Indian Guar Industry and Trade

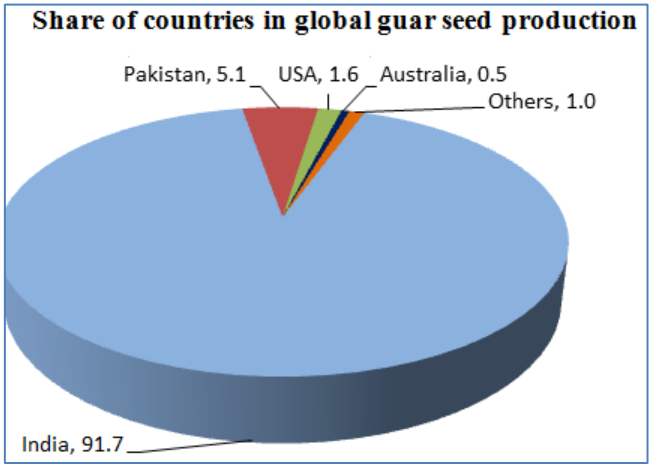
Introduction

India is the leading producer of guar seed and exporter of guar gum in the world accounting for about 80-85% of global guar seed and gum production, followed by Pakistan (10-12%). The rest of guar seed production is contributed by USA, Australia and Sudan. Guar seed is cultivated mainly is arid regions of India and Pakistan. The states such as Rajasthan, Haryana, Gujarat and Punjab contribute more than 99 per cent of the total guar seed production in India. Rajasthan is the major producer of guar seed in the country (contributing about 81% of Indian guar seed production) followed by Haryana (nearly 13%) and Gujarat (about 1%). Guar is a leguminous crop and its seed is used to extract guar gum.

Guar is the source of a natural hydrocolloid, which is cold water soluble and form thick solution at low concentrations. The guar seed consists of three parts: the seed coat-hull (20-22%), the endosperm (32-36%), and the germ (44-46%) (Phillips and William, 2009). The guar gum is derived from the endosperm, which is the prime marketable product of the plant. This spherical-shaped endosperm contains significant amounts of galactomannan gum, which forms a viscous gel in cold water. The by-products of guar processing, *Churi* and *Korma* are used as cattle feed. Guar gum recovery normally constitutes around 29-30% of total guar seed processed.

Guar gum, the powdered endosperm of guar beans, has a variety of applications in different industries such as oil and well drilling, bakery, dairy, meat, dressing and sausages, beverages, printing, textiles, cosmetics and medicine, mining, explosives, water treatment, paper industry, etc. (Sharma, 2010). In food it is used as a thickener and as a mean of preventing ice crystal formation in frozen desserts. Soluble in cold water, guar gum imparts a high viscosity and exhibits superior water-binding capacity at low usage levels.

Guar, a marginalized crop particularly in the Rajasthan state, was cultivated by farmers on the lands not suitable for other competing crops and without application of any productive inputs. With the global oil drilling companies started using the commodity for extracting oil and gas, guar has become a major cash crop. The demand for guar seed has shot up because the industrial-grade guar gum is used in fluid mixtures that oil and gas companies use to blast natural gas out of shale rock especially in the USA. Guar has emerged as one of the most lucrative crops in recent years. Guar gum has become India's most valued agricultural export commodity. As an ingredient, guar gum is highly valuable and sought after ingredient from small quantities in numerous food products to large scale uses in oil field services.



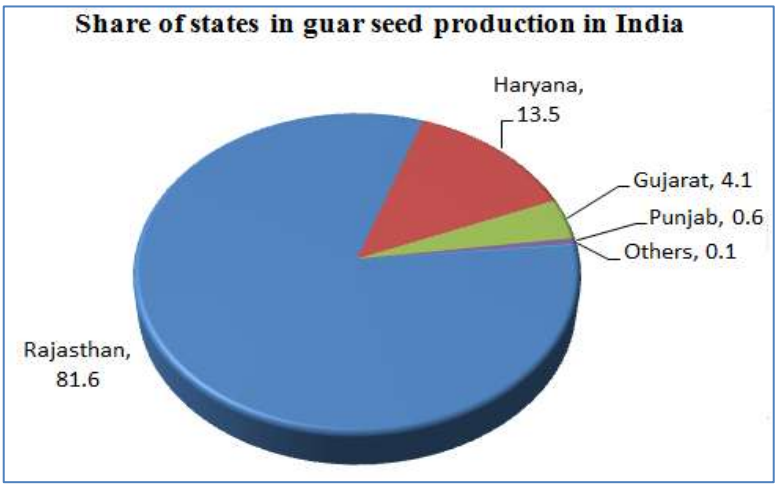
Guar seed supply in India and the World

Global guar seed production ranges from 0.5 to 2.5 million MT annually, depending upon the variability in intensity and pattern of monsoon rainfall in India and Pakistan, particularly in the western districts of Rajasthan. These two countries contribute to about 95-97 per cent of global guar seed production and the

rest is contributed by USA, Australia, Sudan and other African countries. Such a large temporal fluctuation in guar seed production gives rise to uncertainty in guar gum supply and in turn on prices of guar seed and its derivative products. Presently, about 91.7 percent of total guar seed production (estimated at 2.645 million MT during Triennium average ending [TE] 2014-15) is contributed by India followed by Pakistan (5.1 per cent), USA (1.6 per cent) and rest by other countries. Though, authentic data on guar seed production in countries like USA, Australia and other African countries are not available, the estimates are generated as per trade sources.

