

The Role of Agricultural Extension in Decentralizing the Sensitivity of Vegetable Farmers to the Risk of Residual Pesticide Effects

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Abstract

This study was carried out in the northern Khartoum (Bahry Locality) with the aim of knowing the role of agricultural extension in developing the awareness of the farmer to the danger of residual effect of pesticides (vegetable farmers). The social survey method was used to conduct this study; 100 vegetable farmers were selected randomly. The data collected through questionnaires, observation, and interviews for primary data, previously concerned, and reference documents were used to collect secondary data. Data collected were analyzed using the statistical packages for social science (SPSS). The study yielded some useful results, the most important of which are: the presence of respondents who obtain their information about pesticides from merchants, the absence of a guide provider in their area, and the absence of any seminars or lectures on the use of pesticides, or programs. For example, radio and television programs were presented but protective clothing was not used. This study is based on the researcher's advocate for the following: intensifying agricultural extension and employee visits to the agricultural field, in addition to intensifying educational evidence for consumers regarding pesticides and providing preliminary data on pesticides and how to deal with them and increase them. Educate farmers about the safe use of pesticides and identify the risks and damages that pesticides cause to humans.

Keywords

Agricultural Sector, Pesticides, Vegetables, Awareness

1. Introduction

Agriculture in Sudan is the main pillar of the Sudanese economy and is the main economic activity of the Sudanese countryside. Eighty percent of Sudanese depend on agriculture for their decent living. Agriculture contributes about 30 percent of the national product and about 90 percent of exports [1]. The agricultural sector consists of two main sectors, plant, and animal. Although the arable area is estimated at about 200 million acres, the area already cultivated with irrigated and rain crops does not exceed 30 million acres, but compared to the areas in many neighboring countries, is considered a vast area as in [2]. Sudan has known vegetable cultivation from a time when far away and has gained great importance recently due to awareness and its nutritional and economic value and the area cultivated with vegetables in Sudan is estimated at about 525 thousand acres as in [3].

Vegetables and fruits occupy large areas; however, growing vegetables still do not meet the requirements of the local market. The cultivation of vegetables and fruits is also one of the areas that are exposed to pesticide contamination, which is used to control insect and fungal diseases and chemical fertilizers through agricultural processes and post-harvest as in [4]. He defined chemical pesticides as chemicals that are used to control agricultural pests or any kind of organism that could constitute a pest on agricultural crops [5]. Storage operators are concerned with pollution problems for some reasons, including: 1) not knowing the groups working in the agricultural sector, especially producers and workers, the danger of pesticides and fertilizers, 2) lack of specifications that identify pesticide residues in these products, 3) lack of trained technical staff, 4) poor agricultural extension as in [6]. And that's right here the use of vegetable pesticides is a major safety problem for any farmer spraying, usually limited to the use of pesticides, the use of appropriate pesticides and appropriate doses, and it is not responsive to the extension. While acknowledging the damage caused by pesticides to the environment in general and to humans in particular, we hope to find a common formula through which they can contribute to an appropriate solution to the problem. In this way, it can be said that the existence of legislation or a system capable of reducing these damages requires research into the role that agricultural extension can play in educating farmers as well as how to rationalize the use of pesticides through the methods of work used through which the appropriate solutions to these damages lie as in [7]. Agricultural extension is one of the practical aspects that combine both guidance education and agricultural sciences, *i.e.* the process of selecting the appropriate agricultural techniques for

