



## RESEARCH PAPER

## OPEN ACCESS

## Agricultural Extension Worker Role in the Transfer of Garlic Production Technology: A Case Study of Balochistan Province, Pakistan

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### Abstract

The garlic production of local growers in Baluchistan, Pakistan, has the potential to be increased with the role of agricultural extension workers. Therefore, this study was organized with the aim to examine the agricultural extension worker role in the transfer of garlic production technology in the Ziarat District of Balochistan, Pakistan. The research data was performed in three villages of tahsil Sinjawi, namely Raigura, Giwari, and Ozlyze. The total number of sampled farmers were chosen from selected villages by the proportional allocation method. In terms of literacy rate, illiterate farmers accounted for 25% and literate for 75%. Farm size in the research area was evaluated in acres, and 25% were those having 1-5 acres of landholding. The outcomes indicated that 39% of growers grow garlic on 1-3 acres, followed by 27% on 4-6 acres. In the study area, solitary 40% of the farmers knew the extension department. While 60% were unaware, 27% of the growers stated extension workers visits as the sole source of information, whereas the remaining 29% of the farmers learned through mass media, and 44% of farmers already knew the extension department. A huge proportion of respondents, i.e., 82%, did not go to the extension office, while 18% seek guidance. It was concluded that the significant source of knowledge and awareness of garlic production for the majority of growers were fellows, relatives, farmers, and companions. Our study suggested that the agricultural extension department should facilitate their employees to regularly visit the fields, collaborate, and negotiate farmers' problems and requirements pertaining to garlic production.

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## Introduction

Pakistan is a big agricultural country with more than 70% of the population depends on agriculture, which is the pillar of Pakistan's economic development and growth. As an important sector of the economy, agriculture currently accounts for 18.5% of gross domestic product (GDP) and 38.5% of the country's workforce and contributes significantly to export revenue. It also adds to the growth of raw materials for the industry. Hence, agriculture has a significant impact on the growth of overall gross domestic production (GoP, 2019).

The economy of Pakistan relies on the agriculture sector. Agriculture is the primary source of income, but the income from agriculture is below individuals' purchasing power. However, most of the time, people notice that farmers are dissatisfied with production and revenue. As an agricultural country, Pakistan imports agricultural products from other countries. There are several causes for low yields, of which the transfer of the latest farming technologies and information to the farmers is of great importance (Khurshid *et al.*, 2017). According to the Food and Agriculture Organization of the United Nations, there are 6 million acres globally, and more than 25 million tons of garlic are produced each year. According to FAO's average-based report, garlic is grown in more than 100 countries around the world. Pakistan has become one of the top twenty garlic producers in the world. China ranks first in the world in garlic production, followed by India, Bangladesh, Egypt, South Korea, and Russia (Aziz *et al.*, 2018; Joyce, 2017).

In Pakistan, garlic production is on 7,882 hectares at the present stage, with 70,925 tons, and the average yield is 8.99 tons/ha. The prominent garlic producing province in Khyber Pakhtunkhwa (KPK), with an average output of 32,205 tons, followed by Punjab with 24,143 tons, Balochistan with 7,880 tons, and Sindh with 6,557 tons, respectively. Balochistan share, i.e., 7,880 tons, was less and low compared to other Pakistan provinces. In Balochistan, other regions also produce garlic, but 40% of the total garlic

production is contributed by the Sibi division, where the district Ziarat is the main garlic growing area (GoP, 2019). This problem can be solved by producing high-yielding garlic varieties on the mainland to fill the yield gap. The agricultural extension workforce is liable for delivering awareness, solving grower's difficulties, and technology transfer. Despite advantageous climate conditions, excellent soil, and irrigation water, the crop yields in the Balochistan province of Pakistan is still much lower than the yield achieved in other provinces.

