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An economic analysis of production & marketing of chickpea in Banda district of Bundelkhand zone in Uttar Pradesh

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Abstract
In the present paper, an attempt has been made to examine various chickpea production in different categories of the farmers. A study on "Production and Marketing of Chickpea in Banda District of Bundelkhand Zone in Uttar Pradesh: An Economic Analysis was conducted for analyzing the cost of input-output in chickpea cultivation. Hundred (100) sample farmers (marginal-28, small-34 & medium-38) were interviewed from few villages of Baberu block of Banda district. Data were analyzed and found that average land holding size was 1.95 hectare and cropping intensity was 187.18% on an average cost of cultivation per hectare was found to be Rs. 34353.35. The gross income and net income were found to be Rs. 55172.70 and Rs. 22666.81 per hectare on overall farm respectively. The input-output ratio was found to be 1:1.66 on cost C_3 chickpea cultivation in the study was characterized by decreasing returns to scale.

Keywords: Farm structure, cropping pattern, cropping intensity, cost and return etc.

1. Introduction
Chickpea (*Cicer arietinum* L.) is one of the major pulse crops grown in India. Chickpea has the richest, cheapest and easiest source of best quality proteins and fats. Chickpea is also a good source of vitamins (especially B vitamins) and minerals like potassium and phosphorus. Agriculture continues to be the backbone of Indian economy, which has a significant history. The share of agriculture and allied sectors in India's GDP has declined to 17.32 per cent in 2016-17 due to shift from traditional agrarian economy to industry and service sectors. Despite a decline in the sector's contribution to GDP, the production of food grains has increased from 255.4 million tonnes in 2012-13 to 275 million tonnes in 2017-18. The economic contribution of agriculture to India's GDP is steadily declining with the country's broad-based economic growth. Still, agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India. Agriculture, with its allied sectors, is the largest source of livelihood in India. 70 percent of its rural households still depend primarily on agriculture for their livelihood, with 82 percent of farmer being small and marginal (AFO 2017-18).
Chickpea is the 4th largest grain-legume crop in the world, with a total production of 9.20 MT from an area of 11.20 M ha and productivity of 0.89 T ha (FAO, STAT 2011). Over 90 per cent of the global chickpea is produced and consumed in Asia. Chickpea is a highly nutritious pulse and placed third in the important list of the food legumes that are cultivated throughout the world.
In India, the total food production in 2013-14 was about 257.4 million tones out of which only 19.3 million tones was contributed by pulses. The production of cereals increase by 460 per cent since 1950-51 but the production of pulses in the country has increased only 178 per cent. There is acute shortage of pulses in the country.
Pulses are grown across the country with highest share coming from Madhya Pradesh (24 per cent), Uttar Pradesh (16 per cent), Maharashtra (14 per cent), Andhra Pradesh (10 per cent), Karnataka (7 per cent) followed by Rajasthan (6 per cent), which together accounted about 77 per cent of the total pulse production, while the remaining 23 per cent contributed by Gujarat, Chhattisgarh, Bihar, Orissa and Jharkhand. In Uttar Pradesh total chickpea production was 0.73 million tonnes from 0.6 million hectare area with 1217 kg/ha productivity in year 2012-2013 (NFSM 2014).
Bundelkhand region has been divided into two divisions i.e. Chitrakoot and Jhansi. In Bundelkhand total chickpea production and area contributed by Chitrakoot division 45794

45794 Metric tonnes production from 40971 hectare with 2.36 kg/ha productivity and Jhansi division 39235 metric tonnes production from 4800.2 hectare area with 7.14 kg/ha in year 2014-2015 (Zila Sankhikiya Patrika 2016).

Most of the people in the country satisfy their appetite requirements by consuming pulses. Chickpea is the most largely produced pulse crop in India accounting to a share of 40 per cent of the total pulse crops produced in India and that makes it the leading chickpea producing country in the world.

