

Original scientific paper
10.7251/AGRENG1702132K
UDC: 632+631.1 (549.1)

ASSESSMENT OF EXTENSION AGENTS' KNOWLEDGE AND SKILLS REGARDING PEST MANAGEMENT IN KHYBER PAKHTUNKHWA PROVINCE -PAKISTAN

Muhammad Zafarullah KHAN

The University of Agriculture, Peshawar, Pakistan
Corresponding author: drzafar@aup.edu.pk

ABSTRACT

The research study was initiated in Khyber Pakhtunkhwa province of Pakistan to investigate about the extension agents' knowledge and skills regarding pest management. Key objectives of the study were to know the present levels of their potentials and to judge their interested level of skills and potentials in pest management capabilities needed by Agriculture Extension Officers (AEOs) for their effective job performance. Respondents were asked to report the self perceived level of expertise possessed by them and the level required for smooth performance regarding pest management measures in the field to sustain agriculture. The present and interested levels of potentials were measured both on Likert scale ranging from 1 to 5 such as "very low" as "1" and "very high" as "5". There were significant differences observed in the agricultural officer's potential for sustaining agriculture regarding age, professional qualification and job experience. Age, professional qualification and job experience have significant association on technical efficiency regarding protection of plants from pests for sustainable agriculture. Moreover, required level in said capability was higher in identification of major field crops' diseases as well as the guidance of farmers for herbicides use against weeds. Trainings of AEOs were required in identification of diseases and insect pests of minor crops along with their causes. Hence it is recommended that AEOs may be trained and well prepared in the mentioned parameters of pest management measures to face challenges in the field of agriculture and can face farming community effectively to raise their living standards by sustaining agriculture for their coming generation.

Key Words: *assessment, extension agents, knowledge and skills and pest management.*

INTRODUCTION

Since old times, agriculture has been considered as the most momentous and capable economic activity in Indo-Pak Subcontinent. Agriculture is the substantial segment and dominant impulsive power for increase, progress and also the elementary cause of livelihood for the population of Pakistan (Ali *et al.*, 2013).

Agriculture had been vital to fiscal expansion and progress in Pakistan. Agriculture is the most important fragment of the economy of Pakistan and has a share of 19.8% to Gross Domestic Product (GDP) along with provision of employment to 42.3%. Agriculture has an imperative part in achieving foodstuff sanctuary, increasing economic growth, plummeting paucity, and the development of cottage industries (GOP, 2016).

Now a days farming in Pakistan is confronting numerous issues that are directly connected with sustainable improvement in agriculture. The most indispensable among these are the expanded utilization of manures, weedicides and bug sprays and so forth to give a support to profitability of agriculture. The extreme utilization of these inputs has a decaying impact on the dirt and epitomizes a danger to the surrounding. The major challenge to the development of agriculture is to retain sustainable increase in production and also to avoid the degradation of the natural resources as well. The sustainable farming improvement needs practices and technological advances that are scientifically correct, monetarily reasonable, ecologically non-debasing and socially adequate for accomplishing nourishment security and enhanced personal satisfaction for present and future eras. Sustainable development is a continuous process that includes involving utilization of the natural resources base and orientation of technological and institutional changes in such a manner to ensure the attainment and continued satisfaction of human needs for present and future generations (GOP, 2016).

Agricultural Extension is a system of diffusing latest farming methods and ideas to farming community for bettering their conventional farming practices (Abbas *et al.*, 2008). The extension institutions consider at utmost that the farmers have to improve their cropping system and their lands and also to motivate them for the judicious use of latest agricultural equipments and to adopt the latest technologies according to their climatic conditions (Safdar, 2005). Farmers have must be made conscious of the latest and updated farming practices prior to their utilization. The vital practical objective of successful extension worker is to teach the farmers how they could improve their land, setup a cropping plan and stimulate the farmers to develop latest farming tools based on recent research (Bajwa, 2004).

