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Research Article

UNLOCKING INCLUSIVE COMPETITIVE VALUE CHAINS OF CHICKPEAS IN PUNJAB, PAKISTAN: A WALKING THE CHAIN APPROACH TO IDENTIFY BARRIERS, OPPORTUNITIES, AND OPTIONS

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Abstract

Improved and inclusive agricultural value chains by linking all stakeholders' particularly farmers with the market have remained a challenge in Pakistan. This study is aimed at identifying issues and obstacles that hinder the development of chickpeas' value chain by using the lens of value sought by consumers. Primary data are collected from consumers, retailers, wholesalers, processors, and farmers to understand consumer value and identify opportunities and options to create and deliver greater consumer value along the chickpea chain. Results of focus group discussion of consumers depict that the important quality parameters are cleanliness, grading, and packaging. Moreover, results of the data analysis of farmers and other stakeholders reveal that mostly households stick to their traditional farm management practices and crop types. Value addition and storage of chickpeas at the farm level is very limited. Farmers are weakly connected with the market indicating the high potential of developing and upgrading chickpeas value chains in Pakistan. Value addition at the stakeholders' level, such as processors and wholesalers existed but not purely consumer oriented. However, value addition at retailers' level is consumer oriented. It indicates that information flow from consumers to value chain actors is not adequate. An important option can be to give small cleaning and grading machine to farmers and building their capacity to perform value added activities and adopt appropriate storage techniques at farm level which facilitate them to sell value added products at good price to processors, wholesalers or retailers which could lead to increase the farmers' profitability and in turn motivate them to increase area under chickpea production.

Keywords: Value chain, Chickpeas, Stakeholders, Pakistan, Interventions
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1. INTRODUCTION

Pakistan is termed as agricultural economy with an estimated population of 231.4 million people (PBS, 2023). Agriculture sector, which includes livestock, crops, fisheries, forestry subsectors, is considered as the most vital in economic growth, contributing significantly to employment generation, food security, foreign direct investment, exports, and poverty alleviation (Government of Pakistan, 2023).

The performance of the agriculture sector is directly linked with the country's economic growth and prosperity. Pakistan is highly vulnerable to climatic shocks, natural hazardous and land use change is a great threat to this sector due to unplanned urbanization and industrial expansion (Raza et al., 2019; Faisal et al., 2020).

Therefore, expansion in other sectors and climatic shocks has drastically decreased the agriculture sector share in overall GDP of the country. However, this sector play a vital role by contributing 22.9 % to the GDP, and employing 37.4% of the total labor force (Government of Pakistan, 2023). Thus, sustainable, and environmentally friendly agricultural practices are necessary for ensuring food security and growing population, which is consistent with the second goal (End hunger, achieve food security and improved nutrition and promote sustainable agriculture) of Sustainable Development Goals (SDG).

Pulses are considered as rich sources of proteins as 'meat' for commoners and the poor. Chickpea, mungbean and lentils; most important pulses in Pakistan; are grown in rainfall regions and can tolerate poor soil conditions. Smallholders with 2-10 ha contribute 90-95% in pulses production (Rani et al., 2012; Ullah et al., 2020). However, pulses production is decreasing from last few years which results in high trend of imports and continues rise in prices (Rani et al., 2012; Vanzetti et al., 2017). In fiscal year 2023, import has reached up to 1.344 million tons which has total value of $946 million as compared to 1.266 million tons of a value of $709 million (Khan, 2023). The reasons of this decline include lack of certified seed, climate change, lack of investment from private sector and marginal lands devoted for pulses production (Ullah et al., 2020; Raza et al., 2022). Likewise, there is little evidence of technology-based improvement in pulse crops because they compete with mainstream crops such as rice, wheat, and cotton; therefore, receive less research and development attention. Moreover, lacking policy support from government, poor marketing, and lack of research on value chain result in low prices received by farmers are also considered as source of the decline in farmers' interest in the pulses' production (Vanzetti et al., 2017; Raza et al., 2022).

Among pulses, chickpeas are a major crop of the pulses farmers in the rain fed areas of Pakistan mainly in Punjab and Sindh provinces. The majority of Chickpea producers have small farms and through collective approaches may have potential to improve yield, reduce post-harvest losses and improve marketable attributes of their chickpea crops (Ullah et al., 2020; Raza et al, 2023). Chickpeas are grown on about 2.2 million hectares in Pakistan, mostly in the rain fed regions of Pakistan which includes districts such as Chakwal, Bhakkar, Khushab and Layyah. The chickpea crop is contributing to a great extent to nutritional security, particularly of low-income group of people of Pakistan (AARI, 2024). However, in recent years, there has been a decrease in chickpea production. Production was approximately 751 thousand tons in 2013, but by 2021 it had fallen to 234thousand tons. Adverse climate conditions and rising domestic demand that exceeds local production capacity represent a couple of the explanations attributed to this decline (USDA, 2023; AARI, 2024) . Pakistan has become more and more dependent on imports as a result of the wide gap between local production and home demand. The value of imports was estimated at $40 million in 2013, but by 2022, it had increased to $262 million. Australia is the major supplier, making up about half of the imports, while Canada and Turkey are the other main sources of these imports (Ullah et al., 2020; Khan, 2023; USDA, 2023; AARI, 2024).

