

ASSESSING PROFESSIONAL CAPABILITIES OF AGRICULTURE OFFICERS FOR WEED CONTROL: A CASE STUDY OF KHYBER PAKHTUNKHWA-PAKISTAN

Muhammad Zafarullah Khan¹, Javid Ullah², Sajjad Ahmad³ and Muhammad Qasim⁴

ABSTRACT

Professionally competent Agriculture Officers (AOs) can play an important role in increasing the crop production through communicating new findings about the yield losses due to weeds in crops. Survey was conducted to find out the professional capability of AOs to cope with the weed problem in Khyber Pakhtunkhwa., Pakistan. Study was initiated during January, 2007 where 112 questionnaires were distributed among the AOs across the province. One hundred and eleven AOs returned the questionnaires and the data were analyzed using SPSS. Analysis revealed that all the officers had basic understanding of weed science. However, only 19% of AOs had the required knowledge related to weeds. Majority of the respondents were unable to describe the weeds of major and minor crops and their impact on crop production. Same was the case regarding lack of farmers' guidance in herbicide application. The study showed that there were significant differences in the professional capabilities of the agriculture officials classified by their attendance in training programs provided, family background and professional qualifications. Professional qualifications, family background and regular trainings were found to be highly and significantly related to professional capability in weeds. The present findings suggest that the AOs are supposed to be trained in weed related problems, so that they can cope with the weed management issues of the farming community for increasing quality and quantity of agricultural commodities and to raise the socio-economic status of rural people in the province.

Key words: Agriculture Officer, Khyber Pakhtunkhwa, professional capability, weeds.

INTRODUCTION

In Pakistan, agriculture is not only the source of foreign exchange earnings through exports of cotton, cotton products and rice,

¹Department of Agric. Extension Education and Communication, ²Department of Food Science and Technology, ³Department of Entomology, Khyber Pakhtunkhwa Agricultural Univ. Peshawar, ⁴Department of Agriculture, Abdul Wali Khan University Mardan
Correspondence email: drzafar@aup.edu.pk

but it also provides raw materials to industries and consumes products of several industries as inputs. Provincial Agricultural Extension Department is responsible for transferring of agricultural technology and providing technical guidance to farmers for improving agricultural practices to increase agricultural productivity. So failing to achieve self-sufficiency in major agricultural products has always been attributed to inefficiency of our agriculture extension services. (Pervaiz, 2001) Despite an increase in yield in other countries, the low productivity of Pakistan's agriculture is one of the major areas of concerns for our planners, policy makers and research workers. Presently there is big difference between the actual and the potential yields of major crops. Reports have shown yield gaps in various crops such as wheat (72%), rice (83%), maize (88%), sugarcane (78%) and cotton (72%), vis-à-vis to their potential yields under experimental conditions. Wheat productivity is 44% of Mexico's rice, 43% of Egypt's maize, 33% of Turkey's, cotton 75% of Mexico's and Sugarcane 66% of India (Govt. Pakistan, 1991). These differences between the potential and the actual yields are attributed to farmers' lack of awareness about the application of scientific research and new knowledge to agricultural practices.

According to several studies, extension specialists are one of the primary sources of information for county extension agents (Radhakrishna and Thompson, 1996; Shih and Evans, 1991). According to Gibson and Hillison (1994) effective specialists should clearly understand the extension education process. In addition, they must understand the human development, learning and social interaction processes, and they must become knowledgeable about the organization within which they work. Weeds are a serious problem in all agricultural lands throughout North West Frontier Province (NWFP) now called as Khyber Pakhtunkhwa especially in irrigated belts. It decrease crop yield in a variety of ways. According to estimated data weeds cause Rs. 100 billion per annum in Khyber Pakhtunkhwa (Anonymous, 2007). According to Khan *et al.* (2006), Jan *et al.* (2004) and Khan (2000), weeds compete with the major crops for water, nutrients, space and light, thus reduce the crop yield. These weeds can be controlled through educating the farmers by agriculture officers who are competent and trained in weeds.