Agricultural yield may be rapidly improved by the use of suitable appliance of latest techniques in farming (Farooq *et al.*, 2007). For this reason it is indispensable that the farmers have to be made aware of the logical information and enhanced practices and also the techniques regarding farming. This objective is achieved by the government through the dissemination of modern techniques in agriculture with the help of agricultural extension services (Ziaullah, 2005; Ali *et al.*, 2008). AEOs' duty is to probe the problems of the farmers and then to forward their solutions to the farming community again. The Agricultural Extension Officer provides information to the farming community regarding various cropping practices, diseases and pest management with application of chemicals along with crops harvesting and threshing techniques as well as the marketing of the produce. Therefore, in this context, agricultural extension can be defined as the valuable mean and organization which enables famers to assist themselves. Farmers have

the opportunities to a wide range of educational programmes to provide and facilitate themselves for bettering farming system, growing techniques, improve yield and ultimately upgrade their livelihood (Safdar, 2005).

Humans and their environment is highly affected by the indiscriminate use of chemical pesticide resultantly crop reduction in crop production. Plant protectionist has developed another concept of Integrated Pest Management (IPM) for sustainable agriculture by developing pest disease resistant indigenous crop varieties. Pest damage can also be compensated by increasing the seed rate, sowing time adjustment to avoid pest damage with no cost and no harm to environment. To be sure, farmers have an unavoidable requirement for different sorts of information to carry out their agricultural activities in a viable way. The information regarding enhanced agro-innovations generated by agricultural researchers and scientists must be diffused in ways that are perfect with the necessities of ranchers and as a result brings satisfaction among the end user due to that information. This space in desired yields and genuine yields is credited to farmers' lack of knowledge about the use of modern and up dated research agricultural methods including pest management measures. The research study was initiated in one among four agriculturally rich provinces with the objective to examine existing and required levels of technical competency in pest management skills of AEOs. This study will help policy makers to devise policies to make agricultural extension service more effective and efficient which will further help to increase agriculture productivity without harming to human and environment and to help in poverty alleviation.

MATERIALS AND METHODS

The present research was carried in the province of Khyber Pakhtunkhwa from all the Agricultural Officers (n=111) who constituted the sample of the study. Primary data were obtained by carefully prepared questionnaire which was pre tested on 20 extension workers including deputy directors and directors that have served the post of AEOs and also on senior field assistant having more than one decade of experience in the field of agriculture extension before actual data collection so that irrelevant questions can be discarded. The research was supported by secondary data got through published and unpublished sources. Well-structured questionnaire was designed with the help of experts in the field of agriculture extension that consists of groups of questions regarding professional competencies (program planning, extension teaching methods, use of audio visual aids, participatory extension methodology, computer skills, supervision and administration and public relations etc.) and of the technical competencies like agronomic practices, pest management and protection measures, horticultural crops, farm mechanization, soil sciences and biotechnology. In addition to the above competencies, questions related to demographic characteristics and satisfaction regarding different facilities of AEOs were included in questionnaires that was based on the official job description of their duties. Questionnaires were sent by hard mail to AEOs and at district level their meetings were called by requesting the Director General of Agriculture Extension (Khyber Pakhtunkhwa) and explained to them any

ambiguity in the research instrument by clarifying their questions. Preferred potentials of AEOs identified were supported as per their job description of them. Following Ali (1991), Randavary and Vaughn (1991), Najingo *et al.* (1991) and Easter (1985) by using Likert scale to capture their potentials intensity. Available and interested potentials were scaled from one to five where one representing very low and five represented very high. Levels were: very low, low, average, high and very high. Potentials relating to pest management skills were assessed. Data were analyzed by SPSS and Microsoft Excel (version 2000). To find out relationship between demographic characteristics and the potentials of Agriculture Extension Officers in pest management skills were divided into different groups. In the present study, scaling index value lies between 0 and 1. The assigned values of scaling for possessed and required or wishing competencies ranged from 0.00 to 1.00. The scaled were assigned values and classified into five categories as expressed by (Qadeer, 1993) by stating very low was 0 - 0.20, 00.21 – 00.40 (low), 00.41 – 00.60 (medium), 00.61 – 00.80 (good) and 00.81 – 1.00 (very good). Descriptive statistics and mean ranks were calculated whereas to find the relation among various studied variables Pearson's correlation coefficient was calculated. The author faced no noticeable problems during the course of this research study.