A value chain strategy is used to generate positive livelihood effects by development projects to help in identifying other areas of livelihood improvement, such as development of small-scale value adding enterprises. A value chain is a series of consecutive steps that go into the creation of a finished product desired by customers, from its initial design to its arrival at a customer's door (Keyser, 2006). The chain identifies each step in the process at which value is added, including the sourcing of inputs, production, manufacturing, and

marketing stages (Initiative, 2004). In spite of being separated by space and time, it explain how producers, buyers, processors, sellers, and consumers add value at their scale of operation in the products (Hailu., 2016). This technique not only quantify effectiveness and efficiency of supply chains, but also provide opportunities to generate more sales or superior margins compared to its market rivals (Keyser, 2006; Van Engelen et al., 2013). This concept of adding value has been used to bring long-term competitive advantages to the businesses in the form of a value chain. Value chain is also termed as a fundamental tool to investigate the source of competitive advantage by using organization lens, power networks, governance structures and market collaborating strategy (Porter, 1985). It also helps to study how various activities influence businesses, as well as integration of these activities that generate value. On the other hand, agriculture value chains analyze the market adjustment mechanism during supply shocks and variations in demand and changes in institutional and management needs as well as technological advancements in both marketing and production techniques (Collins et al., 2002; Hailu., 2016). Besides enhancing the connectivity among all the stakeholders, this approach also helps to ascertain weak links where structural gaps exist along the chain (Bonney et al., 2009; Collins et al., 2016). The value chain actors have the limited access to different services and support from government which put hindrance in actively participation in higher value portion of the chain (Mehdi et al., 2022; Petersen et al., 2023).

In Pakistan, marketing of chickpeas is mainly in private hands, and the role of the public sector is confined to creating an enabling environment. This coupled with production of chickpeas on marginal lands has resulted in slow progress of the Pakistan's chickpeas industry, with farmers unmotivated to cultivate pulses on account of market instability and unattractive prices. Therefore, chickpea value chain must be studied to document existing inefficiencies along the chain, improve the information flow, improve coordination mechanism among actors, aid in knowing power dynamics, and identify the governing actor.

Although few research has been conducted on the pulses value chains in the different regions of the country, there is a need of research regarding Chickpea value chain analysis in Pakistan. This study is aimed at applying walking the chain approach to study the current Chickpeas value chain system in Punjab, in order to understand the current chickpea marketing system and the role of each actor in the chain. The walking the chain approach, which uses the lens of value sought by consumers to identify the issues and obstacles in the chickpea value chain development that hinder the creation and delivery of that value. The result of this value chain analysis will help to identify problems, opportunities and options for existing chickpeas value chain improvement.

2. Data and Methods

In this study, walking the chain approach is employed to conduct value chain analysis. The purpose of 'walking the chain' approach is to identify how the value of Chickpeas is generated along the chain from consumers to farmers, and to identify problems, opportunities, and options for improving value and efficiencies along the chain (Verbeke, 2005; Mitchell *et al*., 2009). As a starting point, a focus group discussion of consumers was held to learn consumer perception and preferences about the quality parameters. Then a walking the chain activity was organized which included the visits of farmers to retailers, wholesalers and processors so that farmers can view by themselves and understand the quality and value generation process along the chain. Primary data were collected from the farmers and all other chickpeas chain actors by using semi-structured and pre-tested questionnaires. The detailed procedures are described below.

2.1. Consumers' Focus Group Discussion

Primary data were collected from the consumers through focus group discussion. About 10 participants participated in this discussion held at the University of Agriculture, Faisalabad. Participants belong to middle/upper middle class living in Faisalabad city; however, some of them had rural background. All of the participants were very well-educated ranging from Masters to PhD. All the participants were regular buyers of pulses for their household and six of them were cooking for themselves as well. Discussion was conducted through different open-ended questions. Participants were allowed to record their views in verbal form as well as in written form. The majority of the responses were recorded in verbal form, and few were in written form.

2.2. Walking the Chain

After the focus group discussion walk the chain activity was organized in which five lead farmers (three farmers and one extension worker from Chakwal district and two farmers from Karak (KPK) district) walked from Faisalabad retail market back to the chain wholesalers and processors to understand consumer value and identify opportunities to create and deliver greater consumer value along the chain. Data were collected through semi-structured questionnaire following Australian Centre for International Agriculture Research (ACIAR) workbook on value chain analysis (Collins et al., 2016b) after walk the chain activity. Farmers visited two high end, one medium to high end and one traditional retailer; two wholesalers and one processor in Faisalabad city during walk the chain activity. Selection of these stakeholders was made through convenient and snowball sampling techniques.

2.3. Financial Analysis

After the walk farmers were interviewed to know about their learnings and identify the opportunities and options for executing value addition activities at the farm as well as to calculate the cost of production. The detailed calculations were made with the help of financial model described below.