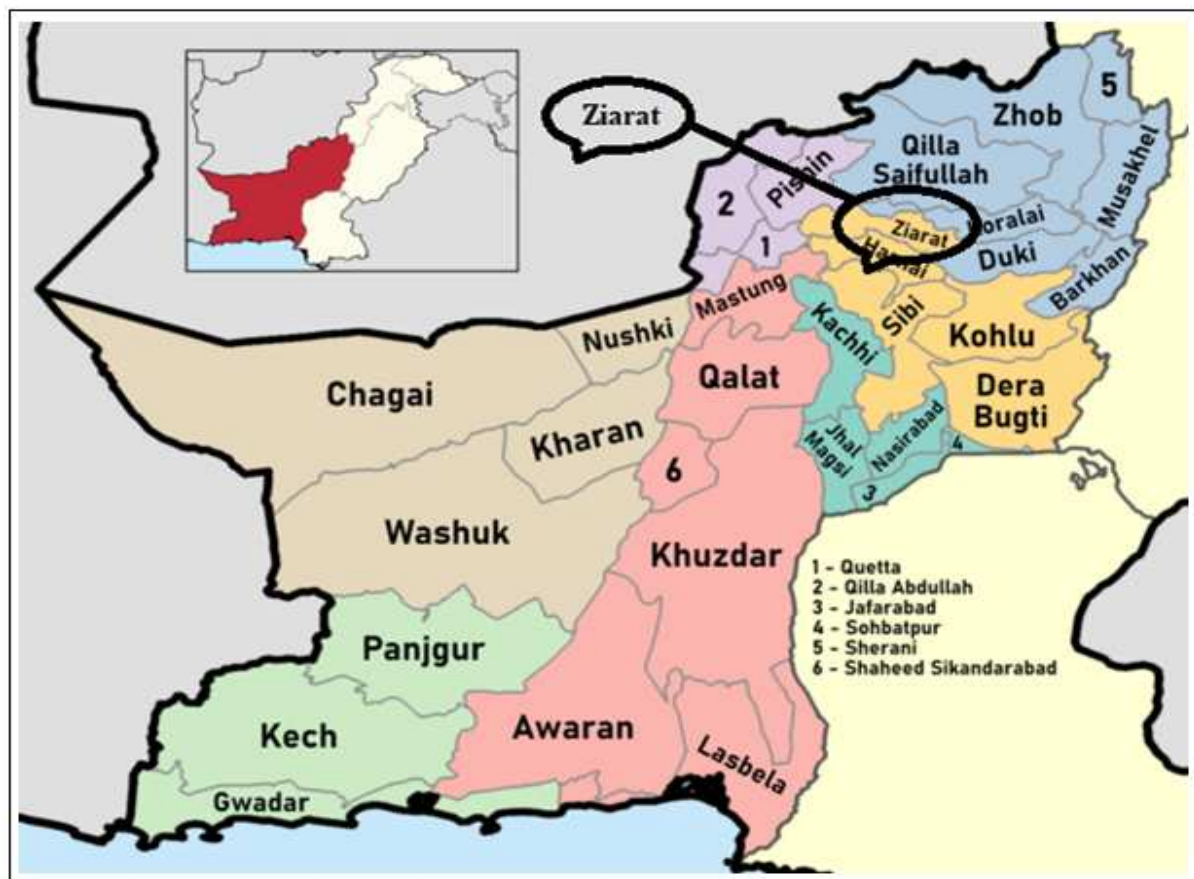
The possible unrealized enhancements in Balochistan crop yields maybe because the growers did not adopt complete sets of crop production knowledge or skills but are still following traditional practices. Farmers must be provided with suitable technology and the determination to adopt it. Therefore, it is important for national organizers and agricultural extension workers to understand the new technologies being used by farmers and the sources of better information applied. This standard of knowledge is critical to a strategic plan to enhance crop production.

The function and role of agricultural extension require to be redefined in the Balochistan province of Pakistan because growers do not often go to research or extension institutions and vice versa. Moreover, the growers acquire the necessary information from various sources, like, information and communication technologies (ICT's), fertilizer and pesticide companies, but with a business point of view. Therefore, to transfer new technologies and information related to agricultural production, extension workers' role is inevitable. Hence, this research was performed to investigate the agricultural extension workers role in disseminating the modern and appropriate farming techniques to farmers in relation to garlic crops with the objectives of; to assess the agricultural extension worker role in the transfer of garlic production technologies, to identify the connection of the farmers with agricultural extension workers in the study area, and to formulate the suggestions and recommendations for policymakers.

## Materials and methods

The present study was conducted in district Ziarat of Balochistan province, Pakistan. The district Ziarat has the potential to be one of the top garlic producing areas. The tehsil Sinjawi was selected because agriculture was the main occupation of most residents, and soil conditions also favored garlic production. Three villages of tehsil sinjawi, namely, Raigura, Giwari, and Ozlyze, were purposively selected due to many garlic farmers. A total of 120 farmers were randomly selected from 250 garlic producing growers in this research. We used the proportional allocation method to select 26 growers from Raigura, 41 growers from Giwari, and 53

growers from Ozlyze. The study was based on essential data collected via a prepared interview schedule. Before accumulating the raw data, a pilot survey was conducted, and the interview schedule was revised based on the garlic producers' response. The study also used secondary data gained from the agricultural extension department and other published and unpublished materials. The interview schedule was designed to covers all aspects of the research goals. Pre-tested to confirm validity and reliability, and add, omit related and irrelevant questions, respectively. The collected data was analyzed using SPSS v.20. Real outcomes are expressed as counts and percentages.



