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Economics of Onion (*Allium cepa* L.) production and marketing in Ballia district of Eastern Uttar Pradesh, India

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Abstract

The present study on entitled “Estimation of Onion production and marketing: A Case Study of Ballia District of Eastern Uttar Pradesh. This research article focused on the following specific objectives are (1) To work out costs-returns and input-output relationship of onion production and second objectives (2) To study marketing channels, price spread, marketing cost and efficiency of onion production. Multistage sampling technique were used for selection of onion growers. Primary data was collected by personal interview methods with the use of pre structured and pre listed schedule questionnaire. The district was selected purposively. 160 farmers were selected by simple random sampling method. There are 40 marginal 40 small, 40 medium and 40 large farmers from eight selected villages of the two block of the district. The farm level data and required information of onion growing farmers pertaining to crop year 2024-2025. On overall average cost of onion cultivation was found Rs 98873.86 per hectare. The per hectare operational cost at overall level was Rs. 71945.31 (72.76 percent of the total cost). The per hectare fixed/ overhead cost was came out to be Rs. 89885.33 (90.91 percent of the total cost). Per hectare gross income and net income was on overall average of Rs. 323093.09 and Rs.233207.76. The Benefit-cost ratio which indicates the profitability of farm was observed to be 2.21 at the overall level. Channel I (Producer to Consumer) recorded the highest marketing efficiency value of 10.66, owing to the lowest combined marketing cost and margin of ₹120 per quintal. In Channel II (Producer to Retailer to Consumer) the marketing efficiency declined sharply to 6.02 due to a higher total marketing cost and margin amounting to ₹220 per quintal. Channel III (Producer to Wholesaler to Retailer to Consumer) the lowest marketing efficiency of 5.69, as it involved the highest total marketing cost and margin of ₹240 per quintal.

Keywords: Cost of production, onion, farm income measures, benefit-cost ratio, marketing channel, marketing cost, marketing margin, marketing efficiency

Introduction

The framework of the Indian economy primarily relies on the agricultural sector. Among all vegetable crops, onions constitute one of the most significant varieties. They are utilized in every household for dietary purposes. India consumes approximately 1.3 million tonnes of onions monthly, establishing it as a vital vegetable crop for domestic consumption. The nation ranks first in terms of cultivated area, encompassing 194 thousand hectares, and holds the second position in production, amounting to 31,703 thousand metric tons in the fiscal year 2021-22. During the agricultural years 2021-22, the country harvested 26.64 million tons of onions. The principal onion-producing states in India, such as Maharashtra, Madhya Pradesh, Karnataka, Rajasthan, Bihar, Andhra Pradesh, Haryana, Telangana, and Gujarat, collectively contribute over 60

percent of the total onion output. Notably, Maharashtra leads in production, followed by Madhya Pradesh, with respective shares of 42.53 percent and 15.16 percent in the year 2021-22. The Ministry of Commerce & Industry has articulated that regarding the onion export policy, “The extant export policy is free and only the export of onion seed is ‘restricted’ and that too is permitted under authorization from DGFT” (Directorate General of Foreign Trade).

The precise origins of onion as a wild plant remain uncertain. It is hypothesized to have originated in a region encompassing Iran, West Pakistan, and the northern mountainous countries. In India, onions serve as an essential spice and commercial crop that can enhance the livelihoods of impoverished farmers. Furthermore, they play a pivotal role in ensuring food and nutritional security for individuals.

Onions are consumed nearly every day in households, often served as a salad and prepared in various culinary methods, including curries, frying, boiling, baking, as well as in soups and pickles. The daily requirement of onions in kitchens highlights the necessity for a consistent supply in the market at equitable prices for both producers and consumers. In addition to fresh consumption, onions provide excellent raw material for the processing industry, as they can be transformed into dehydrated powder, rings, and shreds. Historically, onions have been recognized as a medicinal herb in ancient times, as documented in medicinal treatises such as the “Charak Samhita” from the third or fourth century. The Sanskrit term for onions, “Palandu,” signifies their usage during the Vedic period and within Aryan culture. Moreover, onions are an abundant source of phosphates, calcium, carbohydrates, proteins, and vitamins B and C. They are also utilized in the production of oil and pectin.