Chick pea is one of the important pulse crops of Banda district of Uttar Pradesh. Chickpea occupied 92759 hectare of area and 13190 metric tones production with 1.4 quintal per hectare productivity. (Zila Sankhyaki Patrika, 2016). Chickpea seems to have lucrative pulse crop of Banda district of Uttar Pradesh. No scientific study has been so far conducted on economics aspects of this crop. Therefore, the proposed study entitled **"**Production and marketing of Chickpea in Banda district of Bundelkhand Zone in Uttar Pradesh: An Economic Analysis The study was carried out with following specific objectives:

1. To study the farm structure, cropping pattern, and cropping intensity of sample farm.
2. To work out the cost and returns of chickpea production.

2 Material and Methods

2.1 Sampling technique

The purposive and random sampling techniques were used to select village and farmers. The district Banda was selected purposively. The sampling technique were sub divided into following stages-

a) Selection of block
b) Selection of village
c) Selection of farmers

(a) Selection of block

At first a list of all blocks of Banda district of Bundelkhand zone in Uttar Pradesh along with acreage in chickpea cultivation were prepared and arranged in descending order, namely "Baberu" block having highest area in chickpea was selected purposively for this study.

(b) Selection of Village

A list of all villages following "Baberu" block was prepared and arranged in ascending order to take area covered under chickpea crop and 5(Five) village selected randomly from this list.

(c) Selection of farmers

Three stage stratified purposive cum random sampling technique was used to select the district, block, village and farmers. Banda district of eastern U.P. and Baberu block of district Banda were selected purposively. A list of all the chickpea growing villages of selected block was prepared and five villages were selected randomly.

A list of all the chickpea cultivators of each selected village was prepared and arranged in ascending order under three categories i.e.

- Marginal (below 1 ha.)
- Small (1-2 ha.)
- Medium (2-4 ha. and above)

Following proportionate random sampling technique a sample of 100 farmers viz. marginal -28, small-34 and medium -38 were selected for the purpose of the study.

2.2 Method of Enquiry

The primary data information was collected by survey method through personal interview. The data were selected on well structure & pre tested schedule but secondary information were collected from the tehsil/village and district level official records.

2.3 Period of enquiry

The primary data were collected for the period of one year i.e. Agriculture year 2018-19.

2.4 Analytical tools

Tabular analysis was used for analysis of data weighted average, cropping intensity and cost benefit ratio was worked out with the following formula.

(A) Weighted Average: $$WA = \frac{\sum W_i X_i}{\sum W_i}$$

Where,
WA = Weighted Average Xi = Variable
Wi = Weights of variable

(B) Cropping intensity: $$C.I. = \frac{\text{Total Cropped Area}}{\text{Net Cultivated Area}} \times 100$$

Where,
C. I. = cropping intensity

3 Results and Discussion

3.1 Structure of farms

Farm structure includes the average size of holding, cropping intensity, cropping pattern and investment on farm assets.

Distribution of farm and their cultivated area under different size groups of farms is presented in Table 1. It is clear from the Table 1 that net cultivated area of sample farms constituted 11.63%, 28.58% and 59.79% chickpea under marginal, small and medium farms respectively.

The average size of land holding of marginal, small and medium farms comes to be 0.5, 1.29 and 3.42 hectare respectively. On an average holding size was estimated to be 1.18 hectare.

