Media Usage: Understanding the Extension Services in Diffusion of Agricultural Innovations

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Abstract

This Paper develops a framework of diffusion of agricultural innovations. The study investigates the sources through which farmers are exposed to the new methods. The assessment of adoption process provides valuable information to the researchers, extension workers and policy makers to identify reasons of low productivity. The present study aimed to observe the adoption level of farmers for new methods of production and use of technologies. This exploratory study takes into account, the media and, interpersonal communication of two-step flow in diffusion of agricultural innovation processes.

Keywords: Framework of Diffusion, Agricultural Innovations, Media Usage

Introduction

Extension workers become facilitators and recorders of the process rather than merely relayer of messages. They are involved in all of the field activity, and greater demands are made on them in terms of interpersonal skills. Farmer innovators are brought to the fore as key actors in technology development, and also in communication. We discuss the changing roles of farmers, extension workers and media use. The purpose of this study is to explore what types of innovations are currently available in Bhakkar district of Punjab, Pakistan. This study explores the perceptions and attitudes of farmers. This study will also explore successful strategies used by extension workers into their curriculum. After a review of diffusion and innovation concepts, some of the

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additional literature in the area of agriculture will be explored. It may also show as to who are the successful change agents in the transformation of innovations. Communication channels are categorized as (1) interpersonal or mass media in nature, and (2) originating from localite or cosmopolite sources.

Mass media channels are all those means of transmitting messages that involve a mass medium, such as radio, television, newspapers, and so on, which enables a source to reach an audience of many. The formation and change of strongly held attitudes, however, is best accomplished by interpersonal channels. Interpersonal channels involve a face-to-face exchange between two or more individuals. The channels of communication used by the farmers in different stages of the innovation-decision process are very effective. In case of mass media sources, TV is the major source of information utilized by majority of farmers. It provides to reduce uncertainty through solving the individual farmers' perceived problems.[1]

Most of the extension officers seem to concentrate their efforts on creating awareness knowledge, although this goal can be achieved more efficiently in many client systems by mass media channels. Extension officers/change agents could perhaps play their most distinctive and important role in the innovation-decision process if they concentrate on "how-to-knowledge, which is probably most essential to clients at the trial and decision function in the process. Most extension workers perceive that creation of principle-knowledge is outside the purview of their responsibilities and is a more appropriate task for formal schooling and general education i.e. agricultural literacy (Nunnery (1996). It is admittedly difficult for extension workers to teach basic understanding of principles. But, when such understanding is lacking, the change agent's long-run task remains very difficult. For instance, we in India advocate the adoption of new crop varieties to villagers. But because the basic principles of how to evaluate these seed innovations is never developed, therefore the extension officers must conduct repeated diffusion campaigns each time a new crop variety become available. The central task of extension is to help rural families help themselves by applying science, whether physical or social, to the daily routines of farming, homemaking, and family and community living.[2]

Communication is an activity much taken for granted. Extension education is essentially a process of communication. Communication of ideas and skills between and among the people is abstract and possesses numerous meanings. According to Clevenger,[3] it is inconceivable that any person cannot communicate. The process of communication is fundamental to extension, training and passing on information. Thus

learning processes, the dissemination of innovations or social change cannot be explained without reference to communication. Communication is an activity much taken for granted. Extension education is essentially a process of communication. Communication of ideas and skills between and among the people is abstract and possesses numerous meanings.

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Statement of the problem

The statement of the problem is "Media Usage: Understanding the Extension Services in Diffussion of Agricultural Innovations: The Case of Punjab", during 2008-2010.

Rationale of the study

The study will help provide scientific information on the necessary diffusion services through extension workers and psychological factors that would influence the acceptability of the innovations in Pakistan. Pakistan has a rich and vast natural resource base, covering various ecological and climatic zones; hence the country has great potential for producing all types of food commodities. Agriculture has an important direct and indirect role in generating economic growth. The importance of agriculture to the economy is seen in three ways: first, it provides food to consumers and fibers for domestic industry; second, it is a source of scarce foreign exchange earnings; and third, it provides a market for industrial goods.

