Iraqi Journal of Scientific and Industrial Research
Volume 4, Issue (4), October-December 2025, pp. 126-129

Farmers' Knowledge Level Regarding Pesticide Use and Its Impact on Health and Environment in Iraq

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Abstract

This research dealt with studying the reality of farmers' use of personal protective equipment when dealing with agricultural pesticides in the Baghdad region, by distributing a scientific questionnaire to a sample of (300) farmers. The study aimed to determine the extent of this group's awareness of the importance of using prevention tools, analyze the level of knowledge, discover awareness gaps, and understand the relationship between demographic variables (age, gender) and academic level.

The results showed a significant decline in the level of knowledge, with the "very weak" category accounting for nearly a third of the sample (90 farmers), followed by the "weak" category with a large percentage (60 farmers), while the "average" and "good" categories showed lower percentages, and no cases were recorded in the "very good" or "excellent" categories. This indicates a near-total lack of preventive culture among farmers, exposing them to significant health risks resulting from direct contact with pesticides without proper protection. A small group (10 individuals) was also found to have no knowledge of how to use protective equipment, a serious indicator that must be addressed.

In terms of age distribution, the sample included farmers of different ages ranging from 18 years to more than 70 years, and they were divided into four age groups. These distributions indicate that awareness was not limited to a specific age group, but rather that the decline in awareness was general across all groups. As for gender, the majority were males (about 250), compared to a small percentage of females (50), reflecting the reality of agricultural work in Iraq, which is dominated by males.

Keywords: Agriculture; Pesticide; Agricultural awareness; Agricultural education
Received: 12 June 2025; **Revised:** 23 August 2025; **Accepted:** 30 August 2025; **Published:** 1 October 2025

1. Introduction

Agriculture is one of the cornerstones of economic and social development in most countries around the world, particularly in developing countries that rely heavily on agricultural activity as a primary source of income and food. With the advancement of agricultural technology, the use of pesticides has become an urgent necessity to reduce damage caused by insects and diseases to plants and to ensure improved production quality and quantity. However, if this use is not based on scientific foundations and accurate knowledge, it may turn from a tool for protection into a source of danger that threatens human health and environmental safety [1]. Pesticides contain toxic chemicals, requiring high awareness and precise procedures during application to minimize their potential risks. The problem is clearly evident in the fact that many farmers, especially in rural environments and low-income agricultural communities, lack the minimum awareness and knowledge necessary to handle these materials safely. Pesticides are often used indiscriminately, without adhering to the accompanying instructions or paying attention to occupational safety standards, which leads to direct health damage to the farmer and his family, such as poisoning or respiratory and skin problems, in addition to long-term environmental damage such as soil and water pollution and the killing of non-target organisms [2].

In the Iraqi context, particularly in Baghdad Governorate, the reality of pesticide use reflects multiple challenges, including weak market oversight, the availability of banned or unknown-source pesticides, the low level of education among many farmers, and the absence of effective guidance programs that explain proper use, prevention methods, and the proper disposal of empty containers.

Based on this reality, this study aims to shed light on the level of knowledge of farmers in Baghdad regarding the safe use of pesticides, identify the most prominent knowledge and behavioral gaps, and explore the relationship

between demographic characteristics such as gender, age, and educational level, and the level of knowledge, in order to provide a clear picture. Clearly, this can help decision-makers and stakeholders develop more effective guidance and educational strategies that contribute to raising farmers' awareness and achieving a balance between protecting crops and preserving human health and the environment.

2. Methods

This part of the research focuses on the applied field aspect, which aims to monitor and analyze the reality of pesticide use by farmers in Baghdad, the capital of Iraq, within the context of the local agricultural context of the Middle East**.**

Study community

The study community consists of a sample of farmers working in the suburbs of Baghdad, specifically in agricultural areas such as Madain, Abu Ghraib, Nahrawan, Taji, and Mahmoudiya, areas known for their fertile soil and diverse crops. This sample was purposefully selected to reach farmers who regularly use pesticides in their agricultural activities.

When selecting the sample, care was taken to ensure that it would be diverse in terms of age groups (from young people to the elderly), as well as in terms of educational level (illiterate, primary, intermediate, secondary, university), in order to provide a comprehensive picture of the different levels of agricultural awareness and behavior in dealing with pesticides.

Method of implementing the study in the field

The study was conducted through direct field visits to farms in the targeted areas. Questionnaires were distributed manually after coordination with local selectmen or agricultural officials in the districts and villages. The research objectives and nature of the questions were explained to farmers to ensure their understanding and encourage them to answer accurately and honestly. The data collection period took several weeks, and care was taken to follow up on the completion of the questionnaires in person to ensure quality.

