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Chickpea (*Cicer arietinum* L.) Scenario in India and South Eastern Rajasthan: A Review

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A B S T R A C T

Chickpea is the one of the major pulse crop worldwide with multifarious role in human health and nutrition, improving soil health and fertility, crop rotation and agricultural sustainability. The demand of pulses in general and chickpea in particular is increasing with the increasing population. This paper aims to discuss the present scenario of chickpea cultivation in India and South Eastern Rajasthan to emphasize the integrated approach for raising production and productivity of chickpea in the country.

Introduction

Indian agriculture is diverse in nature in terms of agro-ecology and natural resource availability. Self sustainable agriculture systems have evolved with time by integration of pulses as they enrich the soil through symbolic nitrogen fixation from atmosphere. Role of pulses in Indian agriculture, food and nutrition is well known as these crops fit well in crop rotation models; being rich in protein and some of the essential amino acids, acts as a major source of protein to the predominantly vegetarian population of the country. Chickpea is second most important pulse crop worldwide; it is second in area and third in production. The crop meets up to 80% of the soil's nitrogen needs, so farmers have to apply less nitrogen fertilizer than they do for other non-legume crops. The present paper aims to discuss the scenario of chickpea cultivation in India, Rajasthan state and south eastern Rajasthan (humid south eastern plain zone or zone V) in order to understand the various factors affecting chickpea production and productivity.

Chickpea is classified into *desi* (chromosome number 2n = 14, 16) and *kabuli* chickpea (chromosome number 2n = 16). The *desi* type however, is more prominent – it accounts for close to 80-85% and the *kabuli* type around 15-20% of the world's total production. India

produces mostly the *desi* type chickpeas. It is generally grown under rainfed conditions or in the drier areas of the country as they are best suited for its production but however, gives good returns in irrigated conditions as well. It is best suited to areas having moderate rainfall of 60-90 centimetres per annum, excessive rains after sowing or at flowering and fruiting or hailstorms at ripening cause heavy loss. India is a premier pulse growing country. The domestic demand of chickpea is so huge that inspite of being the largest producer of chickpea, India is also the largest importer of chickpea in the world. The countries which exports chickpea to India are Canada, Australia, Iran, Myanmar, Tanzania, Pakistan, Turkey, France. India also exports chickpea to nations like USA, UK, Saudi Arabia, UAE, Sri Lanka and Malaysia.

The share of chickpea to the total pulses in the country, in terms of area has increased from 29 to 39 percent while in terms of production; it has increased from 42 to 50 percent in last ten years (2004-04 to 2013-14). While there has been a steady increase in area; but fluctuation in production during this decade.The increase in area of the total pulses has been only 9.89 percent while the increase in area of chickpea has been around 48 percent.

The increase in production of total pulses has been around 32 percent while the increase in production of chickpea has been around 74 percent during this period. This quantum increase in area and production of chickpea as compared to total pulses highlights the importance of the crop with respect to pulses as a whole. Inspite of the fluctuation in production, the productivity of chickpea has always been higher than the productivity of all the pulses. Madhya Pradesh contributes highest (39%), followed by Maharashtra (14%), Rajasthan (14%), Andhra Pradesh (10%), Uttar Pradesh (7%), Karnataka (6%) and other remaining states & UTs of India (10%) to the total chickpea area and production.

Indian Scenario: Since chickpea is the most important pulse crop of India, therefore, a positive association also seems to exist between the production of total pulses and chickpea. Whereas, the production of pulses as well as chickpea has shown an increasing trend during the years 2004-05 to 2006-07, the production of total pulses as well as chickpea has decreased during the years 2011-12 and 2014-15. Excluding the two years i.e., 2007-08 and 2008-09, the production of total pulses and chickpea has been in the same direction during the years 2004-05 to 2006-07 (positive / increase) and from 2009-10 to 2014-15 (either positive/increase or negative/decrease).

