

Research Article



Comparative Analysis of Satisfaction of Smallholder Rice Growers with Public and Private Extension Organizations and Development of a Strategy to Enhance the Effectiveness of Extension Work in the Punjab

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Abstract | Agricultural extension is the main source for addressing technical issues and dissemination of current technologies among the smallholder farmers in Pakistan. Since the late 1980s, the government of Pakistan include private sector in extension circle to enhance the effectiveness of public extension through competition. This study conducted in 2016, sought to analyze whether smallholder rice growers are more satisfied with public or private extension organizations and development of a strategy to enhance the effectiveness of extension work. The specific objectives were to ascertain the satisfaction smallholder rice growers regarding the extension work conducted by public and private extension organizations; to analyze the satisfaction of smallholder rice growers with public and private organizations; and to develop a strategy to enhance effectiveness of extension work. Gujranwala, being the largest rice growing district in the Punjab was selected as study area. A sample of 342 drawn from the list of 2,365 rice growers registered by public and private sectors in the district was selected. Interview schedule was used as research tool. In the light of above findings, it is concluded that growers were not satisfied with public sector's extension field staff (EFS) regarding their help in credit acquisition and dealing with them. Performance of private sector is very poor in provision of information about innovative technologies to farmers. Analysis of satisfaction of farmers with public and private sectors show that farmers are not completely satisfied with extension package of either sector. Therefore, the new strategy proposes changes in working order of both sectors in order to enhance the extension work in the Punjab.

Received | June 03, 2016; **Accepted** | Jul 24, 2017; **Published** | September 26, 2017

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Citation | Talib, U., I. Ashraf, K.M. Chaudhary and R. Ahmad. 2017. Comparative analysis of satisfaction of smallholder rice growers with public and private extension organizations and development of a strategy to enhance the effectiveness of extension work in the Punjab. *Pakistan Journal of Agricultural Research*, 30(3): 242-248.

DOI | <http://dx.doi.org/10.17582/journal.pjar/2017.30.3.242.248>

Keywords | Smallholder farmers, Private extension services, Rice growers, Punjab, Agricultural extension

Introduction

Rice (*Oryza sativa* L.) plays a manifold role in serving humanity across the globe. About 50% of the world population depends partially or wholly on rice. An overwhelming majority (90%) of poor Asian population feeds on it (FAO, 2004). It also plays mul-

tifarious role in Pakistan's economy. It is the second staple food as well as the largest (9%) employment generating crop in the country. Unfortunately, there is a big yield gap between potential and actual rice yield ranging from 1-3 t/ha (Mohanty, 2010). The current yield is much less than what could be achieved by using modern technologies and varieties. There is al-

most 82 percent unachieved potential of paddy in Pakistan (Govt. of Pakistan, 2013; USDA, 2014). Paris et al. (2008) indicated that gigantic yield gap of rice is mainly due to lack of social and biological sciences integration, technical knowhow on how to efficiently use the available technology, resistance for application of new technology by the farmers and weak linkages between public and private extension organizations.

FAO (2013) described that farmers' dissatisfaction with extension organizations either public or private on lack of knowledge and management skills i.e. unlevelled field, poor variety/seed selection, early nursery raising, non-technical transplanting, less plant population, imbalanced use of fertilizers, untimely irrigation scheduling as well as injudicious application of pesticides against diseases and insect-pests added fuel to the production loss. The last but not the least is conventional harvest and post-harvest means, which reduces 15 to 20% of on-farm production (Table 1). While economic losses at market are 10-15% (USDA, 2010). The ultimate basis of yield gap of rice is dissatisfaction of growers with extension organizations.

This vacuum can be revamped by improving the extension services in order to build the capacity of the rice growers. Cooperation between public and private extension agencies can also make the farmers technically sound which enables them to use the existing resources and inputs efficiently with currently available technology (Smil, 2005). In case of Pakistan since

last decade of 20th century private sector is also in competition with public sector to deliver all the available resources and technicalities for upbringing the socio-economic status of rice growers. Generally it is perceived that smallholder farmers are more satisfied with private agricultural extension organizations (Ali et al., 2008). While another cluster considers they are more satisfied with public agricultural extension organizations (GoP, 2007).

