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An Analytical study on Export Performance of Gherkin, bottlenecks and hidden struggles of Indian Gherkin growers

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Abstract: India is the third largest exporter of gherkin with 8 % share in global exports market. Gherkin is exported to European countries in the form of fresh, preserved or prepared in vinegar/Acetic acid. It also exported in other two forms as ready to eat (jars/can) and bulk fresh produce for further processing. The objectives of the present study is made to study the export performance of gherkin and to analyse the factors influencing the export of gherkin products and trend associated with production and export performance. The study also presented the actual fact that happens among gherkin growers, roadblocks faced by the gherkin producers, and suggested policy intervention for governments to prevent the leadership loss of gherkin exports in global markets. The present study utilized secondary data collected from various government websites regarding gherkin production, export quantity and its value for five major exporting countries. The results of CAGR analysis revealed that countries like USA and Spain shows strong export growth. Hence, need more focus on investment in high value sectors, innovation policies and improvement in sustainable supply chain.

Keywords: Gherkin, Small and Marginal Farmers, Contract Farming, Export Performance, CAGR

1. Introduction

Gherkin also called Gooseberry gold or pickling cucumber. In India gherkin production, processing and exports were started in the early's 1990 in the state of Karnataka and later extended to the neighbouring states like Andhra Pradesh and TamilNadu. Gherkin act as a dietary constituent to most of the foreign countries. Gherkin is exported to major countries like USA, China, South Korea, Russia and France. There are around more than 50 gherkin

processing companies located in southern parts of India. The Gherkin processing enterprises were located in Karnataka, TamilNadu, Andhra Pradesh and West Bengal. These companies grow gherkins in contract farming with small and marginal farmers. Indian government under ministry of food processing industries has introduced a scheme named PM-Formalization of micro food processing enterprises to promote Gherkin production and processing and export. Gherkins are being exported as ready to eat foods in jars. Preserved gherkins were used as favourite lunch substitute in western countries as well as considered as animal fodder. The crop duration of gherkin is 90 days, which enable farmers to harvest 2-3 crops per year.

Indian Gherkin cultivation is 100 % export oriented production system and 95 % contact farming based model, but the model has several internal and external environmental issues, as a result there exist a yield losses. In case of yield loss, and if there is no government interventions to overcome these loss issues, farmers income and company's profit will get affected. In addition to that, area under gherkin cultivation will get reduced further in upcoming years. since, gherkin is high valuable and high risky crop that depend on export, a change and shift in behaviour was observed among India gherkin farmers to less risky crops like drumstick, bhendi, brinjal, maize and fodder crops, etc.

India has been the world's largest exporters of gherkin over the years, but in past two years there happens a continuous decline gherkin production and export. If this situation persist for another two to three years, India may lose its leadership position in Gherkin production and export which may hurt small and marginal gherkin farmers, processing industries, export companies and also rural income among South Indian people due to employment loss. In the present situation, the entire gherkin industry is under pressure from farm to export market yards. Therefore, there is a call for an study to analyse the export performance of gherkin in global market to find the reason for downward export trend and to bring out the constraints in gherkin production and export activities.

2. Research Methodology

The present study was purely based on secondary data collected from various websites, government publication like Food and Agriculture Organization, APEDA, Indiastata and NIFTEM. The secondary data regarding gherkin production, export quantity and its value, domestic prices were collected from 2013 to 2023. Further, the data regarding export and its price were collected, compiled and analysed with appropriate analytical tools and technique in order to derive a meaningful conclusion.

2.1 Compound Annual Growth rate

The Compound annual growth rate (CAGR) for gherkin export quantity was computed for five countries namely Russia, USA, France, Spain and Belgium for the period (11 years) from

2013 to 2023. The CAGR trends presented in the table 1 illustrate significant cross-national differences influenced by geopolitical tensions, macroeconomic cycles, and varied levels of structural resilience.

2.2 Linear Regression Model

The collected secondary data were analysed using simple linear regression model to examine a relationship between export price and quantity of gherkin commodity for 54 observations. The regression model framed in the study were given as follows.

$$Y_j = \alpha + \beta_i x_i + m$$

Where, Y_j- Total export quantity (dependent variable); α – constant term; β_i – regression coefficients; x_i – Total export value (independent variable); m – random disturbance term. Based on observations, the linear regression model indicates, how changes in independent variable affects the dependent variable.

