

## An Analysis of Problems of Value Chain Actors of Peas in Punjab

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### Abstract

*Peas (*Pisum sativum*) is a highly valuable crop, both nutritionally and economically, and play an essential part in supportable farming because of its nitrogen-fixing potential. This study provides an in-depth analysis of the challenges faced by key value chain actors of peas in Punjab, including farmers, retailers, wholesalers, processors, and local traders. To collect primary data, a multistage sampling technique was employed, using a non-disguised questionnaire administered in the major pea-producing districts of Punjab—Patiala, SBS Nagar, and Hoshiarpur. The final dataset comprises responses from 180 pea farmers, 20 wholesalers, 20 local traders, 20 retailers, and 20 processors. Farmers face marketing problems such as the lack of organized market channels, high costs, and exploitation by intermediaries, while production challenges include low yields, limited access to certified seeds, and insufficient knowledge of agronomic practices. Retailers and wholesalers face several challenges, including supply shortages, price volatility, competition from unlicensed traders, and high brokerage fees. Processors struggle with limited access to raw materials, inadequate infrastructure, and outdated technology. Local traders report concerns related to theft, inaccurate weighing (scaling), and transportation issues. The study highlights the need for strategic interventions such as improved market infrastructure, easier access to credit, enhanced training programs, and the modernization of processing facilities to effectively address these challenges and reinforce the sustainability and overall efficiency of the value chain of peas in Punjab.*

**Keywords:** Production, Marketing problems, Value chain actors, One-sample t-test, Likert scale, Cronbach's Alpha

**JEL Classification:** D47, Q13, Q41, D40

### Introduction

Agriculture is the backbone of India's economy, depending around 58 per cent of the country's population. Being the second most populated in the world, 2.4 per cent of land share and approximately 17 per cent of the total world population, it is quite a difficult as well as challenging task to fulfill the demands of 1.39 billion people (Neeraj *et al*, 2017). After China, India is the next largest producer in the horticulture sector by producing 13 per cent of fruits and 21 per cent of vegetables from the global production of fruits and vegetables (GOI, 2017).

As compared to most of the staple crops, the vegetables are considered high-value crops because they require financial, labor inputs along with intensive cultural practices. (Richter *et al*, 1995) The perishability of vegetables creates several challenges within the value chain and for both producers and consumers (Zhong *et al*, 2015). Vegetables are perishable commodities with short shelf lives ranging from just a few days to hours, depending on the type and the storage

conditions (Barretta and Lloyd, 2012). Additionally, supporting infrastructure, such as better storage and transportation, would help to reduce post-harvest losses and improve marketability (Wondim, 2021). The value paid by the consumer for a service reflects a series of interconnected activities and stages that contribute to the final retail price of the product (Dicken, 2007). The most basic value-adding functions are carried out by the primary value actor i.e., the farmer. In contrast, more complex value addition, such as freezing, storage, processing, and culinary preparation, is undertaken by specialized actors or service providers within the market chain (Muluken, 2014).

Issues like inadequate knowledge among farmers and the lack of integration between farmers, vendors, and customers are significant barriers to improving the vegetable supply chain. Effective information dissemination and strategies to enable this can empower farmers to make informed decisions, reduce post-harvest losses, and ultimately increase their profits (Zhong *et al*, 2015).

Farmers generally do not use agricultural inputs effectively due to the high costs involved. The value chain from producers to consumers includes various intermediaries

such as service providers, logistics centers, industries, and traders (Emongor *et al*, 2009). Several challenges hinder efficient production and marketing: quality planting materials are often unavailable, and producers lack adequate knowledge about the proper use of fertilizers and pesticides. Soil fertility is poorly managed, irrigation facilities are insufficient, and labour shortages are common. The perishable nature of vegetables leads to significant postharvest losses. Moreover, farmers have limited access to reliable market information, market centers remain unorganized, collection points are few, and packaging and transportation facilities are inadequate.

