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Guar (*Cyamopsis tetragomoloba* L.) seed production status in India

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Abstract

The present study examined the prospects of guar (*Cyamopsis tetragomoloba* L.) crop production in India. To achieve the stipulated objectives of study, secondary data were collected. The study revealed that Guar is draught tolerant *kharif* crop and India is the main producer of guar in the world. Rajasthan was the major guar producing state followed by Gujarat, Haryana and Punjab. The study also elucidates that area under guar crop which was 3497 thousand hectares with production of 659 thousand metric tonnes (MT) of guar during 2001-02 and area increased to 3541 thousand hectare with production of 1676 thousand MT during the year 2016-17. The production of Guar in India has seen wide variations during the recent past ranging from 649.33 (base year 2000 to 2003) to 2280.67 (current year 2014 to 2017) thousand tonnes. The overall growth of 4.9, 9.76 and 4.63 per cent per annum was calculated for area, production and yield of guar bean in India, respectively from the year 2000-01 to 2016-17. The area under cultivation has increased; it has not been as substantial as the increase in total production, indicating productivity gains during the period. It is important to note that there are large fluctuation in both production and area of cultivation for guar in India, mainly due to variability in the amount and distribution of rainfall, especially in Rajasthan. Both production and area of cultivation plunged in 2002-03 and 2009-10, largely on account of drought conditions. Major quantities of guar products were exported to different countries like USA, Germany and China during the last ten years with the growth rate of 17.6, 3.43 and 10.17 per cent per annum, respectively. During the year 2012-13, export increased to 458.06 thousand MT particularly for these three countries against total export of 839.89 thousand MT with a growth rate of 14.54 per cent per annum. Lastly, it was inferred that to make guar farming more remunerative, Government initiatives such as to ensure farmers by assured prices, marketing facilities for guar crop and farmer awareness camps should be conducted.

Keywords: guar, growth rate, exports, variability

1. Introduction

Agriculture in semiarid regions where water is limited and drought are more frequent is challenging than humid and sub humid regions. Guar is an annual plant, which can grow in extremely drought resistant conditions and can thrive in semiarid regions where most plants perish. It was traditionally cultivated for using as a vegetable and fodder. Commercial interest for Guar is fairly recent and its large-scale industrial production started from the 1950s. Commercial cultivation of guar seed is primarily triggered by the demand for guar gum production. India is the single largest producer of Guar Seed accounting for 80% of the total guar produced in the world. Rajasthan is the single largest state producer and has been the traditional home for guar production and trade Majority of the crop is grown under rainfed conditions and hence, the yields are heavily dependent on rainfall. Nevertheless, Rajasthan alone contribute for more than 70% of India's total output and Gujarat, Haryana, Punjab and Uttar Pradesh contribute for the rest. India is the single largest exporter of guar gum in the world. India exports nearly 80-90% of the domestically produced guar gum. In India the production of Guar was 2751.42 Thousand MT with an area of 5581.21 Thousand ha and productivity level of 492 t/ha (2015-16). The country exports over 117000 tons of guar and its derivatives, which is comprises of 33000 tons of refined split guar gum, and 84000 tons of treated and pulverized guar gum. The net worth of the Indian exports is estimated over Rs 500 crores (Anonymous 2014; Anonymous, 2015) In Rajasthan it occupied an area of 4630.85 Th.ha with a production of 2747 Th MT and productivity of 593 t/ha (Department of Agriculture (DoA), Government of Rajasthan 2014). Which is higher than the production in 2015 in the state (4786.78 Th.ha area, 2223.47 Th MT Production and 465 t/ha productivity). Bikaner is a potential guar producing district in the state producing 408.08 Thousand MT with an area of 1043.11 thousand ha and productivity level of 391 t/ha Agricultural Statistics

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((2015-16), Rajasthan).

