

STRATEGIES TO IMPROVE RUBBER INDUSTRY IN SRI LANKA

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SUMMARY

Hevea brasiliensis is the main environmental friendly agricultural crop grown in Asia. At present the World demand for Natural Rubber is increasing at the rate of 300,000 metric tons per year and heading for a global deficit of 0.8 million metric tons by year 2000. Further there is also an indication that there will be a strong shift across the globe in the production of rubber goods industries from "Industrial west" to "Developing Asia" within the next decade. A high growth rate of rubber products manufacture has been forecast for many Asian countries.

At present, Sri Lanka produces 108,000 metric tons of rubber out of which nearly 65% is exported in raw rubber form while the balance 35% is converted into value added products. It has been planned to increase the rubber production to 126,000 metric tons by introducing new technology and also to convert 50% of this into finished products by the turn of the century.

Sri Lanka will continue to produce highest quality latex crepe rubber specially made for food, pharmaceutical and adhesive applications and arrangements have already been made to present them in technically specified forms clearly indicating their physical properties. Action is being taken to obtain ISO 9002 registration for crepe factories.

Rubber products industry in Sri Lanka started in 1936 have shown a sharp growth since 1990, with the highest development between 1992 and 1993. In addition to the low labour rates and cheap electricity, there are several incentives offered by the Government of Sri Lanka for new Investors to invest in rubber based industries. Sri Lanka is the leading solid tyre manufacturer in the world and is ranked among the top leaders in non medical glove production. In foot wear manufacture too Sri Lanka is in the forefront. Vast increase in rubber products manufacture specially in the area of automotive components under South Asian Preferential Trade Agreement (SAPTA) are expected during the next few years thereby consuming 50% of the increased rubber production by year 2000.

Key words: ISO registration, latex crepe, productivity, value added product policy

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INTRODUCTION

1. Raw rubber industry

The natural rubber (NR) industry in Asia came into existence a century ago. Since then in addition to commercial benefits the main contribution to the producing countries from this environmental friendly crop has been in the area of protecting the environment. The *Hevea* plant being a perennial tree crop, protects the soil well, prevents earth slips in hilly areas by means of its deep rooting system while the utilization of atmospheric carbon dioxide by the canopy minimises the Green House effect.

Hevea tree was first introduced in South East Asia in 1876 by Sir Henry Wickham who planted the few seedlings brought from the Kew Gardens in Sri Lanka. Last year natural rubber production in the world was just over 5.7 million metric tons (Mn MT). Nearly 95% of this has been produced in Asia while only 3.8% of this has come from Africa and the balance 1.2% from Latin America. Among the 6 countries producing more than 100,000 MT of NR per year, Thailand, Indonesia and Malaysia are in the lead while India, China and Sri Lanka occupy 4th, 5th and 6th positions respectively. Although there is no extra land available in significant quantities in Sri Lanka to expand the rubber plantation, plans are under way to increase the rubber production by means of:

- a. Planting high yielding clones, namely RRIC 100, 102 and 121.
- b. Increasing the stand per hectare from 450 to 500.
- c. Minimizing rain interference on tapping using rainguards.
- d. Improving management practices in the plantations such as maintaining the stands at the recommended level and following the recommended exploitation procedures.

It has been observed that the main incentive for smallholders to continue to replant rubber in Sri Lanka is the attractive farm gate price paid for their produce. Price of NR in the market today is very attractive to our farmers where the COP of rubber is still the lowest in Asia (Rs.29/kg) and hence the replanting is carried out at a satisfactory rate at present.

Export according to grades of NR from Sri Lanka for 1994, NR production and local consumption figures of Sri Lanka since 1990 and the production and consumption figures forecast according to the above strategic plan are given below.