**Fig. 1.** Map of Balochistan Province Showing the Sampled District.

## Results

### *Demographic Characteristics of the Respondents*

The information in Fig. 2 revealed that 17% of the farmers were 25 years old, and 25% of the farmers were between 26-35. In the 36-45 age group, there were 34% of farmers, while 25% were in the above 45 age group. The farmers' education levels were asked

by asking questions about their education status and given in Fig. 2. The findings revealed that uneducated growers accounted for 25%, while only 17% of educated growers were up to the primary level, 19% up to the middle, followed by 13% up to metric, 11% up to intermediate, and 16% were graduates and above. The number of families is divided into four

groups, namely 1-3, 4-6, 7-10, and 10 or more (Fig. 2). The largest number of farmers (i.e., 41%) belonged to the 7-10 members, followed by 36% belonging to the

4-6 members group. In groups 1-3, there were 11% of the respondents, while 12% of the respondents were families with more than ten households.

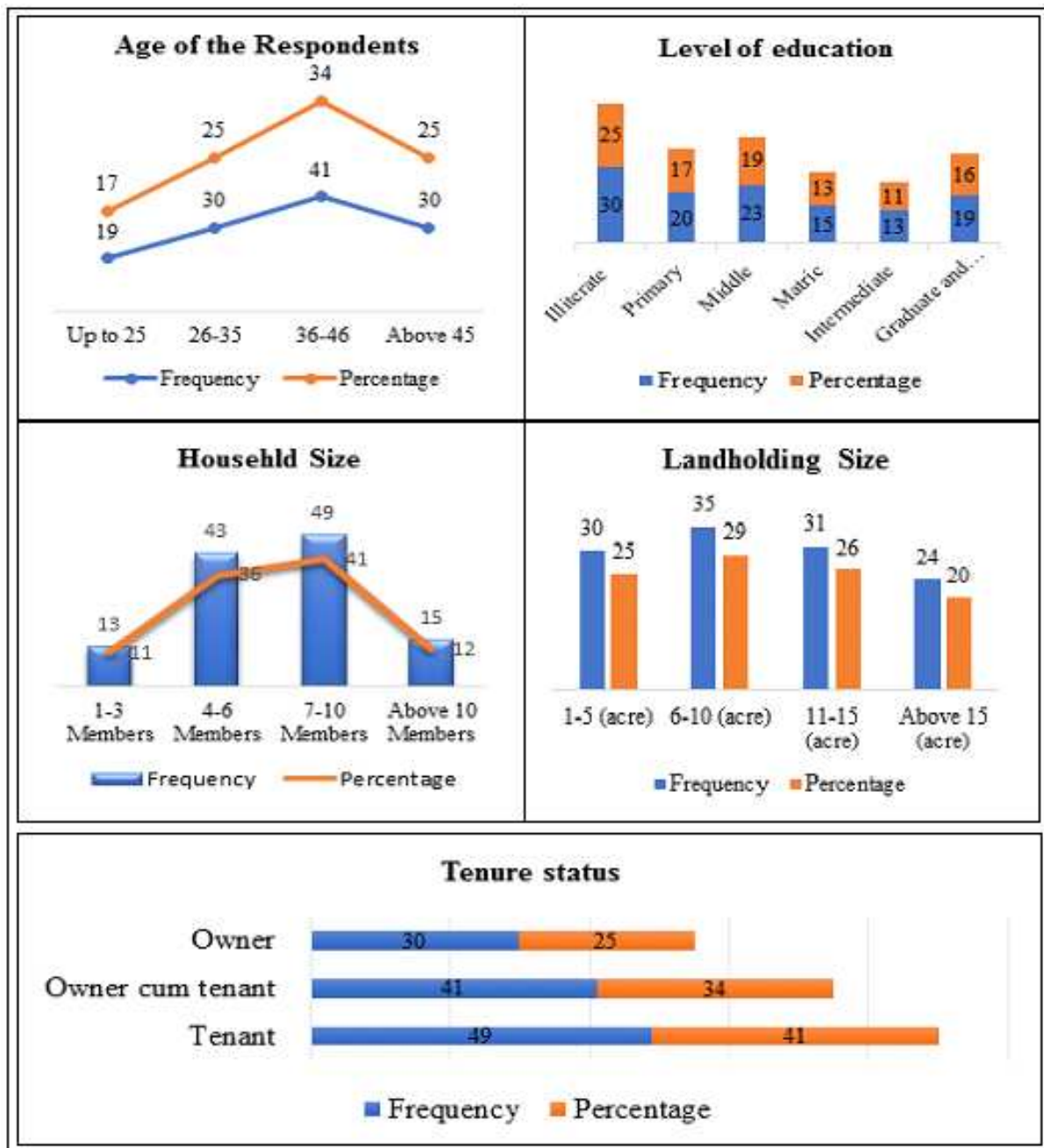


Fig. 2. Demographic characteristics of the respondents.

