LR-4421
[1-7]

RESEARCH ARTICLE Legume Research- An International Journal, Volume Issue : ()

Trends and Economic Analysis of Chickpea (*Cicer arietinum*) Cultivation in India with Special Reference to Haryana

Vijay Kumar, D.P. Malik

10.18805/LR-4421

ABSTRACT

Background: The place of pulses in agricultural production and in human diet is very important. India is a leading pulse growing country in the world. In 2016, India's contribution to world's area was around 38 per cent, whereas in terms of production, it was 23 per cent. The pulses are the essential part of the cropping system in the Indian farming. The CGRs of area and production of pulses showed a positive sign in India however, it indicated declining trend in Haryana. In the study, an attempt has been made to analyse the economics of chickpea *(Cicer arietinum)* in Haryana.

Methods: For the present study, the data were collected from the chickpea growers out of total 161 farm households from 30 clusters out of most growing area in Haryana state following stratified random sampling technique. The cultivation/production cost of chickpea was calculated as per the standard cost concepts framed by Directorate of Economic and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India. In the economic analysis, cost of cultivation, cost of production, costs of various inputs used in production and returns were worked out for different periods from 2004-05 to 2016-17.

Result: The total cost of cultivation worked out was Rs.12163/- and Rs.9241/- for the period x-I (2004-05 to 2007-08) and it touched to Rs. 36036/- and Rs.39207/-per ha in the period x-IV (2014-15 to 2016-17) for India and Haryana, respectively. On an average 74and 42 kg/ha seed; 285 and 292 human labour (man hours) were utilized for cultivation of one hectare unit of land. Out of total human labour, about 50 per cent was contributed by farm family itself. The share of fixed and variable cost to the total cost of cultivation was found 59:41 and 44:56 per cent, respectively for India and Haryana. The net profit of chickpea in the study period increased by three times in India and seven times in Haryana. The value of B-C ratio was found more than one in Haryana and India reveals that chickpea cultivation is profitable entity.

Key words: B-C Ratio, CGR, Chickpea, Costs, Pulses, Returns.

INTRODUCTION

The role of pulses in agriculture as well as in human diet is of immense significance. India is a leading pulse growing country in the world. In 2016, India's contribution to world's area was around 38 per cent, whereas in terms of production, it was 23 per cent (Varma Poornima, 2019). The pulses are the essential part of the cropping system in the Indian farming. The World Food Programme includes 60 grams of pulses in its particular food bask*et al*ong with other cereals, sugar, salt and oil.

The growth trends of area and production of pulses in Haryana was found declining from 1970-71 to 2016-17 (Nimbrayan *et al*., 2019). The area and production of pulses is shrinking over years while area and production under cereals is amassing scenario. The production of total pulses in 2017-18 was 113.80 thousand tonnes from 56.60 thousand ha and out of total pulses, the production of chickpea was 36.40 thousand tonnes from 32 thousand ha of area. Hence, chickpea is one of the major pulse crops in India as well as Haryana. Chickpea is also known as Bengal Gram and Gram. Chickpea occupies 56.53 per cent of pulse area and contributes 64.31 per cent of total pulse production in Haryana. Chickpea is used for human consumption as well as feed for animals. In India during 2016-17, the area and production for overall food grains increased by 5.27 and 32.15 per cent to 2005-06 respectively (Catherin Mehla, and Jose Paul, 2018). India is the largest producer and consumer of pulses in the world, accounting for about 25% of global production, 27% of consumption and 34% of food use (Qasim *et. al.* 2020). During 2017-18, a total of 25.23 million tonnes pulses were produced from 29.99 million ha. Out of total pulses production, a total of 112.29 lakh tonnes chickpea was produced from 105.61 lakh ha area which accounted for 35. 21 per cent and 44.50 per cent of area and production of total pulses, respectively. Kumar Vijay and Dutt Ishwar (2019) reported that the highest per capita availability of pulses in 1971-72 was 51.22 grams per day and the lowest was in 1980-81 *i.e* 30.90 grams per day but increased to 43 grams per day in 2016-17. Kumar *et al.* (2018) analysed that 36 per cent of identified farmers reported non-availability of high yielding varieties of pulse

Department of Agricultural Economics, College of Agriculture, CCS Haryana Agricultural University, Hisar-125 004, Haryana, India.

