EXPORT PERFORMANCE OF GUARGUM IN INDIA

THESIS

Submitted to
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola
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MASTER OF SCIENCE
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Enrolment Number - PP/3397 2019

DECLARATION OF STUDENT

I hereby declare that, the experimental work and its interpretation of the thesis entitled, **"EXPORT PERFORMANCE OF GUARGUM IN INDIA"** or part thereof has neither been submitted for any other degree or diploma of any University, nor the data have been derived from any thesis / publication of any University or Scientific organization. The source of materials used and all assistance received during the course of investigation have been duly acknowledged.

Place : Akola **(Vivek Siddhodhan)**

Date : / / 2019 Enrolment No. PP/3397

CERTIFICATE

This is to certify that thesis entitled, **"EXPORT PERFORMANCE OF GUARGUM IN INDIA"** submitted in partial fulfilment of the requirement for the degree of **"Master of Science in Agriculture (Agricultural Economics)"** of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola is a record of bonafide research work carried out by **Vivek Siddhodhan** under my guidance and supervision.

The subject of the thesis has been approved by the Student's Advisory Committee.

Place : **Akola**
Date : / /2019

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$	:	Dollar
%	:	Per cent
/	:	Per
Agril.	:	Agricultural
APMC	:	Agricultural Produce Marketing Committee
APEDA	:	Agricultural and Processed Foods Export Development Authority
CGR	:	Compound Growth Rate
CSO	:	Central Statistical Organisation
CV	:	Co-efficient of Variation
et al.	:	Et alia (and associate)
etc.	:	Etcetera
FAO	:	Food and Agricultural Organisation
Fig	:	Figure
GDP	:	Gross Domestic Product
Govt.	:	Government
Ha.	:	Hectares
i.e.	:	That is
J.	:	Journal
Kg	:	Kilogram
M	:	Million

MT	:	Metric Tonnes
M. Sc.	:	Master of Science
No.	:	Number
Ph. D.	:	Doctor of Philosophy
Qty.	:	Quantity
Res.	:	Research
Rs.	:	Rupees
R^2	:	Regression
SE	:	Standard Error
Sr. No.	:	Serial Number
UAE	:	United Arab Erimates
UAS	:	University of Agricultural Sciences
UK	:	United Kingdom
Unpub.	:	Unpublished
USA	:	United States of America
Viz.	:	Namely
Vol.	:	Volume
WTO	:	World Trade Organisation
Yrs.	:	Years

D) THESIS ABSTRACT

a) Title of the Thesis	**:**	**EXPORT PERFORMANCE OF GUARGUM IN INDIA**
b) Full Name of Student	**:**	**Vivek Siddhodhan**
c) Name and Address of Major Advisor	**:**	**Dr. B. N. Ganvir** Head Department of Agricultural Economics and Statistics, PGI, Dr. PDKV, Akola
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ABSTRACT

The present study entitled “Export Performance of Guargum in India” was undertaken to know growth and instability in area, production, productivity of Guar and export of Guargum, trend in domestic and international prices and competitiveness of Guargum export. The nature of

data used for the study is entirely based on secondary source of data from 1988-89 to 2017-18 and for price of Guargum it is from 2000-01 to 2017-18.

The growth in area, production, productivity of Guar and export of Guargum was measured by Compound Growth Rate, Coefficient of Variation and Coppock's Instability Index was used for working out the instability in area, production, productivity of Guar and export of Guargum. Quadratic production function was used to study the trend in domestic and international prices of Guargum. The export competitiveness of Guargum was measured by Nominal Protection Coefficient.

There is increase in agriculture exports but percentage share of agriculture export to total export was decreasing due to increase in share of manufacturing sectors , service sectors etc.

The growth rate of Guar area in India is found to be Positive and significant during period II and over all period of the study. The growth rate of production was significant during period II and over all period. The growth rate of productivity was positive and significant during over all period. The growth of export quantity and export value was found to be positive and significant during period I, period II and over all period.

The area of Guar exhibited less variability with coefficient of variation at 24.84 per cent and 27.01 per cent in period I and period II, respectively and it was 37.93 per cent in over all period. The production of Guar exhibited less variability with coefficient of variation at 40.29 per cent and 43.50 per cent in period I and II period, respectively, while it was highest in overall period at 65.82 per cent. The variability in productivity was less in period II with 28.34 per cent and it was higher with 34.36 per cent and 37.58 per cent in period I and over all period, respectively. As regard to the export quantity and export value of Guargum the highest variation was observed with 88.61 per cent and 183.77 per cent in over all period.

Coppock's Instability Index shows the highest variation in export value of the Guargum at 52.24 per cent, followed by export quantity

at 23.54 per cent during over all period. Instability in area and productivity was higher in over all period and the instability in production was higher in overall period .

Trend in domestic price and International prices of Guar gum were significant at one per cent level of significance.

The NPC value of Guargum showed the average NPC value as 0.99 per cent and 0.93 per cent in period I and period II, respectively and the NPC value for over all period was 0.96 per cent. It indicates moderate competitiveness of Export of Guargum in international market.

CHAPTER I

INTRODUCTION

1. 1 EXPORTS AND ECONOMIC GROWTH

Export plays a significant role in a country's growth and development process. The importance of export as one of the contributing factor in the development of any country has long been recognised by many economists. Export growth is seen as a determinant of import capacity, which, in turn, is a determinant of the level of domestic activity. However, it is misleading to assess the contribution of the export sector solely in terms of foreign exchange earnings, as many underdeveloped countries, while stressing exports, also hope to reduce their relative dependence on foreign markets as economic development proceeds at a more rapid pace. Thus, it is stressed that the export sector assumes a much broader and useful role than that reflected in terms of foreign exchange earnings (Hultman, 1967). The growth and expansion of global export facilitates the progress of global economy.

Export expansion can play an instrumental role in promoting rapid economic growth. Since exports are a component of GDP, rapid export growth means an even faster growth of GDP, through the Keynesian multiplier process. Moreover, export expansion increases efficiency in the economy, which further stimulates economic growth. The increase in income that comes directly from exports leads in time to a rise in demand for a wide range of products, including non-tradable. These demand pressures are reflected in a higher rate of capacity utilization and ultimately involves investment in facilities providing such products. This tends to increase the scale of production and leads to various economies of scale, which ultimately reduces the cost and price of the product. Export industries also have the high intensity to absorb surplus of labour force of developing country which thereby leads to the creation of employment and increase in income which leads to rise in savings which is transferred into investment in physical and human capital, and thus in the rate of economic growth. The expansion of exports sector leads to the inflow of foreign direct

investment, foreign loans and advance technology. Apart from above, through export activities the international trade relations is developed between the foreign countries which promotes healthy political relations among different economies of the world and at the time of any economic and natural crisis the trading partner countries are the first to come to rescue.

1.2 INTRODUCTION

India is native of guar or cluster bean where it is used as a vegetable. Guargum is an extract of the guar bean, where it acts as a food and water store. Guar gum comes from the endosperm of the seed of the legume plant *Cyamopsis tetragonoloba*; an annual plant, grown in dry regions of India as a food crop for animals. The guar bean is principally grown in India and Pakistan, with smaller crops grown in the U.S., Australia, China, and Africa. The drought-resistant guar bean can be eaten as a green bean, fed to cattle, or used in green manure. For hundreds of years Guar has been used as vegetable in India. Guar is a rain-fed crop sown in July-August and harvested in October-November. Being a leguminous crop, guar fixes nitrogen, making the soil fertile.

The growing season of guar is 14 -16 weeks and requires reasonably warm weather and moderate flashing rainfall with plenty of sunshine. Too much rain can cause the plant to become more 'leafy' thereby reducing the number of pods or the number of seeds per pod which affects the size and yield of seeds. The crop is generally sown after the monsoon rainfall in the second half of July to early August and is harvested in late October and early November. The Guar is a naturally rain fed crop. Depending on the monsoon rainfall the total size of Guar crop varies from year to year.

The guar seeds are dehusked, milled and screened to obtain the guar gum. It is typically produced as a free-flowing, pale, off-white coloured, coarse to fine ground powder. Guar Gum (Galactomannan) is a high molecular weight carbohydrate polymer made up of a large number of mannose and galactose unit linked together. The crude Guar Gum is a greyish white powder, 90 per cent of which dissolves in water. It is a non-

ionic polysaccharide based on the milled endosperm of the guar bean (leguminous seed cyamposis tetragonalobus). The guar gum is produced from endosperm and consists mainly of gummy Polly groups of monogalactoses with small amount of fibre and minerals.

Several methods have been used for the manufacture of different grades of guar gum but due to its complex nature, the thermo mechanical process is generally used for the manufacture of edible grade and industrial grade guar gum.

Commercially important derivatives of Guargum

1) Hydroxy Alkylated Guar gum
2) Carboxy Methylated Guar gum
3) Oxidised Guar gum
4) Acetates of Guar gum
5) Cationic derivatives of Guar gum
6) Sulphated Guar gum
7) Guar gum formats
8) Guar gum acryl amide
9) Borate cross linked Guar gum
10) Reticulated Guar gum

Guargum Production

Guar seed is a monsoon crop and further require dry weather for better production. The annual production is related to rainfall. The production will be higher if the crop receives good rainfall and will result in decline in prices. From the year 2005 the availability of rainfall was steady which maintained the production of crop in a range bound. Accordingly the price of gaur seed was also steady from the year 2005 till 2008. In 2009-2010 the production was 3.5 lakh tonnes due to unfavourable rainfall and the price hit all time high in the spot and futures market. During that season (2009-2010) the farmers shifted to profitable crops as the availability of rain was only 392.1MM. But this year the overall fundamentals are favourable

for guar seed productions and have received 688.2 MM rain. The output is estimated to increase in this fiscal year at around 10 lakh bags against 3.5 lakh bags in 2009-2010.

India produces 600000 tonnes of guar annually i.e. the maximum level of production in the world. It contributes to around 80 per cent share in the world's total production (APEDA).

Guar meal is the by-product of Guar Gum, consisting of outer seed coat and germ material. After gum extraction, it is a potential source of protein and contains about 42 per cent crude protein. The protein content in guar meal is well comparable with that of oil cakes.

The consumption pattern of guar seeds is largely influenced by the demands from the petroleum industry. India accounts for 90 per cent of the world's guar produce, of which 72 per cent comes from Rajasthan.

About 90 per cent of guar gum processed in India is exported. There are various grades of Guar gums pure or derivative. Its ability to suspend solids, bind water by hydrogen bonding, control the viscosity of aqueous solutions, form strong tough films have accounted for its rapid growth and use in various industries. It is used in food, paper and textile industries. But most of the demand for the gum is due to the expansion of the shale gas and oil industries. Ninety per cent of the export is used to extract oil and shale gas, a natural gas trapped in shale formations. Guar Gum either modified or unmodified, is a very versatile and efficient bio-polymer covering a wide range of industrial applications such as: Oil drilling, Textile printing, Human food and Pet Food, Paper, Explosive, Water Treatment, etc. Where its binding, thickening, film forming and lubricating factors are of great interest.

According to National Institute of Agricultural Marketing, (NIAM) (2005) Guar trade from India. The price of Guar seed ranged from INR 4000 per quintal to INR 11000 Rs/quintal at Jaipur market in 2013. While for the same period the price range at Sri Ganganagar was from INR 7752 per quintal to INR 28556 per quintal. In the year 2013, the ranges of price at Jaipur and Sri Ganganagar market were INR 4361 per quintal to

INR 11482 per quintal and INR 5004 per quintal to INR 11743 per quintal respectively. The total quantity traded in commodity exchanges was 88 times of total quantity of Guar seed produced in the year 2004-05, 179 times in the year 2005-06, 146 times in the year 2006-07 and 53 times in the year 2007-08.

