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Factors Influencing the Supply & Demand for Guar Gum: A Qualitative Study of Stakeholder Perspectives in India and the U.S

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Abstract

Guar gum is a versatile commodity critical to diverse sectors such as oil and gas, food, pharmaceuticals, and cosmetics. Despite its widespread industrial use, the guar industry faces complex challenges due to its climatic sensitivity, market volatility, and increasing competition from synthetic polymers. This paper explores the factors shaping the supply and demand of guar gum by analyzing qualitative data from ten semi-structured interviews with producers and suppliers across India and the United States. The study reveals five key drivers: dependence on oil and gas markets, agricultural challenges, lack of research and development, inadequate marketing, and rising competition from synthetic substitutes. The findings suggest that strategic investments in innovation and awareness are crucial to ensure the industry's resilience and sustainability.

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Introduction

Guar, scientifically termed Cyamopsis tetragonoloba, is a seasonal legume underpinning a wide range of industrial and agricultural ecosystems. Its primary derivatives, guar gum and guar meal, are essential to sectors such as oil and gas, food, pharmaceuticals, cosmetics, textiles, and paper (Source: Agricultural & Processed Food Products Export Development Authority [APEDA]). Guar's adaptability and versatility have driven its standing across these sectors alongsidereinforcing its significance throughout global supply chains and rural economies.

Amidst escalating climate-related challenges and fluctuating market demands, recognizing the importance of this legume yields critical findings about the interdependence of farming, commerce, and sustainability.

Guar's cultivation is concentrated in India's northwestern states of Rajasthan, Gujarat, and Haryana (which, together, account for ~80–90% of the world's supply with Rajasthan alone contributing around 70% to the total output), (Source: CMIE) where warm, arid conditions are ideal. Initially, farmers cultivating guar incur production costs of ~INR 3,000 per quintal, covering fertilizers, labor, and transportation, and sell their harvest at local markets/ mandis for around 5,000 per quintal, underscoring guar's importance to smallholder livelihoods.

Factories, then, procure guar at ~INR 5,200 per quintal and process it into (a.) guar gum and (b.) guar meal, comprising churi and korma, with processing costs of around INR 200 per quintal in Rajasthan. As of 1 of March 5, 2025, market prices reflect the demand for these byproducts: guar gum at INR 10,300 per quintal, churi at INR 3,200, and korma at INR 3,800. The final processing stage transforms guar gum into gum powder, costing approximately INR 1,400 per quintal and sold at INR 12,200 per quintal (a hefty 8.7x its cost), with prices varying based on specialized chemical additives for industrial applications. The profit margins, consequently, highlight the profitable upside of the guar processing business alongside the opportunities it creates for value-added activities in rural economies.

The high profit-yielding guar gum (a.) (which produces gum powder) is extracted from the endosperm of guar beans and valued for its high viscosity and stabilizing properties. In the oil and gas industry, it serves as a thickening agent in hydraulic fracturing, facilitating efficient extraction from shale formations. Its ability to form hydrogen bonds with water molecules makes it a versatile thickener and stabilizer in food, pharmaceuticals, textiles etc. Within food and pharmaceutical sectors, in particular, guar gum's high fiber density as well as gentle bowel- regulating effects meet the evolving consumer health trends, while additionally aiding in diabetes control, digestive health, cardiovascular wellness, and colon cancer risk reduction. Its versatility is strengthened by its ability to formulate industry specific gum powder mixes, using designated chemicals for unique industryapplications. As a result, its applications continue to expand into vastly diverse fields ranging from bakery, beverages, and meat products to cosmetics, where it functions as a natural lubricating agent, softening and protecting the skin (Source: Guar gum: processing, properties and food applications by Deepak Mudgil). Ultimately, guar's transformation from raw agricultural product to an integral industrial input reveals the layered value chain sustaining guar's economic relevance.