As majority of the farmers in Pakistan and especially in Khyber Pakhtunkhwa are illiterate and have no access to newspapers, research articles and other agriculture related magazines, therefore, they are totally dependent on the agricultural extension agents. Keeping in view the importance of weeds, this study was conducted to judge the possessed and required levels of professional competencies of agricultural extension agents in Khyber Pakhtunkhwa, Pakistan.

MATERIALS AND METHODS

All Agriculture Officers (AOs) of Agricultural Extension Department were the pool of information of the instant study. Number of AOs in various administrative districts widely varies across the province (Khyber Pakhtunkhwa) ranging from 1-11 depending upon intensity of agricultural activities. District D.I. Khan has the highest number of AOs (11) while district Shangla and Kohistan have the lowest number (1).

Data Source

The study was based on both primary and secondary data. Primary data were obtained through a carefully prepared and pre-tested questionnaire. Secondary data were obtained through published sources. The questionnaire along with instructions/explanatory sheet was mailed to all AOs through Director General, Agricultural Extension office (Khyber Pakhtunkhwa), who is the overall in charge of provincial agricultural extension services.

The questionnaire comprised of various questions. However, in the present article only weeds related competencies of AOs were included. Two main categories were used as level possessed and level required and there were five choices of each category. The choices in each category were; VL = Very low, L = Low, M =Medium, H = High and VH = Very High. The respondents placed one check-mark each in possessed and required levels to capture the level and intensity of competencies.

Sampling procedure and Sample Size

As per information provided by office of the Director General, Agricultural Extension, Khyber Pakhtunkhwa, total number of Agricultural Officers (AOs) in the Khyber Pakhtunkhwa is 112, posted in 24 administrative districts across the province. The selected competencies areas were identified based on the job description of AOs. This approach has been followed by several authors in the past (Ali, 1991; Randavary and Vaughn, 1991; Najjingo and McCasline, 1991; Easter, 1985). The data were analyzed statistically using computer software, Statistical Package for Social Sciences (SPSS) and the percentages of the respondents were calculated.

In this study, the purpose of scaling of index value was between 0 and 1. There are five parameters where scale step can be constructed into five categories (parameters). Scaling for possessed and required competencies was assigned values ranging from 0.00 to 1.00 into five scales. The scales were assigned values 0.00 - 0.20 (very low), 0.21 - 0.40 (low), 0.41 - 0.60 (moderate), 0.61 - 0.80 (high) and 0.81 - 1.00 (very high). Information on demographic and social characteristics and professional competencies perceived by AOs were also collected by the survey questionnaire. The weighted average index of professional competencies both on existing and expected level

perceived by AOs based on the five scale assigned values (Qadeer, 1993).

Analysis of differences of Professional Capabilities Levels by Demographic and Social Characteristics

To find out the differences between demographic and social characteristics and levels of Professional Capabilities of the AOs, a T-test was applied. The F-test was employed to analyze the differences between the professional competencies of each aspect in comparison between the existing and the expected levels perceived by the AOs.

RESULTS AND DISCUSSIONS

Capability of AOs in identification of weeds in major field crops

The number of respondents (Fig. 1) showed that majority of the extension agents know the basic concepts about the weeds and reported that they recognize the weed species and the related problems (compete for nutrients etc.). Thus, they possess the basic knowledge however, due to changing scenarios of weeds related problems; these agricultural professionals need to be properly trained. Regarding the required level of competency of agricultural extension agents, they rated the weed science activity as a vital component for extension agents (Fig. 1). They know about the weeds of wheat, maize, rice and sugarcane. However, the weed flora of different geographical areas is different from one another and their assignment to another zone results in creating problems in identifying the new weed species. Two and seven of the respondents rated their capability as very low and low respectively, while 37, 46 and 19 respondents rated their self perceived capability in identification of weeds of major crops as medium, high and very high, respectively (Fig. 1). Sixty-nine respondents reported that the required capability in identification of major crops as very high and 35 respondents rated required capability as high. Two and one respondents showed that the required level of capability in identification of weeds of major crops as very low and low respectively.