The field size of the growers was also checked in the field survey. The findings were demonstrated in Fig. 2. Farm size is measured in acres, of which 25% of farmers were those who own 1-5 acres of land, 29% of farmers were 6-10 acres, and 26% of farmers own 11-15 acres. These results are like those of (Aziz *et al.*, 2018), which stated that most growers are small

farmers (60%) and report smaller lands than one acre. The findings further demonstrated that in the survey area, the largest number of farmers (41%) were tenants, Fig. 2 indicated that 36% of the second majority of farmers were owners and tenants, while 25% were owners who own their land. Most growers (41%) were tenants, which implies that most growers

in the research zone do not cultivate their own land. Owners who cultivate land through tenants have not shown enough interest in land management and

farming as their part-time job. Also, they are not interested in the problems that tenants encounter in field activities.

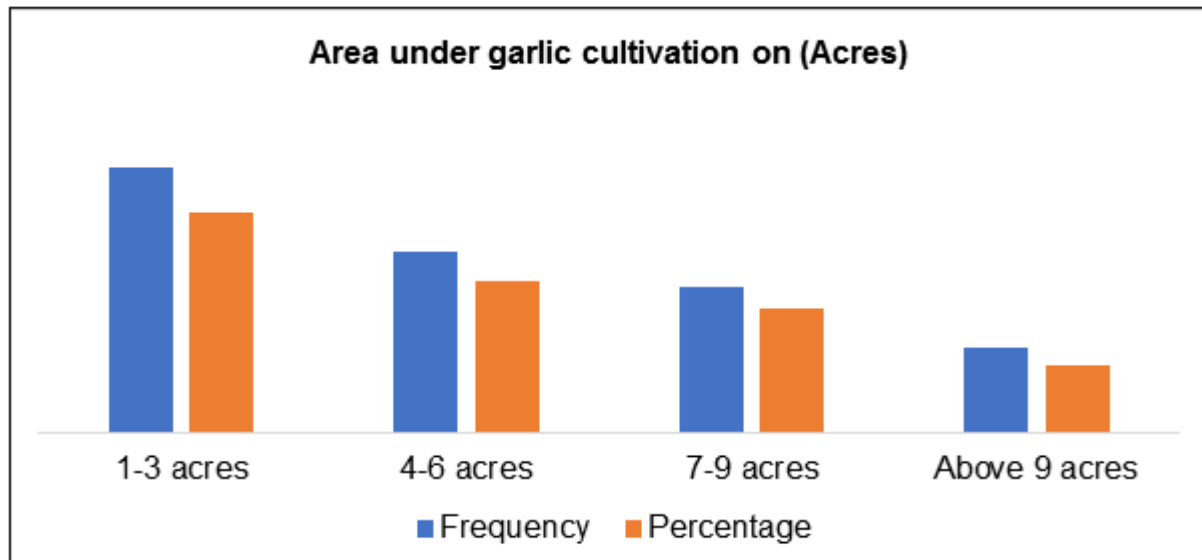


Fig. 3. Distribution of the growers about the area under garlic.

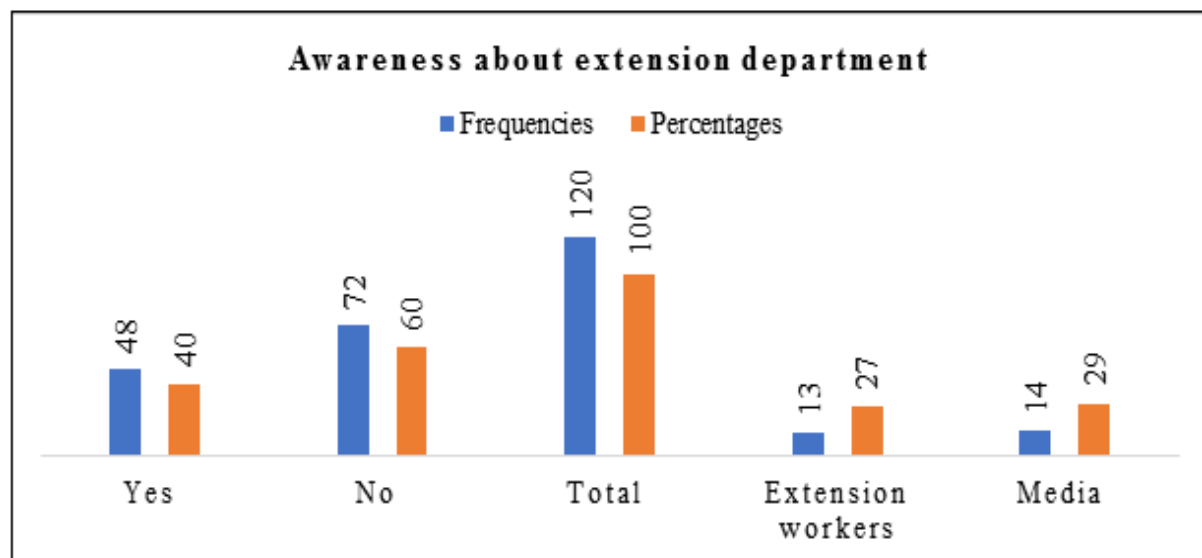


Fig. 4. Distribution of farmers regarding awareness about extension department.

