

## Linkage Mechanism of Research-Extension-Farmer with Market in Punjab

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### ABSTRACT

*The present study was undertaken to study the existing research-extension-farmer linkages as perceived by the farmers and their linkages with the market. A total of 700 farmers representing six villages from three districts were selected for the study. The results of the study revealed that farmers had low linkages with researchers, extensionists and market in the adopted (83.9%) and non-adopted (85.2%) villages. Farmers were found to have maximum linkages with the KVK SMS in the adopted villages while in the non-adopted villages, they were having maximum linkages with the ADOs. Participatory technology generation and participatory conduct, monitoring and evaluation of research and extension activities should be used to enhance the research-extension-farmer linkages. Formation of Village Knowledge Centres in the adopted villages and farmer's organizations will help in increasing market linkages of the farmers.*

**Key words:** Research; Extension; Farmer; Market; Linkages;

In recent years, two major concerns have been raised regarding the relative failure of research-extension services in increasing agricultural production: first, the research problems being investigated are generally not in accordance with the priority needs of agricultural producers and second, the knowledge generated at the research stations have not been effectively transferred to the producers. The age old problem of weak linkages between research and development and extension continues to beset the flow of information, knowledge and resources among actors in the technology-delivery-utilization system. As a result, farmers have limited options in making decisions on technologies appropriate to their specific farming needs and those within their local, social, cultural, economic and political environment (Faylon and Acoba, 2002). Poor linkages explain the present low adoption of technology and minimal research utilization in agricultural production systems. There is a growing mountain of shelved, perfected yet unutilized research outputs and there are large amounts of information getting tied up in journal publications targeted to peer groups rather than intended beneficiaries (Smith et al, 2004). It has also adversely affected farmers' participation and role in

exercises that set agenda for agricultural research and development. Besides, the ineffective links between research and extension has impeded the development and transfer of technology appropriate for small-scale and resource poor farmers. For agro technologies to be relevant to local needs, researchers, extension workers and farmers must play important roles in identifying research problems, adapting the recommendations to local conditions and providing feedback to researchers about the innovations that have been developed. Thus, the need for effective linkages among research, extension and farmers is essential for development and dissemination of appropriate and location specific farm technologies so as to increase their adoption rate at farmers' level under actual farming conditions. Also, the linkage of all these three actors with the market in the present scenario is equally essential for enabling the farmers to engage in markets profitably.

The adoption level of the various recommendations in predominant crops made by Punjab Agricultural University is very low among the farmers (Chahal, 2009<sup>a</sup>, Chahal, 2009<sup>b</sup> and Chahal, 2009<sup>c</sup>). In spite of the strong linkages being observed in Punjab in the form of annual rabi and kharif research extension specialists'

workshops, Fruit and Vegetable workshops, etc., adoption gaps can be seen to a great extent in the predominant crops of the state. One of the reasons behind this may be that research-extension-farmer linkages may not be as strong as they seem to be. Thus, an attempt was done to study the existing linkages of farmers with research, extension and market in the agriculture sector of Punjab

## METHODOLOGY

The study was conducted in three agroclimatic zones of Punjab and one district was randomly selected from each zone. From each district, two villages were selected; one adopted village of the KVK of that district and the second village was far away from the KVK in the district. Thus, a total of six villages were selected for conducting this study. The entire farmer population of each selected village was taken for this study thus making a total of 700 farmers in following table.