The area of chickpea under irrigation in the country has been much higher than the irrigated area under total pulses during the past years. This may account for the higher productivity of chickpea as compared to the total pulses. The highest chickpea area under irrigation is in Madhya Pradesh (53%) followed by Rajasthan (34%) which again may be the contributing factor for highest production of chickpea in these two states.

Inspite of being the most important pulse crop, the seed replacement rate of chickpea in India has been observed to be lowest among all the pulses while the seed replacement rate of pigeonpea has always been higher than rest of the pulses.

Seed Replacement Rate (SRR) has gone high due to proactive efforts and various seed related programmes after 2014-15 in most of the pulses. The targeted SRR of 33% for self-pollinated crops was not only achieved, but also increased with a number of HYVs in the seed chain. The details of SRR is given below (Table-3).

The per capita availability of chickpea per

annum has increased from 2.9 kg per year to 5.6 kg per year during the last decade. It is noteworthy that out of the per capita availability of total pulses, the percent share of chickpea alone had been from 25 to 36 percent, while its share in total foodgrains availability ranges merely between 1.9 to 3.2 percent.The present per capita availability of India is 41.9g/day (15.3 kg/year), while World Health Organization recommendation is 53 g/day/capita (19.3 kg/year) (Anonymous 2012), therefore, increasing protein availability through increased pulses production is the way out.

It is remarkable to observe that whenever the total rainfall in a particular year was higher than the average rainfall, the production of pulses and chickpea has also increased significantly. There was around 34 percent increase in production of pulses and chickpea, respectively, when there was an increase of 30 percent in annual rainfall in the year 2003-04, 24 and 9.89 percent increase in the production of pulses and chickpea, respectively, when there was 24 percent increase in the total rainfall in the year 2010-11. Similarly in the year 2013-14 also, production of pulses and chickpea increased nearly by 5 and 8 percent when there was 17 percent increase in the total rainfall. It implies that although the maximum area under chickpea cultivation in the country is under rainfed conditions but it seems that pulses as well as chickpea responds well to ample availability of water, may be under critical stages of crop growth and seed setting.

Relationship between actual rainfall (X) and chickpea yield (kg/ha) (Y)

Simple correlation coefficients (r) were computed to study the relationship between chickpea yield and actual rainfall data (2001-02 to 2013-14)(Table5; Fig 1). It is clear from the data that seed yield was significantly and positively correlated with rainfall (R=0.215). The regression coefficients (b) and regression equations were also worked out to quantify the amount of change in seed yield of chickpea for a unit change in rainfall. Result showed that every unit increase in rainfall increased the seed yield of chickpea by 0.351 kg/ha(Y=276.3+0.351X).

Pigeonpea and chickpea are known as kings of pulses as they together contribute 64% to total pulses production. Generally, the mojor pest *Helicoverpa armigera* and disease Fusarium *wilt* in pigeonpea and chickpea causes 20-40 % loss to productivity. Therefore, it's essential to intensify research work for developing pest/disease resistant varieties for harvesting high yields.

Chickpea tends to be sensitive to high temperature during the growth and reproductive stages. As the global temperature is rising gradually, therefore, improving heat tolerance in chickpea for enhancing its productivity in warm growing conditions and mitigating impact of climate change becomes a prime concern of the researchers. Many high yielding varieties of chickpea with other desirable traits like disease and insect pest resistance have been developed in the last decade. The seed production programme of these varieties is regularly being taken up as per the annual indent allotted by the Government of India. The major high yielding varieties presently under seed chain procuring highest indent are JAKI 9218, JG 11,Vijay, JG 14, GNG 1581, RVG 203 and GNG 2144 etc. The following varieties have contributed significantly in increasing pulse production in recent times.

