



Chickpea Value Chain in Bundelkhand Region of India: An Empirical Insight

Uma Sah¹, Vikrant Singh², Jitendra Ojha³, Mohit Katiyar⁴, S. K. Dubey^{5*}, S. K. Singh⁶ and Prasoon Verma⁷

^{1,2,3,4&7}ICAR-Indian Institute of Pulses Research, Kanpur-208024, Uttar Pradesh, India

⁵ICAR-Agricultural Technology Application Research Institute, Kanpur-208002, Uttar Pradesh, India

⁶ICAR-Agricultural Technology Application Research Institute, Jodhpur-342005, Rajasthan, India

*Corresponding author email id: skumar710@gmail.com

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ABSTRACT

The study mapped the chickpea value chains in Bundelkhand region of Uttar Pradesh (BRUP) state during 2019-21. Findings showed that chickpea production was profitable in the region for producers with B:C ratio of 2.15. The average production cost of chickpea was Rs. 23191/ha with an average net return of Rs. 26809/ha. Chickpea was primarily furthered as chickpea split grains (*dal*), flour (*besan*) and wholegrain. Four marketing channels were recorded with a series of actors involved in moving chickpea and its products from producers to consumers. The total value added collectively by different value chains actors varied from Rs 1929 to Rs. 3231/q depending upon the channels and chickpea products. Processors added maximum value (Rs 849/q to 1689/q), followed by wholesaler (Rs. 475/q to Rs.745/q) across all the channels. The ME of MC was higher across all the channels and products giving higher share to producers in consumer rupee (58.7 to 69.7 percent). Chickpea value chains are long and complex in the region. Establishment of farmers' managed market platforms facilitating the aggregation of produce at village level is suggested.

INTRODUCTION

Chickpea (*Cicer arietinum*), the major pulse crop cultivated and consumed in India, is one of the cheapest and readily available protein sources and hence, it is critical for food and nutrition security of the country (FAO, 2018). Besides protein, chickpea also adds an array of important nutrients, namely, carbohydrates, dietary fibre, unsaturated fatty acids, amino acids, minerals and vitamins to daily Indian diets (Jukanti et al., 2012). The BRUP, a rain fed semi-arid region of the state, is a major chickpea producing region of the state contributing more than 69 per cent (0.43 million ha) of chickpea area and adding to about 77 percent (0.63 MT) of the total chickpea production in the state. The average chickpea productivity in the region (1.43 t/ha) is far below the potential yield (2.0 t/ha). Occurrence of fusarium wilt and pod borer infestation (Sah et al., 2021) coupled with significant crop losses during harvest and postharvest stages (Kumar et al, 2010; Nag et al., 2000) are the as major challenges to chickpea production

in the region. Vishwakarma et al., (2019) reported that the extent of losses in farm operations of chickpea varied from 2.08 per cent to 10.75 per cent while storage losses accounted for 0.03 per cent to 1.17 per cent across the agro-climatic regions of India. Further, the loss during storage at processing units was highest (0.55%). Therefore, attracting profitability in the chickpea production warrants a holistic view of entire value chain.

The concept of value chain was introduced by Porter (1985) as the entire range of activities involved in bringing out products or services from initiation to different phases of production to distribution, reaching the consumers and final disposal after use. Value chain involved the related actors and action as the linking chain (Norton, 2014). Value Chain Analysis (VCA) ascertain the degree of relationships among the actors and coordination mechanism (Trienekens, 2011) with focus on the dynamics of complex linkages within a network involving suppliers, distributors, partners, and collaborators (Zott et al., 2011). VCA identifies the

value being added to the product or service rendered at each stage of the chain (Kaplinsky & Morris, 2007). In agriculture, value chain framework helps to enhance efficiency, productivity and profitability of agriculture (Kumar & Sharma, 2016), reduces costs and losses (Kumar & Rajeev, 2016). Strengthened value chain is an effective instrument against inequality, lesser income and in appropriation of value added to the products by different actors (Oddone & Perez, 2014). VCA is thus a prerequisite for any development oriented policy decisions, in agriculture (Dubey et al., 2020). The present research was undertaken to gain a holistic view of chickpea value chain in BRUP for generating appropriate empirical evidence to support policy decision making.