Guar seed production in India

Guar seed production in India is concentrated mainly in the states of Rajasthan, Haryana, Gujarat and Punjab. Rajasthan is the largest producer of guar seed with about 81.6 per cent share (Triennium average ending year 2012-13) in total guar seed production in India, followed by Haryana (13.5 per cent), and Gujarat (4.1 per cent). These three states combined produces about 99 per cent of Indian guar seed production.



Guar seed production in India ('000 MT)

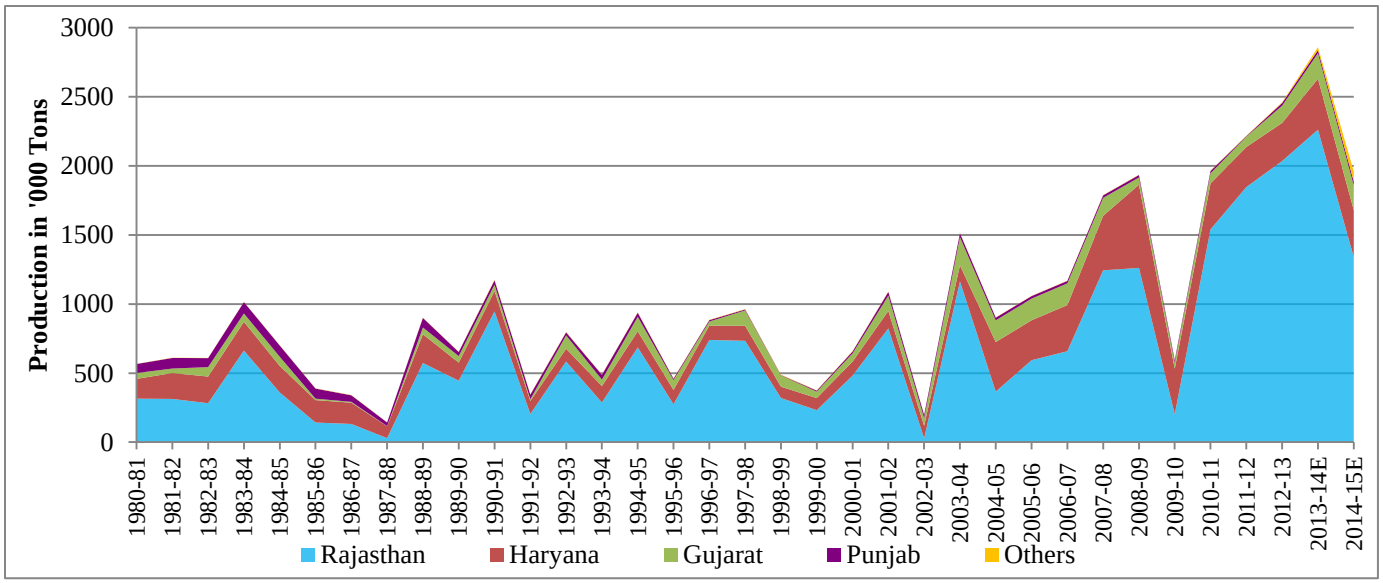
Year	Rajasthan	Haryana	Gujarat	Punjab	Others	India
1980-81	315.0	143.3	42.2	65.2	1.0	566.7
1985-86	142.1	162.3	10.6	72.8	1.7	389.5
1990-91	946.2	148.0	46.0	31.4	4.3	1175.9
1995-96	274.2	104.1	71.5	9.6	2.0	461.4
2000-01	481.2	102.3	59.0	13.8	2.5	658.8
2005-06	593.2	289.0	157.1	17.8	1.9	1059.0
2009-10	202.7	329.0	44.0	16.8	2.1	594.7
2010-11	1540.5	333.0	73.0	16.8	2.0	1965.3
2011-12	1846.6	290.0	75.0	4.0	2.0	2217.6
2012-13	2035.1	276.0	125.0	19.5	5.0	2460.7
2013-14 E	2261.8	369.0	185.0	22.1	20.8	2858.6
2014-15AE	1339.8	340.0	179.1	27.4	72.6	1958.9
Growth rate (%)	5.17	2.80	5.69	-4.75	4.33	4.23
Growth rate (% 2000-14)	15.09	9.20	1.77	-1.83	15.29	10.99
CV (%)	83.2	59.9	67.2	75.2	262.2	67.4
2015-16 (NBHC Estimate)	1320.56	235.32	93.23	13.14	14.99	1677.24

Source: Department of Agriculture and Cooperation, Ministry of Agriculture, GOI. E= estimates based on respective state Agriculture Department estimates, AE= projections based on trade estimates

The country is expected to have record guar seed production to the tune of 28.58 lakh MT during 2013-14, increased from 5.67 lakh MT during 1980-81. The guar seed production in India has increased at an annual compound growth rate (CAGR) of 4.23 per cent during the period 1980-2014, and at about 11 per cent during 2000-2014. The tremendous increase in guar seed production in the country has been observed during the last 4-5 years owing to the high demand for guar products from importing countries, particularly from US oilfield sector. The guar seed production in India fluctuates from 1.43 lakh MT in 1987-88 (drought year) to highest of 28.58 lakh MT recently. The coefficient of variation in

production of guar seed in India was 67.4 per cent. Guar seed production in the country this year is estimated at 19.59 lakh MT, decrease by 31 per cent over previous year due to delayed onset of monsoon and lower area planted under the crop. For the current year of 2015-16 the guar seed production for India is likely to be 1677.24 thousand tonnes owing to near draught like situation in major growing areas.

