RELATIONSHIP OF RESPONDENTS DEMOGRAPHIC CHARACTERISTICS WITH AWARENESS AND ADOPTION LEVEL OF IMPROVED COTTON PRODUCTION TECHNOLOGY IN TEHSIL HASILPUR, BAHAWALPUR

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ABSTRACT

Agriculture Extension Wing of Agriculture Department Punjab, Pakistan is focusing to improve farming skills of farming community for obtaining considerable average per acre yield through different trainings, demonstrations and other strategies in collaboration with private sector. In same instance, integrated pest management (IPM) project was launched in five districts of Punjab province in 2004 to educate farming communities with new aspects of modern agriculture through establishment of farmer field schools (FFS) at their door steps. The present study was conducted in Department of Agricultural Sciences, Allam Iqbal Open University, Islamabad, Pakistan during the year 2010. The objective was to evaluate the role of FFS in success of IPM project in tehsil Hasilpur, district Bahawalpur and adoption level of latest cotton production technology in relation with demographic characteristics of respondents. For this purpose an interview schedule was prepared and respondents (150 FFS farmers) were interviewed personally. Data were analyzed with SPSS software. The results showed that maximum output of IPM project was found in farmers having age less than 40 years. In this age group number of sprays on cotton crop were reduced from 7-8 to 5-6 with 67.3 percent adoption of technology, yield increased from 16-20 to 21-25 maunds per acre with 36.7 percent adoption of IPM technology.

KEYWORDS: Integrated pest management; farmer field school; demographic characteristics; cotton production technology; adoption level; yield; Bahawalpur; Pakistan.

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INTRODUCTION

In Pakistan rural population is directly or indirectly involved in agriculture which contributes 21 percent to GDP (3). Cotton, being widely grown all over the world, is a major cash crop of Pakistan having unique geographic distribution which supports positive production of cotton. However, there are number of factors which ultimately lowers the average per acre yield of cotton as compared to other cotton growing countries in the world. The main reason for low cotton yield is that our farming community faces many problems like conventional methods for crop management, indiscriminate use of pesticides, unapproved seed varieties, soil nutrients imbalance, insufficient water management and poor marketing system. The extension workers help farmers to increase crop productivity and improve their living standards. Integrated pest management is a general approach based on ecologically sustainable pest control measures which are cost effective and safe for the farmers and consumers.

In view of limiting factors, four years IPM project was launched by Government of Punjab in five districts of Punjab i.e. Lodhran, Vehari, Khanewal, Dera Ghazi Khan and Bahawalpur. Moreover, a new approach of Farmer Field Schools (FFS) was practiced in Punjab to teach the farmers in their villages (4). FFS staff used different extension methods under this approach. The extension methods like group discussions, lectures and literature were used to an average extent and ranked as 1^{st}, 2^{nd} and 3^{rd} with mean values of 3.24, 2.94 and 2.74, respectively (7). It was concluded that all extension methods except exhibitions and sign boards/slogans were used to slightly above or below an average extent. The objective of FFS was to enable farmers to grow healthy crops, observe field regularly, conserve natural enemies of pests and understand ecology and become expert in their fields. In order to demonstrate sustainable solution for increasing productivity, one demo plot of two acres (one acre IPM and one acre of farmer) in each FFS was established for conducting Agro-Eco- System analysis (2). In another study (15) in Sakrand, Sindh, experience of farmer field school was found as best way for transfer of technology in practice through training of farmers about IPM. The results further showed 65 percent improvement regarding pesticides hazards, 50 percent improvement about selection of good quality seed, 65 percent improvement in identification of insect-pests of cotton, 50 percent improvement about identification of natural enemies and 75 percent improvement was observed in cotton contamination identificaiton. Moreover, it is concluded that IPM plot provided more yield (25%) and profit increase (38.03%) over growers plot (15).

