



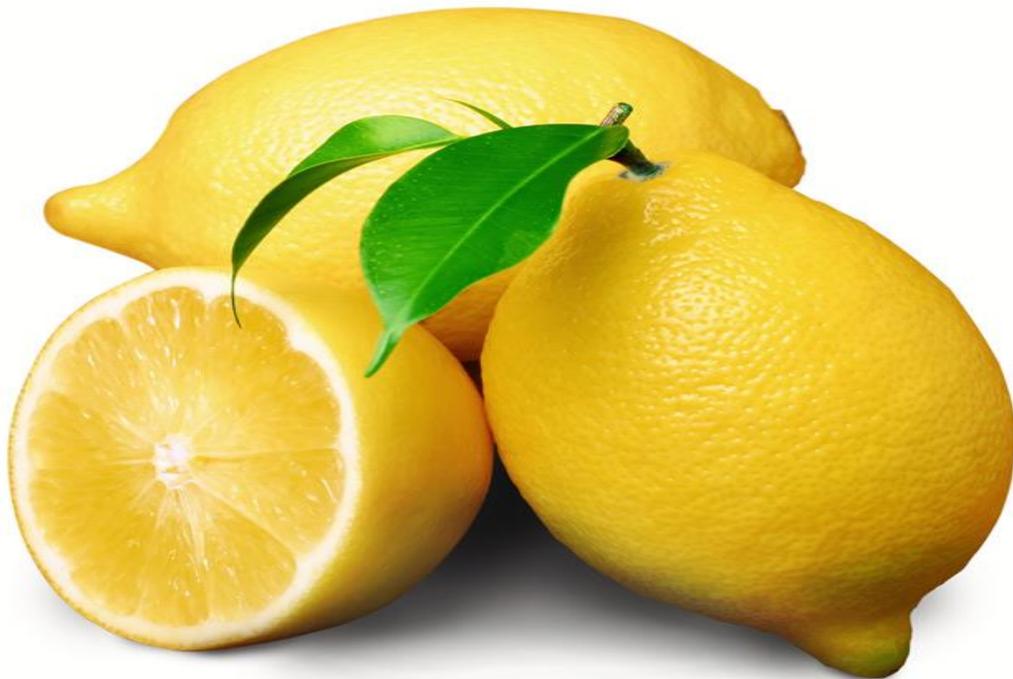
Indo-German Cooperation on Agricultural Market Development

Building sustainable partnerships

Lemon (Citrus limon)

(FAO Code: 0497)

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Product information

Global Trade – India’s Role

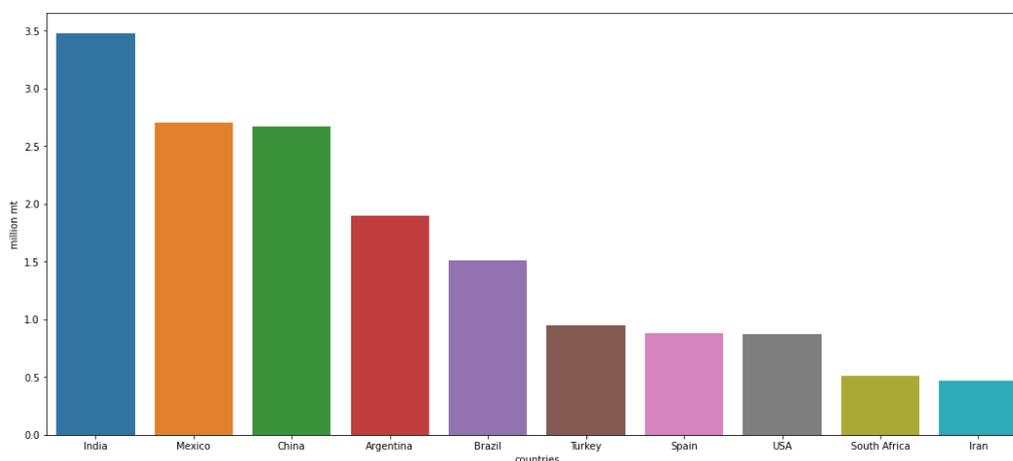


Figure 1. Major lemon producing countries in 2020 (FAOSTAT 2021ⁱ)