Extension education has been employed in agriculture with particular emphasis on its role as an instrument for promoting change among the farming community for securing and providing information base for planners and policy makers in order to make accurate decisions (Ahmad, 1993). Extension is a non-formal education, which provides advisory services using the educational process to help clients in acquiring knowledge and skills to cope effectively with needs and problems they face in their own socio-economic contexts (Boone, 1989; Carter, 1993; Rahim, 1995). All the AOs consider the weed identification as an important factor for satisfying the farmers' needs. As weeds related problems have been increased due to changing cropping systems and excessive use of fertilizer and irrigation,

extension agents should be trained in weed identification which is a prerequisite for successful weed management program.

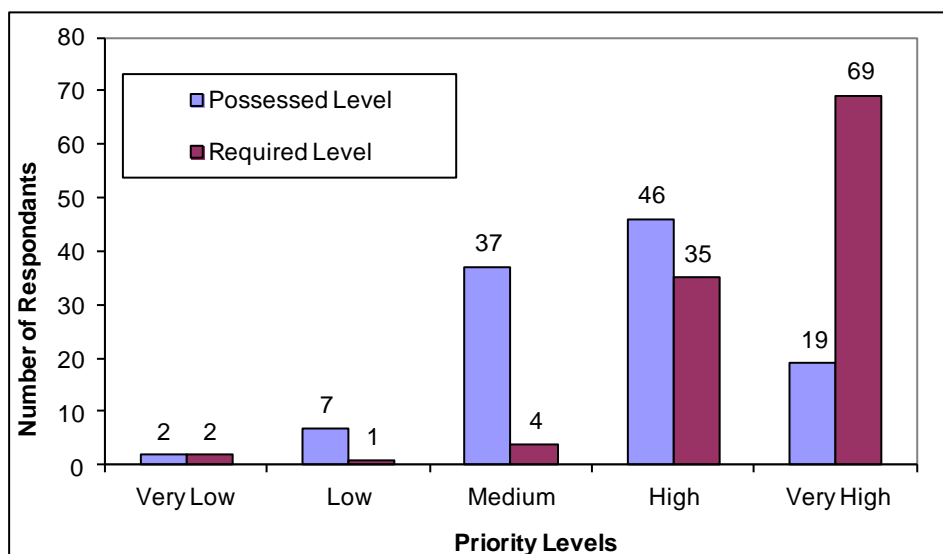


Figure 1. Capability of AOs in identification of weeds in major field crops.

Capability of AOs in identification of weeds in minor field crops

Very few AOs possessed the knowledge to identify of weeds of minor crops. Majority (55) of the AOs possess higher capability level in identification of minor crops. Fifteen respondents possessed very high level of capability in identification of weeds of minor crops. Majority of the respondents (67) reported that AOs should possess very high capability in identification of weeds of minor crops. Over 95% of the AOs reported that the required level of competency in identification of weeds should be high and very high as shown in Fig. 2. These results show that the extension agents of KPK are not properly trained in the weed related problems and thus their knowledge is not up to the mark. Based on the result of the present study it can be concluded that proper training of the extension agents is mandatory in the subject of weed science so that the AOs can communicate the recent trends of Weed science to the farming community. As the changes in composition of weed communities occur overtime, identification of weed is further complicated. Frequent trainings are expected to solve this problem. According to Alonge and Martin (1995), the first step toward adoption of new ideas by farmers is to provide information on sustainable practices. What has emerged, however, is bipolar evidence from proponents among extension agents on this subject. Agencies

and institutions engaged in information dissemination and educational activities often have high responsibilities regarding these topics, yet still have a high need for information and education themselves, responsibilities whom themselves have information and education needs (Rollins and Golden, 1994).