Table 1: Average size of land holding under different size group of sample farms

S. No.	Size of Group Farms	No. of sample farms	Net cultivated area	Averages size of land holding
1	Marginal Farms (below 1 ha)	28	22.68 (11.63)	0.81
2	Small Farms (1-2 ha)	34	55.76 (28.58)	1.64
3	Medium Farms (2-4 ha & above)	38	116.66 (59.79)	3.07
Total		100	195.10 (100)	1.95

Table 2: Cropping intensity of different size group of sample farms (%)

S.N.	Size group of farms	No. of farms	Net cultivated area (ha)	Gross Cropped area (ha)	Cropping intensity
1.	Marginal	28	0.81	1.67	206.17
2.	Small	34	1.64	3.18	193.90
3.	Medium	38	3.07	5.53	180.13
Average		100	100	3.65	187.18

3.2 Size of holding

The average size of holding and cropping is presented in Table 1. It is depicted from the table that average size of holding was of increasing trend with increase in the size of farmers. The holding size of marginal, small and medium farms, were found to be 0.81, 1.64 and 3.07 hectare respectively.

3.3 Cropping intensity

Cropping intensity has been computed for all size groups of farms and is presented table 2. The maximum cropping intensity was observed as 206.17 at marginal size group of sample farms followed by small (193.90) and medium 180.13 size group of farms overall cropping intensity in the area was found to be 187.18 percent.

3.4 Cropping Pattern

Cropping pattern is the proportion of area under different crops at a point of time. It is an important factor to decide the level of investment for different input on farm and income of farmer based on resource availability and climatic condition.

Table 3: Cropping Pattern under different size group of sample farms (Area in ha and %)

S. No.	Name of Crops	Average size of sample farms						Overall average	
		Marginal		Small		Medium			
		Area	%	Area	%	Area	%	Area	%
A. Kharif									
1	Til	0.26	15.77	0.49	15.49	0.75	13.61	0.52	14.45
2	Paddy	0.19	11.09	0.32	9.75	0.64	11.63	0.40	11.00
3	Jwar	0.16	9.71	0.34	10.79	0.37	6.66	0.30	8.27
4	Arhar	0.05	3.18	0.13	4.20	0.43	7.70	0.22	6.09
5	Bajra	0.08	4.86	0.15	4.83	0.27	4.83	0.18	4.83
6	Chari	0.02	0.84	0.08	2.33	0.05	0.96	0.05	1.35
7	Maize	0.02	1.26	0.02	0.82	0.13	2.39	0.27	1.78
	Sub-total	0.78	46.70	1.53	48.20	2.64	47.78	1.74	47.77
B. Rabi									
1	Wheat	0.29	17.63	0.57	17.98	1.08	19.52	0.69	18.82
2	Chickpea	0.28	16.97	0.40	12.59	0.56	10.07	0.42	11.70
3	Mustard	0.06	3.60	0.18	5.74	0.32	5.82	0.20	5.51
4	Potato	0.01	0.24	0.01	0.35	0.01	0.24	0.01	0.27
5	Barley	0.05	2.94	0.10	3.12	0.22	3.85	3.52	0.13
6	Pea	00	-	0.01	0.32	0.03	0.60	0.02	0.44
7	Lentil	0.08	4.98	0.22	6.97	0.35	6.31	0.23	6.34
8	Barseem	00	-	0.01	0.44	0.04	0.71	0.02	0.54
	Sub-total	0.77	46.34	1.51	47.51	2.61	47.12	1.72	47.13
C. Zaid									
1	Moong	0.04	1.92	0.08	2.49	0.16	2.95	0.10	2.68
2	Chari	0.08	5.04	0.06	1.80	0.12	2.15	0.09	2.42
	Sub-total	0.12	6.95	0.14	4.29	0.28	5.10	0.19	5.10
Gran Total(A+B+C)		1.67	100	3.18	100	5.53	100	3.65	100

Figure in parentheses indicate the percentage to the total cropped area.

Table 4: Per farm average investment of assets on different size group of sample farms (Rs.).

