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## WATER USERS' ASSOCIATIONS: AN EFFECTIVE APPROACH FOR CONFLICTS RESOLUTION AMONG WATER USERS IN PUNJAB-PAKISTAN

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### ABSTRACT

This study aimed at assessing the role of water users' associations (WUAs) in conflicts resolution among water users. A sample of 100 executive members of WUAs was selected purposefully from twenty randomly selected registered and improved watercourses. The data was collected through a detailed, validated and pre-tested interview schedule and analysed through SPSS. Findings showed that social conflicts ( $\bar{x}=2.00$ ), repair and maintenances of watercourse ( $\bar{x}=1.91$ ) and disputes on watercourse design, route and section to be lined ( $\bar{x}=1.81$ ) were the top most causes of conflicts among the water users. Uprooting of trees (86.0%), payment of farmers' share (79.0%), quality of materials used (73.0%), section of watercourses to be lined (71.0%), working of farmers' labor (70.0%) and provision of labour (69.0%) were the important reasons for differences among water users. Satisfaction level of water users regarding contribution of WUAs in conflict resolution ( $\bar{x}=3.98$ ) was lying between medium to high tending towards high while, effectiveness of WUAs in conflict resolution ( $\bar{x}=4.17$ ) was lying between high and very high tending towards very high. There exist a stronger association between the role of WUAs as dependent and strategy to resolve the conflicts as independent variables while, the role of WUAs was strongly dependent on their response to the complaints and it was also dependent on determining the causes of these conflicts. Thus, WUAs must be promoted at every level for enhancing their role for conflicts resolution through regular trainings to improve their conflicts resolution abilities on modern lines and must be made more powerful in terms of authority to decide common conflicts at the spot.

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### INTRODUCTION

Water is the usual reserve like wood, coal, oil or gold. Though, it is dissimilar from other usual reserves as it has many financial, practical, traditional, communal and rhetorical scopes. Without coal wood or oil, life can be managed but without water it is impossible. Since water

has distinct prominence in different religions and considered as the beginning of creation (Sehring and Diebold, 2012), hence, the development and management of this usual reserve is very important for the sustainability of agricultural sector especially in those areas where water is limited (Ashraf *et al.*, 2007;

Khalkheili and Zamani, 2009). Water is not only essential for household chores but has an important source for irrigation in agriculture (Crow and Sultana, 2002). Agriculture sector is the major user of fresh water. Though, irrigation projects are not secluded but part of a whole basin with other water users. Water shortage tends may escalate if water does not properly distribute among various water users (Lecler, 2004). This may be the beginning of clashes among water users (Gasteyer, 2009). These clashes among water users are results of rivalry for water resources especially in the dry season (Gichuki, 2002; Kulkarni, 2011). One of the main issues in this scenario is the water conflicts. It can be described as a conflict between nations or people regarding the unequal distribution of water reserves (Tulloch, 2009; Kameri-Mbote, 2007; Wolf *et al.*, 1999). Water conflicts emerge among two or more groups due to the competition in distribution or its use (OECD, 2015). The philosophy of conflict resolution describes the wide-range of problems faced by the humanity, reasons of differences and after effects. The dominant reasons behind the philosophy of conflict are the unfair allocation of limited water reserves and use of authority. Authority is not inevitably bad but is a crucial aspect that escorts the humanity and collective relationships (Coser *et al.*, 2006).

There is very limited research on the topic under discussion. Therefore, no specific literature that completely analyze the current role of WUAs to focus if transformation of irrigation management system is available related to countries like Pakistan. Though Pakistan has worked a lot on the subject matter and has improved the watercourse maintenance mechanism, improved water rotation, reduced water thefts, reduced water conflicts, timely delivery and consequently improvement in agricultural production. Related literature from other parts around the globe suggests that WUAs have definite role in improving output (Samad and Vermillion, 1999; Liu *et al.*, 2002). It has also important role in efficient water utilization procedures as well as improved productivity (Uphoff and Wijayaratna, 2000), labor mobilization and monetary resources for maintenance and also the resolution of conflicts (Waheed, 1998). There are evidences that such benefits are dependent on space and context as the success rate of WUAs is dependent on variety of factors which include elections of WUA leaders must be conducted on merit in a democratic way (Liu *et al.*, 2002), current social networks like caste or biradari network system (Waheed, 1998), if the watercourses are improved or they act in a traditional