Habib *et al.* (10) conclude that the best agricultural practices have brought a positive change in the attitude of farmers of the project area through FFS in Malakand Agency. Ashraf *et al.* (5) while studying the strengths and weaknesses of extension system as perceived by extension field staff found that information reaches farmers and their access to information by farmers also increases under decentralized extension system. They further observed that decentralized extension system offers more feedback on farmer problems and extension field staff. Javed (12) observed that relationship of age, level of education, tenure status and size of land holdings of the respondents was highly significant with the adoption of improved agricultural practices for cotton. Kotile and Martin (14) reported that a majority of respondents in Iowa used sustainable agricultural practices associated with weed control and continued to show interest in learning about the practices they considered sustainable. They further argued that demographic characteristics of respondents i.e. age, level of education, number of years in farming and number of acres, owned and acres rented, played some role in management decision regarding the adoption of sustainable agricultural practices. Haq *et al.* (11) found that almost 71 percent of cotton growing farmers were in a position to diagnose the pests damaging their cotton crop whereas; almost 29 percent of respondents had no pest diagnosis concept. Their results further showed that 75 percent cotton growing farmers had orientation about side effects of pesticide chemicals, whereas almost 94 percent of respondents were involved in pesticide using practices. Dhawan *et al.* (9) observed that integrated pest management practices reduced pesticides load in cotton and increased knowledge of farmers in IPM villages about use of chemicals safe to natural enemies (7). Participant farmers irrespective of their age, education, social participation, degree of extension contact and size of land holdings developed similar symbolic adoption behavior of DCH-32 cotton as result of peripatetic training (16). Kalaskar *et al.* (13) reported that variables such as education, land holding, land under cotton crop, annual income, socio-economic status, infrastructural facilities, innovations, source of information and knowledge of cotton growers had significant relationship with adoption of IPM practices in cotton cultivation. FFS projects were compared with untrained farmers from the same localities, using individual interviews and participatory group analysis methods. FFS trained farmers were generally more confident in their pest management strategies than untrained farmers.

Effectiveness of extension work was analysed under community integrated pest management projects in tehsil Yazman, district Bahawalpur (1). It revealed that IPM farmers of FFS adopted timely irrigation in cotton as advised by the extension workers, with mean value of 4.81. The respondents

were satisfied about the recommended ploughing, time of sowing and seed rate in cotton. Bajwa *et al.* (6) also evaluated the effectiveness of FFS approach for information dissemination of agricultural technology in Punjab. They conclude that information provided by extension field staff through different extension methods was considered averagely effective.

Majority of farmers in our country are illiterate and use injudicious insecticides/pesticides and conventional cotton production technology. Moreover, farmers are not well versed with latest technologies regarding major crops in general and cotton in particular. That's why the farmers are not getting good yield as compared to potential yield of crops. In view of these facts the community integrated pest management project is striving for creating awareness regarding cotton production technologies among its registered growers. The present study was designed to find out relationship of demographic characteristics of-community IPM project registered growers with awareness and adoption level regarding improved cotton production technology in tehsil Hasilpur (district Bahawalpur).

MATERIALS AND METHODS

This study was conducted in the Department of Agricultural Sciences, Allama Iqbal Open University, Islamabad, Pakistan during the year 2010. Registered IPM farmers of FFS residing in tehsil Hasilpur were included. The lists of FFS were obtained from the office of Deputy District Officer Agriculture (Ext), Hasilpur. There are total 15 Union Councils in tehsil Hasilpur. One village (FFS) from each union council was selected randomly. One FFS comprised 25 IPM farmers, so 10 farmers from each FFS were selected by using random sample technique, making sample size of 150 respondents. Data collection was accomplished through validated interview schedule. The demographic characteristics studied were; age, education, farm size, farming experience, number of pesticides sprays on cotton crop to see their impact on adoption cotton production technology and its yield. The IPM farmers were interviewed by researchers personally at their farms or homes. Although, the interview schedule was constructed in English, yet the questions were administered in Punjabi and Urdu language for the convenience of respondents to get required information with maximum accuracy. For analysis of data, SPSS software was used. Statistical analysis of data such as chi square, T-test, frequencies and percentages were made according to recommended methods.