The research problem originated because there were only few researchers analyze the satisfaction of smallholder farmers with public and private extension organizations in Pakistan and development of a strategy to enhance the extension work. The research issue also hollowed out as almost no study conducted with rice growers in the Punjab, Pakistan.

The practical research question that needs to be answer is that which sector public or private is more effective in addressing the needs of smallholder farmers? Therefore, the research problem for this study is to analyze the satisfaction of smallholder rice growers with public and private extension service and how to enhance the effectiveness of extension work?

This study set out to analyze satisfaction of smallholder rice growers with public and private extension organizations and development of a strategy to enhance the effectiveness of extension work. The main purpose is determining, which is more effective.

Table 1: Comparative characters of public vs private extension organizations

Characters	Public sector	Private sector
Goal	Welfare maximization	Profit maximization
Client	Whole farming community	Big landholders or resource rich farmers
Working area	Area is small but having no transportation facility	Area is large but having transportation facility
Research	Product-oriented	Farmer-oriented and need based
Extension Methods	Use modern means of communication (ICTs) on small scale	Use modern means of communication (ICTs) on large scale
Transportation Facility	There are less transportation facilities for front line extension workers	There are more transportation facilities for front line extension workers
Financial incentives	There are less financial incentives for EFS and farmers	There are more financial incentives for EFS and farmers
Farm visits	Irregular farm visits	Regular farm visits
In-service Training	There are less in-service trainings of EFS	There are less in-service trainings of EFS
Focused Technology	Whole production technologies	Protection technology
Duties	Agricultural Extension and some administrative	Agricultural only
Involvement of farmer	There is involvement of farmers in group in decision making	There is involvement of individual farmers in decision making
Monitoring & Evaluation	There is poor mechanism of evaluation of working of EFS	There strict evaluation of working of EFS

Source: Ali et al. (2013)

The specific research objectives are:

- To ascertain the satisfaction smallholder rice growers regarding the extension work conducted by public and private extension organizations;
- To analyze the satisfaction of smallholder rice growers with public and private organizations; and
- To develop a strategy to enhance effectiveness of extension work.

Research Methodology

A survey research methodology was applied to conduct the study. The study was conducted in Gujranwala, Pakistan, the largest rice-producing district in the country. The population or sampling frame was made up of rice growers registered with the Department of Agriculture (Extension Unit) and the largest private extension unit, a pesticide company. The largest private unit in the district was Syngenta Agrochemicals. A sample size of 342 farmers was drawn out of 2,365 rice growers from the four tehsils of the district: Gujranwala, Wazirabad, Kamoky and Noshehra Virkan (Fitz-Gibbon and Morris, 1987). The respondents from each tehsil were selected on the basis of number of farmers in the tehsil. There was: 103 respondents selected from tehsil Gujranwala; 97 respondents from tehsil Kamoky; 83 respondents from tehsil Wazirabad; and 59 respondents from tehsil Noshehra Virkan. An interview schedule was prepared in English but ad-libbed in vernacular (Punjabi) to facilitate the respondents (Flower Jr., 2004). Its validity and reliability was checked through pre-testing. Data collection was carried out by the lead author through face-to-face interviews. Of 342, 289 respondents were interviewed on their farms locally known as Deras while rest of them was at their homes or shops. Data analysis was done using the SPSS 24 (Statistical Package for Social Sciences).

The small sample size of 342 smallholder farmers is not enough to generalize the results to whole the whole country or even to the province. Though, it does help answer the research hypothesis 'Private extension services are more effective than public extension services?'.

