



Available Online at EScience Press

# International Journal of Agricultural Extension

ISSN: 2311-6110 (Online), 2311-8547 (Print)

<https://esciencepress.net/journals/IJAE>

## INVESTIGATING THE RESOLUTION OF WATER-RELATED CONFLICTS THROUGH LOCAL APPROACHES IN PUNJAB, PAKISTAN

<sup>a</sup>Sohaib Usman\*, <sup>a</sup>Aqeela Saghir, <sup>a</sup>Khalid Mahmood Ch., <sup>b</sup>Muhammad Tahir<sup>a</sup> Institute of Agricultural Extension, Education and Rural Development, University of Agriculture Faisalabad, Pakistan.<sup>b</sup> Department of Agronomy, University of Agriculture Faisalabad, Pakistan.

### ARTICLE INFO

#### Article History

Received: October 10, 2020

Revised: June 10, 2021

Accepted: July 14, 2021

#### Keywords

Conflicts

Water

Strategies

Panchayat

Conflicts management

### ABSTRACT

This study aimed to explore the use of local strategies by the farmers to resolve water-related conflicts in District Gujranwala of the Punjab, province. Total 384 farmers chosen at random were interviewed face to face on a structured questionnaire. Collected data were analyzed using descriptive statistics like frequency, percentages, mean and F-test. Findings indicated that distribution of canal water at farm level ( $\bar{x}=3.6$ ), water theft ( $\bar{x}=3.18$ ) and illegal ways of usage of canal water ( $\bar{x}=3.14$ ) were the key causes of water conflicts. Whereas, Panchayat ( $\bar{x}=3.90$ ), intermarriage between the conflicting parties ( $\bar{x}=3.46$ ), Payment of compensation to victims ( $\bar{x}=3.46$ ), Political pressure ( $\bar{x}=3.42$ ), use of thana culture ( $\bar{x}=3.37$ ) and migration ( $\bar{x}=3.37$ ) were the prominent strategies adopted locally by the farmers to resolve the conflicts. This study concludes that farmers had over-reliance on the non-formal judicial system, thus a comparison of the non-formal and formal judicial systems is suggested for future researchers. Moreover, a proactive institutional role is much needed for the formal resolution of conflicts and stoppage of water theft.

*Corresponding Author: Sohaib Usman**Email: sohaibusmancheema174@gmail.com*

© The Author(s) 2021.

### INTRODUCTION

The term "water conflict" is used to describe the conflicts in access to water sources among exploiting societies, groups and people (Bijani *et al.*, 2020). Resolving the water conflicts is inevitable to bring peace to society and foster developmental opportunities. Certainly, exploring the awareness of the causes and consequences of the conflicts help in this process and pave the way for creating opportunities for interactions among people (Bijani and Hayati, 2018; Veisi *et al.*, 2020). Water is imperative for the existence of living things. Water is also regarded as a soul for industrial expansion as well. The rapid population growth is asking for more resources to feed such a mammoth population

and on another side, the intensity of use of water has increased alarmingly because human existence is directly associated with water availability (Tian *et al.*, 2020).

Globally, it is well established that water resources are decreasing at a pace and many of the countries can become water-scarce in coming years. According to the estimates reported in Tzanakakis *et al.* (2020), more than 2 billion people are living in those regions which are undergoing high water stress and these numbers are likely to increase further. WEF (2019) have reported that water scarcity is a major concern for several countries and this scarcity has become one of the greater challenges over the coming decade. Water is used for

household consumption, public health, agriculture, industry and transportation. The agriculture sector is one of the largest sectors consuming a great amount of water. Scarcity of water can directly influence the agriculture sector (WEF, 2019) and eventually lessening the agricultural productivities which are tantamount to feed the enormous population. Underwater scarcity and its importance people are more concerned with its conservation, access and even conflict (Toset *et al.*, 2000; Salehi *et al.*, 2017). In this regard, access and exploitation of water resources have become a challenging issue causing water conflicts within society (Veisi *et al.*, 2020). Water disputes and conflicts emerge between the two parties with the competing claims about the water resources and their allocation or their use (Huffaker *et al.*, 2007). These conflicts end in severe consequences and sometimes these conflicts persist from generation to generation. Some research studies have reported adverse consequences of the conflicts on farmers. Siyum *et al.* (2015) found that the conflicts especially farm-related terminated the social interaction of the community. Moreover, the conflicts adversely hampered local and national development by reducing agricultural productivity. Pertinent to conflicts, the cost of production of farmers increased whereas the net profits decreased (Yasmi *et al.*, 2010). Huggins *et al.* (2005) augmented that conflicts obstacle the social relationships within the society. Whereas, According to Adalakun *et al.* (2015), due to conflicts family farming was the worst hit. This can be deducted those conflicts had adverse consequences on the farmers, until not resolved properly. Considering the water conflicts important and due to the availability of scanty literature on water conflicts and their resolution in Pakistan, this study was conducted to bridge the research gap. The core objectives of this study were to explore the causes of water conflicts in the study area and to assess the different local approaches as followed by the farmers to resolve the conflicts.

