FARMER'S ASSESSMENT OF EXTENSION WORKERS EXPERTISE IN ENHANCING CITRUS PRODUCTION IN NANGARHAR PROVINCE-AFGHANISTAN

SALAHUDDIN HIDAYAT[1], MUHAMMAD ZAFARULLAH KHAN[1] & AYESHA KHAN[1].

Department of Agricultural Extension Education and Communication, The University of Agriculture Peshawar, Khyber Pakhtunkhwa-Pakistan.

Corresponding author: Salahuddin Hidayat

ABSTRACT

Agricultural Extension services serves are essential for citrus growers to increase the citrus production of the farming communities for improving their socio economic conditions for discouraging the illegal immigration of Afghanistan's youth. The current research study was carried out to analyze the farmers' perception about expertise of extension workers in enhancing citrus production in Nangarhar Province-Afghanistan. Nangarhar Province was universe of the study and multi stage sampling technique was used to draw the required sample. Nangarhar is comprised of 22 Districts where District Bati Kot was purposively selected at stage I. Five villages out of 12 were selected on basis of citrus cultivation. A list of 200 citrus growers was obtained from Agriculture Extension Department. For data collection 60% of the citrus growers were sampled by following proportional allocation technique at villages level gave us 120 respondents. A pretested interview schedule was used to collect primary data which was analyzed through SPSS and results were presented as counts and percentages. Moreover, rank order, mean and standard deviation was used for association the extension workers' expertise, while chi-square test was used to find the association between different variables. The empirical results shows that 31.7% of citrus growers in the study area were in the age of 40-50 years, 66.7% citrus growers had small land holdings of 1 to 6 acres, with 39.2% of them had citrus growing experience of 6-10 years. About 45.8% citrus growers obtained citrus yield ranging from 3001 to 6000 kg/acre. About 53.3% citrus growers reported that the extension field staff did not visit their farms while 20% reported their visits once in a year. About 60.8% respondents reported the availability of extension services in the study area and 38.3% citrus growers availed the trainings. The ranking skills of extension workers as per citrus growers' point of view were the skills of extension workers in picking of citrus was forecasting maturity and yield which was ranked 1ˢᵗ with highest mean 3.467 and standard deviation 1.099. The findings revealed highly significant association between average yield of citrus and skills of extension workers in plant protection for citrus fruits. It is concluded that majority of the citrus growers were illiterate and were not satisfied from agriculture extension staff. The study recommends that extension workers may visit citrus producers' orchards on regular basis to give basic knowledge about new profitable citrus production practices to improve the socio-economic conditions of the citrus growing community by improving their citrus production on sustainable basis.

Keywords: Assessment, extension workers, expertise, citrus production

INTRODUCTION

Agriculture extension serves as the bridge between agriculture researchers and the farming communities by sharing and demonstrating the innovative technologies to the farmers' fields for enhancing their production and income through scientific farming (Suvedi *et al*., 2017). Agriculture is the most important part of the world's poorest nations' economy like Afghanistan. Most of Afghans' economic output comes from agriculture, so mostly Afghanistan's economy is based on agriculture sector. Afghanistan's agriculture sector accounted for around 22% of the Gross Domestic Product (GDP) in 2023 and more than 60% of workforce that depend on agricultural sector as well as 70% of rural residents depend on it for their living (Sarwary *et al*., 2023). Citrus fruit is an important ever green fruit tree of Rutaceae family which is grown in both tropical and sub-tropical areas of the world (Aruoma *et al.*, 2012). The world's largest grower of citrus fruit is China by producing 44.6 million tons of citrus fruit in 2020, or 28.07% of the total citrus fruit production worldwide. The top 5 nations make up 59.15% of it (the other 4 being Brazil, India, Mexico, and the United States of America) (Knoema, 2021). In 2020, Afghanistan exported $1.93M in citrus, making it the 75th largest exporter of citrus in the world. At the same year, citrus was the 32nd most exported product in Afghanistan. The main destination of citrus exports from Afghanistan are: Pakistan ($1.56M), Kazakhstan ($244k), Senegal ($102k), Tajikistan ($17.5k) and Canada (S10.5k). The fastest growing export markets for citrus of Afghanistan between 2019 and 2020 were Pakistan ($l.16M), Kazakhstan ($244k) and Senegal ($74.2k), Afghanistan imported $56.9M in Citrus, becoming the 47th largest importer of citrus in the world. At the same year, citrus was the 25th most imported product in Afghanistan (OEC, 2020).