Results and Discussions

The first objective was to ascertain the satisfaction level of rice growers regarding certain aspects of ex-

tension work conducted by public and private extension organizations. Satisfaction level was measured regarding certain aspects of extension work. The aspects were: information about innovative technologies; situation analysis; involvement of local people in program planning; training of farmers; skill development; use of various extension methods; facilitation in input acquisition; provision of training facilities; farmer motivation; dealing with farmer; help in credit acquisition; farmer-extension linkage; and follow up visits. The satisfaction level was denoting the level of capacity built by extension services of either public or private sectors. It was defined as the gratitude level towards public or private sector of respondents about its built capacity by them. The data in this regard are summarized in Table 2 (Supplementary Table 1).

According to the data given in the Table 2 (Supplementary Table 1), the respondents were highly satisfied with public sector regarding use of various extension methods ($X_1=3.71$). The satisfaction of the respondents regarding follow up visits and farmer-extension linkage of the sector was ranked 2nd and 3rd with mean values of 3.37 and 3.25, respectively heading towards medium. Similarly, respondents' satisfaction regarding situation analysis ($X_1=3.17$) and farmers' motivation ($X_1=3.13$) of the sector also fell between medium and high with inclination towards medium. Satisfaction of the respondents regarding their trainings and skill development by the sector was ranked 6th and 7th with mean values of 2.71 and 2.51. The respondents' satisfaction regarding provision of training facilities ($X_1=2.37$) and information about innovative technologies ($X_1=2.24$) fell between low and medium category but inclined towards low. The respondents were the least satisfied with involvement of local people in program planning ($X_1=1.61$), help in credit acquisition ($X_1=1.96$), dealing with farmers ($X_1=2.06$), and facilitation in input acquisition ($X_1=2.12$) of the sector which were ranked 13th, 12th, 11th, and 10th, respectively.

The data also reveal that satisfaction of the respondents with provision of training facilities of private sector was ranked 1st with mean value of 3.65 heading towards high. The satisfaction of the respondents with the sector's farmer-extension linkage ($X_2=3.46$), follow up visits ($X_2=3.35$), farmer dealings ($X_2=3.33$), and farmers motivation ($X_2=3.32$) fell between medium and high category with slight inclination towards medium. Satisfaction of farmers with the sector's in

Table 2: Ranking of public and private sectors on the basis of satisfaction of the respondents with their extension work

Ranking of public sector				Extension work	Ranking of private sector			
W. Score	Mean (X_1)	Std. Dev.	R. Order		W. Score	Mean (X_2)	Std. Dev.	R. Order
1270	3.71	0.904	1	Use of various extension methods	804	2.35	1.811	9
1153	3.37	1.646	2	Follow up visits	1147	3.35	0.841	3
1112	3.25	1.270	3	Farmer-extension linkage	1184	3.46	1.973	2
1083	3.17	1.267	4	Situation analysis	673	1.97	0.777	11
1069	3.13	1.492	5	Farmers motivation	1137	3.32	1.459	5
926	2.71	1.072	6	Training of farmers	871	2.55	1.321	7
860	2.51	1.071	7	Skill development	840	2.46	0.724	8
813	2.37	1.905	8	Provision of Training facilities	1247	3.65	1.786	1
767	2.24	0.894	9	Information about innovative technologies	604	1.77	1.721	12
726	2.12	0.892	10	Facilitation in input acquisition	840	2.46	0.966	8
704	2.06	1.153	11	Dealing with farmers	1140	3.33	1.370	4
672	1.96	0.869	12	Help in credit acquisition	715	2.09	0.943	10
549	1.61	0.811	13	Involvement of local people in program planning	1024	2.99	0.688	6

involvement of local people in program planning and training of farmers was ranked 6th and 7th with mean values of 2.99 and 2.55. The respondents were equally satisfied with the sector's facilitation in input acquisition ($X_2=2.46$) and skill development ($X_2=2.46$) and together ranked 8th slightly heading towards low. Similarly, the satisfaction of the farmers regarding use of various extension methods ($X_2=2.35$) and help in credit acquisition ($X_2=2.09$) fell between low and medium but inclined towards low. The respondents were the least satisfied with sector's situation analysis and information about innovative technologies with mean values of 1.97 and 1.77.