Corresponding Author: Vijay Kumar, Department of Agricultural Economics, College of Agriculture, CCS Haryana Agricultural University, Hisar-125 004, Haryana, India. Email: v_jay1977@yahoo.com

How to cite this article: Kumar, V. and Malik, D.P., Trends and Economic Analysis of Chickpea (*Cicer arietinum*) Cultivation in India with Special Reference to Haryana. Legume Research. ():

Submitted: 18-05-2020 **Accepted:** 16-06-2020 **Published:** 10-11-2020

crops. Keeping in view, above facts, the study was conducted with the objectives i) to study the present status of total pulses vs. chickpea production in India and Haryana and ii) to analyse the economic indicators for chickpea production in Haryana.

MATERIALS AND METHODS

For the present study, the data were collected from the 161 farm households from the chickpea growing districts of Haryana following stratified random sampling technique. The cultivation/production cost of chickpea was calculated as per the standard cost concepts framed by Directorate of Economic and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India. The cost of cultivation (C_2) covers not only paid out costs (A_1) but also imputed value of owned assets including rental value of owned land, family labour and interest on owned fixed capital for which the farmers do not incur cash expenses.

The paid out costs *i.e*. Cost A_1 included hired labour (human, animal and machinery), maintenance expenses (Owned animals and owned machinery), Expenses on material inputs such as seed (home grown and purchased), fertilizer, manure (owned and purchased), pesticides and irrigation, depreciation on implements and farm buildings, land revenue, rent paid for leased-in land, interest on working capital *etc*. The other cost concepts used in analysis were as under:

Cost A_2 : Cost A_1 + rent paid for leased in land.

Cost B_1 : Cost A_1 + interest on value of owned fixed capital assets (excluding land).

Cost B_2 : Cost B_1+ rental value of owned land (net of land revenue) and rent paid for leased-in land.

Cost C_1 : Cost B_1 + imputed value of family labour.

Cost C_2 : Cost B_2 + imputed value of family labour.

Cost C_2* : Cost C_2 adjusted to take into account valuation of human labour at market rate or statutory minimum wage rates whichever is higher.

Cost C_3: Cost C_2* + management Cost at 10 per cent of total cost (C2*).

Economic Indicators: Input and Output variables.

The relationship between cost and benefits or expenditure and income may be explained using the following formulas-

1. Operational Cost Ratio: $\frac{\text{Variable Cost}}{\text{Gross Income}}$

2. Fixed Cost Ratio: $\frac{\text{Fixed Cost}}{\text{Gross Income}}$

3. Gross Cost Ratio: $\frac{\text{Gross Cost}}{\text{Gross Income}}$

4. Input-Output Ratio: $\frac{\text{Gross Income}}{\text{Gross Cost}}$

5. Benefit-Cost Ratio: $\frac{\text{Net Income}}{\text{Gross Cost}}$

RESULTS AND DISCUSSION

Pulses scenario in India and Haryana

The compound growth rates (CGRs) showed positive trend in respect of area, production and yield of pulses in India with 0.14, 1.09 and 0.97 per cent, respectively for the period 1970-71 to 2016-17 (Table 1). The coefficient of variation (CV) of pulses remained 6.45, 20.18 and 15.33 for area, production and yield, respectively. In Haryana, the CGRs calculated for pulses was found to be -5.56, -4.51 and 0.64 per cent, respectively for area, production and yield, exhibited declining trend in area and production and marginal increase in yield.