The comprehensive expenditure associated with the cultivation process amounts to Rs. 24,400 per hectare, with variable costs representing over 90 percent of this total. Within the spectrum of variable costs, the expenditure attributed to human labor (37.91 percent) emerged as the predominant component of the overall cultivation cost, succeeded by expenditures on fertilizers (12.89 percent), farm-yard manure (10.64 percent), irrigation (9.82 percent), seeds (8.14 percent), and bullock labor (6.82 percent). (Balappa and Hugar 2003) ^[2]. The average cost of cultivation per hectare for onion, assessed across cost categories A1, B2, B2, C1, C2, and C3, was determined to be Rs. 16,616, Rs. 17,011, Rs. 19,161, Rs. 19,461, Rs. 21,611, and Rs. 23,772, respectively. The cost of cultivating onion per hectare demonstrated an upward trajectory correlating with the increase in the size of the holding. (Rajput *et al.* 2008) ^[5]. The total estimated cost of cultivation was calculated at Rs. 49,563 per hectare for onion and Rs. 34,840 per hectare for cauliflower. The net returns for onion were observed to be superior (Rs. 74,597 per hectare) when juxtaposed with those for cauliflower (Rs. 38,072 per hectare) (Sidhu *et al.* 2010) ^[7]. The expenditure associated with onion cultivation in the large farm category was the highest, recorded at Rs. 91,595, followed by medium farms at Rs. 83,689 and small farms at Rs. 72,258. Among the various elements comprising the cost of cultivation, human labor constituted the largest share (28.45 percent), followed by seeds (17.43 percent). Additional significant components included the rental value of land (12.85 percent), irrigation charges (11.92 percent), farm-yard manure (9.52 percent), plant protection chemicals (5.87 percent), fertilizers (5.20 percent), and machinery (3.22 percent) (Meena *et al.* 2016) ^[4]. The highest proportion of production (57.89 percent) was transacted through commission agents, succeeded by primary wholesalers. The onion cultivators incurred the highest average total marketing cost of Rs. 57.27 per quintal for onions sold via commission agents, followed by secondary wholesalers. The producers received the most favorable net price per quintal in Channel-IV. The marketing cost per quintal was the highest within Channel-II (Rs. 319.00), while the marketing margin reached its peak in Channel-I (Rs. 136.31), followed closely by Channel-V. The producer's share in the consumer's expenditure per quintal was greatest in Channel-

I, whereas marketing efficiency was also highest in Channel-I (Kantariya *et al.* 2018) ^[3].

Materials and Methods

Selection of Study Area

Uttar Pradesh is broadly divided into nine agro-climatic regions, namely: Tarai and Bhabar Region, Western Plain Zone, Mid-Western Plain Zone, South-Western Semi-Arid Zone, Upper Gangetic Plain Zone, Central Plain Zone, Bundelkhand Zone, Eastern Plain Zone (also known as the North-Eastern Plain Zone or Poorvi Maidan Kshetra), and Vindhyan Zone.

Selection of District

The Eastern Plain Zone of Uttar Pradesh comprises nine districts, namely Azamgarh, Mau, Ballia, Ayodhya, Ghazipur, Jaunpur, Sant Ravidas Nagar, and Varanasi. From these districts, Ballia district was purposively selected due to the district's considerable area under onion cultivation.

Selection of blocks

A list of all 17 blocks were prepared on the basis of onion growing area. Two block namely Murlichhapra and Bairia block were purposively selected for the study.

Selection of Villages

A comprehensive list of villages under Murlichhapra and Bairia blocks was prepared in consultation with Block Development Officers and arranged based on the number of onion growers. From this list, eight villages were selected randomly for detailed investigation. These villages were Sonbarsa, Bhojpur, Lakshimpur, Dalan Chhapara, Upadhyapur, Chakiya Jamalpur, Madhubani, and Karmanpur.

Selection of Sample Size and Farmers

A complete list of Onion growing farmers was prepared for each selected village. Farmers were classified into four categories based on landholding size: marginal farmers (below 1.0 ha), small farmers (1.01-2.0 ha), medium farmers (2.01- 4.0 ha), and large farmers (above 4.0 ha). From each category, five farmers were selected randomly from each village, resulting in a total sample size of 160 farmers. Primary data were collected directly from the selected farmers through personal interviews using a pre-structured and pre-tested schedule. The study was conducted in year 2024-25.

Analytical tools

The cost and returns of Potato crops

For calculating the cost and returns, tabular analysis, averages, and percentages were used. The standard Cost Concepts Method recommended by the Commission for Agricultural Costs and Prices (CACP) was adopted.