In addition to written questionnaires, open-ended personal interviews were conducted with a group of farmers to gain a deeper understanding of their background knowledge and real-life experiences with pesticides. These interviews helped uncover several common misconduct practices, such as mixing pesticides in random ways, storing them in undesignated locations, or disposing of them in irrigation water or on roads.

Data analysis

Data collected through questionnaires were entered into SPSS for statistical analysis. A combination of descriptive and analytical statistical methods was used.

Descriptive methods included calculating percentages, frequencies, and averages to monitor general trends in farmers' responses. Statistical analysis included using the Chi-square test to test the existence of statistically significant relationships between variables, such as: The relationship between education level and the use of protective equipment, the relationship between training and knowledge of pesticide used, the relationship between storage methods and farmers' awareness of the risks of misuse.

This analysis helped clarify the factors influencing farmers' behavior and the degree of their commitment to correct procedures, paving the way for providing accurate scientific recommendations that contribute to raising awareness and improving agricultural practices in the future.

3. Results and discussion

The survey results showed that the ages of the study participants ranged from 18 to over 70 years, and they were divided into four age groups, as shown in the figure above. The data indicate that group 2 represents the largest proportion of the sample, with over 110 participants, followed by group 1 with approximately 90 participants. Groups 3 and 4 recorded smaller numbers, approximately 45 and 55 participants, respectively Figure (1). These results indicate that most participants belong to the young and middle age groups, reflecting a greater willingness to respond to awareness and training programs compared to older groups, who may face challenges in accessing information or adopting new preventive practices.

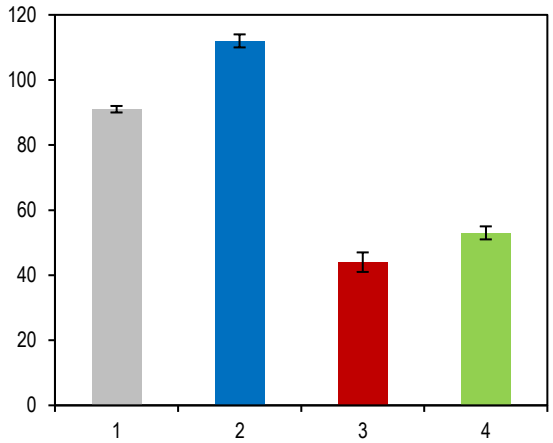

Fig. (1) Age of participants

The results of Fig. (2) also showed the relative distribution of study participants by gender, with a significant preponderance of males compared to females. The number of male participants reached approximately 250, while the number of female participants reached only 50.

Figure (3) shows that the largest proportion of the study sample was uneducated, at approximately 90%, followed by the preparatory category at approximately 70%, then primary school at 50%, and intermediate school at 45%, while the proportion of bachelor's degree holders was approximately 30%. As for the master's and doctoral categories, they recorded low proportions, not exceeding 10% for each. These results indicate a low educational level among the majority of the sample, which may be reflected in their level of awareness regarding the use of pesticides.

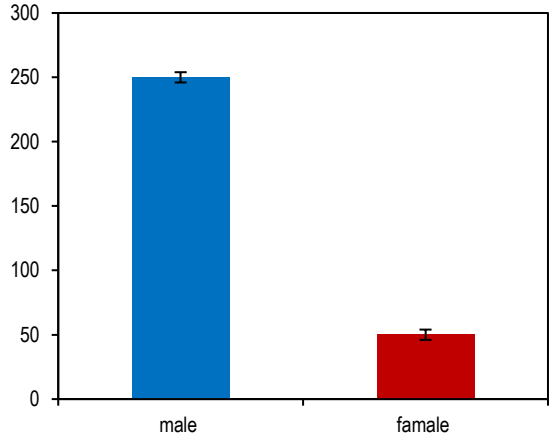

Fig. (2) Ratio of males to females

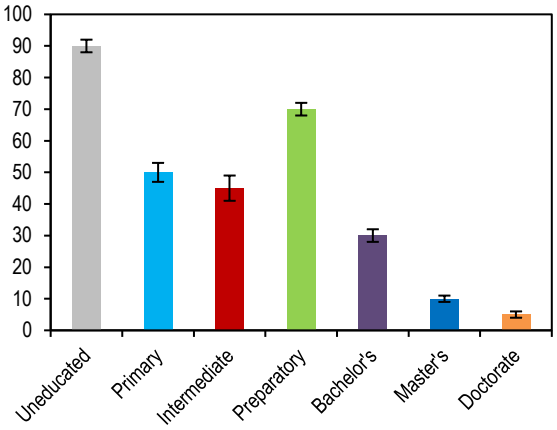

Fig. (3) The educational level of the target group

Data indicate a positive relationship between some farmers' socioeconomic characteristics and their level of knowledge about safe pesticide use. For example, education level was significantly associated with knowledge, with more educated farmers being more aware of the risks and proper application methods [3]. Age and years of experience in using pesticides also played a role in increasing the chances of obtaining training, and thus enhancing knowledge [4].