Even though, government and non-government organizations have been conducting various programs for improving citrus production in the area, resulted in more profit for farmers but still they didn't get enough citrus production from their orchards. In this study main obstacles and problems of farmers were investigated that are faced regarding citrus production in the study area as well as to know the problems about extension activities. This study will be more helpful to the farmers of citrus production for getting enough yields from their orchards to improve their socio-economic conditions and standard of living by considering that the job of agriculture extension agents are not simply to inform and educate citrus growers for proper orchards pattern by preparing their lands for citrus orchards but also to disseminate modern technology and suitable varieties of citrus along with their motivation for adoption of improved methods. This is the first project regarding citrus production in Nangarhar Province which needs thorough awareness among the farming community to encourage other farmers for citrus production. One of the major causes of low adoption of citrus production technology among the farming community is lack of information and expertise about seasonal needs, awareness about new technology and varieties, marketing strategies and subsequently their actual use in the production of citrus. In order to better understand the relationship between farmers and extension workers for enhancing citrus cultivation in District Bati Kot, the present research was carried out for identifying the socio-economic features of the citrus growers and their perception about the capabilities of extension workers in citrus production. The study's findings will help to provide recommendations and suggestions for enhancing citrus production in the future. Furthermore,

this research will assist planners and policy makers in the future for improving citrus production in the study area through better decision-making.

Objectives

The study has the following objectives:

1- To know the socio-economic characteristics of citrus growers.
2- To find out the farmers' perception about extension workers' expertise in enhancing citrus production in the study area.
3- To give policy recommendations for further improvement.

MATERIALS AND METHODS

The universe of the present study was Nangarhar Province-Afghanistan in December, 2022. Multi Stage Sampling Technique MST was utilized to draw the required sample (Cochran, 1977). At stage I, out of twenty two Districts of Nangarhar, Bati Kot was selected purposively based on citrus cultivation. Bati Kot consists of 12 villages, out of these 5 villages were purposively selected due to citrus cultivation at stage II. For selection of respondents at village level, a list of citrus growers was obtained from Agriculture Extension Department, which comprised of 200 citrus growers in the selected villages. Proportionate allocation technique was used to select 60% of the citrus growers for data collection, giving a total of 120 respondents. For collection of data, a well-developed interview schedule was used which was prepared in English but the interviews were conduct in local language "Pashto". Obtained data was analyzed using SPSS, results were presented in frequencies/counts and percentages. While Chi-square test was used to find association between different variables whereas, likert scale and rank order were used to assess the expertise of extension worker's capabilities regarding citrus production.

RESULTS AND DISSCUSION

Socio-Economic Characteristics of the Citrus Growers

Age of the Citrus Growers

Age plays a significant role in both the ability to learn and comprehend new knowledge and skills along with problem-solving. Those who are older have more experience, with less physical strength than those who are younger in age. According to several reports, people in their early 20s, are more receptive to novel concepts. Several researches has reported that there is a strong relationship between adoption of innovations and age (Afsar and Idrees, 2019).Table 1 shows that 31.7% of the citrus growers in the study region were in the age of 40-50 years, 25% of the citrus growers were in the age of 31-40 years, 20% respondents were found to have above 50 years age and 18.3% respondents were in the age of 21-31 years. Whereas only 5% of citrus growers were found under the age of 20 years. It is clear that the age of majority citrus growers were between the ages of 40 to 50 years. Age has a significant impact on modern farming practices which are adopted or rejected. Younger people are more willing to adopt and use innovations (Okwu *et al*., 2007). As compared to older generations who take longer time for acceptance of new technology (Agwu *et al*., 2008). Our results are similar with Okwu *et*

al.(2007) who told that maximum are older having age of 40-50 year who were reluctant to adopt modern technologies in the study area.

Literacy Status

Education is regarded as the most important pillar in the growth of nations. Over 90% of people in industrialized countries are literate. Illiterate farmers are less likely to accept new technology because it is difficult to convince them while, literate farmers easily and quickly adopt modern methods (Sanaullah *et al*., 2020). Education may have an impact on a person's willingness to adopt better farming techniques. An educated person is more likely to stay abreast of the most recent facts and is therefore, regarded to be more aware of agricultural breakthroughs and to approach farming practices more scientifically (Aziz *et al*., 2018). Table 1 shows that 55% respondents in the study area were found illiterate and remaining 45% were literate. Among literate, 20% were having primary level of education, 12.5% respondents had middle level of education, 8.3% respondents had matric level of education whereas and about 4.2% of the respondents were educated till intermediate level. These findings are consistent with Doudyal (2006) who found an overwhelming majority (97%) of the respondents as illiterate in his study area.

