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FACTORS IMPEDING CITRUS SUPPLY CHAIN IN CENTRAL PUNJAB, PAKISTAN

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A B S T R A C T

Pakistan is one of the largest citrus producer and leading exporter of Kinnow in world. Average production of this vital fruit comparatively lower than potential and in result, minor contributions comes to national economy and livelihoods of the growers. Present study was designed to analyze factors impeding citrus supply chain in Toba Tek Singh District of the Punjab province. Through multistage sampling technique 120 citrus growers were selected. Data were collected through face to face interview technique with the help of structured, validated, reliable and pre-tested questionnaire. Collected data were analyzed by using Statistical package for Social Sciences (SPSS). Findings unveiled that black marketing of fertilizers, shortage of labor; lack of technical knowledge and shortage of finance were major factors impeding production of citrus crop. Monopoly of middle-man; late payments by the dealers; lack of storage facilities; high storage cost and less price of citrus set by the government were leading barriers of marketing. Study recommended that development of effective marketing system, subsidies on inputs and initiation of direct marketing for small farmers in particular. Study further urges development of affordable machinery for growers to encounter labor shortage problems.

Keywords: Production, marketing, factors, citrus supply chain, Punjab.

INTRODUCTION

Citrus is one of the leading fruit crops of Pakistan being income source and source of foreign exchange earnings. Since the introduction of kinnow mandarin (Citrus reticulate Blanco.) in the country, its production has been increasing steadily to fulfill the growing demands at home and abroad. Citrus has great importance in view of its dietary and economic values. Kinnow is a valuable fruit occupies 1st position amongst all fruits both in terms of area and production. However, Pakistan has 12th position in citrus production in the world (FAO, 2005). Total area under citrus cultivation during 2010-11 was 194528 hectares with production of 1982191 (tons) and during 2014-15 was 192832 hectares with production of 2395550 (tons) (Government of Pakistan, 2016). About 95 per cent of the citrus area is located in Punjab. Of the total area under fruits, 29.55 per cent is under citrus and 60 per cent of it is under kinnow with more than 75 per cent production of total citrus fruits. Under citrus fruits, kinnow area, production and exports are at the top. More than 90 per cent of citrus exports are those of kinnow. Assuming that all kinnow produced in Punjab is domestically marketed, the employment generated from its production and marketing is estimated at about 23.48 million labour days or fulltime jobs for more than 75,000 people (about 57 million labour days in production and remaining in marketing sectors) (Sargodha online, 2016).

The fruit bearing life of citrus orchard is 20-30 years which is lower compared to other citrus producing countries of world, where its span goes up to 50 years. The basic factor affects the citrus supply chain is less use of high-quality citrus production techniques. Farmers are not realizing the orchard as an endeavour rather they grow as additional crops in the field. So, they are not able to fulfil the demand of kinnow crop at the time of need; they create a huge gap in citrus production as they do intercropping of different crops in citrus orchard which cause unfavourable losses to the citrus plants and production (Nawaz *et al.,* 2011).

Analysis of the data show that lack of technical assistance, lack of improved varieties, lack of irrigation facilities, diseases attack and natural disaster (flood)

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were perceived to be the related problems faced by citrus growers for citrus low productivity in the study area (Iqbal & Kamal, 2014).

Citrus supply chain across Pakistan has turned to ineffective, in results net returns are diminishing with the passage of time. Multiple factors are responsible for this ineffective supply chain including variant climatic conditions (Zekri, 2011). Inadequate technical support, poor availability of improved varieties, outdated irrigation approach, infestation of diseases and abrupt climatic changes are stressors for the supply chain (Iqbal and Kamal, 2014). Poor planning and quality ignorance are additional factors affecting supply (FAO, 2005). Poor quality assurance followed by adoption of traditional packaging practices appear inconvenient for higher returns in international market (Khan et al., 2011). This miserable condition is costing loss of millions to national economy and livelihoods of the growers.