In 2004-05, a total of 176.20 thousand ha area was cropped under pulses out of which a total of 134.90 thousand

Measurements of inputs used	Measurements of output
Human Labour	Yield {Total Volume of Output/ Area under cultivation}
Rental Value	Yield gap {Difference between the potential yield and actual yield}
Seeds, manures, fertilizers, pesticides and weedicides.	Revenue {The amount of produce that farmer gets through sale}
Irrigation Charges	Gross Income {Sum of gross sale value of main produce, by product and retained product at home}
Permanent hired labour cost	Cash Income {Cash receipt from farm sales and from hiring out of the resources available at farm}
Transportation cost from farmyard to home	Net Operating Income {Gross Income – (Operating Expenses + Depreciation on working assets.)}
Carrying and storage cost	Net farm Income {Net operating Income – (Fixed Expenses + Dep. On fixed assets)}
Maintenance Cost	Net Family Income {Net farm Income +Off farm Income}
Land Revenue	Net Income {Gross Income – Gross Cost (excluding imputed value of family labour)}
Depreciation	Net Profit {Gross Income – Gross Cost (including imputed value of family labour)}
Interest on working capital	

tonnes of pulses was produced. After analysis, it was observed that since 2004-05, there was much fluctuation in area cropped under pulses. The maximum impact was in the year 2013-14, which shows the growth of the area under pulses was 39.84 per cent from the previous year and in the year 2012-13 the area was decreased up to 38.28 per cent from the area of previous year. In the similar way, the higher positive change in production of the total pulses was recorded in the year 2012-13 and highest negative change in 2013-14, which showed 175 per cent growth and 68.21 per cent decline in the production of pulses, respectively (Fig 1). The decline in area and production of pulses particularly in the years 2012-13 and 2013-14 owing to long dry spell as pulses are mainly cultivated in rainfed conditions.

Status of chickpea production in India and Haryana

Chickpea is a major pulse crop in India accounting about 40 per cent of the total area and production of pulses. From an area of 5.19 million ha, the production of chickpea was 3.86 million tonnes with steady growth up to 2017-18 *i.e*. 11.23 million tonnes production from 10.57 million ha of area. In 2004-05, chickpea contributed 67 per cent in production and 61 per cent in area of the total pulses; however, the share remained only 32 per cent in production and 57 per cent in area during 2017-18 in Haryana as area under mungbean increased over the years. Fig 2 indicates the per cent change in area and production of chickpea in Haryana.

Cost and Return analysis of chickpea

The Cost analysis of India and Haryana as presented in Tables 2 and 3 reveals that the total cost (Cost C_2) worked out to Rs. 36036/ ha and Rs. 39207/ha; Cost A_1 contributed to Rs. 18365/ha (51 %) and Rs. 13852/ha (35%), respectively for the period 2014-15 to 2016-17 (x-IV). In India, out of Cost C_2, seed constituted 13 per cent followed by hired human labour (12%), mechanical hired labour (10%), fertilizers and manures (5%), irrigation (3%) and plant protection (2%) and in Haryana hired human labour constituted 15 per cent followed by mechanical hired labour (7%), seed (6.9%), irrigation charges (1.5%) and plant protection (0.5%). The yield of chickpea obtained was found to be 1050 kg/ha and 1090 kg/ha, where the per quintal cost of production worked out to Rs.3499/ha and Rs. 3514/ ha against minimum support price (MSP) of Rs.3650 and Rs.3233/quintal for India and Haryana, respectively.

As per analysis, in overall India, Cost C_2 for the period $\overline{X}$-I, $\overline{X}$-II, $\overline{X}$-III and $\overline{X}$-IV worked out to Rs.12163, Rs. 17402,

Table 1: Area, production and yield of pulses in India vis-à-vis Haryana (1970-71 to 2016-17).

Particular	Area (000, ha)			Production (000, tonnes)			Yield (kg./ha)		
	CV (%)	CGR (%)	R^2	CV (%)	CGR (%)	R^2	CV (%)	CGR (%)	R^2
India	6.45	0.14	0.87	20.18	1.09	0.62	15.33	0.97	0.76
Haryana	71.16	-5.56	0.87	75.62	-4.51	0.55	22.50	0.64	0.76

Source: Nimbrayan, *et al.,* (2019).