- In 2020, India was the world’s largest lemon producing country contributing more than 17.81% of total world production (Tridge 2021ⁱⁱ).
- Spain was the world’s largest lemon exporter with a share of 26.24% (US\$ 1.03 billion), USA was the largest lemon importer with a value of US\$ 659.3 million and a share of 16.17% (Tridge 2021).
- Volume-wise, Mexico is the world’s biggest exporter with a volume of 0.8 million metric tonnes in 2020 (FAOSTAT 2021)

Table 1. Top global lemon exporters in 2020 (Tridge 2021)

Country	Export Share 2020 (%)	Export Value in 2020 (US\$ million)	Export Growth Value from 2017-20 (%)
Spain	26.24	1.03 billion	+22.19
Mexico	13.85	540.92	+7.77
South Africa	10.26	400.57	+31.46
Netherlands	8.35	326.10	+15.69
Turkey	7.01	273.79	-7.33

Table 2. Top global lemon importers in 2020 (Tridge 2021)

Country	Import Share 2020 (%)	Import Value in 2020 (US\$ million)	Import Growth Value from 2017-20 (%)
USA	16.17	659.3	-4.78
Germany	11.19	456.36	+40.51
France	6.79	276.92	+24.22
Netherlands	6.66	271.71	+14.66
UK	4.86	198.10	+12.89

- In 2020, India’s global lemon export value was US\$ 9.8 million. Middle Eastern countries are among the major importing countries of Indian lemon, particularly UAE is a leading importer with a share value of 63.16% of total Indian lemon exports. India’s major export trade with the UAE has increased up to +38.2%.

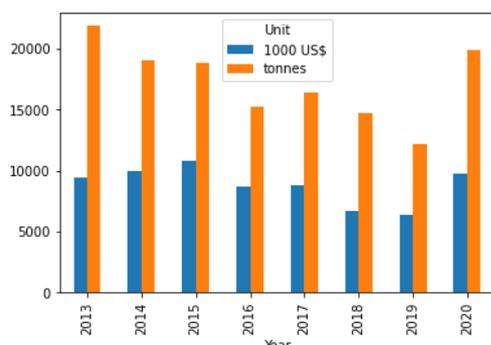


Figure 2. Indian lemon export trends from 2013 to 2020 (Tridge 2021)

Table 3. Major lemon imports from India in 2020 (Tridge 2021)

Country	Export Share 2020 (%)	Export Value in 2020 (US\$ million)	Export Growth Value from 2017-20 (%)
UAE	63.16	6.16	+38.21
Nepal	19.87	1.94	+105.85
Oman	4.21	0.41	+209.36
Qatar	3.12	0.30	+49.44
Saudi Arabia	2.31	0.25	+161.69
Kuwait	2.18	0.21	+180.53
Bahrain	1.44	0.14	+107.21