Export of NR from Sri Lanka by Grades 1994 (MT)

	Sheet	TSR	Crepe	Latex	Total
Quantity	34,000	7,000	25,000	14,000	69,000
% of the total production	49	10	37	14	65
% of the world consumption	2	0	57	1	2

NR Production and Forecast till year 2000 in Sri Lanka (000 MT)

Year	1990	91	92	93	94	95	96	97	98	99	2000
Quantity	113	104	106	106	105	108	118	120	122	124	126

NR domestic consumption and Forecast till year 2000

Year	1990	91	92	93	94	95	96	97	98	99	2000
Quantity	23.6	26.8	28.8	33.4	36.4	36.9	40	43	48	53	60

Fig. 1 shows rubber production, exports and domestic consumption for period 1990 to 2000.

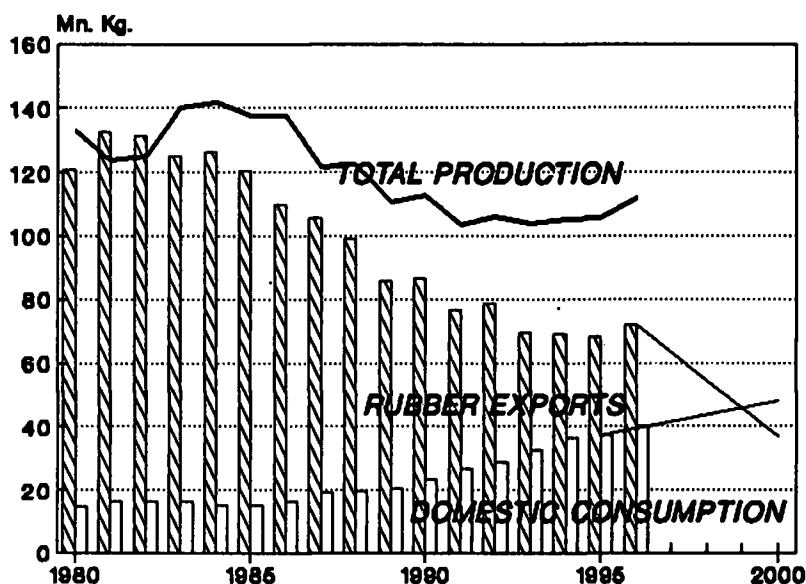


Fig. 1. Rubber production, exports and domestic consumption (1980-2000)

Demand for NR

Several factors have contributed for the unexpected situation of excess demand for NR which has pushed up the rubber prices in the world market since the latter part of 1994.

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The demand for NR in the world is increasing and this increase is marked in Asian countries. The current economic policies in most developing Asian countries, including the NR producing nations, have given a considerable weightage to enhance the domestic raw rubber consumption by converting the raw rubber into value added products. It has been estimated that the share of NR consumption in the Asia region will increase from 54% in 1993 to 58% by year 2000 (Fig.2). In terms of the NR producing countries situated within the south and South-East Asia region, this increase will be from 14.5% in 1993 to about 24.5% by year 2000 (Fig.3). This implies that in year 2000, the NR producing countries will consume nearly one fourth (25%) of the global NR production while Asia region consume 58% of it. Hence, there will be a strong shift in the production of rubber goods across the globe from "Industrial West" to "developing Asia".