S. No.	Particulars	Size of farms			
		Marginal (28)	Small (34)	Medium (38)	Overall average
1.	Buildings	178321.40 (72.99)	352968.40 (69.20)	352968.40 (53.55)	279116.00 (61.17)
2.	Live stock	40378.57 (16.95)	67063.97 (16.38)	59592.11 (9.04)	56752.75 (12.44)
3.	Machinery and Implement	23955.79 (10.06)	59051.56 (14.42)	246510.70 (37.40)	120459.20 (26.40)
	Grand total	238155.80 (100)	409403.80 (100)	659071.20 (100)	456327.90 (100)

3.5 Investment of farm Assets

Investment on farm assets such as farm building, implement and machinery and livestock on marginal, small and medium farms and overall farm are displayed in table 3 on average investment on overall for farm building, implements and machinery and livestock, accountant for 61.17, 26.40 and 12.44 percent respectively for the total farm assets which occurred Rs. 279116.00 (61.17), Rs. 120459.20 (26.40) and

Rs. 56752.75 (12.44) respectively. Similarly per farm investment on implements and machinery also at the position trend with farm size as it increase with increasing the farm size. It was recorded Rs. 23955.79 (10.06), Rs. 59051.56 (14.42) and Rs. 246510.70 (37.40) against marginal, small and medium farm respectively. It is concluded from the table that per farm investment on building and farm machinery had direct relationship with farm size but in case of livestock the investment was higher on marginal farms followed by small and medium size of farm respectively.

4. Structure of cost and Returns

4.1 Cost

Per hectare cost and return from the cultivation was presented for chickpea crop on different categories of farms have been presented in table No. 4. It is obvious from the table that, on overall average per hectare cost of chickpea crop comes to be Rs. 34353.35 per hectare which was maximum to Rs. 31619.09 on marginal farms followed by small and medium farms corresponding to Rs. 34924.74 and Rs. 35856.84 respectively. The cost of expenditure occurred on marginal sample due to more expenditure occurred on human labor and machinery charges as compared to other categories of farms. It was also observed from the table that cost of cultivation showed positive relationship with the size group farms.

4.2 Return

It is observed from the table 5 that per hectare gross income was maximum to be Rs. 55722.00 On marginal farms followed by small and medium farms corresponding to Rs. 57240.00 and Rs. 57780.00 respectively in respect of all farms. Average gross income come to Rs. 22666.81, farm business income Rs. 38929.94, family income Rs. 31298.36 and farm investment income Rs. 30298.39 were also assessed and trend was showing positive relationship in the context of various measures of income with size of farms.

Cost of production per quintal of chickpea was computed to Rs. 2802.07 on overall farms, which varied Rs. 2889.35 Rs. 2839.41 and Rs. 2632.73 on medium, small and marginal size group of farms. Cost of production per quintal had the negative relation with size of farms. Output-input ratio on marginal, small and medium farm was 1:1.76, 1:1.64 and 1:1.61 on cost $C_{3.}$

Table 5: Per hectare cost of different inputs use in chickpea cultivation (Rs.)

S. No.	Particulars	Size group of farms							
		Marginal		Small		Medium		Overall average	
		Rs.	%	Rs.	%	Rs.	%	Rs.	%
A.	Cost expenditure								
1.	Human Labour	7913.29	25.03	8629.41	24.71	9070.85	25.30	8596.64	25.02
a.	Family Labour	5374.71	17.00	4704.38	13.47	4422.38	12.33	4784.91	13.93
b.	Hired Labour	2538.58	8.03	3925.03	11.24	4648.47	12.96	3811.73	11.10
2.	Machinery Power	6836.74	21.62	8261.03	23.65	8379.39	23.37	7907.21	23.02
3.	Seed and showing	3674.71	11.62	3753.00	10.75	3759.03	10.48	3733.37	10.87
4.	Manure and fertilizer	1373.19	4.34	1849.71	5.30	1948.72	5.43	1753.91	5.11
5.	Irrigation	734.19	2.32	877.85	2.51	999.90	2.79	884.01	2.57
6.	Total working capital	15157.40	47.94	18666.62	53.45	19735.51	55.04	18090.22	52.66
7.	Interest on working capital	606.30	1.92	746.66	2.14	789.42	2.20	732.61	2.11
8.	Rental value of land	7500.00	23.72	7500.00	21.47	7500.00	20.92	7500.00	21.83
9.	Interest on fixed capital	106.22	0.34	132.09	0.38	149.82	0.42	131.58	0.38
10.	Sub Total	28744.63	90.91	31749.76	90.91	32597.13	90.91	31290.32	90.91
11.	Managerial Cost@10% of sub-total	2874.46	9.09	3174.98	9.09	3259.71	9.09	3123.03	9.09
Grand Total		31619.09	100	34924.74	100	35856.84	100	34353.35	100