RESULTS AND DISCUSSION

On-hand and Interested Level of Pest Management Skills:

The Agricultural Extension Officers rated the potentials they possessed in pest management and interested levels of these potentials to perform their job in pest management skills for agriculture sustainability. Their self perceived responses are depicted in Table 1. AEOs rated all fourteen potentials in pest management by wishing and showing high interested (means scores = 4.42–4.62) to perform their jobs effectively (Table 1). Among fourteen potentials, the top three were the job performance for Agriculture Officers as perceived by themselves were 1) identification of disease of major field crops (mean = 4.62, SD = 0.647), 2) farmers guidance in herbicides use for weeds (mean = 4.61, SD = 0.677) and 3) identification of insects/pests of major field crops (mean = 4.60, SD = 0.666). The potentials, which received very low rank on interested scale, included 1) advise the modes of loss of insects of minor field crops (mean = 4.42, SD = 0.695), 2) identifications of weeds of minor field crops (mean = 4.50, SD = 0.673) and 3) identification of disease of minor field crops (mean = 4.51, SD = 0.659).

Table 1. Mean SD and rank of Interested and Available potentials in Pest Management

S.No.	Potentials	Interested Levels			Available Levels		
		Mean	SD	Rank	Mean	SD	Rank
	The talent to:						
1	Identify disease of major field crops	4.62	0.647	1	3.59	0.948	8
2	Guide farmers for herbicides use against weeds	4.61	0.677	2	3.75	0.967	3
3	Identify the insect/pest of major field crops	4.60	0.666	3	3.64	0.989	5.5
4	Advise the modes of loss of insects of major field crops	4.57	0.683	4	3.61	0.992	7
5	Describe the control measures of insect/pest	4.56	0.710	5	3.70	1.005	4
6	Identify the weeds of major field crops	4.56	0.697	6	3.80	0.932	2
7	Describe the control measures of major field crops	4.55	0.723	7	3.64	0.989	5.5
8	Describe the control measures of minor field crops	4.55	0.629	8	3.57	0.959	10
9	Discuss the causes of disease of minor field crops	4.54	0.658	9	3.49	0.971	11.5
10	Identify the insect/pests of minor field crops	4.54	0.658	10	3.49	0.980	11.5
11	Discuss the causes of disease of major field crops	4.53	0.711	11	3.58	0.949	9
12	Identify disease of minor field crops	4.51	0.659	12	3.38	0.915	14
13	Identify the weeds of minor field crops	4.50	0.673	13	3.83	0.893	1
14	Advise the modes of loss of insect of minor field crops	4.42	0.695	14	3.39	0.926	13
		4.55			3.60		

* Source: Author s' elaboration based on the questionnaire survey results.

The self-perceived responses of Agriculture Extension Officers in the potentials they possess presently having mean score of 3.38 to 3.83 on a five-point scale (Likert Scale). The potentials, which were available in Agriculture Extension Officers at maximum were, 1) Identify the weeds of minor field crops (mean = 3.83, SD = 0.893), 2) Identify the weeds of major field crops (mean = 3.80, SD = 0.932) and 3) Guide farmers for herbicides use against weeds (mean 3.75, SD = 0.967). The three potentials, which received lowest mean rating on the scale, were; 1) Identify disease of minor field crops Identify disease of minor field crops (mean = 3.38, SD = 0.915), 2) Advise the modes of loss of insect of minor field crops (mean = 3.39, SD = 0.926) and 3) Discuss the causes of disease of minor field crops and Identify the insect/pests of minor field crops (mean = 3.49, SDs = 0.971 and 0.980). On the whole average of the means of the interested level was 4.55 as against 3.60 in available level (possessed level). The disparity values showing gap on the basis of differences of interested levels of AEOs to perform their pest management skills and the available levels of potentials were calculated. These differences were considered as training needs in the identified potentials. The data regarding these features are available in Table 2..

