India’s exports of **Cellulose & its Chemical Derivatives and Crustaceans** and imports of **Phenols ; Phenol – Alcohols and Natural or Chemical Potassic Fertilizer**

Some Insights Preface

The study uses trade indicators to analyse merchandise export and import data in a way that should be useful for the purpose of policy. The indicators provide a glimpse of the trade patterns of the world and the performance of India in comparison to various other countries. They have been used in the case of India’s exports of **Cellulose & its Chemical Derivatives and Crustaceans** and imports of **Phenols ; Phenol – Alcohols and Natural or Chemical Potassic Fertilizer** to indicate the possible directions policy may take.

The data used in this study has been sourced from the Export Import Data Bank of the DGCI&S, Department of Commerce, and Government of India and from the United Nations Comtrade Database. Introduction notes of each commodities has been sourced from the various sights –viz Wikipedia, Britannica, The Economic Times etc.

Computations are based on data at ITC-HS four-digit level (ITC-HS Code-3912 & 0306 for export and 2907 & 3104 for import) and the latest finalized data available on the UN Comtrade Database up to year 2021 and on the DGCI&S Database up to April’2023. So, trends from 2018 to 2021 have been shown when we extract the data from UN Comtrade and from 2019 to 2022 have been shown when we extract the data from DGCIS Data base.

In this report, we will see various analysis and aspects of India’s Precious as well as International export trade of Cellulose & its Chemical Derivatives and Crustaceans and imports of Phenols ; Phenol – Alcohols and Natural or Chemical Potassic Fertilizer. We will use both the 4 digit Commodity codes.

Trends in India’s as well as International Trade i.e. Exports and Imports of above four Commodities are given below in different tables :

- Table 1 : India’s top 10 Export destination of Cellulose and its Chemical derivatives with their shares in percentage.
- Table 2 : World’s top 10 Exporters of Cellulose and its Chemical derivatives with their shares in percentage.
- Table 3 : World’s top 10 Importers of Cellulose and its Chemical derivatives with their shares in percentage.
- Annex- I : Top 3 sources of Cellulose and its Chemical derivatives of World’s top 3 Importers.
- Table 4 : India’s top 10 destination of Crustaceans with their shares in percentage.
- Table 5 : World’s top 10 Exporters of Crustaceans with their shares in percentage.
- Table 6 : World’s top 10 Importers of Crustaceans with their shares in percentage.
- Annex-II : Top 3 sources of Crustaceans of World’s top 3 Importers.
- Table 7 : India’s top10 Sources of Phenols ; Phenol – Alcohols with their shares in percentage.
- Table 8 : World’s top 10 Importers of Phenols ; Phenol – Alcohols with their shares in percentage.
- Table 9 : India’s top 10 Sources of Potassic Fertilizer with their shares in percentage.
- Table 10 : World’s top 10 Importers of Potassic Fertilizer with their shares in percentage.

EXPORT

Cellulose & its Chemical Derivatives

Cellulose is an organic compound with the formula ($C_6H_{10}O_5$) a polysaccharide consisting of a linear chain of several hundred to many thousands of β(1→4) linked D-glucose units. Cellulose is an important structural component of the primary cell wall of green plants, many forms of algae and the oomycetes. Some species of bacteria secrete it to form bio films. Cellulose is the most abundant organic polymer on Earth. The cellulose content of cotton fibre is 90%, that of wood is 40–50%, and that of dried hemp is approximately 57%.

Cellulose is mainly used to produce paperboard and paper. Smaller quantities are converted into a wide variety of derivative products such as cellophane and rayon. Conversion of cellulose from energy crops into bio fuels such as cellulosic ethanol is under development as a renewable fuel source. Cellulose for industrial use is mainly obtained from wood pulp and cotton.

Some animals, particularly ruminants and termites, can digest cellulose with the help of symbiotic micro-organisms that live in their guts, such as Trichonympha. In human nutrition, cellulose is a non-digestible constituent of insoluble dietary fibre, acting as a hydrophilic bulking agent for feces and potentially aiding in defecation.

Cellulose was discovered in 1838 by the French chemist Anselme Payen, who isolated it from plant matter and determined its chemical formula. Cellulose was used to produce the first successful thermoplastic polymer, celluloid, by Hyatt Manufacturing Company in 1870. Production of rayon ("artificial silk") from cellulose began in the 1890s and cellophane was invented in 1912. Hermann Staudinger determined the polymer structure of cellulose in 1920. The compound was first chemically synthesized (without the use of any biologically derived enzymes) in 1992, by Kobayashi and Shoda.

Cellulose has no taste, is odourless, is hydrophilic with the contact angle of 20–30 degrees, is insoluble in water and most organic solvents, is chiral and is biodegradable. It was shown to melt at 467 °C in pulse tests made by Dauenhauer *et al.* (2016). It can be broken down chemically into its glucose units by treating it with concentrated mineral acids at high temperature.

Cellulose consists of fibrils with crystalline and amorphous regions. These cellulose fibrils may be individualized by mechanical treatment of cellulose pulp, often assisted by chemical oxidation or enzymatic treatment, yielding semi-flexible cellulose nanofibrils generally 200 nm to 1 µm in length depending on the treatment intensity. Cellulose pulp may also be treated with strong acid to hydrolyze the amorphous fibril regions, thereby producing short rigid cellulose nanocrystals a few 100 nm in length. These nanocelluloses are of high technological interest due to their self-assembly into cholesterol liquid crystals, production of hydrogels or aerogels, use in nanocomposites with superior thermal and mechanical properties, and use as Pickering stabilizers for emulsions.

Cellulose is soluble in several kinds of media, several of which are the basis of commercial technologies. These dissolution processes are reversible and are used in the production of **regenerated celluloses** (such as viscose and cellophane) from dissolving pulp.

The most important solubilising agent is carbon disulfide in the presence of alkali. Other agents include Schweizer's reagent, N-methylmorpholine N-oxide, and lithium chloride in dimethylacetamide. In general, these agents modify the cellulose, rendering it soluble. The agents are then removed concomitant with the formation of fibres'. Cellulose is also soluble in many kinds of ionic liquids.

Regenerated cellulose can be used to manufacture a wide variety of products. While the first application of regenerated cellulose was as a clothing textile, this class of materials is also used in the production of disposable medical devices as well as fabrication of artificial membranes.