way (Alam *et al.*, 2012), but the presence of merit-based leaders in the association will have great impact. (Lempériere *et al.*, 2014). Furthermore, it will also depend on how active the farmer organizations are (Gedara *et al.*, 2012). The major reasons for disputes among the water users may be uprooting of trees, payment of farmers' share, quality of materials used, section of watercourses to be lined, working of farmers' labor, provision of labor, realignment etc. Hence, there exist a need to explore these major reasons for disputes among the water users. Present effort has been done to assess the role of WUAs as an effective approach for conflict resolution among water users.

#### **Problem statement**

Problems associated with water management with agricultural production, particularly can be considered in the list of important issues for the world and especially for Asia. The heaps of literature on the problem of irrigation water can verify relevance of this study in the light of the existing knowledge level and research-based needs. Water can be described as a source of conflicts between nations or people regarding unequal access to water reserves. Water conflicts created among two or more groups due to the competition in distribution or its use. Therefore, the need is felt for research work which can visualize the role of WUAs as an effective approach to solve conflicts among water users in Punjab, Pakistan.

#### **Research objectives**

- To assess the causes of conflicts/disputes among water users.
- To explore the various specific reasons for differences among water users.
- To identify the farmers' complaints and role of WUAs in resolving them.

#### **METHODOLOGY**

The purpose of this research was to study the role of WUAs as an effective approach for conflict resolution among water users of central Punjab, Pakistan. The study was conducted in Sargodha division. A descriptive survey research design was used in this study. The narrative of the study was built up from the available literature. All the executive members of WUAs (president, vice-president, treasurer, deputy treasurer, secretary) located at the registered and improved watercourses in Sargodha division were the target population of the study. From the division, two districts

were selected at random for the study. From each selected district, two tehsils were chosen at random. From each chosen tehsil, five improved watercourses were chosen at random and from each chosen watercourse, five executive members were interviewed, so hundred executive members were chosen purposefully. A pre-tested and validated interview schedule was used as an instrument for data collection. Content and Face validity of the instrument were checked by establishing the panel of experts from the discipline of Agricultural Extension and was modified accordingly. Likert type scale was used to record the opinions of the respondents. The instrument was prepared in English and then translated into native language of the respondents such as Urdu or Punjabi etc. The respondents were interviewed face-to-face by the researcher. The interview schedule was managed individually for each respondent. The collected data was coded and entered into the excel sheet on computer for analysis. SPSS was used to analyze the collected data. The descriptive and inferential statistics was used for data description.

## RESULTS AND DISCUSSION

WUAs are very important tool to address the water conflicts among the water users. The data which was collected have been explained on the basis of the research problem under discussion. Results of the study were drawn based on different factors included in the interview schedule. Different factors included important causes of conflicts among water users, WUAs' response to such complaints, WUAs adoptive strategy to handle the cases of complaints and effectiveness of WUAs in resolving conflicts among water users.

### Causes of conflicts/disputes among water users

There are many causes for conflicts/disputes among the water users but the main causes can be local politics, social conflicts, rivalry among two families, water thefts, disputes on watercourse design, route and section to be lined, collection and payment of farmers' share, provision and working of farmers' labor, up-rooting of trees, installation and construction of outlets, culverts and buffalo wallow and repair and maintenance of watercourse (Table 1).

Table 1. Important causes of conflicts among water users.

Important causes of conflicts	Mean	SD	Rank
Social conflicts	2.00	0.14	1
Repair & maintenance of watercourse	1.91	0.35	2
Disputes on watercourse design, route & section to be lined	1.81	0.39	3
Provision & working of farmers' labor	1.67	0.47	4
Installation & construction of outlets, culverts & buffalo wallow	1.58	0.54	5
Local politics	1.51	0.52	6
Rivalry among two families	1.33	0.49	7
Water thefts	1.07	0.26	8
Collection & payment of farmers' share	1.06	0.24	9
Up-rooting of trees	1.05	0.22	10