Table 2. Self-perceived desired level and present level by AEOs with training need and its rank regarding Pest Management

S.No.	Potential	Interested Level	Available Level	Training Need	Rank
	The talent to:	Mean	Mean	Training = IL-AL	Rank
1	Identify disease of minor field crops	4.514	3.38	1.1351	1
2	Identify the insect/pests of minor field crops	4.541	3.49	1.0541	2
3	Discuss causes of disease of minor field crops	4.541	3.50	1.0450	3
4	Identify disease of major field crops	4.622	3.59	1.0360	4
5	Advise modes of loss of insect of minor crops	4.423	3.523	1.0360	5
6	Describe the control measures of minor crops	4.550	3.57	0.9820	6
7	Identify the weeds of minor field crops	4.505	3.52	0.9820	7
8	Discuss the causes of disease of major crops	4.532	3.58	0.9550	8
9	Identify the insect/pest of major field crops	4.595	3.64	0.9550	9
10	Advise modes of loss of insects of major crops	4.568	3.61	0.9550	10
11	Describe the control measures of major crops	4.550	3.64	0.9099	11
12	Guide farmers about use of herbicides for weed	4.613	4.91	0.8649	12
13	Describe the control measures of insect/pest	4.559	3.70	0.8559	13
14	Identify the weeds of major field crops	4.559	3.80	0.7568	14
		4.548	3.674	0.966	

Source: Author s' elaboration based on the questionnaire survey results.

The disparity values showing gap on the basis of differences of interested levels of AEOs to perform their pest management job efficiently and effectively as well as the available levels of potentials were calculated. These disparity values or gaps were considered as training needs in the identified mentioned potentials (Table 2). Among fourteen training needs of Agriculture Extension Officers, the most important top three were 1) identification of disease of minor field crops (Difference = 1.1351), 2) identification of insect/pests of minor field crops (Difference = 1.0541) and 3) Disease causes of minor field crops (Difference = 1.0450). The AEOs training requirements with lowest levels of interest included 1) identification of weeds of major field crops (Difference = 0.7568), 2) describe the control measures of insect/pests (Diff. = 0.8559) and 3) guidance of farmers in herbicides for weeds control (Difference = 0.8649). The disparity and gap based on the mean perception of AEOs for all potentials ranging from the very low level (0.7568) to top level value (1.1351). Agriculture is an industry under open sky and thus faces many environmental vagaries. Thus the plants are always prone to many disease, insects/pest and weeds. Therefore, proper identification of plant pathogens, insects and weeds are required to manage. The only option is the prevention which is possible if the Agriculture Extension Officers are fully aware from the latest information and trends in the pest management skills.

Judgment between possessed and attractive self perceived aptitudes in Pest Management:

Judgment between available and attractive self perceived aptitudes in Pest Management for Agricultural Sustainability assessed by them is presented in a web-radar diagram Fig.1 based on their mean values which is presented in Table 1. The change agents have to be skilled in every fragment of farming that can help the farmers to boost up their income. According to Khan *et al.* (2006) yield of the crops are reduced due to the continuous struggle of the weed with the principle crop for light, space, nutrient and most importantly water. By the utilization of IPM techniques these weeds can be evoked, so there is a need to educate the farmers regarding IPM techniques through competent AEOs in the field of pest management skills. Ahmad (1992) in his study regarding assessment of the competencies of extension agents reported that lack of training opportunities for the extension agents negatively affect their working efficiency.