CACP Cost Concepts

The following cost components were calculated:

Cost A₁: Includes all actual cash and kind expenses, such as:

1. Value of hired human labour.
2. Value of owned bullock labour.
3. Value of hired bullock labour.

4. Value of owned machine labour.
5. Hired machinery charges.
6. Value of fertilizers.
7. Value of manure (produced farm and purchased).
8. Value of seed (both farm- produced and purchased).
9. Value of insecticides, pesticides and fungicides.
10. Irrigation charges.
11. Canal water charges.
12. Land revenue, cusses and other taxes.
13. Depreciation on implements and farm building.
14. Interest on the working capital.

Cost A₂: Cost A₁ + Rent paid for leased in land

Cost B₁: Cost A₁ + Interest on owned fixed capital (excluding land)

Cost B₂: Cost B₁ + Rental value of owned land

Cost C₁: Cost B₁ + imputed value of family labour

Cost C₂: Cost B₂ + imputed value of family labour

Cost C₃: Cost C₂ + 10% of Cost C₂ (managerial cost)

Farm Income Measures

Gross Income = Total value of produce

Net Income = Gross Income - Cost C₃

Farm Business Income = Gross Income - Cost A₁

Family Labour Income = Gross Income - Cost B₂

Benefit-Cost Ratio (BCR) = Gross Returns / Total Cost

Return per Rupee of Investment = Gross Returns / Total Cost

Results and Discussion

Table 1: Per hectare costs of different inputs used in onion cultivation (Rs. /ha)

Sl. No.	Particulars	Size group of farm				Overall average
		Marginal	Small	Medium	Large	
1.	Human Labour	29932.47	30515.23	31508.95	32093.85	31012.63
		31.63	31.51	31.35	31.00	31.37
a)	Family labour	14650.25	13848.56	11565.33	9835.48	12474.91
		15.48	14.30	11.51	9.50	12.62
b)	Hired labour	15282.22	16666.67	19943.62	22258.37	18537.72
		16.15	17.21	19.84	21.50	18.75
2.	Machinery charges	7250.45	7323.33	7643.92	7920.25	7534.49
		7.66	7.56	7.61	7.65	7.62
3.	Seeds charges	5527.63	5672.23	5856.24	6246.68	5825.70
		5.84	5.86	5.83	6.03	5.89
4.	Manure & fertilizer	14835.74	15210.22	15864.33	16666.67	15644.24
		15.68	15.71	15.78	16.10	15.82
5.	Irrigation	5254.78	5434.36	5664.73	5867.23	5555.28
		5.55	5.61	5.64	5.67	5.62
6.	Plant protection	4657.92	4780.34	5146.32	5264.62	4962.30
		4.92	4.94	5.12	5.09	5.02
7.	Total working capital	67458.99	68935.71	71684.49	74059.30	70534.62
		71.29	71.18	71.32	71.55	71.34
8.	Interest on working capital	1349.18	1378.71	1433.69	1481.19	1410.69
		1.43	1.42	1.43	1.43	1.43
	Total operational cost	68808.17	70314.42	73118.18	75540.49	71945.31
		72.72	72.60	72.75	72.98	72.76
9.	Rental value of own land	15000.00	15000.00	15000.00	15000.00	15000.00
		15.85	15.49	14.92	14.49	15.17
10.	Depreciation	1754.93	2254.72	2764.37	3065.45	2459.87
		1.85	2.33	2.75	2.96	2.49
11.	Interest on fixed capital	460.76	474.50	488.52	496.80	480.15
		0.49	0.49	0.49	0.48	0.49
	Sub total	17215.69	17729.22	18252.89	18562.25	17940.01
		18.19	18.31	18.16	17.93	18.14
13.	Total cost	86023.86	88043.65	91371.07	94102.74	89885.33
		90.91	90.91	90.91	90.91	90.91
14.	Managerial cost @10 of sub total	8602.39	8804.36	9137.11	9410.27	8988.53
		9.09	9.09	9.09	9.09	9.09
	Grand Total	94626.25	96848.01	100508.18	103513.01	98873.86
		100	100	100	100	100

(Figures in parentheses indicate percent to total number of farmers)