This study has significant potential to make the research and extension agenda more relevant to farmers' needs and their environment, and indeed in bringing about the desired changes in agricultural productivity, incomes and sustainability. Considerable on farm research and adaptation involving farmers and farmers' groups is often required before an innovation becomes fully relevant and can be easily adopted. Information management, dissemination and exchange by documenting farmers' experiences, and activities using other media, e.g. radio, television, booklets and newsletters. This work focuses on informing producers of agricultural innovations and organizations from which they may benefit. Individuals or teams and to communicate important feedback that one believes are responsible for a problem.

Objectives of the study

- To become aware of the understanding of farmers about the extension workers' services.
- To explore the index of frequency of TV agricultural programs.
- To see the management ability of farmers through extension agents.
- To understand the "Track Two theory" regarding government administration.
- To document the peer role in diffusion of agricultural innovations.
- To see the extension workers role as a linkage between farmers and the media men.
- To explore the vital role of interpersonal contacts.
- To evaluate the role of communication technology.

Literature review

The literature review for this study covers the constructs of diffusion and innovations, from their beginnings in agricultural studies through their current connection to extension workers. It examines the concept of a change agent and the role that such an agent may play in promoting agricultural innovations.

Traditionally, extension has categorized farmers according to their propensity to adopt innovations and/or according to broad economic or farm size criteria. Much of the previous literature on technology adoption has focused on mechanical (e.g., tractors), chemical (e.g., pesticides), and agronomic (e.g., integrated pest management) innovations. More recent research has been devoted to informational (e.g., precision farming) and biological (e.g., BE) innovations.[5] Agricultural extension finds itself in the midst of significant changes and uncertainty. Processes of change have been underway for some time but in many developing countries these have been accelerated by structural adjustment reforms aimed at reducing public sector spending.

Balamatti argues the strategic extension campaign (SEC) methodology developed by Food an Agriculture Organization (FAO) emphasizes stakeholder participation in the planning, management, and implementation of extension and training programs. Communication strategies and materials are developed based on results of a participatory problem identification process that analyzes the causes of farmers' non-adoption of technology or practices. Balamatti argues the strategic extension campaign (SEC) methodology developed by Food an Agriculture Organization (FAO) emphasizes stakeholder participation in

the planning, management, and implementation of extension and training programs. Communication strategies and materials are developed based on results of a participatory problem identification process that analyzes the causes of farmers' non-adoption of technology or practices. Numerous studies have been conducted on the adoption of individual technologies. But no effort has been made in the past to determine the extent of adoption of crop production technologies as a whole.[6]

The knowledge about technologies does not guarantee for their adoption. There may exist social and economic barriers that do not allow individuals to adopt recommended technologies. The following section deals with **a**doption of various rice production technologies (Sheikh, 2000).[7] The research in extension was born out of practical considerations such as making improvements in extension work. Studies on communication methods and social change were needed to make effective interventions for increasing farm production. The pioneering work done Rogers,[8] greatly contributed towards understanding the process of diffusion and adoption of innovations.

There are two major approaches to using media and technology in agriculture: farmers can learn "from" media and technology, and they can learn "with" media and technology.[9] Learning "from" media and technology is often referred to in terms such as instructional television, computer-based instruction, or integrated learning systems.[10] Learning "with" technology, less widespread than the "from" approach, is referred to in terms such as cognitive tools [11] and constructivist learning environments.[12]

The S-shaped curve illustrates the fact that there are relatively few adopters at first but that, as the technology, concept, or practice is picked up by innovators and early adopters, their influence will have an impact on the later adopters that make up a majority of potential adopters. The resultant bell-shaped curve graphically represents the different types of adopters and roughly reflects categories corresponding to standard deviations. That is, early and late majority adopters are often time statistically shown to be one standard deviation "above" the mean (average adopter), and the innovators, and early adopters, and laggards are two to three standard deviations "below" the mean.[13]