On the flip side, guar meal (b.), comprising churi and korma, is a protein-and carbohydrate-rich byproduct used as a natural animal feed. Guar korma, a granular byproduct, supports weight gain in cattle, fish, poultry, and swine, offering a cost-effective alternative to soya meal. Guar churi, a powdery byproduct, serves as a safe binding agent for pelletizing animal feeds, free from contaminants such as salmonella and E. coli, thereby ensuring high- quality, sustainable feed without synthetic additives.

However, despite its wide-ranging applications, the current landscape of today's guar gum industry is faced with several challenges across the agricultural, industrial, and market domains. (1) Guar gum production is highly sensitive to climatic conditions, requiring significant water re- sources and thriving in warm, arid environments. This makes it vulnerable to erratic weather, drought, and pest infestations. (2) The global supply chain's reliance on India (80%) and Pakistan (15%) introduces fragility, as demonstrated in 2012 when guar gum prices surged by 900% due to speculation, hoarding, and increased demand in U.S. futures markets, exacerbated by rising crude oil prices. This volatility, driven by agricultural dependencies, industrial demand, and speculative trading, complicates demand forecasting and long-term planning for producers. As a result, such factors result in a notably volatile guar gum market, wherein volatility complicates producers' demand forecasts, posing business-wide risks in long- term investment. Despite guar gum's critical role in diverse global industries, there remains limitedsystematic research into the drivers of its supply and demand. To address this gap, my paper seeks to conduct interviews with guar gum suppliers and producers alike to identify the underlying factors influencing guar's demand fluctuations as well as supply chain resilience.

(Sources: Agro Gums, Indian Trade Portal, Research Gate, Altrafine Gums, Supreme Gums, Zion Market Research)

Method

Study Design

A exploratory qualitative study was designed to examine factors influencing guar gum's supply/demand dynamics of guar gum. Data were collected through semi-structured interviews conducted from April 21, 2025, to May 13, 2025. The study aimed to elucidate the operational mechanisms of the guar industry, identify drivers of price volatility, and explore challenges encountered by stakeholders. All participants provided verbal informed consent prior to their involvement, and the study adhered to the Standards for Reporting Qualitative Research (SRQR) guidelines to ensure methodological rigor and transparency

Data Collection

Data were gathered through in-depth, semi-structured interviews with directors or designated representatives from relevant organizations, supplemented in some cases by additional participants in leadership roles to capture a broad range of organizational perspectives. Each participant was interviewed once, with the option to provide additional written responses via a supplementary questionnaire. To accommodate participant preferences and logistical constraints, interviews were conducted either via telephone or through email correspondence.

Analysis

All interviews were assessed through written transcripts and analysis of the responses to questionnaires. Interviews were coded to identify key themes.

Results

Overview of the Firms

Ten owners of various guar gum firms were interviewed. Five of ten interviewees were from Rajasthan, three from the USA (two of which have plants in India as well), one from Haryana and one from Gujarat. Five of the interviewees were involved in the stage of converting the guar split into the gum powder. Moreover, three converted the guar seed into guar meal and guar gum and two of the firms were involved in all the process starting from farming to producing the final product. A summary of the firms is shared in Figure 1. Five key factors emerged from the interviews as large contributors to the supply and demand for guar. Key quotations which represent each of these factors are outlined in Table 2.

		A	B	C	D	E	F	G	H	I	J
Role of firm	Inter - State Manufacturers	■	■	■	■		■	■	■	■	■
	Importers					■	■			■	
	Exporters					■	■				
Production stage	Farming	■	■								■
	Production of guar gum / meal	■	■	■	■	■					
	Production of guar gum powder		■			■	■	■	■	■	■
	Production of the final product		■			■					
Region	Rajasthan	■	■	■	■					■	■
	Haryana					■			■		
	Gujarat						■	■			