Districts	Adopted	Non-adopted
Hoshiarpur	Chaknatha (50)	Dugri (60)
Faridkot	Pindi Balochan (165)	Mandewal (60)
Sangrur	Nagra (275)	Bhumbawati (90)

## RESULTS AND DISCUSSION

*Socio-personal characteristics of the farmers:* The

information regarding personal characteristics of the farmers has been presented in Table 1. The age of the farmers ranged from 20 to 80 years. Data given in Table 1 showed that in case of Fardikot district, 44.2 per cent and 56.7 per cent of the farmers belonged to the age group of 40-58 years while 35.2 and 26.7 per cent of them belonged to the age group of 20-40 years in both adopted and non-adopted villages respectively. In case of Sangrur district, majority of the farmers i.e. 41.8 per cent and 54.4 per cent belonged to the age group of 40-58 years in both adopted and non-adopted villages respectively while 29.5 per cent in adopted village belonged to the age group of 58-80 years and 26.7 per cent of them in non-adopted village belonged to the age group of 20-40 years. In case of Hoshiarpur district, majority of the farmers i.e. 62 per cent and 55 per cent belonged to the age group of 40-58 years while 26 and 36.7 per cent of them belonged to the age group of 20-40 years in both adopted and non-adopted villages respectively. Overall it was found that 44.7 per cent and 55.2 per cent of the farmers belonged to the age group of 40-58 years in both adopted and non-adopted villages respectively.

The education of the farmers ranged from illiterate to graduate as presented in Table 1. The findings revealed that in case of Faridkot district, nearly half of

**Table 1: Distribution of farmers according to their socio-personal characteristics**

Socio-personal characteristics	Faridkot				Sangrur				Hoshiarpur				Total			
	Adopted (165)		NAd (60)		Adopted (275)		NAd (90)		Adopted (50)		NAd (60)		Adopted (490)		NAd (210)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<i>Age (years)</i>																
20-40	58	35.2	16	26.7	79	28.7	24	26.7	13	26	22	36.7	150	30.6	62	29.5
40-58	73	44.2	34	56.7	115	41.8	49	54.4	31	62	33	55	219	44.7	116	55.2
58-80	34	20.6	10	16.6	81	29.5	17	18.9	06	12	05	8.3	121	24.7	32	15.3
<i>Education</i>																
Illiterate	82	49.7	14	23.3	150	54.5	50	55.6	13	26	06	10	245	50	70	33.3
Up to 5 <sup>th</sup>	27	16.4	11	18.3	12	4.4	08	8.9	05	10	15	25	44	8.9	34	16.2
Up to 8 <sup>th</sup>	13	7.9	15	25	30	10.9	13	14.4	20	40	33	55	63	12.9	61	29.0
Matric	24	14.5	13	21.8	54	19.6	10	11.1	08	16	06	10	86	17.6	29	13.8
10+2	17	10.3	05	8.3	20	7.3	07	7.8	02	04	00	00	39	7.9	12	5.8
Graduate	02	1.2	02	3.3	09	3.3	02	2.2	02	04	00	00	13	2.7	04	1.9
<i>Land*</i>																
Small (> 16)	92	55.8	40	66.7	249	90.5	74	82.2	40	80	60	100	381	77.8	174	82.9
Medium (16-40)	55	33.3	18	30	25	9.1	12	13.3	10	20	00	00	90	18.4	30	14.3
Large (40-180)	18	10.9	02	3.3	01	0.36	04	4.5	00	00	00	00	19	3.8	06	2.8

\*Operational Landholding (acres); NAd denotes Non-adopted Villages

**Table 2: Rank order of researchers and extensionists according to the extent of linkages developed by the farmers with them**

Personnel	Faridkot				Sangrur				Hoshiarpur			
	Adopted		Non-Adopted		Adopted		Non-Adopted		Adopted		Non-Adopted	
	MS	Rank	MS	Rank	MS	Rank	MS	Rank	MS	Rank	MS	Rank
Researchers	1.15	3.5	1.17	III	1.12	II	1.17	2.5	1.00	4.5	1.00	IV
PAU Ext. Splst.	1.15	3.5	1.15	IV	1.09	III	1.17	2.5	1.00	4.5	1.00	IV
KVK SMS	1.75	I	1.27	II	1.44	I	1.13	IV	1.24	I	1.00	IV
ADOs	1.35	II	1.32	I	1.08	IV	1.2	I	1.12	II	1.12	1.5
Market	1.08	V	1.13	V	1.04	V	1.1	V	1.08	III	1.12	1.5

