

Rubber Report



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2.Agricultural and Botanical details of Rubber

Rubber is a coherent elastic solid obtained from latex of a number of tropical trees of which *Hevea brasiliensis* is the most important. Rubber tree (*Hevea brasiliensis*) is a quick growing tall tree acquiring 20-30 metre height. It begins to yield latex in 5-7 years after planting. It requires hot and humid climate with temperature of 25°-35°C and annual rainfall of over 200 cm. The rainfall should be well distributed throughout the year. Dry spell and low temperatures are harmful. Daily rainfall followed by strong sun is very useful. Deep well drained loamy soils on the hill slopes at elevation ranging from 300 to 450 metres above sea level provide best conditions for its growth. The yields decline at higher elevations and no rubber plantations are found above 700 m elevation.

Rubber latex is extracted from rubber trees. The economic life period of rubber trees in plantations is around 32 years — up to 7 years of immature phase and about 25 years of productive phase.

The soil requirement is well-drained, weathered soil consisting of laterite, lateritic types, sedimentary types, non lateritic red or alluvial soils.

The climatic conditions for optimum growth of rubber trees are:

- Rainfall of around 250 centimetres (98 in) evenly distributed without any marked dry season and with at least 100 rainy days per year
- Temperature range of about 20 to 34 °C (68 to 93 °F), with a monthly mean of 25 to 28 °C (77 to 82 °F)
- Atmospheric humidity of around 80%
- About 2000 hours sunshine per year at the rate of six hours per day throughout the year
- Absence of strong winds
-

Many high-yielding clones have been developed for commercial planting. These clones yield more than 2,000 kilograms per hectare (1,800 lb/acre) of dry rubber per year, under ideal conditions.

Hevea brasiliensis, the Pará rubber tree, **sharinga** tree, **seringueira**, or, most commonly, the rubber tree or rubber plant, is a flowering plant belonging to the spurge family **Euphorbiaceae**. It is the most economically important member of the genus *Hevea* because the milky latex extracted from the tree is the primary source of natural rubber.

H. brasiliensis is a tall deciduous tree growing to a height of up to 43 m (141 ft) in the wild, but cultivated trees are usually much smaller because drawing off the latex restricts the growth of the tree. The trunk is cylindrical and may have a swollen, bottle-shaped base. The bark is some shade of brown, and the inner bark oozes latex when damaged. The leaves have three leaflets and are spirally arranged. The inflorescence include separate male and female flowers. The flowers are pungent, creamy-yellow and have no petals. The fruit is a capsule that contains three large seeds; it opens explosively when ripe.

The white or yellow latex occurs in latex vessels in the bark, mostly outside the phloem. These vessels spiral up the tree in a right-handed helix which forms an angle of about 30 degrees with the horizontal, and can grow as high as 45 ft.

In plantations, the trees are generally smaller for two reasons: 1) trees grow more slowly when they are tapped for latex, and 2) trees are generally cut down after only 30 years, because latex production declines as trees age, and they are no longer economically productive. The tree requires a tropical or subtropical climate with a minimum of about 1,200 mm per year of rainfall, and no frost. If frost does occur, the results can be disastrous for production. One frost can cause the rubber from an entire plantation to become brittle and break once it has been refined."

The natural rubber tree takes between seven and ten years to deliver the first harvest. Harvesters make incisions across the latex vessels, just deep enough to tap the vessels without harming the tree's growth, and the latex is collected in small buckets. This process is known as rubber tapping. Latex production is highly variable from tree to tree and across clone types.

As latex production declines with age, rubber trees are generally felled when they reach the age of 25 to 30 years. The earlier practice was to burn the trees, but in recent decades, the wood has been harvested for furniture making.

3.Uses of Rubber

Uncured rubber is used for cements; for adhesive, insulating, and friction tapes; and for crepe rubber used in insulating blankets and footwear. Vulcanized rubber has many more applications. Resistance to abrasion makes softer kinds of rubber valuable for the treads of vehicle tires and conveyor belts, and makes hard rubber valuable for pump housings and piping used in the handling of abrasive sludge.

The flexibility of rubber is appealing in hoses, tires and rollers for devices ranging from domestic clothes wringers to printing presses; its elasticity makes it suitable for various kinds of shock absorbers and for specialized machinery mountings designed to reduce vibration. Its relative gas impermeability makes it useful in the manufacture of articles such as air hoses, balloons, balls and cushions. The resistance of rubber to water and to the action of most fluid chemicals has led to its use in rainwear, diving gear, and chemical and medicinal tubing, and as a lining for storage tanks, processing equipment and railroad tank cars. Because of their electrical resistance, soft rubber goods are used as insulation and for protective gloves, shoes and blankets; hard rubber is used for articles such as telephone housings, parts for radio sets, meters and other electrical instruments. The coefficient of friction of rubber, which is high on dry surfaces and low on wet surfaces, leads to its use for power-transmission belting and for water-lubricated bearings in deep-well pumps. Indian rubber balls or lacrosse balls are made of rubber.

Around 25 million tonnes of rubber are produced each year, of which 30 percent is natural. The remainder is synthetic rubber derived from petrochemical sources. The top end of latex production results in latex products such as surgeons' gloves, balloons and other relatively high-value products. The mid-range which comes from the technically specified natural rubber materials ends up largely in tires but also in conveyor belts, marine products, windshield wipers and miscellaneous goods. Natural rubber offers good elasticity, while synthetic materials tend to offer better resistance to environmental factors such as oils, temperature, chemicals and ultraviolet light. "Cured rubber" is rubber that has been compounded and subjected to the vulcanisation process to create cross-links within the rubber matrix.

Relatively soft variants of rubber are known to have a wide range of applications in the manufacture of conveyor belts. The flexibility offered by certain types of rubber make them ideal for use in printing presses and wringers for domestic clothes.

Some vehicles are equipped with airbags that protect the drivers from getting injured in case of a high impact accident. These bags are solely made of rubber that inflates depending on the impact and shields the driver involved from getting any significant injuries. In the modern-day flooring technology, most contractors have begun opting for rubber floors in gyms, commercial kitchens, among other places. These types of surfaces provide padding, are slip-resistant. They are easy to maintain and last longer making them an ideal option for those looking to spend less for excellent flooring options.



4. Production -Geographical locations Countries in world (Top10)

1: Thailand

Thailand ranks first in natural rubber production in the world. This southeast Asian country has a monsoon climate, which is most suitable for vegetative growth of the rubber plants. Southern Thailand region has world's largest rubber plantation.

Thailand produces 3.12 million metric tons of natural rubber, and area under rubber plantation was 1.7 million hectares. Per hectare yield in Thailand is 17,710 kg.

2: Indonesia

Indonesia is the 2nd largest natural rubber producer in the world. Tropical and monsoon climate suitability has encouraged plantation in Indonesia. Indonesia shared about 21% output of the world.

Its rubber production was 2.54 million metric tons and area under rubber plantation was 3.175 million, while per hectare yield was 8000 kg, which is very low.

3: Malaysia

Malaysia ranks third after Thailand and Indonesia. The west coastal and piedmont zone of the Malay Peninsula and western part of Kalimantan is important for rubber estates.

Rubber output was 1,270,000 metric tons, while the area under plantation was 3,175,000 hectares and shared about 10% of the total production of the world.

4: India

Natural rubber plantation was introduced in India in 1880 when rubber was planted in Travancore and Malabar regions, but commercial plantation started at a relatively later date of 1902. Kerala is the most important largest rubber producer state in India, accounting for 92% for 92% of India's rubber acreage.

Tamil Nadu, Karnataka, Nicobar Islands, Tripura, Mizoram and Assam are other producing states. In the recent past, India produced 803,000 metric tons natural rubber, while the area under plantation was 450,000 hectares.

5: Vietnam

Vietnam has emerged as the fifth largest natural rubber producer in the world. The area around the Ho "Chi Minh" city is of fundamental importance for rubber cultivation. Vietnam exports the bulk of her natural rubber output to international market.

Its natural rubber production was 550,000 metric tons (550 thousand metric tons). Plantation area is 512 thousand hectares.

6: China

China is another outstanding country among rubber producing countries and has emerged as 6th largest producer. China is an emerging industrial nation, its demand is very large, and therefore it is a deficit in production. China import natural rubber from other countries.

China's rubber plantations are located at the hills of the south-east and in the Yangtze basin and coastal belt.

It produced 545,000 metric tons rubber, while the area under plantation was 475,000 hectares.

7: Philippines

The Archipelago of Philippine has a suitable climate for plantation. It has emerged an important country among producers in the recent decade. Philippines coastal regions are most suitable. Its production is 360 thousand metric tons and 95 thousand hectares plantation area.

8: Nigeria

During the last decade of the 20th century, Nigeria expanded its hectare age and yield and has become the 8th largest rubber producing country in the world. Favorable geographical conditions, cheap labor, nearness to the European market and foreign investment has increased plantation in Nigeria.

Rubber production was 143 thousand metric tons, while the area under rubber plantation was 340 thousand hectares.

9: Cote-d-Ivoire

In the West African region, plantation first started in Liberia but Cote-d-Ivoire out ranked Liberia within short period. The Cote-d-Ivoire ranks 9th in the world.

During recent years, Its average rubber production was 128 thousand metric tons while hectare age under plantation was 75 thousand hectares. It is the largest rubber producing country in Africa. Cote-d-Ivoire exports all its production to European countries

10: Sri Lanka

In South, Asia rubber was first planted in Sri Lanka (Ceylon) towards the close of the 19th century. Being a small country expansion of rubber plantation is not possible. Even then, Sri Lanka is 10th largest producer in the world.