Marketing of vegetables faces several challenges, including inadequate waste removal, poor sanitation, lack of sheds, and inefficient transportation systems (Ahmad Javed, 2015). Farmers also struggle with low yields, limited production and marketing skills, poor storage, adulteration, and unfair pricing practices due to broker interference (Giziew *et al*, 2014). Wholesale and retail actors face issues like poor road access, lack of shading in stalls, and inadequate infrastructure. In markets like Apni Mandi, constraints include the absence of drinking water, unhygienic conditions, especially during rains, and insufficient facilities (Sidhu *et al*, 2011). Further issues, such as price fluctuations, delayed payments, and weak cooperative systems, impact all stakeholders. Contract farming firms deal with poor-quality produce and side-selling by farmers, while retailers face high fees and inadequate infrastructure (Singh *et al*, 2023).

Peas are a highly valuable crop, both nutritionally and economically, and play an essential part in sustainable agriculture, reason being their nitrogen-fixing talent. India is the second-largest producer of peas globally, contributing 21 per cent to the world's total production. Within India, Punjab holds the fifth position in pea production, making up 6.7 per cent of the national output. In Punjab, peas are the second most significant vegetable crop after potatoes, reflecting their importance in the state's agricultural landscape. (Dhall, 2017)

Peas were cultivated over an area of approximately 43,860 hectares, with a total production of 4,60,450 tonnes in Punjab. They also play an important role in Punjab's vegetable sector, being a popular crop for both local consumption and trade because of its excessive demand and the value it adds to nutrition. (Verma, 2021). Area under peas was 10.37 per cent of the sum vegetable area, and production was 3.27 per cent of the total vegetable production in 2009-10. (Kumar and Kumar, 2012)

Pea production and marketing in Punjab face numerous challenges. Farmers struggle with inadequate seed treatment skills, a lack of timely technical guidance, and limited access to improved tools and labour during harvest. High costs of plant protection chemicals, insufficient low-interest credit, price fluctuations, and lack of market information further constrain production. Additional issues include high

commission charges, absence of cold storage and grading facilities, elevated transportation costs, delayed payments, and inadequate processing infrastructure. Faulty weighing systems, distant markets, labour scarcity, poor seed quality, non-assured markets, excessive production costs, marketing malpractices, and unremunerative prices compound the problem. Infrastructure deficiencies, such as the lack of all-weather roads, extension services, training, and market consultancy, also hinder the sector's development (Nagar *et al*, 2023; Meena, 2014; Navneet, 2016; Sidhu *et al*, 2011; Thakur *et al*, 2023; Kaur *et al*, 2018). The peas value chain in Punjab involves farmers, wholesalers, local traders, retailers, and processors, each facing specific challenges. This study systematically explores these production and marketing issues, aiming to identify key bottlenecks and propose actionable strategies to improve the sustainability and efficiency of the peas value chain.

### Data Sources and Methodology

Primary data is used in this research study to analyze the problems faced by actors in the peas value chain in Punjab. Data were collected from various stakeholders, including farmers, wholesalers, local traders, retailers, and processors, to achieve the objectives of the study.

The primary data was collected through a multistage sampling method from 180 peas growers, 20 wholesalers, 20 local traders, 20 retailers, and 20 processors using a structured non-disguised questionnaire made separately for every value chain actor. In the first stage of sample selection, Hoshiarpur, Shaheed Bhagat Singh Nagar, and Patiala districts were selected based on the highest producing districts. In the next stage, two blocks were selected randomly from each district, then three villages were selected randomly from each block. Then, 10 farmers were chosen from each village to a total sample of 180 peas growers. The primary data collected from the respondents pertained to the year 2021-22.

Value chain actors (respondents) were asked for their agreement against the set of statements to study the mean perception of their problems in the value chain of peas in Punjab using a 5-point Likert scale, a where 1 represents "strongly agree", 2 represents "agree", 3 represents "neutral", 4 represents "disagree" and 5 represents "strongly disagree". To analyze the data, the statements were tested by applying one-sample t-test. There are two types of hypotheses for one-sample t-test: the null hypothesis and the alternative hypothesis. The alternative hypothesis assumes a distinct difference between the actual mean value ( $\mu$ ) and the relative value ( $m_0$ ), while the null hypothesis assumes no difference. The purpose of the single-sample t-test is to determine whether to accept or reject the null hypothesis given sampling data. The alternative hypothesis can take one of three forms depending on the question. The null hypothesis is the same for all types of sample t-tests. The mathematical expressions