Areas of Cultivation

The main areas of cultivation of Guar in India are Rajasthan, Gujarat, Haryana, Punjab, Uttar Pradesh, Madhya Pradesh , Tamil Nadu , Maharashtra , Karnataka and Andhra Pradesh.

Guar Seed Production in Rajasthan

Rajasthan is largest Guar bean producing state in India. The crop is cultivated in *Kharif* season and sowing starts with the onset of monsoon in the month of June/July. Guar is being grown mainly in arid districts of western part of Rajasthan. A production of 2.0 million metric tons was achieved from an area of 4.5 million hectares in Rajasthan during 2012-13. However, the advance estimates of Department of Agriculture, State Government of Rajasthan suggest that a further increase in area to 4.9 million hectares will help state in achieving a production of more than 2.2 million metric tons during 2013-14. Nearly 90 per cent of the area under Guar crop in the country is being contributed almost consistently by Rajasthan state though the same is not true for production which has shown lots of variation owing to over dependence of the crop (in terms of area and productivity) on monsoon.

Guar seed Production in other States

In addition to Rajasthan, Guar is also cultivated in Haryana, Gujarat, Uttar Pradesh and Punjab. In terms of area, Haryana and Gujarat are comparable but Haryana has made significant growth in production in recent years due to higher productivity. The latest available official statistics reveal that the production of Guarbean in Haryana has ranged from 91,000 tons in the year 2002-03 to 602,000 tons in 2008-09. The productivity has ranged from 435 kg/ha during 2003-04 to 1627 kg/ha in 2008-09. Productivity in 2011-12 was estimated at 1350 kg/ha against the national

average productivity of Guarbean of 644 kg/ha only. The high yielding and short duration varieties developed by Haryana Agricultural University, Hissar viz.; HG 365, and HG 563 and its extensive use by farmers has supported higher productivity in the state. Increasing area under cultivation of Guar in Haryana will help in augmenting the overall production of Guar from India. In Gujarat, a production of 33,000 metric tons was achieved from an area of 37,000 hectares during 2011-12.

India Facts and Figures

India is the major exporter of guargum to the world. India exports various forms of Guar products to a large number of countries. The country has exported 494101.27 MT of guargum to the world for the worth of Rs. 4169.56 crores / 646.94 USD Millions during the year 2017-18.

India's production contributes to 80 per cent of the world's total production figuring up to 6 lakh tonnes. Rajasthan wholly retains the credit for India's position producing 70 per cent of the production itself. Guar is largely consumed as a vegetable in the Indian subcontinent. 25000 tonnes of the total production in the country constitutes to the domestic market. India is the leading net exporter of guar seeds and guar gum. The country exports over 117000 tonnes of guar and its derivatives, which is comprised by 33000 tonnes of refined split guar gum, and 84000 tonnes of treated and pulverized guar gum. The net worth of the Indian exports is estimated over Rs 500 crores. The production list of guar is dominated by India as a leading producer of this crop.

Major Export Destinations (2017-18) : U S A, Norway, Russia, China and Germany

Guar Gum Market Outlook

1. Asia Pacific accounts for smaller market share for guar gum consumption. However, it is a major raw material source for guar seeds. Eighty per cent of the world's guar is produced by India in Rajasthan, Gujarat, and Haryana. Currently, guar gum is used in the food, textile, and pharmaceutical industries in the Asia Pacific region.

2. North America and Europe are the largest markets for guar gum powder due to application in the food industry as an additive and oil industry as a fracturing agent. Hence, increasing drilling activities in the U.S. shale industry has increased the demand for guar gum, thus driving market growth.
3. Africa is a small player in this market and is not expected to experience much growth over the forecast period.
4. Latin America also demonstrates significant growth in the guargum market. The productivity of processed foods such as cheese, sausages, soups and animal feed preparations increases on addition of guargum.

Major players in the Guar Gum Market include Penford Corp., TIC Gums, Inc., Lucid Group, Vikas WSP Limited, and Ashland Inc

1.3 Need for the study: India stands first in the production of guar seed in the world. Still we are not able to exploit the full potential of this crop especially in view of low productivity and inconsistent production. The guar production is often subjected to wide fluctuations due to its dependence on rainfall. Very few studies have been conducted on the production and export performance of guar. India is the largest producer, and exporter of guar and derivatives in the world. The analysis of growth rates of area, production, yield and exports will help to augment guar production in the country and extend it to non-production regions. The analysis of export of guar and derivatives will reveal the potential. The current study will help the scientists, producers and policy makers to devise appropriate policies to enhance guar production and export to meet the requirements of both domestic and international markets

1.4 OBJECTIVES

1) To estimate the growth in area, production, productivity of Guar and export of Guargum
2) To work out the instability in area, production, productivity of Guar and export of Guargum
3) To study the trend in domestic and international prices of Guargum
4) To study the export competitiveness of Guargum

1.5 HYPOTHESIS

1) There is a growth in production, value and export of Guargum in India

2) Guargum has better competitiveness in international market.

1.6 Limitations of study

Although the study was based on the secondary data collected from various published sources, inevitable effort was made to choose the better among them. Care has been taken to avoid personal bias in such decision. However, the limitations inherent in the secondary data are to be recognized.

CHAPTER II

REVIEW OF LITERATURE

The review of literature is one of the important aspect in the research process which helps researcher to get acquainted with the subject matter under study and channelize future efforts in desirable directions. It provides necessary guidelines and help the researcher to delineate his research problem.

The main purpose of this study is to determine the growth in area, production, productivity of guar and export of guargum, to workout the instability in area, production, productivity of guar and export of guargum over the study period, to study the trend in domestic and international prices of guargum and to study the export competitiveness of guargum. Several research worker have worked on the problem in different regions. This chapter takes brief account of research work in growth, instability in production and export trend in domestic and international prices and export competitiveness of guargum. This chapter has been organised into the following subsections.

2.1) Growth in area, production, productivity of Guar and export of Guargum

2.2) Instability in area, production, productivity of Guar and export of Guargum

2.3) Trend in domestic and international prices of Guargum

2.4) Export competitiveness of Guargum

2.1 Growth in area, production, productivity of Guar and export of Guargum

Brahm Prakash (1998) in his study entitled "Export Potential of Rajasthan" tried to identify the agro-products having export potentiality form Rajasthan. The study revealed that Rajasthan is the emerging agricultural giant of national front. To country's total production during 1995-96, Rajasthan contributes 8.8 per cent of wheat, 8.4 per cent of coarse grains, 11.1 per cent of total pulses, 13.7 per cent of oilseeds, 10.2

per cent of cotton and 7.96 per cent of milk. It holds 21.3 per cent share in bajra, 8.6 per cent in maize, 21.7 per cent in gram, 90 per cent in moth bean and 40 per cent share rapeseed and mustard in country's total food basket. The state also has potentiality for export of horticultural products particularly arid fruits, flowers, medicinal and aromatic plants and processed products. Rajasthan economy endowed with cheap labour, diverse agro-climatic conditions, developed infrastructure, passed great potentially for export of agricultural commodities.

Alagappan and Manoharan (2001) analysed the growth in production, area and productivity of pepper in India and compared it with other major producing countries like Indonesia, Brazil, Malaysia and Vietnam. They observed that increase in production of pepper was a function of increase in both its area and productivity. They also analyzed the magnitude of variability of pepper for the major producers and their production share. Even though India occupies first place in area and production, however holds the last position in productivity among the major pepper producing countries.

Arora (2001) examined trends and variability in area, production and productivity of guar in India. The results indicated that the highest levels of guar acreage were 2405.1(1999-98), 327.2(2000-1999) and 2811.7 (1999-98) thousand hectares in case of Rajasthan, Haryana and the country as a whole, respectively. In the growth rate of production Haryana state registered the highest and highly significant growth rate of 9.72 percent per annum. The variations in area and appropriate regulation of prices management practices and risk factors could be conducive for stabilizing the area allocation under this crop.

Srivastava et al. (2003) analyzed the growth in pulses in eastern Uttar Pradesh. They estimated compound growth rates of area, production and productivity of pulses in the districts of Eastern Uttar Pradesh during the period 1975-76 to 1999-2000 and sub periods 1975-76 to 1989-90 and 1990-91 to 1999-2000. Highest positive growth rate was 95.40 per cent and lowest 32.50 per cent. A decline in

productivity was observed in all the districts, where there was a positive growth in production, which indicated that whatever increase in production was achieved in those districts, was only due to growth in area, during those periods. In Eastern Uttar Pradesh, as a whole, arhar area increased by 1.7 per cent annually, whereas production and productivity was decreased during that period. Analysis of entire period revealed that area and production of pulses declined at the rate of 1.8 and 0.67 per cent per annum, respectively, but productivity increased at a compound rate of 1.18 per cent per year.

Henry and Kumar (2005) studied the trend in area, production and productivity of guar for long-term period (1976-2000) and recent period (1991-2002) for arid Rajasthan, Rajasthan state and for the whole country. The Compound Growth Rate (CGR) for area in arid Rajasthan and Rajasthan state had an increasing trend on long-term basis, but a decreasing trend on all - India basis. In recent years, area under the crop revealed an increasing trend in arid Rajasthan and all-India basis, but a decreasing trend in Rajasthan state. CGR for production and productivity had a decreasing trend in both arid Rajasthan and Rajasthan state. On all- India basis, these indicated a positive trend both on long term and recent year basis. The total mean production on all India basis was 7.3 lakh tones, out of which arid Rajasthan contributed 51 per cent, and whole Rajasthan contribution was 67 per cent on the long term basis. CGR for guar gum quantity and foreign exchange earnings revealed a significant positive growth trend.

Chamola and Hasija (2005) examined the trend in area, production and productivity of cluster bean in India and other major cluster bean producing states. Compound growth rates and decomposition technique were used as analytical techniques. The main finding of the study was that the highest growth rate was recorded for production and the least in the case of productivity among the cluster bean growing Haryana states. Haryana recorded the highest growth rate in area and production. Whereas, Rajasthan topped in case of yield per hectare.

Mondal and Roychowdhury (2010) analyzed the area, production and yield of pulses in West Bengal during the period of 1980-81 to 2007-08. In this, an attempt had been made to find out the district wise variations of Compound Annual Growth Rate (CAGR) of area, production and yield of pulses during the study period. This study revealed that the compound growth rate of area under pulses declined in all the districts and the compound growth rate of production of pulses has decreased in all districts except Birbhum district. The compound growth rate of yield of pulses has increased in all the districts except four districts i.e. Dakshin Dinajpur, Jalpaiguri, Darjeeling and Purulia. The study also highlighted district wise variations of productivity of pulses in West Bengal.

Rao (2010) studied the performance of pulses during the pre and post-WTO period in the Andhra Pradesh. The time series data for the period 1986-87 to 2007-08 on area, production and productivity were used for the study. Hierarchical and K- Means clustering, Compound Growth Rate (CGR), Coppock's Instability Index (CII) and Analysis (change in average production) were employed for achieving the objectives. He found that growth performance of pulses production was high, but it was accompanied by high degree of instability. Decomposition analysis revealed that area effect was marginally higher than the productivity effect on the production differential. Therefore, growth in production should mainly come from area attributing factors like assured supply of farm inputs and provision of remunerative prices.