"Diffusion is the process by which an innovation is communicated through certain channels over time among members of a social system".[14] The diffusion framework is a fairly involved framework that includes several "sub-theories" or concepts. These concepts together provide insight into human and social nature, including how new information is accepted (or not accepted) by potential users. Because of

this, the diffusions framework draws heavily from the fields of psychology and rural sociology.[15]

Hypotheses

(i) Higher is the exposure to the media, higher will be the adoption level of extension services
(ii) Higher is the availability/accessibility of communication technology, higher will be the awareness of extension workers
(iii) It is more likely that interpersonal contact change the farmers' attitude as compared to other sources
(iv) Awareness and information leads the farmers toward trial and adoption

Method

Sample

The present study is a survey research in nature. Twenty towns/ villages were randomly selected from the entire universe and 17 farmers from each towns/villages for data collection were selected on quota basis. In this way total sample size for this study was 340 farmers. To explore the phenomena, a standardized questionnaire was constructed.

The present study was conducted in district Bhakkar according to agricultural department Bhakkar, 2011. This District was established on 01-07-1982. It comprises of Four Tehsils namely, Bhakkar, Kallurkot, Darya Khan and Mankera. Bhakkar District is surrounded by District Mianwali on Northern side, District Layyah on Southern, District Khushab and Jhang on Eastern and District Dera Ismail Khan on Western side.

The survey was alert to meaning and syntax, clarity, elapsed time and effects of the order of presentation. In pre-testing was ultimately concern with reliability and validity. Reliability, of course, concerned the consistency of responses with variations in time, place, and interviewer validity, the degree to which what was sought is actually reflected in the measurement. For this exploratory study quota sampling procedure randomly selected farmers from each selected towns/ villages was adopted.

Data Analysis

The first step was to determine the type of research H_o to be answered by the statistical analysis. Contingency table χ^2 Pearson correlation, Kendall's tau_b, Spearman's $r_{s,}$ one way analysis of variance, Correlation

Matrix, Binomial/ sign test, regression equation and normal probability plot and histogram plot are used for data analysis

Table5.1: Education and Income of the Respondents
H_o Education and Income are correlated
H_a Education and Income are not correlated

			Education	Monthly Income
Kendall's tau_b	Education	Correlation Coefficient	1.000	.949(*)
		Sig. (2-tailed)	.	.023
	Income	Correlation Coefficient	.949(*)	1.000
		Sig. (2-tailed)	.023	.

Table 5.1 indicated that both the variables (Education & Monthly Income) at the 0.05 level of significance were correlated and coefficient. This 2-tailed correlation table showed that education 1.000 and income .949(*) and at cross-matched level income was coefficient with education .023 over all. The result tells us that education and income affect the knowledge, attitude and, practice level of the farmers and extension workers. Therefore, it was concluded that null hypothesis is accepted.

Table 5.2: Visit fields' days and Visit office of extension worker
H_o Visit at field days and at office of extension workers is significant
H_a Visit at field days and at office of extension workers is not significant

	X		Visit fields' days	Visit office of extension worker
Kendall's tau_b	Visit fields' days	Correlation Coefficient	1.000	.333
		Sig. (2-tailed)	.	.497
	Visit office of extension worker	Correlation Coefficient	.333	1.000
		Sig. (2-tailed)	.497	.
Spearman's rho	Visit fields' days	Correlation Coefficient	1.000	.400
		Sig. (2-tailed)	.	.600
	Visit office of extension worker	Correlation Coefficient	.400	1.000
		Sig. (2-tailed)	.600	.

According to the Kendall's tau_b test of correlation and coefficient shows 1.000, .333 among the visit fields' days and visit office of extension worker was insignificant. Spearman's rho test of correlation and coefficient also indicated that visit fields' days and visit office of extension worker is not significant. Both statements of assumption were not correlated. The visit office of extension worker .400, .333 was significant because the farmers visits the office but not at field days. We have concluded that the null hypothesis is rejected.