Guar seed production trend in India



Guar seed production in Rajasthan increased from 3.15 lakh MT in 1980-81 to 22.62 lakh MT in the year 2013-14, increased at a compound annual growth rate of 5.17 per cent. The temporal fluctuation in guar seed production was very high (83.2 per cent coefficient of variation). The year-to-year fluctuation of guar seed production in Rajasthan state ranges from a low of mere 0.279 lakh MT during 2002-03 (severe drought year) to high of 22.62 lakh MT in 2013-14. The high inter-year variability in guar seed production is mainly on account of rainfall variations as the crop is grown rainfed on marginal lands. The crop size heavily depends on pattern and intensity of monsoon rainfall. Guar seed production in Haryana is estimated at about 3.5 lakh MT, and nearly 1.8 lakh MT from Gujarat state, increased at the rate of 2.8% and 5.7%, respectively over the period 1980-2014. Punjab witnessed a decline of 4.75% from 72.8 thousand MT in 1985-86 to merely 4 thousand MT in 2011-12. With the recent spike in prices of guar seed and gum, the renewed interest was seen in the guar cultivation in major producing states as well as in non-traditional states like Tamil Nadu, Andhra Pradesh, Maharashtra and Chhattisgarh, etc.

The non-availability of short-duration, high yielding and drought-resistant varieties of guar seed and lower seed replacement ratio are adding to the fluctuations in production and yield of the crop in Rajasthan state. In Haryana, though the crop receives life-saving irrigation, the use of varieties, viz., HG 365, HG 563, etc. developed by the Haryana Agricultural University, Hisar, and extensive use of HYV seeds by the farmers have improved the productivity level of guar in the state (Sharma and Gummagolmath, 2012).

Guar seed production in Pakistan

The guar seed production in Pakistan has decreased from 2.24 lakh MT in 1981-82 to about 0.99 lakh MT in 2005-06 but recovered again in the recent years. The country is estimated to have produced about 1.63 lakh MT in 2013-14. Pakistan has registered a negative growth in production of guar seed (CAGR -

2.6 per cent per annum) with high temporal variability (CV 40.6 per cent), though the country witnessed slight recovery in growth (0.6 per cent) in guar seed production during the period 2000-2014.

Guar seed production in Pakistan ('000 MT)

Year	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan	Pakistan
1981-82	162.0	57.5	4.2	0.3	224.0
1985-86	139.3	55.0	8.4	0.8	203.5
1990-91	218.4	32.4	12.4	0.7	264.0
1995-96	162.0	10.4	6.7	1.4	180.5
2000-01	107.6	7.6	7.6	1.8	124.6
2005-06	81.7	12.9	2.5	1.9	99.0
2010-11	50.6	89.8	1.6	4.0	146.0
2011-12	45.0	73.9	2.2	3.8	124.9
2012-13 E	51.8	74.1	2.1	4.0	132.0
2013-14 E	61.6	94.7	2.9	4.1	163.2
2014-15 E	41.1	64.3	2.0	3.0	110.5
Growth (%)	-4.4	0.7	-5.3	6.1	-2.6
Growth (% 2000-14)	-6.7	18.0	-8.3	10.0	0.6
CV (%)	54.6	74.1	60.2	76.3	40.6

Source: Pakistan Bureau of Statistics. E= projections based on trade estimates

In Pakistan, Punjab and Sindh provinces produces about 96 per cent of total guar seed production, and the rest in Khyber Pakhtunkhwa and Balochistan provinces. The guar seed production in Punjab province has decreased at the rate of 4.4 per cent annually during the period 1981 to 2014, while in Sindh it has increased at the rate of 18 per cent annually. About 86.7 per cent of the total guar seed production in Pakistan was contributed by Punjab province during TE 1990-91 followed by Punjab (about 9 per cent). The share has changed presently to Punjab contributing about 36.6 per cent and Sindh accounting to 59 per cent to total guar seed production in Pakistan. Guar seed production in Pakistan is estimated at 1.1 lakh MT this year, decreased by 32 per cent over previous year.

Global guar seed production

Global guar seed production is estimated at about 21.69 lakh MT this year down by 30 per cent over previous year (31.05 lakh MT), mainly due to estimated decrease in production in India and Pakistan. About 92 per cent of the world guar seed production is contributed by India followed by Pakistan (5 per cent). The expected significant decline in production this year is likely to put pressure on prices provided the demand support from major consuming industries/ countries. Since, about 95 per cent of global guar seed production comes from India and Pakistan, and the production in these countries decides the global guar seed and in turn guar gum supplies. The crop is mainly grown rainfed, and thus, crops production heavily depends on rainfall in major producing centres in India and Pakistan. Other than these supply side factors, prices of guar seed and gum are also decided by the demand from user industries.

