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Farmers' conflicts: threat to environment friendly agricultural technology transfer in Pakistan

Ejaz Ashraf[1*], Hafiz Muhammad Afzal Sultan[2], Saima Sadaf[1], Hafiz Khurram Shurjeel[3], Khalid Mahmood[4], Mujahid Iqbal[5], Muhammad Arshed Javed[1], Syed Mukarram Ali[6]

Abstract

At present time, farmers' conflicts are considered as emerging threat to supply chain from agricultural production to consumption. Rural conflicts are on top especially those may intimidate the integrity of agricultural activities in the country. These conflicts also cause hindrance for smooth transfer of agricultural technology. Present study was conducted in Sargodha district of Punjab province in Pakistan. The population for the present study consists of all residents of rural areas of district Sargodha. Multistage sampling technique was used for selection of the sample from the study area. The data were analyzed using computer software Statistical Package for Social Sciences (SPSS). Descriptive and inferential statistics such as ranks, mean scores, percentages and non-parametric Chi-square test were used for interpretation of the data. It is concluded that farmer-to-farmer conflicts are of complex in nature due to low education and difference in social status. It is further concluded that trust-deficit between farmers and Extension field staff exists and provides huge constraint for transfer of technology among farming community in the study area. It is recommended that EFS must possess accommodative attitude towards farmers to resolve their conflicts and must be incorporated in their job responsibilities and training curriculum.

Key words: Extension, conflicts, rural communities, threat, transfer of technology
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[1]Department of Agricultural Extension, Faculty of Agriculture-College of Agriculture, University of Sargodha-Sargodha, Punjab-Pakistan; [2]Institute of Agricultural Extension and Rural Development, University of Agriculture-Faisalabad, Punjab-Pakistan; [3]Department of Entomology, Faculty of Agriculture-College of Agriculture, University of Sargodha-Sargodha, Punjab-Pakistan, [4]Agricultural Biotechnology Research Institute, Faisalabad, Punjab-Pakistan, [5]Institute of Agricultural Research, Government of Balochistan, Saryab Road, Quetta, Balochistan-Pakistan; [6]Department of Mathematics, University of Sargodha, Sargodha, Punjab-Pakistan; *Corresponding author's Email: ejaz.ashraf@uos.edu.pk

Introduction

Conflict refers to some sort of disagreement arising within similar group when the actions, beliefs within one member of the group are unacceptable or resistible to another member of the group. In a society, conflict is a social consequence in which two or more parties (states, groups, individuals) are involved to strive for incompatible or same goals and finally one party become winner by utilizing incompatible means to accomplish certain goals and hence lay down the foundation of long lasting conflicts that run downstream from ancestors to decedents.

Conflicts relocate population, destroy state's resources and organizational structure, disturb educational system, threaten civil rights, damages community social and cultural values. In addition, causes health and famine like disasters. Political, financial, and social penalties of conflicts cause destruction and create huge fear among smallholder families that is an obstacle in production chain (Adelakun, et al., 2015). Conflicts reduce the employment opportunities and cause the excessive rate of unemployment among people in societies that involve in various radical activities (Nannyonjo et al, 2005). Conflicts sometimes are direct consequence of continuous rivalry among members of a certain community, between different groups of the community, two states or even between state and non-state actors. Conflicts cause rapid displacement of millions of people each year around the world and hence it becomes occasionally serious threat to feed tens of thousands of families in the country and the world at large (Mankletow & Carlson, 2005).

Conflicts are foremost intimidation to agricultural production as well as reduce success rate of the farming culture. Further, damages livelihoods and socio-economic status and cause psychological-emotional disturbance in farming communities. The emerging trend in agricultural conflicts within farming communities lead to many social, economic problems not only at farm level but also technology transfer process and reduces rate of national crop production in the country. Today's farmers' conflicts get popularity at litigation level in the police station and in court. Farmers' conflicts become good income generating sources for lawyers and politicians. Politicians play with farmers' thoughts and perceptions to resolve their disputes at police station (Mujtaba et al., 2014).