Lemon Import Trends in European Union

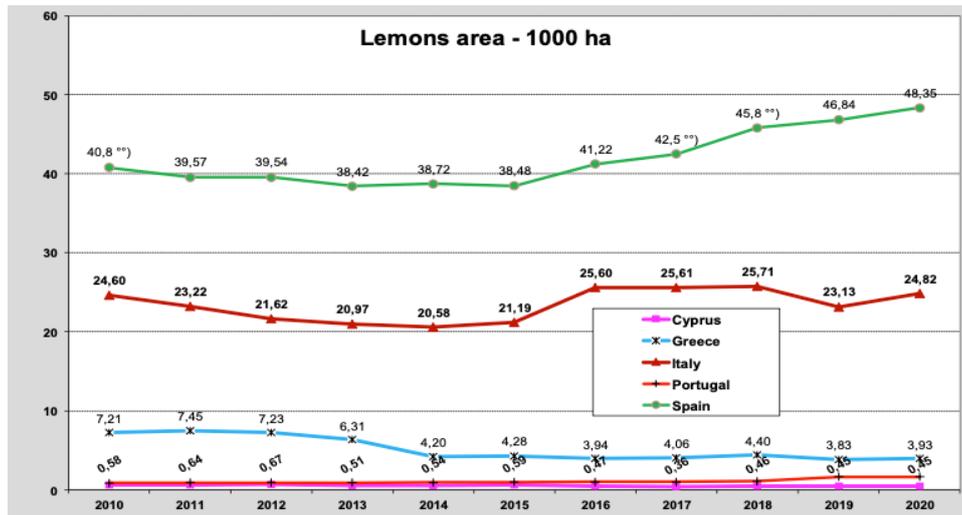


Figure 3. Lemon under the area of cultivation in EU member states

- In 2020/21, EU lemon production has been forecasted to increase almost 11.7% compared to the previous season to 1,654 million metric tonnesⁱⁱⁱ. Spain is the largest lemon producer with the highest area under cultivation. The European market heavily relies on Spain’s production, which supplies 75 to 80% of the lemons.
- In 2020/21, Spain’s lemon production was above 1 million metric tonnes - an increase of 14% compared to the previous year. In addition, in recent years, Spain increased its total planted area for lemons standing at around 48,000 hectares in 2020.
- In 2016 and 2018, EU imports of lemons from non-EU regions increased due to low production in Spain. In the 2015-16 season, Spain suffered a tremendous reduction in lemon production of 23% due to adverse weather conditions at the flowering stage. The production decreased from 1.1 million to 0.85 million tonnes.

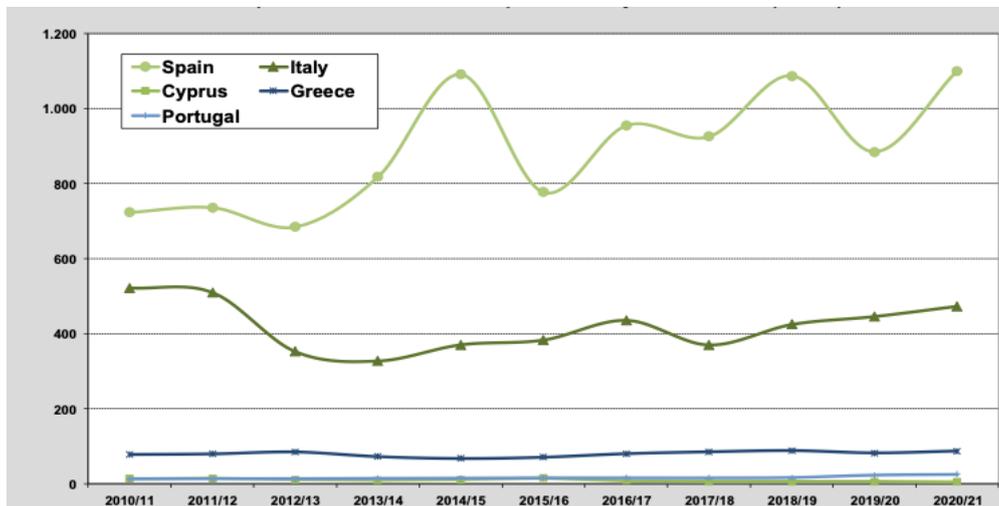


Figure 4. Trend in lemon production by EU member states (1000 tonnes)

- Italy produces around 400,000 tonnes of lemons annually. The majority of the production takes place in Sicily, but the country is also known for its traditional lemons on the Amalfi coast with Protected Geographical Indication (PGI). Lemons in Italy are not only consumed as fresh fruit or for culinary purposes but are also a popular ingredient for ice cream and limoncello.
- Nevertheless, Italy imported 115,000 tonnes of lemons in 2018 and (only) exported 47,000 tonnes. This makes Italy a net importer. Almost half of the imported volume came from Spain.

- Most lemons of non-European origin enter Europe via the Netherlands with the largest destination markets being Germany, France and the United Kingdom. Poland offers a particular demand for Turkish lemons, while Italy uses imports to complement its own production