RESULTS AND DISCUSSION

Age

Age is a significant factor which affects retention and learning behavior of respondents. The data (Table 1) showed that the youngest person of respondents was less than 20 years of age and the oldest one was of 60 years age (13.3%). Average respondents, were between 20-40 years (47.3%) while 38.7 percent were between 41-60 years age (Table 1). The results showed that maximum respondents were in the ideal age of learning and adopting new skills, methods and IPM approach. These results are similar to those of Javed (12).

Table 1. Distribution of IPM farmers with regards to age.

Age level	Number of respondents	Percentage
< 20 years	1	0.7
20 – 40 years	71	47.3
41 – 60 years	58	38.7
>60 years	20	13.3
Total	150	100.0

Education

Education is considered as desirable quality of mind in the process of developing knowledge, wisdom, character and is an important factor for the adoption of skills, methods and techniques of IPM approach. The data (Table 2) showed that the lowest number of IPM farmers (15) was illiterate (10%) and the highest number of IPM farmers (50) was upto matric (33.3%) while others were upto primary (14.7%), middle (22.7%) and above matric level education (19.3%). Umaheesha and Channegowba (16) also reported that education and trainigns of farmers are practically oriented.

Table 2. Distribution of IPM farmers with regards to education.

Educational level	Number of respondents	Percentage
Illiterate	15	10.0
Upto primary	22	14.7
Upto middle	34	22.7
Upto matric	50	33.3
Above matric	29	19.3
Total	150	100.0

Farm size

Farm size is a piece of land owned and cultivated by a farmer or by his family. Small farm size farmers desire immediate response regarding profit and maximization of their existing yields for the purpose of improvements in

their living standards as that of large farm size farmers. The data (Table 3) showed that more than half (62%) of farmers had farm size upto 12 ½ acres (small farmers), 22 percent had farm size upto 12 ½ - 25 acres (medium farmers) and only 16 percent farmers had above 25 acres (large farmers) of land. Kotile and Martin (14) have also reported similar results.

Table 3. Distribution of IPM farmers with regards to farm size (acres).

Farm size	Number of respondents	Percentage
Upto 12½ acres (small farmer)	93	62.0
12½ - 25 acres (medium farmer)	33	22.0
> 25 acres (large farmer)	24	16.0
Total	150	100.0

Farming experience

Farming experience is also considered as an important factor in adoption of technologies, skills and new approaches. The data (Table 4) revealed that only one farmer (0.7%) had farming experience of above 40 years while majority of farmers (33.3%) had 11-20 years farming experience followed by farming experience upto 10 years (31.3%). Kotile and Martin also (14) support these results.

Table 4. Distribution of IPM farmers with regards to their farming experience.

Farming experience	Number of respondents	Percentage
Upto 10 years	47	31.3
11 – 20 years	50	33.3
21 – 30 years	24	16.0
31 – 40 years	28	18.7
> 40 years	1	0.7
Total	150	100.0

Relationship between age of IPM farmers and number of pesticides sprays used before and after IPM adoption

According to statistical analysis (chi square) the results regarding age of IPM farmers and number of sprays used in cotton crop are non-significant before adopting IPM and significant after IPM projects as given below on the basis of data given in Table 5 and 6.

Before IPM project: Calculated Chi. Sq = 5.88
Tabulated Chi.Sq. = 15.51 (at 5% probability level)
df = 8
P = 0.660
If calculated Chi.Sq. ≤ Tabulated Chi. Sq. then it is non-significant.

After IPM projects: Calculated Chi. Sq. = 15.98
Tabulated Chi.Sq. =12.50(at 5% probability level)
df = 6
P = 0.014
If calculated Chi.Sq. ≥ Tabulated Chi.Sq then it is significant.

The results indicated a strong association between age of IPM farmers regarding the number of pesticides sprays in cotton before IPM and after IPM project.

Table 5. Relationship of age of IPM farmers and number of pesticides sprays used before adopting IPM.

No. of sprays	Age (years) %			Total
	<40	41-60	>61	
3-4	1.4	3.4	0.0	2.0
5-6	29.2	32.8	45.0	32.7
7-8	59.7	50.0	40.0	53.3
9-10	8.3	13.8	15.0	11.3
>11	1.4	0.0	0.0	0.7
Total	100	100	100	100

Chi. square = 5.88 NS (p= 0.660), df = 8

Table 6. Relationship of age of IPM farmers and the number of pesticides sprays used after IPM project.