**Table 1: Demographic and socio-economic characteristics of peas farmers in the study area**

<b>Variables</b>	<b>Frequency (Percentage)</b>
<b>Age (years)</b>	
Up to 25	6 (3.3)
25-35	35 (19.4)
35-45	19 (10.6)
45-55	74 (41.1)
> 55	46 (25.6)
<b>Marital status</b>	
Married	156 (86.7)
Unmarried	24 (13.3)
<b>Family size</b>	
Small size (up to 5 members)	100 (55.6)
Medium size (6-10 members)	60 (33.3)
Large size (10 members)	20 (11.1)
<b>Annual Income (Rs)</b>	
Less than 2,00,000	10 (5.6)
2,00,000 to less than 4,00,000	25 (13.9)
4,00,000 to less than 6,00,000	77 (42.8)
6,00,000 to less than 8,00,000	53 (29.4)
8,00,000 to less than 10,00,000	7 (3.9)
10,00,000 and above	8 (4.4)
<b>Farming experience</b>	
Less than 5 yrs.	3 (1.7)
5 – 10 yrs.	33 (18.3)
Above 10 yrs.	144 (80)
<b>Educational status</b>	
Illiterate	38 (21.1)
Primary	28 (15.6)
Matric	55 (30.6)
Graduation	6 (3.3)
Above Graduation	35 (19.4)

*Note: Figures in parentheses are percentages to total number of respondents*

of the null and alternative hypothesis are mentioned below:

$$H_0: \mu = m_0$$

$$H_1: \mu \neq m_0 \text{ (two-tailed)}$$

$$t = \frac{x - \Delta}{s / \sqrt{n}}$$

where  $x$  is the sample mean,  $\Delta$  is a specified value to be tested,  $s$  is the standard deviation of the sample and  $n$  is the sample size.

The reliability of the scale can be checked by the commonly utilized indicator of internal consistency known as Cronbach's Alpha. This metric reflects the average of all possible split-half reliability coefficients, calculated by dividing the scale items into various combinations. Cronbach's Alpha ranges from 0 to 1, with values above 0.6 generally considered acceptable for demonstrating adequate reliability. In the current study, Cronbach's Alpha was computed to determine the internal reliability of the scale.

$$\alpha = \frac{N\bar{c}}{\bar{v} + (N-1)\bar{c}}$$

where,  $N$  is equal to the number of items,  $\bar{c}$  is the average inter-item covariance among the items and  $\bar{v}$  equals the average variance.

## Results and Discussion

The demographic analysis of peas farmers in Punjab reveals that the majority are aged 45-55 years (41.1%) and predominantly married (86.7%) (Table 1). Most households have small family sizes (55.6%), and 42.8 per cent of farmers have an annual income between Rs. 4,00,000 to Rs. 6,00,000. A significant proportion (80%) possess over 10 years of experience in peas production. Regarding education, 30.6 per cent have matriculation, while 21.1 per cent are illiterate, highlighting varying levels of educational attainment among the farmers.

**Table 2: Farm size of peas farmers in the study area**

Farm size category	Frequency (Percentage)
Marginal (< 1 ha)	3 (1.7)
Small ( 1-2 ha)	87 (48.3)
Semi- Medium ( 2-4 ha)	73 (40.6)
Medium ( 4-10 ha)	3 (1.7)
Large (> 10 ha)	14 (7.7)

*Note: Figures in parentheses are percentages of total number of respondents*

Table 2 indicate that a majority of the respondents (48.3%) operated on small size of farm land ranging from 1 to 2 hectares, followed by 40.6 per cent of farmers who owned semi-medium size of farm land between 2 to 4 hectares. A smaller proportion of the farmers (7.7%) were engaged in large-scale farming with landholdings exceeding 10 hectares. Peas cultivation in the Punjab is predominantly undertaken by small and semi-medium scale farmers, with minimal representation from marginal and medium-scale peas farmers.