Scale: 1- least important, 2- important, 3- most important

The data show that social conflicts were the top most cause of conflicts among the water users with mean value of 2.00. Among the various causes of conflicts, repair & maintenance after the improvement of watercourse and disputes on watercourse design, route and section to be lined were ranked at 2<sup>nd</sup> and 3<sup>rd</sup> positions with mean values of 1.91 and 1.81. These results are also supported by Bijani *et al.* (2020) who stated that physical structure of the irrigation system is also the main causes of water related disputes. Provision and working of farmers' labor, installation and construction of outlets, culverts and buffalo wallow, local

politics and rivalry among two families stood at fourth to seventh ranks having values of 1.67, 1.58, 1.51 and 1.33 respectively. These results are also contradicted from the findings by Bijani *et al.* (2020) who stated that politics cannot be the main cause of conflict among the water users. Among the other causes of conflicts, water thefts, collection and payment of farmers' share and up-rooting of trees were ranked at 8th, 9th and 10th positions with mean values of 1.07, 1.06 and 1.05 respectively.

### Specific reasons for differences among water users

There can be many points where views of the water

users can differ but the important points have been enlisted below and the views of water users have been mentioned against each reason. The views of

respondents regarding specific reasons for differences among water users are given in Table 2.

Table2. Distribution of respondents according to specific reasons for differences.

Point of difference	Frequency	Percent
Up-rooting of trees	86	86.0
Payment of farmers' share	79	79.0
Quality of material used	73	73.0
Section of watercourses to be lined	71	71.0
Working of farmers' labor	70	70.0
Provision of labor	69	69.0
Realignment	59	59.0
Back earth filling of lined portion	47	47.0
Repair and maintenance of watercourse	45	45.0
Installation of outlets	36	36.0
Watercourse's route	27	27.0
Construction of culverts	23	23.0
Construction of buffalo wallow	19	19.0
Removal of silt	13	13.0
Removal of vegetation	11	11.0

The data show that uprooting of trees was the topmost reason for differences as reported by a large majority (86.0%) of the respondents. While 79.0, 73.0, 71.0 and 70.0% of the respondents thought that payment of farmers' share, quality of materials used, section of watercourses to be lined and working of farmers' labor were the other important reasons for differences among water users. While 69.0 and 59.0% of the respondents thought that

provision of labor and realignment were another reason for differences among water users. These results are also supported by those of Bijani *et al.* (2020) as they stated that the physical structure of the irrigation system was also one of the main causes of water related disputes.

#### Validity of farmers' complaints

The views of respondents on WUAs' response to farmers' complaints are given in Table 3.

Table 3. WUAs' response to such complaints.

WUAs' response:	Mean	SD	Rank
Only listen to the complaintee	1.99	0.10	1
Advise to register a case in the court	1.99	0.10	1
Discuss with Govt. officials	1.73	0.45	2
Listen to both the parties	1.01	0.10	3
Judge the situation at site	1.01	0.10	3

Scale: 1- low, 2- medium, 3- high

The response of WUAs to these complaints is much more important. Their role in proper management and resolution of these complaints is crucial and guarantees the proper and smooth functioning of the associations. But, according to the respondents' point of view, majority of the WUAs only listen to the complaintee and advised to register the case in court. Both were ranked at 1<sup>st</sup> position ( $\bar{x}$  =1.99). WUAs' response to farmers' complaints was done through the discussion with the

government officials which stands at 2<sup>nd</sup> position ( $\bar{x}$ =1.73). On-site situation analysis and listening to both the parties often receive weaker attention from the WUAs and both were ranked least ( $\bar{x}$  =1.01).

#### Strategy adopted by WUAs to handle the farmers' complaints

The views of respondents regarding the strategies adopted by WUAs to handle the farmers' complaints are given in Table 4. The data show that social leaders'

involvement was the most important strategy to handle the complaint which stood at the top having mean value of 1.94 as a social leader has their own status and value in any society. Involvement of political leaders, involvement of officials, mutual settlements and involvement of family heads were the other strategies to resolve the complaints and stood at 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> rank with mean values of 1.92, 1.66 and 1.06 respectively.