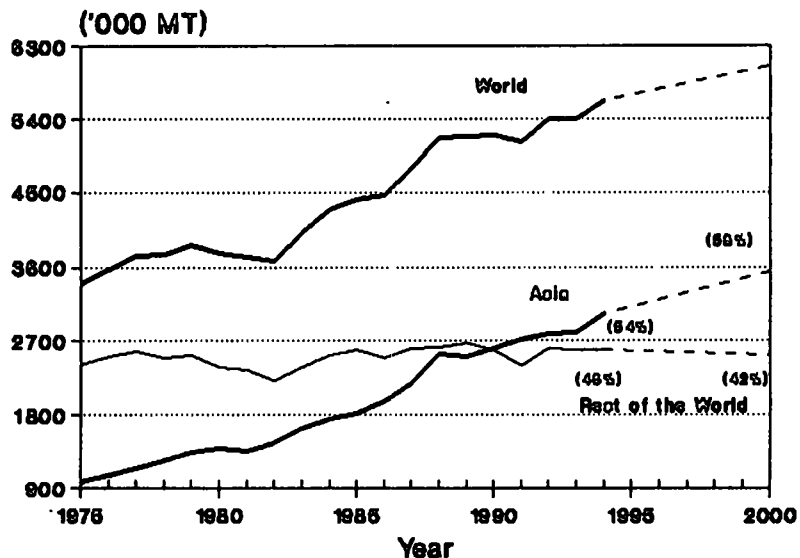


Fig. 2. NR consumption Asia vs rest of the world

Economic development in the CIS and East Europe is of vital importance to ascertain the exact future demand for NR. Yet, economic growth of these regions for the years to come is very uncertain, so is the growth in demand for rubber. It has however been reported that after gaining independence from the former USSR, the independent states such as Ukraine, presently enjoy the liberty to select the appropriate grades of rubber to suit their own requirements. Moreover, these independent states are compelled to use a large share of NR to improve the standards of their end products in order to compete on equal terms with other countries in the international market. Also, these former communist countries no longer get their synthetic rubber (SR) from Russia at subsidized rates. Hence, this situation too will create a further demand for NR, at least in the short-term.

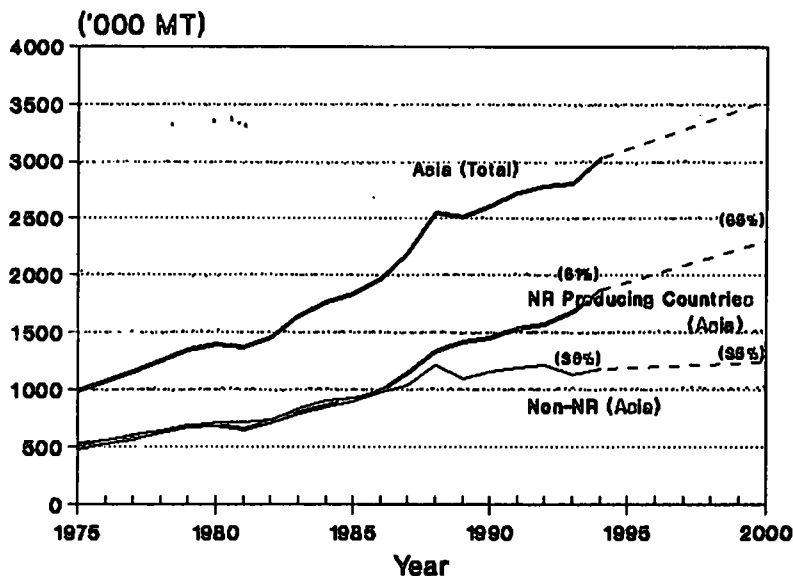


Fig. 3. Distribution of NR consumption in Asia

The above facts clearly demonstrate a scenario of which the rubber consumption in the world is on the increase. The estimated world demand for NR in year 2000 is around 7.6 Mn.MT compared to the 1993 figure of 5.4 Mn.MT. This is an increase of 2.2 Mn.MT within a period of 7 years with an annual increase of around 300,000 metric tons. According to the latest estimates of supply and demand for NR, there will be a global deficit of 0.8 Mn.MT in the year 2000.

At present the grade TSR enjoy the highest market share of NR consumed in the world while the demand for RSS has also been stable specially in the area of radial ply tyre industry. Latex occupies the 3rd position in the demand list while the share of latex crepe in the world market is still very low although latex crepe is the most superior grade of rubber with highest purity and of pure water white colour. However, demand for such speciality grades of rubbers are now growing specially in the area of speciality rubber products industry.

Latex crepe and sole crepe production in Sri Lanka

At present Sri Lanka is the sole producer of latex/sole crepe rubber to the open international rubber market.