METHODOLOGY

The study was conducted during 2019-21 in the Bundelkhand region of Uttar Pradesh. All the 7 districts of UP Bundelkhand region were selected for the study. Multistage stratified random sampling was used for selection of blocks (14), villages (28) and farmers (840) from the selected districts. In addition, 14 members of Agricultural Produce Marketing Committee (APMC), retailers (21), whole sellers (21), traders (56), aggregators (56), village trader (28) and chickpea processors (18) were also chosen for the study as per their availability during of survey period. Semi-structured interviews, group meetings and focussed group discussions were carried out to elicit data from the respective respondents

Value chain Mapping reflected the flow of transaction from sourcing of raw materials and inputs, to production, processing, marketing and final consumption besides illustrating the factors and available services that supported chickpea production in the region. In addition, it depicted the costs, value addition at each stage, and the secondary services along a value chain. Illustrative methodology of value chain mapping (FAO, 2005) was used for the present study. The associated activities and actors in chickpea value chains operating in the region were mapped and their interconnections were worked out. Data on variables like production cost, marketing efficiency (ME), marketing cost (MC) and price spread; cost incurred and market margin (MM) obtained in the marketing channel, producers' share in consumers' price (PSCP) etc. were collected. Prevailing chickpea market price at the time of data collection was observed as base. Marketing cost was estimated as the sum of cost incurred by value chain actors in performing various marketing related functions. Value added was assessed as the sum of cost incurred and the marketing margin drawn by value chain actors before furthering the chickpea in the value chain to the next actor. Marketing Efficiency Index (MEI) and producer's share in consumer's rupee were also estimated (Acharya & Agarwal, 2016).

Producer's share in consumer's rupees:

$$P_s = (P_f/P_c) \times 100$$

Where, P_s = Producer's share in consumer's rupee, P_f = Producer's price (Rs/q), P_c = Price paid by the consumer (Rs/q)

Marketing efficiency:

$$M_E = F_p / (M_C + M_M)$$

Where, M_E = MEI, F_p = Price received by the farmer, M_C = Total MC and M_M = Net MM

RESULTS AND DISCUSSION

Enabling factors and support services

Chickpea production in the BRUP was observed to be supported by an array of enabling facilities. This included financial support from banks and money lenders; technological support from research institutes, Krishi Vigyan Kendra and agricultural universities; input support from existing sources; extension advisory support from extension machinery of UP state; the network of APMC market provided the needed market infrastructure support for sale of chickpea (Figure 1). The favourable policy environment also supported chickpea production in the region which included declaration of minimum support price, favourable EXIM policy and presence of e-NAM. Further, the existing seed hubs at district level in the region accelerated quality chickpea seed availability among producers in the region.

The map (Figure 1) further illustrates the associated actors which included the input dealers, producers, village level aggregators, aggregators, traders, processors, wholesalers, retailers and consumers. The input dealers facilitated the seeds, plant protection chemicals, fertilizers and farm machinery available to chickpea producers. The producers were either carrying the produce to market yards for sale or sold it to village level aggregators. At yards, the aggregators usually collected the produce and furthered it to traders, operating in the same market yards. The traders with the services of commission agent sold the produce to processor, located in the region or in other part of the state or the country. After adequate processing, processor sold the produce to wholesalers involving commission agents. The wholesalers packed and transported the produce to retailers who finally sold the produce to the end consumers.

Existing channels for furthering chickpea from producers to consumers

Market demand for multiple forms of chickpea has led to emergence of more complex value chain involving many actors, activities and marketing channels (Figure 1). Chickpea were primarily consumed as dehusked split grain (*dal*), in powder form as flour (*besan*) and as whole grains. Well established four channels for marketing of chickpea in different forms were documented from the region, for furthering the chickpea and its products from producer to consumers.