Guar seed production in World ('000 MT)

Year	India	Pakistan	USA	Australia	Others	Total
2012-13E	2460.7	132.0	35	12	21	2660.7
2013-14E	2858.6	163.2	42	14	27	3104.8
2014-15E	1958.9	110.5	50	17	32.5	2168.9
2015-16 E	1677.24	98.4	46	14	28.43	1864.07

E= trade estimates

International trade of guar products

Guar gum is classified under 'Mucilages and Thickeners' group (HS code 130232) in the harmonized system of classification in the international trade. Mucilages and thickeners include derivatives of locust bean, locust bean seeds and guar seeds. India is the largest exporter of world thickners and mucilages trade with 84.5 per cent share (Table 4) in 2012 followed by USA (3.74%), Pakistan (3.35%), Spain (1.74%) and Italy (1.14%). The share of India has improved significantly in the recent years due to higher prices of guar gum in the world market and its higher demand from major importing countries. During 2006, India's share in world mucilages and thickeners trade was 38 per cent followed by Spain (14%), USA (9%), Italy (7%), Pakistan (5%) and Germany (4%). Countries like USA, Spain, Italy, Germany, etc. import refined guar split and guar gum powder from India, process it into industry-specific guar gum products and re-export it. Therefore, the major guar gum producing countries, India and Pakistan, faces competition with USA, Italy, Spain, Germany and other European countries.

Major exporting countries of guar gum

Exporting Country	2010		2011		2012	
	Qty (MT)	Value (US$ Million)	Qty (MT)	Value (US$ Million)	Qty (MT)	Value (US$ Million)
India	3,67,932.22	628.44	3,72,993.95	1,218.46	3,65,779.16	3,917.46
USA	14,350.66	65.61	17,509.78	91.67	17,230.94	173.51
Pakistan	26,106.17	39.07	49,818.20	73.48	21,024.37	155.19
Spain	9,756.23	83.81	8,065.72	71.47	8,959.37	80.69
Italy	7,925.33	47.5	6,543.73	40.17	7,680.83	53.01
China	2,022.52	12.62	3,224.39	18.91	4,735.37	51.75
Germany	9,725.92	29.4	9,259.73	28.04	7,176.16	33.95
Netherlands	3,958.13	15.17	2,987.41	14.55	3,818.00	33.04
France	3,521.13	24.92	2,739.51	21.9	2,393.50	26.96
Denmark	1,699.01	20.2	1,563.28	17.1	1,586.61	18.82
Switzerland	2,922.72	14.04	2,787.84	15.53	2,073.79	17.26
United Kingdom	3,206.79	10.19	2,821.75	10.49	2,704.48	15.37
Morocco	2,073.07	20.2	1,643.69	15.47	1,654.19	13.49
Belgium	1,199.00	4.64	1,246.77	6.19	1,180.47	10.55
Others	5,096.07	28.52	5,791.96	26.29	5,027.66	37.38
Total	4,61,494.97	1,044.33	4,88,997.71	1,669.72	4,53,024.90	4,638.43

Source: APEDA Website

United States of America is the largest importer of guar gum with 65 per cent of world guar gum imports in the year 2012. The other major importers of guar gum include Germany (5.5% of world guar gum imported), Canada (3.6 %), Italy (3.5%), Australia (1.8%), China (1.7%), Russian Federation (1.5%), United Kingdom (1.3%), Japan (1.2%), Netherlands (1.1%), France (1.1%), Denmark (1.0%), etc. Many of the European Countries, USA and China are the major importers of the guar gum as well as exporters also. These countries have developed the capacity to further process the guar gum split/ powder into diversified products, which India is lacking in. Majority of patents are registered in USA or European countries (NRAA, 2014). India had not invested on research and development of processing guar gum powder in different products and its technology (Sharma, 2010).

Major Importing countries of guar gum

Exporting Country	2010		2011		2012	
	Qty (MT)	Value (US$ Million)	Qty (MT)	Value (US$ Million)	Qty (MT)	Value (US$ Million)
USA	2,76,025.59	547.32	2,77,935.08	1,002.68	2,94,223.97	3,534.85
Canada	9,685.98	28.48	16,388.81	64.5	16,473.83	152.49
Germany	32,149.40	71.41	29,486.72	101.18	25,142.31	147.48
Australia	5,833.09	11.55	5,690.34	18.26	7,984.55	72.82
Italy	12,006.13	23.82	18,587.19	40.35	15,721.33	59.34
China	13,893.05	28.65	14,126.38	46.48	7,533.92	59.04
Japan	7,096.35	30.94	7,160.82	38.99	5,435.98	55.08
Russian Fed.	11,597.31	28.49	8,174.39	27.47	6,931.71	47.02
Denmark	5,291.50	24.71	5,236.02	26.76	4,593.07	41.66
Netherlands	4,784.70	12.34	4,814.39	19.25	4,964.95	41.36
France	6,511.30	29.7	5,785.09	27.81	4,849.85	37.46
Mexico	4,817.78	13.47	24,953.64	20.8	3,090.15	35.05
United Kingdom	13,703.92	32.89	7,320.73	22.42	6,060.24	33.79
Argentina	2,206.17	5.68	2,853.82	11.65	2,139.61	30.45
Brazil	4,132.22	9.66	4,206.25	14.54	2,988.69	22.55
Belgium	3,647.00	11.23	4,401.12	16.12	3,272.56	21.26
Others	48,113.52	134.02	51,876.97	170.43	41,618.17	246.73
Total	4,61,495.01	1,044.36	4,88,997.76	1,669.69	4,53,024.89	4,638.43