## METHODOLOGY

This study was conducted in District Gujranwala, one of the prominent districts of a total of 36 districts in Punjab. District Gujranwala consists of a total of four tehsils (sub-districts). The sample was selected through a multi-stage sampling technique. In the first stage, three tehsils out of a total of four were selected at random. The selected tehsils were, Gujranwala, Nowshehra Virkan and Wazirabad. In

the second stage, four rural union councils were selected from each selected tehsil, thereby selecting a total of 12 Union councils from three tehsils. In the third stage, two villages were selected at random from each selected union council from three tehsils, thereby selecting a total of 24 villages from three tehsils. In the fourth stage, 16 farmers were selected through a random sampling technique from the selected 24 villages. Thus, a total of 384 farmers were selected at random to serve as “respondents” for this study. The interview schedule was used as the data collections instrument for this study. The interview schedule was prepared well in line with the objectives of the study, Scholarly articles, books and various reports were critically reviewed to prepare the interview schedule contents.

The interview schedule has quantitative questions, and a five-point Likert scale was used to record the responses of respondents. The Likert scale used was 1=very low, 2=low, 3=medium, 4=high, 5=very high. Interview schedule was further validated by the consultation with the subject experts, and pre-testing on 20 farmers. The reliability analysis of the Likert scale question remained at 0.86, indicating a satisfactory outcome to proceed with the data collection. Data were collected through the face-to-face interview technique. The questionnaire was comprised of mainly four sections (i) demographic profile of the respondents (ii) causes of water-related conflicts (iii) and local approaches adopted by the farmers to resolve the conflicts.

Collected data were analyzed with the help of the Statistical Package for Social Sciences (SPSS). The study was quantitative, thus descriptive statistics such as frequency, percentage, mean and standard deviation were applied to the data. F-test was applied to compare the means in three tehsils.

## RESULTS AND DISCUSSION

### Demographic attributes of the respondents

In this section, the detailed socio-economic profile of the respondents is explained. The major demographic characteristics included the age of respondents, educational level, family size, family system, annual income, land size and farming experience of the respondents. It was obligatory to explore the demographic condition of farmers because it could have an association with the causes and effects of the water associated conflicts. The detailed information is tabulated in Table 1.

Table 1. Socio-economic characteristics of the respondents.

Socio-economic characteristics	Percentage
Age of respondents	
Up to 35	41.9
>35-50	39.3
>50	18.8
Educational level	
Illiterate	11.7
Up to primary	9.4
Middle	27.1
Matric	29.2
Graduation or post-graduation	22.7
Family size	
1-5	15.1
6-10	51.6
11-15	31.3
Above 15	2.1
Family system	
Joint family system	56.3
Separate family system	43.8
Annual income	
1- 5 lacs	9.6
6 – 10 lacs	27.6
11-15 lacs	42.7
15-20 lacs	20.1
Land holding size	
Small farmer (< 12.5)	30.7
Medium farmer (12.5-25)	45.3
Large farmer (> 25)	24.0
1-10	43.22
11-20	44.01
Above 20	12.8

Table 1 shows that 41.9% of farmers were aged under 35 years followed by 39.3% of the farmers who were aged between 35-50 years. Out of total farmers, 18.8% were aged more than 50 years. This indicates that a major chunk of farmers was in their productive ages as most could be stated as young with the age under 35 years). Of the total respondents, the majority (88.3%) of respondents was literate and 11.7% were illiterate. Almost one in ten respondents (9.4%) had an education of less than primary level. More than one fourth (27.1%) of respondents were middle and 29.2% had matriculation. Slightly more than one-fifth of respondents (22.7%) had the highest level of educational degree, graduation of post-graduation. As for family size and systems were concerned, 51.6% of farmers had 6-10 members in their families and 56.3% of farmers were living in the joint family system. One in ten respondents (9.4%) had earnings of 1-5 lac on yearly

basis to meet the needs of their families. Greater than one fourth (27.6%) and 42.7% of farmers had annual earnings of 6-10 and 11-15 lac, respectively. One fifth (20.1%) of respondents had annual earnings of 15-20 lac. Considering the land size, 30% of farmers were small landholders and 24% were large farmers bearing a large size of landholdings. Maximum numbers of farmers (45%) had a land size between 12.5-25 acres. Respondents were more inclined towards farming and 43.2% of farmers had the farming experience of 1-10 years followed by 44.01% of farmers who were experiences from 11-20 years. Of the total respondents, the experience of 12.8% of farmers surpassed over 20 years.