On the other hand, full-time farmers, as well as married ones, showed a higher level of knowledge compared to part-time or single farmers, perhaps due to the greater time they spend in the fields and their concern for their own and their families' safety [5].

Farmers' knowledge of pesticides

The study results showed that the number of pesticides used by farmers in Iraq amounted to (20 different pesticides). It was found that the most widely used of these pesticides is Acetamiprid, a fast-acting insecticide that is absorbed through the stomach and affects the nervous system of insects. It is widely used to control pests that infect vegetable crops such as tomatoes and cucumbers, due to its great effectiveness in eliminating sucking insects.

The results revealed that a significant percentage of farmers do not have sufficient knowledge of the different types of pesticides or how to use them, rather, they rely primarily on recommendations from agricultural shop owners or personal experience. The responses also revealed that some farmers are unaware of the importance of reading the instructions on the package and do not pay attention to the specified dosages or proper mixing methods, increasing the likelihood of poisoning or environmental damage.

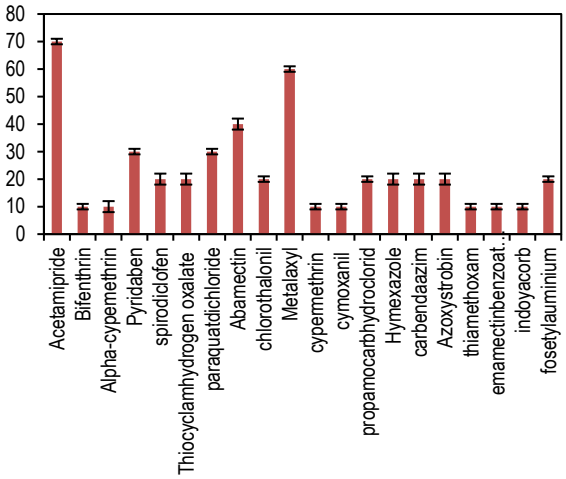

Fig. (4) The pesticides used by farmers in Iraq

Despite the importance of agricultural extension services, their effectiveness has been limited. Study 6 showed that the majority of farmers did not receive any kind of guidance or practical training, and some did not even know who agricultural extension workers were [6]. The study also indicated that private sector extension was directed primarily at large farm owners, while small farmers or those with limited resources were ignored [7].

Several studies have indicated that farmers rarely read the usage instructions on pesticide containers, either because of language difficulties, small print, or illiteracy [8]. More than half of farmers also reported that they do not use gloves or masks while spraying, and are content with covering their faces with clothing [9].

General knowledge rate

The results showed that the general level of knowledge among the study sample was that more than 75% of the sample had no knowledge of how to handle, prevent, and store pesticides, as well as the spraying rate for each pesticide, spraying times, and the duration of staying away from the field, while the percentage of knowledge did not exceed 25%, as shown in Fig. (5).

The results of this study showed that although most farmers are aware of the harm pesticides cause to their health, many still use inappropriate pesticides, or do not use protective equipment at all, while handling them.

This may be due to several reasons, including the low level of education among farmers, the lack of adequate protective equipment during hot weather, and ineffective risk communication by government authorities and technical advisors in the region. It is essential to raise awareness among rural residents in these areas about the risks of exposure to pesticides through ongoing educational programs by local governments that focus on the rational and safe use of pesticides, and to implement risk communication strategies to protect this population group. This is consistent with what other researchers have found in their studies [10].

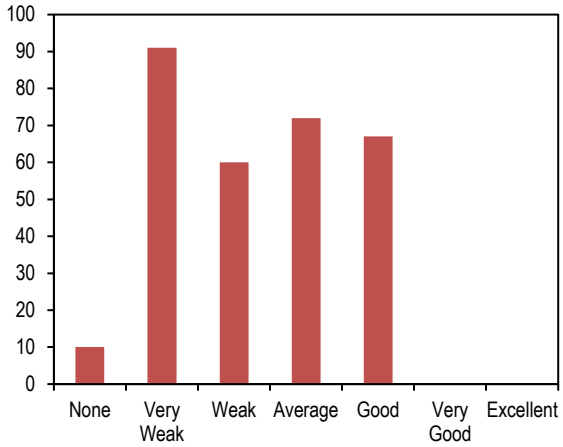

Fig (5) the level of knowledge of self-protective equipment

4. Conclusion

It can be said that there is a real gap in agricultural safety culture among farmers, which, if left unaddressed, could exacerbate health and environmental problems. Therefore, the results of this research serve as a call for relevant authorities to take concrete steps to enhance occupational safety in the Iraqi agricultural sector.

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