Theories of cost and revenue suggest the following formula to calculate the profit (McConnell et al., 2005; Taylor, 2014; Mehdi et al., 2016). `

$\pi = TR - TC$ (1)

Where π denotes the profit while TR and TC are the total revenue and total cost which are calculated as following:

$TR = Q \times P$ (2)

Where, Q shows the total sales of the product (Chickpeas) while P is the rate price. Total cost is comprised of fixed and variable costs described as follows:

$TC = FC + VC$ (3)

Where, FC and VC denote total fixed cost and total variable cost in chickpeas production respectively.

The total variable cost of chickpea at farm level is described as in equation 4:

$VC = PRHC + POHC + LGC + WC$ (4)

Where,

PRHC = Pre-harvest Costs
POHC = Post-harvest Costs,
LGC = Logistics Costs by Farmers
WCC = Working Capital (Opportunity cost of the grower)

Pre-harvest costs of chickpeas at farm level can be calculated as in equation 5:

$PRHC = SDC + PLC + FNC + PSC + LBC + ENC$ (5)

Where,

SDC = Seed Cost
PLC = Ploughing Cost
FNC = Fungicide Cost
PSC = Pesticide Cost
LBC = Labor Costs (Labor hours / Unit)
ENC = Energy Cost (Electricity/Solar)

Post-harvest costs can be calculated as in equation 6:

$POHC = HPC + COS + GPC + PMC + CO$ (6)

Where,

HPC = Cost of harvesting
GPC = Costs of grading and cleaning
PMC = Packing/ packing material cost
COS = Cost of Storage
COL = Cost of Labor (Labor hours / Unit)

Calculations of logistics costs can be made according to equation 7:

LOGC = LDC + UDC + TRC + MFC + COL (7)

LDC = Cost of loading into the transport vehicle at the farm

UDC = Cost of unloading from the vehicle in the market

TRC = Transport cost of the vehicle from farm to market

MFC = Marketing/commission fee charged by the commission agent.

COL = Cost of Labor (Labor hours / Unit)

Retailer is ending actor of the chain as he fulfils the quality parameters demanded by consumers and sell to the consumers. The main functions performed by the consumers and associated costs calculations are given in the equation 8:

Retailer's Costs = COP + LDC + TRC + UDC + COS + COG +COP + COR + COL (8)

Where,

COP = Costs of Purchase (Buying Price)

LDC = Cost of loading into the transport vehicle at the market

UDC = Cost of unloading from the vehicle in the market

TRC = Transport cost of the vehicle from market

COS = Cost of Storage

COG = Cost of Grading

COP = Cost of Packaging

COR = Cost of Rent of Shop (Opportunity Cost in case Own Shop)

COL = Cost of Labor (Labor hours / Unit)

Gross marketing margin can be defined as the difference between price paid by the consumer and received by the farmer and is given in equation 9:

Gross Marketing Margin = Consumer price – Farmer price (9)

3. Results

The results of the data analysis, presented in this section, start from the elaboration of the characteristics of the value chain of chickpeas. After that the results of the consumer-focused group are explained followed by the results of interviews of retailers, wholesalers, processors and finally of the farmers. From the findings of the data analysis, the important problems, opportunities and options are derived from the results presented and the conclusions are made.

3.1. Chickpeas Value Chain Characterization

Two types of chickpeas, Desi Channa (Black) and Kabli Channa (White), are distinguished by their characteristic taste and size. Desi Channa is widely used in salad, Samosa and other homemade food. Traders, processors, wholesalers and retailers are the main stakeholders in the chickpeas value chains. Traders are the main buyers of the chickpeas from producers, selling 70% to processors and 30% to wholesalers in the grain markets and large shopkeepers in cities. In the product flow for chickpeas, village traders play a critical role, and to whom smallholders are often tied by credit (some traders were said to start rumors of a bumper crop in order to pay low prices to growers).

The quality which is desired by the end consumer is not rightly perceived by the growers as the emphasis of the growers is to harvest, pack and sell the produce as early as possible. Beopari/ brokers believe in volume which is obvious as it generates more commission for them. Wholesalers particularly dealing in volume have more trust on the produce which they bought directly from the farmers. Processors/factory owners and high-end retailers are more conscious of quality determination as well as managing their supplies on the basis of quality determined by their customers. The whole chain is characterized as little understanding of quality management system along the chain which is due to poor information flow system. However, chain actors such as processors and retailers who understand the value of quality management systems are earning more as compared to the other chain actors such as Beopari, wholesalers and farmers. Consequently, a temporary price-based relationship exists between the chain players. The reflection of the Chickpeas chain characterization is presented in Figure 1. About 90-95% farmers sell their produce to village dealers

(beoparies) while 5-10% farmers bring their crop to wholesale markets. Among the village dealers, about 25-30% sell to wholesale markets while the majority of the dealers, about 55-60% sell their chickpeas produce to processors. Majority of the wholesalers sell to retailers both high end stores as well as traditional retailers.