In informal discussions, growers explained that both sectors are providing: insufficient training of extension workers about social/humanitarian aspects; poor monitoring and evaluation of extension staff; lacking in involvement of farmers in their respective program planning; infrequent visitation of farmers by them; and inadequate information provision of information. They further argued that private sector workers provide them good information but more inclined to sell their product while public sector worker's attended us at crop sowing and harvesting stages, if we need them in-between these stages, they were not more available to us. Further, public sector's innovative technologies are less compatible with soil and environment of the area. It's further noted that private extension workers have poor capacity to analyze the situation and associate any problem with insufficient use of chemicals.

Comparison of satisfaction level of rice growers with public and private sectors

To assess the satisfaction level of the respondents with public and private sectors, t-test for independent means was performed to calculate t-value.

H_0 = There is no difference in extension work conducted by public and private sector

H_1 = There is difference in extension work conducted by public and private sector

$\alpha = 0.05\%$ (two tail)

$$\begin{aligned} \text{Degree of freedom} &= (N_1 - 1) \text{ or } (N_2 - 1) \\ &= (342 - 1) \\ &= 341 \end{aligned}$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Critical Region = (+1.966 to -1.966)

The results depict that satisfaction of the respondents with public and private sectors was highly significant different in their provision of training facilities ($X_1=2.37$, $X_2=3.65$), involvement of local people in program planning ($X_1=1.61$, $X_2=2.99$), situation analysis ($X_1=3.17$, $X_2=1.97$), use of various extension methods ($X_1=3.71$, $X_2=2.35$), and dealing with farmers ($X_1=2.06$, $X_2=3.33$) with t-values of -64, -25.1, 14.3, 13.1, and -13.37, respectively.

Table 3: Comparison of public and private sectors on the basis of satisfaction of the respondents.

Public sector		Satisfaction level	Private sector		t-value
Mean	S.D		Mean	S.D	
2.37	1.905	Provision of Training facilities	3.65	1.786	-64**
3.25	1.270	Farmer-extension linkage	3.46	1.973	-1.62 ^{NS}
3.37	1.646	Follow up visits	3.35	0.841	2.00*
2.06	1.153	Dealing with farmers	3.33	1.370	-13.37*
3.13	1.492	Farmers motivation	3.32	1.459	-1.67 ^{NS}
1.61	0.811	Involvement of local people in program planning	2.99	0.688	-25.1**
2.71	1.072	Training of farmers	2.55	1.321	-1.79 ^{NS}
2.12	0.892	Facilitation in inputs acquisition	2.46	0.966	-4.79*
2.51	1.071	Skill development	2.46	0.724	0.70 ^{NS}
3.71	0.904	Use of various extension methods	2.35	1.811	13.1*
1.96	0.869	Helping in credit acquisition	2.09	0.943	-1.83 ^{NS}
3.17	1.267	Situation analysis	1.97	0.777	14.3*
2.24	0.894	Information about innovative technologies	1.77	1.721	4.48*

t-value=± 1.966; $\alpha=0.05$: *=Significant; **=Highly significant; NS=Non-significant

The satisfaction of the respondents with the sectors was significantly different about innovative technologies ($X_1=2.24$, $X_2=1.77$), facilitation in inputs acquisition ($X_1=2.71$, $X_2=2.55$), and follow-up visits ($X_1=3.37$, $X_2=3.35$) with t-values of 4.48, -4.479, and 2, respectively.

The growers were equally satisfied with extension work of public and private sectors, like help in credit acquisition ($X_1=1.96$, $X_2=2.09$), skill development ($X_1=2.51$, $X_2=2.46$), training of farmers ($X_1=2.71$, $X_2=2.55$), farmers motivation ($X_1=3.13$, $X_2=3.32$), and farmer-extension-linkage ($X_1=3.25$, $X_2=3.46$) with t-values of -1.83, 0.70, 1.79, -1.67 and -1.62, respectively.