The analysis of production data reveals that the majority of the respondents (73.9%) listed a yield of less than 50 quintals per hectare, indicating relatively low productivity among most farmers in Punjab. Only 26 per cent of the farmers achieved production levels between 50 and 100 quintals per hectare

**Table 3: Production per hectare of peas farmers in the study area**

Production/Ha	Frequency (Percentage)
Less than 50 quintal	133 (73.9)
50 to less than 100 quintal	47 (26.1)

*Note: Figures in parentheses are percentages of total number of respondents*

The most widely cultivated crop variety of peas was PPL-88, reported by 30.6 per cent of the respondents. This was followed by E-6, adopted by 22.2 per cent of farmers, and Punjab-89 (2007), with a frequency of 19.4 per cent. The variety Ap-3 (Azad Pea-3) (2016) accounted for 12.2 per

**Table 4: Crop Variety of peas used by farmers in the study area**

Crop Variety	Frequency (Percentage)
Ap-3 (Azad pea-3) (2016)	22 (12.2)
Ppl-88, E-6	17 (9.4)
Punjab-89(2007)	35 (19.4)
Arkel (1985)	11 (6.1)
Ppl-88	55 (30.6)
E-6	40 (22.2)

*Note: Figures in parentheses are percentages to total number of respondents*

cent of the total reported cultivations. Other varieties such as PPL-88, E-6 (combined entry) and Arkel (1985) were less frequently cultivated, representing 9.4 per cent and 6.1 per cent of the responses, respectively. The results show that farmers mostly prefer newer and possibly better-performing pea varieties, especially PPL-88 and E-6. This may be because these varieties grow well in local conditions and are well-known to the farmers. However, some farmers still grow older varieties like Arkel, though in smaller numbers.

#### Production problems of peas farmers

Table 5 presents the production problems of peas farmers in the peas value chain in Punjab. The reliability test conducted on the data yielded a Cronbach's alpha value of 0.74, indicating that the statements in the scale assessing the production problems of farmers in the peas value chain in Punjab are moderately reliable. The study found that farmers disagreed with certain production problems, such as ill-timed supply of agricultural inputs and lack of access to packaging materials, suggesting that these issues did not have a significant impact on their operations. Farmers agreed on several critical challenges that were statistically significant. These included low yields attributed to inadequate agronomic practices, the unavailability of certified seeds, and a lack of knowledge regarding plant protection. Additionally, problematic agro-ecological conditions were also identified

as a major concern by the respondents.

#### Marketing problems of peas farmers

The marketing problems of peas farmers in the value chain of peas in Punjab are presented in Table 6. Farmers highlighted several significant challenges in the marketing of peas. They identified issues such as the absence of well-organized market channels, inadequate supply to subsequent stages in the value chain, and the lack of modern facilities like pre-cooling and grading. Additionally, they reported significant concerns related to high marketing and transportation costs, market malpractices, and exploitation by commission agents.

Farmers did not consider issues such as poor-quality control or the absence of government support to be significant challenges. Other issues, including lack of grading and standardization, Unremunerative pricing, and limited access to agricultural literature, were also deemed less significant. These findings suggest that while farmers face several pressing problems in the marketing process, not all aspects of the value chain are perceived as critical obstacles.

#### Problems of peas wholesalers

The problems being faced by wholesalers in the value chain of peas are presented in Table 7. Wholesalers expressed disagreement regarding certain issues such as inadequate