JAKI 9218- suitable for cultivation in rainfed conditions, medium large seeded variety

Vijay (Phule G 81-1-1) – suitable for cultivation in rainfed conditions, spreading

type growth habit, small seeds
RSG 974-suitable for cultivation insuitable for cultivation in rainfed and late sown conditions, resistant to wilt
JG 11-suitable for cultivation in irrigated and rainfed conditions, semi spreading, large pods and seeds
JG 14- heat tolerant variety suitable for late sown conditions
JG 63- suitable for cultivation in rainfed and irrigated conditions, semi spreading with profuse branching
JG 130-suitable for cultivation in rainfed and irrigated conditions, semi spreading, profuse branching, medium tall plant
GNG 1581-suitable for cultivation in normal sown and irrigated, medium plant height, semi erect
RVG 201-suitable for cultivation in irrigated conditions, early maturing, moderately resistant against wilt
RVG 203-suitable for cultivation in irrigated and late sown conditions, moderately resistant against wilt and dry root rot
GNG 2144-suitable for cultivation in irrigated and late sown conditions, tolerance against wilt
GNG 2171-suitable for cultivation in irrigated conditions, tolerance against wilt

As the major area under chickpea is rainfed, hence apart from yield, the desirable characteristics of these leading varieties such as spreading / semi spreading growth habit for suitability for rainfed ecologies, heat tolerance, wilt resistance etc. make them highly indented varieties of the country.

Table.1 Area, production and yield of total pulses and chickpea in India

Year	Total Pulses			Chickpea			% share	
	A	P	Y	A	P	Y	A	P
2004 - 05	22.76	13.13	577	6.71	5.47	815	29	**42**
2005 - 06	22.39	13.39	598	6.93	5.60	808	31	**42**
2006 - 07	23.76	14.20	598	7.63	6.33	830	32	**45**
2007 - 08	23.81	14.76	620	7.58	5.75	759	32	**39**
2008 - 09	22.99	14.57	638	7.89	7.06	895	34	**48**
2009 - 10	23.35	14.66	625	8.17	7.48	915	35	**51**
2010 - 11	26.28	18.24	689	9.19	8.22	895	35	**45**
2011 - 12	24.46	17.09	699	8.32	7.70	912	34	**45**
2012 - 13	23.47	18.34	750	9.51	8.83	929	41	**48**
2013 - 14	25.26	19.25	764	9.93	9.53	960	39	**50**
2014 - 15	23.55	17.15	728	8.25	7.33	889	35	**43**
2015 - 16	24.91	16.35	656	8.39	7.06	840	34	**43**
2016 - 17	29.44	23.13	786	9.63	9.38	974	33	**40**
2017 - 18	**31.11**	**24.51**	**788**	**10.76**	**11.16**	**1037**	**34**	**45**

Area: m. ha. Production: m. tons Yield: kg/ha
Source: Project Coordinator Report2017-18, AICRP on Chickpea, ICAR-IIPR, Kanpur (U.P.)

Table.2 All India Yield of Total Pulses and chickpea along with Coverage under Irrigation

Year	Total Pulses		Chickpea	
	Yield (Kg/Hectare)	Area under Irrigation (%)	Yield (Kg/Hectare)	Area under Irrigation (%)
2000-01	544	12.5	744	**30.9**
2001-02	607	13.3	853	**30.4**
2002-03	543	14.4	717	**32.1**
2003-04	635	13.6	811	**31.0**
2004-05	577	13.9	815	**31.4**
2005-06	598	15.0	808	**31.1**
2006-07	612	15.4	845	**31.7**
2007-08	625	16.2	762	**34.1**
2008-09	659	16.0	895	**33.6**
2009-10	630	16.2	915	**32.2**
2010-11	691	14.8	894	**29.7**
2011-12	699	16.1	928	**33.5**
2012-13	789	-	1036	-
2013-14*	**764**	-	**967**	-

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation

Table.3 Crop-wise & Year-wise SRR (SRR Percent)

Crop	2014-15	2015-16	2016-17
Urd	30	34	38
Moong	24	31	34
Arhar	41	45	48
Pea	34	30	30
Gram	25	28	32
Lentil	31	27	35

Source: Seed Division, Min. of Agri. & FW (DAC&FW)

Table.4 Per Capita Net Availability of Food grains (per Annum) in India as on 6 March 2014 (Kg per year)