Source: APEDA Website

Guar products export from India

Nearly 80 per cent of guar gum and split produced in the country are exported which fetch a good amount of foreign exchange. Export of guar split and gum powder from India is continuously increasing with the annual compound growth rate of 9.4 per cent in quantity-terms and 22 per cent in value-terms. The major items of export among guar products are guar gum treated and pulverized, followed by guar gum refined split and guar meal. The total quantity of guar split and gum powder exported from India has increased from about 50 thousand MT valued at Rs. 58.09 crores during 1990-91 to all time high of 627.175 thousand MT in 2011-12 valued at Rs. 16407.04 crores.

Guar gum refined split, an intermediate product, is processed into guar gum powder and further to diversified products. The export composition of guar derivatives shows that export of refined guar splits was 47% and guar gum treated and pulverized was 53% in the year 1990-91. Currently the share of guar gum refined split is about 18 per cent of total guar products export from the country. The ratio of per unit value realisation from refined split to the gum treated and pulverised is 0.69. This indicates that exporting an intermediate product fetches 31 per cent less value realisation compared to exporting gum treated and pulverised.

Guar splits and gum exports from the country decreased by about 47 per cent in the year 2012-13 over previous year due mainly to low demand on higher prices and lower supply. In the year 2013-14, India exported 206.91 thousand MT of guar gum refined splits and 240.05 thousand MT of guar gum treated and pulverised valued at Rs. 3784.79 crores and Rs. 42593.45 crores, respectively. In the current financial year, the country has exported guar splits and guar gum powder about half the level of previous year quantity during the April to August period.

Guar meal, a by-product of guar seed processing, is used as animal feed. The export of guar meal is also continuously increasing at the compound annual rate of 37 per cent. The guar meal exports was only

60 MT in the year 1990-91 valued at Rs. 5.9 Lacs, which has increased to 1321.11 thousand MT presently valued at Rs. 289.94 crores.

The year-to-year variation in exports of guar products was observed to be very high due to higher fluctuation in production of guar seed and prices of guar seed and products. The fluctuation was found to be high in case of guar meal (189% in quantity exported and 193% in value realised) followed by guar gum treated and pulverised (95.7% and 215.6%, respectively) and refined splits (47.3% and 177.4%, respectively).

Guar products export from India

Year	Guar Meal		Guar gum refined split		Guar Gum Treated & Pulverised		Total Split and Gum	
	Qty (in T)	Value (Rs. Lacs)	Qty (in T)	Value (Rs. Lacs)	Qty (in T)	Value (Rs. Lacs)	Qty (in T)	Value (Rs. Lacs)
1990-91	60.0	5.9	23,344.0	2,435.0	26,448.1	3,373.6	49792.1	5808.6
1995-96	335.0	84.4	27,522.9	6,774.2	55,425.5	15,861.6	82948.4	22635.8
2000-01	1720.2	923.5	43954.9	20597.6	83855.7	38773.9	127810.7	59371.6
2005-06	3146.5	1078.0	49381.3	23797.7	134190.6	80047.6	183571.9	103845.3
2010-11	41424.9	6548.5	83011.5	50767.9	317171.3	236553.5	400182.8	287321.4
2011-12	80151.9	11682.5	102423.7	192330.0	524750.8	1448374.2	627174.5	1640704.3
2012-13	74814.1	14027.9	70515.2	339053.8	260982.4	1775618.6	331497.6	2114672.4
2013-14	132110.9	28993.7	82689.1	148408.8	387161.6	996136.7	469850.7	1144545.5
2014-15 (Apr-Aug)	68806.3	15301.0	33139.3	47466.8	206910.6	378478.7	240049.9	425945.4
Growth (%)	37.1	35.8	5.6	16.8	11.0	23.7	9.4	22.0
CV (%)	189.0	193.0	47.3	177.4	95.7	215.6	82.4	208.8

Source: DGCI&S

Export destinations of Indian guar products export

Guar refined split is derived from guar seed and is an intermediate product used for processing and producing different industry specific guar gum products. USA continues to be the major importer of guar refined splits. From 2005-06 onwards, China also emerged as major importer of guar refined split. China imposes import duty to the tune of 15% on import of guar gum powder and import of guar refined split is duty free (Padmanabhan, 2007). Recently China revised its duty structure in June, 2011 and imposed customs duty of 7% on the guar splits and 15% on guar powder for imports from India. However, the import of guar products from Pakistan is duty free. Thus, China is encouraging import of intermediate product, process it into different diversified guar gum products and re-export it (Sharma, 2011). Similarly other countries who are importing guar refined split in bulk from India process it and re-export the finished product.