3. Results and Discussion

3.1 Compound Annual Growth rate

The dataset in the table 1 highlights divergent structural dynamics across countries. The results of compound annual growth rate analysis of Russia's Gherkin import growth rate from India showed an abrupt and completely induced collapse in export quantity over the years (-100 %) . ie., after a sharp increase it leads to long term decline during the year 2022 and 2023. This may be due to conflict escalation in tension between two countries Russia – Ukarine [1]. As a result, there exists an geopolitical disruptions in Russia and its economic participation in global market systems has been restricted which lead to contraction in trading of agricultural commodity and several other sectors.

The CAGR of 6.19 % indicated that United States displays steady increase in import of gherkin from India which showed resilient growth, rising from 32,816 in 2013 to 59,810 in 2023. USA contributes to majority of gherkin exports from India and plays a significant role towards the rise in Indian economic value. On the other side, several research showed that the U.S. economy recovered more faster after the COVID-19 shock due to advanced economies, strong fiscal stimulus and technological capacity [2].

Next to USA, the CAGR Value of Gherkin export of Spain indicated a consistent upward trend, increasing from 15,393 in 2013 to 27,306 in 2023. Spain's post-pandemic recovery in export-oriented sectors has been increasing steadily [3]. Henceforth, in near future there can be a potential chances and can expect additional quantity of gherkin exports from India. Framers, Export agents may grab the opportunity to have more production and focus on these two countries USA and Spain.

Table 1. Compound annual growth rate of Gherkin export (in Metric tonnes)

Year	RUSSIA	U S A	FRANCE	SPAIN	BELGIUM
2013	57996	32816	19303	15393	13656
2014	81295	31586	19186	20710	12590
2015	42656	39962	17428	23843	15345
2016	30352	35703	15436	20142	13208
2017	29722	35135	15331	24225	11680
2018	39355	40492	26323	25032	19402
2019	30235	36478	15980	23178	10494
2020	31829	59531	18589	23451	5987
2021	42307	57104	12049	19934	3956
2022	0	70191	19979	19547	3201
2023	0	59810	17158	27306	3172
CAGR Value	-1	0.061865	-0.01171	0.058995	-0.13582
CAGR in %	**-100.00%**	**6.19%**	**-1.17%**	**5.90%**	**-13.58%**

France exhibits modest fluctuations and slight decline in export performance (CAGR of –1.17%). The export performance of Belgium decline steadily across the decade, resulting in a CAGR of –13.58%. The results indicated that export performance of gherkin in the countries like, Russia, Belgium and France has declined over the years due to market constraints, decline in industrial competitiveness and demographic pressures.

When compared cross-nationally, the United States and Spain emerge as the most robust import performers, demonstrating resilience and consistent growth. France shows mild stagnation, while Belgium experiences long-term contraction. Similarly, Russia's collapse is unique and reflects exogenous geopolitical shocks rather than structural economic patterns. It shows huge impact on India's gherkin export to Russia, Belgium and France. As a result, small and marginal contract farmers face price decline for their gherkin production, income loss and even the gherkin processing industries faces margin loss in their business. The decline in gherkin export results in economic changes [4]. To conclude, it is clear that, out of five major exporting countries, USA and Spain contributes to the growth of our nation as well as gherkin farmers and traders and processors.

3.2 Comparison of Gherkin Export across the countries

The table 2 illustrated the overall comparison of Gherkin Export from India to top five exporting countries in 2013 and 2023 and the results were furnished below.

