

# Marketable Surplus and Supply Chain Analysis of Wheat in the Mid Hills of Kangra Valley, Himachal Pradesh, India

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**Abstract**— An attempt has been made in this research to identify the major supply chains in the mid-hills of Kangra valley involved in the wheat business and the different functionaries transferring the produce from producer to consumer, along with their marketing costs, margin, price spread, efficiency, and the producer's share in the consumer's rupee. The supply chains were identified on the basis of form, place, time, and possession utility. Three marketing channels were found. Channel II (producer → primary wholesaler → secondary wholesaler → retailer → consumer) was the most preferred, with 56.86 per cent of the total wheat traded through it. Price spread was highest in Channel III (producer → local trader/commission agent → flour miller → retailer → consumer) due to the highest marketing margin (19.84%). The producer's share was highest in Channel I (97.73%) where cultivators sold directly to consumers, and lowest in Channel III (62.88%). Marketing efficiency was highest in Channel I (42.99%) as reduced intermediation lowered costs. The study concludes that a larger number of intermediaries increases marketing cost and margin, reduces the producer's share, and makes the channel less efficient.

**Keywords**— Wheat, marketing channel, wholesaler, processor, retailer, consumer, price spread, producer's share, marketing efficiency.

## I. INTRODUCTION

Wheat is the most important food crop in H.P. and is primarily cultivated during the *rabi* season across most of the state. The state has seen a reduction in the total area under wheat cultivation. In early 2024, the sowing area was reported to have dipped by 7,500 hectares in the northern zone, which includes Kangra, Una, Mandi, Hamirpur, and Chamba districts. In Kangra valley, a large portion of the agricultural land (around 80%) is rain-fed, making it highly vulnerable to rainfall deficits. A prolonged dry spell during December and January 2024 significantly impacted the crop, with the agriculture department estimating a potential 5-7% dip in wheat output.

The importance of a marketable surplus lies in providing farmers with income, while efficient supply chain management ensures this surplus reaches the market effectively, securing better prices and reducing losses. Together, they are crucial for farmer profitability and preventing distress sales, especially given challenges like lack of irrigation and market infrastructure. With this background, this research identifies the major supply chains and actors involved in transferring wheat from production to consumers in Kangra valley, along with an analysis of marketing cost, margin, price spread, efficiency, and the producer's share.

## II. METHODOLOGY

### 2.1 Selection of the study area:

The study was purposely conducted in Kangra district of Himachal Pradesh, as it occupies the foremost position in wheat production within the state. As per the Statistical Abstract of Himachal Pradesh (2021–22), the district produced about 1,35,247 metric tonnes of wheat. The district also has an established network of agricultural markets and intermediaries, which enabled the mapping of multiple marketing channels.

## 2.2 Sampling Design and sample Selection:

Kangra district has fifteen development blocks. Multistage random sampling was followed. Firstly, two blocks, Indora and Nurpur, were randomly selected. In the second stage, five villages in each block were selected randomly. In the third stage, eight farmers were selected randomly from each selected village, making a total sample of 80 cultivators. The respondents were divided into Small (<1 ha) and Large (1-3 ha) holdings (Table 1).

**TABLE 1**  
**DISTRIBUTION OF SAMPLED HOUSEHOLDS ACCORDING TO THEIR SIZE OF LAND HOLDING**

S.No.	Category of farmers	No. of Farmers
1	Small (<1 ha)	37
2	Large (1-3 ha)	43
3	Overall	80

## 2.3 Data collection:

Both primary and secondary data were collected. Primary data were collected by survey method using pre-tested schedules via personal interviews with cultivators, wholesalers, traders, flour millers, and retailers (five each). Secondary data were collected from government reports. Data were collected for the agricultural year 2024-25.