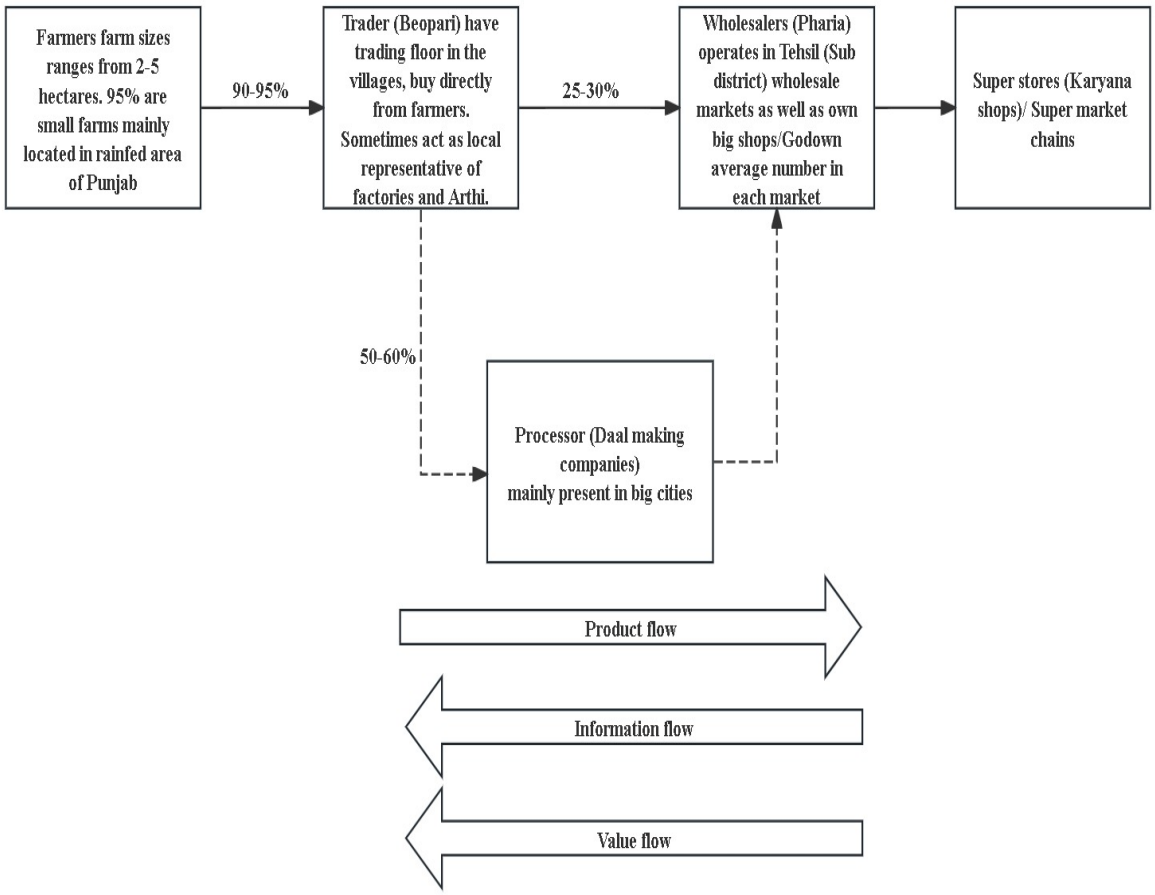

Figure 1: Chain characterization

3.2. Consumer Focus Group Discussion (FGD)

Value chain concept is demand-driven, and the consumer is the main driver of value. A focus group of middle to high-income group consumers was conducted at University of Agriculture Faisalabad, Pakistan. The focus group identified that most consumers preferred to buy from mart/superstores/supermarkets in metropolitan cities such as Faisalabad. The main reason for this preference was that stores were trusted with respect to maintaining the quality of pulses. Consumers perceived quality of pulses according to the following dimensions:

- Cleanliness (free from dust, debris, etc.)
- Packing and labelling (1/2 Kg to 1 kg)
- Size of the grain (6-7 mm in chickpea)
- Color (dark brown in black chickpea and yellow in white chickpea (bright)
- Fresh appearance

According to the consumers, freshness is assessed by the following characteristics:

- Pulses mixed with broken pieces are not fresh
- Pale colored of chickpea is not fresh
- The smell is a measure of freshness (pulses lose their smell as they get older)
- Appearance is an aesthetic sense to assess freshness which may be

reflected in the form of dark brown in black chickpea and yellow in white chickpea

- Moisture level is a measure of freshness. Pulses having low moisture are considered as fresher.
- One respondent said that he could not differentiate between fresh and non-fresh pulses when they were dried and packed, and he relied on store image.

The consumption of the pulses is more in the summer season as compared to the winter season. Consumers differentiate pulses as "Farmi" or "Desi", to distinguish between imported and locally produced pulses, respectively. Moreover, consumers viewed that "Farmi" pulses are of big size, good appearance, and cooked in less time than Desi pulses. Regarding taste, some respondents said that "Farmi" has a better taste while the majority said that taste of Desi pulses is better, but they took longer to cook.