Table 2. Overall Comparison of Gherkin Export across the countries

S.No	Country	Export in 2013	Export in 2023	CAGR	Interpretation
1	Russia	57996	0	100.00%	Export stopped completely
2	U S A	32816	59810	6.19%	strong growth
3	France	19303	17158	-1.17%	slight decline
4	Spain	15393	27306	5.90%	Strong growth
5	Belgium	13656	3172	-13.58%	sharp decline
	Total	**139164**	**107446**	**31.23 %**	

It could be concluded from the table 2, Russia's exports fell from 57,996 to zero, indicating a complete collapse. The United States and Spain recorded strong growth, with CAGRs of 6.19% and 5.90%, reflecting robust export expansion. France experienced a slight decline (–1.17%), while Belgium saw a sharp contraction (–13.58%). Overall, despite strong performers, total gherkin exports for all five countries decreased from 139,164 in 2013 to 107,446 in 2023, showing a net downward trend over the decade. India remains among the world's largest exporters of gherkins and pickled cucumbers. During the financial year 2023-24 the gherkin export value from India is US$ 256.58 million, with 2.44 lakh tonnes of export [5]. However, exports to some international markets, notably Russia, Belgium and France have fallen due to some external factors and competitiveness issues in freight costs. At the same time, demand from USA and Spain increased thereby helping to offset some losses.

3.3 Year on Year (YOY) % change in export quantity

The table 3 revealed the per cent of change in Gherkin export quantity over year on year from 2013 to 2023.

The table 3 and figure 1 highlighted that the gherkin export data is volatile with sharp increasing and decreasing trends. After 2018, the decline is strong and consistent towards downward direction. The year 2014 showed a strong growth 18.8%, besides exports declined sharply from 2015 to 2016. During the year 2017, a mild recovery appeared, followed by a major surge in 2018 (29.7%). However, exports again dropped in 2019 and showed fluctuating recovery during 2020 and 2021. The period ends with consecutive declines in 2022 (- 16.6%) and 2023 (-4.8%), indicating weakening export performance and a downward trend in the final years [5].

Table 3. YoY % change in total export quantity

S.No	Year	Total export quantity	YOY Change in quantity
1	2013	139163	
2	2014	165367	18.8%
3	2015	139233	-15.8%
4	2016	114841	-17.5%
5	2017	116093	1.1%
6	2018	150604	29.7%
7	2019	116365	-22.7%
8	2020	139387	19.8%
9	2021	135349	-2.9%
10	2022	112919	-16.6%
11	2023	107446	-4.8%

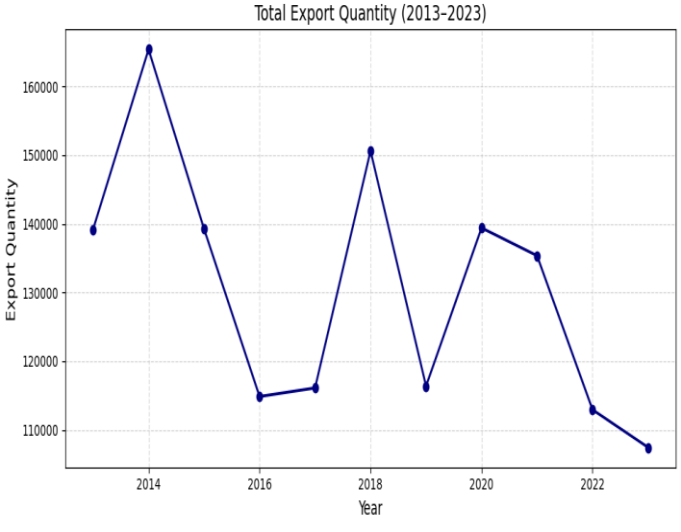

Figure 1. Export trend line

The main key factors for decline in trend may be increase in tariff for many imported agricultural and processed food products from India. Another key factor is dependency on contract farming and agro-climatic risks. The gherkin crop is largely grown under contract farming. Recent research revealed that though gherkin farming remains profitable, farmers face constraints like inadequate processing facilities for sorting and grading [6]. Moreover, Gherkin price and farmers' incomes depend heavily on exporters' procurement terms. Overall, the graph

in the figure illustrates no stable growth pattern and instead reflects cyclical rises and falls, ending with a downward trajectory in the final years.