## 2.4 Analytical framework:

Cost concepts recommended by Commission for Agricultural Costs and Prices (CACP), Govt. of India, 2004 were employed. Supply chains were identified based on form, place, possession, and time utility. The following formulas were used:

- **Marketing cost:**  $TC = PC + \sum MC_i$
- **Marketing Margin:**  $Ami = PR_i - (PP_i + CM_i)$
- **Producer's price:**  $PF = PS - PC$
- **Producer's share:**  $PS = (FP / RP) * 100$
- **Marketing efficiency (Modified Acharya's method):**  $ME = (RP - MM) / (MC + MM)$

## III. RESULTS AND DISCUSSION

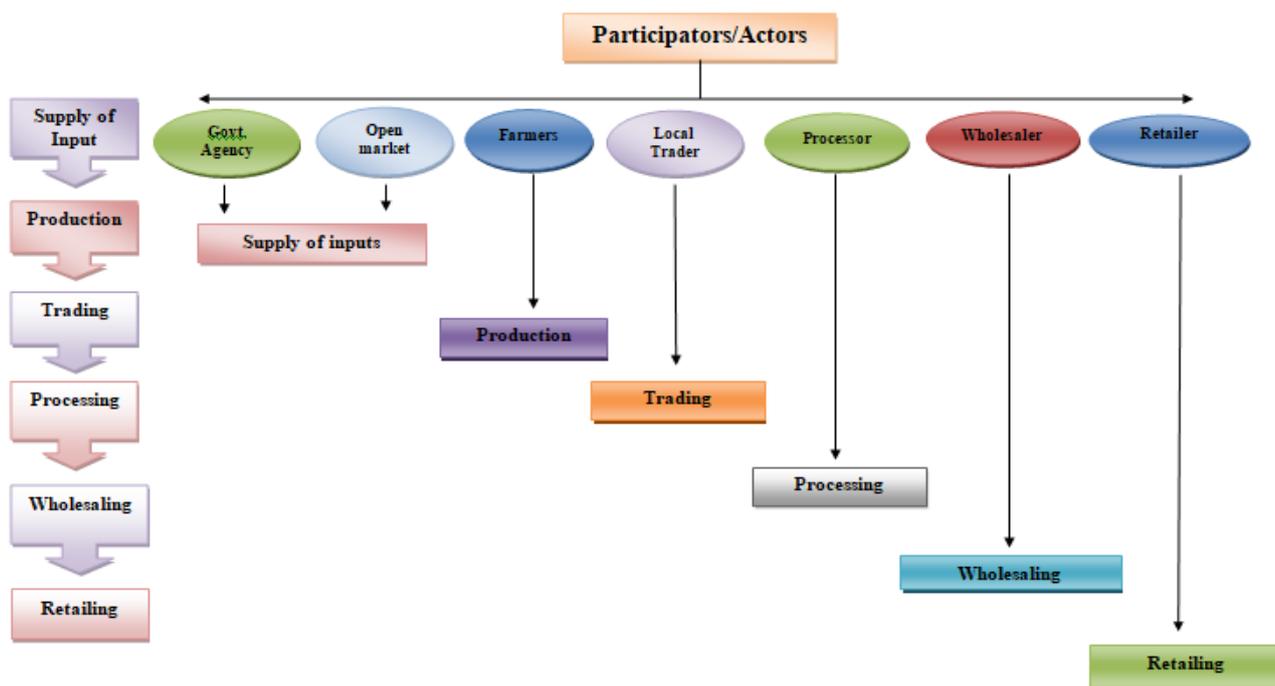
### 3.1 Production, Utilization, and Marketable Surplus:

The overall production of wheat was 38.12 q per farm (Table 2). Out of total production, 9.73% was used for self-consumption, 5.51% as seed retained, and 6.03% as payment in kind. The marketable surplus, which equaled the marketed surplus, was 30.01 q (78.73% of total produce). This high marketed surplus is consistent with Thakur (2024), who noted a similar proportion in Una district, underscoring wheat's role as a primary cash crop in the region.

**TABLE 2**  
**PRODUCTION AND UTILIZATION OF WHEAT**

S.No.	Particulars	Overall per farm (q)	Percent
1	<b>Total Production</b>	<b>38.12</b>	<b>100</b>
2	<b>Utilization</b>		
i.	Self-consumption	3.71	9.73
ii.	Seed Retained	2.1	5.51
iii.	Payment in Kind	2.3	6.03
	<b>Sub total (A)</b>	<b>8.11</b>	<b>21.27</b>
3	<b>Marketable Surplus = Marketed Surplus (B)</b>	<b>30.01</b>	<b>78.73</b>

\*Note:  $B = Total\ Production - A$ . Source: Field survey data, 2024-25.\*



**FIGURE 1: Flow chart of functions with participants to identify actors in wheat sector**

**3.2 Supply Chain Mapping and Input Procurement:**

The supply chains were mapped based on form, place, time, and possession utility (Jassi, 2011). Input procurement data (Table 3) revealed that a majority of seeds (67.19%) were sourced from government agencies, while fertilizers (77.41%) and plant protection chemicals (81.06%) were primarily purchased from the open market. This preference for open markets for non-seed inputs aligns with Mandial (2025), who noted farmers prioritize easy availability and timely application.