*The area under garlic cultivation*

Fig. 3 indicates the results of garlic-growing land, which shows that 39% of farmers grow garlic on 1-3 acres, 27% on 4-6 acres, and 22% on 7-9 acres, while only 12% were those who grow garlic on more than 9 acres.

*Awareness regarding the extension department*

Fig. 4 shows that only 40% of the farmers were informed regarding the extension department in the

research area, while 60% did not know about the extension department. Most of the growers were unaware regarding the department of extension, which is not a better sign for the advancement of agriculture production.

Serious attention would need to be paid to provide growers with suitable agricultural technology. The information further indicated that 27% of the grower's source of information regarding the

agricultural extension department was due to extension workers' visits, 29% were educated through the mass media, and 44% were due to growers'

companions knowing the extension department. Due to the friends and relatives' growers, most farmers know the extension department.

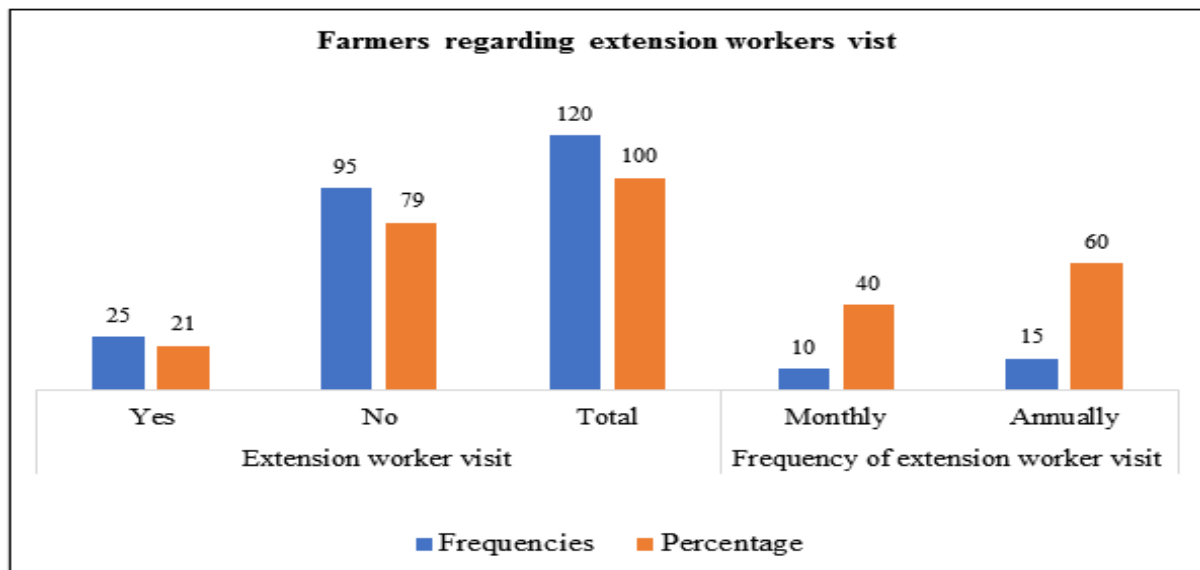


Fig. 5. Distribution of farmers about agricultural extension worker visit.

*Farmers opinions about agricultural extension workers*

The findings revealed in Fig. 5 that 21% of the farmers stated that the agents had visited them, whereas most (79%) reported that the workers did not visit them.

This indicates that in the research area, the extension staff was unable to perform their responsibilities correctly. Their activities and duties were awful. Besides, it is insufficient for extension workers to visit growers alone, but it requires regularity.