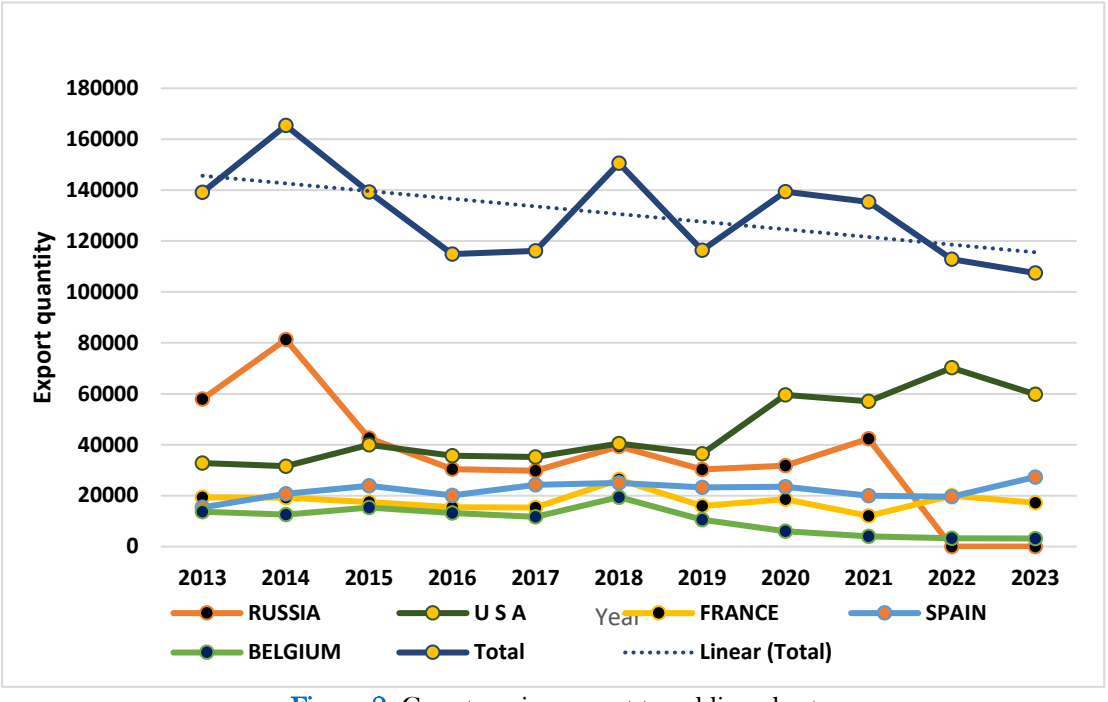

Figure 2. Country wise export trend line chart

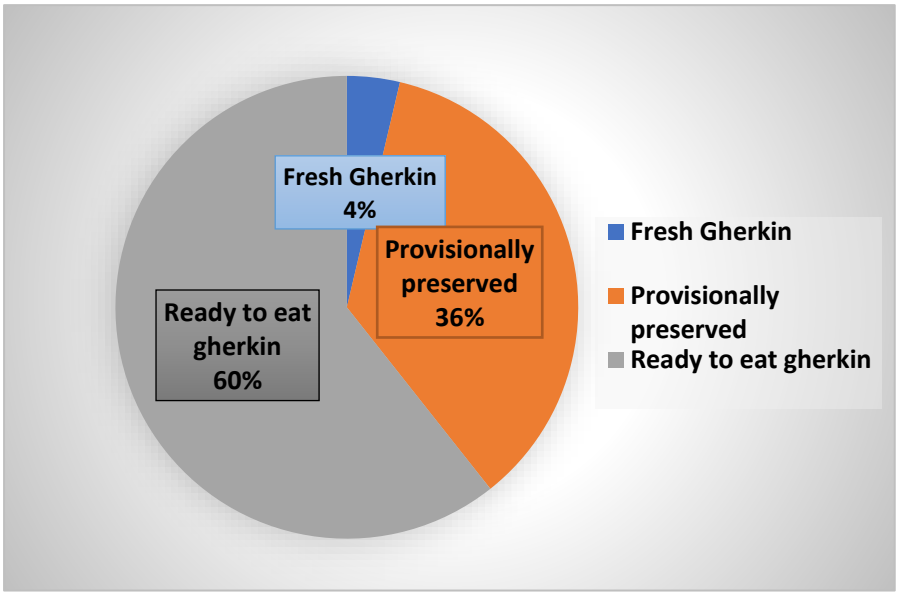

Figure 3. Forms of gherkin export from India

The country-wise were illustrated in Figure 2 revealed the substantial heterogeneity in gherkin export performance across the five countries. The gherkin export trend analysis from 2013 to 2023 demonstrated cyclic fluctuations with notable peaks in 2014 and 2018. However, the linear trend line (blue dashed line) in total export quantity indicated an overall downward growth**,** suggesting a structural weakening in the export performance. This aggregate decline is primarily driven by sharp contractions in a subset of countries rather than uniform performance across the sample countries. Overall, the findings suggested that while certain economies within the group have adapted effectively to changing political conditions, others have experienced severe setbacks that contribute to the declining aggregate gherkin export trends.

The Figure 3 revealed the different forms of gherkins exported from India to foreign nations. The structural shift in raw product emphasize the growing importance of value-added processed produce. The figure 3 indicated that around 60 per cent of gherkin produce is value added and exported as ready-to-eat preserved food. Advancements in food processing technologies and increased consumer demand in developed and emerging markets [7, 8] may help us to achieve the export expectations. The value-added gherkin produce may provide high prices and generate more export revenue. The results were in consistent with findings of Henson & Humphrey, 2010 in food value chain research. Around 36 per cent of gherkin were exported as provisionally preserved products that exhibit steady growth in quantity and export value. The trend reflects global market shifts toward semi-processed foods, catering to evolving consumer preferences [9]. Exports of fresh products remain minimal and declining over time contributing 4 per cent of export. This aligns with existing literature which highlights that challenges like perishability, cold chain logistics facilities, phytosanitary regulations may occur for fresh gherkin exports which limit scalability and market penetration [10].