APEDA Agri Exchange Ready Reckoner Series Commodity Guargum (2011) India’s production contributes to 80% of the world’s total production figuring up to 6 lakh tonnes. Rajasthan wholly retains the credit for India’s position producing 70 per cent of the production itself. Guar is largely consumed as a vegetable in the Indian subcontinent. The total production of 25000 tonnes in the country constitutes to the domestic market. India is the leading net exporter of guar seeds and guar gum. The country exports over 117000 tonnes of guar and its derivatives, which is comprised by 33000 tonnes of refined split guar gum, and 84000 tonnes of

treated and pulverized guar gum. The net worth of the Indian exports is estimated over Rs 500 crores. The production list of guar is dominated by India as a leading producer of this crop.

Purushottam et al. (2013) observed that there was a high year-to-year variation in production of cluster bean, and consequently, in exports of cluster bean and its derivatives. Cluster bean gum is mainly used in the food and bakery industry, the food safety concerns are becoming important for the cluster bean processing industry. The preparedness of cluster bean split and cluster bean gum manufacturing industries for these food safety concerns, high fluctuations in area, production and productivity of cluster bean seed, high volatile prices of cluster bean seed and gum splits, are crucial limitations to the growth of cluster bean industry. The paper has discussed these issues and strategies in cluster bean value chain and cluster bean gum processing industry. Lack of technical knowledge and processing technology for industry specific value added products, poor market linkages with farmers and unstable trade policies were the main issues confronted by the cluster bean industry. Some suggestions for reforming cluster bean industry in India were also mentioned.Results of the analysis reflect that there was high volatility in prices of Guar bean at Hissar (56.7% and 56.6% in 2012 and 2013, respectively), Fatehabad (56.3% in 2012), Jaipur (50.6% in 2011), Adampur (47.7% in 2012), Sri Ganganagar (46.1% in 2012) and Hanumangarh (36.1% in 2011) markets, as indicated by the higher magnitude of CV in the respective markets.

Purushottam et al. (2013) observed that the export of guar derivatives has increased sharply from 2005-06. Growth in export of guar meal has been worked out to be 25 per cent in quantity terms and 32 per cent in value-terms. Export of guar gum refined split has grown at the rate of 5.3 per cent in quantity-terms and 14.6 per cent in value-terms. The export of guar gum treated and pulverized has shown an increase of 8.6 per cent in quantity and 18 per cent in value . Coefficient of variation (CV) and Instability Index (CVt) in export of guar products show that the export of guar meal was highly instable and volatile in both quantity and value

terms. The CV for value export of guar refined split (64.2%) and gum treated and pulverized (76.6%) indicated high instability in export value realization.

Dhawan and Kashish (2015) stated that the 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 20.50, 2.75 and 15.70 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 1.86 per cent for area under guar crop, 7.40 per cent for production and negative growth rate of 8.38% for yield.

2.2 Instability in area,production,productivity of Guar and export of Guargum

Singh (1993) applied variance decomposition procedure to time series data on food grains to analyze the sources of instability over the period from 1950-51 to 1989-90. The increase in total food grain production and average production for two sub-periods had been accompanied by higher instability and risk in the production of certain crops. The coefficient of variation of food grains production increased by 6.97 per cent and 39.65 per cent respectively between the periods.

Jalajakshi (1994) studied the instability in export of shrimps from India for the period of 1961-91. The frozen shrimps export to Japan and USA were found to be stable but dried and canned shrimps to Japan, USA, UK and EEC showed high variability due to the decreased demand in importing countries and high cost of production in India.

Hyma Jyoti et al. (2003) studied export performance of onion and potato from India an economic analysis conducted the growth in volume of export, export earnings and unit value realization indicated a positive trend for both onion and potato during period 1997-1991 to 1999-2001. The highest instability was observed for volume of exports in both potato and onion when compared to export earnings and export price / unit

value. The average NPC values of onion and potato during 1996-97 to 1999-2001 indicated moderate and high competitiveness respectively.

Sharma and Gummagolmath (2012) study has observed that export of guar gum treated and pulverized fetched 25-30 per cent higher income to the country compared to the export of guar refined splits. Considering about 5-10 per cent increase in cost of processing splits to gum powder, still 15-20 per cent higher income realization could be achieved, and processing industry could provide employment to more people in the area.

Sharma and Gummagolmath (2012) studied that the value of CV for production of guar was 60 per cent for Rajasthan and 44 per cent at all-India level, indicating high instability. The magnitude of CV for yield of guar was higher in Rajasthan (51%) than at all-India level (33%). However, lower CV for area under guar cultivation shows stability in the acreage allocation for this crop. It was mainly due to the fact that under rainfed conditions, farmers have limited alternatives in terms of crop selection, implying thereby that production of guar can be stabilized with the stable yield of the crop over the years.

Sharma and Gummagolmath (2012) studied the total volume of guarseed and guar gum traded on commodity futures exchanges increased continuously in the initial years and accounted for more than 30 per cent of the total volume of agricultural commodities traded. The total quantity traded on commodity bourses was 88-times of the total quantity of guar seed produced in the year 2004-05, and it was 179-times in the year 2005-06, 146-times in the year 2006-07 and 53-times in the year 2007-08. The total value of output of guar seed was estimated at Rs 1,238 crore during 2005-06 (June – July), which has enjoyed a futures turnover of Rs 299,305 crore (242times of guar output) during May 2005-March 2006. This shows that futures contracts of guar seed and guar gum are liquid enough and provide sufficient hedging opportunities to minimize price risk.

Mathur (2012) studied Export of guar products from India to the world market, especially to the US and Europe, began in the early 1960s. Guar products have become one of the largest agricultural export

products from India during the last couple of years. In fact, guar accounted for about 18 per cent of India's total agricultural exports in 2012-13. There has been a remarkable increase in both the export value and volume of guar products. the value of Indian guar product exports increased from a mere US$ 84.7 million in 2001-02 to about US$ 650 million in 2010-11. Thereafter, the export grew at a galloping pace and reached about US$ 3,930 million in 2012-13, making guar products the largest agricultural export item in that year. However, the value of exports declined later to US$ 1,574 million in 2014-15. The rise/fall in value of exports was due more to a surge/decline in unit values of exports rather than to an increase/decrease in quantity

Mudgil (2014) studied that India accounts for 80% of the total guar produced in the world and 70% of it is cultivated in Rajasthan. India is the world leader for production of guar, which is grown in the northwestern parts of country encompassing states of Rajasthan, Gujarat, Haryana and Punjab. During 1970s guar was also grown regularly in the State of Uttar Pradesh (U.P.), Madhya Pradesh (M.P.) and Orissa. As the processing facilities have been closed down in U.P. and M.P., the cultivation in these states is negligible now. In Orissa too guar is not cultivated any more. The annual production of guar during last 3 years ranged from 11, 00,000 to 12, 87,000 MT.

Suresh et al. (2014) Instability in prices of ahricultural commodities has implications on various sectors of the economy and livelihood of millions of rural households. Liberalization of the economy since early 1990s is believed to import the instability in the international prices to the domestic prices. The present study has analyzed the instability in the prices of non-milk livestock commodities in India since liberalization. There was a general rise in the prices of the livestock commodities but during the later periods, rising trend has decelerated for all commodities. The instability has also declined during the recent periods, except for a few commodities. The study has also decomposed the prices into its constituent components, *viz*. Seasonal, trend, cyclical and irregular components. The seasonal effects are generally high during the periods of

December to June. The variability in the cyclical and irregular components was found to increase during the later periods. The effect of these factors varied across commodities.

Rai, (2015) studied the trends and economic dynamics of guar in India,. Global production of guar seed is estimated at about 1.0-1.6 million tonnes annually. However, there is wide fluctuation in the production of guar depending mainly on the monsoon conditions in India, particularly in Rajasthan. India is the largest producer of guar seed and its derivative products with a share of about 80 per cent of world production of guar seed. In term of export, Guar products are exported from India to more than 100 countries. However, the US is the largest export destination. In 2014-15, about 73 per cent of Indian exports went to the US followed by China (5.4 per cent), Canada (3.2 per cent), Germany (3.1 per cent), Russia (2.8 per cent) and Italy (1.1 per cent). Although the US was always the major market for Indian guar products, there was a big spurt in US demand in the recent past raising its share from about 41 per cent in 2009-10 to 81 per cent in 2012-13. After reaching a peak, the share declined to about 73 per cent in 2014-15.

2.3. Trend in domestic and international prices of Guargum.

Hazell et al. (1990) in their study on the relationship between world price instability and the farm prices in developing countries indicated that world prices for agricultural commodities were traditionally unstable, but they were particularly turbulent during the late 1970's and early 1980's. They used the available post war data on individual commodity prices to test whether world price instability was increasing and to examine its impact on the producer prices in developing countries. It was found that the recent turbulence was more of a statistical fluke than the beginning of any long-term increase in market instability. Further while the variability in world prices had been entirely transmitted to developing countries in dollar equivalent of their export unit value, it had not been fully transmitted to the average producer's prices. Real exchange rates, domestic marketing arrangements and government intervention had resulted in controlling price movements in favor of producers in many developing countries.

Basavaraja (1993) studied the movement of prices and arrivals of major crops viz., jowar, bajra and groundnut in Bijapur using the moving averages and linear trend to analyze the data. The study showed the presence of upward trend during the period under consideration and the seasonal character was more pronounced in the case of arrivals than in the case of prices. He suggested that the short term price instability could be eliminated by provision of finance and storage facilities to those farmers who were unable to streamline their supply in accordance with the seasonal variations.

Mali (1999) analysed the trends in arrivals and prices of vegetables (tomato and lady's finger) in Pune regulated market during the period from 1978-79 to 1996-97. The coefficient of variation of arrivals (56-80%) and prices (40-80%) of tomato were higher than the variation in arrivals (27-60%) and prices (49-75%) of lady 's finger. The compound growth rate of arrivals (2.11% per annum) and prices (1.02% per annum) for both the vegetables were significant during the same period and prices of both vegetables showed increasing trend indicating good integration of Pune regulated vegetable market

(National Institute of Agricultural Marketing) (NIAM) (2005) Guar trade from India. The price of Guar seed ranged from INR 4000/- per quintal to INR 11000/- quintal at Jaipur market in 2013. While for the same period the price range at Sri Ganganagar was from INR 7752/- per quintal to INR 28556/- per quintal. In the year 2013, the ranges of price at Jaipur and Sri Ganganagar market were INR 4361/- per quintal to INR 11482/- per quintal and INR 5004/- per quintal to INR 11743/- per quintal respectively. The total quantity traded on commodity exchanges was 88 times of total quantity of Guar seed produced in the year 2004-05, 179 times in the year 2005-06, 146 times in the year 2006-07 and 53 times in the year 2007-08.

Yogisha (2005) studied market integration for major agricultural commodities in Kolar dstrict. He found an increasing prices in the initial period followed by decreasing prices in the later period. Increasing price trend was found in case of Bangalore and Chintamani. Chikkaballpur and Srinivaspur showed exactly reverse of the above where

in the initial periods prices was decreasing and in the mid period it started increasing while in the later period the prices was decreasing. Kolar showed increasing trend in initial period later it found to be decreasing.

Kaur *et al.* (2006) analyzed the seasonal fluctuations and price trend for green pea in Punjab for the period 1994 to 2003. They observed that when arrivals were high, the prices ruled low and when arrivals were low, the prices ruled high. The arrivals in the peak season were high as compared with those in the mid and lean seasons indicating seasonality of the crop, lack of storage and processing facilities and low holding capacity of the farmers. The higher price indices observed during the month of July to November and lowest for March and kept less than hundred for December to June.