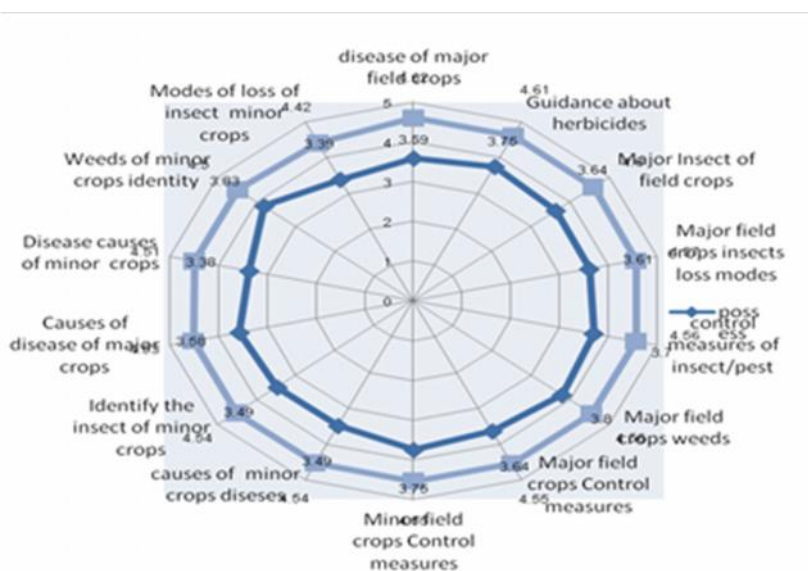


Figure 1. Judgment between available and required self perceived aptitudes in Pest Management

Issues coupled and associated with Pest Management skills for sustainable agriculture: Pest management capability is promoted significantly by job experience in the field of agriculture extension along with age and highly significant with higher professional and academic qualification of the Agricultural Extension Officers. Demography such as Agricultural extension Officers' specialty during student life as major in agriculture education, and domicile have negative relationship with pest management skills along with urban/rural background and personal experience in farming. (Table 3).

Table 3. Issues coupled and associated with Pest Management Ability

Issues (Independent)	Correlation Co- efficient Value	Significant level
Maturity level of AEOs	0.207*	0.030
Job knowledge	0.195*	0.041
Certified Qualifications	0.387**	0.000
Institution specialty during student life	-0.067	0.488
Background of Family	0.110	0.252
Rural/ Urban Living	-0.182	0.056
Length of Experience in Farming	-0.173	0.069
Availed opportunities of Training Program	-0.379**	0.000

*Source: Author s' elaboration based on the questionnaire survey results.

(We have recorded the response of respondents who have not attended the regular training with “1” and those who attended with “0”. Therefore, correlation becomes negative.)

Age, job experience, professional qualification and availing the opportunities of training programs are considerably contributing to enhance the pest management competencies of AEOs rather than other demographic factors who are not significantly contributing to their competency. This shows that young AEOs of enthusiastic attitude in agricultural field having greater pest management capacity that increase with experience in the field with the passage of time. More exposure in the university education up to PhD level contributing a lot by reviewing more literature for their dissertation and formal sitting with university professors also give more exposure to him in the said competency. According to Darkenwald and Merriam (1982) statement the importance of staff progress to excite intelligence, to increase understanding, to keep eyes on new progress and development to increase organizational effectiveness could be availed through trainings. Department of Agricultural Extension facilitate farmers how to progress their productivity, profits and how to be cooperative with one another. Accordingly these programs are changing of laying down from scientific methods to spotlighting more on capacity building of the farmers for community development in order to identify and take assistance from the current situation, together practical as well as financial. In order to play such a diversified role, the change agents are required to be trained in areas further than scientific farming to make ability in farmer's motivation (World Bank, 2008). Lodhi (2003) reported the lack of training facilities for the change agents of Punjab and also affirmed that department of extension is not up to mark and extension workers are not considered knowledgeable for their job performance.

CONCLUSIONS

- The study indicates that there are significant gaps between the level possessed and the level required in the potentials of pest management for smooth performance of their responsibilities.
- The professional qualification, job experience and professional trainings during service have improved the capabilities of AEOs.
- Demographic characteristics of AEOs like age and length of experience in job have significant effect on their competency in pest management.
- The Agricultural Extension Officers lack the mandatory information about pest management and mostly rely on outdated extension technologies.
- Most of the AEOs does not possess the expected technical competency level which seems supportive in raising the production of farmers.

RECOMMENDATIONS

Pre-service training for newly recruited AEOs must be arranged for efficient outcome of AEOs especially in pest management skills.

In-service trainings on regular basis ought to be provided to make them acquainted with updated technologies in field of agriculture with special emphasis on pest management skills.

Rural women can play their best role especially in storage of grains in their homes, so must be taken into consideration to train them best in pest management skills to save the stored grains at homes. Therefore, it is also recommended that rural women must be trained and to include this component in agriculture extension department.

It is also suggested that there is strong need to revamp training programmes as well as refresher courses for Agriculture Extension Officers in order to make them efficient, effective and competitive to meet the emerging challenges in crop protection measures and pest management skills as the problem with the insects/pests and diseases are changing with changes in the climates and their importance cannot be ignored in crop production.

