

## Research Article



# Analysis of Intermediaries' Influence in Citrus Supply Chain in Pakistan

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**Abstract** | Citrus production contributes significantly to livelihoods uplift and national economic development. However, the marketing system is criticised for inconsistent supply chain of citrus in Pakistan. This research aimed to bridge the research gap by soliciting intermediaries' role in the citrus marketing process. Total 120 randomly selected citrus growers were interviewed face to face and collected data were analysed using Statistical Package for Social Sciences. Findings affirmed that middleman, processing factories and friends/relatives were the foremost intermediaries in citrus marketing. Majority of growers (94.16%) preferred selling their pre-harvest fruit to processing factories (55.75%), middleman (30%) and friends and neighbours (14.25%). High prices of inputs (84.3%), small lands (82.6%) and monopoly of the middleman (76%) were prominent factors limiting benefits as perceived by the respondents. Correlation analysis unveiled that most of constraints impeding growers' benefits were inter-correlated. This implies that resolving one barrier could limit another. This study urges a need to regulate middleman in marketing system through legislation and government should develop systematic marketing channels and support to develop fruits industry or value addition.

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## Introduction

Citrus is the levered fruit of Pakistan graced with 1<sup>st</sup> rank among all fruits in terms of area and national production (Mahmood et al., 2014). This esteemed fruit was originated in tropical areas around Southern Himalayas South-East Asia and Indonesia Archipelago. However, citrus is widespread across the world on both sides of equator constructing 35-degree latitude in South Australia in the Southern

hemisphere. Citrus quality diverges in different areas. The regions of semi-tropical climate adjacent to southern and northern latitude limits are a vital source of commercial production (Mahmood and Akhtar, 1996). Climatic conditions of Pakistan are susceptible to quality production of citrus. Therefore, today in a global world "Kinnow Mandarin" of Pakistan is widely preferred and necessitated cultivar (Naz et al., 2014). Kinnow is cultivated in plain areas of the Punjab province and its production is recorded

increasing over time.

Production of citrus in Pakistan is productive and potentially appreciable. However, the marketing system remains under criticism. Inefficient marketing structure results in poor return to grower. Unnecessary involvement of intermediaries in the marketing chain spoils the benefits of growers. Similarly, inadequate marketing management spoils fruit before reaching the consumer. The government in the report (GoP, 2006) had reported that despite profitability, sound irrigation system, favourable climatic conditions production and marketing of citrus fruit was varied due to inadequate access and sluggish system of marketing.

Sabir et al. (2010) summarised that the open marketing of citrus gives profit to each intermediary. Consumers' intentions to purchase fruit directly from producer could grab benefits but this happens rarely. Therefore, contractors earn multifold benefits and margins through marketing fruit in adjacent areas. Similarly, contractors or middleman is not imposed with marketing cost while selling fruit to factories, thus contractor earns benefits again. Factories earn double benefits in the direct purchase of unharvested fruit and export of fruit. Mahmood and Sheikh (2006) had revealed a direct purchase of factories from producers and *beoparies*. In a recent research study, Ullah et al. (2017) iterated that marketing intermediaries take away a considerable marketing margin while profit margin of citrus growers narrows badly. For the well-being of producers and sustainable production of citrus, effective marketing is imperative. Sabir et al. (2010) suggested that a number of intermediaries involved in citrus marketing should be reduced, this will enrich producers' benefits.

This study was planned and executed to unveil intermediaries' role and growers' behaviour towards harvesting and prospects of marketing. Of the total production of citrus, 98% is produced in Punjab province and 70% contribution is from Kinnow cultivar. Therefore, this study was planned in Sargodha district of Punjab which is considered hub of citrus and kinnow cultivar. As the geographical distribution of citrus growing areas in Punjab is alike, hence, the findings of this research may generalise to entire growing regions. This study is first of its kind focusing on intermediaries' role in citrus marketing, hence this will bridge the research gap and present insight to formulate future directions on the government level.

