

Research Article



Effect of Conflict on Farmers' Income from Tomato Crop in Kurram Agency, Pakistan

Zeeshan Haider¹, Inayatullah Jan^{1*} and Waqar Akram²

¹Institute of Development Studies (IDS), The University of Agriculture, Peshawar, Pakistan; ²Sukkur Institute of Business Administration, Pakistan.

Abstract | Conflicts have adverse effects on income and living conditions of populations worldwide. Keeping that in mind, this study was conducted in northwest Pakistan with the aim to identify the effect of armed conflict on income from tomato crop. The study is based on the primary data collected from two villages namely Shilozan and Pesar in Kurram Agency in the northwest of Pakistan. Data were analyzed using descriptive statistics and paired t-test. The results of the paired t-test reveal that farmers observed a significant difference in the overall income and income from tomato crop after the conflict as shown by larger t-values of 6.17 with ($p < 0.01$) and 10.91 with ($p < 0.01$) respectively. It was mainly due to restrained mobility during the conflict, farmers had limited or no access to cultivable land, irrigation facilities, and input and output markets which resulted in increased cost of production and decreased farm productivity of tomato. This further resulted in decreased net income of farmers from tomato crop. The study concludes that poverty in these areas can be alleviated if the government and non-governmental organizations (NGOs) play their role in promoting social cohesion and management of any conflict in future.

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***Correspondence** | Inayatullah Jan. Institute of Development Studies (IDS), The University of Agriculture, Peshawar, Pakistan; **Email:** jaan.inayat@gmail.com

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Keywords | Armed conflict, Tomato growers, Input market, Output market, Kurram Agency

Introduction

Agriculture sector is the largest sector of Pakistan economy and plays a key role in the socio-economic development of Pakistan. It contributes 19.8 percent to the GDP, employs 42.3 percent of the country's labor force and contributes to the growth of other sectors of the economy of Pakistan (GoP, 2016). A sustained agricultural development is required for improving living standards of the people and reducing poverty in rural areas of Pakistan (GoP, 2011). Due to commercialization of agriculture, farmers, particularly smallholders prefer to grow cash crops for quick and timely returns.

The major cash crops in Pakistan are cotton, rice, to-

backo, fruits and oil seeds. These crops are exported to different countries and are a major source of earning for the farmers as well as for the country in the form of foreign exchange (Hussain, 2009). Kurram Agency is one of the tribal areas located in the northwest of Pakistan where people mostly grow cash crops as the main source of their living. In past people in Kurram Agency have been earning from marketing fruits and vegetables such as apple, peach, tomato, onion, potato, and turnip (Wahid, 2012). However, due to armed conflicts in the area, farm productivity was adversely affected which resulted in decreased income of the farmers.

Conflict in Kurram Agency

Conflict is undoubtedly an expressed struggle between at least two interdependent parties who per-

ceive incompatible goals, scarce resources, and interference from others in achieving their goals. Conflict results when there are incompatible goals, cognitions, or emotions between individual or groups that leads to antagonistic interaction (Paul, 2003; Fisher and White, 1996).

Kurram Agency was a peaceful area until Soviet Union's invasion of Afghanistan in 1979. Due to war, millions of Afghan refugees migrated from Afghanistan to tribal areas. This influx of refugees became a burden on the resources on one hand, and created economic and social problems to the local communities on the other. Besides, the Afghan war left grave and long lasting consequences for Pakistan that can be felt even today in the shape of growing militant extremism, insecurity, intolerance, militancy in religious and sectarian groups and terrorism (Zaman, 2010). The sectarian conflicts occur periodically; decade after decade, however, not extending over a long period.

Both military as well as sectarian conflicts have affected Pakistan severely in the recent past in terms of human as well as economic losses. In 2007-08 in Pakistan, the death toll due to violence rose to 5,000 people leaving another 10,000 injured. Similarly, the country incurred a loss of around 35 to 40 billion US\$ from 2001 to 2008 (Ali, 2010). In Swat valley, farmers have been adversely affected by losing their crops and livestock due to continuous attacks by the insurgents. This also resulted in huge displacement of the local population having indirect socio-economic impacts on the host populations in the nearby cities (Fazal, 2009).

A growing body of research (Bardhan, 2007; Ian, 2006; Pierre, 2006) has identified the inter-linkage between conflicts, food insecurity, and poverty. The internal conflicts in Cameroon, for example, have resulted in decreased farm productivity and have adversely affected the sustainable development in the country (Bardhan, 2007). Similarly, Ian (2006) reported that conflicts resulted in damage of the infrastructure, social and economic systems, and livelihood in Republic of Angola. This conflict has slowed down developmental efforts. In such circumstances, conflict management is an effective means of long-term growth and improvement in living standard of the people.