Year	Gram	Pulses	Food grains	% share of gram in total pulses	% share of gram in total Food grains
2001	2.9	10.9	151.9	26.60	**1.90**
2002	3.9	12.9	180.4	30.23	**2.16**
2003	3.1	10.6	159.7	29.24	**1.94**
2004	4.1	13.1	168.9	31.29	**2.42**
2005	3.9	11.5	154.2	33.91	**2.52**
2006	3.9	11.8	162.5	33.05	**2.40**
2007	4.3	12.9	161.6	33.33	**2.66**
2008	3.9	15.3	159.2	25.49	**2.44**
2009	4.7	13.5	162.1	34.81	**2.89**
2010	4.9	12.9	159.5	37.98	**3.07**
2011	5.3	15.7	165.6	33.75	**3.20**
2012	4.9	15.2	164.2	32.23	**2.98**
2013 (P)	**5.6**	**15.3**	**186.4**	**36.60**	**3.00**

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation

Table.5 All India Rainfall Distribution from 2001-02 to 2013-14

Year	P (total pulses)	P (chickpea)	Actual	Normal	% departure	% irrigated area under total pulses	% irrigated area under chickpea
2001-02	13.37	5.47	1120.2	1196.0	-6.3	13.3	**30.4**
2002-03	11.13	4.24	981.4	1205.4	-18.6	14.4	**32.1**
2003-04	**14.91**	**5.72**	1278.0	1196.5	**6.8**	13.6	**31.0**
2004 – 05	13.13	5.47	1085.9	1197.3	-9.3	13.9	**31.4**
2005 – 06	13.39	5.60	1185.4	1196.8	-1.0	15.0	**31.1**
2006 – 07	14.20	6.33	1133.0	1195.5	-5.2	15.4	**31.7**
2007 – 08	14.76	5.75	1180.2	1194.8	-1.2	16.2	**34.1**
2008 – 09	14.57	7.06	1075.0	1196.4	-10.1	16.0	**33.6**
2009 – 10	14.66	7.48	972.8	1195.6	-18.6	16.2	**32.2**
2010 – 11	**18.24**	**8.22**	1212.3	1191.7	**1.7**	14.8	**29.7**
2011 – 12	17.09	7.70	1094.7	1186.9	-7.8	16.1	**33.5**
2012 - 13	18.34	8.83	1073.4	1186.3	-9.5	-	-
2013 - 14	**19.25**	**9.53**	1262.4	1186.3	**6.4**	-	-
2014 - 15	**17.38**	**7.17**					

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation

Table.6 Chickpea Breeder seed indent of high yielding varieties during last ten years

Year	Total indent of chickpea (q)	Variety	DAC Indent (q)	% share of the variety
2010-11	9888.84	**JG 11**	1123.50	**11.36**
		A 1(Annegiri 1)	760.70	7.69
		Vijay	526.60	5.32
		RSG 888	450.00	5.01
		JG 130	443.00	4.47
		JG 63	408.00	4.12
		JAKI 9218	420.00	4.24
		JG 322	400.00	4.04
		GNG 1581	339.70	3.43
2011-12	9367.94	**JG 11**	937.80	**10.01**
		Vijay (Phule G 81-1-1)	584.70	6.24
		JAKI 9218	572.00	6.10
		JG 63	470.00	5.01
		GNG 1581	455.70	4.86
		JG 130	425.00	4.53
		Digvijay	359.05	3.83
		JG 14	302.00	3.22
2012-13	9367.94	**JG 11**	937.80	**10.01**
		Vijay (Phule G 81-1-1)	584.70	6.24
		JG 63	470.00	5.01
		GNG 1581	455.70	4.86
		JG 322	450.00	4.80
		JG 130	425.00	4.53