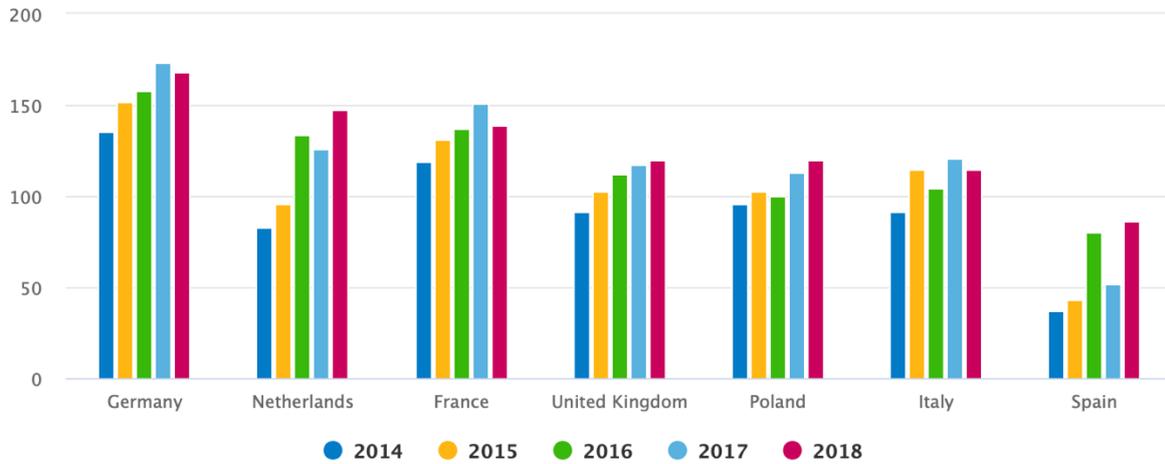


Figure 5. Major lemon importing EU member states (CBI 2021^{iv})

- The imports of the Netherlands consist for the most part of non-European lemons, mainly from Argentina (52,000 tonnes in 2018) and South Africa (46,000 tonnes). Non-European imports increased by 90% since 2014. Imports from South Africa even tripled in five years' time.
- Germany is the main non-producing destination for lemons, having imported 168,000 tonnes of lemons in 2018. The majority is supplied by Spain (120,000 tonnes, mostly of the *Primofiori* variety). South Africa is the largest non-European supplier with 14,000 tonnes and with an above-average growth, exporting 138% more than five years ago.
- Lemons are a standard product for large retail chains, however, German retailers are among the strictest buyers in terms of food safety and pesticide residues. By sourcing the majority of lemons in Spain and Italy, buyers maintain the highest degree of control over the supply chain and fruit quality. Germany is also one of the better markets for organic lemons.

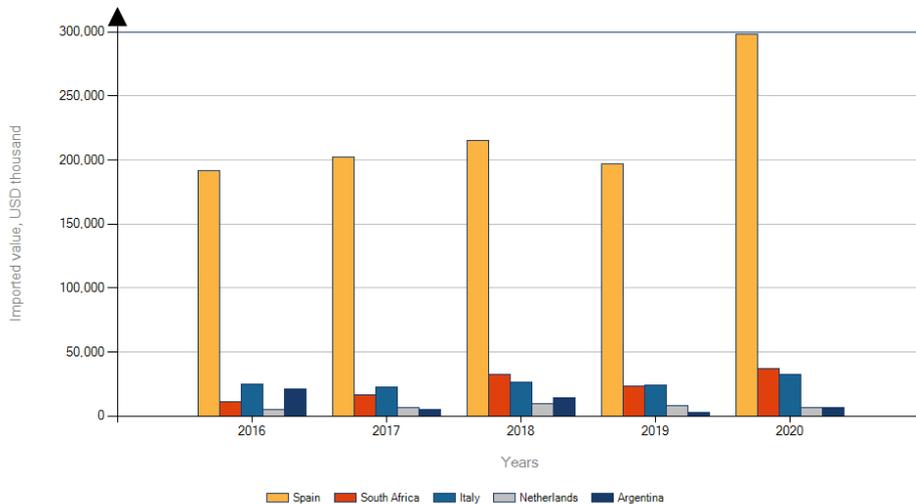


Figure 6. Lemons import trend in Germany (ICT^v)

- Poland depends mainly on Spain, Turkey and re-exports from the Netherlands for the supply of lemons. Spain supplies the largest volume: 46,000 out of the 120,000 tonnes in total in 2018. Turkey also exports a significant amount of 24,000 tonnes and is developing fast. Polish imports from Turkey are already three times higher than five years earlier. This is likely due to the geographical position as well as the price-competitive suppliers.