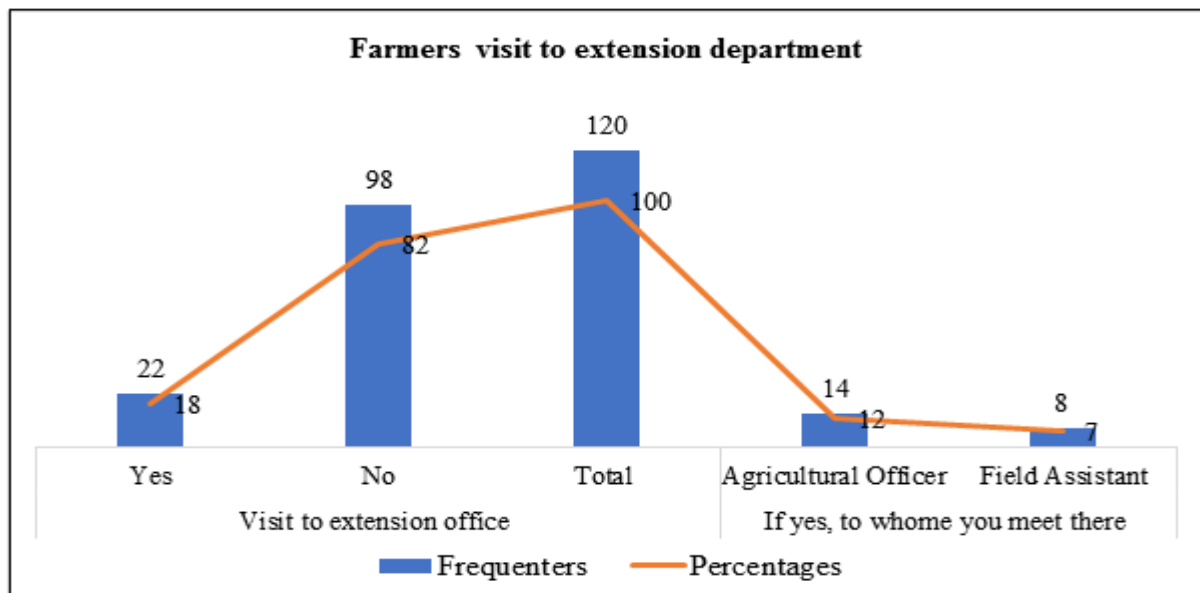


Fig. 6. Distribution of farmers about their visit to the extension department.

They also asked how often the extension workers visited them. The findings in Fig. 5 indicate that there were no weekly and daily visits in the study area that

require extension staff. Furthermore, out of 25 farmers, who stated that extension workers visited them, 40% responded that they visited them monthly,

but 60% once every year.

This showed the unsatisfactory performance of agricultural extension worker visits in the research area. Most similar results were reported by (Kamal *et al.*, 2014) who stated that only 20% of the

respondents were aware regarding agricultural extension workers.

Our results are also confirmed by (Ali *et al.*, 2011) indicated that 80% of respondents have no concept regarding agricultural extension workers.

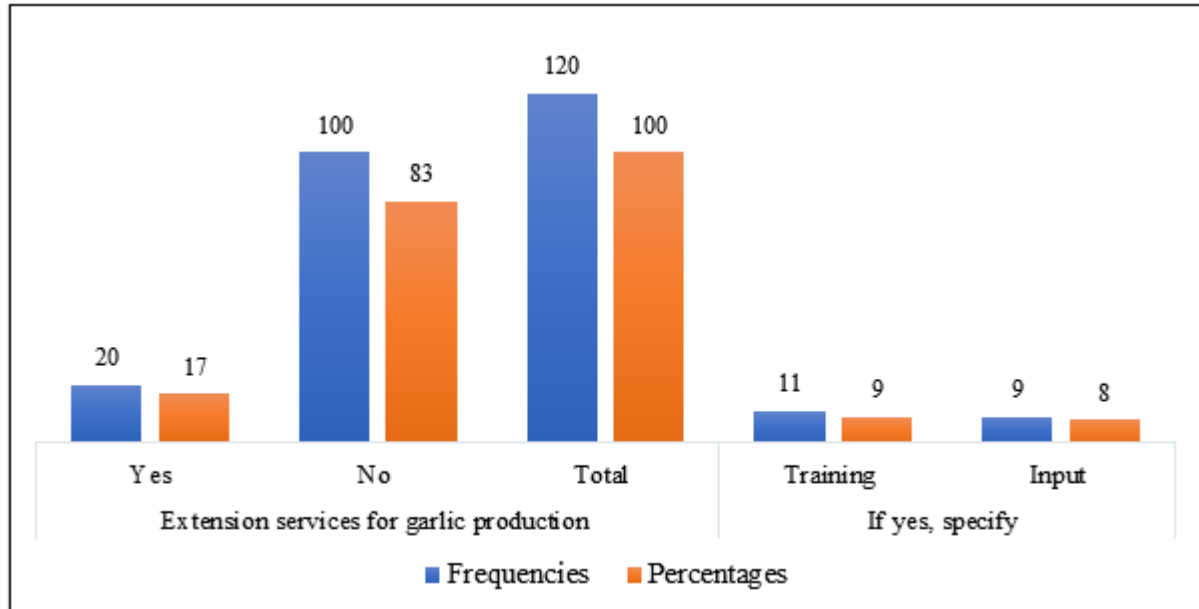


Fig. 7. Extension services for garlic field.

*Farmers visits to the agricultural extension office*

The situation of farmers visiting the extension office for help was investigated, and their opinions are listed in Fig. 6. Most farmers (82%) did not visit the agricultural extension department for help, whereas

18% visited. Those who visited the agricultural extension office were asked whom they met in the offices. Up to 12% of the farmers answered that they met with agricultural officials, while 7% met with field assistants.