## Materials and Methods

Pakistan includes Punjab, Sindh, Baluchistan and Khyber Pakhtunkhwa provinces. Punjab is prominent in terms of population, infrastructure and agriculture growth encompassing of 36 districts. Geographical distribution of Punjab province is so blessed that major and minor crops are cultivated at full strength pertinent to the conducive environment and one of the best canal irrigation system.

This study was conducted in purposively selected district Sargodha which is the largest citrus-producing district of Punjab and graced with the distinct position regarding citrus production across the country. Sargodha City is located in longitude 72° -38" to 72° - 43" and latitude of 32° -3" to 32° - 7" The city is situated at a distance of about 180 km towards the north-west of Lahore. The climate of the area varies from extreme heat and cold with maximum temperature 50° C (122 F) in the summer while the minimum temperature as low as freezing point in the winter. Therefore, it is Pakistan's best and leading citrus-producing area. The city is well connected to the other major cities Faisalabad (90Km), Jhang (126 Km), Sheikhupura (143 Km), Khushab (45Km), Gujrat (210 Km) and Sialkot is 214 km by metalled road. The city is also connected with Lahore, Faisalabad, Jhang and Rawalpindi by rail. This wide network of different transportations gives an ample opportunity for citrus marketing across the province. Citrus is the leading crop of the study area and the citrus growers around the study district were considered as population for the study to select respondents accordingly.

There are seven sub-districts (Tehsils), viz, Bhera, Sargodha, Silanwali, Kot Momin, Bhalwal, Shahpur and Sahiwal in the district. Considering time and resources study was further restricted to sub-district Kot Momin. All sub-districts were homogenous in characteristic, so, sample selected from selected sub-district tend to generalise on the entire district. Multistage random sampling was employed to select the sample. On the first stage, one tehsil (sub-district) was selected. Selected tehsil was further divided into 24 Union Councils. Out of the total Union Councils, 22 were rural and 2 were urban by nature. On the second stage, 05 union councils were selected at random and on the third stage from each selected Union Council 02 Villages were selected at random.

On the fourth stage, 12 citrus growers were selected from each selected village through random selection thereby making a sample size of 120 citrus growers. For the preparation of sampling frame, Office of Deputy Director Agriculture (Extension) Sargodha was consulted. The office coordinated well and provided district profile, list of tehsils, Union Councils, Villages and list of registered citrus growers. The list consisted of more than 3000 citrus growers. This detailed list served as sampling framer and provided a base for random selection of respondents.

For a collection of data, a questionnaire was developed as a research instrument. The validity of the questionnaire was checked through content validity technique. Two Assistant Professors of Agricultural Extension department and one Assistant Professor from Horticulture Department, University of Agriculture Faisalabad, Pakistan examined the contents of the questionnaire. Prior final data collection, the questionnaire was pre-tested on 20 citrus growers other than sampled growers. On the basis of pre-testing, a questionnaire was finalised for final data collection. The questionnaire was administered through face-to-face interview technique. Collected data were coded in the Statistical Package for Social Sciences (SPSS) for analysis. Descriptive statistical technique i.e. frequency and percentages were applied to data. Linear regression model and correlation techniques were applied for the meaningful interpretation of the data. The regression model used is as under;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Where;  
harvesting behaviour, selection of different intermediaries such as processing factoru, middleman and Friends/neighbours served as dependent variable (Y) while socio-economic attributes such as age, education, land possessed, tenancy status and area under citrus cultivation were kept as independent variables (X).

## Results and Discussion

Table 1 shows that almost half (48.4%) of the respondents were in the age bracket of 36-50 years followed by 38.3% respondents with age of less than 35 years. Approximately, one fourth (24.2%) respondents were illiterate and 75.8% were literate. Among literates, almost one-fifth (19.2%) had less

than primary level education (05 years of schooling). 12.5% of respondents had more than 10 years (matriculation) of education. During discussion it was unveiled that educated growers had more inclination and perceived innovative towards citrus production. Almost 72% respondents had less than 12.5 acres of land but majority (81.7%) was owner of their lands which makes them confident and persuade to take risks and practice recent innovations related to citrus cultivation. Cultivation of citrus was being practised mainly for commercial purpose though major part of cultivation was on less than 12.5 acres. One fourth (25%) respondents had the cultivation of citrus on more than 10 acres. Earning income was the sole purpose of practising citrus, therefore, Kinnow appeared leading cultivar cultivated. Kinnow is the widely exported cultivar of Pakistan and quality of kinnow exported from Pakistan is ranked 1<sup>st</sup>. The debate summarises a sound picture of citrus growers in the study area. Being young, educated, possessing lands, being owner of their lands and growing globally acclaimed cultivar showcase farmers as a productive growers in the country.