Land Holding

The farmers' size of land holding varies significantly because some citrus growers only have a low acreage of land available for growing citrus trees. They rarely sell their harvests due to their low production because of their limited land specified for citrus orchards and they mostly use these farm products for their own needs and requirements. Small landowners have less interaction with extension agents and are less likely to incorporate contemporary cultural practices into their farming while, farmers with larger landholdings are often thought to be more enthusiastic about adopting innovations (Ajayi *et al*., 2000). They have more access to agricultural knowledge than small land holders (Chaudhary, 2006). Data in Table 1 revealed that 66.7% participants had small land holdings of 1-6 acres, 8.3% farmers had 13-18 acres of land, and 11.7% respondents had land holdings of more than 18 acres while, 13.3% of the respondents owned between 7-12 acres of land. These results are consistent with those of Safdar (2005), who found that the majority (60%) of farmers had small land holdings of less than an acre for tomato cultivation. This might be due to diversification in the crop and country.

Farming Experience of Citrus Growers

Citrus crops are common to farmers' they have been growing them for years. Citrus fruits are widely cultivated for their juice which is consumed as fresh or used in various food and beverage products. They are also used in the production of essential oils, which have various industrial and medicinal applications. Data presented in Table 1 shows that 39.2% citrus growers had citrus farming experience of 6-10 years and 9.2% had experience of above 12 years. About 23.3% citrus growers had experience of 1-5 years and 28.3% citrus growers had experience of 11-12 years in the citrus cultivation. Overall analysis showed that almost 67% citrus growers have cultivation experience of 6-12 years while minimum (9.2 %) have above 12 years of cultivation

experience in citrus. Our results are dissimilar to Saddam (2021) as he revealed that 11-15 years tomato cultivation experience was recorded by majority in District Peshawar, Khyber Pakhtunkhwa- Pakistan which might be due to the fact that tomato is being cultivated since long as per need of every home.

Table 1　　　　　*Socio-Economic Characteristics of Citrus Growers*

Age (in years)	Frequency	%	Literacy status	Frequency	%
Below 20	6	5.0	Illiterate	66	55.0
21-31	22	18.3	Primary	24	20.0
31-40	30	25.0	Middle	15	12.5
40-50	38	31.7	Matric	10	8.3
Above 50	24	20.0	Intermediate and above	5	4.2
Total	120	100	Total	120	100
Landholding Size (in acre)	Frequency	%	Farming experience (in years)	Frequency	%
1-6	80	66.7	1-5	28	23.3
7-12	16	13.3	6-10	47	39.2
13-18	10	8.3	11-12	34	28.3
Above 18	14	11.7	Above 12	11	9.2
Total	120	100	Total	120	100

Source: Field Data 2022
Parentheses showing the percentages

 Average Yield of Citrus Fruits

Citrus is one of the widely grown fruit and major source of income of the farmers of District Bati Kot in Nangarhar Province of Afghanistan. The data given in Table 2 shows the averaged citrus yield of citrus growers. The outcomes revealed that majority (45.8%) citrus growers were getting yield of 3001-6000 kg/acre and least number (11.7%) of citrus growers were getting average yield of above 8000 kg/acre. The data further revealed that 25% of the citrus farmers were getting only 3000 kg/acre and 17.5% of the respondents were those who were getting average yield of citrus from 6001-8000 kg/acre.

Table 2　　　　*Distribution of the Citrus Growers regarding Average Yield of Citrus Fruits*

Villages	Average yield of Citrus (Kg/Acre)				
	Up to 3000 (%)	3001-6000 (%)	6001-8000 (%)	above 8000 (%)	Total
Ghaze Abad	8(6.7)	12(10)	7(5.8)	3(2.5)	30
Shab Diyani	4(3.3)	14(11.7)	4(3.3)	2(1.7)	24
Lowarty	6(5)	8(6.7)	6(5)	4(3.3)	24
Anbar Khana	5(4.2)	11(9.2)	3(2.5)	2(1.7)	21
Barekab	7(5.8)	10(8.3)	1(0.8)	3(2.5)	21
Total	30(25)	55(45.8)	21(17.5)	14(11.7)	120

Source: Field Data 2022
Parentheses showing the percentages

Frequency of Extension Workers' visits to the Citrus Orchards of the Citrus Growers