Table 5.3: Type of land & Irrigation system
One-Way Analysis of Variance

Source	DF	SS	MS	F	P
Factor	1	0	0	0.00	1.000
Error	6	39866	6644		
Total	7	39866			
Individual 95% CIs For Mean					
Based on Pooled StDev					
Level		Mean	StDev	---+---------+---------+---------+---	
Type of land	85.00	66.57	(----------*----------)		
Irrigated system		85.00	94.11	(----------*----------)	
				---+---------+---------+---------+---	
Pooled StDev =		81.51		0 60 120 180	

H_o There is relationship between type of land and irrigation system
H_a There is no relationship between type of land and irrigation system

Analysis of variance in table 5.3 explores that M=85.00 and StDev=66.57 record the SS=0 MS=0 and F distribution is 0.00. The main calculation of P value is 1.000 which shows that there is no relationship between type of land and irrigation system. The possession of land of the farmers and the system of irrigation is different. On the basis of calculation we conclude that H_o is rejected.

Figure 5.1: Type of land and irrigation system

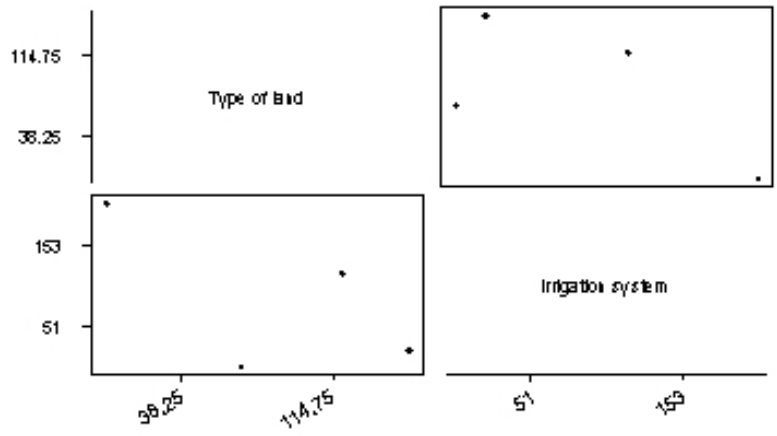

Table 5.4: Family member work
Binomial Sign Test

	Category	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Yes	190.00	.50	.50	1.000
No	150.00	.50		
Total		1.00		

Result indicates that 190 of the respondents out of 340 works together at Farm while 150 not working.

Sign test. If the probability of "yes" is 0.500, then:

- The two-tail P value is < 1.000
  this is the chance of observing either 190 fall in category "yes", and 150 in the category "no" in 340 respondents.

Table 5.5: Female should do work

		Percent	Valid Percent	Cumulative Percent
Valid	.00	25.0	25.0	25.0
Very likely	51.00	25.0	25.0	50.0
Likely	136.00	25.0	25.0	75.0

Not likely	153.00	25.0	25.0	100.0
	Total	100.0	100.0	

Table 5.5 shows that the three categories of the respondents are of the equal (25.0%) opinion, although the actual score are different from each other but the SPSS result is similar.

Hujra,bathik,chouk system
Result indicates that 272 of the respondents out of 340 not getting information from Hujra, bathik, chouk while 68 gets.
Sign test. If the probability of "yes" is 0.500, then:

- The two-tail P value is < 1.000
  this is the chance of observing either 68 fall in category "yes", and 272 in the category "no" in 340 respondents.

Table 5.6: Communication technologies &agricultural information
Correlation Matrix

		TV	Radio	Internet	Newspapers
Correlation	Magazine	1.000	.866	-.431	.993
	Posters	.866	1.000	.077	.802
	Sign board	-.431	.077	1.000	-.534
	Wall chalk	.993	.802	-.534	1.000
Sig. (1-tailed)	Burgees		.167	.358	.037
	Friends	.167		.475	.204
	Neighbors	.358	.475		.321
	Extension worker	.037	.204	.321	

Results of the correlation matrix of variable are different in strength of relationship. Magazine is not correlation to TV but have relationship with radio, Internet and newspapers (.866, -.431, and .993). Findings shows that relationship among poster, Internet and newspapers are strong but not with TV. Sign boards have no relation with Internet. Newspapers are not correlation with wall chalking. Burgees have correlation with

other variable but not with TV. Friends, neighbors and, extension worker have relationships with the other variables. Over the strength of relationship among variable are strong.