Lemon Market Segmentation

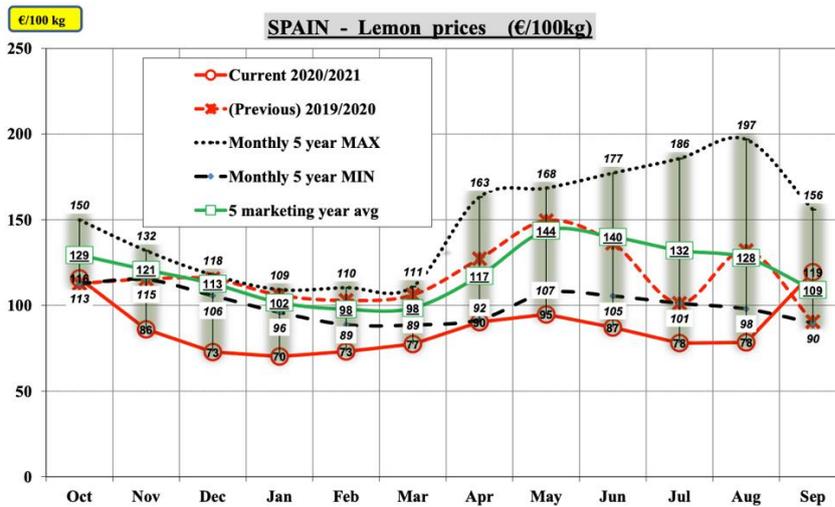


Figure 7. Monthly-wise lemon prices in Spain

- Fresh lemon retail prices are usually between €2 and €3.50 per kilo. Organic lemons are sold for roughly between €4 and €5.
- Prices in Poland tend to be lower. Statistics indicate a trade value of 1.08 € per kilo for imported lemons in Poland, compared to 1.53 € in Germany and 1.41€ in France.
- The global lemon-based products market size was valued at USD 5.6 billion in 2019 and is projected to grow at a compound annual growth rate (CAGR) of 4.2% from 2020 to 2027^{vi}.
- Lemon extract emerged as the largest product segment in terms of revenue, accounting for a share of 53.5% in 2019. It is a concentrated fruit flavour composed of a significant amount of alcohol content that increases its shelf life. It is used for adding fresh and refreshing flavour and aroma to carbonated soft drinks, fruit beverages, bottled water, functional drinks, yoghurt mix and sports drinks.
- In terms of region, the global lemonade market has been segmented into North America, Europe, Asia Pacific, Middle East and Africa and South America. North America captured the largest market share due to the rising consciousness towards health among consumers. Key players operating in the global lemonade market are: Britvic, The Coca-Cola Company, PepsiCo, Dr Pepper Snapple, Parle agro, Nestlé, Mike’s Hard Lemonade, Arizona Beverages, The Kraft Heinz Company and Hydro One Beverages.