**Satisfaction level regarding contribution of WUAs in resolving conflicts**

The views of respondents regarding the satisfaction level regarding contribution of WUAs in resolving

conflicts are given in Table 5. The results of the study depict that satisfaction level of water users regarding contribution of WUAs in conflict resolution was lying between medium to high tending towards high with mean value of 3.98. The mean value in this regard indicates that water users were quite satisfied with the effective approach adopted by WUAs for conflict resolution among water users.

**Effectiveness of WUAs in resolving conflicts**

The views of respondents regarding the effectiveness of WUAs in resolving conflicts were recorded on likert scale and the responses are given in Table 6.

Table 4. Strategy adopted by WUAs to handle the farmers’ complaints.

WUAs handle complaints through	Mean	SD	Rank
Social leaders	1.94	0.24	1
Political leaders	1.92	0.27	2
Govt. officials	1.66	0.48	3
Mutual settlement	1.06	0.24	4
Family heads	1.06	0.24	4

Scale: 1- low, 2- medium, 3- high

Table 5. Satisfaction level regarding contribution of WUAs in resolving conflicts.

Aspects regarding:	Mean	SD
Satisfaction level regarding contribution of WUAs in resolving conflicts	3.98	0.738

Scale: 1- very low, 2- low, 3- medium, 4- high, 5- very high

Table 6. Effectiveness of WUAs in resolving conflicts.

Aspects regarding:	Mean	SD
Effectiveness of WUAs in resolving conflicts among water users	4.17	0.805

Scale: 1- very low, 2- low, 3- medium, 4- high, 5- very high

The results of the study depict that effectiveness of WUAs in conflict resolution received highest mean (4.17). The mean indicates that these aspects fell between high and very high categories tending towards very high category which shows the effectiveness of WUAs in resolving conflicts among water users.

**Regression analysis**

Keeping role of WUAs as dependent while disputes between the water users as independent variable (it depicts stronger the role of WUAs, stronger will be the strategy to resolve the conflicts) a regression analysis

approach was followed. The model shows quiet larger unexplained variation in the data while a stronger association between the variables does exist. The role of WUAs was strongly dependent on their response to the complaints and it was also dependent on determining the causes of these conflicts. If we keep on strengthening the role of WUAs, causes of the conflicts may be emerged more prominently whereas most significantly WUAs’ response rate to all the complaints received to them may also increase (Table 7 & 8).

Table 7. Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.440a	0.194	0.169	4.448

a. Predictors: (Constant), Adoptive strategy, Causes of conflicts, WUAs' response

Table 8. ANOVA.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	457.014	3	152.338	7.699	0.000b
	Residual	1899.626	96	19.788		
	Total	2356.640	99			

a. Dependent Variable: Role of WUAs

b. Predictors: (Constant), Adoptive strategy, Causes of conflicts, WUAs' response

Table 9. Coefficients.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	53.467	8.556		6.249	0.000
	Causes of conflicts	0.198	0.249	0.074	0.796	0.428
	WUAs' response	5.240	1.478	0.479	3.544	0.001
	Adoptive strategy	0.605	1.322	0.062	0.458	0.648

a. Dependent Variable: Role of WUAs

## CONCLUSION AND RECOMMENDATIONS

This study summarizes that watercourse design, route and section to be lined during the improvement, repair and maintenance of watercourse along with the social conflicts were the main causes of conflicts among water users. Uprooting of trees, payment of farmers' share, quality of materials used and section of watercourse to be lined were the specific reasons for differences. Majority of the respondents were of the view regarding the validity of farmers' complaints that WUAs only listen to the complainee and advised to register the case in the court. Involvement of social and political leaders along with government officials in resolution of complaints is the most common strategies adopted by WUAs. There exists a stronger association between the role of WUAs as dependent and strategy to resolve the conflicts as independent variables while, the role of WUAs was strongly dependent on their response to the complaints and it was also dependent on determining the causes of these conflicts. If we keep on strengthening the role of WUAs, causes of the conflicts may be emerged more prominently whereas, WUAs' response rate to all the received complaints may also increase most significantly. Thus, this study concludes that role of WUAs as an effective approach for conflicts resolution

among water users is encouraging and promising. It is suggested in this regard that WUAs must be promoted at every level for enhancing their role for conflicts resolution through regular trainings to improve their conflicts resolution abilities on modern lines and must be made more powerful in terms of authority to decide common conflicts at the spot.

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