Extensions worker field days
Binomial/ sign test shows that 139 of the respondents out of 340 extension works hold field days while 221 not holds.
Sign test. If the probability of "yes" is 0.500, then:

- The two-tail P value is < 1.000
  this is the chance of observing either 130 fall in category "yes", and 221in the category "no" in 340 respondents.

Table 5.7: Satisfaction with TV program and Extension worker role
Correlations (a)

		Satisfaction with TV programs	Extension workers role
Satisfaction with TV programs	Pearson Correlation	1	.747
	Sig. (2-tailed)		.253
	Sum of Squares and Cross-concepts	7514.000	4760.000
	Covariance	2504.667	1586.667
Extension workers role	Pearson Correlation	.747	1
	Sig. (2-tailed)	.253	
	Sum of Squares and Cross-concepts	4760.000	5408.000
	Covariance	1586.667	1802.667

Table 5.8 of Pearson Correlation shows that satisfaction with TV agricultural programs in Sig. (2-tailed) SS=7514.000 and 4760.000 and the covariance 2504.667 and 1586.667 and extension workers' role to disseminating agricultural information Sig. (2-tailed) SS=4760.000 and 5408.000 with covariance=1586.667 and 1802.667 have no significant relations.

Table 5.8: Dissemination agricultural information & numberdar role in extension campaign

The chi-square test is defined for the hypothesis:

H_0:	The data follow a significant level of information.
H_a:	The data do not follow the significant level of information

Finding of $\chi^2_{(\alpha,k-a)}$ 12.453 + 13.190 + 1.629 + 1.726 + 0.421 + 0.445 +1.034 + 1.095 = 31.994 with DF=3 indicates that extension worker role to disseminate agricultural and numberdar role in extension campaign information is significant because of the P-Value = 0.000. The null hypothesis is found true.

Table 5.9: Efficiency of processed seeds and agricultural input prices

Analysis of Variance

Source	DF	SS	MS	F	P
Factor	1	0	0	0.00	1.000
Error	6	84056	14009		
Total	7	84056			

Individual 95% CIs For Mean

Based on Pooled StDev

	Mean	StDev	-----+------+-------+------
Efficiency of processed seeds	85.0	90.3	(----------*----------)
Agricultural input prices	85.0	141.0	(----------*----------)
			-------+---------+---------+--------
Pooled StDev = 118.4		0	80 160

Table 5.9 reveals the analysis of variance Where SS=0 MS=0 F=0.00 and P=1.000. The Mean of efficiency of processed seeds is 85.0 while StDev=90.3. The StDev of agricultural input prices is 141.0. Therefore, the null hypothesis of significant variation accepted.

Conclusion

A conceptual model was developed in the light of system approach for evaluating all the diffusion of agricultural innovations campaigns, farmers' level of satisfaction with such campaigns, their intention to adopt the introduced agricultural innovations and their adopting behavior. For instance interpersonal communication, face-to-face interview technique was used for the collection of data from the respondents. The use of such technique made the comparison and

validation of data possible multivariate statistics was used to according to the nature of present study's objectives.

Income and education have significant correlation and played a significant role in adoption of agricultural innovations. Field days visit was not necessary because farmers were not interested. Land and irrigation system have not been found playing role in changing knowledge, attitude and practices. The family members have worked at field but the female role in farming was not effective in changing behavior of farmers, in adopting agricultural innovations.

Communication technologies regarding agricultural innovations information played important role along with extension services and others media i.e. numberdar, agricultural experts, agricultural agents, relatives, friends and co-farmers were also observed. It cleared that among media variables television was perceived most effective medium in diffusion of agricultural innovations in the rural areas where newspapers and magazines received very low responses. The role of interpersonal communication- numberdar, agricultural experts, agricultural experts, relatives, friends and interaction with other farmers- was also explored. Interaction with neighbors regarding agricultural innovations was observed significant.

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