**Table 5: Production problems of peas farmers in the value chain of peas in Punjab**

Production problems	Mean	S.D.	t-value $H_0 = 3$	p-value
Ill-timed supply of agricultural inputs such as fertilizer.	3.17	1.74	1.37	0.17
Low yield due to inadequate agronomic practices	2.44	1.45	5.12	0.01*
Unavailability of certified seed as well as the high cost of seed.	2.55	1.54	3.86	0.01*
Lack of soil testing facilities	2.66	1.52	2.92	0.01*
Lack of knowledge regarding plant protection	2.37	1.53	5.48	0.01*
Lack of knowledge /facilities for storage of peas	3.82	1.62	6.80	0.01*
Lack of knowledge /facilities for processing of peas	2.44	1.62	4.58	0.01*
Insufficient access to agricultural credit	3.28	1.66	2.32	0.02*
Illiteracy and deficiencies in information access and dissemination	2.80	1.54	1.73	0.01*
Lack of labour skills and shortages	2.90	1.69	0.79	0.43
Problematic agro-ecological conditions (climate change, floods, etc.)	1.98	1.40	9.64	0.01*
Lack of knowledge regarding farm management, harvest and handling practices	3.06	1.66	0.53	0.59
Lack of information regarding new technologies and techniques in farming	3.49	1.62	4.07	0.01*
Lack of access to credit	3.40	1.64	3.30	0.01*
Lack of packaging material	3.10	1.76	0.80	0.42

Note: \*indicates significance at 5% level of significance

**Table 6: Marketing problems of peas farmers in the value chain of peas in Punjab**

Marketing Problems	Mean	S.D.	t-value $H_0 = 3$	p-value
Lack of well-organized market channel	1.53	1.10	17.79	0.01*
Lack of grading and standardization of the peas	2.91	1.29	0.86	0.39
Poor quality control	3.19	1.17	2.22	0.02*
Inadequate supply to the next in the chain	2.18	1.08	10.09	0.01*
Lack of modern facilities such as pre-cooling and grading & standardization.	1.20	0.75	32.18	0.01*
Unable to have good government policy	3.01	1.33	0.16	0.86
Absence of government support	3.24	1.20	2.71	0.01*
High costs on marketing and transportation, malpractices in the market	2.18	1.16	9.40	0.01*
Unremunerative price	2.90	1.29	1.03	0.30
Exploitation by the commission agents	2.89	1.38	1.02	0.30
Lack of market information	4.15	1.38	11.15	0.01*
Problem of price fluctuation in market	2.85	1.32	1.46	0.14
Problem of packaging	3.26	1.26	2.82	0.01*
Less availability of agriculture farming /market related newspaper, farm magazine, literature etc. particularly in rural areas	3.10	1.32	1.06	0.28
Lack of proper training for vegetable growing and marketing	4.10	0.70	21.02	0.01*

Note: \*indicates significance at 5% level of significance

**Table 7: Problems of peas wholesalers in the value chain of peas in Punjab**

Problems of wholesalers	Mean	S.D.	t-value $H_0 = 3$	p-value
Inadequate credit access	3.20	1.43	0.62	0.54
Problem of theft	2.75	1.55	0.72	0.48
Problem of price setting	1.25	0.44	17.61	0.01*
Problem of scaling weighting	3.10	1.37	0.32	0.74
Shortage supply	1.90	1.16	4.22	0.01*
High brokerage fee	1.55	0.82	7.85	0.01*
Storage problem/improper shading	3.75	1.29	2.59	0.01*
Lack of demand	2.95	1.57	0.14	0.88
Capital shortage	2.75	1.65	0.67	0.50
Problem of rural road access	4.65	0.74	9.90	0.01*
Inadequate information	2.80	1.70	0.52	0.60
High competition with licensed traders	2.45	1.57	1.56	0.13
High competition with unlicensed traders	1.85	1.08	4.72	0.01*
Quality problem(adulteration)	3.05	1.46	0.15	0.88
Unable to have good government policy	3.30	1.68	0.79	0.43
High transportation cost	2.90	1.61	0.27	0.78
Lack of Proper infrastructure of market	2.75	1.55	0.72	0.48
High commission rate	3.15	1.53	0.43	0.66

Note: \*indicates significance at 5% level of significance

access to credit, theft, scaling and weighing challenges, storage problems, and rural road access, suggesting that these were not considered significant concerns, though road access was viewed as a crucial factor. On the other hand, wholesalers agreed on facing difficulties with price setting, supply shortages, high brokerage fees, intense competition from unlicensed traders, and high transportation costs. However, they disagreed with the significance of problems related to quality issues, favorable government policies, and high commission rates, suggesting these were not viewed as pressing concerns. Additionally, issues such as lack of demand, capital shortages, inadequate information, and competition with licensed traders were considered non-significant problems by the wholesalers.