agriculture and providing them with a simplified method through the methods and guidance tools to learn them and no one can carry out an agricultural indicative activity efficiently if he knows one side without the other. The government's work on the issue of the "family" is a very important issue. The importance of agricultural extension is highlighted as one of the specialized agricultural sciences that works to properly link the products of agricultural research represented by modern agricultural technology and areas of application in the countryside by educating farmers and convincing them of the importance of these agricultural techniques and training them in use correct and continuous to them. The agricultural extension service is influenced by the nature of the economic and social conditions for all, so we find that the form and mechanisms of this service are occupied from one country to another. The distinguished agricultural extension service is a product of sincere cooperation and efforts by officials and participants in the field of agricultural guidance and agricultural research in addition to implementation among those with field experience in dealing with farmers as well as the government and private entities concerned rural development as in [8] [9]. Results indicated that most of the 83% of the farmers surveyed resort to several sources to inquire about pesticides and their use, namely parents and acquaintances, pesticide dealers, the preamble of the pesticide, which is the most important source of information. Therefore, the main objectives of this paper are the role of agricultural extension on developing awareness of the farmer to the danger of residual effect of pesticides, knowing the extension of the method used in the development of the awareness of the farms about the danger of pesticides, and the role of extension activities in the development of farmer awareness of the danger of the residual effects of the meds on the safety and safety of the consumer.

2. Methodology

2.1. Study Area

The area of villages is located in the locality of Bahri and is bordered by the Blue Nile to the south and the border of the Nile River state in the north and the east local sea (East Nile) and the west bordered by the Nile River.

The total number of farmers (7) thousand farmers, a random stratified homogeneous stratified sample of all farmers in the villages was selected in the following table with a sample of 100 farmers:

Table 1 shows the villages and the number of farmers and researchers of the villages that were studied:

Social survey methods were used to conduct the research. The primary data have been collected through interviews, critical observation, and questionnaires. The secondary data were collected from documents, articles report, and website or internet; these secondary data are useful for purveying background information.

2.2. Data Analyses

The data was entered into the computer and analyzed by the Statistical Product for Science & Services programs (SPSS) to reach percentages and frequencies.

3. Results and Discussions

3.1. Distribution of Respondents

Level of knowledge of pesticide data sources: the data are presented in **Table 2**. From the table, it is clear that 69% of the researchers receive their information about pesticides from pesticide dealers and sellers, and 16% of the researchers receive from friends due to the contact of farmers with companies and traders and with each other more than the other sources due to the weakness of the extension system in the region.

3.2. Frequency Distribution

From **Table 3**, it is clear that 53% of the researchers confirmed the absence of an

Table 1. Villages and the number of farmers and researchers.

Villages	Number of farmers	Number of researchers
Wawissi	3000	43
Geely	2520	36
Shmbat	1480	21
Total	7000	100

Table 2. Distribution of respondents according to knowledge about sources of information on pesticides.

Sources of information	Frequencies	%
Agricultural extension	9	9
Plant protection	5	5
Farmers' union	1	1
Friends	16	16
Pesticide dealers and companies	69	69
Research centers	-	-
Total	100	100

Table 3. The frequency distribution and percentages of the researchers with an extension office in their respective regions.

Extension office in the area	Frequencies	%
There's an office	47	47
There's no office	53	53
Total	100	100

extension office in their area, and 47% of the researchers confirmed the existence of an extension office in their area despite the importance of extension in raising awareness and providing services to farmers in various fields of vegetable cultivation, especially the correct methods of using pesticides.

3.3. Agricultural Guide

Through **Table 4**, it is clear that 81% of the researchers confirmed that the agricultural guide does not provide any assistance and does not visit them and there is no guidance program in the use of pesticides and 12% of the researchers confirmed that the agricultural guide visits and gives the necessary guidance due to their good relationship with the guide (friends).

3.4. Distribution of Respondents

From **Table 5**, it is clear that 93% of the researchers confirmed that pesticides are harmful, and this indicates their knowledge of the danger of pesticides, while 7% of the researchers confirmed that they are harmless and this indicates a lack of awareness of their seriousness and lack of guidance programs in their awareness of this. Similarly, **Table 4** shows the distribution of respondents with numeric values on their knowledge of the damage of pesticides. Most of them (93%) had a high level of knowledge. Researchers as in [10] also reported the risk of pesticides on the environment and public health in developing countries.

3.5. Precautionary Methods

Through **Table 6**, it is clear that 88% of the researchers reported that they do not use protective clothing despite their knowledge of the danger of the pesticide, and 12% of the researchers reported that they use it and this indicates their full

Table 4. The advice provided by the agricultural guide.