2. Material and Methods

The present study was based on secondary data. The data in respect of area and production of selected crop were collected from the records and reports of the Directorate of Economics and Statistics and Directorate of Agriculture, Government of Rajasthan, Jaipur. The data related to export and import were collected from APEDA. This database is under the directorate of Marketing and Inspection of the Ministry of Agriculture of Government of India.

Descriptive statistics i.e. growth rates and percentages were used wherever necessary to examine the changing scenario of guar bean production in India, exports of guar to different countries over the years and also to examine the changes in guar cultivation of the top most guar producing districts of the country.

3. Result and Discussion

3.1 Trend and growth in area, production and productivity of Guar in India

There is huge demand for guar derivatives and these have

extensive use in a number of industries such as petroleum, textile, paper, food and pharmaceuticals etc. Table 1 inferred that the production of Guar in India has seen wide variation during in recent past ranging from 0.2 to 2.75 million metric tons due to the over dependence of the crop on monsoon precipitation. Although the area under cultivation has also increased, it has not been as substantial as the increase in total production, indicating productivity gains during the period. Similarly, the yield rose sharply to 644 kg/ha in 2011-12 which declined to 473 kg/ha in 2016-17.

It is important to note that there is large fluctuation in both production and area of cultivation for guar in India, The production of guar in Rajasthan in 2002-03 was only 28 thousand tonnes. In 2003-04 it increased to 1163 thousand tonnes i.e. 4053.57 per cent increase over the previous year which is quite a substantial growth due to good rainfall in the major cultivating areas and increased productivity level but it decreased to 368 thousand tonnes (-68.35 per cent) in subsequent year mainly due to variability in the amount and distribution of rainfall, especially in Rajasthan. Both production and area of cultivation plunged in 2002-03 and 2009-10, largely on account of drought conditions.

Table 1: Trend and growth in area, production and productivity of Guar in India (2000-2017)

Year	Area ('000' ha)	Production ('000' tonnes)	Productivity (Kg/ha)
2000-01	3497	659	188
2001-02	2903	1090	375
2002-03	975	199	204
2003-04	2854	1513	530
2004-05	2867	903	315
2005-06	2956	1059	358
2006-07	3344	1169	350
2007-08	3472	1789	515
2008-09	3863	1936	501
2009-10	2996	595	199
2010-11	3382	1965	581
2011-12	3444	2218	644
2012-13	5152	2461	478
2013-14	5603	2715	485
2014-15	4225	2415	567
2015-16	5581	2751	492
2016-17	4215	1896	450
Trend(b)	187.44**	148.36***	18.12***
SGR (%)	5.07	8.67	4.16
CGR (%)	5.55***	9.76***	4.63**

*** 1% level of Significance, ** 5% level of Significance

In spite of the fluctuation in the area and production of Guar, an increasing trend has been observed during last decade in acreage under the crop and production of Guar bean in India (Figure-1).

The area under guar registered nearly 5.55 per cent growth rate while production represented annual growth rate of 9.76 per cent for guar seed whereas the productivity showed

annual growth rate 4.63 per cent. The results showed significant annual growth rate in production, followed by area and productivity in India. Since the compound growth rate is positive and statistically significant, the null-hypothesis that 'There is positive growth in area, production and productivity of guar in India' is accepted.

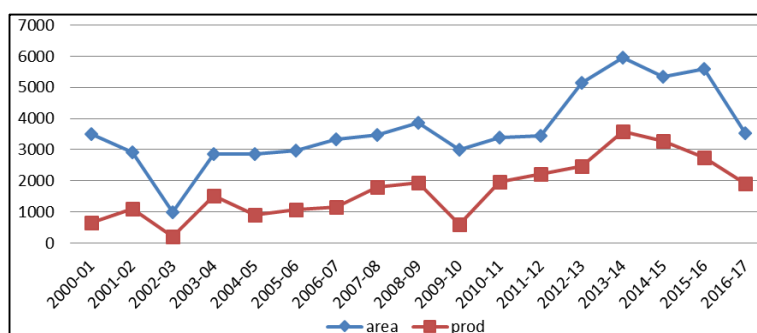


Fig 1: Trend in area and production of Guar in India (2001 to 2017)

The progress of Guar bean in India has been presented in Figure. It is apparent from the figure that production is increasing at a faster rate than the area under cultivation of Guar due to increase in the productivity. It is expected that the area under cultivation of Guar in India will come down during current year i.e. 2017-18, but it is expected to improve in coming years on account of better prices based on increasing demand for factors like use of guar gum in shale gas industry, low-input requirement and relative profitability of crop even at lower prices.