No of sprays	Age (years) %			Total
	< 40	41-60	>61	
3-4	5.6	12.1	15.0	9.3
5-6	81.9	55.2	50.0	67.3
7-8	11.1	32.8	35.0	22.7
9-10	1.4	0.0	0.0	0.7
Total	100	100	100	100

Chi. Square = 15.98 S (p= 0.014), df = 6

Table 7. Comparison of number of sprays before and after IMP for different age groups.

Age group	No. of respondents	Mean number of sprays		Mean difference	t-value
		Before IPM	After IPM		
< 40 years	72	7.13±0.15	5.63±0.12	1.50±0.09	16.55**
41-60 years	58	7.26±0.20	5.90±0.15	1.36±0.10	13.55**
>61	20	7.00±0.36	5.85±0.30	1.15±0.15	7.67**
Overall	150	7.16±0.11	5.76±0.09	1.40±0.06	22.57**

**Highly significant (p<0.01)

Relationship between age of IPM farmers and cotton yield before and after IPM adoption

According to statistical analysis (chi-square), the results regarding age of IPM farmers and cotton yield are non-significant before IPM and significant after IPM project as given below on the basis of data given in Table 8 and 9.

Before IPM project: Calculated Chi.Sq. = 5.67

Tabulated Chi.Sq. =18.31(at 5% probability level)

df =10

P = 0.842

If calculated Chi.Sq. ≤ tabulated Chi. sq. Then it is non-significant.

After IPM project: Calculated Chi.Sq.= 22.08

Tabulated Chi. Sq.= 21.03 (at 5% probability level)

df = 12

P = 0.037

If calculated Chi. sq. ≥ tabulated Chi.Sq. Then it is significant.

These results indicated a strong association between age of IPM farmers regarding cotton yield before IPM and after IPM project.

Table 8. Relationship of age of IPM farmers and cotton yield before IPM adoption.

Yields (maunds)	Age (years) %			Total
	< 40	41-60	>61	
<10	5.6	5.2	0.0	4.7
11-15	15.2	15.5	20.0	16.0
16-20	50.0	51.7	45.0	50.0
21-25	22.2	25.9	25.0	24.0
26-30	5.6	1.7	5.0	4.0
31-35	1.4	0.0	5.0	1.3
Total	100	100	100	100

Chi. square = 5.67 NS (p = 0.842), df =10

Table 9. Relationship of age of IPM farmers and cotton yield after IPM adoption.

Yields (maunds)	Age (years) %			Total
	<40	41-60	>61	
≤ 10	2.8	1.7	0.0	2.0
11-15	2.8	8.6	10.0	6.0
16-20	27.8	36.2	50.0	34.0
21-25	50.0	25.9	20.0	36.7
26-30	13.8	27.6	10.0	18.7

31-35	1.4	0.0	5.0	1.3
36-40	1.4	0.0	5.0	1.3
Total	100	100	100	100

Chi. square = 22.08, Significant (p = 0.037), df = 12

Table 10. Comparison of yield before and after IPM for different age groups.

Age group (years)	No. of respondents	Mean yield		Mean difference	t-value
		Before IPM	After IPM		
< 40	72	19.32±0.51	23.01±0.55	3.69±0.22	16.53**
41-60	58	18.83±0.52	21.95±0.62	3.12±0.25	12.38**
> 61	20	19.80±1.22	21.80±1.34	2.00±0.26	7.65**
Overall	150	19.19±0.35	22.44±0.40	3.25±0.16	20.93**

**Highly significant (p<0.01).

CONCLUSION

The study concludes that majority of IPM farmers (47.30%) fell under age group 20-40 years. One third of respondents had an educational level upto Matric. Most of them belong to agriculture families with farming experience. Majority of respondents were owner cultivators. Maximum number of respondents (62%) had small holding upto 12.5 acres of cultivated land, out of which cotton was sown on area upto five acres. One third of respondents had farming experience of 11-20 years. There was a strong relationship between the age of IPM farmers with their decrease in number of pesticides sprays and increase in cotton yield.

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