Fast changes in society, technological developments, complex roles and responsibilities of professionals require continuing education, continuous learning, in-service training and in most cases, graduate education (Merriam and Caffarella, 1991) and while Darkenwald and Merriam (1982) emphasized the importance of staff development to stimulate intellect, to increase knowledge and to keep abreast with new advances and developments and for organizational effectiveness.

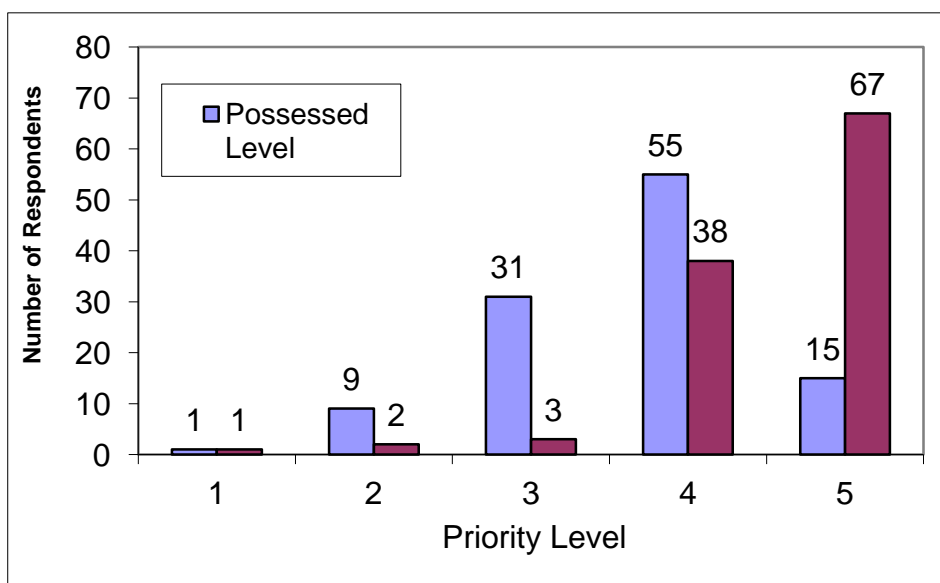


Figure 2. Capability of AOs in identification of weeds in minor field crops.

Capability of AOs in Guidance of farmers in use of herbicides

Farmers' guidance is the ultimate goal of agricultural extension agents. However, without proper training extension agents cannot address the weed related issues. The data in Fig. 3 shows that 45 respondents possessed high capability in guiding farmers about correct use of herbicides while 18 respondents possessed very high capability in instructing farmers about the use of herbicides. Only 11 respondents possessed low to very low knowledge about herbicides use. Majority of the respondents (104) reported that extension agents should possess high to very high level of capability in guiding farmers

about herbicides use. This difference may be due to the fact that few extension agents are working in arid zones and the crops are totally dependent on rainfall. Therefore, weeds are not a big problem in those regions; weeds rather become a big problem in irrigated and fertile zones. Agunga (1995) noted that extension agents need to be trained in sustainable agriculture in order to develop their understanding, competence, and ability to teach and communicate the concepts to farmers. As farmers are the end users of weed management campaigns, Agricultural Extension Agents should be trained and motivated to transfer the knowledge to the end users. Proper weed identification and selection of appropriate weed control method can consequently result in higher crop yield and economic returns, which will ultimately contribute to the farmers' economical improvements. Agriculture officers should be competent in a wide range of agricultural concepts which helps to raise income of the farming community.