Strategy for effective extension work in the Punjab, Pakistan

The sixth objective of the study was to develop a new strategy for effective extension work in the Punjab, Pakistan. In the light of above findings, conclusions and recommendations, a strategy is proposed for effective extension work in the province (see Figure 1).

The proposed strategy pointing that there should be provincial governing body for agricultural development under provincial ministry of agriculture. This body should consists of all head of research organizations under provincial government, Director General (Agricultural Extension & Adaptive Research), Vice Chancellors/Principals/ Deans' agriculture in the province, farmers' representative, and private sec-

tor's representative. All the members will participate to formulate provincial agricultural policies. This body will establish various consultative groups like, water management, environmental protection etc. to integrate all domains of Agriculture Department like, Extension, Research, and Farmers, which is dire need of the hour. The famer representative in the governing body will directly feed the heads of research organizations about farmer problems. The provincial research organizations will coordinate with research institutes, agricultural universities/colleges to study the farmer issues. The solution of these farming issues will equipped to the Directorate of Agricultural Extension and Adaptive Research.

Provincial Agriculture (Extension) department will work by establishing Regional Communication for Development (C4D) centers, Information Controlling Unit (ICU), and Integration & Monitoring Cell (IMC). As all extension services providers recommend different technologies so, the ICU will standardize the recommended production technologies of public and private sectors. The IMC will integrate and monitor the implementation of these recommended technologies by both sectors. The C4D centers will train public and private sector's extension workers to update them about the provincial agricultural policies. Newly recruited extension staff of both sectors will get pre-service and in-service trainings on development through communication from these regional C4D centers. There are three In-service Agricultural Training Institutes (IATIs) are already working for agricultural training of extension workers.