the farmers (49.7%) in adopted village were illiterate while 25 per cent of them in the non-adopted village had educational qualification up to 8<sup>th</sup>. In Sangrur district, a little more than half of the farmers i.e. 54.5 per cent and 55.6 per cent were illiterate in both adopted and non-adopted villages respectively. In Hoshiarpur district, 40 per cent and 55 per cent had educational qualification up to 8<sup>th</sup> in both adopted and non-adopted villages respectively. On an overall basis, it was found that half of the respondents in the adopted villages were illiterate whereas one third from the non-adopted villages fell in the same category.

The operational landholding of the farmers was classified into three categories by using cumulative cube root method. It is clear from the data in Table 1 that in the adopted villages of all the three districts i.e. Faridkot, Sangrur and Hoshiarpur, majority of the farmers i.e. 55.8 per cent, 90.5 per cent and 80 per cent respectively had small operational landholding i.e. less than 16 acres followed by 33.3 per cent, 25 per cent and 20 per cent of the farmers respectively with medium landholding i.e. 16-40 acres. On similar lines, in the non-adopted villages of Faridkot and Sangrur districts, majority of the farmers i.e. 66.7 per cent and 82.2 per cent respectively had small landholding i.e. less than 16 acres followed by 30 per cent and 13.3 per cent of the farmers respectively with medium landholding i.e. 16-40 acres. All the farmers in the non-adopted village of Hoshiarpur district had small landholding of less than 16 acres. On an overall basis, it was found that 77.8 per cent and 82.9 per cent of the farmers had small landholding of less than 16 acres in both adopted and non-adopted villages respectively. This has been concluded by *Kaur (1990)*, *Pandita (1991)* and *Kaur (1999)* that majority

of the farmers in Punjab are small and marginal farmers. *Extent of linkages with research, extension and market as perceived by the farmers:* The information regarding extent of linkages developed by the farmers with the researchers, PAU extension specialists, KVK Subject-Matter Specialists (SMS), Agriculture Development Officers (ADOs) and market has been presented in Table 2. In the adopted village of Faridkot district, it is evident from Table 2 that on the basis of mean scores farmers had maximum linkages with KVK SMS and placed them at first rank with mean score of 1.75 followed by ADOs at second rank with a mean score of 1.35, both researchers and PAU extension specialists at rank 3.5 with a mean score of 1.15 and market at fifth rank with a mean score of 1.08. In case of non-adopted village in Faridkot district, it was found that ADOs were on first rank with mean score of 1.32 in terms of their linkages with farmers followed by KVK SMS at second rank with a mean score of 1.27, researchers at third rank with a mean score of 1.17, PAU extension specialists at fourth rank with a mean score of 1.15 and market at fifth rank with a mean score of 1.13. It can be concluded that in the non-adopted villages, ADOs had maximum linkages with the farmers as they attained first rank on the basis of mean score whereas in the adopted villages, first rank was attained by the KVK SMS.

It is pertinent from Table 2 that similar to Faridkot district, majority of the farmers in the adopted village of Sangrur had maximum linkages with the KVK SMS as they attained first rank with mean score of 1.44 followed by researchers at second rank with a mean score of 1.12, PAU extension specialists at third rank with a mean score of 1.09, ADOs on fourth rank with mean