Durgesh (2015) observed that the monthly trends in the whole sale prices of guar in the two major guar producing states in India. Guar prices have witnessed monthly and seasonal variations throughout the years. As far as the long term trend is concerned, during January 2003 to September 2010, guar prices increased slowly but remained within the range of Rs 1,000/quintal to Rs 2000/quintal in both Rajasthan and Haryana. However, prices increased substantially after November 2011. Prices in Rajasthan increased from about Rs 4,455/quintal in November 2011 to Rs 27,430/quintal in May 2012. In Haryana too prices increased from Rs 4,683/quintal to Rs 29,848/quintal during the same period. Prices declined sharply after May 2012 and the decline became even more pronounced after July 2012, falling to about Rs 7,100/quintal in Rajasthan and Rs 8,100/quintal in Haryana in September 2012. After a slight increase up to December 2012, there has been a continuous decline, touching a four year low at Rs 3,542/quintal in Rajasthan and Rs 3,477/quintal in Haryana in March 2015. There was some recovery in April and May but it could not be sustained in subsequent months and prices remained below Rs 4,000/quintal.

Anonymous (2015) prices of guar seed spiralled down to nearly Rs 4,200 a quintal in January, the lowest since December 2013, against a peak of Rs 30,000 a quintal in March 2012.In the past six

months, the price of guar seed has come down by 30 per cent, from nearly Rs 6,500 a quintal.Gum prices have fallen to their lowest since June 2011, to Rs 10,000 from its peak in March 2012 of Rs 90,000 in Jodhpur spot mandi.

Pavaskar M (2016) studied pulses market in India and World. The study highlighted the major pulses producing countries were India, Canada, Myanmar and Brazil and major pulses being produced in the world were dry bean, dry peas, chickpea, dry cowpea, pulses and broad beans. The price of pulses in the world has been determined by supply side factors like productivity and area under pulses while the demand side determinants mentioned were consumption pattern, population and income growth, urbanization, changes in food habits and the shift in trade flows. The pulses price was influenced by cross-border trades which has increased almost six fold over the past decades. The unit value (per tonne) has also increased from $133.8 in 1961 to $654.6 in 2011. India being the highest importer of the pulses mostly from Myanmar and West Africa, India has strong bargaining advantage in world market. The study concluded that with the demand of pulses to increase over the time, the world pulses price was expected to surge and India being the highest importer would experience the burden of price inflation.

Ambagus company (2017) a report on Global guar gum (guaran) market reported that the rapid price increases, due to demand spike in the United States, led to India, the main producer to expand their production, which rose to up to 2.45 million metric tons in the year 2015-2016. New production site were set up and processing factories established in the state of Rajasthan. The higher prices forced importers like china and Australia to seek local production and to explore cheaper substitutes, which led to a decline in the prices. Despite this fall in the prices, the demand for the guar is still relatively stable. This has been supported by the continued expansion in shale oil and gas production. The china government has set a target of producing over 300 billion cubic meters of gas up to the year 2020. The European food sector accounts for 10 – 15 % of the exports from India. This trend is expected to continue.

2.4. Export competitiveness of Guargum

Gangwar and Ravi (1995) studied the suitability of specific commodities for exports from India .The highly competitive agricultural commodities identified for higher export earnings based on NPCs were rice followed by banana tomato, onion, cotton and wheat .They felt that these commodities need to be given preference In production programme as well as export in order to secure maximum benefit of the globalization of agricultural trade.

Reddy et al. (1998) studied the export competitiveness of sunflower production using the nominal protection coefficient (NPC). Data on the domestic prices for sunflowers sold in Karnataka were collected for the period 1984/85-1993/94 and compared to the FAO's world prices for 1984-93. Results indicate that sunflower production is an efficient import substitute but that sunflower exports are less competitive on the world market.

Shete et al. (2000) studied that, the India's share in world's output showed a declining trend (9.33) during the year 1997. The India's percentage share of cauliflower was observed highest (45.33 %) than the dry onion (12.34%) and cabbage (7.83%). The share of fruits, vegetable and processed foods in the total agricultural export sharply declined to a low of 3.31 per cent as compared to 11.41 per cent during the year 1991-92.

Yeledalli and Vilas (2009) studied the direction of trade and export competitiveness of onion. Markov chain analysis has been employed to as certain the direction of trade through transitional probability matrix. The study revealed that Malaysia had shown the increasing trend while, UAE had shown a declining trend. UAE and Sri Lanka have been very loyal markets for Indian onion.

Anonymous (2009) reported that India--being the major producer of guar seed--competes with Pakistan, which is the major competitor in exports. Indian guar seed in terms of Pakistani rupee (PKR) is less competitive because of sharp PKR depreciation in the past couple of

months. If at all recovery in guar product imports is expected from major consumers such as US and China—In the wake of global economic recovery--India would be the first choice for overseas buyers as the guar price in Pakistan rules almost INR 800-1000 higher as compared to prices in India. Guar seed costs Rs 2800-3000 per 100 kg in Pakistan against the Jodhpur (India) price of Rs 1,800-1900 per 100 kg and this will definitely lead Indian demand in global markets.

Siddaya and Atteri (2010) examined the export competitiveness under the cost compliance horticultural commodities. The NPC, Effective Protection Coefficient (EPC), Domestic Resource Costs (DRC) and effective subsidy Co-efficient (ESC) were computed under cost compliance as well as without cost compliance. Except for grapes, NPC, ESC and ORCs were found to be less than unity for fresh and processed fruits and vegetables implying that the Indian horticultural sector has a comparative advantage in the selected fruits and vegetables. The EPC was more than unity for various fresh and processed fruits and vegetables because the relation between domestic and international input and output prices were not uniform.

Vaishali (2010) conducted study on competitiveness of major agricultural commodities among SAARC countries. She observed that, India was in a competitive position in rice, mango and onion with the NPCs values of 0.98, 0.975 and 0.893 respectively for the period 2008-09. India did not have comparative advantage in export of wheat as its value is equal to unity for the period 2008-09. The study of competitiveness indicating NPC less than unity shows that Indian rice, mango and onion are more competitive among SAARC countries

Jyothi and Thomas (2012) studied the global competitiveness of Indian turmeric during pre –WTO (1980- 81 to 1994 - 95) and post – WTO (1995-96 to 2009 -10) periods. The findings of the Study revealed that the domestic prices of turmeric have been consistently lower than the international prices indicating that India enjoyed more export competitiveness for turmeric in the international market. During both pre

and post –WTO regimes, turmeric enjoyed more export competitiveness in the international market. Further, NPCs were declined during post - WTO regimes compared to pre – WTO regimes

Rajur and Patil (2013) analyzed the export competitiveness of chillies using the Nominal Protection Co-efficient (NPC) and time series data on exports. In chilli, the NPC was less than one from 1996-97 to 2004-05 indicating its high export competitiveness. In other words, higher prices of chilly in the international market than the domestic price showed distinct comparative price advantage in favor of India.

Lakshmi (2014) in her study examined the export competitiveness of chilli in Guntur market by Employing Nominal Protection Co – efficient (NPC). The results indicated that NPC's were less than one ranging from 0.46 to 0.79 during 2008-09 to 2012 -13, suggesting that Indian chilly was Globally competitive under the exportable hypothesis.

CHAPTER III

METHODOLOGY

The object of any investigation is to draw the useful conclusion in the light of objectives of the study in order to arrive the meaningful conclusion, it is essential to the investigator to adopt appropriate method and procedure, keeping in this view, this chapter has devoted to explain the methodology adopted to fulfil the objectives of the study. The present investigation was undertaken to study the “Export Performance of Guargum in India”. This chapter discusses the methodology used for conducting the study under following headings.

3.1 Nature and source of data

3.2 Period of study

3.3 Analytical tools and techniques

3.4 Material required

3.5 Place, time and duration of research work

3.1 Nature and source of data

In the view of Guargum as an important processed product and its increased utilization in the industrial application, is traded in domestic and also international market. This market has become more speculative and hence Guargum is purposively selected for the study.

The nature of data that, was used for study is entirely based on secondary source of data. The annual data on area, production, productivity of Guar and export quantity, export value, domestic prices and international prices of Guargum were compiled from Agriculture and Processed Food Products Export Development Authority (APEDA), Food and Agriculture Organization (FAO), Agricultural Produce Marketing Committee (APMC) and other Government publications.

3.2 Period of study

The data regarding production of Guar and export of Guargum in India was collected from 1988-89 to 2017-18, which includes

the data of 30 years. The time series data has been divided into two sub periods and overall period.

- Period I (1988-89 to 2002-03)
- Period II (2003-04 to 2017-18)
- Overall period (1988-89 to 2017-18)

Due to non availability of Domestic price data of Guargum on Official websites for the complete period, the data were collected for a period of 2000-01 to 2017-18, the price data is collected from various sources like NCDEX, direct contact with officials of Rajasthan marketing committee, some old Business times online e-papers and from Guargum manufacturing companies

3.3 Analytical Tools and Technique

The data was collected from secondary sources subjected to appropriate analytical techniques in order to arrive at a meaningful conclusion. The different analytical techniques used in the study as follows.

3.3.1 Tabular Presentation

3.3.2 Growth Rates

3.3.3 Instability Analysis

3.3.4 Trend Analysis

3.3.5 Nominal Protection Coefficient

3.3.1 Tabular Presentation

The data collected were presented in tabular form to facilitate easy comparisons. The data were summarised with the aid of statistical tools like, per cent share etc., to obtain the meaningful results.

3.3.2 Growth Rates Analysis

The growth rates were used to measure the past performance of the economic variables. The growth in area, production, productivity, quantity exported and export value etc. were analysed by using exponential growth function using following formula.

$$Y=ab^t$$

Where,

Y = Area/ Production / Productivity/ Export quantity/ Export value / Unit value of Guargum production.

t = Time variable

b = Regression coefficient

a = Intercept

The compound growth rates 'r' was computed by using the following formula.

CGR (r) = [Antilog (log b) – 1] x 100

Where,

r = Compound growth rate

3.3.3 Instability Analysis

Instability in export is expected to hamper the process of economic development. The degree of instability in area, production, productivity of Guar and export of Guargum were measured by using Coefficient of Variation (CV %) and Coppock's Instability Index (CII).

3.3.3 a) Coefficient of Variation (CV%)

The coefficient of variation measures the variation around the trend.

Coefficient of Variation, CV (%) = $\frac{\sigma}{\bar{X}} \times 100$

Where,

σ = Standard deviation

$$\boldsymbol{s} = \sqrt{\frac{\sum(\boldsymbol{X} - \bar{\boldsymbol{X}})^2}{\boldsymbol{n}}}$$

Where,

$\bar{X}$ = Arithmetic means

X= Variable

n = Number of observations

3.3.3 b) Coppock's Instability Index (CII)

Coefficient of instability is another measure of instability besides coefficient of variation. The coefficient of variation measures the variation around the trend. Coppock's Instability Index (CII) is close approximation of the average year to year percentage adjusted for the trend are pronounced than the absolute variation.

Coefficient of instability was worked out using Coppock's Instability Index (CII).

$$\boldsymbol{Vlog} = \frac{\sum\left(\boldsymbol{log}\frac{\boldsymbol{X_{t+1}}}{\boldsymbol{X_t}} - \boldsymbol{m}\right)}{\boldsymbol{N}}$$

The Instability Index = **[Antilog ($\sqrt{\boldsymbol{V\ log}}$)-1]×100**

Where,

X_t = Area/ Production/ productivity/ Export quality/ Unit value of Guargum Export in year t

N = Number of year minus one

m = Arithmetic mean of the difference between the log of X_t and $X_{(t-1)}$, $X_{(t-2)}$ etc.