In true sense, effective citrus supply chain can harness best outcomes and attract international market. The quality produce can boost livelihoods and present significant share in national economy (Khan et al., 2011). Apart from citrus, entire horticulture crops are highly competitive in global market and grab higher returns. Processed horticulture products have had more success in higher income markets. Citrus in this regard is special because of strong competitive edge in kinnow mandarins. But despite being world's largest exporter of kinnow mandarins, entry in developed country markets is scanty so far, possibly due to their excessive seed content and quality issues. Considering this importance of citrus fruit in national economy and livelihoods, this study was planned to probe those factors which are affecting citrus supply chain in Toba Tek Singh district of Province Punjab

Several studies emphasized the issue of citrus supply chain constraining factors in Pakistan. Johnson (2006) has estimated that citrus fruits in Pakistan are estimated at 40 percent while according to ACIAR (2008) & Khan (2008) 35 percent of the total produce of citrus in Pakistan is lost during supplying the fruit form one to another place. After all these studies, citrus supply chain in Pakistan is affected by various factors. Therefore, this study was planned to limelight this issue that our country may able to mitigate these factors

METHODOLOGY

Among all the provinces in Pakistan, Punjab is the 2nd largest province by means of area scattering on 206,344 km2 after Baluchistan. About 95% of the citrus area is located in Punjab. Of the total area under fruits, 29.55% is under citrus. The major citrus producing districts are Sargodha and Toba Tek Singh districts across Punjab province (Govt. of Punjab, 2016).

For this research, District Toba Tek Singh was purposively selected considering extensive production of citrus in the region. Moreover, research-based literature regarding citrus supply chain in this area was scanty. The study district comprised of 04 sub-districts (Tehsils) and considering limitations of time and resources, study was restricted to one sub-district. Through random selection, sub-district Toba Tek Singh was chosen as study area. Interestingly, Sub-district Toba Tek Singh was the largest in terms of citrus cultivation area and production among all sub-districts of study district.

All citrus growers residing in selected area served as population for the study and sample was selected through multi stage random sampling technique. On first stage, study district was selected while on second stage, study-sub-district was selected at random. There were total 32 Union Councils in study sub-district. Of the total 32, 29 were rural while 03 were urban by nature. On third stage. From 29 rural union councils, 06 were selected randomly. On fourth stage, one village from each selected Union Council was selected thereby making total 06 villages from where study sample was assumed to be chosen. From each selected village, 20 respondents who were typical citrus growers were selected thereby making total sample size of 120 citrus growers. The list of sub-districts, union councils, villages and citrus growers provided by the Directorate of Fruits and Vegetable Development Project, Toba Tek Singh served as sampling frame and facilitate researcher to opt multi stage random selection. This random selection eliminated the bias and gave equal opportunity to each respondent to be selected.

Study was entirely quantitative in nature, therefore, keeping study objectives in mind, questionnaire was prepared as research instrument. Questionnaire was structured, and validity was assessed through face validity technique while reliability was assured through Cronbach alpha. Prior final data collection, instrument was pre-tested on 20 respondents other than sample. Based on pre-testing results some minor revisions in instrument was incorporated. Final data were collected through face to face interview technique.

Collected data were statistically analyzed using Statistical Package for Social Sciences (SPSS). Means, standard deviation, and weighted score were computed for drawing conclusions and formulating recommendations.

RESULTS AND DISCUSSIONS

Socio-economic characteristics of the Respondents: Socio-economic attributes of the respondents unveiled that about one fifth (18.3%) respondents were of less than 35 years of age while less than half (47.5%) respondents were of between 36-50 years and 34.2% respondents were old aged (above 50). Majority of the respondents (80%) were literate while one fifth (20%) respondents were illiterate. Among literate respondents, about 16.7% were educated up to primary level while 18.3% were educated more than matriculation. Vast majority of respondents (70%) were owner of their land while remaining respondents were tenants or owner cum tenants. Likewise, majority of the respondents (76%) were small farmers having less than 12. Acres of land while more than half (54%) respondents had citrus cultivation less than 12.5 acres of land. Growers were experienced in citrus cultivation as average year of experience was approximately 16.5 years. Regarding cultivation of varieties, Kinnow was the prominent variety under practices among respondents.

Table 1. Production constraints as perceived by the citrus growers.

Production Constraints	Weighted score	Mean	Rank
Black marketing of fertilizer	541	4.66±0.474	1
Small land holding	540	4.50±0.810	2
Shortage of labour	521	4.34±0542	3
Costly mechanization	507	4.22±0.783	4
Monopoly of dealers	500	4.17±0.374	5
Less accessibility of fertilizer	480	4.00±0.580	6
Lack of technical knowledge	477	3.98±0.679	7
Shortage of finance	462	3.85±0.513	8
Adulteration in chemicals	324	3.34±0.978	9
High prices of inputs	353	2.94±0.833	10
Poor awareness of recommended production practices	279	2.79±0.608	11
Inadequate contact with experts	150	2.68±1.266	12
Poor availability of diseases free plants/nursery	224	2.60±1.817	13
Accessibility of disease free material	211	2.27±1.490	14
Facility of imported certified material for citrus	186	2.11±1.272	15