The farmers' conflicts are responsible for creating situations like food insecurity, loss of lives, loss of labor force, loss of livestock, loss of capital along lands and consequently urbanization prevails in the area. Farmers' conflicts run downstream from ancestors to descendant and cause social insecurity. The issues like irrigational water or input supplies are huge conflicts among farmers. Due to these conflicts, farmers lose their properties as well as in extreme situation they kill the opponents because of their dominant attitude. Conflicts disturb all supply chains from agriculture production to consumption in agro-based industries and hence there is a decline in overall national economy. In general, there is decreasing trend in agriculture production where farmers' conflicts are everyday business. The violence in farmers' conflicts limits the extension intervention in the farming communities and hence there is poor adoption and adaptation of novel and innovative technologies.

Conflicts among farmers arise due to seeking control over utilization of resources such as farmland, livestock routes, water utilization and grazing etc. Numerous other factors involved creating conflicts like competition for land use, disputes on water passage, watercourse cleaning, access to extension field staff, farmer behavior, access to new agricultural technologies, breakdown of traditional relationship and arguments plus other climatic and natural cause develop the conflict among farmers. Agriculture production is seriously affected by conflicts and it was estimated that about 12.3% agricultural production drops in any conflicted area during the period of conflict each year (Angold et al., 1998).

Jahangir et al. (2007) pointed out that the lack of farmer's awareness and poor practices resulted in farmer's conflicts and a gap between farmer and extension field staff which ultimately reduced the adaptation level of farmer towards new information. There was a direct relationship between extension field staff advisory role and farmers understanding. Hence, there is a dire need to develop improved agricultural advisory services so that the gap between cropping yield and conflicts of the farmer could be minimized and to enhance agricultural production. In Pakistan, the industry mainly based on raw material comes from agriculture. Agricultural is also a main sector of employment in the country. So conflicts cause disturbance in the economic activities when not addressed timely.

However, some kinds of differences always exist among human beings when they live in the form of group or society. If timely measures not be taken to reduce the differences among members of farming community, these differences may turn up into serious problems which could hamper overall rate of agricultural development and transfer of technology. Conflicts also show the post-election violence that has a negative impact on the export volume of crops. There is an urgent need to resolve these issues or else, there could be a great decline in food production consumer's supply chain.

Therefore, keeping in view all the discussed reasons provided in the literature, the rational of the study is to identify the farmers-to-farmers conflicts and conflicts between farmers and different organizations such as Extension service providers to understand the constraints or emerging threats for agricultural technology transfer at grass-root level.

Materials and methods

Research was conducted in district Sargodha, Punjab-Pakistan. Purpose of the study was to identify farmers' conflicts as emerging threat for agricultural technology transfer.

Selection of sample size for the study

The target population was unknown. Consequently, formula for calculating sample size for unknown population suggested by Casley and Kumar (1989) was applied to compute the required sample size with 38.2% assumed variation.

$$n = \frac{Z^2 V^2}{d^2}$$

Where,

n= Sample size

Z= Confidence level 95% = 1.96

V= Assumed variation (38.2%) within the response of each selected respondent

D= Marginal error (5%)

$$n = \frac{(1.96)^2 (0.382)^2}{(0.05)^2} = 224.23 \approx 224$$

Finally, 224 respondents were surveyed according to the formula. Following table gives the overall distribution of computed sample size.

Table 1. Per village distribution of the respondents

S.No.	No. of selected tehsils	No. of selected UCs	No. of selected villages	No. of respondents selected from each village	Total
1.	2	2	2	28	224

Table-1 described the process of multistage sampling for the selection of respondents in the study as per computed sample size. At first stage, out of seven tehsils of Sargodha district, two tehsils were selected at random. Secondly, from each selected tehsil, two union councils were selected at random. Thirdly, two villages from each union council were randomly selected and finally 28 respondents were selected randomely and hence come up with final sample size was of 224 respondents from the study area. Due to unreliable responses, four survey forms were rejected and excluded from the final analyses. Hence, final working sample was 220 respondents.