1. Producer- Aggregator- Trader- Processer- Whole seller- Retailer- Consumer
2. Producer- Aggregator cum Trader- Processer- Whole seller- Retailer- Consumer
3. Producer- Aggregator- Trader cum Processer- Whole seller- Retailer- Consumer
4. Producer- Village trader- Aggregator- Trader- Processer- Whole seller- Retailer- Consumer

Channel 1 and 2 were present in all the seven districts of BRUP, while channel 3 existed in Banda, Jalaun, Jhansi, Lalitpur, Mahoba districts of the region. In contrast, marketing channel 4 was prevailing only in Chitrakoot district of the region. Aggregators and village traders were the important contact point for producers

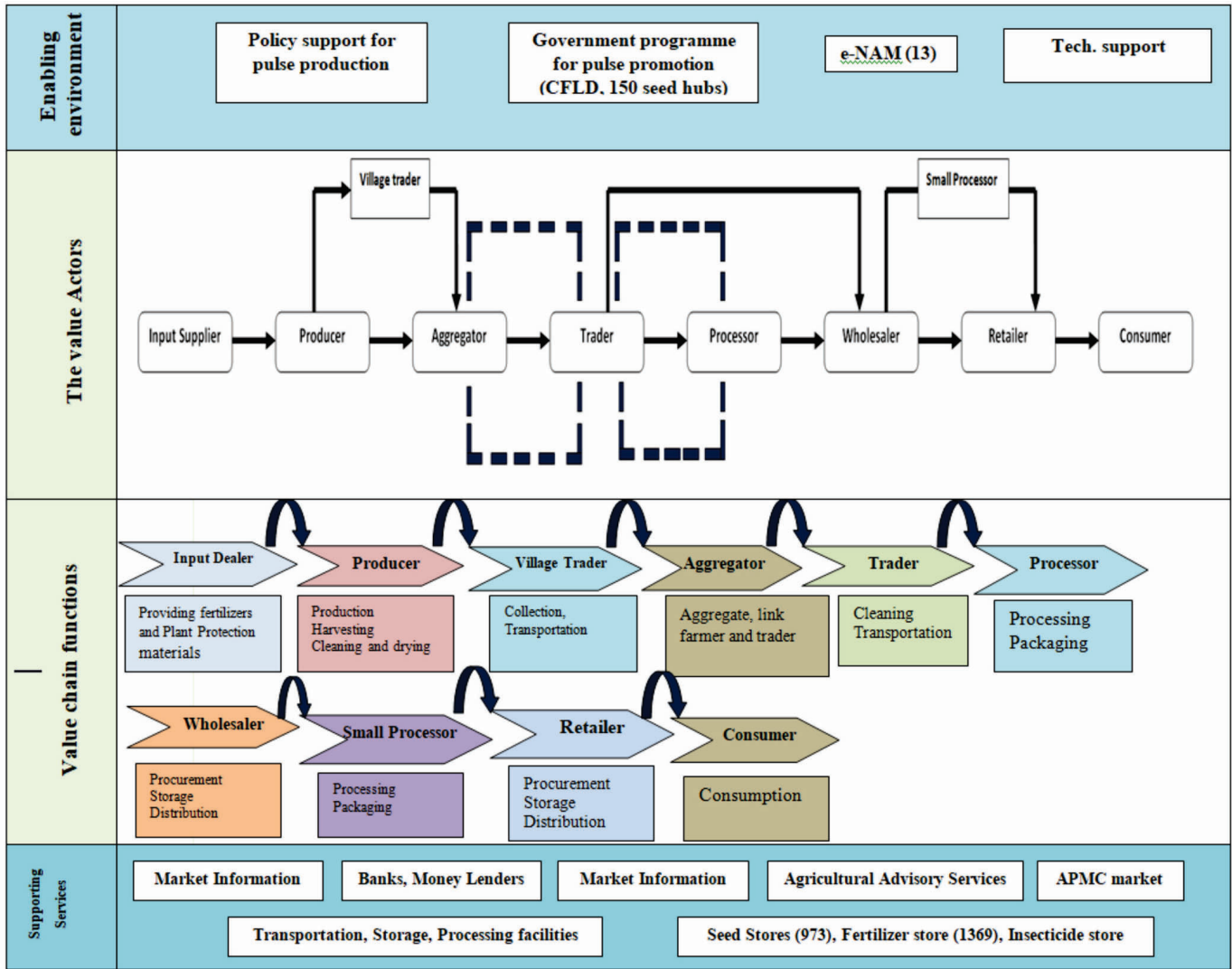


Figure 1. Value chain map of chickpea in Bundelkhand region of Uttar Pradesh state