3.2 Trend and growth in Guar gum export in India (2003 to 2017)

India mainly exports guar products to USA, Germany and

China. The major guar products were exported to USA followed by Germany and China [Table-2]. The export of guar gum quantity and value showed increasing trend in India as well as in top three countries. Export of guar gum quantity and value from India increased significantly with 10.98 percent and 23.94 percent respectively with a magnitude of 46.67 and 880.14.

USA is the largest importer of the guar gum from the India with an annual growth rate of 16.22 percent with 25.31 magnitudes. Germany and china are second and third largest importer of guar gum from India. Trend and growth in both country imports in value as well quantity increased significantly with 3.38 percent and 9.68 percent respectively.

Table 2: Trend and growth in Guar gum export in India (2003 to 2017) Qt – ‘000’ MT, Value Rs Crore

Year	USA		Germany		China		Total	
	Qt	value	Qt	Value	Qt	Value	Qt	Value
2003-04	44.68	195.57	15.54	62.49	8.58	31.91	120.56	507.88
2004-05	54.05	285.58	15.09	97.14	13.49	59.86	131.3	689.46
2005-06	75.19	465.77	17.78	121.47	27.13	127.23	186.72	1049.24
2006-07	66.93	441.03	18.74	126.28	31.54	146.46	189.31	1125.76
2007-08	81.78	484.15	17.9	97.29	34.3	158.09	211.17	1125.72
2008-09	97.15	623.05	22.51	122.74	39.23	177.05	258.54	1338.94
2009-10	71.92	468.45	20.6	104.15	25.26	122	218.48	1133.29
2010-11	215.26	1776.56	30.54	178.55	56.36	216.59	441.61	2938.72
2011-12	434.25	12446.03	35.1	656.23	58.03	969.94	707.33	16523.83
2012-13	244.83	17281.65	12.08	375.49	32.27	1368.33	408.57	21287
2013-14	332.25	8528.72	16.92	332.22	56.97	967.89	601.95	11734.53
2014-15	384.77	7012.96	19.12	277.23	38.57	512.64	665.17	9479.93
2015-16	132.01	1667.57	19.13	194.07	33.18	297.1	325.25	3233.87
2016-17	356	3160.25	42.48	323.94	59.58	415.57	839.89	6213.24
Trend(b)	25.31***	637.46*	0.907*	22.8**	2.72***	55.69**	46.67***	880.14**
SGR (%)	13.67	16.27	4.18	10.39	7.40	13.99	12.31	15.72
CGR (%)	16.22***	28.33***	3.38*	12.00****	9.68***	20.48***	10.98***	23.94***

**** 1% level of Significance, *** 5% level of Significance, * 10% level of Significance

3.3 Change & variation in export of guar gum from India

India is largest exporter of the guar gum. India has a comparative advantage in guar trade over other competitors in the market. This is mainly attributed to large area under production in scanty rainfall areas. USA continued to be the largest importer of guar gum in the world, the largest trading partner for India. The demand for guar gum from USA is mainly driven by oil industry where it is being used as important ingredient gum. Guar gum export quantity from India increased from 146.19 thousand MT in 2003-05 to 610.10 thousand MT 2014-17. Value of guar gum export also

increased by 742.48 percent with a variation of 119.31 percent. Across the world USA, Germany and China are the major importer of guar gum from India. The quantity of guar gum imported by USA was increased from 57.97 thousand MT to 290.93 thousand MT with 401.83 percent. The variation in the value of guar gum import was 75.56 percent. Germany and China also showed a significant in guar gum export quantity as well as in value. Value of guar gum import by these two country increased by 182.90 percent and 459.99 percent respectively during study period with variation of 73.75 percent and 108.80 percent respectively.