This is due to favorable Geographical conditions, cheap labor and easy shipment to international market. Cultivation of rubber is concentrated in the southwestern foothills of the central highlands.

Sri Lanka produced 117.6 thousand metric tons rubber, from 116.4 thousand hectares rubber estates. Sri Lanka's 97 percent rubber output enters the international market.

Other Rubber Production Countries

The countries Brazil, Liberia, Bangladesh, Cambodia, Cameroon, Congo, Guatemala, Liberia, Mexico, Myanmar and Papua New Guinea are some other Rubber Producing Countries

5. Production - States and districts in India (Top10)

India today is the world's 3rd largest producer and 4th largest consumer. Kerala accounts for more than 90 percent of the total rubber production in the country. The total area under rubber cultivation in the state is 5.45 lakh hectares. Rest of the natural rubber is produced in Tamil Nadu and North East states. . The non traditional regions cultivating rubber include coastal Karnataka, Goa, Konkan region of Maharashtra, coastal Andhra Pradesh , Orissa, the North Eastern states and Andaman & Nicobar islands (source: Rubber Growers Companion, 2009).

The total production of Natural Rubber (NR) during 2018-19 was provisionally estimated at 648000 tonnes. The production of NR during April-May 2019 was provisionally estimated at 74000 tonnes.

State-wise production of NR upto 2018-19 is given below:

State-wise production of NR (Tonne)				
State	2015-16	2016-17	2017-18 (P)	2018-19 (P)
Kerala	438630	540400	540775	490460
Tamil Nadu	19495	21140	21110	21500
<i>Traditional Total</i>	<i>458125</i>	<i>561540</i>	<i>561885</i>	<i>511960</i>
Tripura	44245	50985	50500	53050
Assam	14560	19970	23300	24300
Meghalaya	7360	8950	9050	9100
Nagaland	3020	4320	4820	4930
Manipur	1660	2090	1790	1850
Mizoram	595	742	742	750
Arunachal Pradesh	360	478	428	450

<i>North East Total</i>	71800	87535	90630	94430
Karnataka	29400	38800	38300	38200
A&N Islands	240	240	240	275
Goa	640	645	575	625
Maharashtra	925	1185	1185	1250
Odisha	315	400	450	480
West Bengal	325	335	335	380
Andhra Pradesh	230	320	400	400
<i>Others Total</i>	32075	41925	41485	41610
<i>Non Traditional Total</i>	103875	129460	132115	136040
Grand Total	562000	691000	694000	648000

Kerala being a major contributor of rubber its district wise production

Districts	Area (ha)	Contribution (%)	Production (tonnes)	Contribution (%)
Thiruvananthapuram	30449	6	42900	6
Kollam	36111	7	50830	7
Pathanamthitta	49957	10	77400	10
Alappuzha	4329	1	6580	1
Kottayam	112918	21	170800	23
Idukki	39679	8	54600	7
Ernakulam	58729	11	90770	12
Thrissur	15017	3	21800	3
Palakkad	35559	7	47930	6
Malappuram	38136	7	48080	6
Kozhikode	20358	4	28275	4
Wayanad	9723	2	8400	1
Kannur	43819	8	58125	8
Kasaragod	30624	6	39020	5
Total	525408	100	745510	100

Source: Farm Guide, 2012

6. Framework of Rubber - forward/backward /lateral linkages

The rubber sectors have a backward linkage to 27 sectors and forward linkage to 20 sectors. There are four groups of backward linkage: raw materials, machinery and equipment, business supporter, and infrastructure. In the same way, there are five groups of forward linkage: automotive, houseware, services, transport, and others.

Backward Linkage:	Core Sector :	Forward Linkage:
1.Wholesale Trade	1.Rubber Sheet	1.Motor Vehicle
2.Retail Trade	2.Block Rubber	2.Road Freight Transport
3.Fertilizers and Pesticides	3.Tyre Tubes	3.Repairing Motor Vehicle
4.Electricity		4.Plastic Wares
5.Petroleum Refineries		5.Conveyor Belts
6.Banking Service		6.Passenger Transport
7.Business Service		7.Bicycle ,Motor Cycle
8.Plastic Wares		8.Footwear
9.Agricultural Service		9.Recreational Athletics Equipment
10.Road Freight Transport		10.Electric Accumalator,Battery
11.Synthetic Resins and Plastics		11.Special Industrial Machinery
12.chemical Products		12.Watches ,Clocks
13.Secondary Steel Products		13.Bsiness Service
14.special Industrial Machinery		14.Engines,Turbins
15.Cutlery and Hand Tools		15.Chemical Products
16.other petroleum products		16.Made up Textile Goods
17.Basic Industrial Chemicals		17.Building Construction
18.Coastal and Inland Water Transport		18.Manufacturing Goods
19.Real Estate		19.Repair
20.Flour and Grain Milling		20.Stone Quarrying
21.Other Insurance Services		
22.Paper Products		
23.Agricultural Machinery		
24.Repairing of Motor Vehicles		
25.Post and Telecommunication		
26.Other Services		
27.Other Manufacturing Goods		

7. Varieties of Rubber grown in India, qty .Metrics of Quality Parameters and Indian produce range of parameters

Sr. No.	Name	Parents	Characters
Primary clones			
1	TJIR - 1	-	Indonesian clone, yield 930 kg/ha per year, Susceptible to Phytophthora, Oidium and pink disease.
2	G.T.1	-	Indonesian clone, yield 1360 kg/ha year, Tolerant to Phytophthora, pink disease and brown bast.
3	G.I.1	-	Malaysian clone, yield 1130 kg/ha year, Susceptible to brown bast, possess drought tolerance.
4	P.B. 86	-	Malayasian clone, yield 1130 kg per ha/year.
Secondary clones			
5	PRIM-600	TJIR-1 x P.B. 86	Developed by Rubber Research Institute of Malaya (RRIM). Yield 1317kg/ha/year, Susceptible to Phytophthora and pink disease.
6	RRIM. 628	TJIR.1x RRIM.527	Yield 1051 kg/ha/year, Susceptible to brown bast, poor yielded during summer.
Tertiary clones			
7	RRIM - 703	RRIM.600xRRIM.500	Yield 1725 kg/ha/year, Susceptible to brown bast and wind damage.

Rubber Research Institute of Malaya, Rubber Research Institute of India, Kottayam and other institutes have developed clonal varieties. These clones are broadly classified into three categories viz., primary, secondary and tertiary, based on the method adopted for the development of their mother trees. When mother trees are selected from existing seedling populations of unknown parentage and are multiplied vegetatively to give rise to the clones, they are called primary clones. When the mother trees clones and are then multiplied vegetatively, they are known as secondary clones.

Rubber Board of India recommends some of the following clones for cultivation in South India: RRII 5,

RRII 105, RRII 414, RRII 430, RRIM 600, RRIM 703, PB 217, PB 235, etc. are a few to name. Known for its high yielding ability, RRII 105 is widely used in **Kerala**.

Varieties of Rubber in India: PB 86, Tjir 1, PR 17, BD 5, BD 10, GT 1, PB 28/59, PB 217, PB 235, PB 260, RRII 5, RRII 105, RRII 414, RRII 430, RRIM 600, RRIM 703 and PCK-1, 2.

8. Domestic Consumption-qty and value

The country has consumed **1,211,940 tonnes** of NR (**Natural Rubber**) in 2018-19, up 9% from the quantity of 1,112,210 tonnes consumed during 2017-18. Tyre sector reported a substantial growth rate of 11.9% in consumption, whereas non-tyre sector consumption increased only by 2.3%. Auto-tyre manufacturing sector accounted for 71.3% of the total quantity of NR consumed in the country during the year 2018-19. Import duty on radial car tyres was raised from 10% to 15% and that of footwear was revised from 20% to 25% in September 2018. Import duty on radial truck and bus tyres had been already raised to 15%. These revisions in customs policy on tyres also contributed to the increase in NR consumption. Out of the total NR consumed by the industry, 43% were RSS(**Ribbed Smoked Sheet**), 47% TSR(**Technically Specified Rubber**) and only 7% latex concentrates in 2018-19.