REFERENCES

- Abbas, M., T. T. Lodhi, A. Bashir, and M.A. Mehmood. 2008. Dissemination of wheat production technologies and interface of outreach efforts with farmers. *J. Agric. Res.*46(1): 99-108.
- Ahmad, M. 1992. Evaluation of the working of extension field staff for the development of farming community. *Pak. J. Agri. Sci.* 29(1): 40-42.
- Ali, G., S.M.A. Shah, D. Jan, A. Jan, M. Fayaz, I. Ullah and M.Z. Khan. 2013. Technical Efficiency of Sugarcane Production in District Dera Ismail Khan. *Sarhad J. Agric.* 29(4): 585-590.
- Ali, H., I. Maimunah, S. Turiman., and S.A. Daud. 2008. Extension Workers as a leader to Farmers: Influence of Extension Leadership competencies and organizational commitment on Extension Workers' Performance in Yemen 369. *The Journal of international Social Research* Volume 1/4.

- Ali, T. 1991. An identification and validation of job performance competence needed by Agricultural extension field assistant in Faisalabad District, Punjab, Pakistan. Doctoral dissertation, University of Minnesota, USA.
- Bajwa, R. 2004. Agriculture Extension & Role of Private Sector. National Rural Support Programme, Pakistan. Pp. 3-5.
- Darkenwald, G.G. and S.B. Merriam. 1982. Adult education: Foundation of Practice. New York: Harper & Row Publishers, Inc. Pp. 106-107.
- Easter, G.W. 1985. Assessment of professional competence needed by extension agent in developing countries. Case study in Switzerland. Doctoral Dissertation Pennsylvani State University, USA.
- Farooq, S., S. Muhammad, K. M. Chaudary and I. Ashraf. 2007. Role of Print Media In TheDissemination Of Agricultural Information among Farmers. Pak. J. Agri. Sci., Vol.44(2): 378-380.
- GOP. 2016. Economic survey of Pakistan (2015-16), Govt. of Pakistan. Ministry of Finance, Eco. Advisor's Wing, Finance Division, Islamabad.
- Khan, M.Z., K. Nawab and M. Azim. 2006. Weed related professional competency of agricultural extension agents in NWFP, Pakistan. Pak. J. Weed. Sci. Res. 12 (4): 331-337.
- Lodhi, T.E. (2003) Need for paradigm shift from top down to participatory extension in the Punjab, Pakistan: perception of farmers, change agents and their supervisory staff. Unpublished doctoral dissertation, Department of Agric. Ext., Univ. of Agric. Faisalabad, Pakistan.
- Najingo, M. Kasujja and I.L. McCasline. 1991. An assessment of the technical and professional competence needed by extension personnel in the central region of Uganda Proc. of AIAEE Conference, St. Louis., Mo.
- Qadeer, A. M. M. 1993. Applied Statistics. A Course Handbook for Human Settlement Planning. Bangkok, Thailand, Asian Institute of Technology, Division of Human Settlements Development. Pp. 315-316.
- Randavay, S. and P.R. Vaughn. 1991. Self perceived professional competence needed and possessed by agricultural extension worker in the western region of Thailand. A multivariate technique approach. The Informer Association for Inter. Agric. Ext. Edu. 7 (1), 19-26. The Punjab, Pakistan. Inter. J. Agric. Biol. 6(5): 941-942.
- Safdar, Z. 2005. Role of Extension Agent in the Diffusion of Onion and Tomato Crop. A case study of four selected villages of UC Sakhakot Malakand Agency. M.Sc (Rons) thesis, Department of Agricultural Extension Education and Communication. NWFP Agricultural University Peshawar. Pp. 1-3.
- World Bank Report. 2008. World development report. Pp 173.
- Ziaullah. 2005. Role of Extension Services in Enhancing Dates (Phoenix dactylifera) Productivity in Two Union Councils of Bannu. Unpublished M.Sc. (Hons) thesis submitted to Department of Agriculture Extension Education and Communication, NWFP Agricultural University Peshawar-Pakistan. Pp. 2-7.