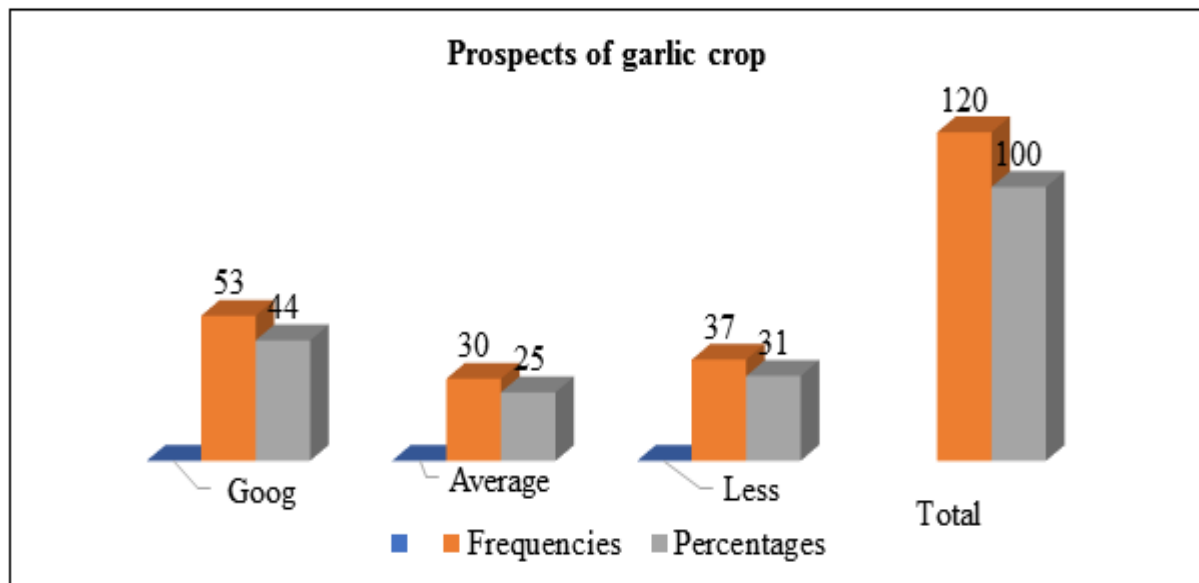


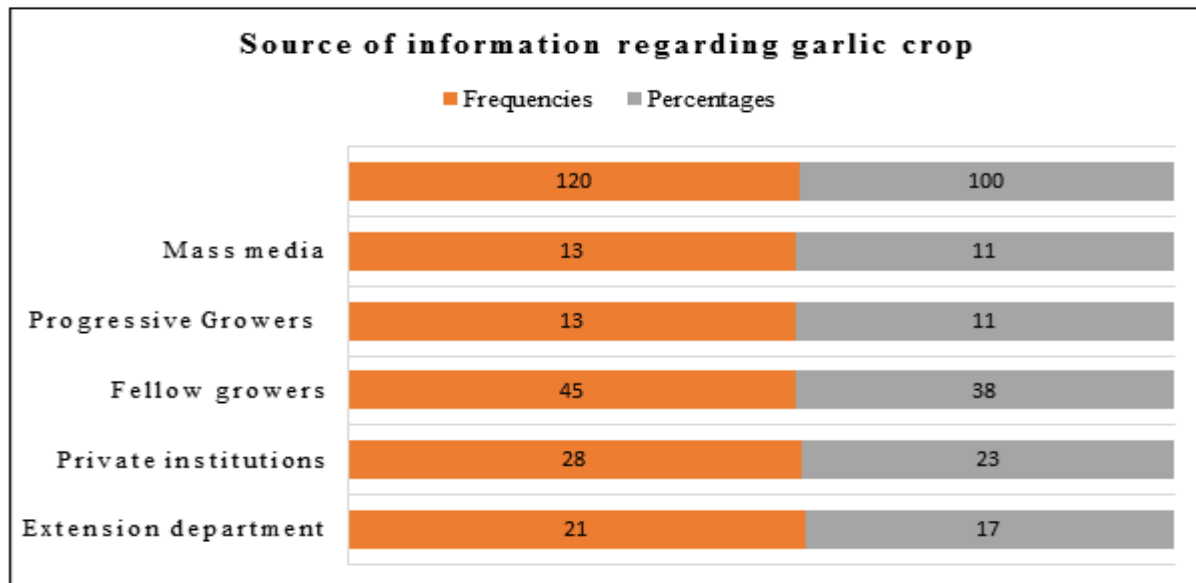
Fig. 8. Distribution of farmers about prospects of the garlic crop.

The lower percentages of visited farmers indicate that most farmers did not go to the extension office for help.

*Extension services for garlic field*

Fig. 7 inquires the interviewees about the extension services provided by the extension department. The findings revealed that only 17% of the farmers received garlic crop services from the extension

department, and 83% did not receive any services. However, the growers who received extension services were inquired regarding the type of extension services they gained; 9% answered that they received training and 8% responded that they received input from the extension department. Most growers reported that they had not received any help from the department. This shows the poor performance of the extension department.