Consumption					
(Metric Tonnes)					
Natural Rubber (NR)					
Ribbed Smoked Sheet (RSS)	48385	46585	521495	513710	
Solid Block Rubber	43025	46290	575115	493410	
Latex Concentrates (drc)	6450	7675	88330	79765	
Others	2140	2450	27000	25325	
Total	100000	103000	1211940	1112210	9.0
Out of which Auto Tyre Manufacturers	71448	70874	864022	772162	11.9
Synthetic Rubber (SR)^p					
Styrene Butadiene (SBR)	31375	29990	357180	311555	
Poly Butadiene(BR)	15485	16655	195835	184130	
Others	9640	11555	133310	138290	
Total	56500	58200	686325	633975	8.3
Out of which Auto Tyre Manufacturers	38124	39925	468086	437754	6.9
Total NR & SR	156500	161200	1898265	1746185	8.7
Out of which Auto Tyre Manufacturers	109572	110799	1332108	1209916	10.1

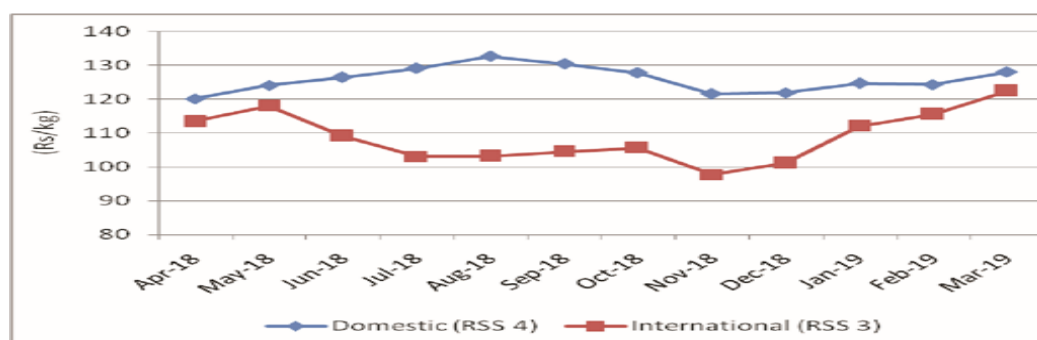
Price of Natural Rubber (Rs / 100 Kg)

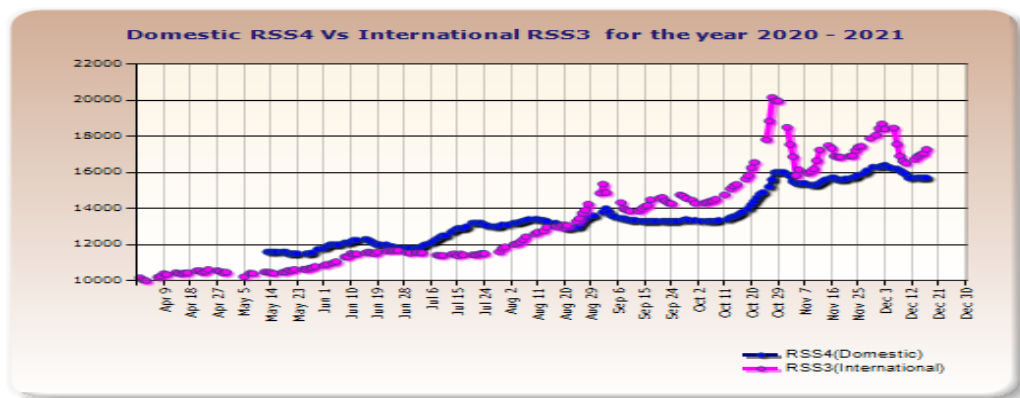
Month/Year		RSS 5	RSS 4	RSS 3	Latex (60% drc)		ISNR 20	SMR 20
		Domestic		International	Domestic	International	Domestic	International
2017-18		12646	12980	11678	14650	13714	11517	9655
April	2018	11790	12012	11343	13678	12742	10787	9077
May	"	12194	12419	11808	14640	14053	11959	9715
June	"	12263	12646	10920	14550	12615	12112	9382
July	"	12687	12919	10308	14077	11927	12782	9093
August	"	13074	13267	10320	16308	11682	13055	9343
September	"	12683	13048	10451	17073	12077	12361	9638
October	"	12314	12780	10556	16273	12015	11536	9748
November	"	11676	12156	9772	13922	11092	11020	8902
December	"	11831	12196	10116	14558	10810	11263	8914
January	2019	12018	12466	11202	14622	11435	11657	9568
February	"	11820	12433	11554	13880	12140	11600	9903
March	"	12433	12802	12248	13747	13695	12329	10273
2018-19		12232	12595	10883	14777	12190	11872	9463

Domestic price refers to Kottayam market, international RSS 3 refers to Bangkok price, international price of latex and SMR 20 to Kuala Lumpur market.

NR Prices: Annual average price for domestic RSS 4 grade rubber for the year 2018-19 was Rs 125.95 per kg compared to Rs.129.80 per kg in 2017-18. During 2018-19, the average price of international RSS 3 grade was Rs.108.83 per kg and it was Rs.116.78 per kg during 2017-18. Domestic RSS 4 price peaked at Rs.134.50 per kg on 28 August 2018 and international price of RSS-3 peaked at Rs.124.66 per kg on 12 March 2019. Domestic RSS 4 price had been ruling above the international RSS 3 price throughout the year 2018-19. The chart depicting the monthly average price of RSS 4 in domestic market and that of RSS 3 grade in international market during the year 2018-19 is given below

Monthly average price of NR -2018-19





9.Export

Commodity	Indicator	2014	2015	2016	2017	2018	2019
4001. Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip.	Netweight (kg)	29,87,369.00	53,63,244.00	80,33,567.00	2,51,65,215.00	60,53,551.00	99,70,034.00
	Quantity	29,87,369.00	53,63,244.00	80,33,567.00	2,51,65,215.00	60,53,551.00	
	Value (US\$)	73,16,915.00	3,33,73,208.00	3,69,00,447.00	4,20,42,785.00	1,03,30,163.00	1,70,20,663.00
	Netweight (kg)	42,29,98,111.00	44,96,76,291.00	45,30,01,028.00	41,02,74,608.00	59,65,65,917.00	48,73,26,766.00



The value of exports of commodity group 4001 "Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip." from India totalled \$ 17 million in 2019. Sales of commodity group 4001 from India went up by 64% compared to 2018: exports of commodity group 4001 "Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip." went up by \$ 6.69 million (cumulative exports of commodity group 4001 from India amounted \$10.3 million in 2018). Exports of commodity group 4001 "Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip." amounted to 0.005% of total exports from India (cumulative merchandise exports from India totalled \$ 323 billion in 2019). The share of commodity group 4001 in total exports from India increased by 0.002 p.p. compared to 2018 (it was 0.003% in 2018 and cumulative exports from India were equal to \$ 322 billion). Exports of commodity group 4001 amounted to 0.527% of total sales of group "" from India in 2019 (the value of exports of commodity group from India amounted to \$3.22 billion in 2019). The share of exports of commodity group 4001 in sales of commodity group from India increased by 0.2 p.p. compared to 2018 (it was 0.326% in 2018, and exports of commodity group from India were \$3.16 billion).

Top export destinations of "Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip." from India in 2019:

- Iran with a share of 83% (14.2 million US\$)

- Nepal with a share of 5.02% (854 thousand US\$)
- Mexico with a share of 3.78% (644 thousand US\$)
- Indonesia with a share of 1.87% (319 thousand US\$)
- Sri Lanka with a share of 1.65% (282 thousand US\$)
- Malaysia - 148 thousand US\$
- Russia - 112 thousand US\$
- Turkey - 82 thousand US\$
- Saudi Arabia - 71 thousand US\$
- Qatar - 71 thousand US\$

Exports structure of 4001 - Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip. - from India in 2019 represented by the following main commodity groups:

- **86%** (14.7 million US\$): **400122** - Technically spec. nat. rubber (TSNR)
- **9.35%** (1.59 million US\$): **400110** - Natural rubber latex, whether or not pre-vulcanised
- **3.24%** (552 thousand US\$): **400121** - Natural rubber (excl. latex), in smoked sheets
- **0.791%** (134 thousand US\$): **400129** - Natural rubber other than latex/smoked sheets/technically spec. nat. rubber
- **0.013%** (2.29 thousand US\$): **400130** - Balata, gutta-percha, guayule, chicle & sim. nat. gums

NR is not a traditional export-oriented commodity, more so because of the current deficit in production. Export of NR happens to adjust temporary demand-supply imbalances in the NR domestic market. There is a huge export potential for rubber products in the country, which if promoted, shall indirectly increase the demand for domestic NR as also the export earnings.

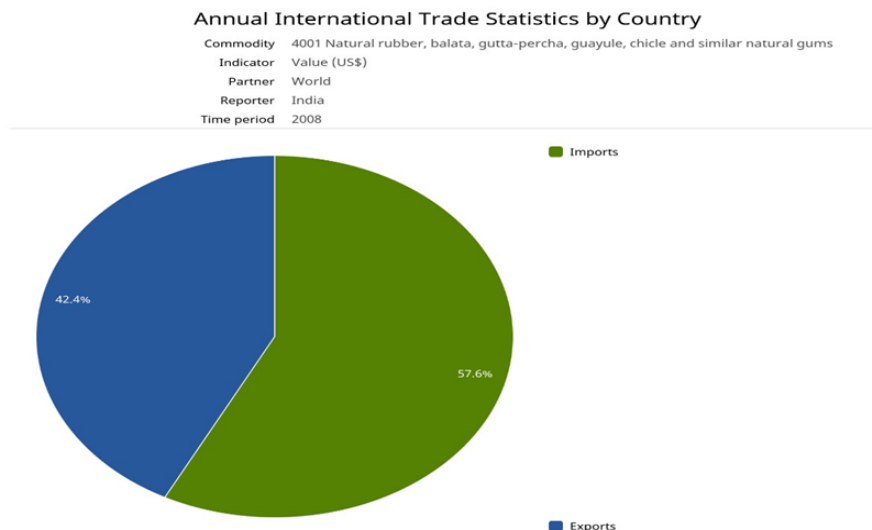
Major trading centers of rubber

Tokyo Commodity Exchange

Singapore Commodity Exchange

Osaka Mercantile Exchange

Kuala Lumpur, New York, London



10. Major production organisations-address /email/mob/.websites

Major manufacturers in rubber industry

MRF(Madras rubber factory) Limited

- Started in 1946 as a small balloon making unit, MRF has grown to become one of India's largest tyre manufacturers, with a turnover close to US\$ 1 billion.
- It manufactures a full range of tyres for vehicles ranging from two wheelers to four wheelers and commercial vehicles.
- The company's main plant is in Tiruvottriyur, Chennai and it has another plant in Pondicherry to manufacture radial tyres.
- It has diversified into toys and games through Funschool India Ltd, a joint venture with Hasbro International, USA. The company also has a collaboration with Pirelli to make conveyor and elevator belts.