Similarly, Ahmad et al. (2009) reported the effects of conflict on farming and overall poverty of small farmers in Bangladesh. According to their study, farmers mostly migrated due to conflict and those who stayed

in their places depended mainly on subsistence farming. It became difficult for small farmers to grow cash crops because of their inability to access the local input and output markets.

Pakistan is the world 6th populous country with a population of almost 195.4 million (GoP, 2016). Out of this huge population, 60 percent lives in rural areas. Majority of the rural population depends on agriculture for their living. The government under the paradigm of the new growth strategy envisioned to enhance growth in agriculture sector so that to enhance growth of the overall economy. Agriculture in the country is, however, highly affected by armed conflicts as people are unable to practice on farm, manage irrigation, and access input and output markets. This results in increased cost of production as well as transaction cost. These issues enormously affect those farmers who are growing cash crops. Similarly, due to conflicts in Kurram Agency, farmers income was affected which contributed into the overall poverty in the region. Therefore, there is a need to identify the potential effects on farmers' income from cash crops which leads to poverty in the area.

Objectives of the study and hypothesis

The specific objective of the study is to analyze the effect of conflict on farmers' income from tomato crop. The research hypothesis of the study is that conflict has adverse effects on farmers' income from tomato production in the area.

Data and Sample Design

The research was conducted in two villages, namely, Pekar and Shilozan of Kurram Agency in northwest Pakistan. These villages were purposively selected for two reasons; firstly, majority of the farmers in these villages were tomato growers, and secondly, they were severely affected by the armed conflict. The total number of tomato growers in these villages was 1,700 out of which 170 farmers were selected through random sampling technique. This data was obtained from Anjuman Hussainia which is a local group working for welfare of the agency people. The sampling design is illustrated in Table 1.

Table 1: Sampling design for the study

Village	Total number of tomato growers	Sample size
Shilozan	935	93
Pekar	765	77
Total	1700	170

Source: Anjuman Hussainia, 2012

Primary data were collected to analyze the effects of conflicts on the overall income of the population. A semi-structured questionnaire was used to collect data from the sampled respondents. Descriptive statistics as well as paired t-test was used to identify the effect of conflict on the overall production of tomato as well as the net income of the farmers from tomato crop. The following general form of t-test was used for analysis (Gujarati, 2009).

$$t = \frac{\bar{d}}{sd/\sqrt{n}} \dots \dots \dots (1)$$

$$\bar{d} = \bar{x}_1 - \bar{x}_2$$

Where:

sd: standard deviation; n: Number of observations

Results and Discussion

In this section a brief overview of the land cultivation, farming practices, and income from land is provided. The effect of conflict on income in the ‘during’ and ‘after’ scenarios is also provided by using paired t-test.

Total land cultivated in the ‘during’ and ‘after’ conflict scenarios

The size of land under cultivation is an important determinant of increased agricultural production. A farmer having more area under cultivation can get more production compared to the smallholders. Risk and vulnerability depend on the nature of shock and the coping strategies of a household. In some cases, however, it becomes difficult for farmers to adopt any coping strategy as the nature of the conflict and the size of asset are immense and large. Figure 1 shows the total land cultivated by the sample respondents during and after conflict in both villages. The landholding is divided into two categories, viz., 1 to 15 jarebs and over 15 jarebs. In the first category 41 percent farmers in Shilozan and 42 percent in Pekar cultivated land during the conflict. The proportion increased to 59 percent in Shilozan and 58 percent in Pekar after the conflict. The same results were observed in the second category as well where the proportion of farmers increased from 40 percent in Shilozan and 45 percent in Pekar during conflict to 60 percent in Shilozan and 55 in Pekar after the conflict.