Production constraints being faced by the citrus growers: Data presented in Table 1 revealed that black marketing of fertilizers appeared prominent obstacle with highest mean value of 4.66±0.474. Small land holdings appeared second leading constraints with mean value of 4.50±0.810 followed by shortage of labour holding 3rd ranking with mean value of 4.34±0542. During informal discussion respondents elaborated that they are facing labour shortage which not only delays the farm operations but also affects the quality of produce as available labour is not skilled. Majority of small farmers not only in study area but also across Pakistan are small farmers and these losses pertaining to labour shortage meant them a lot. Their feeble financial position doesn't allow them to adopt mechanized farming to encounter problem of labour shortage. Mechanized farming is not only inaccessible to small farmers but also an expensive option. Extensive mechanization was further reported as 4th leading barrier with mean value of 4.22±0.783. Ghafoor *et al.* (2008) had reported that inadequate finance and higher prices of inputs were major challenges for citrus producers in Pakistan. Finance shortage and expensive inputs essential for sustained production lowered the potential of citrus production in district Sargodha (Ashraf *et al.,* 2014). In the same district, Ashraf *et al*. (2015) unveiled that growers were practicing manual application of spray and other operations because of expensive technologies, particularly mechanization tools. In converse to these findings, findings a labour has turned to major dilemma. According to Hassan & Ahmed (2015) labour shortage is the prominent constraint of

present time faced by citrus growers. A decade ago, similar kind of findings were reported by Johnson (2006). It may be summarized that with the passage of time shortage of labour is rising and need of affordable machinery is rising. Among various other constraints, Adulteration in chemicals, high prices of inputs. Inadequate awareness regarding production practices, inadequate contact with experts, sluggish availability of disease free plants, and facility of imported and certified material were some least influential constraints. The impact of these constraints was limited under medium level.

Table 2. Ranking of problems regarding marketing.

Marketing Constraints	Weighted score	Mean	Rank
Monopoly of middle man	549	4.65±0.478	1
Inadequate Storage facilities	462	4.53±0.841	2
Late payment by the dealers	510	4.25±0.538	3
Shortage of transport facilities	506	4.22±0.553	4
High storage cost	476	3.97±1.076	5
Information about market prices	418	3.87±0.833	6
High carriage and other handling charges	457	3.81±0.946	7
Distant markets	415	3.52±0.535	8
Less price of citrus in markets	416	3.47±0.697	9
High market committee fee	398	3.43±0.749	10

Marketing constraints being faced by the citrus growers: Data depicted in Table 2 summarized different constraints as perceived by the growers, affecting marketing of citrus. Monopoly of middleman appeared leading constraint with mean value of 4.65±0.478, making marketing uncertain. Inadequate storage facilities for enhanced shelf life of citrus fruits stood on 2nd rank with mean value of 4.53±0.841. late payments offered by the dealers once the produce is sold by producer was another constrain getting 3rd rank with mean value of 4.25±0.538. shortage and inappropriate transportation facilities has been prime source of quality reduction and fruit loss. Hence, stood on 4th rank with mean value of 4.22±0.553. Iqbal & Khan (2014) augmented poor marketing facilities for citrus growers and extensive cost of transportation faced by the growers. Different literature indicated that marketing system in Pakistan is traditional resulting in poor efficiencies (Sharif *et al.,* 2005). There are generally great differences between prices paid by consumer and those received by producers (Toaha, 1974); Qureshi (1974); Sattar, *et al.* (1976); Siddiqui (1979); Memon (1978); Khan (1980); & Mohy-ud-din (1991)]. On the other hand, very little research has been done on domestic marketing of fruits. Improvements of roads, bridge construction and spot maintenance make it easy for farmers to reach at local markets.

There is a need to make better policies to create integrity of remote areas with urban areas through provision and improvement of road networks (Torbjorn & Bharat, 2012). Better transport system should be provided to farmers which reduce transport costs and travel time results in better marketing and increased production (IFAD, 2001).

CONCLUSION AND RECOMMENDATIONS

Citrus supply chain in study area appeared partially effective because of militating factors persisting from the many years. Scanty supply chain offered low price of produce to growers. Traditional mechanism of farming, high cost of inputs, expensive mechanization and labour shortage were the prominent factors obstacle supply chain. While, defective marketing, influence of intermediaries in marketing system were additional barriers in way of citrus marketing. Study urge development of sound marketing system for citrus growers, subsidies on inputs and initiating direct marketing for small farmers in particular. Study further urges development of affordable machinery for growers to encounter labor shortage problems.

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