<https://www.mrftyres.com/>

Apollo Tyres

- Established in 1975, Apollo Tyres is one of India's leading manufacturers of tyres for heavy vehicles and off-road applications.
- The company manufactures tyres for passenger cars, light trucks, commercial vehicles, farm equipment and off-road applications.
- The company has its main plant in Kerala and seven other manufacturing plants across India and Africa, three in India and two each in South Africa and Zimbabwe.

<https://corporate.apollotyres.com/>

JK Tyres

- Part of the 70-year old JG Group, the company's first tyre manufacturing plant was set up in 1976 at Kankroli, in Rajasthan .
- JK Tyres manufactures tyres for passenger cars, commercial vehicles and tractors. In 1997, it acquired Vikrant Tyres.
- Its products are exported to nearly 55 countries, JK Tyres accounts for nearly 26 per cent of all tyre exports from India.
- Along with Vikrant Tyres it has four manufacturing locations in India and has a turnover of over US\$ 700 million.

<https://www.jktyre.com/>

Ceat Limited

- Part of the RPG Group (a large diversified business group in India) Ceat Tyres, was established in 1958.
- With a turnover of close to US\$ 450 million, the company manufactures a full range of tyres, for two wheelers, three wheelers, cars, commercial vehicles, off-roaders and fork lifts.
- It also markets tubes and flaps, sourced from other manufacturers .

- It manufactures over 6 million tyres annually from its plants in Mumbai and Nasik.

<https://www.ceat.com/>

Bata India

- Bata India, was established in 1931 and is India's leading footwear manufacturer
- The Bata Group has 40 production facilities across 26 countries and a retail presence in over 50 countries globally.
- Through its 4600 retail stores, the group employs over 40,000 people and serves nearly 1 million customers every day
- With a turnover of US\$ 200 million, the company has 1250 outlets and sells nearly 45 million pairs of footwear each year.

<https://www.bata.in/>

Bridgestone

- The Bridgestone Group delivers a wide range of tires to customers around the world, such as tires for passenger cars, trucks and buses, aircraft, construction and mining vehicles, motorcycles, etc
- The Bridgestone Group makes and sells a range of rubber products and other diversified products. Many of these products and technologies are used in a variety of everyday applications.
- As of 2017, the company is the largest manufacturer of tires in the world, followed by Michelin (France), Goodyear (United States), Continental (Germany) and Pirelli (Italy).

<https://www.bridgestone.com/>

Michelin

- Michelin is a French multinational tyre manufacturing company based in Clermont-Ferrand in the Auvergne-Rhône-Alpes région of France.
- Michelin manufactures tyres for space shuttles, aircraft, automobiles, heavy equipment, motorcycles, and bicycles. In 2012, the Group produced 166 million tyres at 69 facilities located in 18 countries.

<https://www.michelin.in/>

Sumitomo Rubber Industries(Japan)

- Sumitomo Rubber Industries, Ltd. is a global tire and rubber company based in Japan. It is part of the Sumitomo Group. The company makes a wide range of rubber based products, including automobile tires, golf balls and tennis balls.

<https://www.srigroup.co.jp/english/>

Hankook Tire(South Korean)

- The Hankook Tire & Technology group "(South) Korea", also known simply as Hankook and stylised is a South Korean tire company. Based in Seoul, the Hankook Tire & Technology group is the seventh largest tire company in the world.

<https://www.hankooktire.com/global/>

11. Major Domestic sales organisations in india .address/email/mob/website .special reference to top brands of online sales B to C

1. Deluxe rubber industries

This company has been serving the customers for almost 40 years in all the different states. They supply industrial rollers and ebonite rollers. They use efficient machinery like rubber mixing machine, lathe machine, 3-roller machine, cylindrical grinder, lifting crane and rubber extruder machine. Some of their products are: Printing rolls, Mini offset printing rolls, Paper rolls, Textile rolls, Plastic machine rolls, Steel rolling mill rolls.

Address: 76 A, TASS Industrial Estate, Ambattur, Chennai - 600098, Tamilnadu, India. **Mobile :** +91 98410 56504, +91 98416 87225 **Email id :** deluxrubber@hotmail.com
Website: www.deluxrubber.com

2. Rubco

RUBCO is an abbreviation for the Kerala State rubber co-operative limited. This invention agency is tied up to the government of Kerala, and they acquire and process natural rubber from the farmers directly. This company supplies natural rubber directly to the Indian companies and companies abroad too. The Hi-tech polymers company aids the production of rubber, and the present-day Architects and Consultants prefer this company as their products are reliable and these rubber products are employed in the construction industry. These companies play a vital role in supplying rubber and maintaining the quality. The rubber produced by these industries are used in making belts, tyres, hoses, latex and camelback products, footwear and automobile tubes.

Website: <https://www.rubcogroup.com/>, **Address:** Kerala State Rubber Co-op. Ltd, KANNUR, KERALA
Call 0497 271 1378 , **Email id:** info@rubcomail.com

3. Apcotex India

Started as a division of Asian Paints. Pioneered the manufacturing of Vinyl Pyridine latex and Carboxylated Styrene-Butadiene latex in India. Started High Styrene Rubber production with 10,000 MT p.a. (dry) capacity. **Website:** <https://www.apcotex.com/>

Address: NKM International House, 178, Backbay Reclamation, Babubhai M. Chinai Marg, Mumbai - 400020, India. **Contact:** 91 22 -22838302/04

4. Rubfila international

Rubfila International Limited (RIL) is a Public Listed Company promoted by Rubpro Sdn. Bhd., Malaysia along with Kerala State Industrial Development Corporation (KSIDC) and has been in operation since 1994. The company is listed in Bombay Stock Exchange (BSE) since 1994.

Website: <https://www.rubfila.com/>, **Address :** New Industrial Development Area, Kanjikode, Palakkad - 678 621, Kerala, INDIA. **Phone:** 91-491-2567 261 – 265, **mail:** info@rubfila.com

5. Pix transmis: Leading manufacturer of Belts and related mechanical Power Transmission products in India. The Company features state-of-the-art Belt manufacturing units as well as an ultra-sophisticated, automated Rubber Mixing facility. **Website:** <https://www.pixtrans.com/>

6. SRK Polymers: <http://www.srkpolymers.com/>, **7. MM rubber:** <https://mmfoam.in/>

8. Vamshi rubber: <http://www.vamshirubber.org/>, **9. GRP:** <https://www.grpweb.com/>

10.Rishiroop: <https://www.rishiroop.in/>

11.Eastern Treads: <https://www.easterntreads.com/>

12.SomiConveyor: <https://www.somiconveyor.com/>

13. Mahalaxmi Rubtech Limited: <https://www.mrtglobal.com/>

12. Major Export organisations in india address/email/mob/website

1.Paulson Industries – Mumbai

Paulson Industries are manufacturers and exporters of mould, plastic and rubber components for automobile, pharmaceuticals and electronic industries in mumbai, India.

Address : Gala No.101, Building No.4, Ashirwad Industrial Estate, Ram Mandir Road, Goregaon (W) , Mumbai - 400 104, India..**IRD Website:** <http://www.indiarubberdirectory.com/paulsonindustries>

2.Apratim International - Delhi

Apratim International are manufacturers, suppliers and exporters of chemicals, Petrochemicals and commodities, Rubber Process Oil, Solvents, Paraffin Wax, Laboratory chemicals and reagents in newdelhi, India.**Address :** L - 2A, Hauz Khas Enclave, Delhi - 110 016, India..**IRD Website:** <http://www.indiarubberdirectory.com/apratiminternational>

3.Reliable Autoexpo - Delhi

Reliable Autoexpo - manufacturers, importers, distributors and retailers of Motorcycle Spares and Accessories like Oil Seals and Rubber Parts, Oil Seals and Rubber Parts Gaskets, Brake Shoe, Clutch Plates, Oil Filters, Air Filters in india.**Address :** 3578/2, Lane 9, Vishnu Mandir Marg, Karol Bagh, Delhi - 110 001, India..**IRD Website:** <http://www.indiarubberdirectory.com/reliableautoexpo>

4. Kumar Trading Agency - Mumbai

Kumar Trading Agency are manufacturers, suppliers and exporters of rubber parts for pharmaceutical application like Coupling, Auto Clavable Extrusion, Glass Container,Oil Seal, "U'Seal & Mechanical Seal in mumbai, India.**Address :** Plot No 160/161, Jawahar Nagar,Goregaon (W), Mumbai - 400 062, India..**IRD Website:** <http://www.indiarubberdirectory.com/kumartrd>

5.Venus International Export - Delhi

Venus International Export are manufacturers and exporters of Rubber Parts-Rubber to metal bonded bushings, Engine Mountings/Bushes/Grommets/Couplings, Steering and Suspension components, Swaybar Bush in newdelhi, India.**Address :** B-2605, Narela Industrial Area,D S I D C, Delhi - 110 041, India..**IRD Website:** <http://www.indiarubberdirectory.com/venusexport>

6.Super Floorings Private Limited - YamunaNagar

Super Floorings Private Limited are Manufacturer and Exporter of Rubber Products, Rexine, PVC Floor Covering / Sheeting Every type of Flooring / Sheeting, Mould Sheet, Non Mould Sheet,Melt Sheet in india.**Address :** 5th Km Stone Vill. Aurangabad, Delhi Road, Yamuna Nagar , YamunaNagar - 135 001, India..**IRD Website:** <http://www.indiarubberdirectory.com/italex>

7. S.D. Chemicals - Pune

S.D. Chemicals are manufacturers and suppliers of rubber products like RUBBER BUSHES, O'RINGS, HYDRAULIC SEALS made from natural, Neoprene, EPDM, viton, SBR, Butyl, Polyacrylic, ECO, Nitrile in pune, India.