Total land under tomato crop in the ‘during’ and ‘after’ conflict scenarios

The main aim of shift in agriculture from traditional

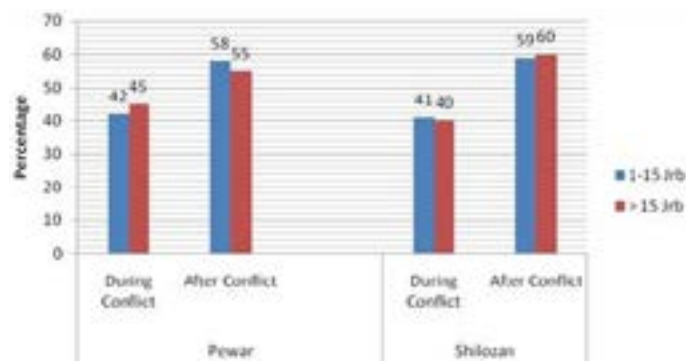


Figure 1: Total land cultivated by the respondents during and after the conflict

Source: Field survey, 2013.

to modern system is to enable farmers to adopt profit-oriented-innovations. Tomato production increases cash income of the farmers. The size of land undertomato cultivation is an important detriment of farmers’ income. Cultivation, weeding, and harvesting of crops is life-risky in areas where landmines are implanted in fields and irrigation channels. Figure 2 shows the land used by the respondents for the production of tomato. The first category is from 1 to 15 jarebs which shows 49 percent for Shilozan and 48 percent for Pekar during the conflict which increased to 51 percent for Shilozan and 52 percent for Pekar after the conflict. The second category is greater than 15 jareb, which shows 45 percent for Shilozan and 42 percent for Pekar during the conflict which increased after conflict to 55 percent for Shilozan and 58 percent for Pekar after the conflict.

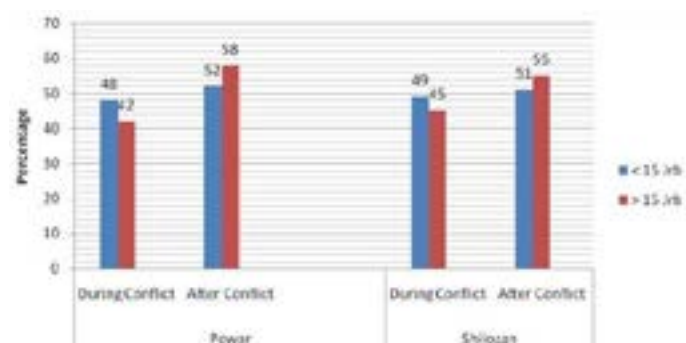


Figure 2: Total land under tomato production in the research area

Source: Field survey, 2013.

Total income of the households in the ‘during’ and ‘after’ conflict scenarios

Figure 3 shows the total income of respondents from all sources during and after conflict. This investigation is important for making comparisons in the ‘during’ and ‘after’ conflict scenarios. The figure shows that during conflict, 75 percent farmers in Shilozan and 60

percent in Pekar were in the income group ranging from Rs. 10,000 to Rs. 200,000. However, the proportion decreased to 63 percent for Shilozan and 39 percent for Pekar after the conflict. It was because of the fact that farmers moved to higher income groups after the conflict was resolved. The second income level is Rs. 201,000 to Rs. 400,000 which contained 8 percent farmers in Shilozan and 5 percent in Pekar in the during scenario. The situation was improved after conflict to 14 percent for Shilozan and 18 percent for Pekar. The third level ranging from Rs. 401,000 to Rs. 600,000 had one percent farmers in Shilozan and 17 percent in Pekar improved to three percent in Shilozan and 21 percent in Pekar after conflict. The last level is more than Rs. 600,000 having 16 percent for Shilozan and 18 percent for Pekar which increased after conflict to 19 percent for Shilozan and 22 percent for Pekar. This implies that conflict severely affected income of the farmers from tomato, whose income was increased after the conflict and they moved up to the higher income groups.

(P -value $< \alpha = 0.01$). These results suggest that conflict significantly affect the farmers income. It implies that the income of the farmers was low during conflict as compared to after conflict situation (Table 2).

Income of households from tomato in the 'during' and 'after' conflict scenarios

One of the aims of this study is to find out the income generated from tomato production in both villages during and after conflict. Figure 4 shows the income of respondents from tomato crop in the 'during' and 'after' conflict scenarios. The figure specifically shows that 34 percent respondents in Shilozan and 39 percent in Pekar earned between Rs. 10,000 and Rs. 200,000 from tomato during conflict. After conflict, however, the percentage of respondents earning this level of income reduced to 13 percent in Shilozan and 20 percent in Pekar. This reflects to the fact that income of farmers from tomato increased after the conflict was over. During conflict, 8 percent of respondents in Shilozan and 4 percent in Pekar had income of more than Rs. 600,000 from tomato, whereas the percentage of respondents earning the same income increased to 24 percent in Shilozan and 11 percent for Pekar after conflict. Based on the information in Figure 4, it can be concluded that the income level of farmers was affected due to conflict which was significantly augmented after the conflict was resolved.