**Table 1: Demographic characteristics of respondents.**

Demographic Attributes		Frequency
Age (Year)	Young (<35)	46(38.3)
	Middle (36-50)	58(48.4)
	Old (> 50)	16(13.3)
Educational Level	Illiterate	29(24.2)
	Up to primary	23(19.2)
	Primary to middle	36(30)
	Middle to matriculation	17(14.1)
	Above matriculation	15(12.5)
Size of land holding (acres)	< 5	47(39.1)
	5-10	39(32.5)
	> 10	34(28.3)
Tenancy Status	Owner	98 (81.7)
	Owner cum tenants	18(15)
	Tenant	4(3.3)
Area under citrus cultivation	< 5	6(5)
	5-10	84(70)
	> 10	30(25)
Cultivar under cultivation	Kinnow	120(100)
	Other than Kinnow	23(19.16)

**Note:** Values in parenthesis are percentages; **Source:** Authors compilations from data collection.

### Harvesting and marketing behaviour

Table 2 shows that the majority of the growers (94.16%) didn't harvest orchards at their own, instead, they preferred selling pre-harvest produce to intermediaries like processing factories and marketing agents. Once the orchard is sold, the buyers were responsible to execute harvesting. For instance, factories had resources and they opt mechanical harvesting and follow the regulations of export. Only 5.84% respondents claimed to harvest the orchards at their own with the help of local labour. These growers were usually small landholders and had enough access to labour for harvesting. Post-harvest, they used to market picked fruit to friends, neighbours, retailers and local market.

**Table 2: Harvesting and Marketing Behaviour of citrus growers.**

Harvesting and Marketing Behaviour of citrus growers	f	%
Harvesting Behaviour of citrus growers (n=120)		
Do not harvest fruit from the orchard at own	113	94.16
Harvest fruit from the orchard at own	07	5.84
To whom growers sell unharvested fruit from the citrus orchard (n=113)?		
Processing Factories	63	55.75
Middleman	34	30
Friends and Fellow Farmers	16	14.25

Source: Authors compilations from data collection.

Table 2 further shows that among different intermediaries, the role of processing factories, middleman and fellow farmers appeared prominent. Ullah et al. (2017) have endorsed that commission agents, middleman and processing factories are leading intermediaries in the citrus marketing system. About 56% of respondents preferred selling pre-harvest produce to processing factories. Respondents acclaimed, the area is rich in citrus cultivation and processing factories have a systematic network to buy pre-harvest fruit to export. Respondents reflected a satisfaction over selling price of fruit. Of the total respondents, 30% sold pre-harvested fruit to a middleman usually playing role of broker and a marketing agent simultaneously. During discussion, respondents termed middleman a profit-making group denting the margin of grower. The middleman in the study area was perceived buying pre-harvest fruit at low price from the growers and selling at double to processing factories. About 15% growers

reported selling their pre-harvest fruit to fellow farmers and friends valuing their relationship with each other.

### Socio-economic characteristics and marketing opportunities

Table 3 shows the impact of demographic characteristics of the growers on their harvesting and marketing behaviour. Higuchi et al. (2012) had found socio-economic attributes as an effective predictor of farmers marketing choice. Abdullah et al. (2019) had confirmed that that gender of the household head, age of the farmers, tenancy status, vocational training, educational level and irrigated land were the determinants of market participation (Ashraf et al., 2015; Sahara et al., 2015; Slamet et al., 2017). Results of the study indicated that relationship of growers' age, landholding, tenancy status and cultivar under cultivation was non-significant with harvesting behaviour of citrus growers. Educational level was highly significant ( $P < 0.01$ ) with harvesting behaviour. This implies that with the increase in education harvesting behaviour of respondents tend to be more positive. Growers would be in good position to decide the proper mode of harvesting to reduce losses, ensuring quality and observing more outcomes with escalation in their education. Highly educated respondents would be in a better position to get harvesting done through skilled labour or adopt mechanized harvesting.