3.3. Retailers

Farmers visited two high end stores, one medium to high end and one traditional retail stores. Following the ACIAR value chain analysis methodology, data were collected from the managers of these stores, Store 1 and Store 2. Detailed cost data were collected from Store 2 as the farmers were able to view the value addition process in this store and the project team was permitted to collect detailed cost data. The important characteristics of these stores are as follows:

3.3.1. Store 1

- One branch in Faisalabad
- Price Conscious consumers
- Low to Middle income customers
- Purchase from the market
- Have their own warehouse
- Perform value adding activities such as sorting, cleaning, packing and labelling
- Not interested in buying directly from the farmers

One of the managers of "Store 1" cash and carry store in Faisalabad said:

"Our customers mainly belong to low-income group and they prefer to buy small-size grain Daal here in Faisalabad than customers in Multan and Gujranwala where medium to big size Daal is preferred".

3.3.2. Store 2

- Pulses and Spices are the focused products and consumer specially come to buy them
- Maintain quality
- Middle to high income customers
- Purchase from the market
- Have their own warehouse
    - Female workers are especially employed for sorting and cleaning manually in the warehouse
    - Packing and labelling by the other employees
- Interested in buying directly from the farmers

The manager of "Store 2" cash and carry store in Faisalabad identified:

"Customers especially come at Store 2 to buy pulses and spices as they are quality conscious and prefer very clean, graded and fresh pulses and they pay relatively high price for that, and we meet their requirement"

The high-end superstores and supermarkets buy the pulses from the wholesale market, and there are no fixed supply sources in the wholesale market. They preferred to buy from wholesalers who offered the best quality and reasonable price. After buying from the wholesale market, they performed value-adding activities such as grading, sorting, cleaning, and packing at their warehouse. Some stores such as "Store 2" preferred women labor for cleaning and grading because:

"Female workers are very much experienced and manually pick every non-pulse material. Then the pulses are packed manually and labelled through a machine."

The superstores and supermarkets use polythene packaging material with appropriate labelling such as weights and expiry dates. These high-end stores preferred to print their name, which leads to customer satisfaction from their store,

while traditional stores sell in loose packing (Usually in polythene bags).

Store managers categorized the relative importance of meeting their customer expectations as given in Table 1.

Table 1: Relative importance of meeting customer expectations about Chickpea at the retail level

Attributes	Relative importance
Variety	6-7mm
Price	Very much
Packaging	Important
Size of grain	Not important
Origin of Pakistan	Not important
Freshness	Important
Cleanness	Very much
Chemical free (safety)	Not important
Price	Very much

Although prime quality pulses may be purchased from the market, an average 1.5-2 Kg / 50 Kg was wastage during the cleaning process at the retail level. The purchase and sale price of various pulses was observed on these superstores as given in Table 2:

Table 2: Prices of Chickpea (Whole and Broken (daal)) at the high-end market

Item	Purchase price range	Retail price range
Daal Channa Farmi	122-125 PKR/kg	165-180 PKR/kg
Daal Channa Desi	122-123 PKR/kg	170-180 PKR/kg
Whole Channa Farmi	124-125 PKR/kg	170-180 PKR/kg
Whole Channa Desi	121-123 PKR/kg	160-170 PKR/kg
Black Channa	111-112 PKR/kg	155-170 PKR/kg

[1] Prices data of 2021

3.4. Retailer's Cost[1]

The main operating cost of processing pulses at the retail level were three salespersons explicitly employed for pulses at wages PKR 15000-20000 per month/per person. Eight to ten women/men were employed for sorting, grading, and cleaning, including packing and labelling on an average salary of 15000/month. Packaging and labelling costs vary from 1-2 PKR/kg and finally, transportation costs of 3-4 PKR/kg were involved in carrying produce from the wholesale market to the storehouse and the storehouse to their sales outlet. On average, 60 kg of all kinds of pulses were sold daily from these stores.

3.5. Wholesaler

Wholesale grain markets are the main source of pulses for high-end retail markets. Usually, beopari/village dealer/brokers purchase pulses from farmers and sell it to wholesalers in the main wholesale markets of the metropolitan cities. However, some wholesalers have strong connections directly with farmers particularly the medium to big size farmers who can arrange supply for the wholesalers. Majority of wholesalers have had their own family business for years in these markets. They maintained communication with their customers via phone and often contacted within 2-3 weeks and asked the rate of the chickpeas (pulses) they required, and if suited, they made the transaction. Such transactions take place on a one weekly credit basis between wholesalers and brokers. Some wholesalers had their own Daal factories, therefore they also prepared Daal for their customers.

The wholesalers have set parameters for assessing quality. The major factors they considered were size, colour and cleanliness. As one of the wholesalers said: *"We preferred to buy a sorted and clean product and check the product randomly from the bags".*

Some insights into maintaining quality and meeting customer expectations in the view of wholesalers are presented in Table 3.