#### Causes of water-related conflicts

This section highlights some of the key causes as perceived by the participating farmers developing water-related conflicts. Those conflicts sometimes

become worse and continue occurring from generation to generation. These conflicts could have adverse

impacts on the livelihoods and overall development of the farmers (Table 2).

Table 2. Causes of water-related conflicts as perceived by the respondents.

Water-related conflicts	Gujranwala		Noshehran Warkan		Wazirabad		F-value	P-value
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Distribution of canal water at farm level	3.32	0.922	3.52	0.860	3.98	0.554	22.999	0.000**
Use of common water courses	3.25	0.851	3.02	0.732	3.09	0.547	3.562	0.029*
Stealing of irrigation equipment	3.09	0.914	3.13	0.851	2.99	0.837	.792	0.454 <sup>NS</sup>
water theft	3.23	0.776	3.19	0.761	3.13	0.784	.562	0.571 <sup>NS</sup>
Distraction of water courses	3.02	0.939	3.17	0.733	3.05	0.691	1.339	0.263 <sup>NS</sup>
Illegal ways of usage canal water	3.20	0.888	3.21	0.683	3.02	0.664	2.667	0.071 <sup>NS</sup>

Table 2 shows that the distribution of canal water at farms and use of common watercourses were statistically significant ( $P < 0.05$ ) indicating a variation in the intensity of these two issues in different study areas. Distribution of canal water at the farm was the prominent cause of water relate to conflict in Wazirabad

whereas the use of common watercourses was the key cause in Gujranwala. Stealing of irrigation equipment, water theft, the distraction of watercourses and illegal ways of usage of canal water had a non-significant association ( $P > 0.05$ ). This implies that these were the common causes of conflicts in study areas.

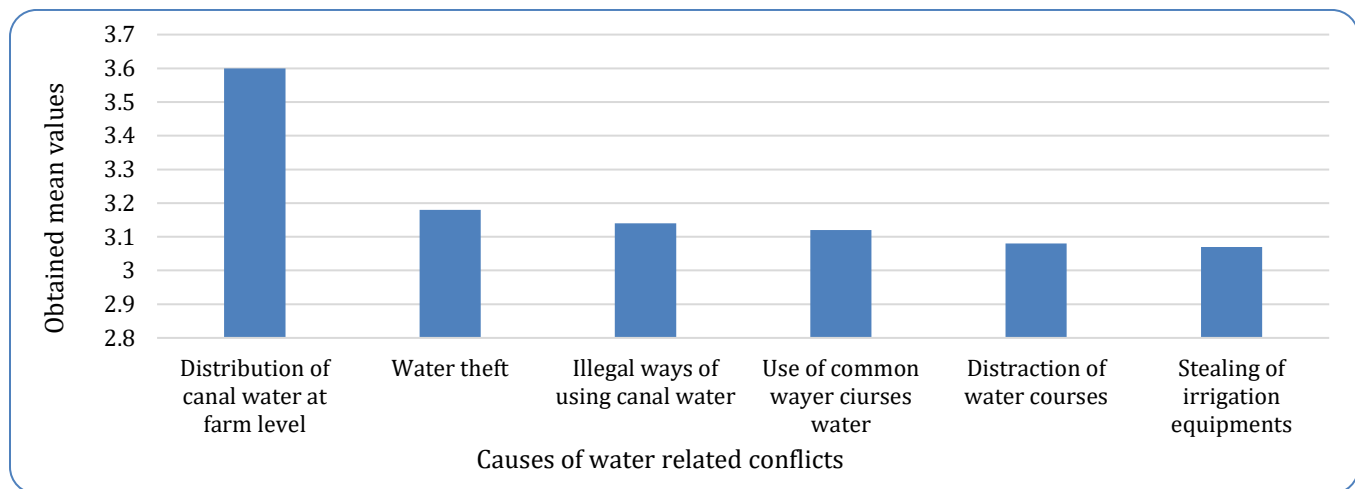


Figure 1. Overall ranking of the causes of water-related conflicts.