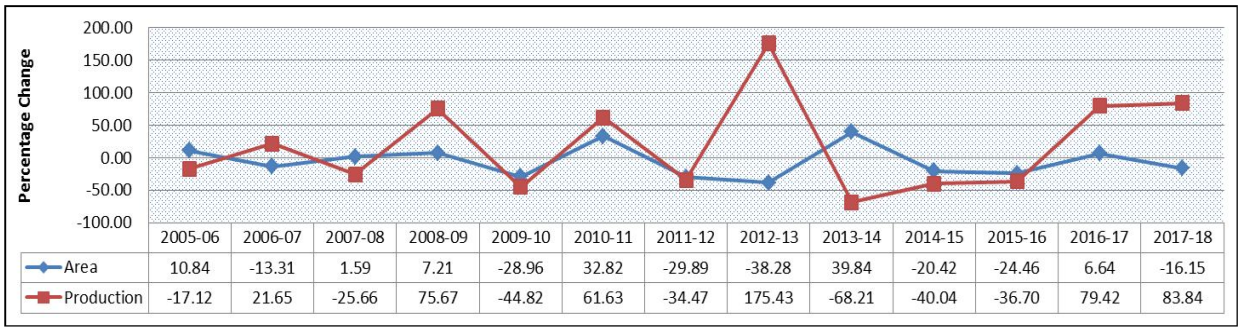

Fig 1: Per cent change in area and production of pulses in Haryana.

Fig 2: Per cent change in area and production of chickpea in Haryana.

Table 2: Cost of cultivation/production of chickpea in India and Haryana.

S. No	Items ↓	Year* →	India				Haryana			
			$\bar{X}$-I	$\bar{X}$-II	$\bar{X}$-III	$\bar{X}$-IV	$\bar{X}$-I	X-II	X-III	X-IV
I-1.1	Cost of Cultivation	A1	6010	8698	14366	18365	3884	4211	9261	13852
1.2	(Rs./Hectare)	A2	6047	8897	14383	18741	3884	4211	9261	13852
1.3		B1	6843	9980	16430	20730	4519	5929	12545	16319
1.4		B2	10839	15223	24140	31293	7802	10270	20408	31287
1.5		C1	8167	12159	19833	25473	5958	9481	17756	24239
1.6		C2	12163	17402	27544	36036	9241	13823	25618	39207
1.7		C2 Revised	12258	17613	27678	36406	9535	14060	25881	39207
2.1	Cost of Production	A1	753	888	1530	1829	998	855	1112	1221
2.2	(Rs./Qtl)	A2	757	902	1532	1859	998	855	1112	1221
2.3		B1	858	1027	1749	2064	1143	1098	1513	1461
2.4		B2	1307	1534	2535	3022	1741	1773	2506	2790
2.5		C1	1041	1277	2123	2540	1523	1716	2198	2185
2.6		C2	1491	1785	2909	3499	2120	2391	3191	3514
2.7		C2 Revised	1507	1804	2923	3536	2209	2432	3216	3514
2.8		C3	1658	1984	3216	3890	2430	2675	3537	3865
3	Value of Main Product (Rs./Ha)		**17028**	**21624**	**31230**	**49664**	**10262**	**12683**	25508	**54711**
4	Value of By- Product (Rs./Ha)		**785**	**1082**	**1512**	**1921**	**982**	**1751**	2709	**2856**
5	Derived Yield (Qtl./Ha)		8.2	**9.6**	**9.3**	**10.5**	**4.8**	**5.2**	**7.4**	**10.9**
6	Break-Up Human Labour hours:-									
6.1	Family		155	143	145	144	110	132	130	149
6.2	Attached		10	3	6	7	9	0	0	26
6.3	Casual		113	144	142	134	21	19	73	118
6.4	Total		**278**	**289**	**293**	**285**	**140**	**151**	**203**	**292**

Year*: $\bar{X}$-I (Avg. of 2004-05, 2006-07 to 2007-08), $\bar{X}$-II (Avg. of 2008-09 to 2010-11), $\bar{X}$-III (Avg. of 2011-12 to 2013-14) and $\bar{X}$-IV (Avg. of 2014-15 to 2016-17).