These are broadly classified under **H.S. Code-3912**

Table - 1

India's Top 10 destination of Cellulose & its Chemical Derivatives (H.S Code-3912)

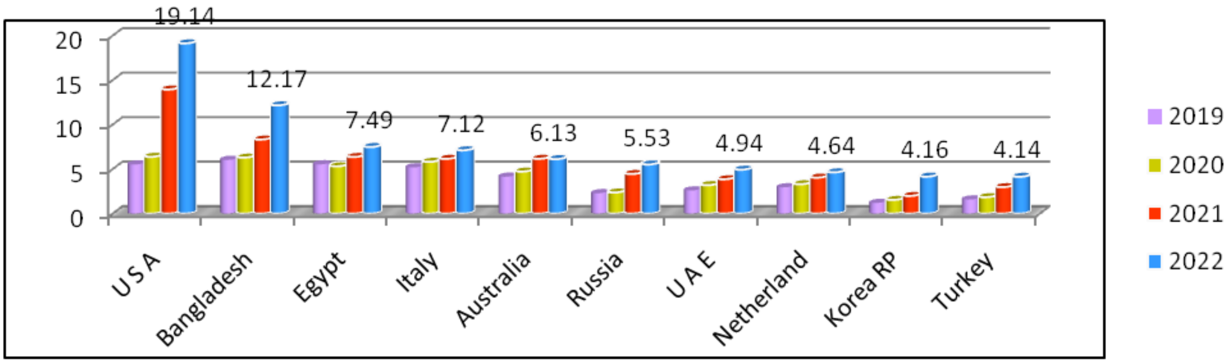
Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	U S A	5.53	6.45	6.39	7.27	13.96	12.15	19.14	13.67
2.	Bangladesh	6.04	7.04	6.30	7.17	8.33	7.25	12.17	8.69
3.	Egypt	5.54	6.46	5.32	6.05	6.37	5.55	7.49	5.35
4.	Italy	5.20	6.07	5.83	6.64	6.16	5.36	7.12	5.08
5.	Australia	4.15	4.84	4.73	5.39	6.17	5.37	6.13	4.38
6.	Russia	2.30	2.68	2.38	2.71	4.46	3.88	5.53	3.95
7.	U A E	2.61	3.05	3.20	3.64	3.87	3.36	4.94	3.53
8.	Netherland	2.96	3.45	3.31	3.77	4.05	3.52	4.64	3.31
9.	Korea RP	1.20	1.40	1.54	1.76	1.99	1.74	4.16	2.97
10.	Turkey	1.59	1.85	1.85	2.11	2.98	2.59	4.14	2.96
	Others	48.64	56.72	46.96	53.48	56.58	49.24	64.57	46.11
	Total	85.76	100	87.82	100	114.92	100	140.03	100

Source: DGCI&S.

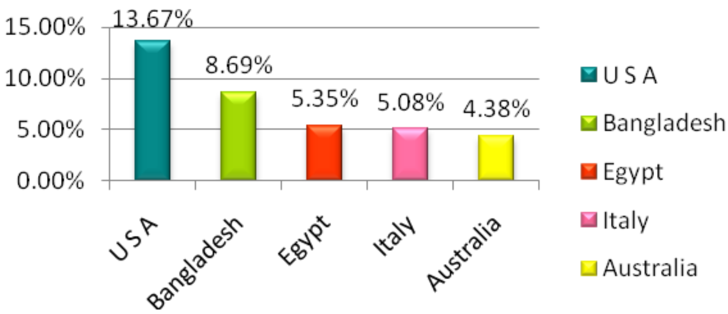
Note : India's Export including re-export

Leading importers of Cellulose & its derivatives from India from 2019-2022**(Values in million USD)**

Data label given on the basis of 2022



India's top 5 destinations of Cellulose & its derivatives by percentage India in 2022:



In the year 2022, India has exported the Cellulose and its Chemical derivatives worth value of US $ 140.03 Million, showing the rise of more than 21.84% compared to the year 2021. USA was the largest market for Indian Cellulose and its Chemical derivatives in the piece export from India, in 2021 USA imported US $ 19.14 Million of Cellulose and its Chemical derivatives from India which was 13.67% share of India's total export. It was followed by Bangladesh and Egypt with 8.69 % and 5.35 % share. The top 10 countries in total shared the share of 53.89% of total export from India.

Table-2

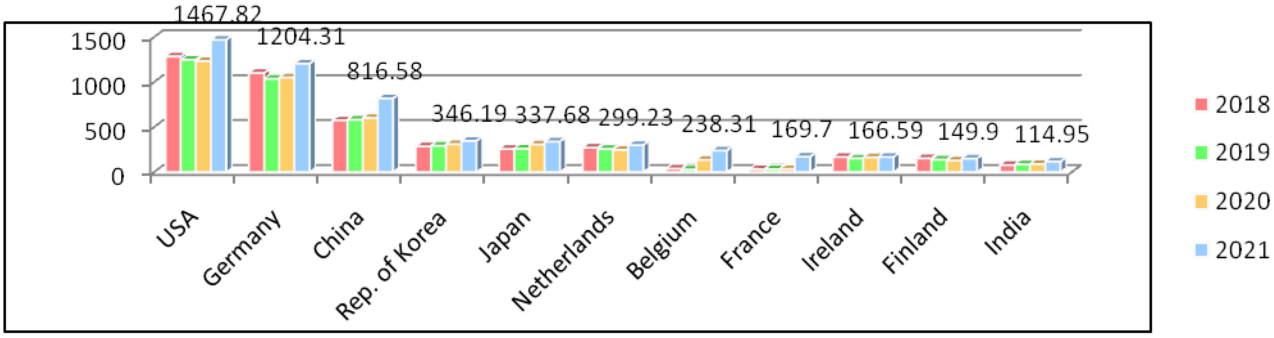
World's Top 10 exporter of Cellulose & its Chemical Derivatives (H.S Code-3912)

Rank	Countries	2018		2019		2020		2021	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	USA	1284.33	24.21	1246.44	24.43	1232.25	23.45	1467.82	23.20
2.	Germany	1099.51	20.73	1036.88	20.32	1050.84	19.99	1204.31	19.03
3.	China	573.01	10.80	581.82	11.40	600.89	11.43	816.58	12.91
4.	Rep. of Korea	283.65	5.35	293.05	5.74	310.95	5.92	346.19	5.47
5.	Japan	256.13	4.83	260.31	5.10	306.95	5.84	337.68	5.34
6.	Netherlands	269.45	5.08	256.32	5.02	244.28	4.65	299.23	4.73
7.	Belgium	36.66	0.69	26.48	0.52	134.83	2.57	238.31	3.77
8.	France	32.08	0.60	30.12	0.59	32.86	0.63	169.70	2.68
9.	Ireland	167.03	3.15	150.89	2.96	163.06	3.10	166.59	2.63
10.	Finland	152.66	2.88	138.08	2.71	126.30	2.40	149.90	2.37
14.	**India**	**77.92**	**1.47**	**85.67**	**1.68**	**87.98**	**1.67**	**114.95**	**1.82**
	Others	1072.03	20.21	996.30	19.53	964.59	18.35	1016.07	16.06
	Total	5304.44	100	5102.36	100	5255.78	100	6327.33	100