The table 1. this table indicates that overall average cost of onion cultivation was worked out to be Rs 98873.86 per hectare. Which was highest for large (Rs. 103513.01) size of holding compared to medium (Rs. 100508.18), small (Rs. 96848.01) marginal (Rs. 94626.25) size of holdings. The per hectare operational cost at overall level Rs.71945.31 (72.76 percent of the total cost). The per hectare fixed/ overhead

cost came out to be Rs.89885.33(90.91percent of the total cost). Input wise analysis showed that overall human labour was highest expenditure among various components of operational cost with 31.37percent (Rs.31012.63) share of total cost. The overall major cost component of cultivation of onion crop was total cost of rental value of owned land Rs. 15000.00 (15.17percent). The distribution of pattern of

operational cost on the various inputs revealed that cost of human labour Rs.31012.63 (31.37percent), manure & fertilizers Rs. 15644.24 (15.82 percent), Tractor charges/

machinery charges Rs. 7534.49(7.62percent), irrigation charges Rs. 5555.28 (5.62 percent) and seed Rs.5825.70 (5.89 percent).

Table 2: Measures of per hectare costs and returns of onion (Rs.)

Sl. No.	Particulars	Size group of farm				Overall average
		Marginal	Small	Medium	Large	
1.	Cost A ₁	55912.85	58720.58	64317.22	68770.46	61930.28
2.	Cost A ₂	55912.85	58720.58	64317.22	68770.46	61930.28
a	Cost B ₁	56373.61	59195.09	64805.74	69267.26	62410.42
b	Cost B ₂	71373.61	74195.09	79805.74	84267.26	77410.42
3.	Cost C ₁	71023.86	73043.65	76371.07	79102.74	74885.33
4.	Cost C ₂	86023.86	88043.65	91371.07	94102.74	89885.33
5.	Cost C ₃	94626.25	96848.01	100508.18	103513.01	98873.86
6.	Yield (q/ha)	233.33	240.37	245.42	248.38	241.88
7.	Price per Q./ha.	1280.00	1325.00	1385.00	1350.00	1335.00
8.	Gross Income	298662.40	318490.25	339906.70	335313.00	323093.09
9.	Net return over cost C ₃	212638.54	230446.60	248535.63	241210.26	233207.76
10.	Cost of production (q/ha)	405.55	402.91	409.54	416.75	408.69
11.	Family Income	227288.79	244295.16	260100.96	251045.74	245682.66
12.	Farm business income	242749.55	259769.67	275589.48	266542.54	261162.81
	Farm investment income	204036.15	221642.24	239398.52	231799.99	224219.23
13	B:C Ratio	3.16	3.29	3.38	3.24	3.27

Table 2. indicates that per hectare, overall total cost C₃ of vegetable onion was Rs. 233207.76. Per hectare gross income received by marginal, small, medium and large farms was Rs. 298662.40 Rs. 318490.25 Rs. 339906.70 and Rs. 335313.00 respectively with an overall average of Rs. 323093.09. Overall cost of production of vegetable onion was estimated Rs. 408.69 per quintal being Rs. 405.55, Rs. 402.91, 409.54 and Rs. 416.75 on marginal, small, medium and large farms. respectively. The net income on onion production was highest for the large farmers (Rs.241210.26) followed by medium (Rs.248535.63) small (Rs.230446.60) and marginal (Rs.212638.54) farmers. The Benefit- cost ratio indicates the profitability of farm investment was observed to be 2.21 at the overall level. Among the size of holding, the Benefit- cost ratio was highest in large size group (3.24) compared to medium (3.38), small (3.29) and marginal (3.16) farmers.

Existing Marketing Channels for vegetables in the Study Area

The commonly observed marketing channels in the study area were as follows:

Channel I

Producer → Consumer

This channel was mainly adopted by marginal and small farmers who sold their produce directly in local markets, village haats, or roadside markets. Although this channel involved minimal marketing costs and no intermediary margins, it required farmers to spend more time and effort on marketing activities.

Channel II

Producer → Retailer → Consumer

This was one of the most widely used channels in the study area. Farmers sold their vegetables directly to retailers in nearby markets. This channel reduced marketing costs compared to longer channels, but farmers still received a lower price than the consumer price due to retailer margins.

Channel III

Producer → Wholesaler → Retailer → Consumer

This channel was predominantly used by medium and large farmers who marketed larger quantities of vegetables. While it ensured quick disposal of produce and access to larger markets, the presence of multiple intermediaries increased marketing costs and reduced the producer's share in the consumer's rupee.

Price Spread of Onion under Different Marketing Channels

The table 3. presents the price spread of onion under different marketing channels in the study area. It is evident that the price received by producers decreased with an increase in the length of the marketing channel.