Table: 3 Wholesaler Insights on Customer Expectations

What consumers value	How this activity contributes to creating customer value	Explanation
Product Quality (sorting, grading, in-store handling & storage)	Very important	*"If we offer cleaned and sorted daal then the customer will come. The market is huge, and customers will go to other shops if we don't maintain the quality"*
Product Availability (sourcing)	Not an issue	
Price (sourcing, waste control)	Important	*"The price is an essential part of customer choice because if we offer a reasonable price according to the quality, the customer will buy"*

[1] *As labor and building as well as transportation were used for all pulses therefore specific costs for chickpeas are not calculated*

Wholesalers identified critical issues at their level, such as (according to one wholesaler):

"There are issues in meeting the customers' expectations because the prices are high, and customers want good quality in the low prices. Particularly in chickpeas, we face problems about the insect attack."

Beopari are the main buyers of chickpeas from a producer who visited the production area at the time of harvesting and paid money based on the quality of the produce. They deduct a commission from the growers, ranging from 3-5 % of the total value sold. Some farmers have a direct link with the wholesalers in the market, and they prefer to go into the wholesale markets as mentioned above. However, this percentage of farmers is less than 1 per cent. Traders/Beopari sell most of their products to the processing industry (Daal factories).

3.6. Processor

Processor plays an important role in the chickpea sector as it processes whole chickpeas into broken chickpeas (daal) and produce quality product. The quality of pulses at the Daal factory is assessed rigorously. The broker brings the product to the factory worker, who takes a random sample of 10 kg from the 220-240 bags (1 bag=40 kg) loaded on the truck. First, they use a sieve to check the waste in the sample and weigh that waste. If the waste is 200 grams from that sample, it becomes 2 kg for 100 kg, and this is used to calculate the overall waste in the load. In the second step, a few grams of grains are taken from the sample, all grains are counted, and the whitish, broken, greenish, and discolour grains are separated and counted. If the broken or discoloured grains exceed 3% of the total seed count, then the owner/farmers bear a 'charge' of 77 kg for each percent above 3% deducted from the total weight. In the third step, the owner checks the moisture, and if it is too high there is a cut from total weight of around 3%-5%. If the dispute arises between the broker and the farmer, all bags are already marked so the broker returns all the stock to the farmer.

Most processors (Daal factories) have their own logistics facilities. The factory receives orders and supplies Daal to the wholesaler according to their demand. Wholesalers pay the price of transportation, however, brokers who bring chickpeas consignments manage transport vehicles by themselves normally hire the services of goods' transport.

In the current walking the chain approach farmers viewed all these processes by themselves and had a detailed discussion with the factory manager and owner. One of the motivations they got was by doing cleaning and grading at farm level, a cluster of farmers can sell to processors and avoid quality cut at processor's level. The leftovers of cleaning and grading can be used as animal feed of the farmers reducing their feed cost or can be sold to feed factories, leading to increase the profitability of the farmers.

Table 4: Production and quality issues in pulses

Issue	Impact on Production	Impact on quality	Possible Solution
Blight	Low production	Stop the growth of the grain	Resistant varieties and fungal sprays
Pod borer	Small grain size	Causes holes in the grain and low price	Effective pesticides
Uncertified seeds	Low yield		Excess to good quality and certified seeds
High land preparation cost	Increase cost of production		Low prices of diesel/ efficient production technology
Wild animal attacks	Destroy crops	Low quality	The government should limit the animals to natural reservoirs

3.7. Farmers Interviews

Chakwal is a barani area; therefore, chickpea (black and white) is largely grown there, followed by mung beans and rarely lentils. Because there is no irrigation available in this area, small farmers rely on rainfall (Imtiaz et al., 2016). Farmers only grow one crop a year on the land, e.g., if they grow chickpea on a plot, they leave that plot for the next crop, and next year they will grow chickpea. They maintain this cultivation pattern for three years and cultivate another crop for a year or so. For chickpea production, they first prepare the land with 2-3 ploughs and 3 cultivators, and then with the drill to complete sowing (Ullah et al., 2020). Small scale farmers usually harvest by hand, and some farmers use a mechanical harvester. After the harvesting, farmers used to dry the product in the open field, relying on heat from the sun. After drying, some farmers do the sorting and cleaning process on farm with the help of a sieve, while most farmers do not do cleaning or sorting due to low production. Farmers face the following issues as mentioned in Table 4.

When farmers face these issues, this also impacts the price of the product. For example, a farmer identified:

"When we have a large scale of pod borer attacks, the grain quality becomes very poor, and ultimately, we don't get a reasonable price. But, likewise, grain size also affects the prices good as size gives a good price."

Small scale farmers usually grow chickpea for home consumption and animal feed because using chickpea Daal in the animal feed saves the cost of Wanda (animal feed). However, most farmers usually sell surplus produce to local traders, who typically buy it from the farm gate. Some farmers want to sell in the bigger markets (i.e., Faisalabad and Sargodha) because prices are better than local markets. Still, farmers generally have no connections and ties with millers and agents in these markets. Some of the critical marketing issues and their effects along with solutions identified by the growers are presented in Table 5.