Address : S. No. 103, C/o. Gujarat Metal Industries, Nehru nagar Corner, Pimpri, Pune - 411 018, India..**IRD Website:** <http://www.indiarubberdirectory.com/smartrub>

8.Rubber Age Industries - Chennai Rubber Age Industries are manufacturers and exporters of rubber products like Hand Gloves - Rubber, P.V.C., Leather, Asbestos and Canvas Gloves, O-rings, Oil seals, Diaphragms, Gasket, Gromets in chennai, India.**Address :** 41, Sembudoss St, I Floor, Chennai - 600 001, India..**IRD Website:** <http://www.indiarubberdirectory.com/rubberageindustries>

<http://indiarubberdirectory.com/rubber-exporters/>

13.Major Countries India Importing from

The value of imports of commodity group 4001 "Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip." to India totalled \$ 735 million in 2019. Sales of commodity group 4001 to India decreased by 20% in value terms compared to 2018.imports of commodity group 4001 "Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip." decreased by \$ 184 million (the value of imports of commodity group 4001 to India was equal to \$919 million in 2018)

Imports of commodity group 4001 "Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip." accounted for 0.153% of total import flow to India (in 2019, total imports to India amounted to \$ 478 billion). The share of commodity group 4001 in total imports to India decreased by 0.027 p.p. compared to 2018 (it was 0.181% in 2018 and cumulative imports to India were equal to \$ 507 billion).

Imports of commodity group 4001 reached 22% of total imports of group "" to India in 2019 (imports of commodity group to India totalled \$3.26 billion in 2019). The share of purchases of commodity group 4001 in imports of commodity group to India went down by 1.81 p.p. compared to 2018 (it was 24% in 2018, and imports of commodity group to India accounted for \$3.77 billion).

Where does India import Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip. from?

Top trading partners (import of "Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip.") of India in 2019:

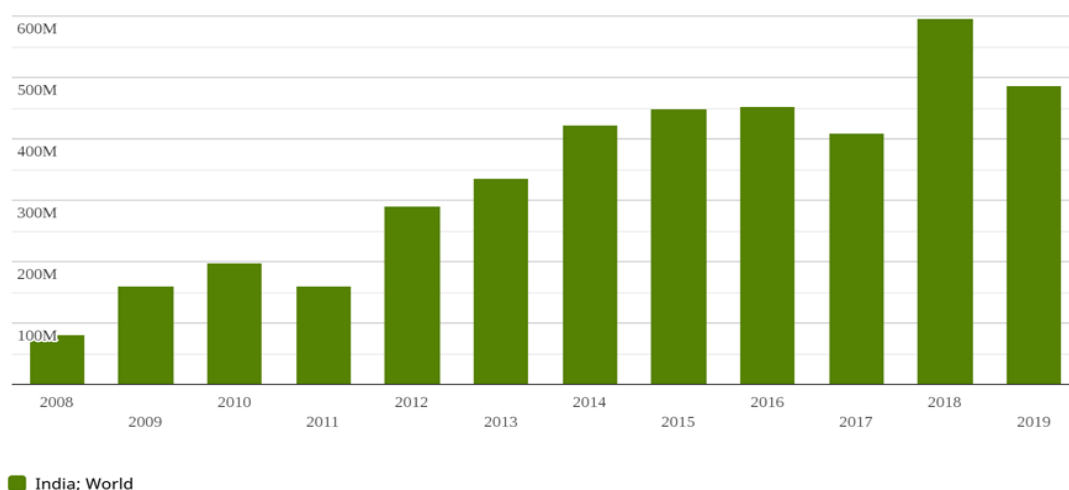
- Indonesia with a share of 35% (262 million US\$)
- Vietnam with a share of 28% (206 million US\$)
- Malaysia with a share of 9.85% (72 million US\$)
- Singapore with a share of 9.58% (70 million US\$)
- Thailand with a share of 7.56% (55 million US\$)
- Côte d'Ivoire with a share of 4.96% (36 million US\$)
- Myanmar with a share of 1.48% (10.9 million US\$)
- Bangladesh with a share of 1.16% (8.56 million US\$)
- Cambodia - 2.36 million US\$
- Ghana - 2.21 million US\$

Imports structure of 4001 - Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip. - to India in 2019 represented by the following main commodity groups:

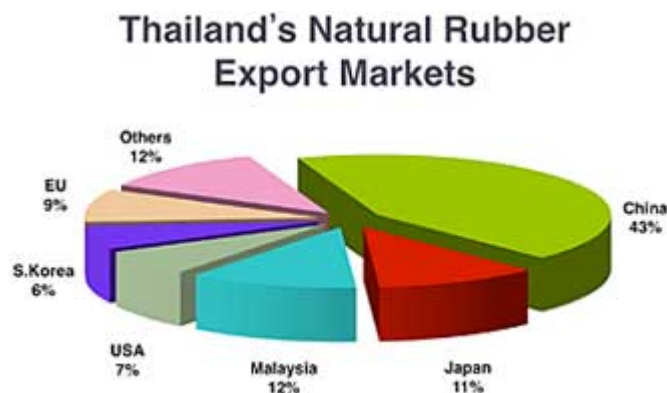
- **81%** (599 million US\$): **400122** - Technically spec. nat. rubber (TSNR)
- **15.7%** (115 million US\$): **400121** - Natural rubber (excl. latex), in smoked sheets
- **1.43%** (10.5 million US\$): **400129** - Natural rubber other than latex/smoked sheets/technically spec. nat. rubber
- **1.26%** (9.3 million US\$): **400110** - Natural rubber latex, whether or not pre-vulcanised
- **0.001%** (10.5 thousand US\$): **400130** - Balata, gutta-percha, guayule, chicle & sim. nat. gums

Annual International Trade Statistics by Country

Trade flow Imports
Commodity 4001 Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums
Indicator Netweight (kg)



14. Network of origin countries and importing countries of Rubber



Source: Rubber Research Institute of Thailand as of Feb 27, 2012

In the year 2019, Thailand was the world's leading natural rubber exporting country, with exports worth some 4.1 billion U.S. dollars. Global sales from natural rubber exports by country totaled US\$13.1 billion in 2019.

That amount reflects an average -1.2% drop in value since 2015 when natural rubber shipments were worth \$13.2 billion. Year over year, exported natural rubber fell by -0.5% from 2018 to 2019.

Among continents, Asian countries exported \$10.8 billion or 82.3% of international natural rubber sales. African exporters supplied 11% worth of the global total followed by European suppliers at 5%.

Accounting for a much smaller percentage of exported natural rubber were shippers in Latin America (1.2%) excluding Mexico but including the Caribbean, North America (0.5%) and Oceania (0.1%) led by Papua New Guinea and Australia.

Below are the 15 countries that exported the highest dollar value worth of natural rubber during 2019.

Thailand: US\$4.1 billion (31.5% of exported natural rubber), Indonesia: \$3.9 billion (29.8%), Ivory Coast: \$1.1 billion (8.4%), Vietnam: \$998.1 million (7.6%), Malaysia: \$910.9 million (6.9%), Myanmar (Burma): \$276.3 million (2.1%), Laos: \$259.7 million (2%), Belgium: \$215.9 million (1.6%), Liberia: \$146.1 million (1.1%), Guatemala: \$144.8 million (1.1%), Singapore: \$99.2 million (0.8%), Netherlands: \$96.2 million (0.7%), France: \$92.5 million (0.7%), Germany: \$88 million (0.7%), Luxembourg: \$79.4 million (0.6%).

The listed 15 countries shipped 95.7% of global natural rubber exported in 2019 by value. Among the top exporters, the fastest-growing natural rubber exporters since 2015 were: Laos (up 327.9%), Myanmar also called Burma (up 136.8%), Ivory Coast (up 121.1%) and Belgium (up 62.4%). Five countries posted declines in their exported natural rubber sales namely: Germany (down -63.6%), Thailand (down -16.9%), Singapore (down -12.6%), Malaysia (down -12.2%) and Vietnam (down -6.4%).

Imports

Global purchases of imported natural rubber cost an estimated total of US\$13.5 billion in 2019.

Overall, the value of natural rubber imports for all buyer countries declined by an average -5.8% since 2015 when natural rubber purchases cost \$14.4 billion. Year over year, imported natural rubber depreciated by -8% from 2018 to 2019.

From a continental perspective, buyers in Asian countries purchased the highest dollar worth of

imported natural rubber during 2019 with purchases costing \$7.9 billion or 58.7% of the global total. In second place were European importers at 21.2% while 15.7% of worldwide natural rubber imports were delivered to North America. Smaller percentages went to importers in Latin America (3.5%) excluding Mexico but including the Caribbean, Africa (0.8%), and Oceania (0.1%) led by Australia and New Zealand.

Below are the 15 countries that imported the highest dollar value worth of natural rubber during 2019.