Figures in parenthesis indicate percentage to the grand total.

Table 6: Measures of per hectare cost and return of chickpea (Rs.)

S. No.	Particulars			Size Group of Farms			Overall Average
				Marginal	Small	Medium	
B.	Income						
1	Cost A1/A2			15157.4	18666.62	19735.51	18090.22
2	Cost B1			15263.62	18798.70	19885.33	18221.80
3	Cost B2			22763.62	26298.70	27385.33	25721.80
4	Cost C1			20638.33	23503.092	24307.70	23006.71
5	Cost C2			28744.63	31749.76	32597.13	31230.32
6	Cost C3			31619.09	34924.74	35856.84	34353.35
7	Yield (q/ha.)	(a).	Main Product	12.01	12.30	12.41	12.26
		(b).	By-product	5.59	6.30	6.45	6.16
8	Gross Income (Rs.)	(a).	Main Product	54045.00	55350.00	55845.00	55172.70
		(b).	By Product	1677.00	1890.00	1935.00	1847.46
		(c).	Total	55722.00	57240.00	57780.00	57020.16
9	Net Return over Cost C3			24102.91	22315.26	21923.16	22666.81
10	Family income			32958.38	30941.29	30394.67	31298.36
11	Farm Business Income			40564.60	38573.38	38044.49	38929.94
12	Farm Investment Income			31709.13	29947.35	29572.98	30298.39
13	Cost of Production (q/ha.)			2632.73	2938.41	2889.35	2802.07
			. On the Basis of Cost A1	1:3.68	1:3.07	1:2.93	1:3.18
		(b).	On the Basis of Cost B1	1:3.65	1:3.04	1:2.91	1:3.16

14	Benefit: Cost (B:C) Ratio	(c).	On the Basis of Cost B2	1:2.45	1:2.18	1:2.11	1:2.22
		(d).	On the Basis of Cost C1	1:1.98	1:1.85	1:1.82	1:1.87
		(e).	On the Basis of Cost C2	1:1.94	1:1.80	1:1.71	1:1.83
		(f).	On the Basis of Cost C3	1:1.76	1:1.64	1:1.61	1:1.66

5. Conclusion

The overall size of holding in the study area was 0.81, 1.64 and 3.07 hectare in marginal, small and medium size of farms respectively. Whereas overall average size of holding size was 1.95 hectare. The cropping pattern sown that chickpea was first important crop which covered maximum area 18.82% followed by til 14.45%, Chickpea 11.70%, Paddy 11.00%, Jowar 8.27%, Lentil 6.34%, Arhar 6.09%, Mustard 5.51%, Bajra 4.83%, Barley 3.52% and other crops to gross cropped area (kharif, Rabi & Zaid) respectively.

Cropping intensity decreased with the increase in the size of holding. The maximum total cost was recorded on medium farms Rs. 35856.84 due to heavy expenditure on human labour, machinery charge, seed and rental value of land the per quintal cost of production of chickpea. Overall farms are Rs. 2802.07, cost of production Rs. 2632.73, Rs. 2829.41 and 2889.35 of marginal, small and medium farms respectively. Input-output ratio on the basis of overall 1:1.76, 1:1.64 and 1:1.61 respectively. The cultivation of chickpea was characterized by decreasing returns to scale on each farm situation.

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