A limitation to chickpea production is Ascochyta Blight, which is managed by the use of resistant varieties. Grower informants said that local varieties had been resistant to Ascochyta blight for the last two decades, but from 2014 this disease had returned - these needs further investigation. Windstorms and heavy rains can also severely reduce productivity. A second limitation is harvesting technology and postharvest losses. Poor threshing technology has been blamed for losses of 20-25%, especially on uneven land. There

is also an absence of appropriate government policy to encourage local production of pulses, although government has started few initiatives of various policies but still they need to be more effective and implemented (Ullah *et al.*, 2020).

Farmers' important costs of production are presented in the table 6.

Table 5: Marketing issues in pulses

Issue	Impact	Possible Solution
Lack of storage facilities	Low price in the peak season	State of the art storage facility
High commissions	Low profits	Direct selling to millers or retailers
Less access to market	Sell on the low price in the local market	Access to the alternate market
Less knowledge about quality standards	Agents offer low prices for produce	Understanding and awareness about the quality standards and market demand

Table 6: Framers' Costs[2]

Land preparation cost per acre		Rs. 4200/-
Sowing/ drilling per acre		Rs. 940/-
Fungicide per acre		Rs. 600- 900/-
Seed Cost per acre	Chickpea Black	Rs. 3750/-
	Chickpea White	Rs. 5000/-
Weedicide picking per acre (If not own)		Rs. 500/- per day for 6 hours
Harvesting per acre		Rs. 1000-2500/-
Transportation (if required)		Rs. 800 per trolley
Average Selling price/40 kg	Chickpea Black	4000
	Chickpea White	4800

3.8. Barriers

Based on the findings of the studies major barriers to develop value chains of pulses in Pakistan were identified as lack of availability of high yielding and environment friendly seed. Blight disease and weeds with poor control and uncertain weather conditions are the major problems in getting higher production of chickpea. Likewise, financial dependence on village dealer/broker, lack of market knowledge, lack of women empowerment, limited value addition at the farm gate level and storage and weak connections of the farmers with the market are considered main barriers in the boosting of chickpea production.

3.9. Opportunities

Following are the important opportunities:

- Cleaning, grading and appropriate storage on farm (particularly for seed purpose)
- Farmers can get better prices for such products and can sell the by-products of cleaning and grading as animal feed
- Appropriate storage can result in better quality of seed
- Processors could consider the feasibility of 'ready to cook' pulses such as canned chickpeas

3.10. Options

Some of the Options for availing the opportunities can be the development and strengthening seed bank. Farmers can work in clusters as formed in this project which can contribute to supply of pulses as well as can reduce the dependence on traders. Small cleaning and grading machines can

be installed at the farm and one of the farmers can be a service provider for the other small farmers. These cleaned and graded products should be sold to major wholesale markets instead of primary markets or retailers to get good price.

4. Discussion

During the Consumers' Focussed Group Discussion (FGD), it was found that main quality parameters considered for the purchase of chickpeas are cleanliness, grading, uniform colour and size and freshness. Some working women showed their interest to buy ready to cook pulses to save time. These findings provide opportunities for farmers to do cleaning, grading and packaging at farm level. Farmers' can get a good price for such products if linked with the major markets or processors or retailers. Moreover, they can sell the left over from the cleaning and grading process as animal feed. Processors can think over making ready to cook pulses. The responses are in line with previous studies based on pulses value chains and signify the need of sustainable value chain development approaches in developing countries such as (Rizwan et al., 2019; Ullah et al., 2020; Raza et al., 2022). Participation of smallholders in best practices value chains help transforming the production activities at large scale and improve the impact on microeconomic indicators.

During the recent decades of globalization, fresh produce value chains are under compliance to transform their practices following the changing preferences of consumers at both upstream and downstream levels. Globalization has benefits in terms of easy access to markets for companies and it may cause risks global standards are constantly changing with additional provisions. This study highlighted the market and production related constraints hindering the development of sustainable chickpea value chain system. Similarly, changing macroeconomic environment and volatility of prices are other main challenges for value-oriented companies (Christopher and Holweg, 2011; Harrington et al., 2011).

Value chains at upstream level are usually influenced by downstream consumers resulting in changing the orientation of farmers towards advanced production technologies and value-oriented farming. Farmers are unable to capture consumer perceived value due to inefficient pre- and post-harvest practices. Evaluating the current scenario, a huge gap in production and quality parameters has shifted our consumer's preferences towards imported chickpea. However, consumers usually prefer the local (Desi) chickpea because of its delicious taste compared with imported chickpeas. In developed world, consumer is considered as the main focus of value-oriented producers but majority of the chickpea farmers in Pakistan are lacking the awareness about consumer changing preferences because of many factors such as lack of awareness, improved varieties and advanced machinery. Consequently, development of the competitive and inclusive value chain of chickpea is prerequisite for sustainable development of chickpeas in the country and for this purpose, identification of the drivers and barriers in the development of the value chain was done to tap this opportunity. Therefore, this research based on value chain analysis through employing the walking the chain approach was undertaken to identify the barriers to recommend the appropriate measures and options for developing chickpeas value chain in Punjab, Pakistan. Previously, value chain approach is employed by many researchers in similar contexts, for instance, to map the future of supply chain and operations management, redesigning the future strategies of agricultural value chains on sustainable lines (Manyise and Dentoni, 2021; Ndlovu et al., 2022) as well as in the development of vegetable value chains (Sharma et al., 2023).