Objectives of the study

To accomplish the purpose of the study following specific objectives were designed.

To assess the demographic characteristics of the respondents.

To identify the conflicts of farmers as an emerging threat to technology transfer.

To identify the conflicts among farmers and extension field staff as a constraint in technology transfer.

To assess the conflicts resolving attitude of farmers and Extension Field Staff (EFS) for smooth technology transfer

Instrumentation

Research instrument (interview schedule) was developed using five-point Likert- type scale for identifying the farmers' conflicts as emerging threat for agricultural technology transfer. Interview schedule was pre-tested before actual data collection and both face and content validity was checked. The reliability was calculated by computing Cronbach's alpha as 0.80 % (for 54-items) using data from pilot study and found satisfactory.

Data collection and analysis

Face-to-face interviews were conducted with the respondents to complete the survey instrument. Collected data were coded and excel sheet was prepared and further Statistical Package for Social Sciences (SPSS) was used for analysis. Descriptive analysis, like frequencies, percentages, means and standard deviation and inferential statistics such as non-parametric Chi-square test was used for data interpretation.

Results and discussions

Demographic profiles of the respondents such as age, gender, educational level, farming experience, social class, marital status, land holding and tenancy status were analyzed and discussed. The results are presented below

Table 2. Demographic profiles of the respondents

	Frequency	**Percentage**
Age (years)		
≤ 20	9	4.09
21-30	25	11.36
31-40	43	19.55
41-50	50	22.73
51-60	55	25.00
61-70	26	11.82
71-80	12	5.45
Gender		
Male	215	97.70
Female	5	2.30
Education		
Under 10th grade	143	65.00
10th grade	59	26.80
Intermediate	10	4.50
Bachelors	3	1.40
Masters and above	5	2.30
Social Class		
Lower	51	23.20
Middle	150	68.20
Upper	19	8.60
Experience (years)		
10-19	48	21.82
20-29	57	25.91
30-39	83	37.73
40-49	18	8.18
50-59	6	2.73
60-69	5	2.27
70-79	3	1.36
Marital Status		
Single	20	9.10
Married	195	88.60
Divorced	5	2.30
Tenancy Status		
Landowner	149	67.70

Tenant	60	27.30
Leaseholder	11	5.00
Landholding (Acres)		
Below 5	41	18.60
5-9	98	44.50
10-14	54	24.50
15-19	20	9.10
20 and above	7	3.20
Water availability source		
Both canal &tubewell water	220	100.00
Total	220	100.00

The results from table-2 showed that one fourth (25.00%) of the respondents were lying in the age group of 51-60 years shows matured respondents while 22.73% were lying between 41-50 years. Little less than one fifth 19.55% were also lying in 31-40 years. Eleven percent of the respondents were in the age group of 61-70 years. Only 5.45% were between 71-80 years. Gender analysis showed that majority 97.7% respondents were male and only 2.3% were female. Around two-thirds 65.0% respondents were under metric which shows poor educational level in the study area. Almost 26.8% had completed their tenth-grad while 4.5% respondents had intermediate degrees. Only 1.4% were bachelors whereas 2.3% respondents had completed their masters or above. Maximum 68.2% respondents were belongs to the middle-class while only 8.6% respondents were from upper-class category. However, 23.2% fell in the lower class category. Maximum 37.73% respondents had experience of 30-39 years. Around 21.82% of the respondents had experience of 10-19 years. Results revealed that respondents were quite experienced in farming. Majority 88.6% of the respondents were married while 9.1% were single whereas 2.1% of the respondents were divorced. Further 67.7% respondents were landowner while 27.3% were tenants and 5% were leaseholders. Almost 44.5% respondents were small landholders and had 5-9 acres of land while 24.5% hold 10-14 acres. More than 18.6% respondents were small landholders had below 5 acres. Almost 9.1% had 15-19 land while 3.2% had 20 acres or above land holding and were high landowners among all the respondents. Respondents had both canal and tubewell water and had no problem regarding availability of water. Both sources of irrigational water such as canal and tube-well are available to the respondents.