China: US\$3.4 billion (24.9% of total imported natural rubber), United States: \$1.7 billion (12.8%), Malaysia: \$1.3 billion (9.8%), Japan: \$1.1 billion (8.3%), India: \$703.9 million (5.2%), South Korea: \$531.3 million (3.9%), Germany: \$403 million (3%), Brazil: \$331.9 million (2.5%), Turkey: \$310.1 million (2.3%), Spain: \$301.8 million (2.2%), France: \$255 million (1.9%), Canada: \$243.4 million (1.8%), Italy: \$219.3 million (1.6%), Russia: \$207.6 million (1.5%), Poland: \$194.9 million (1.4%).

Among the above countries, the fastest-growing markets for natural rubber since 2015 were: Russia (up 32.5%), Turkey (up 20.9%), Poland (up 16.3%) and Spain (up 6.7%). Those countries that posted declines in their imported natural rubber purchases were led by: Germany (down -32.3%), China (down -14.0%), South Korea (down -13.2%) and France (down -6.3%). By value, the listed 15 countries purchased 83.2% of natural rubber imported in 2019.

Below are the top 15 suppliers from which China imported the highest dollar value worth of natural rubber during 2019. Within parenthesis is the percentage change in value for each supplying country since 2015.

Thailand: US\$1.6 billion (down -36% from 2015), Malaysia: \$473.9 million (down -6.9%), Indonesia: \$327.8 million (down -20.6%), Vietnam: \$324.5 million (up 27.2%), Laos: \$256.7 million (up 261.8%), Myanmar (Burma): \$198.5 million (up 183.5%), Ivory Coast: \$136.1 million (up 183%), Cambodia: \$14.9 million (up 144.5%), Philippines: \$5.9 million (up 784.9%), Nigeria: \$5.1 million (up 164.2%), Sri Lanka: \$953,000 (down -61%), Ghana: \$842,000 (up 4.5%), Liberia: \$433,000 (down -76.4%), Cameroon: \$366,000 (down -82.9%), Guinea: \$154,000 (down no 2015 data%).

By value, the listed 15 countries shipped 99.99% of natural rubber imported by China in 2019. Among the above countries, the fastest-growing suppliers of natural rubber to China since 2015 were: Philippines (up 784.9%), Laos (up 261.8%), Myanmar also called Burma (up 183.5%) and Ivory Coast (up 183%). Countries that experienced declines in the value of their natural rubber supplied to Chinese importers included: Cameroon (down -82.9%), Liberia (down -76.4%), Sri Lanka (down -61%) and Thailand (down -36%). Overall, the value of China's imported natural rubber fell by an average -14% from all supplying countries since 2015 when natural rubber purchased cost \$3.9 billion.

Below are the top 15 suppliers from which United States imported the highest dollar value worth of natural rubber during 2019. Within parenthesis is the percentage change in value for each supplying country since 2015.

Indonesia: US\$1 billion (down -6.6% from 2015), Thailand: \$388.2 million (up 30.8%), Ivory Coast: \$93.1 million (up 52.6%), Liberia: \$66.2 million (up 53.3%), Malaysia: \$56.3 million (down -21.4%), Vietnam: \$45.9 million (down -6.4%), Ghana: \$23.4 million (up 1998.3%), Guatemala: \$17.7 million (up 5.1%), Cameroon: \$10.1 million (down -12.6%), Gabon: \$3.4 million (down -0.3%), Sri Lanka: \$3.3 million (up 86.2%), Laos: \$2.8 million (up 166.3%), Taiwan: \$1.5 million (up 50400%), India: \$787,000 (down -71.5%), Singapore: \$575,000 (down -58.7%)

Among the above countries, the fastest-growing suppliers of natural rubber to United States since 2015 were: Taiwan (up 50,400%), Ghana (up 1,998%), Laos (up 166.3%) and Sri Lanka (up 86.2%). Countries that experienced declines in the value of their natural rubber supplied to American importers included: India (down -71.5%), Singapore (down -58.7%), Malaysia (down -21.4%) and

Cameroon (down -12.6%). Overall, the value of US imported natural rubber rose by an average 4.7% from all supplying countries since 2015 when natural rubber purchased cost \$1.7 billion.

Below are the top 15 suppliers from which Malaysia imported the highest dollar value worth of natural rubber during 2019. Within parenthesis is the percentage change in value for each supplying country since 2015.

Thailand: US\$676 million (down -10% from 2015), Ivory Coast: \$350.1 million (up 169.2%), Philippines: \$94.4 million (up 70.1%), Vietnam: \$58.8 million (down -77.2%), Myanmar (Burma): \$49.2 million (up 48.8%), Liberia: \$18.1 million (up 349.9%), Ghana: \$17.6 million (up 61%), Cambodia: \$13.4 million (down -45.3%), Sri Lanka: \$8.6 million (up 67.1%), India: \$8.3 million (up 64.4%), Papua New Guinea: \$6.6 million (up 26.8%), Indonesia: \$6.4 million (up 3.7%), Nigeria: \$2.8 million (down -10.9%), Argentina: \$1.7 million (no 2015 data), South Africa: \$1.2 million (down -84.5%).

Among the above countries, the fastest-growing markets for natural rubber since 2015 were: Russia (up 32.5%), Turkey (up 20.9%), Poland (up 16.3%) and Spain (up 6.7%). Those countries that posted declines in their imported natural rubber purchases were led by: Germany (down -32.3%), China (down -14.0%), South Korea (down -13.2%) and France (down -6.3%). By value, the listed 15 countries purchased 83.2% of natural rubber imported in 2019.

Below are the top suppliers from which Japan imported the highest dollar value worth of natural rubber during 2019. Within parenthesis is the percentage change in value for each supplying country since 2015.

1. Indonesia: US\$740.9 million (up 14.7% from 2015)
2. Thailand: \$348.5 million (down -13.3%)
3. Vietnam: \$17.7 million (down -2%)
4. Myanmar (Burma): \$8.1 million (down -11.5%)
5. Malaysia: \$6.2 million (down -22.5%)
6. Sri Lanka: \$3.1 million (down -27.7%)
7. Cambodia: \$315,000 (up 433.9%)
8. Mexico: \$158,000 (down -63.9%)
9. China: \$126,000 (down -55.3%)
10. Belgium: \$70,000 (down -17.6%)
11. United States: \$23,000 (down -42.5%)

By value, the listed 15 countries shipped 100% of natural rubber imported by Japan in 2019. Among the above countries, two grew their supplies of natural rubber to Japan since 2015, namely Cambodia (up 433.9%) and Indonesia (up 14.7%). Countries that experienced declines in the value of their natural rubber supplied to Japanese importers included: United States (down -42.5%), Sri Lanka (down -27.7%), Malaysia (down -22.5%) and Belgium (down -17.6%). Overall, the value of Japan's imported natural rubber rose by an average 3.4% from all supplying countries since 2015 when natural rubber purchased cost \$1.1 billion.

15. Apex bodies /Associations of this Agric commodity in the world and in India

1. Association of Natural Rubber Producing Countries (ANRPC)

The Association of Natural Rubber Producing Countries (ANRPC) is an inter-governmental organisation established in 1970. The membership is open to the governments of countries producing natural rubber. As on 2 October 2018, the ANRPC has 13 Members; governments of Bangladesh, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Papua New Guinea, Philippines, Singapore, Sri Lanka, Thailand and Vietnam. These 13 countries accounted for about 91 per cent of the global production of natural rubber during 2017.

2. International Rubber Study Group (IRSG).

The International Rubber Study Group (IRSG) is an inter-governmental organization with the main objective of improving the transparency of the world rubber market and strengthening the international cooperation on rubber issues. The IRSG is recognized as an International Body through the negotiation of a Headquarter Agreement with the Government of the United Kingdom in 1978. The Study Group has no provision for market intervention activities of any kind and is independent of the private sector. The IRSG Secretariat is based in Singapore.

3. International Rubber Research and Development Board (IRRDB)

The International Rubber Research and Development Board (IRRDB) is a research and development network which brings together natural rubber research institutes in virtually all the natural rubber producing countries, covering 95 per cent of world natural rubber production. The origins of the IRRDB go back to 1934. The International Rubber Regulation Committee was formed to protect natural rubber producers from the effects of the extremely low prices of the mid 1930s: it attempted to regulate production and exports to adjust supply to match demand. The Committee also recognized the importance of encouraging properly targeted research and development. In 1937 it established the International Rubber Research Board to co-ordinate the work of national institutes and an International Rubber Development Committee to undertake commercial development of research findings. In 1960 these two bodies were fused to create the IRRDB. The IRRDB today covers all aspects of natural rubber, from the cultivation of Hevea to the development of new products.

4. The Rubber Research Institute of India (RRII)

The Rubber Research Institute of India (RRII) established in 1955 in Kottayam has emerged as one of the largest institutes of its kind in the world, significantly contributing to the Indian Natural Rubber (NR) plantation sector and rubber products manufacturing industry. The achievements of decades long research efforts of RRII, such as development of high yielding hybrid clones and the prescriptions of Good Agricultural Practices (GAPs) for different agroclimatic regions of India are widely followed by rubber growers with visible tangible results. As an outcome, the productivity of Rubber in India became one of the highest among the major NR cultivating countries in the world.

5. ALL INDIA RUBBER INDUSTRIES ASSOCIATION (AIRIA)

It is a not for profit making body serving the rubber industry and trade with the objectives of safeguarding and promoting interests of the industry.