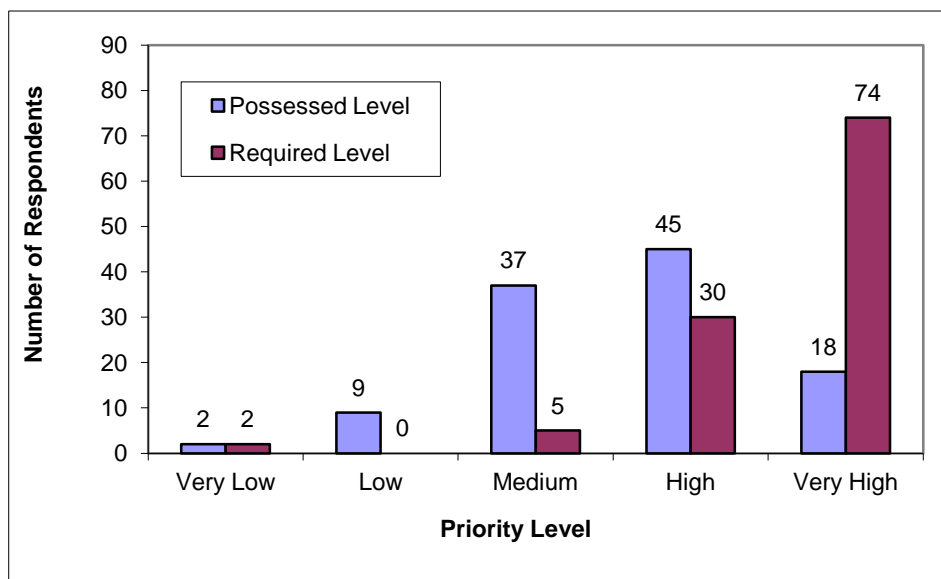


Figure 3. Capability of AOs to guide farmers in herbicides application on weeds.

Current and Expected Levels of Professional Capability of AOs in Weeds

The weighted average index (WAI) values are applied in this analysis to understand the self-assessment of AOs on different aspects of professional capabilities of weeds in comparison between their existing and expected levels. Table-1 shows statistical differences at 99% confidence level between self-assessment of their existing and

expected level in all aspects of professional capabilities of AOs. The professional capabilities comprising of weed identification in major crops, weed identification in minor crops and farmers guidance in herbicides application are all rated as high level (0.80, 0.76 and 0.79) but their expected capability level in this regard is very high (0.92, 0.92 and 0.93) with statistically difference at 99% confidence level.

Table-1. Self-assessment of AOs on Professional Capabilities in weeds on their existing and expected levels.

Weed Identification capability	Current level	WAI Assessment	Expected Level	WAI Assessment	P-value
Weed identification in major crops	0.80	High	0.92	Very High	0.000**
Weed identification in minor crops	0.76	High	0.92	-	0.000**
Farmers guidance in herbicide application	0.79	High	0.93	Very High	0.000**
Average	0.79	Moderate	0.92	Very High	0.000**

**T-test is significant at 99% confident level. Source: Field Survey

According to Khan *et al.* (2008), AEOs of NWFP now called Khyber Pakhtunkhwa needs training programs for agricultural extension services to make them more efficient, effective and competitive to meet the emerging challenges.

Comparison between Current and Expected professional Capability Levels of AOs in Weed Science

The comparison of the existing and expected competencies in weeds assessed by themselves are shown by a web-radar diagram in Fig. 3, that shows the differences between the existing and expected levels of competencies on the weeds based on their WAI values presented in Table-3.

Analysis of Professional Capability in Weed Science of AOs by Demographic and Social Characteristics

Analysis of correlation coefficient of factors associated with professional capabilities of weeds from Table-4 below shows that several factors have positive relationship with it. These include age, job experience, professional qualifications and family background (Shafi, 1995). Whilst specializations, domicile, previous experience in farming and attendance of irregular training program have their negative relationship with professional capabilities in weeds.