Total installed capacity available in the country for latex crepe production is over 60,000 MT annually. Latex crepe thick and thin forms with pure water white colour is the cleanest form of raw rubber produced for making rubber appliances used in food and pharmaceutical industry as well as in infant toys. Latex crepe thin lace grade made by

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removing a large fraction (10 – 15% by weight) of non rubber substances is tailor made for manufacturing rubber derivatives and adhesives by the solvent process while plantation sole crepe is suitable for making winter boots owing to its ability to grip well on ice. Further, latex crepe is the only form of rubber made by removing most of the soluble natural proteins in ordinary rubber and hence the fear of causing allergies by leachable proteins in rubber could be minimized if this grade of rubber is used in the manufacture of surgical and pharmaceutical rubber products.

Action has already been taken to perform grading according to the method of manufacture highlighting the advantages of fractionation and bleaching with regard to the physical properties. Further as a mandatory rule in Sri Lanka since September 1995, packaging of sole crepe rubber is now restricted to corrugated cardboard boxes instead of the Albezzia boxes used early.

An extensive attempt is now being made by the government of Sri Lanka to propagate this commodity in newly improved form and regain the demand it had in the world market. In order to provide consistency in quality, a technical certification scheme is proposed for this grade of rubber. All crepe factories in Sri Lanka are being in the process of obtaining ISO 9002 registration.

Low nitrogen crepe rubber

In order to promote the use of crepe rubber in engineering applications, a protein removed very low nitrogen containing crepe rubber has recently been produced in Sri Lanka.

A successfully developed TSR type grade of low Nitrogen Crepe rubber SLR LN produced by using a locally available protolytic enzyme papain has now been launched.

In this SLR LN grade made by enzyme coagulation, high molecular weight non – rubber materials such as proteins and lipids which cause internal friction resulting in heat build up of vulcanizates on flexing and rolling have been eliminated. NR outperforms most synthetic rubbers in generating less heat and is the preferred polymer for air craft tyres and heavy duty tyres. SLR LN would be a super grade of NR ideally suited to increase the performance of these tyres. Owing to the very low protein content present SLR LN absorb very little moisture unlike vulcanizates of ordinary NR. A recent study conducted by the ODA in U.K. has shown that Low Nitrogen Natural Rubber (LNNR) marketed as SLR LN is suitable to make:

1. Engine mounts subjected to high vibrations
2. Bridge bearings used in adverse environments such as in contact with salt water
3. Off shore oil applications
4. Coating bead wires for tyres to minimise corrosion
5. Rubber to metal bonding

Owing to its low moisture absorption, low bio degradation and high resilience it is also ideal for making earth quake protectors.

Development of SLR LN has reached commercial implementation, and it is estimated that the market for SLR LN could in the long term develop into a world demand of the order of 5000 MT.

Newly proposed TSR type grades of latex crepes, their technical qualities and specifications and technical properties of SLR LN grade are given below.

Proposed new improved grades of latex crepe presented in TSR form

a. Food and pharmaceutical grade TSR F/P

Dirt less than 0.02%, VM less than 0.5% Natural protein content is minimal and hence the % N content less than 0.35.

No leachable chemicals.

Colour white or off white.

Suitable for making rubber appliances used in food and pharmaceutical industries and for making infant toys.

b. Adhesive grade TSR - AD

% Dirt less than 0.03, % VM less than 0.5,

% N less than 0.35.

Soluble in solvents without leaving a gel.

Pure water white in colour.

Used widely in adhesive tape industry

c. General purpose grade TSR - GP

Made from fraction removed and bleached latex.

Recommended for white shoe soles and bright coloured products like baby toys.

d. Yellow fraction Grade TSR - YF

Not suitable for solution process products.

Colour Yellowish brown. Suitable for making very hard vulcanized surfaces.

e. Low Nitrogen grade SLR - LN

Made by enzyme coagulation. No fractionation or bleaching.

% N and % Ash contents below 0.1

Water absorption minimal.

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Min. Po	30
Min PRI	60
% Resilience greater than	60

Colour greenish brown.

Suitable for making Aeroplane tyres, dynamic rubber appliances, water seals and bridge bearings.

2. Rubber products industry

Rubber products industry in Sri Lanka started in 1936, by the establishment of a tyre retreading factory for passenger car tyres and later expanded, particularly during the 2nd World War period due to the increased demand from the allied services. Manufacture of bicycle tyres and tubes commenced in 1959 by a private sector firm with Japanese collaboration. In 1967 the first tyre factory was inaugurated with USSR collaboration.