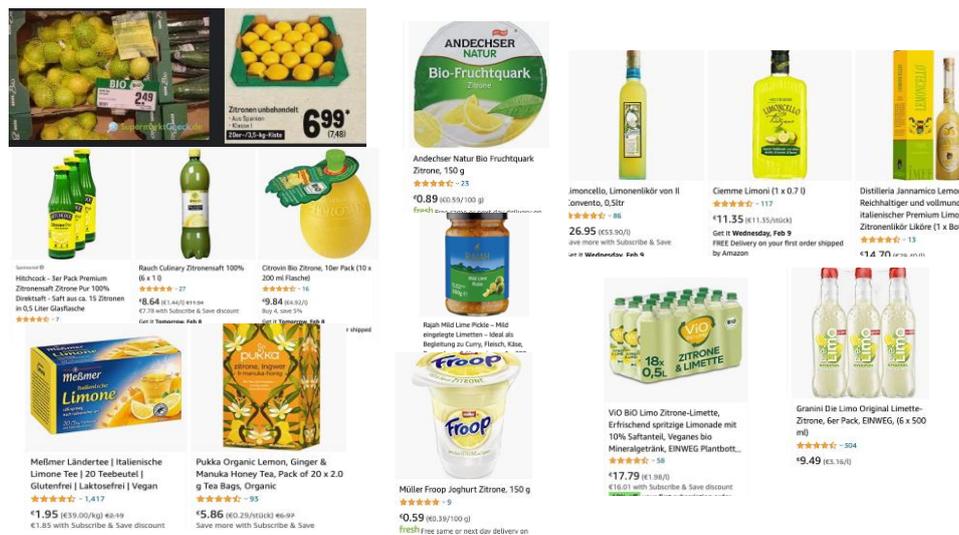


Figure 8. Lemon and lemon centric product prices in the German retail sector

Lemon Production in India

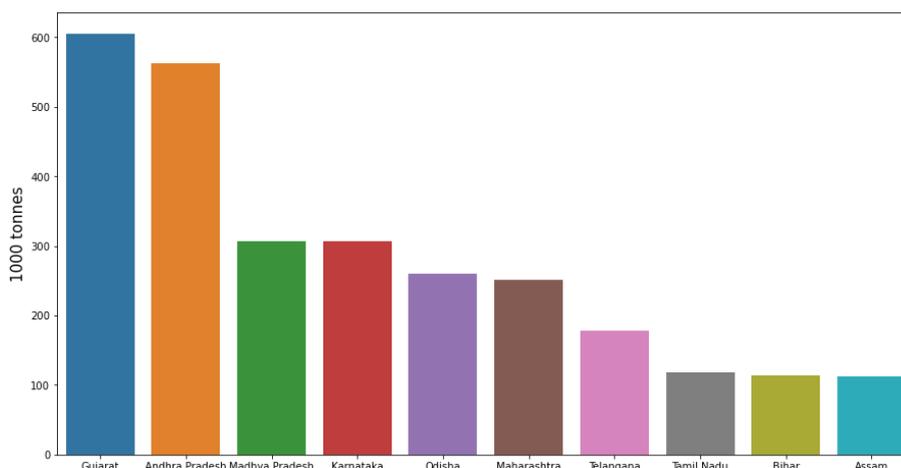


Figure 9. Major lemon producing states in 2018-2019

- The area under lemon has increased from 78 thousand ha to 0.31 million ha during 2005-2020. The production also increased during the same period from 1.03 million tonnes to 3.71 million tonnes. The average productivity of lemon is 10.03 tonnes per hectare.
- In terms of production, Gujarat was the largest lemon producing state in India with a share of 19.2%, followed by Andhra Pradesh (17.8%), Madhya Pradesh (9.7%), Karnataka (9.7%), Orissa (8.2%) and others.
- Popular varieties of lemon with the highest yield and native to India are *Punjab Baramasi*, *Eureka*, *Punjab Galgal*, *PAU Baramas* and *Rasraj*.
- *Kagzi Lime* is one of the most frequently cultivated lime varieties, the popular improved kagzi lime cultivars such as *Pramalini*, *Vikram*, *Sai Sarbati*, *Phule Sarbati*, *PKM1* and *Balaji*.
- The harvesting season of lemons depends upon climatic conditions, nutrition, heat units and moisture availability. The period of maturity is shorter in acid lime (5-6 months) and the longest in mandarin and sweet orange. Major harvesting period is from July to September and from November to January.
- Grading determines the quality of fruits. It is generally carried out on the basis of size, shape, colour and weight of the fruits. Based on physical appearance Kagzi lime was graded as
 - Grade I-Superior quality, attractive, large-sized.
 - Grade II-Good quality, attractive, medium-sized.
 - Grade III-Less attractive, small-sized, with one or two defects/patches.

Lemon Market

- In general, lemon prices follow a typical seasonal pattern in price movement. The market arrivals of lemons start from the month of December to January and July to August. During these months the price is low.
- Figure 10 summarizes the average monthly-wise lemon wholesale and the retail price trend in 2020 based on calculations from National Horticulture Board data in 28 markets in India.

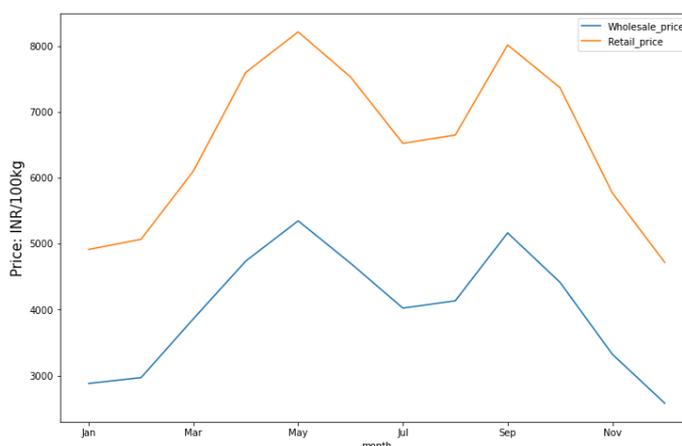


Figure 10. Average monthly-wise lemon price in 2019 (NHB 2021^{vii})