V log = Logarithmic variance of the series.

3.3.4 Trend Analysis

The trend in domestic and international prices of Guargum was computed for the series data of 2000-01 to 2017-18 with the help of following Cubic function.

$$Y_t = a + bt + ct^2 + dt^3$$

Where,

Y_t = Domestic / International Price

a = intercept

t = Time

b, c,d = Partial Regression Coefficient

3.3.5 Nominal Protection Coefficient (NPC)

NPC was computed to determine the extent of competitive advantage enjoyed by the commodity in the context of free trade. The coefficient shed light on whether a country has comparative advantage in the export of that commodity in the free trade scenario or not. The NPC is defined as the ratio of the domestic price to the world reference price of the commodity under consideration. Symbolically,

$$NPC = \frac{P_d}{P_r}$$

Where,

P_d = Domestic Price of Commodity

P_r = World reference price of the commodity

If NPC > 1, the commodity is protected, compared to the situation that would prevail under free trade and if NPC < 1, the commodity is disprotected.

3.4 Material Required

The computational devices i.e. electronic calculators and computers were made available in the Department of Agricultural Economics and Statistics, Post Graduate Institute, Dr.Panjabrao Deshmukh Krishi Vidyapeeth, Akola.

3.5 Place, time and duration of research work

The information of present study was obtained from secondary data. Data pertained for the year 1988-89 to 2017-18 and for price it was from 2000-01 to 2017-18. The data was analysed and interpreted at Department of Agricultural Economics and Statistics, Post Graduate Institute, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola.

CAPTER IV

RESULTS AND DISCUSSION

The present investigation had been undertaken with a view to study “Export performance of Guargum in India”. This chapter deals with general information regarding export, growth, instability and export performance of Guargum, Trend in domestic and international prices of Guargum and Export Competitiveness of Guargum. Data were analyzed for a period 1988-89 to 2017-18 and for price it was from 2000-01 to 2017-18 and the major findings of this study are presented in this chapter.

Export performance of Guargum

The performance of export was studied on following points.

4.1 India’s share in World export

4.2 India’s share in Agricultural Export to Total Export

4.3 India’s Guargum share to the total Agricultural export.

4.1. India’s share in World Export

India’s share in world export at different points of times was worked out and presented in Table 4.1

Table 4.1 India’s share in World Export **Value in (Rs.crores)**

Sr. No.	Year	World Export	India's Export	India's share in World Export (per cent)
1	1988-89	3992699.09	18417.89	0.46
2	1993-94	11571274.26	65780.15	0.57
3	1998-99	22705604.82	137959.06	0.61
4	2003-04	35338422.12	274669.11	0.78
5	2008-09	70326934.54	847603.11	1.21
6	2013-14	111046622.28	1844940.01	1.66
7	2017-18	115472735.47	1948926.68	1.69

In overall, India’s share in world export was near about one per cent.

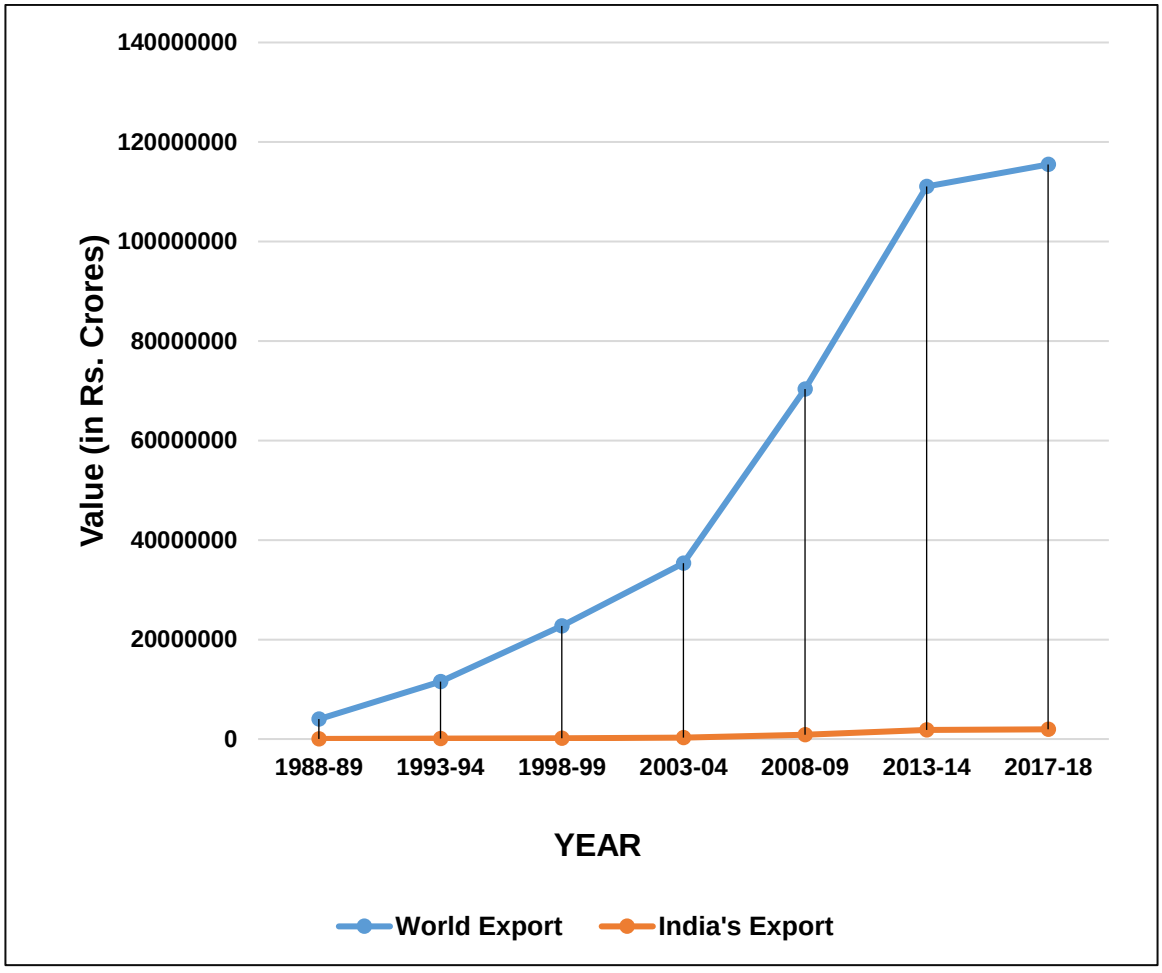

Fig 1. India's Share in World Export

It could be seen from the Table 4.1 that India's export during 1988-89 was Rs.18417.89 crores which has increased to Rs. 1948926.68 crores during 2017-18. In terms share in world export India's export was 0.46 per cent in 1988-89 to raise 1.69 per cent in 2017-18.

4.2 India's share of Agricultural Export to Total Export

The total exports of agriculture and allied products and also a share of agricultural export to total export of the country is presented in the table 4.2

Table 4.2 India's share of Agricultural Export to Total Export

Value in (Rs.crores)

Sr. No.	Year	Total Export	Agricultural Export	Per cent share of Agriculture Export to total export (%)
1	1988-89	18417.89	3443.09	18.69
2	1993-94	65780.15	12706.56	19.32
3	1998-99	137959.06	25725.24	18.65
4	2003-04	274669.11	33563.27	12.22
5	2008-09	847603.11	92452.90	10.91
6	2013-14	1844940.01	261844.27	14.19
7	2017-18	1948926.68	257204.27	13.20

It is observed from the Table 4.2 that, India's total export in 1988-89 was Rs. 18417.89 crores which has increased to Rs. 1948926.68 crores in 2017-18. The agricultural export in 1988-89 was Rs. 3443.09 crores which has increased to Rs. 257204.27 crores in 2017-18. However, per cent share of agricultural export to the total export have been decreased from 18.69 per cent in 1988-89 to 13.20 per cent in 2017-18. This decline in the share was due to the share growth of other sectors like service and Manufacturing etc.

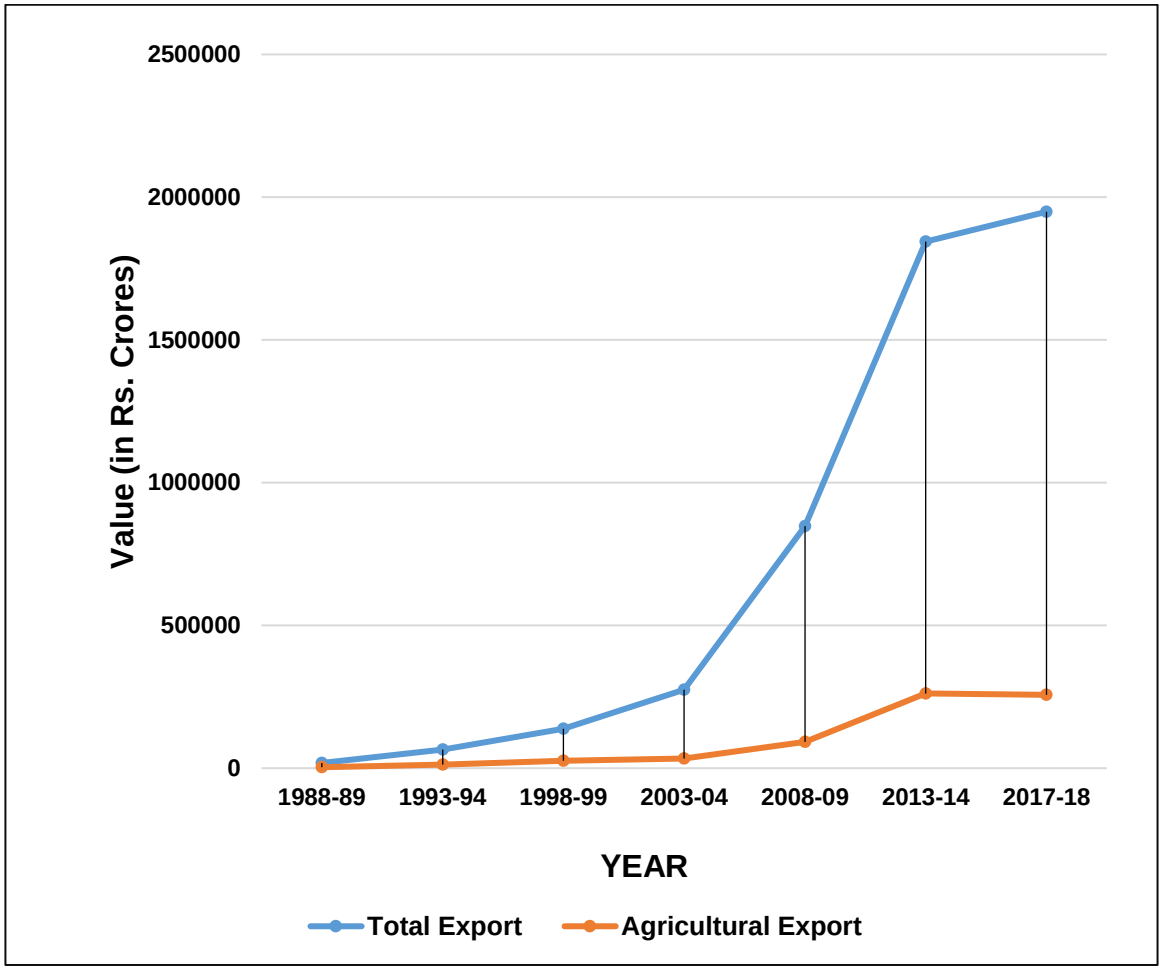

Fig 2. India's Share of Agriculture Export to Total Export

Therefore, it is depicted that, the agricultural sector has been playing a key role in the composition of Indian exports. Thus, the Table 4.2 highlights the surprising fact that the share of Indian agricultural export has been slowly declining in the recent years. In the era of globalization, the agricultural exports from India have been facing many internal and external challenges. Its share has declined from 18.69 per cent in 1988-89 to 10.91 per cent in 2008-09 and further slightly increased to 13.20 per cent in 2017-18.