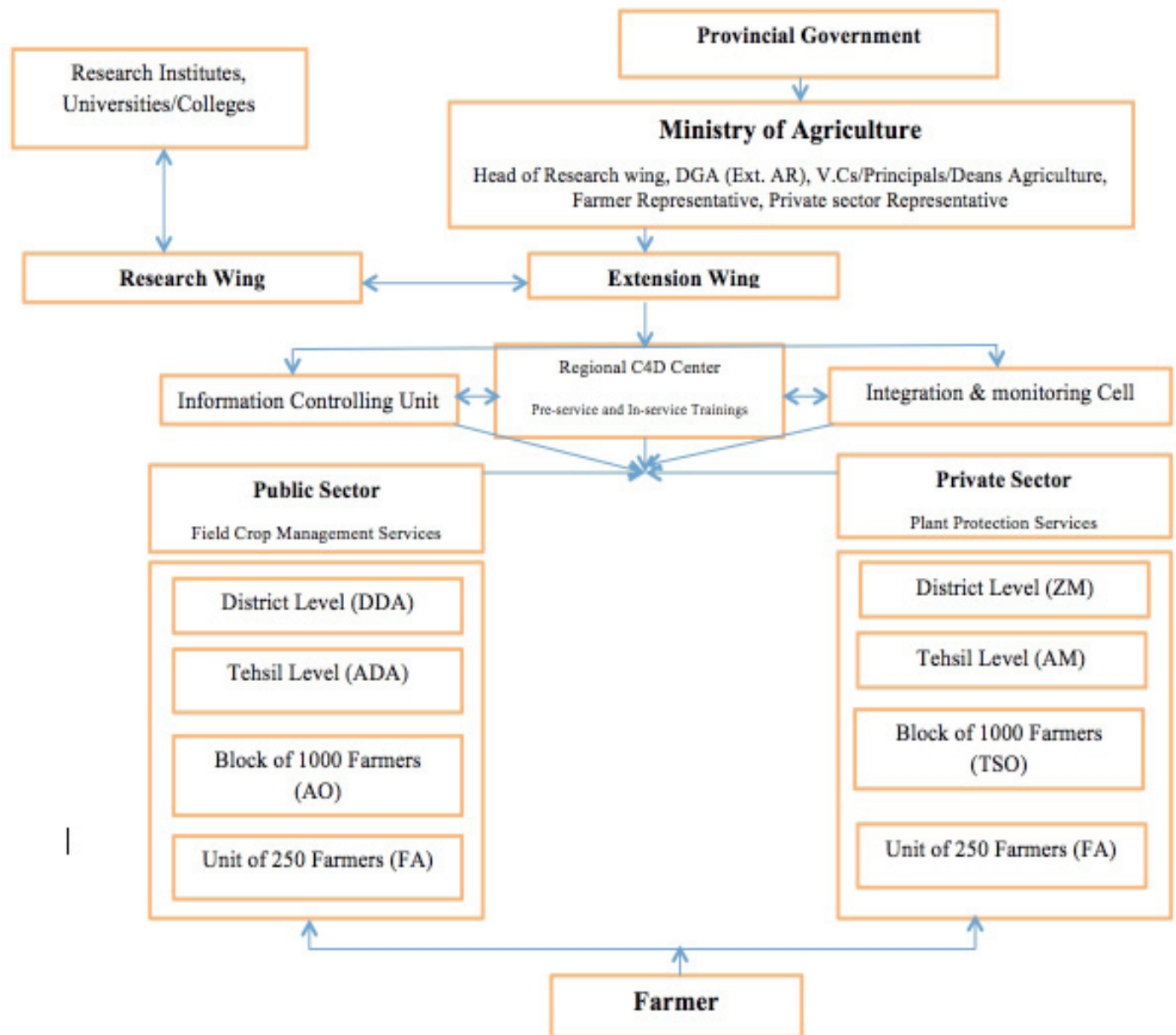


Figure 1: *Proposed Strategy for an Effective Extension Work in the Punjab, Pakistan*

It is suggested that establish the C4D centers in these institute to train extension workers on communication as source of development along with agricultural trainings. Public sector will render field crop management services while private sector will provide plant protection services. The Directorate will also facilitate the private sector to conduct their researched on the adaptive research farms. The district extension offices of both sectors will divide into four tiers. Public sector's administrator at District Level will be Deputy Director Agriculture (DDA), Tehsil (Sub district unit) headed by Assistant Director Agriculture (ADA) and Agriculture Officer (AO) will work with a block of 1000 farmers as frontline worker and he will assisted by Field Assistant (FA) who will work with a unit of 250 farmers.

Private sector's district administrator will be Zonal Manager (ZA), Tehsil (Sub district unit) headed by Area Manager (AM) and Technical Sales Officer (TSO) will work with block of 1000 farmers and assisted by FA who will work with unit of 250 farmers. The AO and TSO are working at Markaz/Town level in present extension system but in proposed set-up, they will work with block of 1000 farmers so that farmers' to agent ratio can be minimized (see Figure 1).

Conclusions and Recommendations

In the light of above findings, it is concluded that growers were not satisfied with public sector's extension field staff (EFS) regarding their help in credit acquisition and dealing with them. Performance of private sector is very poor in provision of information

about innovative technologies to farmers. Analysis of satisfaction of farmers with public and private sectors show that farmers are not completely satisfied with extension package of either sector. Therefore, the new strategy proposes changes in working order of both sectors in order to enhance the extension work in the Punjab.

Supplementary Material

There is Supplementary material with this article. It can be viewed at: <http://dx.doi.org/10.17582/journal.pjar/2017.30.3.242.248>

Author's Contribution

This manuscript is part of Ph.D. study of Umair Talib. He prepared the questionnaire, conducted survey, analysed the data, and wrote the manuscript. Being supervisor, Ijaz Ashraf was involved in all parts of study. As co-supervisor, Khalid Mahmood and Riaz Ahmad were involved in questionnaire preparation, supervision of survey research and critical analyses, revised, edited and finalized the manuscript.

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