Table 3: Change & Variation in export of Guar gum (2003 to 2017) Qt – ‘000’ MT, Value Rs Crore

		BY	CY	AC(RC)	SD(CV)
		Qt	Value	Qt	Value
USA	Qt	57.97	290.93	232.95(401.83)	139.85(75.56)
	Value	315.64	3946.93	3631.29(1150.45)	5392.17(137.66)
Germany	Qt	16.14	26.91	10.77(66.76)	8.50(39.23)
	Value	97.30	265.08	171.38(182.90)	161.69(73.75)
China	Qt	16.40	43.78	27.38(166.93)	16.18(44.02)
	Value	73.00	408.44	335.44(459.50)	413.01(103.80)
Total	Qt	146.19	610.10	463.91(317.33)	236.81(62.49)
	Value	748.86	6309.01	5560.15(742.48)	6679.79(119.31)

The export market for guar gum from India is expected to grow in the future. It's a great opportunity for the country to explore the potential in the world market and foreign earnings, although there is instability in demand for guar gum from importing countries

3.4 Trend and growth in guar gum processed products export from India

The volume and value of the trade in terms of export of Guar derivatives from India during recent years have been presented in Table 5.17. The table reveals the processed commodity is exported mainly as Guar gum treated and

pulverized constituting more than 79 percent during 2016-17 followed by Guar meal and a very small quantity as Guar gum

refined split.

Table 4: Trend and growth in guar gum products export from India (2004- 2017) Quantity '000' MT, Value- Crore

year	Guar meal		Guar gum refined split		Guar gum treated and pulverised		Total	
	quantity	Value	quantity	Value	quantity	Value	Quantity	Value
2004-05	4.71	22.57	49.8	221.66	76.79	445.25	131.3	689.48
2005-06	3.15	10.78	49.38	237.98	134.19	800.48	186.72	1049.24
2006-07	0.19	0.86	41.27	193.28	147.85	931.65	189.3	1125.79
2007-08	7.03	13.29	63.71	302.07	140.43	810.38	211.17	1125.74
2008-09	32.27	42.43	55.43	249.99	170.87	1046.56	258.57	1338.98
2009-10	41.57	63.81	32.14	156.56	144.77	912.93	218.48	1133.3
2010-11	41.42	65.48	83.01	507.68	317.17	2365.54	441.61	2938.7
2011-12	80.15	116.82	102.42	1923.3	524.75	14483.7	707.33	16523.9
2012-13	74.81	140.28	70.52	3390.54	260.98	17756.2	406.31	21287
2013-14	132.09	289.07	82.69	1484.09	387.16	9961.37	601.95	11734.5
2014-15	143.92	325.51	84.74	1161.71	436.51	7992.71	665.18	9479.93
2015-16	68.57	222.34	45.67	403.11	211.01	2608.42	325.25	3233.87
2016-17	101.88	370.31	41.18	272.95	276.89	2463.36	419.95	3106.62
Trend	10.9	30.32**	1.43	91.21	22.20**	680.42	34.53***	801.95*
SGR (%)	19.37	23.42	2.32	11.29	8.94	14.13	9.42	13.94
CGR (%)	39.28***	37.30***	2.07	12.94*	10.69**	22.37*	10.98**	21.11*

*** 1% level of Significance, ** 5% level of Significance

The table 4 revealed that the export of guar gum derivative increased significantly with 9.42 percent in quantity and 801.95 magnitudes in value in India. Maximum increasing trend was observed in guar meal followed by guar gum treated and pulverised and guar gum refined split. Guar meal has witnessed highest growth rate (39.28%) in quantity in last 13 years but its value is as good as other gum derivatives.