#### Problems of local traders

Table 8 depicts the problems perceived by local traders in the value chain of peas in Punjab. The analysis revealed several key issues identified by local traders in agricultural marketing. They agreed that inadequate access to credit, theft, problems with scaling and weighing, storage issues, adulteration and quality concerns, the effectiveness of government policies, high transportation costs, and a lack of proper infrastructure were significant challenges affecting their operations.

There was disagreement regarding other issues such as supply shortages, rural road access, and high commission

rates, suggesting these were seen as less significant concerns. Additionally, issues such as high brokerage fees, lack of demand, capital shortages, and competition from both licensed and unlicensed traders were considered non-significant by the traders.

#### Problems of retailers

Analysis of Table 9 reveals that the retailers expressed strong concerns about inadequate access to credit, issues related to supply shortages, high brokerage fees, problems with storage and improper shading, lack of demand for products, and the intense competition from unlicensed traders. These factors were considered critical to the functioning of the agricultural market. There was less agreement on other issues, such as price setting, scaling and weighing practices, capital shortages, and rural road access, which were viewed as less pressing concerns. Additionally, retailers did not view factors such as inadequate information, quality problems, government policies, high transportation costs, and infrastructure limitations as major barriers. These issues were regarded as less significant in comparison to the other challenges outlined.

#### Problems of processors

Processor problems in the value chain of peas is represented in Table 10. Key problems of processors include limited access to raw materials, inadequate transportation

**Table 8: Problems of local traders in the value chain of peas in Punjab**

Problems	Mean	S.D.	t-value ( $H_0 = 3$ )	p-value
Inadequate credit access	2.05	1.09	3.86	0.01*
Problem of theft	2.30	0.92	3.39	0.01*
Problem of price setting	3.20	1.50	0.59	0.56
Problem of scaling weighing	2.05	1.05	4.04	0.01*
Shortage supply	4.65	0.93	7.90	0.01*
High brokerage fee	2.50	1.31	1.69	0.10
Storage problem/improper shading	1.85	0.93	5.51	0.01*
Lack of demand	2.70	1.30	1.03	0.31
Capital shortage	2.90	1.41	0.31	0.75
Problem of rural road access	3.05	1.39	0.16	0.87
Inadequate information	2.90	1.20	0.37	0.71
High competition with licensed traders	2.35	1.26	2.29	0.03*
High competition with unlicensed traders	2.40	1.35	1.98	0.06
Quality problem(adulteration)	2.40	1.09	2.44	0.02*
Unable to have good government policy	2.20	1.15	3.10	0.01*
High transportation cost	1.80	0.89	6	0.01*
Lack of Proper infrastructure of market	2.40	1.14	2.34	0.03*
High commission rate	2.95	1.19	0.18	0.85

Note: \*indicates significance at 5% level of significance

**Table 9: Problems of retailers in the value chain of peas in Punjab**

Problems	Mean	S.D.	t-value $H_0 = 3$	p-value
Inadequate credit access	1.25	0.44	17.61	0.01*
Problem of theft	2.85	1.46	0.45	0.65
Problem of price setting	3.20	1.43	0.62	0.54
Problem of scaling weighting	3.50	1.73	1.29	0.21
Shortage supply	1.55	0.75	8.54	0.01*
High brokerage fee	2.70	1.59	0.84	0.41
Storage problem/improper shading	1.25	0.44	17.61	0.01*
Lack demand	2.05	1.46	2.89	0.01*
Capital shortage	3.20	1.73	0.51	0.61
Problem of rural road access	4.70	0.57	13.30	0.01*
Inadequate information	3.35	1.84	0.84	0.40
High competition with licensed traders	2.35	1.63	1.78	0.09
High competition with unlicensed traders	1.45	0.75	9.13	0.01*
Quality problem(adulteration)	3.25	1.65	0.67	0.50
Unable to have good government policy	2.30	1.75	1.78	0.09
High transportation cost	3.45	1.50	1.33	0.19
Lack of Proper infrastructure of market	2.80	1.70	0.52	0.60
High commission rate	3.40	1.60	1.11	0.27