2013-14	9433.23	**JG 6**	1087.00	**11.52**
		JAKI 9218	910.00	9.64
		GNG 1581	799.40	8.47
		JG 11	587.00	6.22
		JG 63	509.00	5.39
		JG 130	472.00	5.00
		KPG 59	391.25	4.14
2014-15	6741.6	**JAKI 9218**	964.65	**14.30**
		GNG 1581	763.60	11.32
		JG 11	565.30	8.38
		JG 315	407.00	6.03
		JG 322	347.00	5.14
		JG 14	334.00	4.95
		JG 130	308.00	4.56
2015-16	7184.34	**GNG 1581**	933.70	**12.99**
		JAKI 9218	916.90	12.76
		JG 11	525.60	7.31
		RSG 974	491.00	6.83
		JG 14	411.60	5.72
		JG 63	374.20	5.20
		JG 130	344.30	4.79
2016-17	10119.41	**JAKI 9218**	1875.00	**18.52**
		JG 11	1199.70	11.85
		RSG 974	580.00	5.73
		Digvijay	576.70	5.01
		JG 63	417.00	4.12
		JG 14	396.80	3.92
		GNG 1581	388.00	3.83
2017-18	10226.36	**JAKI-9218**	1593.10	**15.57**
		JG 11	1073.25	10.49
		JG 14	418.80	4.09
		RSG 974	307.00	3.00
		CSJ 515	316.80	3.09
		GNG 1958	458.60	4.48
		Raj Vijay Gram 203	406.30	3.97
		GNG 2171	520.60	5.09
		NBeG 119	400.00	3.91
2018-19	9790.16	**Raj Vijay Gram 202**	1005.00	**10.26**
		Raj Vijay Gram 203	1028.00	10.50
		JG 11	984.70	10.05
		JAKI-9218	831.70	8.49
		Raj Vijay Gram 201	720.00	7.35
2019-20	10678.64	**Raj Vijay Gram 202**	**1001.6**	**9.37**
		Raj Vijay Gram 203	927.00	8.68
		GNG 2144	769.20	7.20
		JAKI-9218	621.30	5.81
		JG 11	620.00	5.80
		Raj Vijay Gram 201	605.00	5.66
		GNG 2171	553.00	5.17

Table.7 Area, production and yield of chickpea in India and Rajasthan

Year	Total			State			% Share of state	
	A	P	Y	A	P	Y	A	P
2004 - 05	6.71	5.47	815	1035.20	773.00	747	15	**14**
2005-06	6.93	5.60	808	1081.90	478.90	443	16	**9**
2006-07	7.63	6.33	830	1010.80	872.60	863	13	**14**
2007-08	7.58	5.75	759	1231.30	574.20	466	16	**10**
2008-09	7.89	7.06	895	1260.00	980.00	779	16	**14**
2009-10	8.17	7.48	915	880.00	530.00	604	11	**7**
2010-11	9.19	8.22	895	1780.00	1600.00	899	19	**19**
2011-12	8.32	7.70	912	1430.00	990.00	691	17	**13**
2012-13	9.51	8.83	929	1252.00	1265.20	1010	13	**14**
2013-14	9.93	9.53	960	1923.00	1640.40	853	19	**17**
2014-15	8.25	7.33	889	1256.30	911.10	725	15	**12**
2015-16	8.39	7.06	840	941.95	840.34	892	11	**12**
2016-17	9.63	9.38	974	1547.91	1409.39	911	16	**15**
2017-18	**10.76**	**11.16**	**1037**	**1572.48**	**1670.26**	**1062**	**15**	**15**

Area: thousand ha. Production: thousand tons Yield: kg/ha

Source: Project Coordinator's Report, AICRP on Chickpea, ICAR-IIPR, Kanpur (U.P.)