**Table 3: Socio-economic impacts on marketing opportunities.**

Socio-Economic Attributes	Harvesting Behavior	Processing Factory	Middleman	Friends/Neighbours
Age of growers	0.123	0.290	0.161	0.046*
Education of growers	0.007**	0.091*	0.363	0.234
Land possessed by growers	0.799	0.001**	0.100	0.822
Tenancy status	0.686	0.104	0.867	0.999
Area under citrus cultivation	0.085*	0.078*	0.015*	0.016*
Cultivar cultivated	0.996	0.063*	0.461	0.999

\* $P < 0.05$ ; \*\* $P < 0.01$ ; Source: Authors compilations from data collection.

The area under citrus cultivation reflected the significant association with harvesting behaviour of citrus growers. Results imply that with a unit increase in an area under citrus cultivation, there will be a positive change in the behaviour of growers regarding marketing of produce.

Age and tenancy status were non-significant with



marketing choices. The educational level had significant relationship with marketing to processing factories ( $P < 0.05$ ) followed by the area under citrus cultivation and practised cultivar having significant relationship ( $P < 0.05$ ). Results imply, higher qualification, large landholdings, area under citrus cultivation and type of cultivar being cultivated provoked growers to market their pre-harvest fruit in befitting manner. Respondents arbitrated that marketing fruit to processing factories was an easy and cost-effective way for them.

The area under citrus cultivation was significant with the selling fruit to a middleman ( $P < 0.05$ ). It can be assumed that that marketing to middleman was the choice of small landholders to save cost and resources. Age and area under citrus cultivation had a significant relationship with the selling of fruit to friends and neighbours ( $P < 0.05$ ). Results summarized that the marketing behaviour of respondents was more influenced by the area under citrus cultivation. As the area and production increases, growers will be more concerned and focused to choose effective marketing options.

#### Constraints analysis

Table 4, illustrates some prominent constraints to citrus cultivation as perceived by the growers. High prices of inputs appeared leading constraint as perceived by 84.3% growers. Respondents showed agitation on escalating inflation in the country as the extended cost of production is lowering the output particularly for the small farmer. An overwhelming majority (82.6%) of respondents argued that being a small farmer is itself a great challenge to encounter. In Pakistan, majority of the farmers are small farmers usually found relying on middleman for financial assistance. Ansari et al. (2018) had concluded that the middleman is responsible for the credit cycle in rural areas in particular. Around 76% respondents were found depressed with the monopoly from middleman. Respondents criticised the role of middleman but pertaining to weak financial position they were compelled to sell their products to this commission mafia because of sluggish marketing mechanism in country. Naseer et al. (2019) agreed that traditional marketing channels (with intermediaries) did not hamper the profitability of the farmers. However, various studies like Ansari et al. (2018) had augmented that the farmer, the middleman and the retailer are the main actors along the supply

chain thus none can be undermined. Findings are more or less similar to those of Sharif et al. (2005) as 90% growers were found selling their orchards to contractors. Siddique and Garnevska (2018) found that majority of growers opted pre-harvest selling of their orchard to contractors and middleman while few of them sold directly to local and foreign market. Middleman cutes growers benefits in many forms. Usman et al. (2018) augmented that monopoly of the middleman significantly hampered the benefits of the farmers. Usually the information regarding price of commodity floated by middleman to the farmers was appeared misleading and inaccurate (Khushk et al., 2006). Ultimately, preventing a major loss processing factories offer higher prices resulting multi-fold benefits to a middleman. Fredriksson et al. (2017) had arbitrated that availability of physical and market infrastructure is of great worth to escalate the revenue of farmer.