Farmer-to-farmer conflicts

Based on responses of the respondents, various farmer-to-farmer related conflicts were identified. The ranks, mean scores, and standard deviations are presented in the following table 3.

Table 3. Ranks, Means, and Standard Deviations of farmer-to-farmer conflicts as threat for technology transfer

	Rank	Mean	Standard Deviation
Water allocation conflicts	8	3.56	0.703
Water passage conflicts	3	3.65	0.676
Water channel cleaning conflicts	11	3.52	0.929
Water theft conflicts	12	3.50	0.863
Family Property conflicts	11	3.52	1.022
Female share in property conflicts	5	3.61	0.942
Land share within family conflicts	9	3.55	1.026
Land record conflicts	16	3.46	1.148
Land tenure conflicts	15	3.47	1.120
Land boundary conflicts	1	3.70	2.978
Land grabbing conflicts	6	3.60	1.031
Grazing conflicts	15	3.47	1.104
Trees on land boundary wall conflicts	15	3.47	0.883
Use of new agricultural technology conflicts	10	3.53	0.852
Use of pesticide/Insecticide conflicts	17	3.45	0.962
Fodder theft conflicts	19	3.41	1.080
Unsafe mode of using pesticides conflicts	18	3.44	1.052
Land record	14	3.48	1.022
Conflicts of technology transfer among small and big landlord	8	3.56	1.007
Conflict for seeking access to new agricultural technologies	2	3.67	0.923
Use of farm machinery conflicts	7	3.57	1.002
Household conflicts	5	3.61	1.021
Social states conflicts	4	3.62	0.960
Intra marriage conflicts	5	3.61	0.961
Young farmer conflicts	14	3.48	1.031
Poverty and lack of resources conflicts	17	3.45	0.985
Ego- base conflicts	13	3.49	1.040
Inherited conflicts	5	3.61	1.003
Lack of education conflicts	6	3.60	0.957
Land rent conflicts	9	3.55	1.061

Scale: 1= Very low level conflicts, 2=low level conflicts, 3=Moderate level conflicts, 4=High level conflicts, 5= Very high level conflicts

The above table-3 shows that land boundary conflicts were main conflicts among farmers and rated at first rank with mean score of 3.70 approaching from moderate to high level conflicts. Conflict for seeking access to new agricultural technologies among farmers was rated at rank second with mean score of 3.67. It also shows that if not address timely the level of conflicts might be changed from moderate to

high level conflicts. Water passage conflicts were third most common conflicts with mean score of 3.65. Social status was ranked at fourth highly rated conflicts with mean score of 3.62. Female share in property conflicts, Household conflicts, Intra marriage conflicts, and inherited conflicts were collectively ranked at fifth highly rated conflicts with mean score of 3.61 and standard deviation values of 0.942, 1.021, 0.961 and 1.003 respectively. Land grabbing conflicts and lack of education conflicts both were rated sixth most highly rated conflicts received common mean score of 3.60 with a standard deviation of 1.031 and 0.957 respectively etc.

Water channel cleaning conflicts and family property conflicts both were ranked at eleventh number. Water theft conflicts were ranked at twelfth with mean score of 3.50 and standard deviation value of 0.863 etc. Land tenure conflicts, grazing conflicts, and trees on land boundary wall conflicts all were ranked at fifteenth with mean score of 3.47 and standard deviation values of 1.120 and 1.104 and 0.883 respectively. Land record conflicts were ranked at sixteenth with mean score of 3.46. The use of pesticide/Insecticide conflicts and poverty and lack of resource conflicts were ranked at seventeenth with mean score of 3.45 and standard deviation s of 0.962 and 0.985 respectively. Similar results were reported by Bello and Abdullahi (2021) in their study and found that act of stealing cattle and violence and killing of farmers due to personal enmity were major threats to their coexistence and security in the study area.