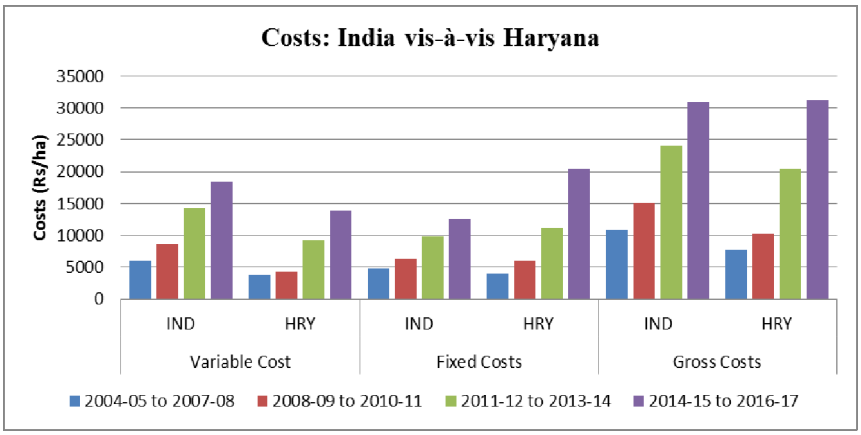

Fig 3: Costs incurred for chickpea cultivation India vis-à-vis Haryana.

Rs.27544 and Rs.36036, respectively. The yield varied from 8.2 quintal/ha in $\bar{X}$-I (2010-11 to 212-13) to 10.5 quintal/ha in $\bar{X}$-IV (2014-15 to 2016-17). In Haryana, Cost C_2 for the period $\bar{X}$-I, $\bar{X}$-II, $\bar{X}$-III and $\bar{X}$-IV worked out to Rs.9241, Rs. 13823, Rs.25618 and Rs.36036, respectively and the yield ranged from 4.8 quintal/ha in $\bar{X}$-I (2010-11 to 212-13) to 10.9 quintal/ha in $\bar{X}$-IV (2014-15 to 2016-17).

Table 4 revealed that the gross cost incurred on chickpea cultivation was higher in Haryana (Rs. 31287/-) than that of in India (Rs.30918/-) during 2014-15 to 2016-17 ($\bar{X}$-IV). During the same period, the contribution of variable and fixed cost to the gross cost was 59:41 and 44:56, respectively for India and Haryana. Fig 3 indicates the variable cost vs. fixed cost vs. gross cost for chickpea cultivation in India and Haryana. The gross cost for cultivation of chickpea during period $\bar{X}$-IV increased by four times in Haryana but it remained twice in India than that of period $\bar{X}$-I. Similarly, the net profit displayed three times increase in India but in Haryana, it has been recorded seven times. The net profit worked out was Rs. 25410 and Rs.

Table 3: Item wise Breakup of Cost of Cultivation (Rs. per ha).

S.No	Items↓ Year* →	India				Haryana			
		$\bar{X}$-I	$\bar{X}$-II	$\bar{X}$-III	$\bar{X}$-IV	$\bar{X}$-I	$\bar{X}$-II	$\bar{X}$-III	$\bar{X}$-IV
1	**Operational Cost**	**7102**	**10572**	**17456**	**22689**	**5196**	**7610**	**14249**	**21589**
1.1.1	Human Labour Family	1324	2179	3404	4743	1439	3552	5211	7920
1.1.2	Attached	83	36	136	247	134	0	0	1128
1.1.3	Casual	893	1922	3201	4159	337	542	3149	4588
1.1.4	**Total**	**2300**	**4137**	**6741**	**9149**	**1909**	**4094**	**8360**	**13635**
1.2.1	Animal Labour Hired	165	257	156	216	2.8	17.7	54.3	0.0
1.2.2	Owned	521	498	587	715	320	256	131.6	6.9
1.2.3	**Total**	**686**	**755**	**743**	**932**	**323**	**274**	**186**	**6.9**
1.3.1	Machine Labour Hired	1038	1729	2970	3558	1188	1090	2102	2902
1.3.2	Owned	130	192	315	405	508	766	787	1098
1.3.3	**Total**	**1169**	**1920**	**3286**	**3963**	**1696**	**1856**	**2889**	**4000**
1.4	Seed	1793	1963	3279	4658	994	1009	1438	2709
1.5.1	Fertilizer and Manure Fertilizer	411.0	634.1	1286.5	1543.0	99.9	31.5	390.5	72.5
1.5.2	Manure	11.2	36.3	172.6	111.1	0.0	0.0	0.0	0.0
1.5.3	**Total**	**422**	**670**	**1459**	**1654**	**100**	**32**	**391**	**72**
1.6	Insecticides	182	386	596	697	0	6	18	182
1.7	Irrigation Charges	375	484	920	1074	61	216	692	569
1.8	Miscellaneous	0.7	2.1	5.6	18.6	0.0	0.0	0.0	0.0
1.9	Interest on Working Capital	175	254	426	544	114	123	274	414
2	Fixed Costs	5060	6830	10087	13347	4045	6213	11370	17617
2.1	Rental Value of Owned Land	3959	5045	7693	10188	3283	4341	7863	14968
2.2	Rent Paid For Leased-in-Land	36.6	198.5	17.6	375.3	0.0	0.0	0.0	0.0
2.3	Land Revenue, Taxes, Cesses	11.2	10.8	8.2	12.5	0.0	0.0	0.0	0.0
2.4	Depreciation on Implements and Farm Building	220	295	305	407	126	153	224	182
2.5	Interest on Fixed Capital	833	1282	2064	2365	635	1719	3283	2468
3	**Total Cost [11+12]**	**12163**	**17402**	**27544**	**36036**	**9241**	**13823**	**25618**	**39207**