Table.8 Area, production, productivity of chickpea in zone V and Rajasthan

Year	Area (ha)			Production (t)			Productivity (kg/ha)	
	State	Zone V	%share of zone V	State	Zone V	%share of zone V	State	Zone V
2000-01	692634	57766	8.34	406576	46270	11.38	587	801
2001-02	969626	78734	8.12	735946	74246	10.08	759	943
2002-03	449680	28105	6.25	340407	32236	9.46	757	1147
2003-04	1117506	43359	3.88	707381	39239	5.54	633	905
2004-05	1036792	27579	2.66	773000	23607	3.05	746	856
2005-06	1081932	16554	1.53	478900	14600	3.04	443	882
2006-07	1010769	29717	2.94	872600	34798	3.98	863	1171
2007-08	1231282	50113	4.07	574200	47306	8.23	466	944
2008-09	1259474	43830	3.48	980000	46109	4.70	779	1052
2009-10	884358	63939	7.23	530000	58440	11.02	605	914
2010-11	1783281	61102	3.42	1600718	58449	3.65	898	957
2011-12	1433928	30332	2.11	989986	35990	3.63	690	1187
2012-13	1252936	35731	2.85	1277348	44748	3.50	1019	1252
2013-14	1923501	40320	2.09	16407464	379814	2.31	853	942
2014-15	1256323	22146	1.76	911085	22727	2.49	725	1026
2015-16	941950	22659	2.40	840341	27855	3.31	892	1229
2016-17	1547908	46614	3.01	1409387	71823	5.09	911	1541
2017-18	1572487	-	-	1670265	-	-	1062	-

Source: Vital Agricultural Statistics, Government of Rajasthan 2017-18

Table.9 Breeder seed indent of chickpea in Rajasthan during last five years

Table State: Rajasthan					
Year	**Centre**	**DAC Indent**	**Allotment BSP-I**	**Production**	**Surplus/deficit**
2014-15	SKRAU, Bikaner	344.00	378.50	514.30	170.30
	AU, Kota	**241.20**	**263.00**	**317.00**	**75.80**
	SKNAU, Jobner	415.60	455.90	406.01	-9.59
	MPUAT, Udaipur	18.00	20.00	51.00	33.00
State Total		**1018.80**	**1117.40**	**1288.31**	**266.51**
% share of AU, Kota		**23.67**	**23.53**	**24.60**	
2015-16	SKRAU, Bikaner	367.5	404	615	247.5
	AU, Kota	**395.2**	**458**	**603**	**207.8**
	SKNAU, Jobner	712.6	787	679	-33.6
	MPUAT, Udaipur	95.7	106	85	-10.7
State Total		**1571**			
% share of AU, Kota		**25.15**			
2016-17	SKRAU, Bikaner	322	408	454	132
	AU, Kota	**407.3**	**510**	**1085**	**677.7**
	SKNAU, Jobner	392.5	491	335.3	-57.2
	MPUAT, Udaipur	122	152	88	-34.0
State Total		**1243.8**	**1561**	**1962.3**	
% share of AU, Kota		**32.74**	**32.67**	**55.29**	
2017-18	SKRAU, Bikaner	631.6	731.39	633	1.4
	AU, Kota	**344.8**	**400**	**646.8**	**302**
	SKNAU, Jobner	309	355.32	277.8	-31.2
	MPUAT, Udaipur	25	28.75	84.54	59.54
State Total		**1310.4**	**1515.46**	**1642.14**	**331.74**
% share of AU, Kota		**26.31**	**26.39**	**39.38**	
2018-19	SKRAU, Bikaner	759.3	860	869	109.7
	AU, Kota	**659.5**	**815**	**876.84**	**217.34**
	SKNAU, Jobner	176	202.4	259	83
	MPUAT, Udaipur	20	23	54.37	34.37
State Total		**1614.8**	**1900.4**	**2059.21**	**444.41**
% share of AU, Kota		**40.84**	**42.88**	**42.58**	