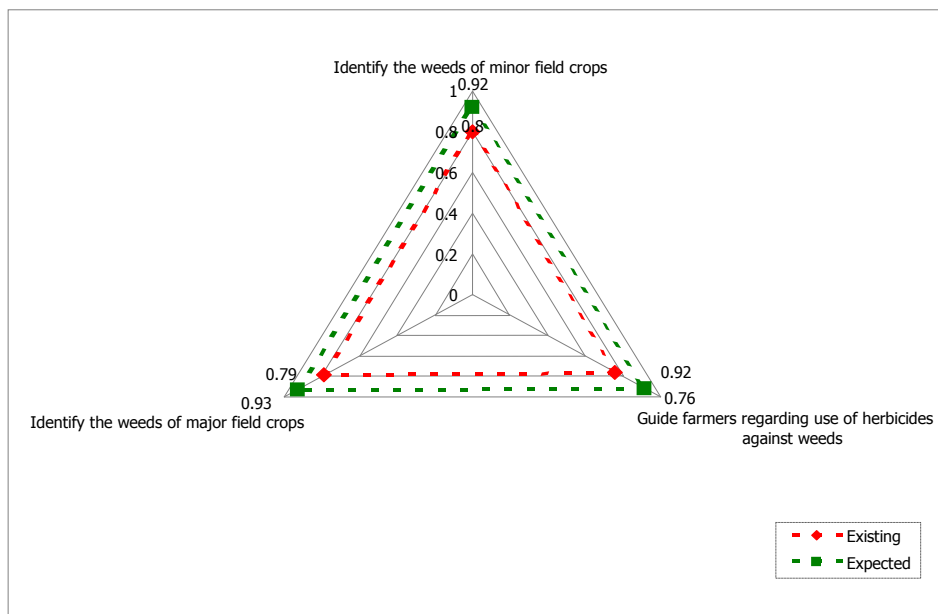


Figure 4. Comparison between possessed and required level of competency of AEOs.

Table-2. Factors associated with professional competencies of weeds.

Factors (Independent)	Correlation Co- efficient Value	Significant level
Age	0.108	0.076
Job experience	0.177	0.063
Professional qualifications	0.400**	0.000
Specializations	-0.007	0.939
Family background	0.219*	0.021
Domicile	-0.068	0.476
Previous farming experience	-0.128	0.179
Irregular training program attendance	-0.248**	0.009

Among those associated factors from the above table, only two factors have statistical significance at 99% confident level consisting of professional qualifications (0.400) and attendance of irregular training program (0.248) and one factor have statistical significance at 95% confident level consisting of family background (0.219).

CONCLUSIONS

It is concluded from the present study that AOs should possess high to very high level of capabilities in identification of weeds of major and minor field crops as well as use of herbicides to manage weeds in field crops. The AOs of Khyber Pakhtunkhwa extension department at present possess medium to high level of capabilities in identification of weeds and use of herbicides. Based on this study, some differences are found between the existing and expected level of professional capabilities of AOs. Their expectation to improve their skills in weed science is very high in many aspects. Specialization, family background and trainings have increased the capabilities of AOs where as on the other hand the demographic factors like age, job experience, farming experience, qualification and the place of origin have no effect on professional capabilities. The differences between the expected and existing levels in professional capabilities in weeds show that the AOs need in-service training in one capability of weeds to identify the weeds of minor crops. It is recommended that in-service trainings should be offered so that they can update their knowledge of weeds.