Figure 1: Firm Roles and Regional Participation

Factor 1: Oil and Gas

The oil and gas industry are amongst the most prominent factors which influence the supply and demand of guar gum. All interviewees suggested that the price of guar is affected by the price of oil. 4 of 10 interviewees shared the importance of the use of guar in global shale oil fracking activities and crude oil. 7 directly highlighted that the main factor affecting the price of guar is the price of oil. One manufacturer also stated that oil is the key driver of the guar industry and that any decline in demand for oil will shrink the demand for guar There were differing opinions on the outlook of the guar industry as it relates to broader trends in oil and gas. For example, one interviewee believed that the guar industry is directly correlated to the shrinking oil industry, while 6 interviewees believed that even if the guar market declines secondary to decreased demand for oil and gas, guar will grow other applications like food, beverages, and medicines.Three interviewees felt that the guar industry is stable, without influence based on changes in oil and gas. Eight interviewees also distinguished between the domestic market and the international market. The domestic Indian market of guar is driven by speculation and agriculture, while international markets like the USA are more driven by oil prices, especially for oil drilling. The manufacturers feel that the challenges faced in both domestic and international markets are different. Challenges in the international market include
price volatility, linked to the oil and drilling sector, while challenges in the domestic market are related to rainfall and climatic conditions.

Factor 2: Agricultural Challenges

Agricultural challenges influence the supply and demand of guar. As agriculture is the first step involved in production of guar, the guar supply change is heavily influenced by challenges in the farming industry. 9 of 10 interviewees felt that agricultural challenges needed to be solved to address other downstream problems in the guar industry. Agriculture problems identified by the interviewees related to farmers, weather and climate, soil and seed quality, and pests. For example, an interviewee stated that key challenges included declining farmer participation and weak integration between agriculture and processing technologies. A second interviewee shared similar sentiments, highlighting the major challenge of climate and farmer dependency.Interviews also stated agricultural factors such as Monsoon patterns, rainfall, and overall crop yield are amongst the main challenges faced by the guar industry. The factors which affect demand for guar in India and in foreign countries are different. Interviews stated that the domestic market is directly impacted by rainfall and crop cycles, while the international market is influenced by oil demand. For instance, one interview stated that in India, the price is more influenced by agricultural output and local market speculation. In contrast, international markets like the USA are driven by industrial demand. 1 of the 10 interviews said that the industry is currently shrinking because farmers are increasingly disinterested in guar cultivation due to poor price realization. He further added that without farmers, guar will not exist, and the industry would collapse. Hence, 7 interviewees mentioned that the government should support farmers within the industry.

Factor 3: Research and Development

Research and Development plays a vital role in influencing the supply and demand of guar. With oil prices declining, all ten interviewees felt the need for greater research and development in the guar industry. All ten interviewees view a lack of R&D as one of the largest challenges facing the industry, thereby posing a threat to guar sustainability. For instance, one interviewee mentioned that the guar industry will continue to shrink after the fall in demand for oil because of the lack of R&D. The same interviewee also stated that the guar industry is on the brink of sinking and the only thing which can save it is research and innovation. Few interviewees from India also share the lack of government support in the R&D. This lack of support leads to fears of shutdowns for manufacturers. One interviewee said thatthe demand of guar can be increased if the government supports the industry in R&D. While another interviewee said that lack of government support in R&D and infrastructure is the biggest challenge of the industry. While this # of interviewees mentioned government support for R&D, only this # discussed private R&D projects, highlighting the lack of innovation amongst guar producers themselves. One interviewee also said that a lot of resources were being put into developing competitive polymers, which may serve as substitutes for guar, but those same resources could enhance the uses of guar

if used properly.

Interviewees stated that every problem has a solution, similarly, developing new derivatives for applications in cosmetics, biodegradable packaging, and pharma could increase the demand for guar. Interviewee stated that market diversification and putting time in innovation could boom the guar market. One interviewee added that to increase guar demand, focusing on stabilizing supply, exploring new applications, and promoting its benefits like improving seed quality, developing hybrid varieties, and addressing supply chain challenges like price volatility, is the key solution for increasing the demand. Interviewees mentioned R&D for achieving these goals.