Figure 1 indicates the ranking of different causes of water-related conflicts in the study area. The distribution of canal water at the farm level was the leading cause of water conflict ( $\bar{x}=3.6$ ). Farmers perhaps were not satisfied with the distribution of water and in quest of accessing more water, the feud may have appeared. Farmers might have unawareness of the canal water distribution systems and misunderstandings could arise among farmers, which later turned into conflicts. The findings of this study are more or less similar to those of Bijani *et al.* (2020) as they found that

drought, water scarcity and physical structure of the irrigation system and mismanagement were the key reasons behind the conflicts at the farm level. Water theft was 2<sup>nd</sup> prominent cause of water conflicts ( $\bar{x}=3.18$ ). Theft of water has become a social issue, especially when a progressive farmer or elite of the area steals the water of a small farmer. Nadeem *et al.* (2021) have reported that if the stolen water is returned to the farmer, it can have a positive impact whereas the conflicts can be resolved. Illegal ways of usage of canal water were ranked 3<sup>rd</sup> ( $\bar{x}=3.14$ ) followed by use of

common watercourses ( $\bar{x}$ =3.12), the distraction of watercourses ( $\bar{x}$ =3.08) and stealing of irrigation equipment ( $\bar{x}$ = 3.07). The use of common watercourses and distraction of watercourses were consuming more time to reaching to the farm area and also causing wastage of water through seepage and establishing a sign of water use inefficiency. Studies like Micklin (2007), Bekchanov *et al.* (2010) and Bekchanov *et al.* (2014) that poorly maintained and traditional watercourses were causing the adequate amount of water to drop.

### Local approaches to resolve the conflicts

This section explores different local strategies adopted by the community to resolve the water conflicts. The key strategies were (i) panchayat (ii) Intermarriage among both parties (iii) Payment of compensation to victims (iv) political pressure (v) use of thana culture (iv) and migration. The response was obtained on a five-point Likert scale (1=very low, 2=low, 3=medium, 4=high, 5=very high). The data in this regard are given in Table 3.

Table 3. Local reproaches as followed by the respondents to resolve the conflicts.

Local reproaches for conflict resolution	Mean $\pm$ SD
Panchayat	3.90 $\pm$ 0.974
Intermarriage among both parties	3.46 $\pm$ 0.860
Payment of compensation to victims	3.46 $\pm$ 0.845
Political pressure	3.42 $\pm$ 0.899
Use Thana culture	3.37 $\pm$ 0.775
Migration	3.37 $\pm$ 0.896

Table 3 shows the use of different indigenous techniques to encounter conflicts among farmers. The major purpose of these different approaches was to reconcile the conflicts on a local level. Most of the strategies were non-formal. For instance, a panchayat was the foremost and extensively used local strategy by the local people ( $\bar{x}$ =3.90). Panchayat is usually headed by the local elite which decides the justice after looking into the matter. Farooqi *et al.* (2019) found that Panchayat was the speedy justice system as perceived by the local people and even they found this local strategy more effective and less expensive as compared to the formal judicial system. To settle the conflicts among farmers, intermarriage between the conflicting parties was another profound strategy being used by the residents ( $\bar{x}$ =3.46). This decision is also often made by the local elite and sometimes under the panchayat with the purpose to bury the conflicts. A couple of studies such as Gunduz-Hosgor (2002) and Monden and Smits (2005) have reported that mixed marriages were successful in developing social cohesion among conflicting families. Payment of compensation to victims was another local strategy adopted by the local people to resolve the conflicts ( $\bar{x}$ =3.46). Political pressure ( $\bar{x}$ =3.42), use of thana culture ( $\bar{x}$ =3.37) and migration ( $\bar{x}$ =3.37) were other indigenous techniques adopted for conflict resolution. Findings are endorsed by those of Vogt and

Magiera (2014) as they found that the police station (thana) was the dominating strategy to resolve the conflicts. In another study, Pandey (2014) reported that community policing (thana) culture was much important and effective for conflict resolution.

### CONCLUSION AND RECOMMENDATIONS

This study concludes that resolving conflicts in rural areas is indiscernible for the growth and development of the rural areas. Distribution of canal water at the farm and use of common watercourses were statistically significant ( $P < 0.05$ ) conflicts. As for as the ranking of different conflicts was concerned, distribution of canal water at farm level ( $\bar{x}$ =3.6), water theft ( $\bar{x}$ =3.18) and Illegal ways of usage of canal water ( $\bar{x}$ =3.14) were the key causes of water conflicts. Panchayat ( $\bar{x}$ =3.90), intermarriage between the conflicting parties ( $\bar{x}$ =3.46), Payment of compensation to victims ( $\bar{x}$ =3.46), Political pressure ( $\bar{x}$ =3.42), use of thana culture ( $\bar{x}$ =3.37) and migration ( $\bar{x}$ =3.37) were the prominent strategies adopted by the farmers to resolve the conflicts. This study found that the farming community was more inclined towards a non-formal judicial system to make justice. This study urges the involvement of formal institutions to initiate formal proceedings on water theft and illegal occupation of water. This study also urges a proactive role from the water user association to work

for the formal judicial system to resolve the conflicts.