3.4 Linear Regression Model

The simple linear regression model was used to examine a relationship between export price and quantity of gherkin commodity for 54 observations [11]. The regression model in the table 4 exhibited that R^2 value of 0.914 implies that approximately 91.4% of the variance in the dependent variable is explained by independent variable. ie., Total Export Value, indicating excellent explanatory power. The presented model is highly statistically significant, and the independent variable (X_i) predicts the dependent variable (Y_i). The slope coefficient value for total export value is 978.55**,** significant. The result concludes that for every unit increase in total export value, the dependent variable increases by approximately 978.55 units, holding other factors constant. The results of linear regression results strongly suggested that there exist a highly significant and positive linear relationship between total export value and the dependent variable (export quantity) [12].

Table 4. Results of simple linear regression model

S.No	Metrics	Regression Value
1	R Square	0.914
2	Coefficient Intercept	3422.69
3	Coefficient export Value	978.55
4	P value	0.003*
	Total no of observations (N)	54

3.5 Market share contribution of exporting countries

The contribution of market share among top five exporting countries were given in the table 3. India's gherkin exports showed a decreasing trend after 2018, falling from 150,604 MT to 107,446 MT by 2023 [13]. The figure 4 clearly indicates that in earlier days, Russia was one of the India's largest importer of gherkin in 2014, and market share completely falls down as they closed imports after 2021 which caused a major market shock. Followed by European markets (France, Spain, and Belgium) remain stable or declining due to strict export norms, quality certification. Further, increased competition from other countries like Turkey, Srilanka, Vietnam markets erodes India's global market share in Gherkin export.