- Gujarat is being a major producer of lemons, the price in the Vadodara market in Gujarat noticed a 3 to 4 times higher prices for *kgazi* lime per kilogram in April 2021. The average retail price for *kgazi* was 40 to 50 INR per kilogram, which has jumped 160 to 200 INR per kilogram^{viii}.
- Andhra Pradesh is the second-largest lemon producer in the country, which noticed the lowest price for *kgazi* lime in June 2021. Nellore district of Andhra Pradesh constitutes the largest acid lime cultivation on 21 thousand hectares with a production of 31 thousand metric tonnes. Gudur is the biggest lemon market in Andhra Pradesh, which recorded the lowest price of 7 INR per kilogram, which is 3 to 4 times less than the average wholesale price in that market^{ix}
- Figure 11 summarizes the monthly-wise lemon price trend in the Delhi market

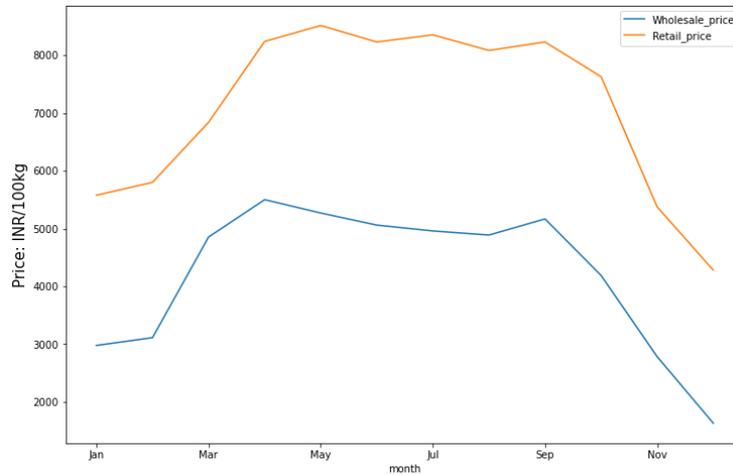


Figure 11. Average monthly-wise lemon price in Delhi market in 2019 (NHB 2021)

Lemon Market Segmentation

- *kgazi* lime is highly valued in Indian cuisine for its culinary and value-added products such as squash, syrups, cordials, citric acid production, pickles as well as cosmetic and nutraceutical applications^x.
- *Nimbu pani* (lemon water) has always been one of the most frequently consumed cold beverage. It has enormous growth potential, higher than any other beverages in the out-of-home / on-the-go consumer segment, especially on a big change in consumer behaviour. Today, consumers look for beverage hygiene, comfort, refreshing taste, affordability and availability of the year.

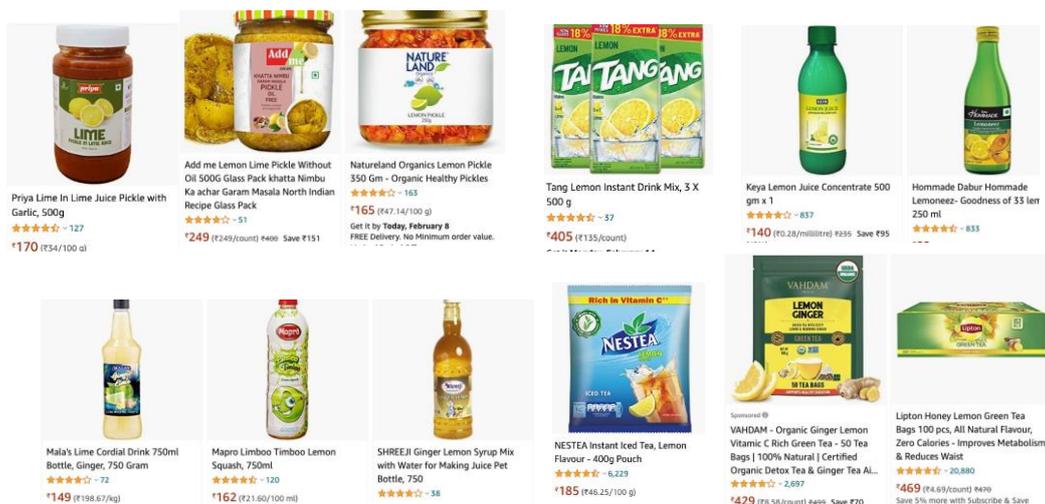


Figure 12. Lemon centric products at retail market in India

What are significant challenges in the lemon supply chain?