## REFERENCES

- Adelakun, O. E., B. Adurogbanga and L. A. Akinbile. 2015. Socioeconomic Effects of Farmer-Pastoralist Conflict on Agricultural Extension Service Delivery in Oyo State, Nigeria. *Journal of Agricultural Extension*, 19: 59.
- Bekchanov, M., A. Bhaduri, M. Lenzen and J. P. A. Lamers. 2014. Integrating Input-Output Modeling with Multi-criteria Analysis to Assess Options for Sustainable Economic Transformation: The Case of Uzbekistan. Springer International Publishing. Place Published. pp.229-45.
- Bekchanov, M., J. P. A. Lamers and C. Martius. 2010. Pros and Cons of Adopting Water-Wise Approaches in the Lower Reaches of the Amu Darya: A Socio-Economic View. *Water*, 2: 200-16.
- Bijani, M. and D. Hayati. 2018. Farmers' Perceptions toward Agricultural Water Conflict: The Case of Doroodzan Dam Irrigation Network, Iran. *Journal of Agricultural Science and Technology*, 17: 561-75.
- Bijani, M., D. Hayati, H. Azadi, V. Tanaskovik and F. Witlox. 2020. Causes and Consequences of the Conflict among Agricultural Water Beneficiaries in Iran. *Sustainability*, 12: 6630.
- Gunduz-Hosgor, A. 2002. Intermarriage between Turks and Kurds in Contemporary Turkey: Inter-ethnic Relations in an Urbanizing Environment. *European Sociological Review*, 18: 417-32.
- Huggins, C., H. Musahara, P. M. Kamungi, J. S. Oketch and K. Vlassenroot. 2005. Conflict in the Great Lakes Region—How is it linked with land and migration? *ODI: Natural Resource Perspectives*, 96: 1-4.
- Micklin, P. 2007. The Aral Sea Disaster. *Annual Review of Earth and Planetary Sciences*, 35: 47-72.
- Monden, C. W. S. and J. Smits. 2005. Ethnic intermarriage in times of social change: The case of Latvia. *Demography*, 42: 323-45.
- Nadeem, A. M., T. Ali, W. Wei, Q. Cui and S. Huang. 2021. Can Irrigation Conditions Improve Farmers' Subjective Well-being? An Investigation in Rural Pakistan. *Water*, 13: 505.
- Salehi, S., M. Chizari, H. Sadighi and M. Bijani. 2017. Assessment of agricultural groundwater users in Iran: a cultural environmental bias. *Hydrogeology Journal*, 26: 285-95.
- Siyum, B. A., B. S. Bihon Kassa, M. A. Gebremedhin and E. Mekelle. 2015. Farm Land Conflict and its Socio-Economic Consequences in Tahtay Qoraro, Tigray, Ethiopia. *International Journal of African and Asian Studies*, 9: 44-55.
- Tian, G., X. Han, C. Zhang, J. Li and J. Liu. 2020. Virtual Water Flows Embodied in International and Interprovincial Trade of Yellow River Basin: A Multiregional Input-Output Analysis. *Sustainability*, 12: 1251.
- Toset, H. P. W., N. P. Gleditsch and H. Hegre. 2000. Shared rivers and interstate conflict. *Political Geography*, 19: 971-96.
- Tzanakakis, V. A., N. V. Paranychianakis and A. N. Angelakis. 2020. Water Supply and Water Scarcity. *Water*, 12: 2347.
- Veisi, K., M. Bijani and E. Abbasi. 2020. A human ecological analysis of water conflict in rural areas: Evidence from Iran. *Global Ecology and Conservation*, 23: e01050.
- Vogt, C. and K. Magiera. 2014. Police Officers' Conflict Management and Restorative Justice. Conference: XVIII ISA World Congress of Sociology. Place Published.
- WEF. 2019. World Economic Forum. Global Risks Report 2019. Available online: <https://www.weforum.org/reports/the-global-risks-report-2019> (accessed on 25 March 2019). Place Published.
- Yasmi, Y., L. Kelley and T. Enters. 2010. Conflict over forests and land in Asia. Impacts, causes and management.

**Publisher's note:** EScience Press remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.