4.3 India's Guargum share to the total Agricultural export

India is the only major country which exports Guargum to the world due to its use in food and processing industries. Guargum solely shared 4.48 per cent during 2013-14 to the Total Agricultural export of the country. which helps to boost the Agricultural export.

Table 4.3 India's Guargum share to the total Agricultural export

Value in (Rs.crores)

Sr. No	Year	Agricultural export	Guargum export	Per cent share of Guargum Export to Agricultural export (%)
1	1988-89	3443.09	73.87	2.14
2	1993-94	12706.56	140.82	1.10
3	1998-99	25725.24	727.70	2.82
4	2003-04	33563.27	507.90	1.51
5	2008-09	92452.90	1338.99	1.44
6	2013-14	261844.27	11734.52	4.48
7	2017-18	257204.27	4169.56	1.62

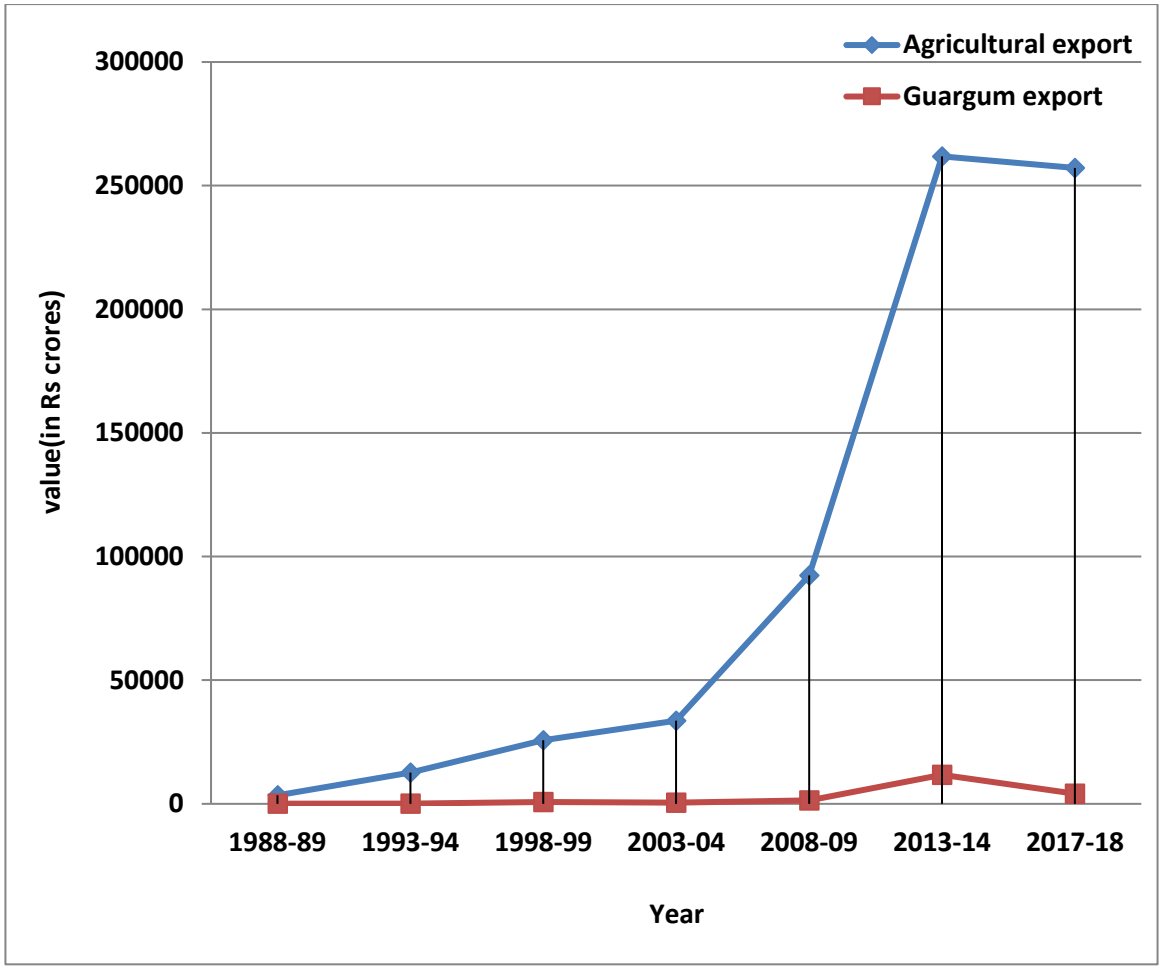

Fig. 3 India's Guargum Share to total Agriculture Export

4.4 Changes in area, production and productivity of Guar in India for the study period

The data on area, production and productivity of Guar in India were collected from 1988-89 to 2017-18. The per cent change was calculated and presented in the Table 4.4

Table 4.4 Changes in area, production and productivity of Guar

Sr. No	Year	Area	Production	Productivity
		In ('000'ha)	In ('000'MT)	MT/ha
1	1988-89	2539.60 (100)	897.50 (100)	0.35 (100)
2	1998-00	1922.10 (-24.31)	488.50 (-45.6)	0.254 (-27.42)
3	2008-09	3862.50 (52.10)	1935.80 (115.60)	0.501 (43.14)
4	2017-18	3541.00 (39.43)	2014.00 (124.40)	0.721 (106)

(Figure in the parenthesis indicates percent change over the base year)
Source: www.indiastat.com

Changes in area, production and productivity of Guar in India were used to analyze the change in area, production and productivity in India over selected study period.

The above table shows change in area, production and productivity of Guar in India during the study period. The area of Guar in 1988-89 was 2539.60 ('000' ha) which decreased to 1922.1('000' ha) in 1998-2000 and again increased to 3541('000' ha) in 2017-18. The per cent change recorded over the base period was -24.31 and 39.43, respectively.

The production has decreased to 488.5 ('000 MT) in 1998-2000 from 897.50(000'MT) in 1988-89 with a per cent change of -45.6. and during 2017-18 it has increased to 2014.0 ('000 MT) with a per cent change of 124.40.

The productivity of Guar cultivation also decreased to 0.254 MT/ha in 1998-2000 from 0.35 MT/ha in 1988-89. The per cent change registered over the base year was -27.42. and again it is increased to 0.721 MT/ha in 2017-18 with a per cent change of 106.

4.5 Analysis of Growth Rates

This study attempts to analysis the performance of Guar with respect to area, production, productivity and export quantity and export value of Guargum realized through the exports of these products.

Table 4.5 Compound Growth Rate of Area, Production, productivity of Guar and Export Quantity, Export Value and Unit Value of Guargum Export (1988-89 to 2017-18)

The exponential functional form was employed to compute the growth rates and the results are presented in Table 4.5

Particulars	CGR	R^2	SE	t-Value
Area				
Period I	-0.56	0.01	0.01	-0.32
Period II	4.09**	0.50	0.00	3.58
Overall Period	3.19**	0.52	0.00	5.52
Production				
Period I	-3.53	0.10	0.01	-1.23
Period II	7.11**	0.39	0.01	2.89
Overall Period	5.48**	0.45	0.00	4.82
Productivity				
Period I	-2.98	0.12	0.01	-1.34
Period II	3.52	0.22	0.01	1.89
Overall Period	2.39**	0.24	0.00	2.96
Export Quantity				
Period I	8.80**	0.91	0.05	11.80
Period II	11.26**	0.69	0.15	5.33
Overall Period	10.07**	0.91	0.11	17.30
Export Value				
Period I	21.28**	0.84	0.01	8.33
Period II	20.91**	0.51	0.02	3.67
Overall Period	18.89**	0.85	0.01	12.55
Unit Value of Export				
Period I	11.48**	0.66	0.01	4.97
Period II	8.67*	0.27	0.02	2.21
Overall Period	8.31**	0.67	0.00	7.47

Note: Period I (1988-89 to 2002-2003), Period II (2003-04 to 2017-18)

And Overall Period (1988-89 to 2017-18)

**** -** denotes significant at 1% level -*denotes significant at 5 % level and NS denotes Non-significant.

The total study period (1988-89 to 2017-18) was divided into three periods namely, period I (1988-89 to 2002-2003), period II (2003-04 to 2017-18) and overall period (1988-89 to 2017-18).

The data presented in Table 4.5 revealed that in during period I, area, production, productivity of Guar and export quantity, export value and unit value realized through exports of Guargum have growth rate of -0.56, -3.53, -2.98, 8.80, 21.28 and 11.48 per cent per annum, respectively and were found to be statistically significant at one per cent level of significance except area, production and productivity due to the negative growth rate.

However, in period II, area, production, export quantity, export value and unit value shows the growth rate statistically significant at the rate of 4.09, 7.11, 11.26, 20.91, 8.67 per cent per annum, respectively. Whereas, productivity was non significant with growth rate of 3.52.

The overall 30 years growth rate of export value of Guargum in India was highly significant at 21.28 per cent per annum and much higher than the growth rate of area, production, productivity of Guar and export quantity and unit value of export of Guargum for overall period was 3.19, 5.48, 2.39, 10.07, and 8.31 per cent per annum, respectively and significant at one per cent level. Hence, the hypothesis i.e. there is significant growth in area, production, productivity of Guar and export of Guargum in India is accepted here.

4.6 Analysis of Instability in Guargum Exports

In order to study the variability in area, production, productivity of Guar and export quantity, export value and unit value of Guargum exports during the study period, co-efficient of variation was worked out, the total period (1988-89 to 2017-18) was split into three periods viz., period I (1988-89 to 2002-03), period II (2003-04 to 2017-18) and over all period (1988-89 to2017-18). The results are presented in Table 4.6.

It could be seen from Table 4.6 that, the area of Guar production exhibited less variability with co-efficient of variation at 24.84 per cent and 27.01 per cent in period I and period II, while it was highest in overall period with co-efficient of variation at 37.93 per cent.

The production of Guar exhibited more variability as that of area with co-efficient of variation at 40.29 per cent and 43.50 per cent in period I and period II, while it was highest in overall period with co-efficient of variation at 65.82 per cent.

In period II the productivity of Guar showed the less variability with coefficient of variation 28.34 per cent in compare to period I and overall period with 34.36 per cent and 37.58 per cent of co-efficient of variation, respectively.

As regard the Export quantity of Guargum the highest variation was observed 88.61 per cent in overall period with co-efficient of variation at 35.43 per cent in period I and 54.02 per cent in period II.

Export earnings in terms of Export value showed higher instability in overall period with 183.77 per cent of co-efficient of variation when compared to the period I and period II. However, the instability observed in unit value of Guargum export was observed highest variation in overall period with coefficient variation at 128.52 per cent and 61.60 per cent in period I and 105.47 per cent in period II.

From above discussions it is clear that instability was the highest in over all period's export value of Guargum with coefficient of variation 183.77.