**TABLE 3  
SOURCES OF INPUT PROCUREMENT IN THE STUDY AREA (%)**

Particulars	Inputs	Small Farmers	Large Farmers	Overall
Sample Size (No. of Farmers)		43	37	80
Open Market	Seed	34.67	30.64	32.81
	Fertilizer	76.35	78.64	77.41
	Plant Protection Chemicals	79.47	82.9	81.06
Government Agency	Seed	65.33	69.36	67.19
	Fertilizer	23.65	21.36	22.59
	Plant Protection Chemicals	20.53	17.1	18.94
Own Source	Seed	25.58	20.47	23.22

*Note: Percentages for each input type (Seed, Fertilizer, Plant Protection Chemicals) are calculated based on the number of farmers using that source. The "Own" category is for seeds only. Source: Field Survey.*

**3.3 Marketing Channels and Their Prevalence:**

Three marketing channels were identified (Figure 2):

- **Channel I:** Producer → Consumer
- **Channel II:** Producer → Primary Wholesaler → Secondary Wholesaler → Retailer → Consumer
- **Channel III:** Producer → Local trader/Commission Agent → Flour Miller → Retailer → Consumer

Channel II was the most predominant, handling 56.86% of the marketed wheat, followed by Channel III (41.40%). Direct sales via Channel I were minimal (1.74%) (Table 4). This pattern, consistent with Thakur (2024) and Kumar (2022), highlights the near-total dependence of farmers on intermediary-based systems in the region.

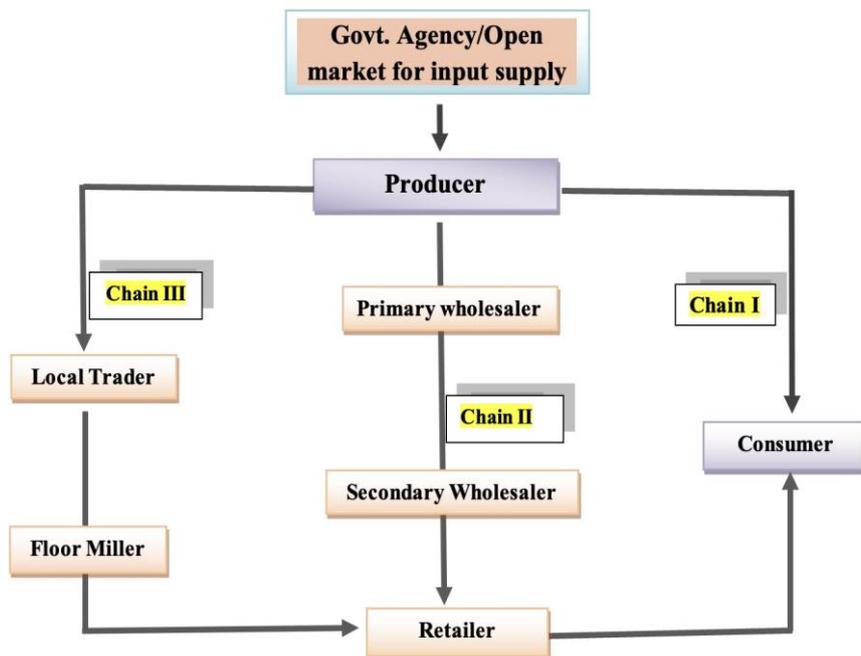


FIGURE 2: Different marketing channels of wheat in study area

TABLE 4

FARM CATEGORY-WISE QUANTITY OF WHEAT MARKETED THROUGH VARIOUS CHANNELS (%)

Marketing Channel	Market Intermediaries	Small Farmers	Large Farmers	Overall
Channel-I	Producer → Consumer	1.43	2.1	1.74
Channel-II	Producer → Primary Wholesaler → Secondary Wholesaler → Retailer → Consumer	54.51	59.6	56.86
Channel-III	Producer → Local Trader/Commission Agent → Flour Miller → Retailer → Consumer	44.06	38.3	41.4

Note: R = Retailer; C = Consumer. Source: Field Survey.