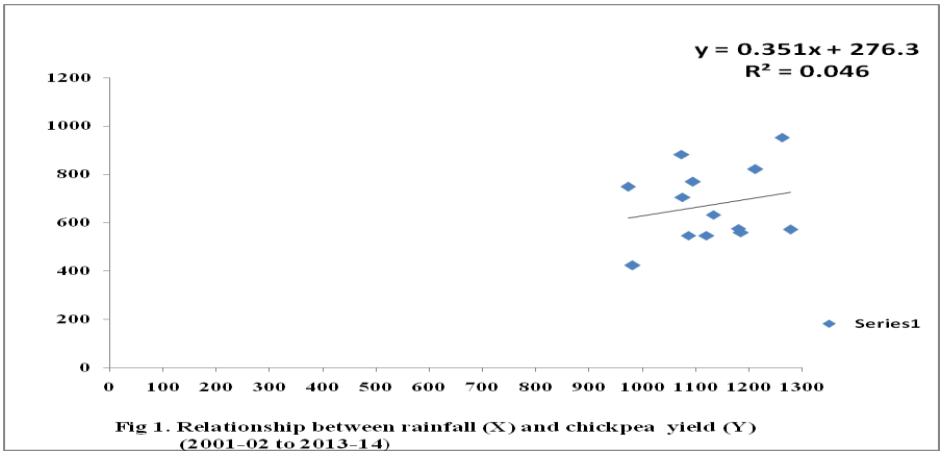

Fig 1. Relationship between rainfall (X) and chickpea yield (Y) (2001-02 to 2013-14)

Scenario of chickpea cultivation in South Eastern Rajasthan (zone V):

Rajasthan is one of the major chickpea producing state of the country. Few facts of state chickpea production, productivity and cultivation regions are as under:

The share of Rajasthan state to the country's total area has increased from 15 to 19 percent while in production; it has increased from 14 to 17 percent in last ten years.

The area of chickpea in Rajasthan has increased from 692634 ha in 2000-01 to 1547908 ha in 2016-17*i.e.* there has been an increase of 81 percent area in last 15 years.

In contrast to the 81 percent increase in the area of chickpea, the production of the crop has increased to 124 percent during the same period as it has increased from 406576 tons in 2000-01 to 1409387 tons in 2016-17. The increase in production is higher as compared to the increase in area which can be attributed to the cultivation of high yielding, disease and insect-pest resistant varieties along with better crop production techniques.

Despite of such a huge increase in area as well as production, the productivity of the crop in the state has shown an increase of a mere 23.5 percent in the same period. The reasons for this slow growth in productivity need to be examined thoroughly so as to remove the impediments in raising the productivity. The probable reasons might be post harvest losses due to storage pests andlosses during grading and processing.

The area of chickpea in zone V (Humid south eastern plain zone) of the state is very less as compared to the total area of the crop in the state. The area has generally always shown a decreasing trend in the last 15 years. It has dropped down from 8.34 percent to 3.01 percent i.e. around 64 percent decrease in the period of last15 years. The probable reason may be cultivation of wheat, mustard and other remunerative crops instead of chickpea in areas with assured irrigation facilities, as chickpea is generally cultivated as rainfed crop.

The production of chickpea in the zone has increased from 46270 tons in 2000-01 to 71823 tons in 2016-17 showing a gain of 55 percent. The remarkable thing is that inspite of the huge decrease in area; there has been an increase in production. It can again be attributed to the cultivation of high yielding, disease and insect-pest resistant varieties, better crop production techniques along with higher fertility status, owing to presence of clay loam soil in the zone.

Inspite of a very insignificant area, the productivity of chickpea in zone V (south eastern humid plain zone) has always remained higher than the productivity of chickpea in Rajasthan state.

The productivity in zone V has increased from 801 kg/ha in 2000-01 to 1541 kg/ha in 2016-17 i.e. there has been an increase of 92 percent in the productivity of zone V in last 15 years while the productivity of the state has shown an increase of 23.5 percent in the last 15 years.

The major high yielding varieties of chickpea under cultivation in the state are GNG 2171, GNG 2144, GNG 1958, GNG 1581 and CSJ 515 while GNG 469, Pratap Chana-1,GNG 1958 and CSJ 515 are the major varieties recommended for cultivation in the zone.

In conclusion the view of the various chickpea facts and figures related to area, production, productivity, rainfall pattern, irrigation availability, prominent varieties under cultivation, it can be concluded that chickpea production and productivity can be

raised through cumulative effect of adoption of suitable high yielding, abiotic and biotic stress resistant varieties, better crop production and protection practices in order to reduce import, saving our currency and achieve self-sufficiency.

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