Year*: $\bar{X}$-I (Avg. of 2004-05, 2006-07 to 2007-08), $\bar{X}$-II (Avg. of 2008-09 to 2010-11), $\bar{X}$-III (Avg. of 2011-12 to 2013-14) and $\bar{X}$-IV (Avg. of 2014-15 to 2016-17).

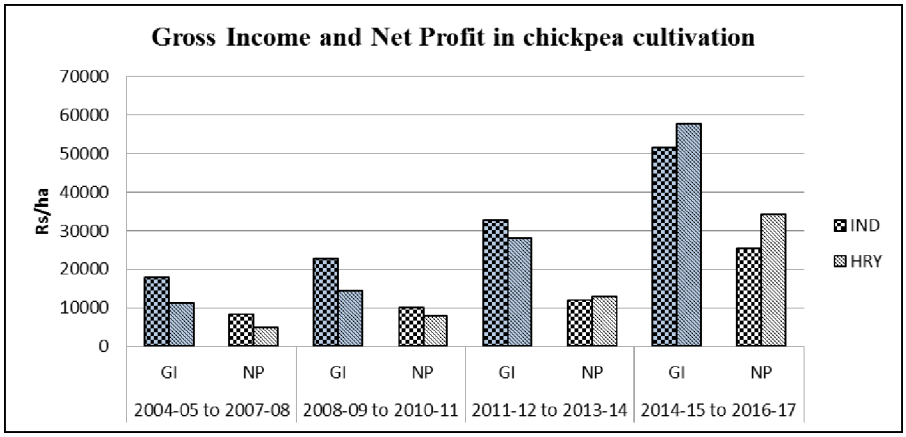

Fig 4: Analysis of profitability of chickpea in India vis-à-vis Haryana.

34199/ha, respectively in India and Haryana during 2014-15 to 2016-17 (Fig 4).

Benefit-Cost ratio and other economic indicators

The Benefit-Cost (B-C) ratio for the cultivation of chickpea was worked out from 2004-05 to 2016-17 by taking mean of three consecutive years *i.e.* $\bar{X}$-I, $\bar{X}$-II, $\bar{X}$-III and $\bar{X}$-IV. The economic analysis showed that B-C ratio was found more in Haryana than India. Table 5 indicates the various economic indicators for chickpea cultivation in India as well as Haryana. It specifies the operational cost ratio, fixed cost ratio, gross cost ratio, input-output ratio and Benefit-Cost ratio in per cent.

Table 4: Costs incurred and Returns for chickpea cultivation in India vs. Haryana.