For the farming community to become more aware of modern scientific tree cultivation, the visits of extension workers from the agricultural extension department are crucial. The main objective of extension personnel is to inform farmers about the different challenges who are faced by the citrus growing community in their citrus farms. The data presented in Table 3 shows that 53.3% citrus growers were not visited by extension workers, while 46.7% citrus growers were paid visits by extension workers as per citrus growers' statements. Regarding frequency of visit to their field 20% growers replied that extension workers visited annually while only 6.7% pointed out weekly visits by extension workers. About 10.8% of the citrus growers revealed that extension workers visited their orchards upon their personal requests, while 9.2% citrus growers were paid monthly visits by extension workers. The data clearly indicates that frequency of visits was poor in the study area. According to Ali *et al*., (2011) majority of the respondents replied that mostly extension personnel visited to farmers' fields on yearly basis which shows that our results are at par with their findings.

Table 3   *Distribution of Citrus Growers regarding Extension Workers' Visits to their Orchards*

Villages	Frequency of Extension Workers' Visits						
	Yes (%)	No (%)	Frequency of Visits				Total
			Weekly (%)	Monthly (%)	Annually (%)	Upon request (%)	
Ghaze Abad	18(15)	12(10)	3(2.5)	4(3.3)	8(6.7)	3(2.5)	30
Shab Diyani	13(10.8)	11(9.2)	2(1.7)	1(0.8)	6(5)	4(3.3)	24
Lowarty	11(9.2)	13(10.8)	1(0.8)	3(2.5)	5(4.2)	2(1.7)	24
Anbar Khana	6(5)	15(12.5)	1(0.8)	1(0.8)	2(1.7)	2(1.7)	21
Barekab	8(6.7)	13(10.8)	1(0.8)	2(1.7)	3(2.5)	2(1.7)	21
Total	56(46.7)	64(53.3)	8(6.7)	11(9.2)	24(20)	13(10.8)	120

Source: Field Data 2022
Parentheses showing the percentages

Availability of Extension Services

To improve crop and fruit output, the department of agriculture extension offers guidance and assistance to the farming community especially to the citrus growers. Through following the extension department's recommendations, farmers are expected to receive high yield of production. Data in Table 4 indicates that about 39.2% citrus growers did not get any assistance

from extension department for their citrus orchards, whereas 60.8% respondents availed the assistance of extension department in various forms like trainings, inputs and field days or lecture. Results showed that 38.3% citrus growers received the trainings in citrus production, 11.7% received inputs while 10.8% of them attended field days/lectures.

Table 4   *Distribution of Citrus Growers regarding Availability of their Extension Services*

Villages	Yes (%)	No (%)	Total	Agricultural Extension Services for Citrus Production			Total
				Trainings (%)	Inputs (%)	Field days or Lectures (%)	
Ghaze Abad	24(20)	6(5)	30	16(13.3)	4(3.3)	4(3.3)	24
Shab Diyani	16(13.3)	8(6.7)	24	9(7.5)	3(2.5)	4(3.3)	16
Lowarty	14(11.7)	10(8.3)	24	7(5.8)	4(3.3)	3(2.50	14
Anbar Khana	11(9.2)	10(8.3)	21	9(7.5)	1(0.8)	1(0.8)	11
Barekab	8(6.7)	13(10.8)	21	5(4.2)	2(1.7)	1(0.8)	8
Total	73(60.8)	47(39.2)	120	46(38.3)	14(11.7)	13(10.8)	73

Source: Field Data 2022
Parentheses showing the percentages

 Farmers' Perception Regarding the Skills of Extension Workers in Plant Protection

Protection of fruit plant means the control of diseases, pests and weeds along with their proper measurement which are used in agriculture for prevention and elimination of the damages done to plants by harmful creatures. It is also important to have knowledge about pest, disease, and insect identification, as suggested by (Rafea, 2010). Analysis of data in Table 5 shows ranking of skills regarding plant protection measures of agricultural extension workers' skills as per citrus growers' point of view on basis of mean (M) and standard deviation (SD). Symptoms of major insects/ pest identification and infestation of causes of disease to citrus plants was ranked first with highest mean value 3.325 and SD 1.146 and selecting the economical methods of pest control was ranked second with the mean value of 3.025 and SD 1.240. The knowledge of diversified environment effects of pesticide was ranked third with the mean value of 2.692 and SD 1.228 and identification of various life stages of citrus insects was ranked fourth with lower mean value of 2.450 and SD 1.346. Biological control knowledge of pests was ranked at last with the lowest mean value of 2.158 and SD 1.167. Our results are almost similar to that Saddam (2021) who revealed that symptoms identification of insect/ pest infestation and the cause of disease was ranked 2nd by the tomato growers in the study area of District Peshawar, Khyber Pakhtunkhwa-Pakistan.