Table 4.6 Instability of Area, Production, Productivity of Guar and Export Quantity, Export Value and Unit Value of exports Guargum in India (1988-89 to 2017-18)

Period	Particulars	Area	Production	Productivity	Export Quantity	Export Value	Unit Value of Export
Period I	MEAN	2294.77	723.81	0.32	82635.75	32259.73	3414.60
	SD	569.95	291.64	0.11	29280.34	25948.09	2103.45
	CV (%)	24.84	40.29	34.36	35.43	80.43	61.60
Period II	MEAN	3931.63	1942.98	0.49	358517.81	529630.27	11910.57
	SD	1062.03	845.24	0.14	193672.92	647278.58	12561.95
	CV (%)	27.01	43.50	28.34	54.02	122.21	105.47
Over All Period	MEAN	3113.20	1333.40	0.40	220576.78	280945.00	7662.58
	SD	1180.79	877.70	0.15	195462.61	516297.53	9848.06
	CV (%)	37.93	65.82	37.58	88.61	183.77	128.52

Note: Period I (1988-89 to 2002-03), Period II (2003-04 to 2017-18) and Overall Period (1988-89 to 2017-18)

4.7 Coppock's Instability Index of Production, Export Quantity, Export Value and Unit Value of exports of Guargum in India (1988-89 to 2017-18)

Coefficient of instability is another measure of instability besides coefficient of variation. The coefficient of variation measures the variation around the trend. Coppock's Instability Index (CII) is close approximation of the average year to year percentage adjust for the trend. Thus variation around the trends are more pronounce than the absolute variation. The Coppock's Instability Index was work out for the total period (1988-89 to 2017-18) was split into three periods viz., period I (1988-89 to 2002-03), period II (2003-04 to 2017-18) and over all period (1988-89 to 2017-18). The results are presented in Table 4.7

It could be revealed from the Table 4.7 that, the highest variation observed in export value of Guargum was 52.24 per cent in overall period and 25.61 per cent and 32.90 per cent in period I and period II, respectively. Coppock's Instability Index for area, production and productivity of Guar and export quantity and unit value of export of Guargum is in period I were 13.30, 16.46, 14.74, 14.83 and 18.23 per cent, respectively.

In period II it was observed in area, production and productivity of Guar and export quantity and unit value of export of Guargum were 12.89, 16.34, 13.95, 17.79 and 20.38 per cent, respectively and for overall period it was 14.66, 20.10, 15.30, 23.54 and 23.66 per cent, respectively.

The discussion thus revealed that instability in Guargum export value was higher in second period with Coppock's Instability Index 32.90.

Table 4.7 Coppock's Instability Index of Area, Production, Productivity of Guar and Export Quantity, Export Value and Unit Value of exports of Guargum in India (1988-89 to 2017-18)

Sr. No.	Coppock's Instability Index (%)						
	Particulars	Area	Production	productivity	Export Quantity	Export Value	Unit Value of Export
1	Period I	13.30	16.46	14.74	14.83	25.61	18.23
2	Period II	12.89	16.34	13.95	17.79	32.90	20.38
3	Overall Period	14.66	20.10	15.30	23.54	52.24	23.66

Note: Period I (1988-89 to 2002-03), Period II (2003-04 to 2017-18) and Overall Period (1988-89 to 2017-18)

4.8 Trend in domestic and International prices of Guargum

The trend equations were fitted to assess the domestic and international prices. Depending upon its better fit, the trends and the results are assessed and presented under different categories namely trends in domestic price and trends in international price.

Table 4.8 Trend in Domestic and International prices of Guargum

Sr. No.	Particulars	Function	R^2	Coefficiants		
				b1	b2	b3
1.	Domestic Price	Cubic	0.33**	-9239	1421	-52.80
2.	International Price	Cubic	0.40**	-7704	1238	-48.86

**** -** denotes significant at 1% level.
*-denotes significant at 5% level.

Knowing the above overall performance, path of movement the series was traced through parametric trends model (Table 4.8). A wide range of models has been explored, among the competitive models the best fitted models are selected based on R^2 along with significance of Co-efficients. Among the competitive parametric models, all cases cubic models are found best for domestic price and international price.The R^2 values of Domestic price and International price were significant at one per cent level. Co-efficients b1, b2 and b3 of Domestic price and International price were non-significant.

4.9. Export competitiveness of Guargum

The export competitiveness of Guargum was analyzed using Nominal Protection Co-efficient. The competitiveness of market depends upon NPC ratio. When NPC ratio is less than 0.5, market is highly competitive, when NPC ratio is in between 0.5 to1, the market is moderately competitive and when NPC ratio is greater than one, then market is non- competitive and it is presented in Table 4.10.

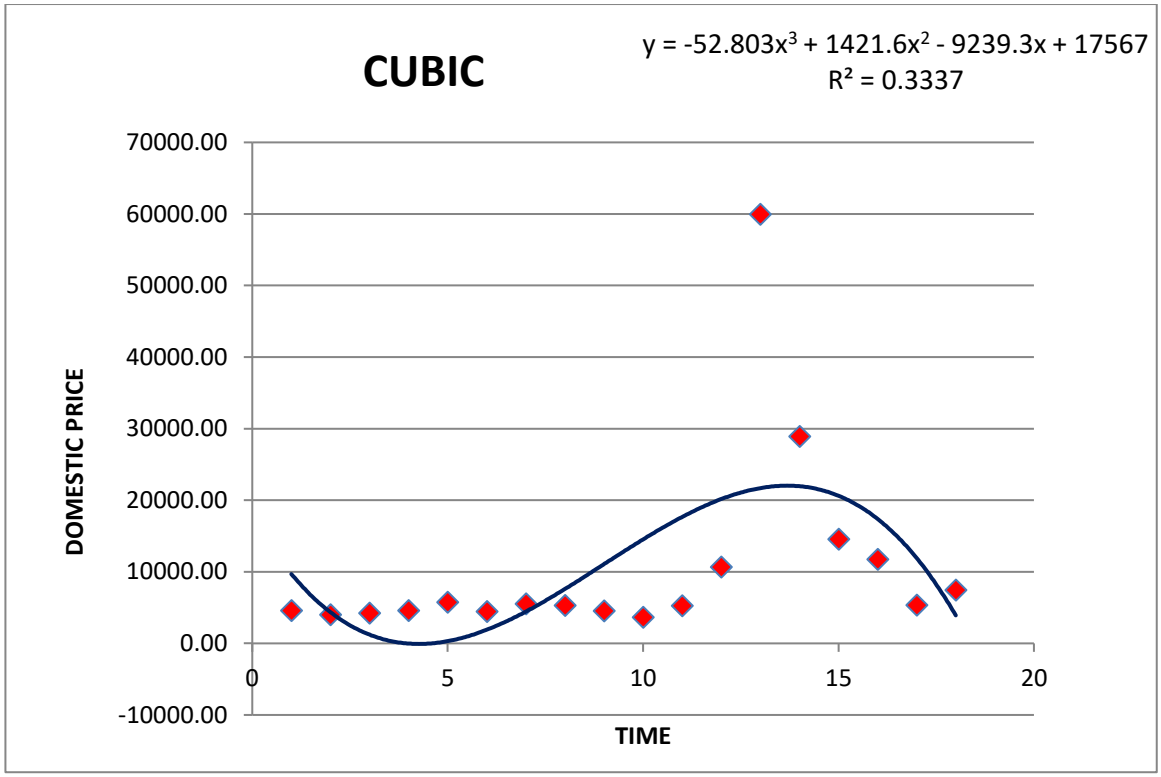

Fig. 4 Graphical presentation of cubic trend in domestic price of Guargum

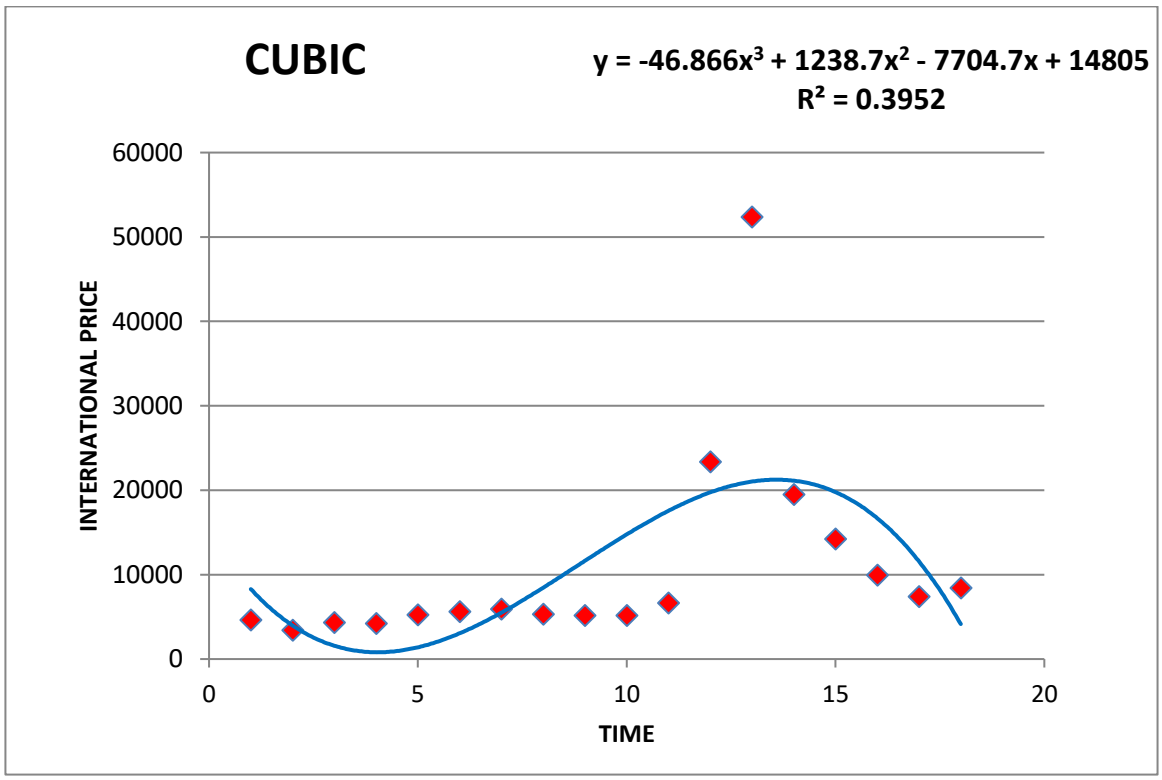

Fig. 5 Graphical presentation of cubic trend in international price of Guargum

Table 4.9 Export Competitiveness of Guargum

Sr. No.	Particulars	NPC (Pd/ Pr)
1	Period I (2000-01 to 2008-09)	0.99
2	Period II (2009-10 to 2017-18)	0.93
3	Overall Period (2000-01 to 2017-18)	0.96

The Table 4.9 shows that, at an overall level, the NPC values of Guargum export was worked out to 0.96, it is indicating moderately competitiveness of Guargum in international level and proves commodity is protected in international market but when it was analyzed for the two different periods in period I and period II. It was observed that, the Guargum was during the period I and period II average NPC values were 0.99 and 0.93, respectively which indicates slightly moderate export competitiveness for the period I and for period II it is moderately competitive. Hence, the hypothesis accepted here i.e. Indian Guargum have better competitiveness in International market.

4.10 Trade balance-India's Guargum export and Guargum import

Table 4.10 Trade balance-India's Guargum export and Guargum import value in ('000'crores)

Sr. No	Year	India's Guargum export	India's Guargum import	Trade Balance
1	2008-09	1.33	0.002	1.33
2	2009-10	1.13	0.002	1.13
3	2010-11	2.93	0.002	2.93
4	2011-12	16.52	0.009	16.51
5	2012-13	21.28	0.033	21.25
6	2013-14	11.73	0.021	11.71
7	2014-15	9.47	0.005	9.47
8	2015-16	3.23	0.013	3.21
9	2016-17	3.10	0.002	3.10
10	2017-18	4.16	0.003	4.16

Source:APEDA.com

Direction of trade means a study of the countries to whom the exports are made and from whom the imports are made. In other words, it tells about the commodities of imports and the commodities of exports of a country. Therefore it indicates the structure and level of economic development of a country.