6. Indian Rubber Manufacturers Research Association (IRMRA)

IRMRA is well known for its expertise in the fields of Testing and Investigations, Research and Products / Compound development, training & manpower development and consultancy services, and has diversified its activities in the new sophisticated areas such as Nano and Latex Technologies as well as Rubber Engineering. At present, IRMRA is under jurisdiction of The Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce & Industry, Govt. of India, New Delhi .

16. Commodity Exchanges of Rubber in the world and India

1) **Tokyo Commodity Exchange**(<https://www.tocom.or.jp/index.html>): Tokyo Commodity Exchange, also known as **TOCOM**, is Japan's largest and one of Asia's most prominent commodity futures exchanges. TOCOM operates electronic markets for precious metals, oil, rubber and soft commodities. It offers futures and options contracts for precious metals (gold, silver, platinum and palladium); energy (crude oil, gasoline, kerosene and gas oil); natural rubber and agricultural products (soybeans, corn and azuki).

2) **Osaka Mercantile Exchange**

3 **Malaysia Derivatives Exchange**: The Malaysian commodity exchange for trading futures in crude palm oil, crude palm kernel oil, tin, rubber, and cocoa.

4) **Singapore Commodity Exchange** <https://www.sgx.com/>: The Singapore Mercantile Exchange (SMX) is a pan-Asian multi-product commodity and currency derivatives exchange situated in Singapore for international trading in a diversified basket of commodities and derivatives including futures and options contracts on precious metals, base metals, agriculture commodities, energy, currencies and commodity indices.

5)	Kottayam	Commodity	Trading
	https://www.commodityonline.com/commodity-trading-markets/kottayam/307		

6)	Kochi	Commodity	Trading
	https://www.commodityonline.com/commodity-trading-markets/kochi/15		

7) **National Commodity & Derivatives Exchange Ltd**(<https://www.ncdex.com/>)

8) **Multi Commodity Exchange of India Ltd** (<https://www.mcxindia.com/>)

9) **Kozhikode Commodity Trading** (<https://www.commodityonline.com/commodity-trading-markets/kozhikode/306>)

10) **Stock Exchange of Thailand** (<https://www.set.or.th/set/mainpage.do?language=en&country=US>)

11) **London Stock Exchange** (<https://www.londonstockexchange.com/>)

12) **New York Stock Exchange** (<https://www.nyse.com/index>)

17. Major challenges in the domestic trade of Rubber

Adverse weather especially, impact of the excessive rains and floods in major producing state of Kerala, the consequent high level of incidence of Abnormal Leaf Fall disease, lack of skilled labourers, grower's reluctance in harvesting or poor maintenance of trees in response to the low NR prices have affected the production of NR in India during the year ended March 2019. The emergent labour shortage, characterized by the paucity of skilled rubber tappers in both the smallholding as well as the organised plantation sectors is one of the issues of immediate concern in raising productivity in rubber plantations. Effluent and pollution is also a major challenge in this industry.

Integrating Climate Change Concerns :Climate Change with its three major dimensions of global warming, increasing seasonal weather variability and higher incidence of extreme/unusual weather events will have impact 13 on rubber plantations in the future. Rubber Research Institute of India (RRII) has reported that if the present warming trend continues, NR productivity in Kerala could be reduced by 4% to 7% and that in North East could go up by as much as 11% in the next decade. The change in climate also has its effects on incidence of diseases in rubber plantations. Focused research on Climate Change on assessing climate risk vulnerability and developing climate resilient technologies for adaptation and mitigation protocols would be taken up to address the challenges.

Our present challenges are with the small-scale units and the major challenges are how they can cope up in the current scenario of : Global Competition,Rising Fuel Cost,Rising Raw Material Cost,Reduction in Import Duty .Given the seasonal nature of production and irregular fluctuations in prices, rubber manufacturers have a challenging task ahead in assessing the market and responding fast to its needs.

The rubber market is cyclic in nature and production fluctuates between months and production is low during the rainy season. Demand fluctuates, based on trends in the user industries and movement of rubber prices. The ability to monitor the market, anticipate changes and respond quickly is a key capability for firms to succeed in the industry.

Sustainability of Rubber development, especially with grower having smallholding predominantly, would face a perilous situation, if market uncertainties as caused by drastic price fall persist for long. In perennial crops like NR, phases of low prices and volatility in prices have serious implications as a planting decision cannot be reversed in the short run. Further, the very small size of holding in traditional regions and majority of resource poor farmers in non-traditional regions intensify the need for safety nets for growers. Efforts would be made to address these issues by suitable programmes

Constant fall in prices of natural rubber, coupled with high labour cost has forced many of the growers (75 per cent small and marginal farmers) to keep away from tapping.Further, this industry is marred by several problems such as:Conflict of interests of Rubber Growers and Tyre Companies. The unrestricted massive imports by larger tyre companies pushed down domestic demand; however at the same time; MSME and other small industries which depend on domestic supply of natural rubber demand for urgent measures.Other reasons including high input costs; bizarre duty structure, cheap imports and signing of Free Trade Agreements with countries from which import of finished rubber products to India is encouraged.

The biggest challenge faced by the rubber industry is the segregation of the units. Most micro units are yet to be a part of the fast changing scene of business. There are operational challenges, technology priorities, innovation needs, new product development, talent management, cost of

material, pressure of price reduction, inventory management, stiff competition and logistic costs. There are many strengths of the industry but the government needs to extend support in order to meet the challenges posed by the free import of rubber products and high cost of interest.

Other challenges include increased imports due to the inverted duty structure which is harming the industry. Policy makers need to focus on the industry to tide over the crisis caused by free import of rubber products. There is a slow shift in high technology equipment caused due to the high interest costs. There is also poor uptake of technologies due to high capital investments.

18. Major Challenges in the export trade of Rubber

Export Concerns:

- Non-availability of Natural Rubber. · Import Duty & Inverted Duty structure.
- Imports of Increasing Finished / Rubber Products into India. · Rubber CESS to be abolished.
- Carbon Black – An Important Input for Manufacturing Rubber Products Placed on Restricted List, under 8(C) Safeguard Duty and Anti-Dumping Duty.
- Futures Trading in Rubber may be banned as price realization purpose is not served. CESS may be imposed on future trading.
- Setting up Manufacturing Clusters or Industrial Parks for Rubber Products & Auto Tyre & Tubes Products.
- Purchase Tax on Natural Rubber by the State Government to be abolished.
- Inclusion of Reclaimed Rubber in Focus Product Scheme in FTP.
- FTA's & PTA's (Free Trade Agreement) and (Preferential trading area) have not served its purpose as all countries have a favorable trade balance against India. · Definition of SME Unit and Investment Limit must be revised.
- Imports have registered a 100% increase in the last 3 years mainly of Sub-standard goods. Only goods meeting BIS Standards should be permitted.
- Focus Product Scheme (FPS) & Focus Market Scheme (FMS), scrip's should be directly credited to exporters account electronically. · Income Tax Deduction under Section 80 HHC.

15% of the exporters make up 85% of the total exports from our country. This core group of 15% should be clearly identified to offer special facilitation & fast track clearances in the DGFT, Customs, Excise & other trade facilitators so address their needs on an urgent basis. Labor laws to be made exporter friendly to encourage exporters to take commitments without fear of facing labor disputes and costs. The US has a relatively low level of implementation and use of international standards set by international standardization bodies. Many Indian rubber exporters to the US market face regulatory barriers as products are increasingly being required to conform to multiple technical regulations regarding consumer protection in respect of health and safety and environment. The Introduction of New Limits of lead content of rubber shoes is one of the examples of such cases. The sudden introduction of this Consumer Product Safety Act for immediate enforcement in relation to lead content in any product shipped appears too harsh on a product like footwear. It is the view of the private sectors that people would neither chew nor swallow footwear and thus cannot be subject to the ill-effects of Lead.

There is a third party testing requirement in Russia which is reported to be highly burdensome. While most of the countries recognize CE conformity under self-declaration, the importers insist on thirdparty

certification or adherence to local or national standards for items such as Electrical heating & tracing cables for domestic, commercial & industrial heating applications. Having a library of standards for specific countries is almost impossible for any Indian manufacturer owing to the high costs involved. Germany and Netherlands have banned use of certain dyes and chemicals which are not Ecofriendly. European countries insist for E-marking. It is reported that extensive product description requirements complicate exports to the US and result in additional costs.

19. Government incentives and policies to promote the production and exports of Rubber

Rubber Group Planting Scheme

This is one of the major Scheme taken up by the MCCDB in collaboration with the Rubber Board of India. In this scheme the small and marginal grower of the state who take up rubber plantation are to be brought under a single umbrella namely Rubber grower's society/ Rubber Producer's society, so that some of the main problem like contacting the Technical officers, bringing the plantation materials, raising the polybag nursery, taking up of the pre-planting operation etc can be undertaken under this banner for the benefit of the members. The cost of cultivation and cost of production have to be brought down and production and productivity increased to enjoy the full benefit of the rubber plantation by the members. All this can be achieved by a Group approach.

Year	Subsidy From Rubber Board	Subsidy From State Govt./MCCDB
1st Year	Rs.14,000/-	Rs.2,500/-
2nd Year	Rs.5,000/-	Rs.1,250/-
3rd Year	Rs.5,000/-	Rs.1,250/-
4th Year	Rs.5,000/-	Rs.1,250/-
5th Year	Rs.6,000/-	Rs.1,500/-
6th Year	Rs.9,000/-	Rs.2,250/-

To avail the Scheme the beneficiaries should fulfill some of the basic requirement, which are:

The beneficiaries should form a Group/Society of not less than 10 members. Each group members should possess land document for the area to be taken up for plantation or should get a certificate from the local Head man/ Sirdar/Nokma. The group/society should ensure the initial source of funds through entrance fee, monthly/yearly subscription etc.