**Table 3: Distribution of farmers according to their extent of linkages with researchers, extensionists and market**

Score Range	Faridkot					Sangrur					Hoshiarpur					Total				
	Adopted		NAd		Z-	Adopted		NAd		Z-	Adopted		NAd		Z-	Adopted		NAd		Z-
	No.	%	No.	%	value	No.	%	No.	%	value	No.	%	No.	%	value	No.	(%)	No.	(%)	value
Low	115	69.7	47	78.3	1.5	254	92.4	79	87.8	1.33	42	84.0	53	88.3	0.57	411	83.9	179	85.2	0.33
Medium	42	25.5	09	15.0	1.67	10	3.6	03	3.3	0.5	08	16.0	07	11.7	0.57	60	12.2	19	9.1	1.15
High	08	4.8	04	6.7	0.67	11	4.0	08	8.9	2.5*	00	00	00	00	00	19	3.9	12	5.7	1.22

*Low* (5-7); *Medium* (7-11); *High* (11-20)

score of 1.08 and market at fifth rank with a mean score of 1.04. Where as in the non-adopted village, it was found that ADOs had maximum linkages with farmers as they were placed on first rank with mean score of 1.2 followed by researchers and PAU extension specialists at rank 2.5 with a mean score of 1.17, KVK SMS at fourth rank with a mean score of 1.13 and market at fifth rank with a mean score of 1.1.

The data in Table 2 revealed that all the farmers in the adopted village of Hoshiarpur district also had maximum linkages with KVK SMS who obtained first rank with a mean score of 1.24 followed by ADOs at second rank with a mean score of 1.12, market at third rank with a mean score of 1.08 and PAU extension specialists and researchers on rank 4.5 with mean score of 1.00. In the non-adopted village of Hoshiarpur district, farmers had maximum linkages with ADOs and market who were found to be at equal rank of 1.5 with mean score of 1.12 each followed by researchers, PAU extension specialists and KVK SMS at fourth rank with a mean score of 1.00 each.

*Overall extent of linkages developed by the farmers in the three districts* : An overall picture of the extent of linkages of the farmers with researchers, extensionists and market is presented in Table 3. The extent of linkages was classified on the basis of the mean scores into three categories of low (5-7), medium (7-11) and high (11-20). It is clear from the data that in both the adopted and non-adopted villages of Faridkot district, majority of the farmers i.e 69.7 per cent and 78.3 per cent respectively had low linkages followed by medium linkages of 25.5 per cent and 15 per cent of the farmers respectively. Similarly, in Hoshiarpur district, it is obvious from the data that majority of the farmers i.e 84 per cent and 88.3 per cent respectively had low linkages followed by medium linkages of 16 per cent and 11.7 per cent of the farmers respectively. However, in

Sangrur district, in both the adopted and non-adopted villages, majority of the farmers i.e 92.4 per cent and 87.7 per cent respectively had low linkages and only four per cent and 8.9 per cent of the farmers had high linkages respectively. On with the findings of *Bael and Rogers (1959)*, *Sofranko et al (1988)*, *Eponou (1993)*, *Intodia (1998)* and *Rao and Sontakki (2000)*. An overall basis it was found that majority of the farmers in both the adopted and non-adopted villages had low linkages in all the three districts while only 12.2 per cent in the adopted villages and 9.1 per cent of them in the non-adopted villages had medium linkages with the researchers, extensionists and market. These findings are in line

The reason behind these low linkages as observed may be that researchers are more focused towards research and are confined to the fields and laboratories at Ludhiana headquarters and are not much participating in the extension activities Besides they are also involved in teaching. Regarding the PAU extension specialists, they also had non-existent to weak linkages with farmers which may be because apart from extension they have teaching and partially the research mandates too. So they are not able to cover all the villages of Punjab. They are generally in contact with the farmers who are selected for the demonstrations or trials through KVKs and personnel from Farm Advisory Service Scheme. Both researchers and PAU extension specialists are also in contact with the farmers who approach them personally or through the phone calls. On similar lines, the KVK SMS also had non-existent to weak linkages with farmers as they have been observed to be more involved in capacity building and completing high targets of trainings throughout the year. Also it was observed that they remain confined within their vicinity and are not visiting the far off villages. Regarding the ADOs, their linkages with the farmers also vary from non-

existent to weak. It was found that more than half of the posts for ADOs in the three districts were found to be vacant. Moreover, there were no transportation facilities with them to make frequent visits at farmer fields. It was also observed that they are more involved in distributing inputs and subsidies to the farmers and are burdened with high targets. Market linkages of the farmers were also found to be non-existent to weak as Punjab farmers are not much skillful in market skills and lack the approach and tendency of self marketing. Besides, till now the marketing aspect had not been emphasized much in the research and extension system of Punjab.