The balance in Guargum trade of India was positive throughout the period. In 2008-09 the balance of trade was 1.33 (‘000’ crores), which increased to 4.16 (‘000’ crores) in 2017-18. It clearly indicates India is a net Guargum exporter.

CHAPTER V

SUMMARY AND CONCLUSIONS

India is the leading net exporter of guar seeds and guar gum. The country exports over 117000 tonnes of guar and its derivatives, which is comprised by 33000 tonnes of refined split guar gum and 84000 tonnes of treated and pulverized guar gum. The net worth of the Indian exports is estimated over Rs 500 crores.

Trade in agriculture goods can play a significant role in Less Developed Countries. Many less developed countries like India have a comparative advantage in the production of agricultural goods and the exports of these goods are the main source of foreign exchange earnings. India which is dominantly an agrarian economy has a great potential in this regard. In view of importance of export trade of Guargum, such a type of study was entitle “Export Performance of Guargum in India” made to know the status and prospects of Guargum with the following specific objectives.

1. To estimate the growth in area, production, productivity of Guar and export of Guargum.
2. To work out the instability in area, production, productivity of Guar and export of Guargum.
3. To study the trend in domestic and international prices of Guargum.
4. To study the export competitiveness of Guargum.

The required data for the present study have been collected from APEDA, FAO, WTO, National Horticultural Board (NHB), NCDEX Database and Agricultural Situation in India (Journal).

The data regarding area, production, productivity of Guar and export quantity and unit price of Guargum in India was collected from 1988-89 to 2017-18, which includes 30 years data. The period has been three, Period I (1988-89 to 2002-03), Period II (2003-04 to 2017-18), overall period (1988-89 to 2017-18).

International price and domestic price data of Guargum was collected from 2000-01 to 2017-18, which includes 18 years data. And it is divided into three periods, Period I (2000-2001 to 2008-2009), Period II (2009-2010 to 2017-2018) and overall period (2000-01 to 2017-18).

The data collected from secondary sources was subjected to appropriate analytical techniques in order to arrive meaningful conclusion. The different analytical techniques used in the study were Tabular Presentation, Growth Rates, Instability Analysis, Trend Analysis and Nominal Protection Coefficient.

The results of the study are summarized as follows

India and Pakistan are producers of guar seed and guar gum. Around 85 per cent guar is produced in India. Guar gum is traded in mainly two forms Guar gum splits and guar gum powder. India exports both the forms. India exports guar gum to 145 countries. Guar gum splits are further processed in some countries for different applications. The major part of guar gum is consumed by Oil and Natural Gas industry after that major quantity goes to food processing industry. The major importing countries of Guargum are U S A, China, Germany, Japan, Canada etc.

Production of Guar in India was increasing considerably during the study period. In 1988-89 it was 897.50 MT and it has increased to 2014.0 MT during 2017-18. The growth rate analysis of production of Guar and export of Guargum in India for the period I, period II and the overall period showed that there is significant and positive growth in area, production, productivity of Guar export quantity, export value and unit value of Guargum export and it shows significant growth at one per cent level of significance**.**

However there was a negative growth in area, production and productivity of Guar during the Period I.

The production of Guar exhibited less variability with co-efficient of variation at 40.29 per cent and 43.50 per cent in period I and period II, while it was the highest in overall period with co-efficient of variation at 65.82 per cent. More variability was shown by area in period II

with co-efficient of variation at 27.01 per cent then that of period I, while in case of productivity variability was more in period I with co-efficient of variation at 34.46 per cent then that of period II. As regard the quantity of Guargum exported, the highest variation was observed 88.61 per cent at overall period with co-efficient of variation. Export earnings in terms of value showed higher instability in overall period with 183.77 per cent of co-efficient of variation and unit value of Guargum export was observed highest variation in overall period with coefficient variation at 128.52 per cent. Instability in production in Guar was less during period I.

Coppock's Instability Index shows the highest variation in export value of Guargum i.e. 52.24 per cent in overall period. In case of area, production and productivity of Guar and export quantity and unit value of export of Guargum for overall period were 14.66, 20.10, 15.30, 23.54 and 23.66 per cent, respectively.

Trend in domestic price of Guargum was decreasing rate. Trend in international price of Guargum was increasing at decreasing rate. R^2 was statistically significant for domestic prices and international prices.

At an overall level, the NPC values of Guargum export was worked out to 0.96, it is indicating moderately competitive export competitiveness of Guargum in international level and proves commodity is protected in international market but when it was analyzed for the period I and period II. it was observed that, the period I and period II average NPC values was 0.99 and 0.93, respectively which indicates moderately export competitiveness during both the periods

Conclusions

The following conclusions were emerged from the present study.

1. There is increase in agriculture exports but percentage share of agriculture export to total exports was decreasing due to increase in share of manufacturing sectors and service sectors etc.
2. There is increase in quantity of India's Guargum export during whole period of study and percentage share of worlds Guargum export to India's Guargum export was also increasing in whole period of study.

3. The growth rates of Guar's area, production and productivity in India were found to be negative and non-significant during the period I, and significant during period II and overall period except productivity. The productivity showed negative growth rate in both the periods, hence more concentration should be given towards the productivity of Guar as it plays major factor in production of Guargum.
4. The growth rate for export quantity, export value and unit value of Guargum export was found positive and significant for period I, period II and overall period.
5. The area and production of Guar exhibited less variability in period I than period II, while it was highest in overall period with co-efficient of variation at 37.93 per cent and 65.82 per cent respectively.
6. As regard the quantity of Guargum exported, the highest variation was observed in overall period with co-efficient of variation at 88.61 per cent.
7. Export earnings in terms of value showed higher instability in overall period with 183.77 per cent of co-efficient of variation and unit value of Guargum export was observed the highest variation in overall period with coefficient variation at 128.52 per cent.
8. Coppock's Instability Index shows the highest variation in export value of Guargum i.e. 52.24 per cent in overall period. In case of area, production, productivity of Guar variability was more in period I. and in case of export quantity ,export value and unit value of Guargum variability was more in period II than period I .
9. Trend in domestic price of Guargum was increasing at decreasing rate. Trend in international price of Guargum was increasing at decreasing rate.
10. The NPC value of Guargum showed that the crop is protected in international market during the period I, period II and over all period with moderate-competitive export in international market.

Policy Implications

There is immense scope to expand India's potential of Guargum. High priority should be given to increase the production and export of Guargum. This is necessary to meet the increasing domestic demand on one hand and to build up a sustainable supply to meet demand in International markets for earning foreign exchange through Guargum export in other hand.

Indian Guargum have export competitiveness in the international market. Therefore, to capture the higher share in the world trade, much emphasis need to be given on sanitary measures and standardization, packaging, processing, grading, infrastructure facility, Irradiation facility and simplification in export procedure. Following policy suggestions have been proposed.

1. In major countries U S A, China, Germany, Japan, Canada the market size for Guargum is increasing, this provides India an incentive to increase the area and production and productivity of Guar through which Guargum can be processed in the country and an opportunity to increase the export, hence government initiatives are needed for increasing the production of Guar which meet international standard for Guargum**.**
2. The study revealed that the overall growth of Guargum exports was positive and high, indicating that there are large number of importers for Indian Guargum like USA, China, Germany, Japan, Canada etc. therefore attempts should be made to exploit these potential markets and develop protocol to increase the Guargum exports.
3. The results of the study have shown that the Indian Guargum is highly price competitive in international market. Therefore, India should make use of this opportunity profitably through concerned efforts aiming at increasing its export's share in the world trade of Guargum.

CHAPTER VI

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APPENDIX-I
Area, Production and Productivity of Guar

Sr. No	Year	Area ('000'ha)	Production ('000'MT)	Productivity (MT/ha)
1	1988-89	2539.60	897.50	0.35
2	1989-90	2262.10	648.10	0.29
3	1990-91	2403	1176	0.489
4	1991-92	1765	346	0.196
5	1992-93	2179	797	0.366
6	1993-94	2101	490	0.233
7	1994-95	2302	939	0.408
8	1995-96	2213	900	0.407
9	1996-97	2125	886	0.417
10	1997-98	2301.2	962.7	0.418
11	1998-99	1922.1	488.5	0.254
12	1999-00	2933.9	375.1	0.128
13	2000-01	3497.4	658.8	0.188
14	2001-02	2903.1	1089.9	0.375
15	2002-03	974.1	202.6	0.208
16	2003-04	2854	1513.4	0.53
17	2004-05	2867.4	903.3	0.315
18	2005-06	2955.5	1059	0.358
19	2006-07	3343.7	1169.3	0.35
20	2007-08	3472.6	1788.5	0.515
21	2008-09	3862.5	1935.8	0.501
22	2009-10	2995.2	594.7	0.199
23	2010-11	3382.2	1965.3	0.581
24	2011-12	3444.2	2222.1	0.644
25	2012-13	5151.7	2457.8	0.477
26	2013-14	5962.5	3587.9	0.602
27	2014-15	5345.9	3286.6	0.615
28	2015-16	5581	2751	0.492
29	2016-17	4215	1896	0.45
30	2017-18	3541	2014	0.721

Source : Indiastat.com

APPENDIX-II

Export Quantity and Value of Guargum Export

Sr.No	Year	Export Quantity(MT)	Export Value(lacs.)
1	1988-89	35422.12	7387
2	1989-90	42278.52	6528
3	1990-91	49751.11	5793
4	1991-92	61310.80	9206
5	1992-93	62373.97	10319
6	1993-94	74492.59	14082
7	1994-95	67748.12	14283
8	1995-96	83283.40	22720
9	1996-97	95169.93	35613
10	1997-98	102728.6	54499
11	1998-99	91990.01	72770
12	1999-00	113746.84	81477
13	2000-01	129530.84	60295
14	2001-02	117883.02	40309
15	2002-03	111826.36	48615
16	2003-04	120561.27	50790
17	2004-05	131299.98	68948
18	2005-06	186718.4	104923
19	2006-07	189304.36	112579
20	2007-08	211166.56	112575
21	2008-09	258567.56	133899
22	2009-10	218479.74	113331
23	2010-11	441607.7	293870
24	2011-12	707326.43	1652387
25	2012-13	406311.81	2128701
26	2013-14	601945.42	1173452
27	2014-15	665177.71	947994
28	2015-16	325250.71	323387
29	2016-17	419948.2	310662
30	2017-18	494101.27	416956

Source : APEDA.com

APPENDIX-III

Domestic and International price of Guargum

Sr.No	Year	Domestic price (Rs./qtl)	International price (Rs./qtl)
1	2000-01	4600	4654.88
2	2001-02	3987	3419.41
3	2002-03	4205.60	4347.36
4	2003-04	4582.31	4212.80
5	2004-05	5741.50	5251.18
6	2005-06	4442.66	5619.32
7	2006-07	5510	5946.98
8	2007-08	5295	5331.10
9	2008-09	4536.33	5178.49
10	2009-10	3657.71	5187.25
11	2010-11	5256.33	6654.55
12	2011-12	10677.33	23361.02
13	2012-13	59957.33	52390.80
14	2013-14	28900	19494.33
15	2014-15	14554	14251.74
16	2015-16	11738	9942.70
17	2016-17	5355	7397.63
18	2017-18	7436.5	8438.67

Source : NCDEX.com