Table 1. Average cost of production of Chickpea in UP Bundelkhand region

Particular	Operational cost	Percent cost
Human labour	4995.16	21.54
Machine labour	6578.15	28.37
Seed	6065.52	26.15
Fertilizer and manure	1835.37	7.91
Insecticides	405.33	1.75
Irrigation charges	2123.32	9.16
Total operational cost	22002.85	94.88
Interest on working capital	1188.15	5.12
Total cost	23191.00	100
Yield (q./ha)	10.00	
Gross return (Rs./q)	50000.00	
Net returns (Rs./q)	26809.00	
Benefit-Cost ratio (gross return)	2.15	

in all cases. Between every two marketing nodes right from aggregators to retailers, commission agents were linked in chickpea value chains. These commission agents added values by minimizing the financial risk to the marketing nodes, also provided assurance of quality, payment and timely delivery. In Andhra Pradesh also

commission agents or brokers were involved in chickpea trade (FAO, 2018). Agbola et al., (2000) also reported presence of multiple channels for marketing of chickpea products. Village traders were the important marketing actor in chickpea marketing in Maharashtra state (Naik et al., 2020), Uttar Pradesh state (Sengar et al., 2022), Chhattisgarh state (Sonvane & Koshta 2019). However, in contrast to the findings of the present study, direct linkages of producer were also reported to exist in major chickpea marketing channel in Chhattisgarh (Seth et al., 2018). In Amravati districts of Maharashtra (Naik et al., 2020) similar observation were reported in chickpea marketing channel. In case of vegetables and flowers also similar channels were observed (Nain et al., 2019). These results reflect on limited direct access of producers to traders or processor, that made the value chains longer and less efficient.

Estimation of chickpea cost of production

Production cost estimation is requisites for value chain analysis as it provides the value build up at producers’ level. The average cost of production of chickpea in the region was Rs. 22,003/ha.

Among the various cost components, machine hiring incurred highest cost (28.37%). This was because of considerable mechanization in chickpea cultivation using seed drill. Seed cost accounted for more than 26 per cent of the total cost, because of the high seed rate practice (65-75 kg/ha) in chickpea. Further, cost of human labour accounted for 21.5 per cent (Rs. 4,995/ha) of total cost of production that were engaged during sowing, intercultural operations, harvesting and threshing. The other components of investment are mentioned as in Table 1. The average chickpea yield in the region was 10 q/ha with producer receiving gross income of Rs. 50,000 per ha. The benefit cost ratio of chickpea was 2.15, reflecting on reasonable profitability of chickpea cultivation in the region.

Build-up of marketing cost along the chickpea value chains

Value chains actors while furthering chickpea to next marketing node, incurred cost in performing different marketing functions and also added their margins to total value of the produce. These services include weighing, packaging, handling, transportation of chickpea at the desired place as well as assurance of payment, quantity and quality, timely delivery and so on. In all the existing marketing channels of chickpea, producers were adding maximum value (Rs. 1878.8/q to Rs. 2028.7/q).