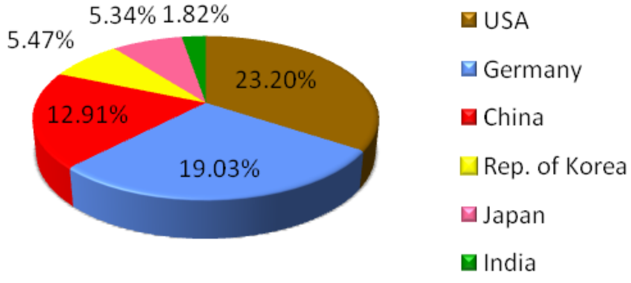
Source: UN Comtrade

World's Leading Exporters of Cellulose & its derivatives from 2018 to 2021(**Values in million USD)**

Data label given on the basis of 2021



Country wise world's top 5 exporter of Cellulose & its derivatives by percentage in 2021 :



In the year 2021, the world exports of Cellulose & its derivatives exceeded US $ 6.32 billion, rose from US $ 5.25 Billion in 2020. USA was the top exporter of Cellulose & its derivatives, exported at about US $ 1.47 Billion, accounted 23.20 % share of world export in 2021. Germany was the 2nd largest exporter of Cellulose & its derivatives in the world, exported US $ 1.20 Billion, accounted 19.03% share of world export in the same year. It was followed by China, exported the same in that year at 12.91%. In 2021 **India** was in the 14th position in world ranking as exporter of Cellulose & its derivatives with 1.82% of world export.

Table-3

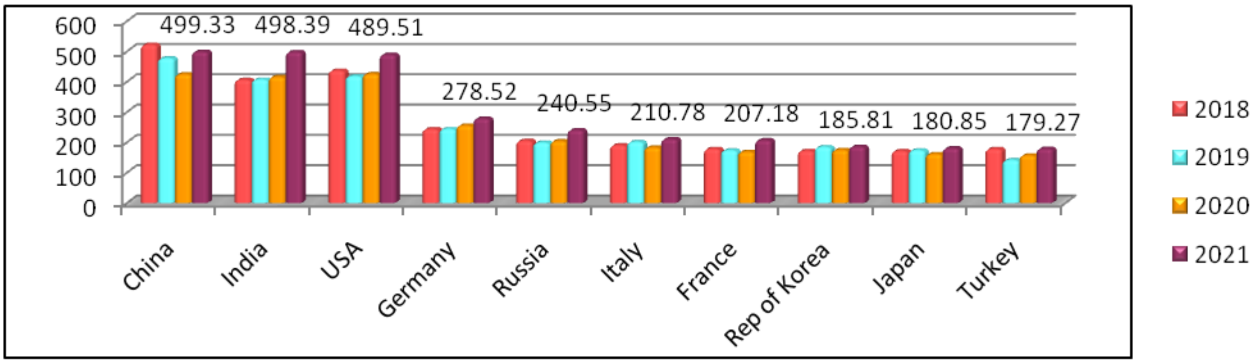
World's top 10 Importers of Cellulose & its Chemical Derivatives (H.S Code-3912)

Rank	Countries	2018		2019		2020		2021	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	522.35	9.23	477.54	8.68	424.67	7.79	499.33	8.20
2.	**India**	**406.31**	**7.18**	**407.24**	**7.40**	**416.04**	**7.63**	**498.39**	**8.18**
3.	USA	436.88	7.72	418.08	7.60	425.38	7.80	489.51	8.03
4.	Germany	243.58	4.30	243.89	4.43	255.33	4.68	278.52	4.57
5.	Russia	205.19	3.63	199.08	3.62	204.02	3.74	240.55	3.95
6.	Italy	190.44	3.37	200.98	3.65	183.10	3.36	210.78	3.46
7.	France	178.39	3.15	173.43	3.15	168.71	3.09	207.18	3.40
8.	Rep of Korea	171.97	3.04	184.34	3.35	174.95	3.21	185.81	3.05
9.	Japan	171.53	3.03	173.63	3.15	161.55	2.96	180.85	2.97
10.	Turkey	178.11	3.15	141.55	2.57	157.14	2.88	179.27	2.94
	Others	2954.03	52.20	2884.29	52.40	2881.76	52.85	3122.75	51.25
	Total	5658.77	100	5504.06	100	5452.64	100	6092.95	100

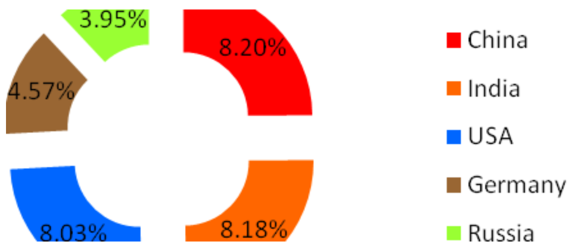
Source : UN Comtrade

Leading Cellulose & its derivatives importers of world from 2018 to 2021 **(Values in million USD)**

Data label given on the basis of 2021



Country wise world's leading importers of Cellulose & its derivatives by percentage in 2021

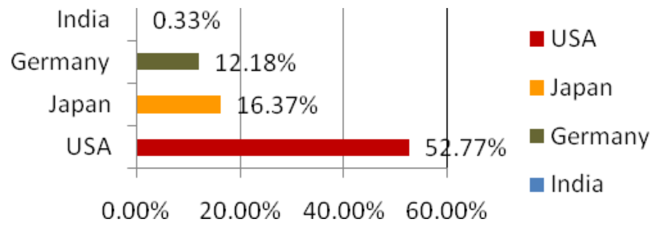


Global purchases of imported Cellulose & its derivatives cost a total US$ 6.09 Billion in 2021. In that year, imported of the commodity appreciated by 11.74% from 2020. China consumed the highest dollar worth of imported Cellulose & its derivatives during 2021 with purchases valued at US $499.33 Million or 8.20% of the world total. In second and third place were **India** and USA at 8.18% and 8.03% of globally imported of Cellulose & its derivatives in 2021.

Annexure-1

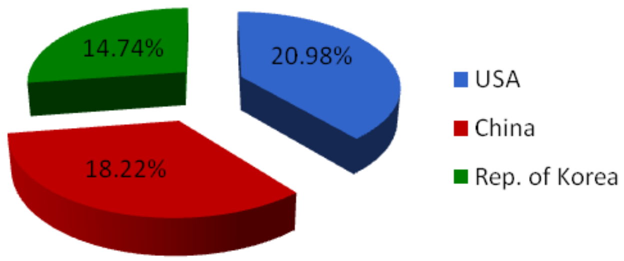
<u>Sources of world's top 3 importers of Cellulose & its Derivatives (H.S Code-3912)</u>

i) Top 3 Sources of Cellulose and its derivatives to China in 2021 by percentage:



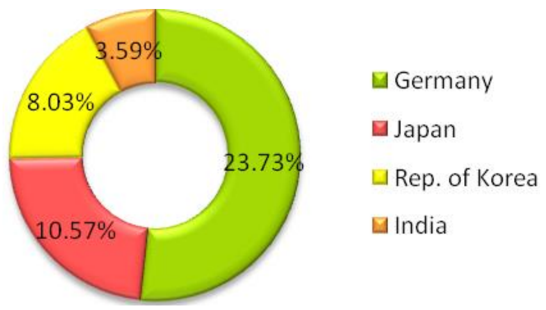
China imports most of its requirements of Cellulose and its chemical derivatives from USA with 52.77 % share of China's total import in 2021, from Japan with 16.37% and from Germany 12.18%. **India** exports 0.33% share of China's total import of Cellulose and its Chemical Derivatives in 2021. **(Source : UN Comtrade)**

ii) Top 3 Sources of Cellulose and its derivatives to India in 2021 by percentage*:*



20.98% share of Cellulose and its chemical derivatives Imports by India in 2021 from USA, Which was followed by China (18.22%) and Rep. of Korea (14.74%). **Source : UN Comtrade)**

iii) Top 3 Sources of Cellulose and its derivatives to USA in 2021 by percentage*:*



USA's 3 major source countries of Cellulose and its chemical derivatives in 2021 were Germany (23.73 %), Japan (10.57%) and Rep. of Korea (8.03%). In the same year **India** has exported only 3.59% share of Cellulose and its chemical derivatives to USA. **(Source: UN Comtrade)**

Crustaceans

Crustaceans form a large, diverse arthropod axon which includes such animals as crabs, lobsters, crayfish, shrimp, krill, prawns, woodlice, barnacles, copepods, amphipods and mantis shrimp. The crustacean group can be treated as a subphylum under the cladeMandibulata; because of recent molecular studies it is now well accepted that the crustacean group is paraphyletic, and comprises all animals in the clade Pancrustacea other than hexapods. Some crustaceans (Remipedia, Cephalocarida, Malacostraca) are more closely related to insects and the other hexapods than they are to certain other crustaceans.

The 67,000 described species range in size from Stygotantulusstocki at 0.1 mm (0.004 in), to the Japanese spider crab with a leg span of up to 3.8 m (12.5 ft) and a mass of 20 kg (44 lb). Like other arthropods, crustaceans have an exoskeleton, which they moult to grow. They are distinguished from other groups of arthropods, such as insects, myriapods and chelicerates, by the possession of biramous (two-parted) limbs, and by their larval forms, such as the nauplius stage of branchiopods and copepods.

Most crustaceans are free-living aquatic animals, but some are terrestrial (e.g. woodlice), some are parasitic (e.g. Rhizocephala, fish lice, tongue worms) and some are sessile (e.g. barnacles). The group has an extensive fossil record, reaching back to the Cambrian. More than 7.9 million tons of crustaceans per year are produced by fishery or farming for human consumption, most of it being shrimp and prawns. Krill and copepods are not as widely fished, but may be the animals with the greatest biomass on the planet, and form a vital part of the food chain. The scientific study of crustaceans is known as carcinology (alternatively, malacostracology, crustaceology or crustalogy), and a scientist who works in carcinology is a carcinologist.

Most crustaceans are aquatic, living in either marine or freshwater environments, but a few groups have adapted to life on land, such as terrestrial crabs, terrestrial hermit crabs, and woodlice. Marine crustaceans are as ubiquitous in the oceans as insects are on land. Most crustaceans are also motile, moving about independently, although a few taxonomic units are parasitic and live attached to their hosts (including sea lice, fish lice, whale lice, tongue worms, and Cymothoaexigua, all of which may be referred to as "crustacean lice"), and adult barnacles live a sessile life – they are attached headfirst to the substrate and cannot move independently. Some branchiurans are able to withstand rapid changes of salinity and will also switch hosts from marine to non-marine species. Krill are the bottom layer and the most important part of the food chain in Antarctic animal communities. Some crustaceans are significant invasive species, such as the Chinese mitten crab, Eriocheirsinensis, and the Asian shore crab, Hemigrapsussanguineus.

Crustaceans have numerous direct and indirect benefits for the economy as well as human health. For instance, shrimps, crabs, lobsters and other large crustaceans are globally recognized as edible aquatic organisms. Furthermore, the Indonesian maritime has a yearly economic potential of 1.33 trillion USD. Shrimps are the most significant aquatic export commodity, and compose 45% of the country’s total fishery export. The worldwide demand for Indonesian shrimp is approximately 560,000–570,000 tons per year, and about 57% of this figure is imported by the United States, the largest destination. Over 60% of the total aquatic produce exported to the US in 2016 was solely shrimp, and this was estimated to cost more than 1 billion USD, and to increase by 2017 in order to meet the increasing global demand.

These are broadly classified under H.S. Code-**0306**

Table - 4

India's Top 10 destination of Crustacean (H.S Code-0306)

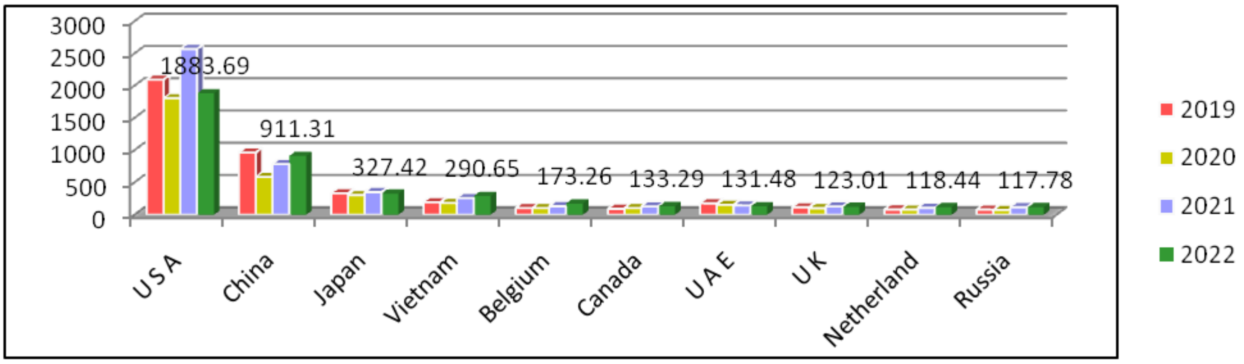
Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	U S A	2096.26	44.86	1808.92	46.69	2571.12	49.00	1883.69	38.45
2.	China	965.08	20.65	588.69	15.20	787.42	15.01	911.31	18.60
3.	Japan	333.34	7.13	306.08	7.90	351.33	6.70	327.42	6.68
4.	Vietnam	194.86	4.17	183.02	4.72	258.00	4.92	290.65	5.93
5.	Belgium	105.20	2.25	105.68	2.73	132.10	2.52	173.26	3.54
6.	Canada	92.30	1.98	105.18	2.71	130.04	2.48	133.29	2.72
7.	U A E	177.73	3.80	155.28	4.01	146.00	2.78	131.48	2.68
8.	U K	116.91	2.50	102.80	2.65	129.50	2.47	123.01	2.51
9.	Netherland	82.96	1.78	81.69	2.11	107.93	2.06	118.44	2.42
10.	Russia	81.48	1.74	74.35	1.92	117.52	2.24	117.78	2.40
	Others	427.08	9.14	362.50	9.36	516.22	9.84	688.22	14.05
	Total	4673.22	100	3874.20	100	5247.18	100	4898.55	100