Table 5   *Farmers' Perception regarding Extension Workers Skills in Plant Protection Measures of Citrus*

Skills regarding Plant Protection	1	2	3	4	5	Mean	S.D	Ranks
Symptoms of major insects/ pest identification and infestation of causes of disease to citrus plants	10(8.3)	15(12.5)	41(34.2)	34(28.3)	20(16.7)	3.325	1.146	I
Selecting the economical methods of Pest control	18(15)	21(17.5)	36(30)	30(25)	15(12.5)	3.025	1.240	II
Knowledge of diversified Environment effects of pesticide	25(20.8)	29(24.2)	34(28.3)	22(18.3)	10(8.3)	2.692	1.228	III
Identification of various life stages of citrus insects	40(33.3)	28(23.3)	21(17.5)	20(16.7)	11(9.2)	2.450	1.346	IV
Biological control knowledge of pests	45(37.5)	33(27.5)	26(21.7)	10(8.3)	6(5)	2.158	1.167	V

Scale: 1= Very Low 2= Low 3= Medium 4= High 5= Very High   S.D= Standard Deviation

Perception of Citrus growers regarding Extension Workers' Skills in Picking of Citrus Fruits

Important process in citrus fruits is picking which needs proper attention for ensuring the best quality of fruits to be harvested. The proper and best time of citrus fruits' picking is when they are fully ready and have reached to their ripe with optimal flavor and texture. The ripening of citrus fruits will continue after they are picked which needs to be stored at room temperature until they are fully ripe. Analysis in Table 6 shows ranking skills of extension workers about picking of citrus fruits from citrus growers' point of view on the basis of their mean and standard deviation. Skills of forecasting maturity and yield was ranked 1st with highest mean 3.467 and standard deviation 1.099. Moreover, proper time judgment for picking of citrus fruits was ranked 2nd with the mean value of 3.042 and standard deviation 1.184. Picking techniques and tools were ranked 3rd with the mean value of 2.475 and standard deviation 1.107 and collecting and processing of citrus fruits were ranked at 4th with lowest mean value of 1.942 and standard deviation 0.853. This reveals that forecasting about maturity and yield of citrus fruit is the basic God gifted skills of extension workers which is always appreciated by the citrus growers.

Table 6   *Perception of   Citrus Growers about Extension Workers' Skills in Picking of Citrus Fruits*

Skills regarding Picking of Citrus	1	2	3	4	5	Mean	S.D	Ranks
Forecasting maturity and yield	7(5.8)	16(13.3)	31(25.8)	46(38.3)	20(16.7)	3.467	1.099	I
Judging proper time for picking	15(12.5)	21(17.5)	43(35.8)	26(21.7)	15(12.5)	3.042	1.184	II
Picking techniques and tools	27(22.5)	37(30.8)	31(25.8)	22(18.3)	3(2.5)	2.475	1.107	III
Collecting and processing of citrus	41(34.2)	50(41.7)	25(20.8)	3(2.5)	1(0.8)	1.942	0.853	IV

Scale: 1= Very Low 2= Low 3= Medium 4= High 5= Very High   S.D=Standard Deviation

Association between Average Citrus Yield & Extension Workers' skills in Plant Protection

Chi-square test was used to find out association between average yields of citrus with skills of extension workers in plant protection in the study area. Findings in Table 7 showed that there is highly significant association (P=0.000) between average yield of citrus with skills of extension workers in plant protection. The results indicated those farmers who ranked extension workers skills in plant protection as, medium, high & very high obtained high yield as compared to others growers in the study area.

Table 7   *Association between Average Yield of Citrus and Skills of Extension Workers in Plant Protection*

Average yield of citrus (Kg/Acre)	Skills of Extension Worker in Plant Protection					Total
	Very Low	Low	Medium	High	Very High	
Up to 3000	12(10)	6(5.0)	8(6.7)	3(2.5)	1(0.8)	30
3001 to 6000	9(7.5)	7(5.8)	25(20.8)	12(10)	2(1.7)	55
6001 to 8000	1(0.8)	3(2.5)	7(5.8)	8(6.7)	2(1.7)	21
Above 8000	0(0)	1(0.8)	2(1.7)	6(5)	5(4.2)	14
Total	22(18.3)	17(14.2)	42(35)	29(24.2)	10(8.3)	120
	$X^2 = 39.123$			P-value= 0.000***		

Data source: Calculated by Author

Note: *** indicates significant at 1 percent level of probability.