In marketing channel 1, chickpea initially moved from producers to aggregators and then to traders. The traders furthered chickpea in three forms –as whole grain, as dehusked split grains (*dal*) and as flour (*besan*). The traders incurred MC of Rs. 276/q and they gained almost equal margin (Rs. 272.5/q) in furthering the chickpea. The processor incurred marketing cost of Rs. 249.57/q and Rs. 318.60/q for processing chickpea as split grains (*dal*) as flour (*Besan*), respectively, before moving it to the wholesaler. The processors were drawing maximum MM among all the actors in the channel. The marketing cost incurred, margins drawn and the total value added by wholesalers, was recorded to be highest for chickpea whole grains followed by chickpea flour (*besan*) and split grains of chickpea (*dal*). Retailers on the other hand incurred least marketing cost (Rs. 38.40/q) in the channel, across all the three products. In Channel 2, aggregation and trading functions were integrated and jointly they incurred highest cost (Rs. 254.7/q) and gained Rs 398.2/q as margins. Processors also incurred high MC for handling chickpea split grain (*dal*) (Rs. 252.4/q) and flour (*besan*) (Rs 313.5/q) and earned better MM among all the value chain actors in the channel. At wholesaler level, the MC (Rs.169.8/q) and total value added (Rs 703.4/q) were highest in furthering of chickpea wholegrain as compared to split grain or flour (*besan*) (Table 2). In channel 3, the processing and trading function were integrated creating highest value addition among all other marketing channels at this node (Table 2). The total value added at trader cum processor followed by wholesaler in this channel in furthering chickpea split grains (*dal*) (Rs. 1509/q and Rs. 594.2/q) as well as chickpea flour (*besan*) (Rs. 1689.2/q and Rs.745/q). In this channel, the overall MM earned were found to be highest in marketing of chickpea split grain (Rs. 1941.7) and chickpea flour (*besan*) (Rs. 2343.2/q). However, this did not translate into higher ME and higher value of PSCP.

Likewise, among all the existing marketing channels, producer incurred highest MC (Rs. 97.44/q) and channel 4 (Table 2). This could be attributed to presence of additional actor i.e. village level aggregator who assembled chickpea at villages itself by incurring cost of Rs. 76.3/q for furthering produce to market yards and gained Rs. 88.4/q as the margin thus enhancing the total value of the produce by Rs 164.7/q. However, in this channel, the total value enhancement at processor level was lesser in comparison to other reported marketing channels. Though the overall value addition in this channel was highest for all three products, split grain (*dal*) (Rs 2723.4/q), as flour (*besan*) (Rs. 3231.6/q) and whole grain (2098.7/q), the PSCP was recorded to be lowest (58-69%) for all the three chickpea products. Further, highest ME and PSCP was recorded in case of marketing of chickpea whole grain across all the four marketing channels. Similar findings were also reported by Sah et al., (2022). This lesser overall MC involved in marketing of wholegrain due to absence of processor in the marketing channels may be reason. In tandem with the results, Kumari et al., (2018) reported presence of village traders in marketing of chickpea in Bihar state and also observed the high processing charges of chickpea in manufacture of value added products. Similar observation was also recorded from chickpea value chains in Andhra Pradesh state (FAO, 2018). In contrast to the results, Vijayalakshmi (2015) reported no integration of chickpea supply chain elements and each element functions discretely in chickpeas industry in India. Results presented above indicated that producers added maximum value to the chickpea in all the existing marketing channels by means of making the produce available for purchase and consumption. The higher marketing surplus was also identified as the strength in case of Potatao in Meghalaya district (Rajavardhan, et al, 2020). The highest share of producers in market margins could be attributed to their higher investment, risk borne and time (almost 135 days) involved in producing chickpea. Besides producer, processors were also adding considerable value to the chickpea across all the channels. This may be because of high operational and maintenance cost involved in chickpea processing. In addition, highest investment in terms of infrastructural cost of processing units as well as bulk handling of chickpea at processor level might be attributing for high marketing cost and better margins drawn. Among the existing channels, the least value addition at processors level was observed in channel 4 which may be because of presence of more number of marketing chain actors leading to margin sharing.