Source: DGCI&S

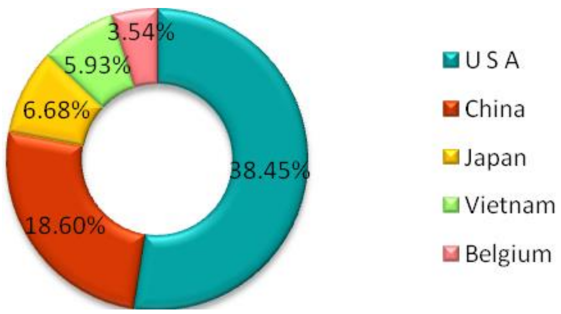
Note : India's Export including re-export

India's major destination Crustacean from 2019-2022 **(Values in million USD)**

Data label given on the basis of 2022



India's top 5 destinations of Crustacean by percentage in 2022:



Exports of Crustaceans from India decreased to US $ 4.90 billion in 2022 from US $ 5.25 billion in 2021.The top 3 destination of Crustacean from India are USA (US $ 1.88 billion), China (US $ 911.31 Miillion) and Japan (US $ 327.42 Million). The total export value of Crustaceans in these countries was US $ 3.12 Billion. These top 3 countries account for over 63.73% of the total Crustaceans export from India.USA is the largest market for Crustaceans export from India. In 2022 USA imported US $ 1.88 billion worth Crustaceans from India which was accounted 38.45 % of India's total export value of Crustaceans in 2022. Followed by China and Japan.

Table - 5

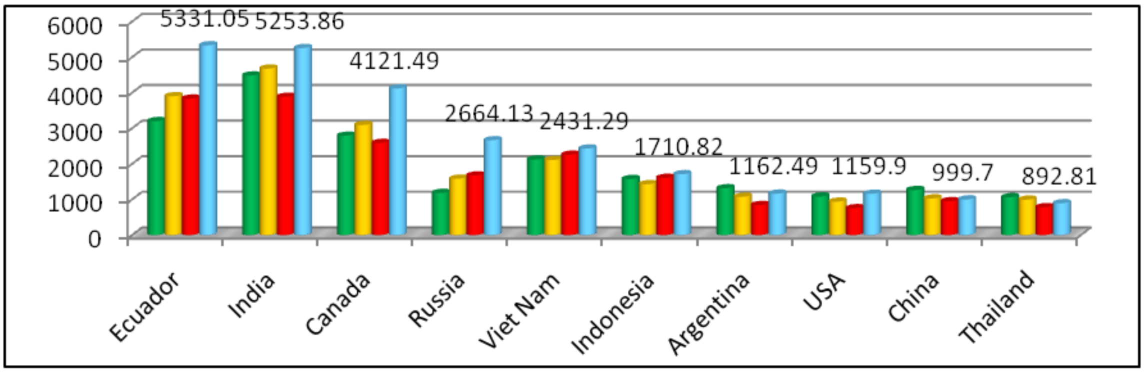
World's Top exporters of Crustacean (H.S Code-0306)

Rank	Countries	2018		2019		2020		2021	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Ecuador	3201.18	11.38	3901.56	13.83	3834.78	14.98	5331.05	15.81
2.	**India**	**4482.39**	**15.93**	**4676.92**	**16.58**	**3884.30**	**15.17**	**5253.86**	**15.58**
3.	Canada	2791.71	9.92	3092.61	10.96	2587.54	10.11	4121.49	12.22
4.	Russia	1185.22	4.21	1582.51	5.61	1673.67	6.54	2664.13	7.90
5.	Viet Nam	2122.95	7.54	2107.35	7.47	2258.01	8.82	2431.29	7.21
6.	Indonesia	1574.13	5.59	1428.66	5.07	1606.47	6.28	1710.82	5.07
7.	Argentina	1314.70	4.67	1073.46	3.81	843.44	3.29	1162.49	3.45
8.	USA	1081.62	3.84	938.72	3.33	754.97	2.95	1159.90	3.44
9.	China	1265.97	4.50	1028.44	3.65	951.62	3.72	999.70	2.96
10.	Thailand	1062.93	3.78	995.45	3.53	781.15	3.05	892.81	2.65
	Others	8054.68	28.63	7378.70	26.16	6424.21	25.09	8000.56	23.72
	Total	28137.49	100	28204.37	100	25600.17	100	33728.10	100

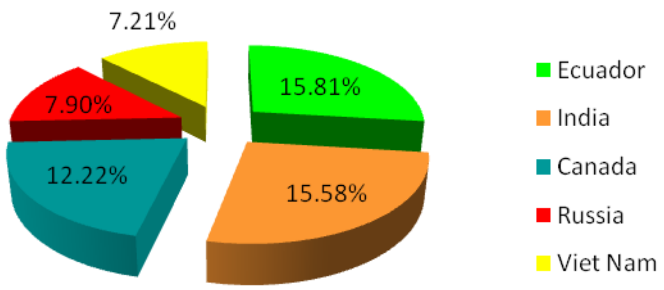
Source: UN Comtrade

Top world exporters of Crustaceans from 2018 to 2021 **(Values in million USD)**

Data label given on the basis of 2021



Export trends in world's leading Crustaceans exporters by percentage in 2021:



In 2021 total export of Crustaceans was US $33.72 Billion. Between 2020 and 2021 the exports of Crustaceans increased by nearly 32%, from US $25.60 Billion in 2020 to US $33.72 Billion in 2021. In 2021 Ecuador was the top country by Crustaceans export in the world, exported US $ 5.33 Billion that accounts for 15.81% of the world export. **India** constituted the 2nd position in ranking of world export of Crustaceans, exported US $ 5.25 Billion in 2021, accounted 15.58%. Which was followed by Canada, exported 12.22% share of world export.

