect the perceived significance that participants attach to both pre-harvest technical practices and collective marketing strategies, underscoring the multidimensional nature of the knowledge needs identified in this study.

Second: Correlation between Knowledge Needs and Personal

Functional Characteristics:

The relationship between employees' knowledge needs and their characteristics was analyzed. The results are summarized in Table 3.

1.Age: The largest group of respondents (56%) was in the 38-51 age range. The Spearman's rank correlation coefficient between age and knowledge needs was 0.108, which was not statistically significant.

2.Educational Attainment: The highest percentage of respondents were graduates of agricultural colleges. The correlation between educational attainment and knowledge needs was not significant ($r_s = 0.074$).

3.Academic Specialization: 51% of respondents specialized in plant production. There was a significant correlation ($r_s = 0.293$, $p < 0.05$) between academic specialization and knowledge needs. This indicates that an employee's specialization influences their knowledge requirements for wheat harvesting and marketing.

4.Length of Service: The largest group (40%) had 11-20 years of service. The correlation between length of service and knowledge needs was not significant ($r_s = 0.174$).

5.Exposure to Agricultural Information Sources: The majority of respondents fell into the medium (50%) and high (46%) exposure categories. A significant correlation ($r_s = 0.351$, $p < 0.05$) was found between the level of exposure to information sources and knowledge needs, suggesting that access to information plays a key role in shaping these needs.

These results of the current study are consistent with the Altalib et al., (2021) who conducted their study on 500 farmers in the Al-Kassic region of Nineveh Governorate. They reported that wheat farmers' knowledge needs regarding wheat pest control were generally moderate. Furthermore, their results showed no correlation between the independent variables (age, educational level, academic achievement, years of experience in wheat cultivation and source of agricultural information) and wheat farmers' knowledge needs regarding wheat pest control. They suggested that farmers' knowledge may be influenced by other factors and variables. The results of this study are consistent with the Ahmad and Dawid (2025), who indicated their findings that there were statistically significant correlations between the knowledge needs of wheat farmers and the variables of age and educational level. However, the variable years of experience in wheat cultivation that did not show a statistically significant correlation with knowledge needs. Their study focused on identifying the knowledge needs of 922 wheat farmers in the Nimrud district of Nineveh Governorate.

Table 3. The link of some variables to agricultural workers' cognitive needs.

Variable	Replicates	Percentage (%)	Arithmetic mean	Value rs , r	Significant
Age:					
24 – 37 years	23	23	30.50	0.108	NS
38 – 51 years	56	56	44.50		
52 – 67 years	21	21	59.50		
Educational Attainment:					
Intermediate	19	19	0.074		NS
Preparatory	15	15			
Institute	18	18			
Bachelorism	24	24			
Master's	11	11			
Doctorate	3	3			
Specialization:					
Botany	51	51	0.293		Sig
Animal	29	29			
Agricultural	9	9			
Extension					
Agricultural	11	11			
Economics					
Length of Employment :					
1 – 10 years	35	35	0.174		NS
11 – 20 years	40	40			
21 years over	25	25			
Level of Exposure to Agricultural Information Sources :					
13 – 15 years	4	4	0.351		Sig
16 – 18 years	50	50			
19 - 22 years	46	46			

NS: Non-significant

Sig: Significance ($P \leq 0.05$).

4. Conclusions

Based on the findings, the following conclusions are drawn:

1. Inadequate Specialized Training: The low level of knowledge and awareness among Nineveh's agricultural staff regarding harvesting and marketing processes indicates a structural gap in ongoing training programs. This necessitates a shift from general theoretical training to specialized programs focused on post-harvest loss management and smart value chains.

2.To Need to Redesign Knowledge Transmission Channels: The strong correlation between academic specialization, information sources, and knowledge levels demonstrates that diversifying digital information sources (such as e-learning) is the primary driver for building employee capacity, not just years of service or traditional practices.

3.Priority of Administrative and Organizational Reform: We emphasize that addressing wheat crop losses in the governorate depends not only on improving employees' technical skills but also requires, first and foremost, a flexible work environment that dismantles bureaucracy and supports institutional coordination between agricultural directorates and grain receiving and marketing centers.

5. Recommendations

In light of the conclusions, the following recommendations are proposed:

1.Specialized Training Recommendations: It is recommended to offer advanced training programs through the Extension Center and the College of Agriculture, focusing specifically on bridging critical knowledge gaps such as methods for measuring grain moisture content before harvest and technical standards for evaluating wheat quality to avoid field losses.

2.Developing Coordination and Marketing Mechanisms: It is essential to establish direct communication and coordination channels between the staff of the Nineveh Agriculture Directorate and the grain marketing agencies (Ministry of Trade) to facilitate laboratory testing procedures and expedite the receipt of the crop from farmers.

3.Targeted Extension Campaigns: Awareness and media campaigns should be directed toward specific targeted topics related to the wheat value chain, rather than general awareness campaigns to ensure that contemporary administrative and technical challenges are addressed directly.

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