The export of refined guar split has increased mainly to USA and China. These are the countries acquiring strength in the processing of guar split to the value added guar gum and other industry specific products. USA, China and European countries are the major competitors' in guar gum export to other countries. Major demand of guar seed originates from the US petroleum industry and also the oil fields of Middle East.

Export destinations of guar refined splits export from India

(Quantity in '000 MT and Value in Rs. Crores)

Country		2008-2009	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015*
USA	Qty	20.97	43.36	51.29	40.02	31.96	23.02
	Value	101.63	272.62	932.28	2029.61	607.99	337.32
Germany	Qty	0.90	0.93	0.24	0.14	0.02	0.00
	Value	4.12	5.84	3.30	4.37	0.64	0.06
Italy	Qty	0.18	1.37	0.87	0.02	0.00	0.10
	Value	0.86	3.38	13.84	0.38	0.00	0.29
China	Qty	27.30	24.27	40.65	27.58	47.44	8.04
	Value	114.53	146.78	817.48	1207.63	814.72	108.72
UK	Qty	0.21	0.12	0.27	0.07	0.12	0.05
	Value	0.95	0.72	4.36	1.19	1.86	0.47
Netherland	Qty	1.38	1.82	2.66	0.40	0.90	0.50
	Value	7.07	9.56	39.26	21.83	18.81	7.22
Switzerland	Qty	0.04	0.70	1.23	1.16	1.14	1.06
	Value	0.29	5.18	41.00	91.84	23.30	15.41
South Africa	Qty	2.33	5.43	3.14	0.32	0.04	0.00
	Value	10.68	29.41	37.47	4.69	1.01	0.00
Total	Qty	55.43	83.01	102.42	70.52	82.69	33.14
	Value	249.99	507.68	1923.30	3390.54	1484.09	474.67

Source: DGCI&S, *denotes that the figures are for Apr-Aug period

Export destinations of guar gum treated and pulverised export from India

(Quantity in '000 MT and Value in Rs. Crores)

Country		2008-2009	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015*
USA	Qty	75.87	171.67	382.31	202.46	299.58	160.62
	Value	519.54	1502.27	11510.80	15251.77	7916.01	3010.32
Canada	Qty	1.79	4.63	8.09	5.47	8.74	7.49
	Value	11.95	37.02	228.89	360.45	221.32	131.80
Germany	Qty	21.59	29.09	34.54	11.67	15.83	6.76
	Value	118.52	171.68	652.18	370.67	328.75	105.38
Australia	Qty	6.28	4.60	9.38	3.96	1.72	0.98
	Value	31.86	30.48	253.19	227.08	41.27	16.74
Italy	Qty	4.65	6.91	12.02	4.90	5.32	2.72
	Value	24.95	53.24	198.06	161.40	125.94	36.61
China	Qty	11.46	30.61	7.41	4.01	7.40	4.62
	Value	61.88	66.90	133.42	156.83	145.81	75.24
Japan	Qty	1.79	2.42	2.12	1.03	1.58	0.84
	Value	9.50	22.24	53.13	55.69	55.11	21.82
Russia	Qty	6.57	13.37	10.99	5.33	10.97	6.86
	Value	41.05	111.20	306.88	289.41	300.67	116.72
Denmark	Qty	1.59	2.05	2.22	1.20	0.75	0.31
	Value	8.66	13.58	37.12	62.23	19.77	5.00
UK	Qty	3.29	4.80	5.94	1.53	3.09	1.66
	Value	17.43	32.81	111.94	53.97	63.36	26.10

Source: DGCI&S, *denotes that the figures are for Apr-Aug period

USA continues to be the largest importer of Guar gum powder from India with an annual import of nearly 300 thousand MT recently which represents 77% of total guar gum exports from India. Germany, Russia, Canada & China are the other major importers of guar gum from India with more than 15.83, 10.97, 8.74 and 7.4 thousand MT of gum powder imports from India, respectively. Other major importers of guar gum are Italy, South Africa, Australia, Netherlands, Japan, Brazil, and Belgium. Presently India exports guar gum to more than 95 countries.

Guar products export from Pakistan

Guar and guar products export from Pakistan was just $29 million in 2006-07. It shot up to a record high of $152 million in 2011-12, but dropped in the following years to $ 142.8 million in 2012-13 and $ 68.57 million in 2013-14 (Hassan, 2014). The country has exported about 31.85 thousand MT of guar products during 2011-12, which has reduced to about 18 thousand MT in 2013-14. The major export destinations of Pakistan guar products are USA, Japan, Netherland, Denmark, Germany and United Kingdom.

Guar products export from Pakistan

Year	Quantity in MT	Value (Pak Rs. Million)	Value ('000 US $)
2011-12	31,847	9,007	1,02,147
2012-13	27,913	16,789	1,77,740
2013-14	17,994	9,727	95,941
2014-15*	5401	3347	33731

Source: Pakistan Statistical Bureau, calculated for April to March period from monthly data. * upto Sept. 2014.