The results of the Z-test applied on the extent of linkages of farmers with researchers, extensionists and market in the adopted and non-adopted villages of the three districts showed that in Faridkot district, the difference in the extent of linkages of farmers in the adopted and non-adopted villages in all the categories i.e. low (Z-value=1.5), medium (Z-value=1.67) and high (Z-value=0.67) was found to be non-significant. In Sangrur district, the difference in the extent of linkages of farmers in the adopted and non-adopted villages in low (Z-value=1.33) and medium (Z-value=0.5) categories was found to be non-significant while it was significant at 5 per cent level of significance in the high category (Z-value=2.5) of linkages. In Hoshiarpur district, the difference in the extent of linkages of farmers in the adopted and non-adopted villages in all the categories i.e. low (Z-value=0.57), medium (Z-value=0.57) and high (Z-value=0) was found to be non-significant. On an overall basis, the results of the Z-test showed that the difference in the extent of linkages of farmers in the adopted and non-adopted villages in all the categories i.e. low (Z-value=0.33), medium (Z-value=1.15) and high (Z-value=1.22) was found to be non-significant.

#### *Recommendations for strengthening linkages:*

1. Participatory technology generation approach should be used to enhance the participation of farmers in research. In this approach, feedback of the farmers regarding the new technology during the testing stage at research stations, KVKs or at the sites where trials have been conducted should be taken in different districts. This will help the researchers to get adequate feedback directly from

the farmers prior to the release of varieties or technology generation.

2. Participatory conduct, monitoring and evaluation should be made mandatory for Adaptive Research Trials and extension programmes to avoid wastage of resources and manpower.
3. A research-extension-farmer interface should be organized at block level by the KVKs twice a year with adequate representation of all sections of the farmers i.e. small and marginal, medium and large.
4. More concentrated efforts are required in the adopted villages of the KVKs so that they become model villages. All the technologies recommended by PAU should be displayed in those villages. Exposure visit of the farmers from other parts of the district should then be organized to inspire them to follow the same. A common place such as cooperative societies, religious places and community centres should be used by the extensionists to conduct the extension activities so that all the groups of farmers in the village can participate in these.
5. Similar to *Punjab Kisan Club* and other commodity groups, formation of Farmers' clubs at district level should be a part of the KVK mandates for Punjab as this is the need of the hour that farmers unite in the form of organizations that can strengthen their linkages with research, extension and market.
6. Focus of the organizations like PAU and State Department of Agriculture should be shifted from production to marketing, post harvest management, value addition and farm-level processing. There is already a marketing wing in the State Department of agriculture which needs to be activated properly in terms of providing useful information to the farmers pertaining to market. Additional staff needs to be recruited exclusively in KVKs and FASS to help in the capacity building of farmers in marketing aspects.
7. Farmers should be facilitated through KVKs in gaining computer literacy and use of Information and Communication Technology (ICT) tools.

#### **CONCLUSION**

The above presented information showed that

majority of the farmers were in the category of small to medium operational landholding in the adopted and non-adopted villages of the three districts. Majority of the farmers had low to medium linkages with the researchers, extensionists and market. Farmers had placed KVK SMS at rank first in the adopted villages while farmers in the non-adopted villages were more

linked to ADOs. The farmers in Hoshiarpur district had better linkages with market rather than with researchers and extensionists which revealed that they were self oriented towards marketing and were trying to develop linkages with this sector.

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