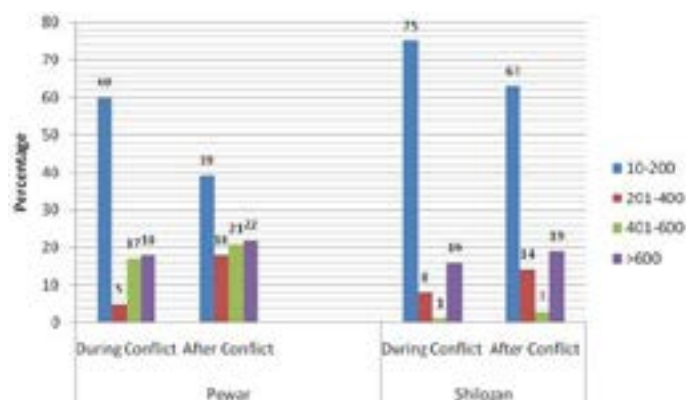


Figure 3: Total income of the household during and after conflict (Rs. in thousand)

Source: Field survey, 2013.

Comparison of household income in the 'during' and 'after' conflict scenarios

A paired-samples t-test was conducted to compare the income of the farmers from all sources during and after conflict. There was a significant difference in the scores for during conflict and after conflict scenarios

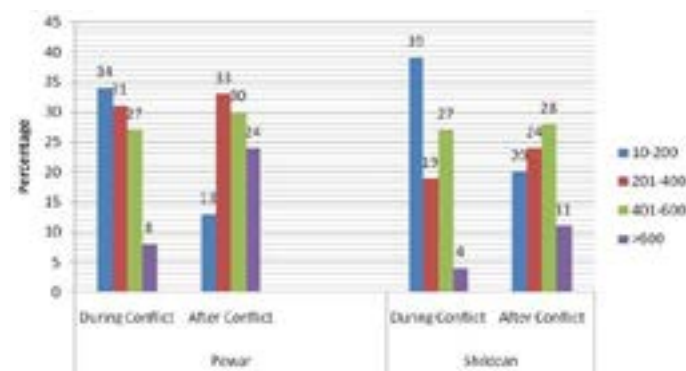


Figure 4: Total income from tomato during and after conflict (Rs. in thousand)

Source: Field survey, 2013.

Table 2: Results of paired sample t-test for the income of the farmers from all sources

Variable	Mean	Std. Dev.	Mean	Std. Dev.	t	df	Sig. (2-tailed)
			Paired differences				
Income from all source after conflict	469324	349115	135547	286443	6.17	169	.000
Income from all source during conflict	333776	205196					

Note: mean values, standard deviation, and differences have been rounded

Table 3: Results of paired sample t-test for the income of the farmer from tomato crop

Variable	Mean	Std. Dev.	Paired differences		t	df	Sig. (2-tailed)
			Mean	Std. Dev.			
Income from tomato crop after conflict	343853	387695	117888	140925	10.91	169	.000
Income from tomato crop during conflict	225965	300052					

Note: mean values, standard deviation, and differences have been rounded

Comparison of income from tomato crop in the 'during' and 'after' scenarios

A paired-samples t-test was conducted to compare the income of the farmers from tomato crop during and after conflict. There was a significant difference in the scores for the 'during' and 'after' conflict scenarios (P -value < $\alpha = 0.01$). These results suggest that conflict affect the farmers income. Specifically, our results suggest that during conflict the income of the farmers from tomato crop was low as compared to income after conflict (Table 3).

Conclusion

The research has been conducted to study the effects of conflict on income form tomato in village Shilozan and Pekar. The number of those farmers having low income from tomato during conflict reduced in both villages as income of many farmers increased after the conflict was over. In other words, income level of farmers has increased after the conflict. An important aspect of determining the income of the farmers is to know about their cost of production. It was found from the field survey that overall cost of production of the farmers was more during the conflict period which was reduced after the conflict. Based on the findings of the study, it is recommended that government and non-governmental organizations (NGOs) should play their role in promoting social cohesion and management of any conflict in future so that farmers get better opportunities to increase their income. This will significantly contribute to poverty reduction in the region.

Conflict of Interest

The authors do not have any conflict of interest.

Author's Contribution

This article is a part of the MSc (Hons) thesis by the principal author. The second and corresponding author was the supervisor of the student. The third au-

thor has contribution in the analysis and write-up of the paper.

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