Table - 6

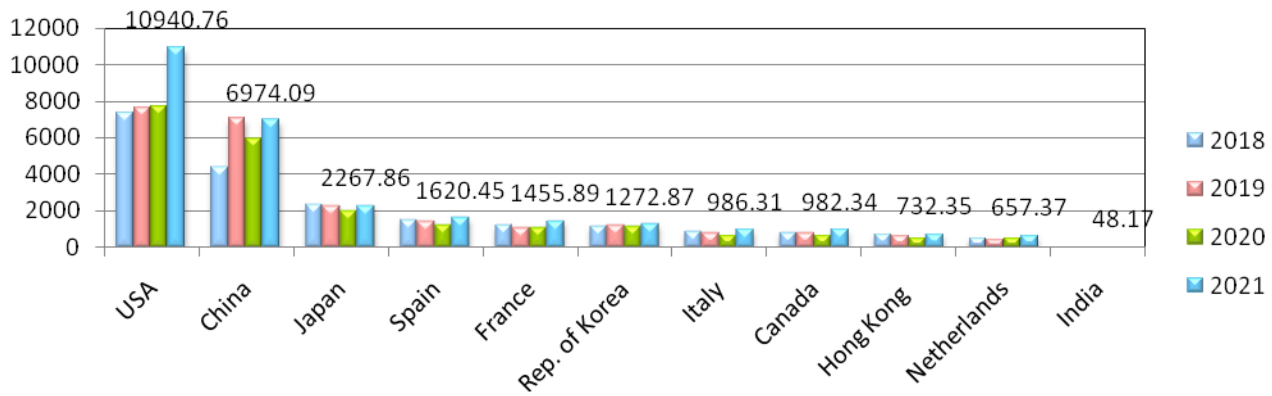
World's Top 10 Importers of Crustacean (H.S Code-0306)

Rank	Countries	2018		2019		2020		2021	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	USA	7337.70	27.08	7653.00	26.13	7699.96	28.56	10940.76	31.48
2.	China	4374.20	16.14	7037.18	24.03	5911.76	21.93	6974.09	20.07
3.	Japan	2343.69	8.65	2297.95	7.85	1970.02	7.31	2267.86	6.53
4.	Spain	1502.86	5.55	1420.97	4.85	1212.84	4.50	1620.45	4.66
5.	France	1188.33	4.39	1074.06	3.67	1067.36	3.96	1455.89	4.19
6.	Rep. of Korea	1172.08	4.33	1200.39	4.10	1137.17	4.22	1272.87	3.66
7.	Italy	859.22	3.17	771.41	2.63	655.35	2.43	986.31	2.84
8.	Canada	809.52	2.99	794.30	2.71	644.89	2.39	982.34	2.83
9.	Hong Kong	713.29	2.63	645.23	2.20	537.67	1.99	732.35	2.11
10.	Netherlands	533.50	1.97	442.88	1.51	514.89	1.91	657.37	1.89
39.	**India**	**39.25**	**0.14**	**35.50**	**0.12**	**40.17**	**0.15**	**48.17**	**0.14**
	Others	6219.63	22.96	5914.92	20.20	5569.04	20.66	6812.37	19.60
	Total	27093.26	100	29287.80	100	26961.13	100	34750.83	100

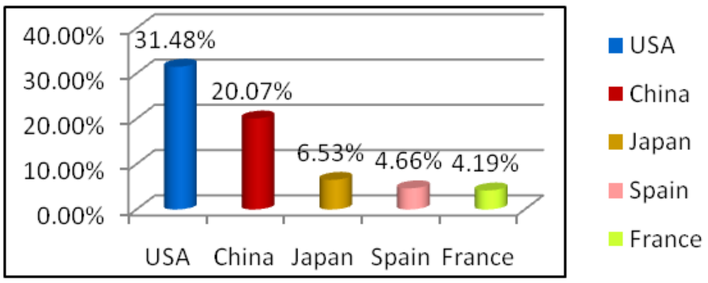
Source :UN Comtrade

Top world importers of Crustaceans from 2018 to 2021 **(Values in million USD)**

Data label given on the basis of 2021



Country wise leading global Importer of Crustaceans by percentage in 2021

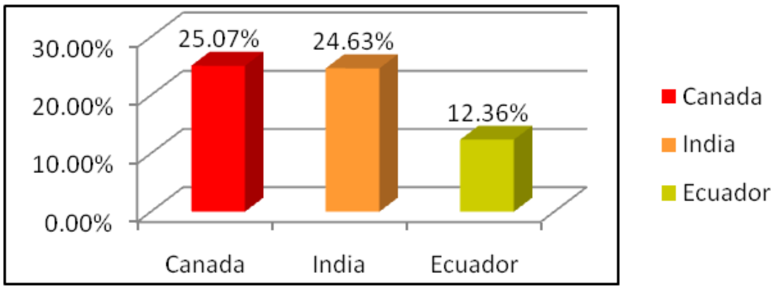


In the year 2021 total global import of Crustaceans was US $ 34.75 Billion which was increased by 29% from 2020. The USA imported US $ 10.94 billion worth of Crustaceans in 2021, making it the leading importer of Crustaceans worldwide that year. China followed in second place, importing US $ 6.97 billion worth of the commodity and Japan stood at 3rd position in raking in world largest importers Crustaceans, imported 6.53% of world import. The import value of Crustaceans into India amounted to US $ 48.17 million in the year 2021.

Annexure-II

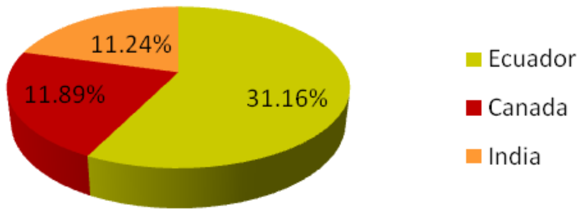
Sources of world's top three importers of Crustacean (H.S Code-0306)

i) Top 3 Sources of Crustaceans to USA in 2021 by percentage:



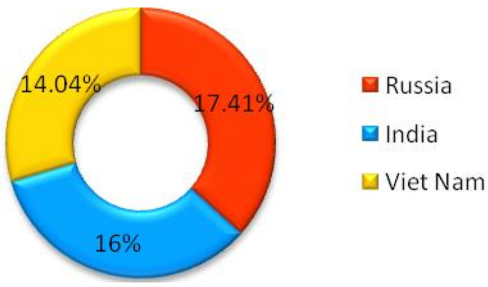
USA's source most of its Crustaceans came from Canada with 25.07% share of its import of the commodity in 2021. **India** constituted the 2nd largest source of USA's import of Crustaceans, exported US $ 24.63% share of USA's total import in 2021. Ecuador was found to be the 3rd largest exporters of Crustaceans to USA by 12.36%. **(Source: UN Comtrade)**

ii) Top 3 Sources of Crustaceans to China in 2021 by percentage**:**



31.16% share of Crustaceans imports to China came from Ecuador in 2021, it was followed by Canada (11.89%) and **India** (11.24). **(Source: UN Comtrade)**

iii) Top 3 Sources of Crustaceans to Japan in 2021 by percentage**:**



With 17.41% share of Japan's total import of Crustaceans, Russia became the largest source of it to Japan in 2021. **India** became the 2nd largest source of Crustaceans with 16% share and Viet Nam was the 3rd largest source of Crustaceans to Japan with 14.04% share of Japan's total import of crustaceans in 2021. (**Source : UN Comtrade)**

IMPORT

Phenols : Phenol – Alcohol

Phenol is an aromatic organic compound with the molecular formula C_6H_5OH. It is a white crystalline solid that is volatile. The molecule consists of a phenyl group ($-C_6H_5$) bonded to a hydroxyl group (−OH). Mildly acidic, it requires careful handling because it can cause chemical burns. Phenol was first extracted from coal tar, but today is produced on a large scale (about 7 billion kg/year) from petroleum-derived feedstock's. It is an important industrial commodity as a precursor to many materials and useful compounds. It is primarily used to synthesize plastics and related materials. Phenol and its chemical derivatives are essential for production of polycarbonates, epoxies, Bakelite, nylon, detergents, herbicides such as phenoxy herbicides, and numerous pharmaceutical drugs.