Under Channel I (Producer → Consumer), farmers received the highest price of ₹1220 per quintal, as no intermediaries were involved. The marketing cost incurred by the producer in this channel was Rs. 60 per quintal, and the consumer paid Rs.1280 per quintal.

In Channel II (Producer → Retailer → Consumer) the price received by the producer declined to Rs. 1010 per quintal due to the involvement of the retailer. The retailer incurred a marketing cost of Rs.120 per quintal and earned a margin of Rs. 100 per quintal, resulting in a consumer price of Rs. 1325 per quintal. Consequently, the producer's share in the consumer's rupee declined to 76.22 per cent.

Channel III (Producer → Wholesaler → Retailer → Consumer) involved both wholesalers and retailers, leading to higher marketing costs and margins. The producer received the lowest price of Rs. 972 per quintal. The wholesaler incurred a marketing cost of Rs. 60 per quintal with a margin of Rs. 100 per quintal, while the retailer incurred a marketing cost of Rs. 90 per quintal and earned a margin of Rs. 100 per quintal. As a result, the consumer paid the highest price of Rs. 1367 per quintal, and the producer's share further declined to 71.10 per cent.

Marketing channels, price spread, marketing cost and efficiency

Table 3: Price Spread of onion under Different Marketing Channels (Rs. /quintal)

Sl. No.	Particular	Channel I	Channel II	Channel III
1.	Price received by producer	1220	1010	972
2.	Marketing cost incurred by producer	60	120	60
3.	Sale price of wholesaler	–	–	1032
4.	Marketing cost of wholesaler	–	–	65
5.	Margin of wholesaler	–	–	80
6.	Sale price of retailer	–	1130	1177
7.	Marketing cost of retailer	–	95	90
8.	Margin of retailer	–	100	100
9.	Price paid by consumer	1280	1325	1367
10.	Producer's share in consumer's rupee (%)	95.31	76.22	71.10

Marketing Cost, Margin and Price Spread under Different Channels

The table 4. shows the marketing cost, marketing margin, and price spread of onion under different marketing channels in the study area. It is evident that marketing costs and margins increased with an increase in the number of intermediaries involved in the marketing process.

In Channel I (Producer to Consumer), the total marketing cost was the lowest at Rs. 60 per quintal, as there were no intermediaries. Consequently, the price spread was also minimum at Rs. 60 per quintal, and the consumer paid the lowest price of Rs.1280 per quintal.

In Channel II (Producer to Retailer to Consumer), the total marketing cost increased to Rs. 120 per quintal due to the involvement of the retailer. In addition, the retailer earned a marketing margin of Rs. 100 per quintal, which resulted in a higher price spread of Rs. 220 per quintal. As a result, the consumer price increased to Rs.1325 per quintal.

Channel III (Producer to Wholesaler to Retailer to Consumer) involved both wholesalers and retailers, leading to the highest marketing cost and margin. The total marketing cost amounted to Rs. 60 per quintal, while the combined marketing margin was Rs. 180 per quintal. This led to the widest price spread of Rs. 240 per quintal and the highest consumer price of Rs.1367 per quintal.

Table 4: Marketing Cost, Margin and Price Spread under Different Channels (Rs. /quintal)

Sl. No.	Particulars	Channel I	Channel II	Channel III
1.	Total marketing cost	60	120	60
2.	Total marketing margin	–	100	180
3.	Price spread	60	220	240
4.	Consumer price	1280	1325	1367

Marketing Efficiency of Different Marketing Channels

Table 5. presents the marketing efficiency of onion across various marketing channels in the study area. It is clear that marketing efficiency diminishes with an increase in the number of intermediaries involved.

Channel I (Producer to Consumer) achieved the highest marketing efficiency value of 10.66, attributed to the lowest combined marketing cost and margin of ₹120 per quintal. The lack of intermediaries in this channel resulted in a minimal price spread, maximizing producer benefits.

Channel II (Producer to Retailer to Consumer) experienced a significant decline in marketing efficiency to 6.02, due to a higher total marketing cost and margin of ₹220 per

quintal. The retailer's involvement escalated marketing expenses, thereby diminishing the channel's efficiency.

Channel III (Producer to Wholesaler to Retailer to Consumer) exhibited the lowest marketing efficiency of 5.69, as it incurred the highest total marketing cost and margin of ₹240 per quintal. The presence of multiple intermediaries resulted in increased marketing costs, a wider price spread, and decreased efficiency.