In Kerala Government has implemented different schemes for protecting rubber cultivators. These are called as Rubber production incentive scheme It includes:

1. Rubber Plantation Development Scheme (RPDS): This scheme aimed at promoting rubber plantation in a scientific way, adopting recommended package of practices. An amount of Rs. 20000 per hectare is paid in six annual installments for holdings up to 5 hectare and Rs. 16000 per hectare; in six annual installments for holdings above 5 hectare and up to 20 hectare.

2. Labour Welfare Scheme (LWS): This scheme is given for the tappers of rubber farming; under this scheme tappers had housing subsidy, scholarship, insurance and labour welfare scheme.

3. Scheme for Rubber Rollers: This is provided for the people in SC, ST category.

4. Rubber Production Incentive Scheme (RPIS): Kerala government has provided the scheme for small scale rubber farmers to encourage them to increase production. Under this scheme, the government buys a maximum of 150 online kilogram per hectare from a grower per month at a price

of Rs 150 per kilogram which is higher than current prices and the difference is paid as subsidy. Unlike other scheme, the payment is made directly to the farmers.

Capacity of existing departmental nurseries under Rubber Board would be fully utilised for propagation of genetically superior and quality planting materials and budwood of clones developed by RRII and supplied to growers. RPS(Rubber Producers Societies) and SHGs(Self Help Groups) may be provided financial and technical assistance for setting up nurseries. Certification of private nurseries for propagation of high yielding cultivars will be promoted.

Setting up of Tappers Banks as SHGs attached to RPS would be formalized and continued by the government. Tapping by small and marginal growers who do not have any other engagement would be promoted as this can in turn enhance the viability of rubber cultivation, more so in the non-traditional areas.

The existing practice of visual grading of rubber sheets would be replaced with more scientific and automated systems of grading. This will enable the rubber growers to get the maximum price by way of avoiding the discrepancies in terms of 'downgrading' of rubber sheets in the present visual grading system. Further, in order to ensure quality and standardisation of sheets, Group Processing Centres (GPC)/Community processing centres would be promoted with facilities for processing latex, effluent treatment, biogas, etc. Latex/sheet/scrap collection through RPS/SHGs would be supported technically and financially. This will facilitate fetching of better price by avoiding intermediaries. Processing block rubber from latex coagulum would also be promoted simultaneously.

Extension Action Plan would be formulated to update the knowledge of the rubber growers in matters relating to planting, harvesting, processing and marketing with special reference to cost reduction and increase in net farm income. Participatory extension with focus on group approach has proved to be an ideal channel of extension in rubber sector in the country and Rubber Board has been instrumental in promoting voluntary forums of smallholders of rubber viz., Rubber Producers Societies (RPS) at village level, private limited companies and Self Help Groups (SHGs).

The possibility of extending exclusive financial assistance schemes for grower forums for processing and trading in rubber would be explored in consultation with NABARD.

Futures trading is a competitive tool of marketing and regulated futures trading can contribute to price discovery and facilitate hedging to reduce risk. NR is traded in auction only in Central Rubber Market of Thailand and by Colombo Rubber Traders Association and the traded volume is minimal. However, the auction prices have seen to have indicative influence in both markets. Hence, introducing auction for rubber trading in the country would be attempted for fair price discovery.

The Government's policies to promote investment and exports, improve quality and R&D etc. have a major influence on rubber prices and profitability of players. These policies include subsidies, restrictions on ports, tax incentives, customs duty etc. The Indian Government has been proactive, in devising a sound regulatory framework for the rubber industry and has provided strong support for its growth. Export promotion of natural rubber had been identified as a thrust area in the Tenth Plan. The Rubber Board, is also pursuing its agenda to bring rubber plantation under the ambit of carbon trading and under the Kyoto protocol. This would also need international cooperation. Efforts and activities to find new uses, improve properties of natural rubber through blending and evolving composites, are also being encouraged.

In order to further promote export, the Board is extending the following support to the exporters:

1. Technical assistance for improving the quality of exportable rubber to international standards and specifications.
2. Assistance for quality certification and packaging of exportable rubber as per international standards.
3. Market information and market identification for different forms of natural rubber in target countries.
4. Identification of NR importers in other countries and provide on-line

information. 5. Sponsor trade delegations to participate in international trade fairs and exhibitions related with rubber. 6. Provide international publicity in potential NR importing countries about India's capability for supplying quality rubbers at competitive rates on a regular basis. 7 .Create awareness among potential exporters about export procedures, formalities and in and out knowledge on latest developments/changes in export-import policy matters.

20.Conclusion

Indian Rubber Industry is expected to grow at over 8% per annum in this decade and the industry is envisaged to grow at the rate of 8% per annum and the per capita consumption of rubber is at 0.8 kg against 14 kg. There exists a huge scope for expansion and development and exports in coming years. Infact, exports of rubber goods was worth Rs. 30 billion in the year 2005. The prospect of growth is further enhanced by a boom in the vehicle industry, improved living standards of the people and rapid over-all industrialization. The per capita consumption of rubber in India is only 800 grams compared to 12 to 14 kilos in Japan, USA and Europe. So far as consumption of rubber products is concerned, India is far from attaining any saturation level. It is a factor leading to tremendous growth prospects of the industry in the years to come. India is the third largest producer of rubber in the world and is the fourth largest consumer of natural rubber. India is fifth largest consumer of natural rubber and synthetic rubber together in the world. India and China are the only two countries in the world which have the capacity to consume the entire indigenous production of natural rubber.

India's Rubber sector is one the fastest growing labour intensive sector in economy which employs over 6 lakhs people directly and around 7 lakhs people indirectly.Indian rubber industry is characterized by the co-existence of a well-established rubber production sector and a fast growing rubber products manufacturing and consuming sector. The Rubber Industry value chain begins from NR plantations and ends with a huge range of dry rubber and latex based products. The rubber industry in India has much scope and growth is still being made in its paraphernalia. Not only in India but countries abroad as well are in dire need of experts in the field.

The production capacity in India is around 900,000 tonnes, of which around 75% is tapped. Out of the total area under rubber in India of around 8 822,000 ha, 614500 ha is a mature yielding crop.

Online Training in Agricultural Practices for Sustainable Rubber Production must be provided by the Rubber Board. Skill development and capacity building of tappers/growers should be accorded priority in view of the shortage of skilled tappers in rubber sector.

The chief hazards to field workers are exposure to the elements, animal and insect bites and hazards related to the sharp tools used to make incisions in the trees. Injuries that result should be treated promptly to reduce the risk of infection. Preventive and therapeutic measures can reduce the hazards of the climate and pests. The incidences of malaria and gastro-enteric diseases have been reduced on modern plantations through prophylaxis, mosquito control and sanitary measures the country.

Rubber by-products are many,but to be able to compete and pass the strict safety and quality test of other countries like Usa,Germany,France visual grading of rubber sheets must be replaced with more scientific and automated systems of grading, this will increase the export revenue.

Industries must collaborate with rubber technology institutes in order to expand their rubber by-products and also to get the quality assurance and improvements in their current rubber products:

Following are some of these institutes

- Gujarat Technological University, Gandhinagar (Gujarat)
- Hindustan College of Engineering, Chennai (Tamil Nadu)

- Indian Institute of Technology (IIT Khagarpur), Kharagpur (West Bengal)
- Cochin University of Science and Technology (C.U.S.A.T.), Kochi (Kerala)
- L.D. College of Engineering, Ahmedabad (Gujarat)
- Madras Institute of Technology, Chennai (Tamil Nadu)
- Anna University, Chrompet , Chennai
- University College of Science and Technology, Kolkata (West Bengal)
- Anna University, Chennai (Tamil Nadu)

Both natural rubber and synthetic rubber (IR) have high tear resistance, good low temperature flexibility, and high tensile strength. An advantage natural rubber has over synthetic rubber is that natural rubber has higher tensile strength, higher tear resistance, and low odor compared to IR. Special properties can also be found in other synthetic rubbers besides IR. These can include chemical resistances, fluid resistances, ozone resistances, electrical resistances, and more. In addition, synthetic rubbers can have excellent heat resistance, lower temperature resistance, and heat aging improvements. Another consideration for choosing between natural rubber vs synthetic rubber is that natural rubber contains natural proteins which may cause allergic reactions when in placed in contact with human skin for prolonged periods. Despite these differences between natural rubber and synthetic rubber, both natural rubber and synthetic rubber are in high demand by manufacturers due to their low costs and satisfactory performance for most applications. According to Statista, there were 15,189 thousand metric tons of synthetic rubber and 13,225 thousand metric tons of natural rubber globally consumed in 2017. Indeed, although synthetic rubbers can provide a myriad of property improvements not found in natural rubber, natural rubber is still valued for its high performance and low cost.

The consumption of rubber has increased from 111,2210 tonnes in 2018 to 1211940 tonnes in 2019. The imports have also increased by 24 percent in 2019 and 70 percent of this import was through duty paid-channel. In the previous years 81 percent was in the form block rubber. The major factors behind the import are the differences in prices between domestic sheet rubber and international block rubber and shortage of rubber in the domestic market.

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