Movement of chickpea from Bundelkhand region for processing

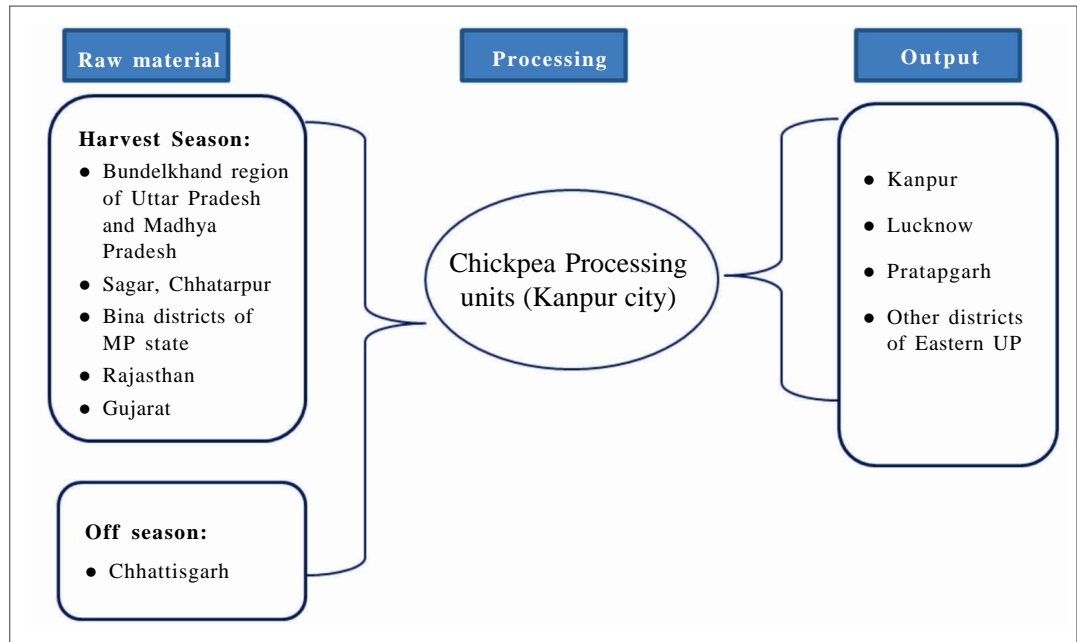
Traders as well as processors located in UPBR and nearby Kanpur city were interviewed for documenting the movement of chickpea from the region (Figure 2). Kanpur city is located in vicinity of the region and contains hundreds of pulse processing units of varying capacities. The city has emerged as a major chickpea processing hub. It was recorded that during the chickpea harvest season and a few months after (April to June), this region of UP and MP primarily supplied chickpea to processing units located within the Bundelkhand region as well as nearby major processing units in cities like Kanpur and Prayagraj. During off

Table 2. Build-up of value along the chickpea value chains (Rs./q)

Actors	Heads	Marketing channel 1			Marketing channel 2			Marketing channel 3		Marketing channel 4		
Producer	Marketing cost	89.3			87.7			95.3		97.4		
	Market margin	1939.4			1929.1			1738.5		2052.5		
	Total value added	2028.7			2016.8			1878.8		2149.9		
Village aggregator	Producer's price											
	Marketing cost											
	Market margin	76.3										
Aggregator	Total value added	88.4										
	Margins	177.6			-			177.2		183.6		
	Trader											
Trader	Marketing cost	276			254.7					258.2		
	Market margin	272.5			398.5					238.7		
	Total value added	548.5			653.2					496.9		
		SG	F(B)	WG	SG	F(B)	WG	SG	F(B)	SG	F(B)	WG
Processor	Marketing cost	249.6	318.6	-	252.4	313.5		524	366	244	297	
	Market margin	665.8	794.2		672.9	801		984.5	1115	605	794	
	Total value added	915.4	1112.8		925.3	1114.5		1509	1689.2	849	1091	
Whole saler	Marketing cost	152.1	155.1	171.08	150.5	167.9	169.8	154.2	157	149.8	131.8	174.1
	Market margin	435.9	565.9	558.72	433.5	308	533.6	440	588	420	582.2	520
	Total value added	588	721	729.8	584	475.9	703.4	594.2	745	569.8	714	694.1
Retailer	Marketing cost	38.4	38.4	38.4	39.6	39.2	39.6	37.5	37	37	37	37
	Market margin	353	453	416	345.2	455	445.2	340	463	325	447	425
	Total value added	391.4	491.4	454.4	384.8	494.2	484.8	377.5	500	362	484	462
Total Marketing cost (Rs/q)		805.4	877.4	544.7	784.9	863	551.8	811.5	863.5	862.7	897.7	643
Market margin		1904.8	2263.2	1424.82	1850.1	1962.5	1377.3	1941.7	2343.2	1860.7	2333.9	1455.7
Total Value added		2710.2	3140.6	1969.52	2635	2825.5	1929.1	2753.2	3206.7	2723.4	3231.6	2098.7
Marketing Efficiency Index		1.7	1.5	2.3	1.7	1.5	2.4	1.7	1.4	1.7	1.4	2.2
Producer Share in Consumer Rupee		62.9	59.3	69.7	63.5	59.6	70.6	62.5	58.7	62.8	58	68.8