Type of assistance provided by the agricultural guide	Frequencies	%
Who visits and gives the necessary instructions in different field	12	12
Explains the types and use of pesticides	3	3
Offers extension bulletins	4	4
Who doesn't provide any help he doesn't visit them, and there's no guideline program in the use of pesticides.	81	81
Total	100	100

Table 5. Distribution of respondents according to their knowledge about the damage of pesticides.

Pesticide damage	Frequencies	%
Yes, pesticides are harmful.	93	93
There's no damage to pesticides.	7	7
Total	100	100

awareness of the danger of pesticides in the absence of wearing protective clothing and therefore it is necessary to implement programs awareness in this area.

While handling pesticides, preventive measures approved by farmers are presented in **Table 6**. A study was conducted on 502 farms that use pesticides in Minnesota. The USA it was observed that 95% of them realized the importance of wearing protective clothing or wears; 88% knew about exposure to pesticides could cause the potential damage; 56% were wearing protective gloves for chemicals and 22% wore gloves for other farm operations and 75% of the time during the process of pesticide application.

3.6. Distribution of Respondents According to Extension Methods

From **Table 7**, it is clear that 57% of the researchers confirmed that the extension methods used in the field of pesticides are radio and television programs. This indicates that other methods are few in use due to the lack of attention of the extension system to these aspects, which help raise farmers' awareness and ownership of the skill and use of the pesticide.

3.7. Frequency Distribution and Percentages of the Researchers

From **Table 8**, it is clear that 77% of the respondents confirmed that they had received assistance from friends and businesses in finding out the residual effect of the pesticide.

3.8. Extension Programs

It is clear from **Table 9** that 57% of the extension programs provided to farmers about pesticides are radio or television programs, which confirms that it is one

Table 6. Precautionary methods used when dealing with pesticides.

Use of protective clothing	Frequencies	%
Don't use it.	88	93
Use it sometimes.	12	7
Total	100	100

Table 7. Distribution of respondents according to extension methods.

Extension methods used in the field of pesticides	Frequencies	%
Field visits	10	10
Field demonstration	5	5
Seminar	9	9
Lectures	9	9
Radio and television	57	57
Extension bulletins	10	10
Total	100	100

Table 8. Frequency distribution and percentages of the researchers by who helped them to know the residual effects of pesticides.

Helpers to know the residual effect of pesticides	Frequencies	%
Agricultural extension	3	3
Protection	3	3
Agricultural research	-	-
Farmers' union	-	-
Commercial companies	38	38
Friends	39	39
Total	100	100

Table 9. Type of extension programs implemented in the field of pesticides.

Extension programs in the field of pesticides	Frequencies	%
Awareness programmers	22	22
Training in the field of type and use of pesticides	1	1
Field visits	5	5
Radio or television programmers	57	57
Extension seminar	5	5
No	10	10
Total	100	100

of the most common types of extension activity, and the least indicative activity used is dribbled and up to 1%, note that it is one of the most important types of programs. Extension can benefit the farmer and lead to an increase in his information and raise his abilities and change his behavior, which positively affects the knowledge and use of pesticides.

4. Conclusions and Recommendations

The study concluded that there are some problems facing pesticide users such as (health—dosing—disposal of pesticide utensils—lack of protective clothing). This could be due to the ineffectiveness of the extension system in this aspect and those who help; they know that the residual effect of the pesticide is commercials. The analysis also concluded that there is no role for agricultural extension in raising awareness and providing services to farmers in various fields of vegetable cultivation, especially the correct methods of using pesticides.

Based on the findings of the study the following recommendations are made: the study recommends the need for designing and executing extension. Programs on the proper and safe methods for pesticide handling and application are needed in the kingdom. Improvements in agricultural extension efficiency and better communication with farmers and between research centers need to be made. More emphasis should be placed on the sources that farmers rely on. Brochures and field visits as a means of sources of information have received

more attention in the extension programs. Farmers should be enlightened on the importance of the periodic check-up of their workers especially those who are dealing with pesticides.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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