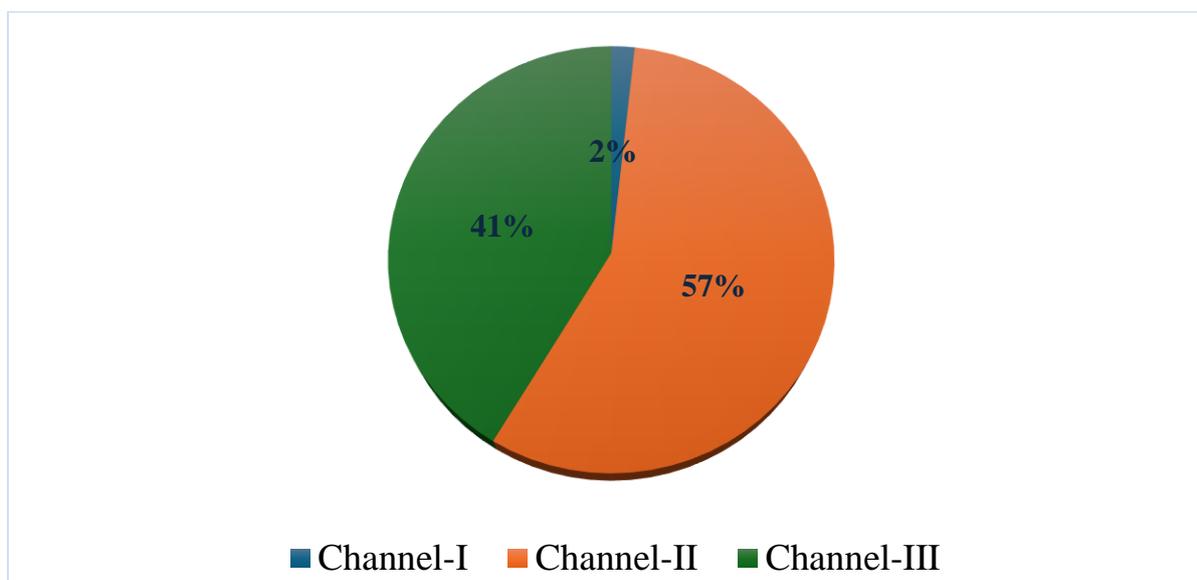


FIGURE 3: Farm category wise quantity of wheat marketed through various channels

### 3.4 Marketing Costs and Margins:

Marketing costs and margins for various intermediaries are presented in Table 5. The producer's net price varied between ₹2300.93 and ₹2490.65 per quintal across channels. In Channel III, the processor (flour miller) added substantial cost (₹150.00) and margin (₹494.27), leading to a significant price increase. In Channel II, costs and margins accumulated across primary wholesalers (₹98.52 cost, ₹56.02 margin) and secondary wholesalers (₹50.00 cost, ₹95.00 margin).

**TABLE 5**  
**MARKETING COSTS AND MARGIN OF DIFFERENT FUNCTIONARIES IN THE MARKETING CHANNELS OF WHEAT (₹/Quintal)**

S.No.	Particulars	Channel-I	Channel-II	Channel-III
<b>1</b>	<b>Marketing cost incurred by producers</b>			
i.	Net price received by farmer	2490.65	2420	2300.93
ii.	Marketing cost incurred by producers	57.93	64.15	53.46
iii.	Farmer's selling price	2548.58	2484.15	2354.39
<b>2</b>	<b>Marketing cost incurred by Local trader/ Commission agent</b>			
i.	Gross price paid by Local Trader	–	–	2354.39
ii.	Marketing cost incurred by Trader	–	–	105.63
iii.	Trader Margin	–	–	61.85
iv.	Trader selling price	–	–	2521.87
<b>3</b>	<b>Marketing cost incurred by processor</b>			
i.	Gross price paid by processor	–	–	2521.87
ii.	Marketing cost incurred by Processor	–	–	150
iii.	Processor's selling price (Cost + Margin)	–	–	3400
<i>of which:</i>	Processor unit margin	–	–	494.27
<b>4</b>	<b>Marketing cost incurred by Primary Wholesaler</b>			
i.	Gross price paid by Wholesaler	–	2484.15	–
ii.	Marketing cost incurred by Wholesaler	–	98.52	–
iii.	Wholesaler's Margin	–	56.02	–
iv.	Wholesaler selling price	–	2638.69	–
	<b>Marketing cost incurred by Secondary Wholesaler</b>			
i.	Gross price paid by Wholesaler	–	2638.69	–
ii.	Marketing cost incurred by Wholesaler	–	50	–
iii.	Wholesaler's Margin	–	95	–
iv.	Wholesaler selling price	–	2783.69	–
<b>5</b>	<b>Marketing cost incurred by Retailer</b>			
i.	Gross price paid by Retailer	–	2783.69	3400
ii.	Marketing cost incurred by Retailer	–	90.58	89.36
iii.	Retailer Margin	–	120.38	170
iv.	Retailer Selling price / Consumer's Purchase Price	<b>2548.58</b>	<b>2994.65</b>	<b>3659.36</b>