Uncertainty, role of intermediaries, gaps in information flow, and complexity of marketing system are among the major

barriers affecting the competitiveness of chickpea value chain system. Further, farmers are trying to adopt sustainable practices to reformulate and redesign their value chains to achieve competitive advantage (Christopher and Towill, 2002). Therefore, in practical context, value chain actors should review the supply chain design regularly following the decisions based on data.

The results of this study show that high prices in the retail market level and effectiveness of the value-added practices have greater importance. Therefore, promoting the benefits of pulses particularly of chickpeas, capacity building of stakeholders and setting up information flow mechanism along the chain about the value are considered as main contributor in the development of chickpea value chain. It can also be considered as a main source of risk reduction strategy. Secondly, flexible policies provide governments with some leverage in analysing and guiding economic activities to redesign the process of value chain development as well as to reduce the risks which can adversely affecting both secondary and primary outcomes (Gereffi and Luo, 2014).

Many comprehensive studies showed that VCA approaches helped the development of sustainable supply chains especially agricultural value chains by engaging stakeholders and to incorporate the best practices in the chain that ensure the product characteristics as desired by end consumers (Godsell et al., 2011; Huggins et al., 2011; Petersen et al., 2023), serving the disgruntled segments of markets by improving the socioeconomic development of engaged actors. Although there are many un-explored research questions regarding the drivers and barriers in development of sustainable chickpea value chain. Present research tried to investigate the problems/drivers that are perquisite for development of consumer driven value chains. Moreover, to further enhance the results, this paper examines whether barriers and drivers vary at different stages of pulses value chain (cost-efficient or responsive).

Lack of improved varieties and non-availability of certified seeds was termed as a major reason in the decline of pulses production in Pakistan (Ullah et al., 2020; Petersen et al., 2023). Moreover, Government provides different kinds of support in cash crops such as cotton, wheat, sugarcane, and rice in terms of fertilizer subsidy, support price, and subsidy on tube well. Therefore, farmers are more inclined to grow these crops, and these crops have established supply chains and value chains all over the country. However, lower yield than other crops and lack of awareness about new production technologies are also very important barriers in developing the pulses particularly chickpeas value chains. As chickpeas are usually grown by small holders, use of traditional production technologies affects the yield badly. Therefore, small farmers are more inclined towards cash crops which provides them good profits (Vanzetti et al., 2017).

In recent studies, the significance of farmers' training on production technology was reflected in the uplift of adoption of climate-resilient varieties and climate-smart technologies (Abid et al., 2016; Jamil et al., 2021). Further, access to financial facilities/support from the government and other agencies can be used to increase pulses production in Pakistan. The target policies should be devised for the pulses growers about the access to financial services, e. g. Kissan Card introduce by the Punjab government in 2021. The support to the pulses growers can be provided via Kissan Card. There is an opportunity to reduce the role of the middleman and provide direct access to the market for the sale of produce. This opportunity can be capitalized by strengthening the linkages among small farmers and other value chain actors such as processors, wholesalers and retailers. This is a big opportunity in the developing country context to address market access issues and provide farmers direct access to the market by building the

capacity of the farmers and developing their linkages with the stakeholders. Overall, information from the value chain analysis study could assist policymakers, research institutions, and international funding agencies in planning efficient interventions and strategies to uplift chickpea production and ensure food nutrition security in Pakistan.

5. Conclusions and Recommendations

The production of chickpea is usually constrained by many social and economic factors including non-availability of quality and certified seed of improved and disease resistant varieties, lack of irrigation facilities, poor marketing infrastructure, high transportation charges and low prices to farmers. With no significant innovation in production systems, yields have remained stagnant for decades, supply lags demand, and retail prices are increasing.

Value chain analysis shows that most households stick to their traditional farm management practices and crop types. Value addition at the farm gate level and appropriate storage of pulses is very limited. Farmers are weakly connected with the market, which indicates the high potential of developing and upgrading pulses value chains in Pakistan. Value addition at the processors and wholesalers is prevailing but not purely consumer oriented. However, value addition at retailers' level is consumer oriented. It indicates that information flow from consumers to value chain actors is not adequate. Therefore, various opportunities for interventions in the value chain exist. For instance, main quality parameters identified by the consumers are cleanliness, grading, uniform size and packaging which can be done at farm level. Farmers' can get a good price for such products as well as can sell the left over from the cleaning and grading process as animal feed. However, awareness, motivation and support in the form trainings as well as linking them with the markets for getting a good price are needed. Farmers need to work in clusters to meet the requirements of the market as majority of the farmers are small. An important option to capitalize the above-mentioned opportunities is that a cleaning and grading machine can be given to a group of farmers and their capacity can be built to perform value added activities at farm level. Then facilitating them to sell this produce at a higher price so that they can be motivated to do value addition at farm level and increase their profitability leading to increase area under chickpeas production.

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