The liberalisation of the economic policies adopted in Sri Lanka since 1977 has led to a range of activities in the rubber product area. Export of value added rubber products were identified as an area suited for foreign investment and was afforded Pioneer status. Yet, the progress made in the rubber products sector until 1989 had been rather slow. The consumption of dry rubber, latex and total rubber have increased by 22%, 92% and 37% respectively during the period of 1989 - 1992.

The first rubber service laboratory in Sri Lanka was inaugurated at the Ceylon Institute of Scientific & Industrial Research (CISIR) in 1950 with the financial assistance of the IBRD. The Rubber Technology Department of the CISIR has been responsible for technical services, R & D, Testing and quality improvement activities.

However, in order to serve the fast growing rubber products industry in a big way, a Rubber Technology Department was initiated at the RRI too with financial assistance from the ODA. The main objective of this new Department which was later shifted to Ratmalana, closer to Colombo city was to undertake R & D activities pertaining to manufacture of rubber products. In order to widen the services to the industry this department was later subdivided to 4 new departments. The prime objective of the R & D scientists working in the above departments are as follows:

1. Provide technical know how to develop products that satisfy the consumer needs.
2. Improve the available technology to suit local conditions.
3. Modify and develop products to meet the needs of specific markets.
4. Substitute more NR formulations and to cut down costs on raw materials, chemicals and energy consumption.
5. Minimise defects to improve the quality and consistency of the end products.
6. Product testing and quality assurance.
7. Obtaining international recognition to rubber industries by way of obtaining situational accreditation like ISO 9000, ISO 14,000.

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In 1978 a separate technical service centre mainly to cater to the small industrialists was established at the Industrial Development Board. This centre too provides services such as testing and advisory to rubber based industries. Further they supply rubber and compounded latex to small scale rubber based industries for making end products made for the local market.

In addition to these a Rubber Technology Division presently known as Polymer Technology Division was established at University of Moratuwa in 1976. Three laboratories namely Latex Technology, Physical Testing and Polymer Processing have been set up with UNDP aid and JICA assistance. In addition to conducting polymer technology courses the Division is also involved in R and D work and provides testing and consultancy services to industry.

Managerial and skilled personnel for rubber industries

So far one of the biggest attractions for the foreign investors who have invested in rubber based ventures in Sri Lanka is the availability of skilled personnel from managerial level to the skilled mill operator level. The Universities of Moratuwa and Sri Jayawardenapura conduct post graduate courses in Polymer Science and Technology and the demand for managerial level personnel is partly met by these two institutions. For the junior management levels the University of Moratuwa conducts a National Diploma in Technology (NDT) Polymer Technology course (full time) and a Certificate course in polymer technology (part time) mainly meant for those employed in Rubber and Plastic industries. The Plastic and Rubber Institute (PRI) Sri Lanka also conducts a Diploma course in Rubber and Plastic Technology. Sri Lanka is the country second to India in Asia where the PRI was formed nearly 4 decades ago and since then the PRI is actively involved in conducting polymer technology courses and training skilled personnel for rubber and plastic industries. As all these diploma holders and graduates are given sufficient exposure to rubber based industries in Sri Lanka during their course work they are in a position to take up responsible positions in industry. With further expansion of rubber based industries there will be a demand for persons qualified in Rubber Technology and suitable action should be taken to meet this demand.

Government policy and incentives to the industries

As an attempt to expand the rubber products industry, the following incentives and concessions have been granted by the Board of Investment (BOI) for prospective investors.

- a. Preferential tax at 15% p.a. for the Export Sector (goods and specified services).
- b. Duty free imports of plants, machinery, raw materials and other project related goods.
- c. Duty free exports.
- d. No restriction on repatriation of dividends, profit etc.
- e. Free transferability of shares.