Association between Average Yield of Citrus and Literacy Status

Analysis in Table 8 showed association between literacy status and average yield of citrus in the study area. Chi-square test findings revealed that there is highly significant association (P=0.000) between literacy status and average yield of citrus. Therefore, the research finding indicated that

education plays a significant role in the production of citrus and as education level increases the yield of citrus also increases and vice versa.

Table 8   *Association between Average Yield of Citrus and Literacy Status*

Literacy status	Average yield of citrus (Kg/Acre)				Total
	Up to 3000	**3001 to 6000**	**6001 to 8000**	**Above 8000**	
Illiterate	29(24.2)	36(30)	1(0.8)	0(0)	66
Primary	1(0.8)	14(11.7)	9(7.5)	0(0)	24dfsa
Middle	0(0)	5(4.2)	8(6.7)	2(1.7)	15
Matric	0(0)	0(0)	3(2.5)	7(5.8)	10
Intermediate & Above	0(0)	0(0)	0(0)	5(4.2)	5
Total	30(25)	55(45.8)	21(17.5)	14(11.7)	120
	χ^2 **= 131.47**		**P-value=0.000*****		

Data source: Calculated by Author
Note: *** indicates significant at 1 percent level of probability.

Association between Age of the Citrus Growers and the Average Yield of Citrus

Chi-square test was used to find the association between age of the respondents and average yield of citrus in the study area. Findings showed in Table 9 that there is highly significant association (P=0.000) between age and average yield of citrus which means that high yield were obtained by farmers with more age. It clearly indicated that with age, experience is good which helps in getting more yield.

Table 9   *Association between Age of the respondents and average yield of citrus*

Average yield of citrus (Kg/Acre)	Age of the respondents (in years)					
	Below 20	**21 to 31**	**31 to 40**	**40 to 50**	**Above 50**	**Total**
Up to 3000	5(4.2)	17(14.2)	8(6.7)	0(0)	0(0)	30
3001-6000	1(0.8)	5(4.2)	19(15.8)	25(20.8)	5(4.2)	55
6001-8000	0(0)	0(0)	2(1.7)	12(10)	7(5.8)	21
Above 8000	0(0)	0(0)	1(0.8)	1(0.8)	12(10)	14
Total	6(5)	22(18.3)	30(25)	38(31.7)	24(20)	120
	χ^2 **=111.023**			**P=0.000*****		

Data source: Calculated by Author
Note: *** indicates significant at 1 percent level of probability.

CONCULUSIONS AND RECOMMENDATIONS

It is concluded that more than half of the citrus growers belong to middle age i.e. 31-50 years, are illiterate, occupies 1-6 acres of land and had farming experience of 6-12 years in the study area. Extension workers mostly paid visits to farmers' orchard on annual basis which resulted in un-satisfaction on part of the citrus growing community. Most of the growers obtained 3001-6000 Kg/Acre average yield. Most of the citrus growers claimed that extension services are available to them which are in the form of trainings, provision of inputs and field days. Farmers' perceived extension workers expertise in different aspects of citrus production as ranked highest symptoms of major insects/pest disease and their causes in plant protection, forecasting maturity and yield in picking. While knowledge about biological control of pest, collecting and processing of citrus was ranked at last with the lowest mean values and standard deviations. Highly significant association existed between average yields with extension workers skills is plant protection. Similarly, age and literacy status had highly significant association with average yield of citrus.

It is recommended that:

- Extension workers may visit citrus producers' orchard on regular basis for improving their basic knowledge about better citrus production practices to solve the problems.
- Citrus is a highly cash fruit, so youth should be trained for provision of job facilities in citrus production to control them to spent their life fruitfully and efficiently and control them from illegal immigration. More formal trainings regarding different aspects of citrus cultivation and production may be arranged by Extension Department for motivation of more farmers towards citrus farming on large scale and sustainable basis.
- Interest free credit facilities may be provided to citrus growers at appropriate time for buying inputs such as citrus improved varieties, fertilizers, pesticide, and insecticide and so on financial assistance is also required to repair the citrus orchards which were damaged by war.
- The identified issues hindering citrus cultivation and production needs to resolve on urgent basis. Likewise, skills of extension workers needs to be upgraded and improved in weak areas as highlighted in the study through provision of in-service training opportunities and refresher courses.

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