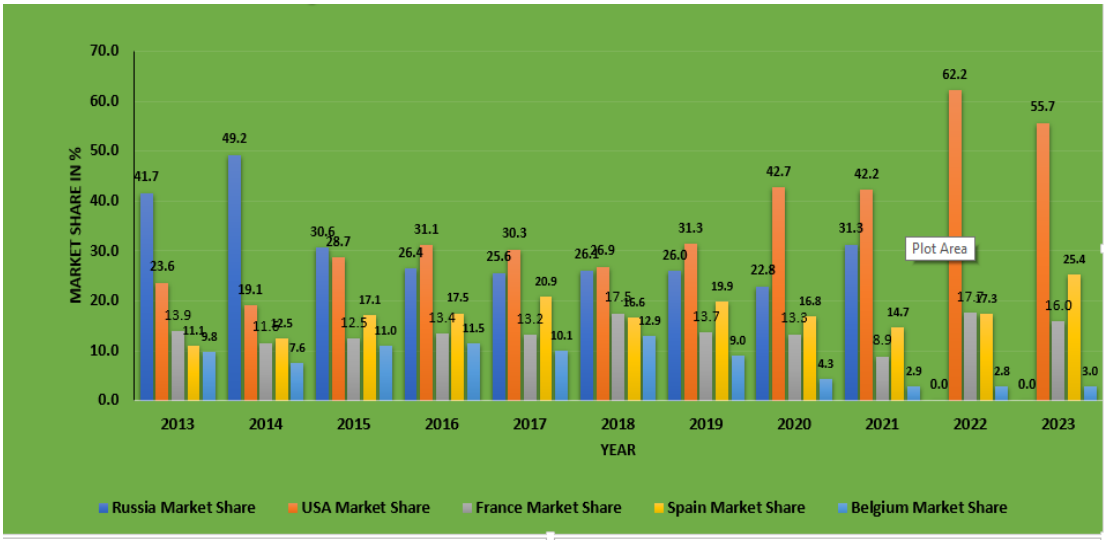

Figure 4. Market Share Contribution of Countries

The Major losses in Russian market share and stagnation in European market share predominantly reduced India's export performance. The USA became the dominant gherkin

export destination after 2021 (ie., From 42.2 per cent to rise of 62.2 per cent), but this rise reflects market substitution rather than genuine demand growth [14]. Hence, to conclude, the overall data signals structural weaknesses in both gherkin production and international demand. In steady state the Gherkin industry is entering a contraction phase of business cycle, requiring urgent policy and supply-chain interventions.

4. Conclusions

Gherkin farming in recent days becoming less profitable for farmers due to high input cost, water scarcity, low yield and no compensation for crop failure either from government or exporters. There are about 90,000 to 100,000 small and marginal farmers engaged in gherkin cultivation in the south India in the states of Andhra Pradesh, TamilNadu and Karnataka covering 26300 hectares of land. India has exported 2,50,000 metric tonnes of gherkin export in the financial year 2024. Recent report from Indian Gherkin exporters association in 2025 highlighted that there is a 40 % drop in gherkin production around south India in two years. In recent days, it has been observed that, the acreage under gherkin cultivation is reduced due to poor price fixation, improper guidance on export activity, unpredictable weather condition, groundwater depletion, impacts due to water scarcity and high dependency on contract farming models. Lack of sufficient demand and absence of domestic market is a major challenge in marketing the gherkin produce in India. High input cost, high quality maintenance and export standards, fluctuations in global market, freight cost indirectly affects gherkin farm gate prices and demand for Indian gherkin got disrupted in global market. Early detection of declining trends can allow policymakers to intervene before structural deterioration becomes irreversible. In case of crop failure due to environmental conditions like weather, pest, water scarcity, there is no guarantee compensation for crop losses to gherkin contract farmers, also limited support from government. The above listed factors altogether creates pressure and push away the small and marginal farmers from gherkin cultivation.

On the other side, demand for India gherkin is reduced in global market and Indian companies are closing contact farming with small and marginal gherkin farmers, which again discourage farmers for gherkin production. Even export of gherkin is over saturated with low price competition. Countires like turkey, Vietnam and Srilanka are producing gherkins at a lower cost and competing directly with Indian exporters in European and Russian markets. International buyers from import markets have strict compliance on fruit size, colour, shape and uniformity, sorting and grading. But as per south India's weather and climatic conditions, crops health is affected and yield declines due to disease, pest and weather stresses which paves way to reject the produce in global market.

5. Policy Implications

Government can take efforts to address geopolitical risks and strengthen the institutional and trade frameworks. There is a need for export diversification. Streamlining customs procedures and improving logistics infrastructure can be effective starting points to increase export performance. The collapse of Russia's export activity was due to vulnerability of economies exposed to geopolitical conflict. Henceforth, strengthening international diplomacy, reducing dependency on politically sensitive trade routes, and building alternative markets may mitigate such risks. The countries like USA and Spain shows strong export growth need more focus on investment in high value sectors, innovation policies and improvement in sustainable supply chain. The study observed and concludes that the need for continuous monitoring of gherkin export performance is essential to bring early warning to gherkin farming community.

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