3.5 State wise area, production and productivity of Guar in different state

Guar is generally produced in different states of country but is

pre-dominantly grown in Rajasthan and Haryana with maximum cover-age of area. There were major fluctuations in the area under guar crop for Rajasthan, Haryana and Gujarat states of the country. In Rajasthan, area under guar production which was 3056 thousand hectares during 2000-01 decreases to only 557 thousand hectares with very less production of 28 thousand MT and a yield of 50 kg/ha during 2002-03 due to severe drought conditions [Table-5].

Table 5: State wise growth in area, production and productivity of Guar in different state Area '000' ha. Prod '000' Tonnes and YieldKg/ha

Year	Rajasthan			Haryana			Gujarat		
	Area	Prod	Yield	Area	Prod	Yield	Area	Prod	Yield
2000-01	3056	481	157	148	102	689	273	60.9	223
2001-02	2413	763	316	196	127	648	263	112	424
2002-03	557	28	50	205	91	444	213	65	306
2003-04	2278	1163	511	269	117	435	266	204	766
2004-05	1944	368	189	217	254	1171	214	157	733
2005-06	2445	566	231	270	289	1070	188	108	575
2006-07	2808	658	234	295	334	1132	205	83	404
2007-08	2842	1244	438	341	395	1200	196	130	662
2008-09	3316	1261	380	370	602	1627	150	53	353
2009-10	2581	201	78	252	329	1305	133	45	337
2010-11	3001	1546	515	256	333	1300	125	73	586
2011-12	3000	1847	616	215	290	1350	128	75	581
2012-13	4526	2023	447	180	276	1533	207	128	620
2013-14	4924	2201	512	481	369	767	364	312	858
2014-15	4631	2748	593	406	338	832	278	167	602
2015-16	4787	2223	465	457	380	832	309	186	602
2016-17	3530	1405	398	315	248	787	223	167	749
CGR (%)	6.51***	13.97***	7.65**	4.16***	6.99***	2.83*	0.003	6.41*	10.4***

*** 1% level of Significance, ** 10% level of Significance

If we look at the scenario of Haryana state for guar production, the area which was 148 thousand hectares with production of 60.9 thousand MT and yield of 223 kg/ha during year 2000-01 has increased to 315 thousand hectares with production of 248 thousand MT and yield of 787 kg/ha during 2016-17, respectively. After 2001-02 there was great downfall for all the major guar producing states of India. During 2008-09 there was gradual increase of area for guar

crop i.e. 3316, 370 and 1504 thousand hectares in Rajasthan, Haryana and Gujarat states, respectively. In Rajasthan, area under guar cultivation was 3530 thousand hectare with production of 1405 thousand MT and yield of 398 kg/ha during 2016-17 with an overall growth rates of 6.51 per cent during for area, 13.97 per cent for production and 7.65 per cent for yield, respectively. In Haryana state, an overall growth rate was carried out of 4.16 per cent, 6.99 per cent and

2.83 per cent for area, production and yield, respectively. For Gujarat state the positive growth rate can be seen for production and yield i.e. 6.41 per cent and 10.4 per cent, respectively whereas slight growth rate of 0.003 per cent was calculated for area under guar cultivation in Gujarat.

4. Conclusion

The study revealed that area under guar crop which was 2903 thousand hectares with production of 90 thousand metric tonnes (MT) of guar during 2001-02 increased to 3541 thousand hectare with production of 1896 thousand MT during the year 2016-17. Major quantities of guar products were exported to three countries i.e. USA, Germany and china pertaining to an export growth over the years of 16.22, 3.38 and 9.68 per cent per annum, respectively. The per cent share of quantity of guar products exported from India to USA was increasing over the years, for Germany and China it was decreasing over the years. Guar production in India has shown a positive growth rate of 5.55 per cent for area under guar crop, 10.35 per cent for production and 4.81 per cent for yield. Guar gum has emerged as India's top farm export due to increasing demand from USA and other countries oil and gas industry. A systematic approach to guar industry by providing training, market information, Research and Development in processing, adopting better technology in processing and value addition etc remain profitable for farmers.

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