**Table 4: Constraints analysis.**

Constraints	Percentage impact
Inadequate awareness	25.8
Middleman Monopoly	76.0
Non-adoption of mechanized operations	31.4
Small land holdings	82.6
Water Shortage	28.9
High Prices of inputs	84.3
Finance shortage	60.3
Poor quality of fruit	39.7

**Source:** Authors compilations from data collection.

Finance shortage was perceived as an obstacle by 60.3% growers. Poor quality of fruit pertinent to various issues like inadequate supply of nutrients and climatic variability was reported one of the serious constraints by 39.7% growers. Water scarcity and inadequate awareness were perceived as a constraint by 28.9 and 25.8% growers. Results infer that most of the constraints are interlinked with varied impact. Thus inter-correlation analysis of constraining variables was run to unveil the association as depicted in Table 5.

Table 5 shows the correlation analysis between different constraining factors. There was a significant relationship between water shortage and non-adoption of mechanized operations. Results infer that water shortage can be mitigated by the adoption of mechanized operations i.e. high-efficiency irrigation system. A highly significant correspondence appeared

**Table 5:** *Inter-correlation of variables.*

	Limiting factors							
	Inadequate awareness	Middleman monopoly	Non-adoption of mechanized operations	Small land-holding	Water shortage	High prices of inputs	Finance shortage	Poor quality of fruit
Inadequate awareness								
Middleman monopoly	-0.031							
Non-adoption of mechanized operations	-0.017	-0.006						
Small land holding	0.111	0.018	-0.128					
Water shortage	-0.003	0.007	0.903*	-.107				
High prices of inputs	0.105	-0.066	-0.166	.939**	-.141			
Finance shortage	0.127	-0.079	0.032	.466**	.064	.428*		
Poor quality of fruit	-0.058	0.008	-0.117	.365**	-.112	.343**	.376**	

\* $P < 0.05$ ; \*\* $P < 0.01$ ; **Source:** *Authors compilations from data collection.*

between high prices of inputs and small landholdings of the farmers ( $P < 0.01$ ). High prices of inputs prevented small growers in particular to adopt the latest orchard management techniques. Shortage of finance showed a highly significant correlation with small landholdings ( $P < 0.01$ ) and a significant correlation with high prices of inputs ( $P < 0.05$ ) as well. Finance is inevitable for managing farms and ensuring inputs timely. Poor quality of fruit was highly significant with small landholdings ( $P < 0.01$ ), high prices of inputs ( $P < 0.01$ ) and a shortage of finance ( $P < 0.01$ ). The results affirm that most of the constraints are interconnected and with the resolution of one, another can be alleviated automatically.

## Conclusions and Recommendations

Citrus is one of the leading fruits in Pakistan and dully important for the national economy and farmers livelihood. Among various cultivars of citrus, Kinnow is the leading one and Pakistan is graced with a unique taste, extended quality, size and extensive demand of Kinnow across the world. Citrus supply chain encompasses different intermediaries playing critical role in marketing in particular. Processing factories, middleman and friends/neighbours were prominent intermediaries to whom growers usually sell pre-harvest fruit. Growers more often sell pre-harvest fruit to factories, retailers and middleman however growers are victimised to monopolies and poor return pertinent to shaky marking system in country. Intermediaries are found making multi-fold benefits while producers are getting poor returns. In results, they are found facing challenges related to technical

knowledge, high prices, monopolies and finance shortage. The constraints being faced by the growers are interconnected. This study urged the development of systematic marketing system for the growers and support to local industry for fruits processing and value addition. In order to alleviate monopolies there is need to regulate middleman in marketing system.

## Novelty Statement

General research emphasizing on intermediaries influence in citrus value chain in Pakistan is almost scanty. This research study not only bridges the research gap but also pointed number of ways to regulate the influence of intermediaries.

## Author's Contribution

**Saleem Ashraf:** Designed research as principal author and finalized the paper.

**Raheel Saqib:** Analyzed the data and prepared initial draft of paper.

**Zakaria Yousuf Hassan:** Supervised overall research and designed research instrument.

**Muhammad Luqman:** Collected data from the research area.

**Abdur Rehman:** Reviewed the relevant Literature and proof reading.

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