SG- Split Grain; F(B)- Flour (*Besan*); WG- Whole Grain

Figure 2. Movement of Chickpea from Bundelkhand region for processing



season, the processing units received chickpea from traders located in states like Chhattisgarh. Processed chickpea from processing units of Kanpur was catering to the chickpea demands of nearby districts like Kanpur, Lucknow, Pratapgarh Prayagraj and other districts of eastern UP state. The quantum of transacted produce, however, depended on the negotiation for the prices, quality and time of delivery between the commissions agents present either side.

CONCLUSION

Finding of value chain analysis of chickpea revealed the presence of long chain of market intermediaries operating between chickpea producers and consumers adding to marketing costs. Integration of value chain functions was noted in the regions; however, it failed to translate into better market efficiency and greater share of producers in consumer rupee. Higher participation of producers in collective marketing and sales of chickpea if

encourages may contribute to generate their better share in consumer price. Encouraging better linkages between chickpea farmers and traders for development of mutually beneficial contractual arrangements in the region state could safeguard producers against fluctuating prices and may also guarantee assured quantity and quality of chickpea produce to trader.

REFERENCES

- Acharya, S. S., & Agarwal, N. L. (2016). *Agricultural marketing in India*. Sixth Edition, Oxford and IBH, New Delhi, pp 199-201, 402.
- Agbola, F. W., Bent, M. J. M., Kelley, T. M., & Rao, P. P. (2000). *Factors influencing the demand for chickpea in India: Implications for marketing and promotion in the Indian chickpea market*. Conference, Sydney, Australia, January 23-25, 2000
- Agricultural statistics at a glance. (2020). Ministry of Agriculture and Farmers Welfare. [https://eands.dacnet.nic.in/PDF/Agricultural%20Statistics%20at%20a%20Glance%20-%202020%20\(English%20version\).pdf](https://eands.dacnet.nic.in/PDF/Agricultural%20Statistics%20at%20a%20Glance%20-%202020%20(English%20version).pdf)
- Dubey, S. K., Gills, R., Gautam, U. S., & Singh, A. (2020). Value chain mapping: A novel approach for market dynamics analysis in tomato (*Solanum lycopersicum*). *Indian Journal of Agricultural Sciences*, 90(5), 924-929.
- FAO. (2005). *Developing sustainable food value chains Guiding principles*.
- FAO. (2018). *Food loss analysis: causes and solutions - Case study on the chickpea value chain in the Republic of India*. Rome. 52 pp. Licence: CC BY-NC-SA 3.0 IGO.
- Hellin, J., & Meijer, M. (2006). *Guidelines for value chain analysis*. Food and Agriculture Organization of the United Nations (FAO), Rome, Italy.
- Jukanti, A. K., Gaur, P. M., Gowda, C. L. L., & Chibbar, R. N. (2012). Nutritional quality and health benefits of chickpea (*Cicer arietinum* L.): a review. *British Journal of Nutrition*, 108, S1-S26.
- Kaplinsky, R., & Morris, M. (2007). The structure of supply chains and their implications for export supply. *African Economic Research Consortium* pp 1-35.
- Kerlinger, F. N., & Rint, N. (1986). *Foundations of Behavioural Research*. London: WinstonInc. <https://ia801603.us.archive.org/28/items/in.ernet.dli.2015.111808/2015.111808.Foundations-Of-Behavioral-Research-Edition-Second.pdf>
- Kumar, P., Peshin, R., Nain, M. S., & Manhas, J. S. (2010). Constraints in pulses cultivation as perceived by the farmers. *Rajasthan Journal of Extension Education*, 17&18, 33-36.