Phenol is an organic compound appreciably soluble in water, with about 84.2 g dissolving in 1000 mL (0.895 M). Homogeneous mixtures of phenol and water at phenol to water mass ratios of ~2.6 and higher are possible. The sodium salt of phenol, sodium phenoxide, is far more water-soluble. Phenols are similar to alcohols but form stronger hydrogen bonds. Thus, they are more soluble in water than are alcohols and have higher boiling points. Phenols occur either as colourless liquids or white solids at room temperature and may be highly toxic and caustic.

Phenols are widely used in household products and as intermediates for industrial synthesis. For example, phenol itself is used (in low concentrations) as a disinfectant in household cleaners and in mouthwash. Phenol may have been the first surgical antiseptic. In 1865 the British surgeon Joseph Lister used phenol as an antiseptic to sterilize his operating field. With phenol used in this manner, the mortality rate from surgical amputations fell from 45 to 15 percent in Lister's ward. Phenol is quite toxic, however, and concentrated solutions cause severe but painless burns of the skin and mucous membranes. Less-toxic phenols, such as *n*-hexylresorcinol, have supplanted phenol itself in cough drops and other antiseptic applications. Butylated hydroxyl toluene (BHT) has a much lower toxicity and is a common antioxidant in foods.

Phenol is more acidic than aliphatic alcohols. The differing pKa is attributed to resonance stabilization of the phenoxide anion. In this way, the negative charge on oxygen is delocalized on to the ortho and para carbon atoms through the pi system. An alternative explanation involves the sigma framework, postulating that the dominant effect is the induction from the more electronegative sp^2 hybridised carbons; the comparatively more powerful inductive withdrawal of electron density that is provided by the sp^2 system compared to an sp^3 system allows for great stabilization of the oxyanion. In support of the second explanation, the pK_a of the enol of acetone in water is 10.9, making it only slightly less acidic than phenol (pK_a 10.0). Thus, the greater number of resonance structures available to phenoxide compared to acetone enolate seems to contribute very little to its stabilization. However, the situation changes when solvation effects are excluded. A recent *in silico* comparison of the gas phase acidities of the vinylogues of phenol and cyclohexanol in conformations that allow for or exclude resonance stabilization leads to the inference that about 1⁄3 of the increased acidity of phenol is attributable to inductive effects, with resonance accounting for the remaining difference.

Accounting for 95% of production (2003) is the cumene process, also called Hock process. It involves the partial oxidation of cumene (isopropylbenzene) via the Hock rearrangement: Compared to most other processes, the cumene process uses relatively mild conditions and relatively inexpensive raw materials. For the process to be economical, both phenol and the acetone by-product must be in demand. In 2010, worldwide demand for acetone was approximately 6.7 million tonnes, 83 percent of which was satisfied with acetone produced by the cumene process.

These are broadly classified under **H. S. Code- 2907**.

Table - 9

India's Top 10 Sources of Phenols: Phenol-Alcohol (HS Code : 2907)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	114.53	19.15	103.98	22.07	266.28	32.43	181.05	23.19
2.	Thailand	73.52	12.29	23.44	4.97	83.84	10.21	118.40	15.17
3.	Korea RP	78.11	13.06	54.77	11.63	142.96	17.41	90.15	11.55
4.	U S A	80.65	13.48	84.33	17.90	63.99	7.79	80.96	10.37
5.	Taiwan	46.90	7.84	27.67	5.87	60.43	7.36	73.47	9.41
6.	Japan	55.19	9.23	64.67	13.73	47.50	5.78	65.86	8.44
7.	Saudi Arab	14.56	2.43	2.06	0.44	20.36	2.48	56.28	7.21
8.	South Africa	27.68	4.63	15.52	3.29	28.73	3.50	37.05	4.75
9.	Singapore	29.06	4.86	24.54	5.21	33.21	4.05	23.14	2.96
10.	France	6.27	1.05	8.55	1.81	12.72	1.55	15.22	1.95
	Others	71.75	11.99	61.64	13.08	61.04	7.43	39.13	5.01
	Total	598.21	100	471.16	100	821.06	100	780.71	100

Source: **DGCI&S**

Note : India's Import including Re-import

India's import of Phenols : Phenol - Alcohol in 2022 stood at US $ 780.71 million which has decreased almost 5% from the year 2021. Major three source countries of Phenols : Phenol - Alcohol to India in 2022 were China (US $ 181.05 million), Thailand (US $ 118.40 million) and Korea RP (US $ 90.15 million). These 3 countries in total sold US $ 389.60 million worth value of Phenols : Phenol - Alcohol to India which rounds up to more than 49.91% of the total Phenols : Phenol - Alcohol import into India in that year.

Table - 10

World Top 10 Importer of Phenols: Phenol-Alcohol (HS Code : 2907)

Rank	Countries	2018		2019		2020		2021	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	1601.09	21.38	1419.85	23.69	1481.57	27.12	2231.77	25.63
2.	**India**	**792.48**	**10.58**	**597.76**	**9.97**	**472.03**	**8.64**	**822.31**	**9.44**
3.	Germany	655.22	8.75	517.80	8.64	426.36	7.80	768.14	8.82
4.	Netherlands	589.22	7.87	420.60	7.02	349.98	6.41	633.93	7.28
5.	Rep. of Korea	388.59	5.19	385.06	6.42	378.34	6.92	575.78	6.61
6.	Japan	436.81	5.83	290.02	4.84	276.13	5.05	416.82	4.79
7.	Thailand	341.43	4.56	175.52	2.93	191.55	3.51	329.93	3.79
8.	Other Asia nes	321.54	4.29	225.66	3.77	121.17	2.22	302.65	3.48
9.	USA	252.13	3.37	201.29	3.36	185.76	3.40	277.45	3.19
10.	Belgium	244.52	3.27	151.44	2.53	157.86	2.89	216.43	2.49
	Others	1866.04	24.92	1608.16	26.83	1423.04	26.04	2132.72	24.49
	Total	7489.08	100	5993.17	100	5463.80	100	8707.94	100

Source :UN Comtrade

According to the United Nation's COMTRADE database, global imports of Phenols stood at amounting to US $ 8.70 Billion in 2021. China was the world's top importer of the commodity, with total value of US $ 2.23 billion in 2021, which represented almost 25.63% of global import of Phenols. In that year India was the 2nd largest importer of Phenols in the world with 9.44% share of world import which was followed by the Germany with 8.82 % share. In the year 2021 global import has increased by more than 59% compare to that than 2020.