Conflicts between farmers and extension field staff

Respondents were also asked about their conflicts between farmers and extension field staff. Data collected in this regard are given below.

Table 4. Ranks, Mean, and Standard deviations of conflicts between farmers and extension field staff

	Rank	**Mean**	**Standard Deviation**
Inappropriate information	5	3.12	1.134
Access only to big landholder	4	3.34	1.117
Lack of accountability	3	3.43	1.077
Social status difference	3	3.43	1.118
Lack of mutual trust between farmers and extension field staff	2	3.46	1.214
Having little technical training	1	3.51	1.277
Lack of technical training opportunities to small scale farmers	1	3.51	1.188
Lack of participation in resolving the farming community issues	7	2.72	1.356
Rare field visits conflicts	6	2.97	1.399

Scale: 1= Very low level conflicts, 2=low level conflicts, 3=Moderate level conflicts, 4=High level conflicts, 5= Very high level conflicts

The above table-4 shows that having little technical training and lack of training opportunities to small-scale farmers were the major farmer to extension field staff conflicts and both were ranked first with mean score of 3.51 and standard deviation of 1.277 and 1.188 respectively. Hence, both of these are considered as moderate level conflicts. Lack of mutual trust between farmers and extension field staff was ranked second with mean score of 3.46. Lack of accountability and social status difference both were ranked third with mean score of 3.43. Similar findings were reported by Sadaf et al. (2021) that farmers and Extension field staff conflicts severely affect the performance of Extension field staff.

Conflict resolving attitude of farmers towards EFS for smooth technology transfer

During the study farmers were also asked about how they adjust or accommodate the coarse attitude of extension field staff for smooth technology transfer process. Followings were the responses of the farmers for items asked during survey.

Table 5. Ranks, Mean, standard deviations for conflicts resolving attitude of farmers towards EFS for smooth technology transfer

	Rank	**Mean**	**Standard Deviation**
Willing to resolve conflicts with EFS	6	3.03	1.258
Willing to settle down the conflicts of farmers for growth and development with EFS	4	3.16	1.231
Willing to avail training opportunities provided by EFS	4	3.16	1.268
Willing to use better and innovative knowledge sharing with EFS	3	3.19	1.416
Willing to participate in the process of formation of association to resolve the farmer conflicts with EFS	2	3.30	1.334
Willing to play a role in community for provision of justice to mitigate conflicts of farmers with EFS	1	3.76	1.094

Scale: 1= Very low accommodative attitude to resolve conflicts, 2=low accommodative attitude to resolve conflicts, 3=Moderate accommodative attitude to resolve conflicts,
4=High accommodative attitude to resolve conflicts, 5= Very High accommodative attitude to resolve conflicts

The findings from table-5 depicts that among all the survey items asked, the respondents showed willingness from moderate to high level accommodative attitude to resolve conflicts with EFS to play any role in the community for provision of justice to mitigate mutual conflicts for smooth technology transfer was rated first with mean score of 3.76 and standard deviation of 1.094. Whereas for remaining five items asked, the respondents showed moderate accommodative attitude to resolve their conflicts with

extension field staff for smooth technology transfer. These results indicated that whatever the situation would be, the farmers of the study area are willing to overcome their differences with public sector extension field staff since they want to learn new and advanced techniques and approaches of farming so they may contribute better in agricultural development of the country and would be able to reduce poverty level among small scale farmers in the study area.

Gender-wise conflicts

Cross tabulation between gender and nature of conflicts was conducted with chi-square analysis to see any association between the gender and the nature of conflict. Phi and Cramer's values were also calculated. Tables 6, 7 and 8 given below show the results in this regard.