Factor 4: Awareness & Marketing

Awareness and marketing play a vital role in influencing the supply and demand for guar. 8 of 10 interviewees mentioned one strategy for increasing demandfor guar is spreading awareness about the product. Guar is commonly used in the food, pharmaceutical, and textile industries; however, its widespread use within these industries goes unnoticed. 6 of 10 interviewees stated that promoting awareness and marketing is necessary for increasing the demand of guar. One of them also mentioned that innovation along with marketing and awareness could unlock new opportunities for the guar industry. Interviewees also felt that spreading awareness about guar gum could potentially decrease demand within the synthetic market, as a better understanding of the natural production of guar would lend preference to its manufacturing over the high chemical burden of synthetic polymers. One interview also saw a lack of awareness as a challenge to the industry, especially given there is low understanding of guar's potential. Interviewees expressed the importance of guar and how it is not fully utilized by society. Hence, they feel that marketing is the solution to increase the demand for guar. Two interviewees also said that the domestic market is showing a decline because of lack of awareness. For instance, one of them stated that guar is predominantly an export driven market and has a very low domestic consumption due to less knowledge of the product. To address this, investors felt that launching awareness campaigns and highlighting guar's sustainability benefits over synthetic substitutes could show an increase in demand. Moreover, two interviewees stated collaborations with industries and academic institutions can also help generate demand.

Factor 5: Competitive Polymers

Competitive polymers, mostly from China, recently entered the guar industry and have already begun influencing the supply and demand of guar. 9 of 10 interviews expressed their concern about the artificial guar polymers. These polymers have the potential to pose a major threat to the natural guar industry. For example, one of the interviewees stated that the competition from synthetic polymers is unhealthy, and if it continues, it threatens the natural guar industry. These substitute products are known as Xanthan gum, GMC and PAM. Interviewees stated that the synthetic guar has the same quality as the best quality guar; moreover, it is cheaper and faces lesser challenges in production. This factor has led to significant increase in demand for artificial gum. Different industries have lost faith in guar due to high price volatility. For instance, one interviewee stated that the main reason for shrinkage of guar includes the shift to synthetic polymers in industrial applications and changes in food recipes due to the price volatility of guar gum; notably, a price surge in 2012 forced food companies to explore alternatives and oil companies to switch to synthetic polymers. Interviewees strongly want research and development to take place in the natural guar industry for the purpose of getting rid of synthetic guar.

Questionnaire
1. How did you get into the guar industry?
2. Tell a few things about your company (location, duration,size).
3. Which step of the manufacturing process is your company involved in, and what product do you manufacture?
4. According to you, what factors influence the price of guar and guar gum?
5. How are these factors different amongst the domestic markets in India vs the international market like the USA?
6. Do you think the guar industry is shrinking, growing, or remaining stable?
7. What are the largest challenges faced by the guar industry?
8. How have the tariffs impacted the industry?
9. What can be done to increase the demand for guar?
10. Do you think it would be beneficial to the guar industry to have more guar suppliers?