- A recent study summarizes the *Kagzi* lime production and market challenges, which are typically attributable to the farming community in India (Dhirvare et al. 2021).

Production constraints:

Sr. No.	Problem	Group				
		Marginal N=30	Semi-medium N=30	Medium N=30	Large N=30	Total N=30
1	Lack of knowledge about quality seedlings	13 (43.33)	17 (63.31)	19 (63.33)	24 (80.00)	56 (62.22)
2	Unavailability of labors on time and high wage rates	16 (53.33)	19 (66.67)	20 (66.67)	27 (90.00)	63 (70.00)
3	High cost of fertilizers	11 (36.67)	14 (46.67)	14 (46.67)	19 (63.33)	44 (48.89)
4	Problems of pests and diseases	22 (73.33)	24 (80.00)	24 (80.00)	26 (86.67)	72 (80.00)
5	High cost of pesticides	13.00 (43.33)	17.00 (56.66)	17.00 (56.67)	20.00 (66.67)	50 (55.56)
6	Lack of electricity (Load Shedding)	25 (83.33)	24 (80.00)	24 (80.00)	27 (90.00)	76 (84.44)
7	Non- availability of sufficient institutional credit	20 (66.67)	22 (73.31)	22 (73.33)	19 (63.33)	61 (67.78)
8	Lack of technical knowledge	22.00 (73.33)	24.00 (80.00)	24.00 (80.00)	17.00 (56.67)	63 (70.00)
	Total	30 (100)	30 (100)	30 (100)	30 (100)	90 (100)

Processing and market constraints:

Sr. No.	Problem	Group				
		Marginal N=30	Semi-medium N=30	Medium N=30	Large N=30	Total N=30
1	Grading					
a	Require more labor and labor demands high wages	--	14 (46.67)	17 (56.67)	16 (53.33)	47 (52.22)
2	High transportation charges	--	18 (60.00)	15 (50.00)	22 (73.33)	55 (61.11)
3	Method of sale					
a	High commission charges	--	21.00 (70.00)	26.00 (86.67)	28 (93.33)	75 (83.33)
b	Delay in cash payment from intermediaries	--	20 (66.67)	17 (56.67)	21 (70.00)	58 (64.44)
c	Malpractices such as unauthorized deductions	--	18.00 (60.00)	16.00 (53.33)	14.00 (46.67)	48 (53.33)
4	Others					
a	Lack of efficient marketing information system	--	26.00 (86.67)	22.00 (73.33)	24.00 (80.00)	72 (80.00)
b	Unpredictable fluctuations in the prices	--	25 (83.33)	24 (80.00)	27 (90.00)	76 (84.44)
c	Low prices	--	26.00 (86.67)	20.00 (66.67)	25.00 (83.33)	71 (78.89)
	Total	--	30 (100)	30 (100)	30 (100)	90 (100)

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- ⁱ https://www.fao.org/faostat/en/#rankings/countries_by_commodity
- ⁱⁱ <https://www.tridge.com/intelligences/lemon/production>
- ⁱⁱⁱ https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Citrus%20Semi-annual_Madrid_European%20Union_06-15-2021.pdf
- ^{iv} <https://www.cbi.eu/market-information/fresh-fruit-vegetables/lemons/market-potential>
- ^v https://www.trademap.org/Country_SelProductCountry_TS_Graph.aspx?nvp=1%7c276%7c%7c%7c%7c080550%7c%7c%7c6%7c1%7c1%7c1%7c2%7c1%7c2%7c2%7c1%7c2
- ^{vi} <https://www.molhr.gov.bt/molhr/wp-content/uploads/2021/05/Lemon-plantationprocesssing-DPR.pdf>
- ^{vii} <http://www.nhb.gov.in/OnlineClient/MonthwiseAnnualPriceandArrivalReport.aspx>
- ^{viii} <https://timesofindia.indiatimes.com/city/vadodara/vadodara-lemon-prices-skyrocket-as-covid-spurs-demand/articleshow/81980574.cms>
- ^{ix} <https://www.thehansindia.com/andhra-pradesh/lemon-farmers-of-nellore-district-in-distress-due-to-sudden-dip-in-prices-665034>
- ^x https://www.researchgate.net/publication/354683645_Kagzi_Lime_Orchard%27s_production_costing_in_DhuleDistrictMaharashtra