Table 6. *Cross tabulation of Gender and Nature of conflicts*

			Nature of conflict			Total
			Interpersonal	Intra-group	Inter-group	
Gender	Female	Count	23	0	0	23
		Expected Count	3.7	5.5	13.8	23.0
		% within Gender	100.0%	0.0%	0.0%	100.0%
		% within Nature of conflict	65.7%	0.0%	0.0%	10.5%
		% of Total	10.5%	0.0%	0.0%	10.5%
	Male	Count	12	53	132	197
		Expected Count	31.3	47.5	118.2	197.0
		% within Gender	6.1%	26.9%	67.0%	100.0%
		% within Nature of conflict	34.3%	100.0%	100.0%	89.5%
		% of Total	5.5%	24.1%	60.0%	89.5%
Total		Count	35	53	132	220
		Expected Count	35.0	53.0	132.0	220.0
		% within Gender	15.9%	24.1%	60.0%	100.0%
		% within Nature of conflict	100.0%	100.0%	100.0%	100.0%
		% of Total	15.9%	24.1%	60.0%	100.0%

The above table-6 shows that 100% females have significant association with interpersonal conflicts while about 67% of the males associated with inter-group conflicts.

Table 7. *Chi-Square Tests*

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	135.765	2	0.000
Likelihood Ratio	102.377	2	0.000
Linear-by-Linear Association	94.009	1	0.000
Total Cases	220		

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Table-8. *Symmetric Measures*

		Value	Approx. Sig.
Nominal by Nominal	Phi	0.786	0.000
	Cramer's V	0.786	0.000
	Contingency Coefficient	0.618	0.000
N of Valid Cases		220	

Not assuming the null hypothesis

Using the asymptotic standard error assuming the null hypothesis

The above table-7 shows the chi-square value of the gender and nature of conflicts. The table depicts that the p-value for gender and nature of conflicts was less than 0.05 and concluded that there exists a significant association between the gender and nature of conflicts. Similarly, Phi and Cramer's values in table-8 depict strength of the association between gender as well as the nature of the conflicts of the farmers.

Conclusions and Recommendations

The study was unique of its nature in extension system in Pakistan. Previously little efforts were exerted to highlight the conflicts research among farmers or within Agricultural Extension system. It is concluded that farmers-to-farmers nature of conflicts is very complex due to low education, difference in social status and variation in personal attitude of the individuals. Large-scale farmers in general have hidden desire to grab land, water, livestock or even sometimes produce of small-scale farmers. They want to dominate the poor farmers of the area. The-types of conflicts as mentioned in table-3 bring complex nature among small and large-scale farmers of the area. In addition, conflicts of Extension field staff with famers further aggravated the situation due to having unaccommodating attitude towards conflicts with different groups of the farmers. Extension field staff was of the view that conflict resolution or management among farmers is beyond their job responsibilities and exerts little efforts to resolve these conflicts. Consequently, it is said that trust-deficit between farmers and Extension field staff exists and provides a huge constraint for smooth technology transfer among farming community in the study area.

Keeping in view the conclusions and findings of the study, following are few recommendations made after the study.

Measures must be taken to minimize farmer-to-farmer conflicts since by overcoming communication gap among farmers would be helpful to improve the diffusion of innovative technologies resulting in adoption of environment friendly advanced technologies for better agricultural production for future food security.

Farmers to EFS conflicts must be avoided. EFS themselves, as well as farmers, must be trained to deal with varied attitudes of each other. It is the hardest challenge for EFS to deal with farmers having diverse demographical background with variation in education, social status, age, values and traditions.

EFS must be trained in promoting conflict resolving attitude with farmers so that communication among farmers may become easy.

Developing an attitude among EFS to reduce conflicts among farmers has great importance. EFS must possess accommodative attitude towards farmers to resolve their conflicts.

Conflicts resolving mandate must be incorporated in the job responsibilities and training curriculum for Extension field staff.

Legal protection must be given to all conflict resolution approaches used by the EFS.

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