REFERENCES CITED

- Ahmad, M. 1993. Evaluation of the working extension field staff for the development of farming community. *Pak. J. Agri. Sci.* 29(1): 231-236.
- Agunga, R.A. 1995. What Ohio Extension agents say about sustainable agriculture? *J. Sust. Agric.* 5(3): 169-178.
- Ali, T. 1991. An identification and validation of job performance competence needed by Agricultural extension field Assistants in Faisalabad, Punjab-Pakistan. Unpublished doctoral dissertation, University of Minnesota, St. Paul, Minnesota USA.
- Alonge, A.J. and R.A. Martin. 1995. Assessment of the adoption of sustainable agriculture practices: Implications for agricultural education. *J. Agric. Educ.* 36(3): 34-42.
- Anonymous. 2007. Yield losses in major crops of Pakistan. www.wssp.org.pk.
- Boone, E.J. 1989. Philosophical Foundations of Extension, In D.J. Blackburn (ed.). *Foundation and Changing Practice in Extension*. University of Guelph, Canada. Pp. 115-121.
- Carter, G.L. 1993. Looking to the Future Prospects for Extension Here and Elsewhere: What Might be learned from the USA Experience. *Conf. Trend Prior. Exten.* University Pertanian, Malaysia. Pp. 1001-1012.
- Darkenwald, G.G. and S.B. Merriam. 1982. *Adult education: Foundation of practice*. New York: Harper and Row. Pp. 603-611.

- Easter, G.W. 1985. Assessment of professional competence needed by extension agent in developing countries. Case study in Switzerland. Unpublished Doctoral Dissertation Pennsylvania State University, USA.
- Gibson, J. and J. Hillison. 1994. Training needs of area of specialized extension agents. Available at: <http://www.joe.org/joe/1994october/a3.html>.
- Govt. of Pakistan. 1991. The Pakistan National Conservation Strategies, Environmental and Urban Affairs Division Government of Pakistan.
- Jan, H., A. Muhammad and A. Ali. 2004. Studies on weed control in potato in Pakhal plains of Mansehra. *Pak. J. Weed Sci. Res.* 10 (3-4):157-160.
- Khan, M.A. 2000. Identification of the factors affecting the working efficiency of Agriculture (Extension) Department, Government of the Punjab. PhD Thesis, Department of Agricultural Education, Extension and Short courses. Sindh Agric. Univ. Tandojam, Pakistan.
- Khan, M.Z, K. Nawab and I. Khattak. 2008. Assessment of the Existing and Required level of Professional Competencies of Agriculture Officers in NWFP in Program Planning and Extension Teaching. *J. Hum. Soc. Sci.* 16(2): 104-115.
- Khan, M.Z, K. Nawab and M.A. Khan. 2006. Weed related professional competency of agricultural extension agents in NWFP, Pakistan. *Pak. J. Weed. Sci. Res.* 12(4): 331-337.
- Merriam, S.B. and R.S. Caffarella. 1991. Learning in adulthood. San Francisco. Pp.239-246.
- Najjingo, M.K. and I.L. McCasline. 1991. An Assessment of the technical and professional competence needed by extension personnel in the central region of Rganda Proceedings of AIAEE Conference, St. Louis., Mo. Pp.116-124.
- Pervaiz, U. 2001. Main factors affecting extension activities. A case study of Malakand agency M.Sc thesis Deptt. of Agric. Extension Education and Communication, NWFP Agricultural University Peshawar, Pakistan.
- 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.
- Radhakrishna, B.R. and J.S. Thompson. 1996. Extension agent's use of information sources. Available at <http://www.joe.org/joe/1996february/rb2.html>.
- Rahim, M.S. 1995. Extension Education for Industrializing Malaysia: Trends, Priorities and Emerging Issues. Inaugural Speech. UPM. 167-172.

- Randavary, 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 Assoc. Inter. Agric. Ext. Ed.* 7(1): 19-26.
- Rollins, J.T. and K. Golden. 1994. A proprietary information dissemination and education system. *J. Agric. Ed.* 35(2): 37-43.
- Shafi, M. 1995. Identification of the factors affecting the working efficiency of Agriculture Officers in the department of Agricultural Extension, Government of the Punjab. M.Sc. (Agri. Ext.) Thesis, University of Agriculture, Faisalabad, Pakistan.
- Shih, W. and J.F. Evans. 1991. Where field staff gets information. Available at <http://www.joe.org/joe/1991fall/a5.html>.