↓Description	India				Haryana			
Period→	$\bar{X}$-I	$\bar{X}$-II	$\bar{X}$-III	$\bar{X}$-IV	$\bar{X}$-I	$\bar{X}$-II	$\bar{X}$-III	$\bar{X}$-IV
Variable Cost	6010	8698	14366	18365	3884	4211	9261	13852
Fixed Cost	4792	6327	9757	12553	3918	6060	11146	17436
Gross Cost	10802	15025	24122	30918	7802	10270	20408	31287
Gross Income	17813	22706	32742	51584	11244	14434	28217	57567
Net Operating Income	11803	14007	18377	33219	7359	10223	18956	43715
Net Farm Income	7231	7975	8925	21074	3568	4317	8033	26461
Net Family Income	7231	7975	8925	21074	3568	4317	8033	26461
Net Profit	8335	9859	12024	25410	4880	7716	13020	34199
Net Income	7011	7681	8620	20667	3441	4163	7809	26280

Table 5: Economic indicators and Benefit–Cost ratio for chickpea cultivation in India vs. Haryana. (Ratio in per cent)

↓Description	India				Haryana			
Period→	$\bar{X}$-I	$\bar{X}$-II	$\bar{X}$-III	$\bar{X}$-IV	$\bar{X}$-I	$\bar{X}$-II	$\bar{X}$-III	$\bar{X}$-IV
Operational Cost Ratio	34	38	44	36	35	29	33	24
Fixed Cost Ration	27	28	30	24	35	42	40	30
Gross Cost Ratio	61	66	74	60	69	71	72	54
Input Output Ratio	165	151	136	167	144	141	138	184
Benefit-Cost Ratio	77	66	50	82	63	75	64	109

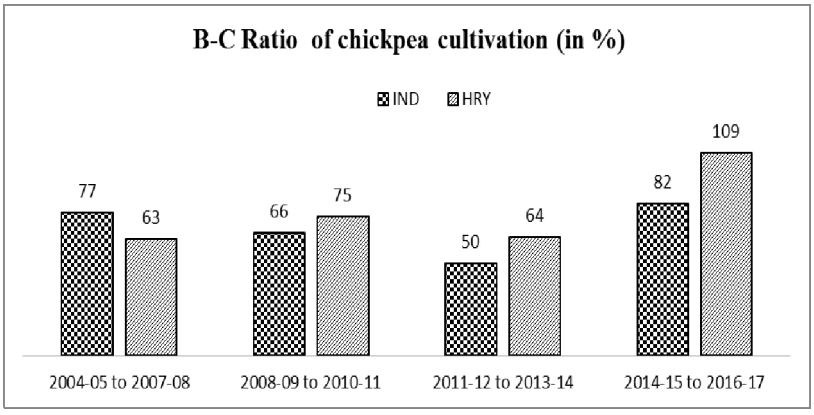

Fig 5: B-C Ratio of chickpea cultivation in India and Haryana.

The higher B-C ratio for chickpea cultivation was found in the period $\bar{X}$-IV (2014-15 to 2016-17) *i.e*. 1.82 and 2.09, respectively for India and Haryana indicating higher profitability. Fig 5 presents the Benefit-Cost Ratio of chickpea cultivation in India vis-à-vis Haryana.

Constraints in chickpea production

The production of chickpea especially in Rainfed Rice Fallow Lands is affected a number of technical constraints which cause pre and post-harvest losses in chickpea. In abiotic constraints, low moisture content in the soil after rice harvest, low and depleting water table due to over exploitation of ground water for production of water intensive crops such as wheat, mustard and vegetables. In biotic constraints, most of the chickpea varieties are subjected to heavy losses due to attack by insect-pests, diseases, stray animals and birds. Maximum economic losses were caused by pests like *Helicoverpa Bruchid* and wilt/collar rot diseases (Pande *et. al.,* 2012). The available data demonstrates the diminishing trend in area and production of total pulses especially in Haryana. Kumar *et al*. (2018) reported that out of 90 chickpea cultivators , 66.39 per cent farmers had inadequate knowledge of recommended packages and practices, 64.49 per cent reported unfavourable weather condition, followed by insufficient quality water for irrigation, lack of knowledge of latest production technology, upset due to low productivity, non-availability of HYVs seed, inadequate credit, shortage of labour and poor quality of land to the tune of 60.71, 55.53, 44.46, 37.95, 36.76, 22.04 and 18.74 per cent, respectively.