Table 1: Questionnaire Utilized for Standardized Qualitative Interviews

Discussion

Interviews with owners of ten guar gum firms illuminated five critical factors driving the supply and demand of guar gum. While each owner brought a unique perspective, they shared a common concern: the industry must innovate to stay ahead of synthetic polymers and alternative materials. The challenges are complex, including dependence on oil and gas markets, agricultural uncertainties, speculative trading, price volatility, and heavy reliance on Indian production. These dynamics shape the industry's stability and outlook. To ensure long-term viability, interviewees emphasized two key strategies: (1) investing in research to expand guar's applications, and (2) strengthening marketing to highlight its unique value to global markets. Historically, the oil and gas sector has been the cornerstone of guar gum demand. A dramatic 900% price surge from 2011 to 2012, fueled by rising crude oil prices, underscored this reliance (Source: Financial Express, Written by Banikinkar Pattanayak). Yet, as of 2025, declining global oil demand threatens the industry's revenue. Owners stressed that research into new uses for guar in food, pharmaceuticals, textiles, and cosmetics is essential to reduce dependence on the unpredictable energy market. Adding to this challenge, synthetic polymers are gaining ground. In China, manufacturers produce these alternatives through advanced chemical processes, marketing them as cost-effective substitutes for guar in industrial applications. Interviewees cautioned that without innovation in natural gum production, synthetics could overtake the market, eroding guar's position. Interestingly, while falling oil demand and synthetic competition significantly impact guar gum, tariffs have little effect. All ten owners noted that guar's critical role in oil and gas, combined with its established agricultural base, shields it from tariff-related disruptions, unlike many global commodities. To navigate these challenges, interviewees advocated for sustained research and development and targeted marketing to keep guar relevant in a rapidly evolving economic landscape. These efforts are vital for maintaining competitiveness. The interviews challenged initial assumptions that the guar market was inherently stable. Instead, the rise of synthetic alternatives revealed significant vulnerabilities, highlighting the need for proactive adaptation. Despite these hurdles, the industry holds promise. Owners unanimously expressed optimism that strategic investments in innovation and marketing could unlock new opportunities. This aligns with market research forecasting substantial growth (Source: Zion Market Research). These findings signal a critical moment for stakeholders to prioritize innovation and adaptability to secure a sustainable future.

Strength and Limitations

This study's qualitative approach, grounded in in-depth interviews with owners of prominent guar gum firms in India and the United States, is a primary strength. These participants, drawing from their hands-on experience, provided detailed and context-rich insights into the factors shaping guar gum supply and demand.

The diversity of their firms—spanning different regions and market roles—offered a well-rounded perspective on the industry's challenges and future potential, enriching the study's findings.

However, despite its strengths, the study has notable limitations. First, the sample size of ten participants, while insightful, does not fully reflect the global guar gum industry's diversity. This limits the findings' generalizability, making them more suitable for exploratory analysis and hypothesis development than for broad industry-wide conclusions. Second, the decision to forgo audio recordings, based on participants' preferences, posed a challenge. Although meticulous notes were taken during and after interviews, the absence of recordings may have reduced the accuracy of capturing exact quotations and nuanced statements, potentially affecting the depth of data analysis. Third, the supplementary questionnaire, intended to enhance interview data with detailed written responses, yielded incomplete or superficial answers in some cases. This limited the questionnaire's contribution to data richness and constrained opportunities for triangulating findings. Despite these constraints, this study offers valuable qualitative insights into an under researched industry. The findings lay a robust foundation for future studies and policy discussions aimed at navigating the evolving dynamics, challenges, and opportunities in the guar gum sector [1-9].

Conclusion

This qualitative study illustrates that guar gum, while integral to industries such as oil and gas, food, pharmaceuticals, cosmetics, and textiles, grapples with significant challenges. These include market fluctuations, climate vulnerabilities, competition from synthetic polymers, and reliance on a concentrated production base in India and Pakistan. The identified factors driving guar gum supply and demand closely mirror these challenges, highlighting the urgencyfor strategic interventions. Interviewees stressed that addressing these issues demands a comprehensive approach focused on research, innovation, and enhanced market awareness both locally and globally. Some firm owners looked to government support to tackle systemic barriers, while others have taken proactive steps, investing in research and development to explore new applications for guar gum and bolster its competitive edge. Among those prioritizing innovation, there is notable confidence that the industry can not only navigate current challenges but also flourish, leveraging guar's unique natural properties to outshine synthetic alternatives.

These insights underscore the pivotal role of sustained research and strategic marketing in ensuring the guar industry's resilience and long-term success in a dynamic global market.

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