Note: \*indicates significance at 5% level of significance

**Table 10: Problems of processors in the value chain of peas in Punjab**

Problems	Mean	S.D.	t-value $H_0 = 3$	p-value
Non-availability of raw materials	2.25	1.48	2.26	0.03*
High price of raw materials	2.50	1.43	1.56	0.13
Poor Quality of raw materials	2.55	1.50	1.33	0.19
Poor transportation service	1.95	1.19	3.94	0.01*
Lack of cold chain facilities	1.45	0.75	9.13	0.01*
Inefficient electricity facility (Frequent power cut )	1.35	0.74	9.90	0.01*
Lack of R&D investment	1.35	0.58	12.56	0.01*
Usage of long-standing machinery	2.35	1.46	1.99	0.01*
Problems in Supply chain mechanism(lack of linkages between different value chains)	2.20	1.47	2.43	0.02*
Poor quality control	2.45	1.46	1.67	0.11
Problems of Packaging	4.60	0.59	11.96	0.01*
High Tax rates imposed by government for processing industry	2.20	1.54	2.32	0.03*
Lack of public support (subsidy/ assistance)	1.40	0.75	9.49	0.01*
Product price (high cost addition)	1.90	1.33	3.68	0.01*
Insufficient Labour	2.35	1.53	1.89	0.01*
Consumer's awareness regarding processed vegetables	2.10	1.33	3.01	0.01*
Concentration of unorganized and tiny firms	2.10	1.33	3.01	0.01*
High land prices	1.55	0.82	7.85	0.01*
Lack of collection centres (with pre-cooling facilities)	2.90	1.88	0.23	0.81
Non-monitoring of consumer behavior ( low acceptance of processed products by consumers	2.35	1.72	1.68	0.10

Note: \*indicates significance at 5% level of significance



infrastructure, insufficient cold chain facilities, unreliable electricity supply characterized by frequent outages, and a lack of investment in research and development. Additionally, challenges such as the reliance on outdated machinery, weak supply chain linkages, high tax burdens on the processing industry, labor shortages, and low levels of consumer awareness regarding processed vegetables were identified as significant barriers. Processors also reported substantial concerns related to elevated land costs, inadequate public support through subsidies or assistance, and the increased costs associated with value-added products. Conversely, concerns regarding the price and quality of raw materials, quality control issues, and the absence of collection centers with pre-cooling facilities, and limited consumer acceptance of processed products were considered less critical. Moreover, processors generally did not perceive packaging as a significant challenge within the value chain.

### Conclusions and Policy Implications

An analysis of the value chain actors of peas in Punjab reveals distinct challenges faced by every value chain actor of peas. Farmers in the peas value chain in Punjab face significant marketing challenges, including the absence of organized market channels, high costs, and exploitation by commission agents. However, issues like poor quality control and lack of government support are seen as less critical. In production, farmers highlight low yields due to inadequate agronomic practices, unavailability of certified seeds, and plant protection knowledge gaps, while disagreeing with concerns about ill-timed inputs and packaging materials. Retailers are concerned with credit access, supply shortages, high brokerage fees, storage issues, and competition from unlicensed traders.

Processors face difficulties with raw material access, transportation, electricity, outdated machinery, labor shortages, and low consumer awareness of processed products. Wholesalers struggle with price setting, supply shortages, brokerage fees, and competition, while downplaying issues like theft and quality concerns. Local traders emphasize credit access, theft, and transportation problems, while viewing supply shortages and commission rates as less critical.

The agricultural market in Punjab exhibits a high degree of complexity, as different value actors within the peas value chain face and prioritize distinct challenges. This heterogeneity underscores the need for a multifaceted approach to value chain development. Key interventions must include the improvement of market infrastructure, expansion of access to reasonable credit, and modernization of existing processing facilities. Moreover, promoting agronomic training and ensuring the availability of certified seeds are essential steps toward enhancing productivity at the farm level. To further reduce inefficiencies, investments in transportation networks and the development of an efficient cold chain system are critical. Reinforcing regulatory frameworks is

essential to control market malpractices, thereby developing a more transparent, efficient, and equitable agricultural environment in the Punjab.

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