CONCLUSION AND SUGGESTION

In India, share of the pulses to the total food grains was 23.12 per cent in area and 8.77 per cent in production during 2016-17 and the contribution of chickpea in pulses of India was 36.01 per cent in area and 45.53 per cent in production.

Haryana being agriculturally advanced State in India, the pulses production is falling over years due to expanded irrigation facilities and profitability of fine cereals, oilseeds, cotton and sugarcane over pulses. The production of total pulses decreased considerably in 2016-17 by 15.64 per cent from 2004-05. Out of total pulses production, the share of chickpea production is 43.46 per cent. The production of chickpea also decreased by 49 per cent in 2017-18 when compared to year 2004-05.

The per hectare cost of cultivation of chickpea showed increasing trend from 2004-05 onward and the cost of production was increased by 2.3 times in India and 1.6 times in Haryana during period $\bar{X}$-I to $\bar{X}$-IV owing to escalation in prices of inputs (seed, chemical fertilizers), labour charges, rental value of land *etc*. Hired human labour and seed were the main inputs accounting 7 to 10 per cent of the total cost of cultivation. The total cost in Haryana increased more as compared to India owing to use of quality seed and adoption of improved production technologies. The economic analysis of chickpea also indicated higher net profit and B-C-Cost ratio in Haryana against India.

The decline in the area and production of chickpea in Haryana is matter of great apprehension. As per studies conducted earlier, the most represented reason is the unawareness of the farmers regarding latest technologies, inadequate availability of HYVs seed and low profitability. Regarding technical constraints under abiotic constraints, low moisture content and attack of Helicoverpa and Bruchid insects and wilt/collar rot diseases under biotic constraints affected the production up to a large extent. To address the above constraints, extension services should be geared up to disseminate information about recent technologies. Seed production of promising cultivars should be initiated to improve availability of quality seed. Cultivation of chickpea should be encouraged on better quality land to harvest potential yield. New varieties to be developed for low moisture and having tolerance to pests and diseases for higher production of chickpea in Haryana as well India.

REFERENCES

Catherin Mehala Mary, R.M. and Jose Paul, P.C. (2018). Performance of food grains production in India. EPRA International Journal of Economic and Business Review. 6(8): 47-50.

Kumar, *et al* (2018). Constraints in the production and marketing of pulses in Haryana. Int. J. Pure App. Biosci. 6(2): 1309-1313.

Kumar, Vijay and Dutt Ishwar (2019). Time series change in pulse scenario in India with special reference to Haryana. Legume Research-An International Journal. 42(2): 228-232.

https://www.sciencedirect.com/topics/food-science/cereal-grain-proteins.

Nimbrayan *et al* (2019). Trends and growth rate analysis of pulses in Haryana vis-à-vis India. Journal of Pharmacognosy and Phytochemistry. 8 (1): 1724-1729.

Pande S, Sharma M, Ghosh R, Rao SK, Sharma RN and Jha AK. (2012). Opportunities for Chickpea Production in Rainfed Rice Fallows of India-Baseline Survey Report. Grain Legumes Program Report No. 1. Patancheru, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 56 pp.

Pocket Book of Agricultural Statistics (2017). Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, GOI.

Pulses Revolution from Food to Nutritional Security (2018). Crop Division, Govt. of India, Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Cooperation and Farmers Welfare, Krishi Bhawan, New Delhi.

Qasim, A., Kumar, V. and Mehta, V.P. (2020). Structural Dynamics of Agri-Import-Export of Pulse Crops to the Total Agriculture Trade in India. Legume Research-An International Journal. DOI No. 10.18805/LR-4349.

Statistical Abstract of Haryana (Various Issues), Department of Economic and Statistical Analysis, Govt. of Haryana.

Varma, P. (2019). Production, markets and trade: A detailed analysis of factors affecting pulses production in India. Centre for Management in Agriculture, IIM, Ahmedabad-380015. www.mospi.nic.in.