- Kumar, S., & Sharma, A. (2016). *Agricultural value chains in India: Prospects and challenge*. CUTS (Consumer Unity and Trust Society) International, Jaipur, 19. http://www.cutsitee.org/pdf/Agricultural_Value_Chains_in_India_Prospects_and_Challenges.pdf
- Kumar, D., & Rajeev, P. V. (2016). Value chain: A conceptual framework. *International Journal of Engineering and Management Sciences*, 7(1), 74-77.
- Kumari, M., Singh, S. P., Rahaman, S.K. M., Bairwa, S. L., & Meena, L. K. (2018). Value chain analysis of major pulses in Bihar: A situation analysis. *International Journal of Current Microbiology and Applied Sciences*, 6, 2832-2842.
- Nag, S. K., Nahatkar, S. B., & Sharma, H. O. (2000). Post-harvest losses of chickpea as perceived by the producers of Sehore District of Madhya Pradesh. *Agricultural Marketing*, 43(3), 12-16.
- Naik, S. R., & Maurya, M. K. (2020). An economic analysis of chickpea to estimate marketing channels, marketing cost, marketing margin and price spread in each channel of distribution in Kurnool district of Andhra Pradesh. *Journal of Pharmacognosy and Phytochemistry*, 9(5), 741-744.
- Nain, M. S., Singh, R., Mishra, J. R., Sharma, J. P., Singh, A. K., Kumar, A., Gills, R., & Suman R. S. (2019). Maximising farm profitability through entrepreneurship development and farmers' innovations: feasibility analysis and action interventions. *Indian Journal of Agricultural Sciences*, 89(6), 1044-1049.
- Norton, R. (2014, July 28). *Agricultural value chains: A game changer for small holder*. <https://www.devex.com/news/agricultural-value-chains-a-game-changer-for-small-holders-83981>.
- Oddone, N., & Pérez, R. P. (2014). Upgrading value chains through professional and supporting services: lessons from Shrimp value chain in El Salvador. Economic Commission for Latin America and the Caribbean.
- Porter, M. (1985). *The value chain and competitive advantage: Creating and Sustaining Superior Performance*. Free Press, New York, pp 33-61.
- Rajavardhan, M., Sethi, B., & Singh, R. (2020). Supply chain of potato in East Khasi Hills district of Meghalaya: A temporal analysis. *Indian Journal of Extension Education*, 56(2), 76-82.
- Sah, U., Dixit, G. P., Kumar, H., Ojha, J., Katiyar, M., Singh, V., Dubey, S. K., & Singh, N. P. (2021). Dynamics of pulse scenario in Bundelkhand region of Uttar Pradesh: A temporal analysis. *Indian Journal of Extension Education*, 57(4), 97-10.
- Sah, U., Singh, V., Ojha, J., Katiyar, M., & Dubey, S. K. (2022). An Insight into value chains of green gram in Bundelkhand region of India. *Indian Journal of Extension Education*, 58(3), 163-169.
- Sengar, V. S., Gautam, A. K., Mishra, V. K., Musaddi, M. K., Kumari, N., & Singh, D. K. (2022). Study of disposal pattern, price spread, marketing efficiency of chickpea in Auraiya district of Uttar Pradesh. *The Pharma Innovation Journal*, 11(3), 933-936.
- Sonvane, O. P., & Koshta, A. K. (2014). Disposal pattern and price spread analysis of chickpea in Chhattisgarh plains. *Journal of Pharmacognosy and Phytochemistry*, 8(6), 1133-1137.
- Trienekens, J. (2011). Agricultural value chains in developing countries: A framework for analysis. *International Food and Agribusiness Management Review*, 14(2), 51-83.
- Vishwakarma, R. K., Jha, S. N., Dixit, A. K., Kaur, A., Rai, A., & Ahmed, T. (2019). Assessment of harvest and postharvest losses of major pulses in India. *Agricultural Economics Research Review*, 32(2), 247-258.
- Zott, C., Amit, R., & Massa, L. (2011). The Business Model: Recent Developments and Future Research. *Journal of Management*, 37(4), 1019-1042.