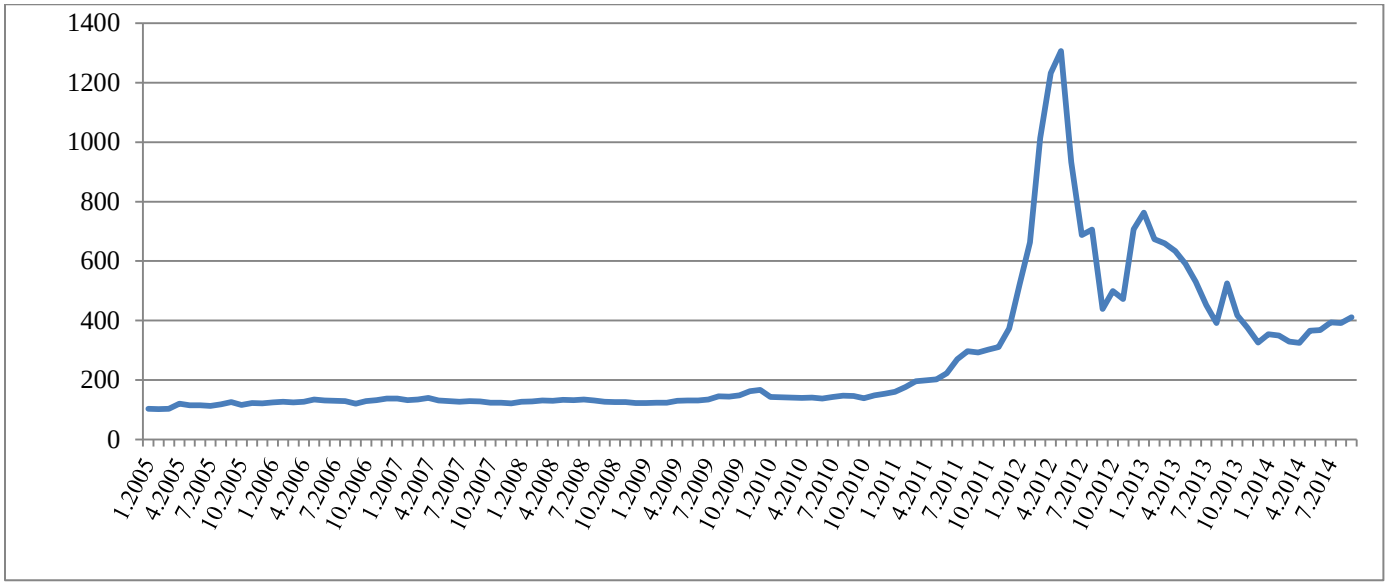
The Fracking boom and guar gum exports

The spurt in export of guar gum from India is mainly due to its role in the extraction of shale oil and gas, particularly after the increased use of hydraulic fracturing or "fracking" process. This process involves injecting a fracturing fluid, at high pressure, to create channels in rock formations. This allows the oil or gas to move into larger pools, from which they can be extracted. The efficiency depends on the uniform suspension of sand in the fluid carries a proppant, which is ensured by adding a soluble gel to the fluid to increase its viscosity. Guar gum is used as the most efficient soluble gel in terms of the least volume to achieve a given level of viscosity. The fluid is forced into the rock to provide support and stability to the channels (Black Rock, 2012). The shale gas surge in United States has transformed it from the world's largest gas importer to a promising exporter, and this has increased the demand of guar gum and hence, its imports. The rise in US imports of guar gum in 2012 was the result of a buildup of stocks by US shale-gas companies that feared a shortage due to an ongoing drought in India's main growing region (Donnan, 2013).

Fluctuating prices of guar seed and guar gum

Owing to the increased demand from the US oilfields for fracking fluid, guar seed and gum prices skyrocketed and reached the level of Rs. 30,000/qt. for seed and Rs. 98,000 per qt for guar gum during the months of April-May 2012. The prices had started increasing in the month of January 2011 and peaked in May 2012 and started decelerating afterwards and similarly the wholesale price index for guar seed.

Wholesale price index for guar seed



Guar Usage Pattern

Guar gum has diversified uses ranging from food uses (Bakeries, Dairy, Dressing, Beverages, Pet Food), industrial uses (petrolium industry, mining, explosices), pharma uses (cosmetics and medicine, slimming), textile printing, paper industry, etc. Previously the food grade guar gum was in high demand, the sector is consuming about 50-55 per cent of total guar gum supplies followed by industrial grade (25-30%), textile and paper grade (10-15%) and remaining used in medicine/ pharmacy industry (Table 10). But with the fracking boom for extraction of shale oil and gas, there was high demand from this sector and during 2010-11 to 2012-13 and it is estimated that this sector was using about 70 per cent of total guar gum supplies. Still this sector is the largest user of the guar gum (60-65%) followed by food grade (15-20%).