**Fig. 9.** Distribution of farmers regarding an adopted variety of garlic crop.

*Prospects of the garlic crop*

Farmers are engaged in agricultural activities, and they have a thorough awareness of the farming activity scenarios and the scope of crops in their farming area. Garlic is one of the vital crops which provide significant income. Likewise, questions were asked about the scope of garlic cultivation in the research area from each interviewee. Their answers were reported in Fig. 8, which demonstrated that 44% of the farmers believe that the future scenarios of the garlic crop are better, 25% were of the opinion that the future prospects are average, and 31% stated that the prospects for garlic crops are less. These findings suggested that the prospects of garlic crops are excellent.

*Source of information regarding an adopted variety of garlic*

Fig. 9 indicates that 17% of the farmers stated that

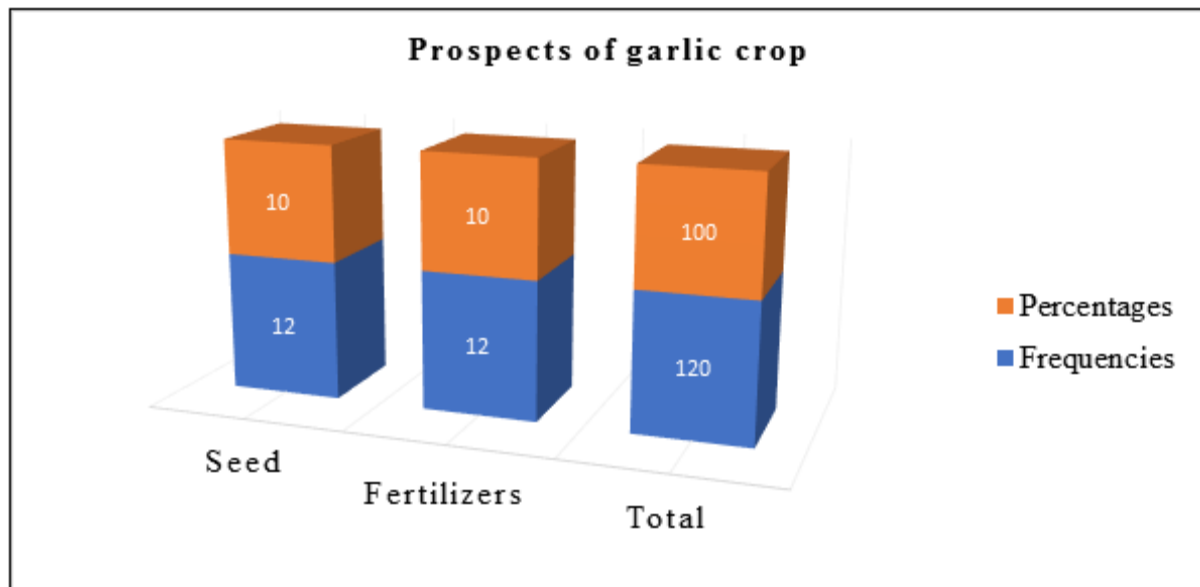
they had learned regarding the adopted varieties from the extension department, while 23% of the growers had realized from the private sector, and 11% of the growers were progressive growers and the media.

A large percentage of 38% learned regarding the adopted varieties from their colleague growers.

*Provision of inputs through the agricultural extension department*

The findings revealed that 10% of the growers received seeds from the office of the extension while 10% obtained fertilizer from the agricultural extension office, and most of the growers (80%) received no inputs from the agricultural extension office (Fig. 10). Additionally, most growers stated that they did not obtain any inputs from agricultural extension and research institutes because they do not provide such facilities.





**Fig. 10.** Distribution of farmers about the provision of inputs via the extension department.

### Conclusion and recommendations

From the current research, it can be concluded that most of the farmers were adults with low education levels and had a small piece of land. Compared with other crops, growers were more motivated by garlic because of their high yield and income. It can be concluded that the department did not fulfil their responsibilities, as more than half of the growers did not have information about the extension department. Extension staff did not visit farmers regularly, which led to a decline in farmers' trust in the extension department. Besides, farmers' visits to extension departments were also unsatisfactory. Colleague or relatives' growers were the primary source of information about garlic crop. It was further concluded that no inputs were delivered to growers under the Farm Service Centre's services.

Agricultural extension departments should organize regular training for growers to keep them informed about the latest agricultural technologies and to improve and empower the management of garlic crops. Extension staff should visit growers often to build trust and solve difficulties of growers' regrading farming. Efforts should be made to ensure that timely inputs are provided at satisfactory prices. Sales facilities should be provided for growers so that they can get the most profit from their products. The government should ensure the availability of

numerous essential inputs at an appropriate time with reasonable prices. Credit services would be organized for non-interest farmers.

### Conflict of interest

All authors declare no conflict of interest regarding this article.

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