Natural or Chemical Potassic Fiertilizer

Potash is the third most important primary nutrient element required by the plants. Although crop-harvest removes more potash than nitrogen and phosphorus, the soil replenishes it faster than the other two. The deficiency of potash in soils is, therefore, not so marked as of nitrogen and phosphorus. Deficiency of potash in the field is symptomised by scorching of leaf tips advancing towards leaf margins and premature death of leaves even though enough nitrogen and phosphorus are supplied. Increased incidence of insects and pests attack and subsequent lodging of crop plants as the plants loose their mechanical strength are also caused by potash deficiency. Fertilizers supplying potash, the chief commercial ones are the potassium sulphate (50% K20) and the muriatic of potash (60% K20). The others are relatively of very little importance.

On the basis of the percentage nutrient content, it is better to choose muriatic of potash than potassium sulphate. Muriatic of potash is also more suitable than potassium sulphate for acidic soils. Potassium sulphate should be preferred to muriatic of potash for well aerated, calcareous (too much presence of calcium) and alkaline soils. In highly leached acid soils, where sulphur deficiency is suspected, the use of potassium sulphate can be justified. In both the fertilizers, potassium is utilised by the plants and the remaining portions are left in the soil. If muriatic of potash is added to alkaline soil, accumulation of chloride may prove toxic to crops. Therefore, for alkaline soils, potassium sulphate should be preferred. Some crops are also sensitive to chlorlde damage (e.g., potato, tobacco etc). In such crops, potassium sulphate should be used.

Potassium is the third major plant and crop nutrient after nitrogen and phosphorus. It has been used since antiquity as a soil fertilizer (about 90% of current use). Elemental potassium does not occur in nature because it reacts violently with water. As part of various compounds, potassium makes up about 2.6% of the Earth's crust by mass and is the seventh most abundant element, similar in abundance to sodium at approximately 1.8% of the crust. Potash is important for agriculture because it improves water retention, yield, nutrient value, taste, colour, texture and disease resistance of food crops. It has wide application to fruit and vegetables, rice, wheat and other grains, sugar, corn, soybeans, palm oil and cotton, all of which benefit from the nutrient's quality-enhancing properties.

Demand for food and animal feed has been on the rise since 2000. The United States Department of Agriculture's Economic Research Service (ERS) attributes the trend to average annual population increases of 75 million people around the world. Geographically, economic growth in Asia and Latin America greatly contributed to the increased use of potash-based fertilizer. Rising incomes in developing countries also were a factor in the growing potash and fertilizer use. With more money in the household budget, consumers added more meat and dairy products to their diets. This shift in eating patterns required more acres to be planted, more fertilizer to be applied and more animals to be fed—all requiring more potash.

After years of trending upward, fertilizer use slowed in 2008. The worldwide economic downturn is the primary reason for the declining fertilizer use, dropping prices, and mounting inventories The world's largest consumers of potash are China, the United States, Brazil, and India. Brazil imports 90% of the potash it needs. Potash consumption for fertilizers is expected to increase to about 37.8 million tonnes by 2022. Potash imports and exports are often reported in K_2O equivalent, although fertilizer never contains potassium oxide, per se, because potassium oxide is caustic and hygroscopic.

These are broadly classified under **H. S. Code 3104.**

India's Top 10 Sources of Potassic Fertilizer (HS Code :3104)

Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Canada	345.58	27.12	423.28	32.81	206.09	22.16	598.52	37.08
2.	Israel	161.29	12.66	147.11	11.40	104.13	11.20	415.48	25.74
3.	Jordan	144.08	11.31	143.06	11.09	125.90	13.54	267.75	16.59
4.	Belarus	189.99	14.91	184.32	14.29	306.97	33.01	168.52	10.44
5.	Lithuania	217.30	17.05	121.02	9.38	94.34	10.14	41.65	2.58
6.	U K	1.70	0.13	5.76	0.45	7.72	0.83	22.28	1.38
7.	U S A	17.13	1.34	2.47	0.19	2.06	0.22	18.76	1.16
8.	Germany	42.02	3.30	48.64	3.77	21.00	2.26	18.14	1.12
9.	Turkmenistan	0.00	0.00	0.00	0.00	0.00	0.00	16.84	1.04
10.	CHINA	6.97	0.55	6.10	0.47	2.76	0.30	12.75	0.79
	Others	148.43	11.65	208.15	16.14	58.97	6.34	33.42	2.07
	Total	1274.47	100	1289.89	100	929.93	100	1614.10	100

Source: **DGCI&S**

Note : India's Import including re-import

The value of imports of Natural or Chemical Potassic Fertilizers to India totalled US $ 1.61 Billion in 2022. Sales of Natural or Chemical Potassic Fertilizers to India increased by almost 73.57% in value terms compared to 2021. Major five source countries of Natural or Chemical Potassic Fertilizers to India in 2022 are Canada (US $ 598.52 Million), Israel (US $ 415.48 Million), Jordan (US $ 267.75 M), Belarus (US $ 168.52 M) and Lithuania (US $ 41.65 M). These 5 countries in total exported US $ 1491.92 Million value of Natural or Chemical Potassic Fertilizers to India which rounds up to over 92.43 % of the total Natural or Chemical Potassic Fertilizers import into India in 2022.

Table - 8

World Top 10 Importer of Potassic Fertilizer (HS Code :3104)

Rank	Countries	2018		2019		2020		2021	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Brazil	3375.93	20.95	3714.62	21.60	2856.20	18.78	4752.43	23.83
2.	USA	2835.95	17.60	2951.78	17.17	2644.79	17.39	4025.09	20.18
3.	China	1900.34	11.79	2730.60	15.88	2171.25	14.28	2023.00	10.14
4.	Indonesia	985.45	6.12	871.92	5.07	742.91	4.89	1261.13	6.32
5.	**India**	**1190.91**	**7.39**	**1269.19**	**7.38**	**1310.91**	**8.62**	**929.91**	**4.66**
6.	Malaysia	560.71	3.48	378.84	2.20	366.88	2.41	588.46	2.95
7.	Belgium	467.08	2.90	436.79	2.54	387.17	2.55	507.65	2.55
8.	Viet Nam	300.62	1.87	266.05	1.55	281.87	1.85	407.88	2.05
9.	Poland	283.57	1.76	298.25	1.73	283.41	1.86	356.42	1.79
10.	Thailand	269.11	1.67	218.02	1.27	221.63	1.46	329.59	1.65
	Others	3941.85	24.47	4060.24	23.61	3938.46	25.90	4762.13	23.88
	Total	16111.53	100	17196.31	100	15205.48	100	19943.69	100

Source :**UNComtrade**

The imports of the Five major importers of Potassic Fertilizer, namely Brazil, USA, China, Indonesia and **India** represented 65.13% of total global imports in 2021. In value terms, Brazil (US $ 4.75 B), USA (US $ 4.02 B), China (US $ 2.02 B), Indonesia (US $ 1.26 B) and **India** (US $ 929.41M) constituted the countries with the highest levels of imports in 2021. **India** stood at 5th position in the world with 4.66% share of Global import of Potassic Fertilizer in 2021.