Application-wise global consumption of guar derivatives

Type of application	Target industries	Past consumption	Present consumption
Food grade	Bakeries (Bread), Dairy (Ice cream, Sherbets, Cheese etc.), Dressing (Sauces, Ketchup's) Beverages (Chocolate drinks), Pet Food (Thickener)	50-55%	15-20%
Pharmacy grade	Cosmetics & medicines (as binder and thickener) Slimming (Reducing weight & laxative)	05-10%	5-10%
Industrial grade	Oil drilling (as a well stimulant and fraction reducer), Mining (increased yield, filter aid) Explosives (Gelling agent),Coal Mining (fraction reducer, binding)	25-30%	60-65%
Other	Textile printing (Thickening agent for dyes) Paper (increase strength and decrease porosity) Tobacco (binding and Strengthening) Photography (Gelling and Hardening)	10-15%	5-10%

Source: PWC, 2003 and updated as per trade estimates

Strengthening Guar Industry: Issues and Suggestions

India is the largest producer of guar gum products. There is high import demand for Indian guar gum products, food additives, food thickener and other products. However, the major concern regarding the export of guar derivatives is high year-to-year fluctuations in guar production. Since guar gum is mainly used in the food and bakery industry, food safety concerns have become important for the guar processing industry. Thus, preparedness of guar split and guar gum manufacturing industries for these food safety concerns, high fluctuations in area, production and productivity of guar seed, and highly volatile prices of guar seed and gum splits, are the crucial limitations for Indian Guar Industry. The other issues in the guar industry are reproduced here from author's earlier work (Sharma & Gummagolmath, 2010):

Cultivation: the issues related to guar production and its research & development includes lack of availability of high-yielding varieties with high viscosity gum, poor access to production technology and quality seeds to farmers, low seed replacement ratio, etc. It was suggested that SAUs/ research centers to develop varieties taking care of industry requirements. The easy availability of production technology and HYV seeds were the main requirement of farmers.

Marketing of Guar and its Products: the issues related to marketing of guar seed and products includes lack of containers and transport facilities for processed products from processing point to the port of export, lack of storage facilities, poor linkage of buyers to farmers, etc. Promotion of direct marketing and contract farming in guarseed is suggested for linking farmers to buyers. Development of hinterland ICDs linked with railway network, and cleaning & grading units in market yards will facilitate the industry. Use of commodity futures as risk management tool by farmers/ groups need to be promoted.

Processing: The major challenges in guar processing were, the poor research and development in the country for processing technology, and development of value-added products of gum for use in different industries. It is suggested that a part of revenue from export taxes need to be diverted to create a national level research and development institute for the purpose.

Promotion of Guar Industry and Export: the issues relating to promotion of guar industry were lack of certification laboratories in the processing centers, policies promoting export of intermediate product, competition from countries strong in processing of value-added products of gum, etc. The requirement of the stakeholders included establishing certification laboratories in the processing locations, export policies discouraging intermediate product export, and concerted efforts for developing/ importing processing technology for value added products.

Guar Industry Value Chain: the industry concerns on guar value chain indicated that there is fragmented supply chain in guar seed and products with lack of skilled manpower and lack of knowhow on technical & emerging market requirements among the small split manufacturers. The measures to strengthen the value chain are creating specialized manpower and capacity building of fragmented industry on the food safety aspects.

Guar Balance Sheet and outlook

Guar seed production in India this year is estimated at 1677.24 thousand MT, one of the lowest figures in last 3 years. Total export of guar split and gum powder converted to guar seed is estimated at 1456.2 thousand MT, domestic use is estimated at 712.3 thousand MT of seed, thus total use of guar seed is expected to be about 2225.3 thousand MT. The carry over stock for the next year is likely to be around 891.9 thousand MT.

Guar supply and demand balance

Year	Supply ('000 Tons)			Uses ('000 Tons)			Carry out ('000 MT)
	Carry in	Production	Total Supply	Export	Domestic	Total Use	
2010-11	759.7	1965.3	2725.0	1379.8	538.3	1918.1	807.0
2011-12	807.0	2217.6	3024.6	2162.5	739.5	2902.0	122.6
2012-13	122.6	2460.7	2583.3	1143.0	757.8	1900.8	682.5
2013-14 E	682.5	2858.6	3541.1	1620.0	762.7	2382.8	1158.4
2014-15 AE	1158.4	1958.9	3117.2	1512.9	712.3	2225.3	891.9

Source: Guar seed production data (Department of Agriculture and Cooperation, Ministry of Agriculture, GOI), Export data (DGCIS). E= estimates based on trade estimates, AE= projections based on trade estimates

Guar split and gum powder export is converted to guar seed based on 29% recovery ratio.

Looking at the demand-supply scenario, the guar prices are expected to be range bound based on export demand and market arrivals. At lower prices farmers are not expected to release the stock, thus putting upward pressure on prices. But in the long-term the demand is likely to keep increasing in the coming years because of the recent discovery of huge blocks of shale rock with natural gas in China. Declining crude oil prices putting pressure on profits of oil companies may lead to reduce in investments and in turn decrease in use of guar gum for some time.

Technical Recommendation:

The market is expected to find strong support at the levels of 3300 and has good potential of testing 4600 and 5800 on the higher side by January 2016.

Price Expectation

Commodity	Units	Current Market (05.10.2015)	Market View	Technical Projections		
				Support	T1	T2
Guar Seed	Rs. / MT	3935	↑	3300	4600	5800