*Note: A dash (–) indicates that the particular functionary is not involved in the given channel. Source: Field Survey.*

### 3.5 Price Spread, Producer's Share, and Marketing Efficiency:

A clear inverse relationship exists between channel length and efficiency (Table 6). **Channel I** was the most efficient (Index: 42.99) and provided the highest producer share (97.73%). **Channel II** showed moderate efficiency (4.21) and an 80.81%

producer share. **Channel III** was the least efficient (2.25) and delivered the lowest producer share (62.88%), with the highest price spread (37.12%) due to heavy marketing margins (19.84%).

**TABLE 6**  
**PRICE SPREAD AND MARKETING EFFICIENCY OF WHEAT AMONG DIFFERENT MARKETING CHANNELS**

Particulars	Channel I	Channel II	Channel III
<b>A. Price Components (₹/quintal)</b>			
Producer's Net Price (PF)	2,490.65	2,420.00	2,300.93
Consumer's Price (RP)	2,548.58	2,994.65	3,659.36
<b>Price Spread (RP - PF)</b>	<b>57.93</b>	<b>574.65</b>	<b>1358.43</b>
Total Marketing Cost (MC)	57.93	303.25	398.45
Total Marketing Margin (MM)	0	271.4	726.12
<b>B. Derived Metrics (%)</b>			
<b>Price Spread (%)</b>	<b>2.27</b>	<b>19.19</b>	<b>37.12</b>
Marketing Cost (%)	2.27	10.13	10.89
<b>Marketing Margin (%)</b>	<b>0</b>	<b>9.06</b>	<b>19.84</b>
<b>Producer's Share (%)</b>	<b>97.73</b>	<b>80.81</b>	<b>62.88</b>
<b>C. Efficiency Index</b>			
<b>Marketing Efficiency (ME)</b>	<b>42.99</b>	<b>4.21</b>	<b>2.25</b>

*Note: Calculated using modified Acharya's method:  $ME = (RP - MM) / (MC + MM)$ .*

This pattern confirms that each intermediary adds cost and takes a margin, widening the price spread and diminishing the farmer's share. The near absence of direct marketing suggests constraints like lack of market access, time, or volume, forcing farmers into less efficient chains (Dustagiri et al., 2013). The findings underscore the need for better market linkages, farmer cooperatives, and direct marketing strategies to enhance farmers' returns (Acharya and Pant, 2021).

#### IV. CONCLUSION

The study on the marketable surplus and supply chain of wheat in the mid-hills of Himachal Pradesh yields key conclusions. First, the marketable surplus was high at 78.73% of production. Second, three main marketing channels were identified. **Channel II (Producer → Primary Wholesaler → Secondary Wholesaler → Retailer → Consumer)** was the most predominant, handling 56.86% of the wheat. Third, the producer's share in the consumer's rupee was highest in Channel I (97.73%) and lowest in Channel III (62.88%). Fourth, marketing efficiency was highest in Channel I (42.99) and lowest in Channel III (2.25), with price spread directly correlating with the number of intermediaries.

All findings indicate that extended, multi-layered supply chains involving several functionaries reduce the farmer's share in the consumer's rupee. The presence of excessive middlemen increases marketing costs and lowers producer margins. To ensure fair prices and improve efficiency, it is essential to reduce unnecessary intermediaries. This can be achieved by promoting direct sales through local farmers' markets, strengthening Farmer Producer Organizations (FPOs) for collective bargaining and aggregation, and leveraging digital platforms to connect growers directly with consumers and bulk buyers.

#### CONFLICT OF INTEREST

The authors declare no conflict of interest.

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