Table 5: Marketing Efficiency of Different Marketing Channels

Sl. No.	Marketing Channel	Value of goods sold (Rs./q)	Total marketing cost + margin (₹/q)	Marketing Efficiency
	Channel I	1280	120	10.66
	Channel II	1325	220	6.02
	Channel III	1367	240	5.69

Conclusion

On Overall per hectare total cost of onion cultivation is Rs 98873.86. The large holdings size incurs the highest cost (Rs. 103513.01) compared to medium (Rs. 100508.18), small (Rs. 96848.01), and marginal (Rs. 94626.25) holdings. The overall per hectare operational cost is Rs. 71945.31 (72.76 percent of total cost). The fixed/overhead cost per hectare is Rs. 89885.33 (90.91 percent of total cost). Analysis indicates that human labour constitutes the highest operational cost at 31.37 percent (Rs. 31012.63) of total cost. The predominant cost component in onion cultivation is the rental value of owned land at Rs. 15000.00 (15.17 percent). The operational cost distribution reveals human labour at Rs. 31012.63 (31.37 percent), manure & fertilizers at Rs. 15644.24 (15.82 percent), tractor/machinery charges at Rs. 7534.49 (7.62 percent), irrigation charges at Rs. 5555.28 (5.62 percent), and seed at Rs. 5825.70 (5.89 percent). Per hectare gross income for marginal, small, medium, and large farms is Rs. 298662.40, Rs. 318490.25, Rs. 339906.70, and Rs. 335313.00 respectively, with an overall average of Rs. 323093.09. The highest net income from onion production is for large farmers (Rs. 241210.26), followed by medium (Rs. 248535.63), small (Rs. 230446.60), and marginal (Rs. 212638.54) farmers. The Benefit-cost ratio indicating farm investment profitability is 1:2.21 overall. The highest Benefit-cost ratio is in the large size group (1:3.24), compared to medium (1:3.38), small (1:3.29), and marginal (1:3.16) farmers. The overall cost of onion production is estimated at Rs. 408.69 per quintal, with Rs. 405.55, Rs. 402.91, Rs. 409.54, and Rs. 416.75 for

marginal, small, medium, and large farms respectively. Channel I recorded the highest marketing efficiency of 10.66, attributed to the lowest combined marketing cost and margin of ₹120 per quintal. The lack of intermediaries facilitated minimal price spread and maximized producer benefits. In Channel II, marketing efficiency significantly decreased to 6.02 due to a higher total marketing cost and margin of ₹220 per quintal. The retailer's involvement escalated marketing expenses, thereby diminishing channel efficiency. Channel III exhibited the lowest marketing efficiency of 5.69, resulting from the highest total marketing cost and margin of ₹240 per quintal. The presence of multiple intermediaries contributed to increased marketing costs, a wider price spread, and reduced efficiency.

References

1. Agarwal PK, Kumar M. An economic analysis of onion cultivation in Giridih district of Jharkhand. *Economic Affairs*. 2018;63(3):703-707.
2. Balappa SR, Hugar LB. An economic evaluation of onion production and its marketing system in Karnataka. *Agricultural Marketing*. 2003;46(1):22-26.
3. Kantariya GK, Ardeshta NJ, Vasavada KM, Thumar VM. Price spread in different marketing channels of onion in Bhavnagar district of Gujarat, India. *International Journal of Current Microbiology and Applied Sciences*. 2018;7(10):307-317.
4. Meena S, Singh IP, Meena RL. Cost of cultivation and returns on different cost concepts basis of onion in Rajasthan. *Economic Affairs*. 2016;61(1):11-16.
5. Rajput AM, Dwivedi ML, Karde S. Economic analysis of production of onion in Indore district of Madhya Pradesh. *Indian Journal of Agricultural Economics*. 2008;63(3):394-395.
6. Sidhu RS, Sidhu MS, Singh JM. Marketing efficiency of green peas under different supply chains in Punjab. *Agricultural Economics Research Review*. 2011;24(2):267-273.
7. Sidhu RS, Kumar S, Vatta K, Singh P. Supply chain analysis of onion and cauliflower in Punjab. *Agricultural Economics Research Review*. 2010;23(1):445-453.
8. Directorate General of Foreign Trade. Directorate General of Foreign Trade. <https://www.dgft.gov.in/CP/?opt=dgft-hq-details>