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- f. Double taxation relief – Sri Lanka has signed agreements with nearly 30 countries.
- g. The right to 100% foreign ownership.
- h. Investment protection guaranteed by the Sri Lanka Constitution, through bi-lateral agreements, multilateral conventions such as MIGA and ICSID Paris and through agreements signed with the BOI.

As a result, several new rubber products industries, especially latex based; have started to emerge (Annex 1). A total of over 50 rubber based industrial projects have already been approved by the BOI of which several of them have commenced commercial scale production.

Some basic advantages in setting up of Rubber products Industries in Sri Lanka are:-

- 1. Raw rubber is available in any form at a comparatively low price, compared to the price in neighbouring countries.
- 2. Labour and Electricity is still the cheapest in this region.
- 3. Availability of skilled workers at the senior managerial level, technician level and lower levels.
- 4. The concessions granted by the BOI as mentioned earlier.

Colombo port is now completely containerized and is one of the best equipped and modernized ports in the world. Moreover, Colombo Customs is fully computerized and the custom formalities are being simplified. The newly built highway between Free Trade Zone and Colombo port has made container transport very much easier even during heavy traffic hours. These facilities will strengthen the attractions of the investors who produce rubber products for the export market.

Type of products

A list of rubber products exported from Sri Lanka during the past 10 years and the income generated from these exports are given in Table 1.

Primarily there are two types of rubber based industries that exist in Sri Lanka, viz.

- Type 01. Traditional rubber product manufacturers; in many instances with more than 35 years of existence. This category of manufacturers produce their products both for the local market and for export. Annex 2 gives product types and annual consumption of rubber by two pioneer Sri Lankan manufacturers.
- Type 02: This type of manufacturers have invested in the Free Trade Zones where 100% of the production is exported in value added form.

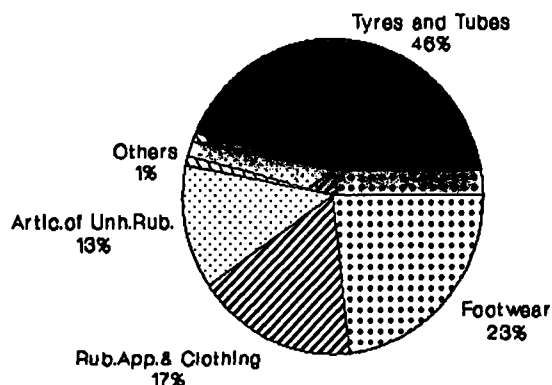
The type 1, produce mainly; retreaded tyres, including motor cycle and cycle tyres and tubes, hoses, rubber carpets, toys, shoes, motor spares and other domestic rubber appliances.

The 2nd type produce items in the caliber of solid tyres, latex based surgical devices, household examination and industrial gloves and shoes. In solid tyre manufacture, Sri Lanka leads the world producing nearly 20-25% of the world requirement. Annex 3,4,5,6 give details of products of major latex and rubber industries in Sri Lanka.

Export earnings

The distribution pattern of export earnings among the major rubber products in 1995 is shown in Figure 4. The tyre and tubes sector accounts for nearly 46%, followed by footwear (23%). Rubber apparel clothing (17%) and articles of unhardened rubber (12%).

The Figure 5 illustrates annual growth in export earnings from 1986 - 95. In 1995, the amount of foreign exchange earned by Sri Lanka by exporting nearly 20% of the total production in the form of value added products, is 35% more than the amount earned by exporting the balance production of approximately 65% as raw material. In 1995, 35% of the total rubber production in Sri Lanka have been consumed locally by the rubber based industries.



Source: EDB

Fig. 4. Distribution of export earnings among major rubber products (1995) Sri Lanka

The annual growth in export earnings by different rubber products, i.e. examination, surgical and house-hold rubber gloves, tyres and tubes, footwear, articles of unhardened rubber are shown in Figures 6,7,8 and 9 respectively. Generally, all these products have demonstrated a rapid growth rate, especially since 1989. For instance, the shoe industry has progressed from a moderate Rs.20.5 Mn earnings in 1989 to register a massive Rs.1818 Mn in 1995.

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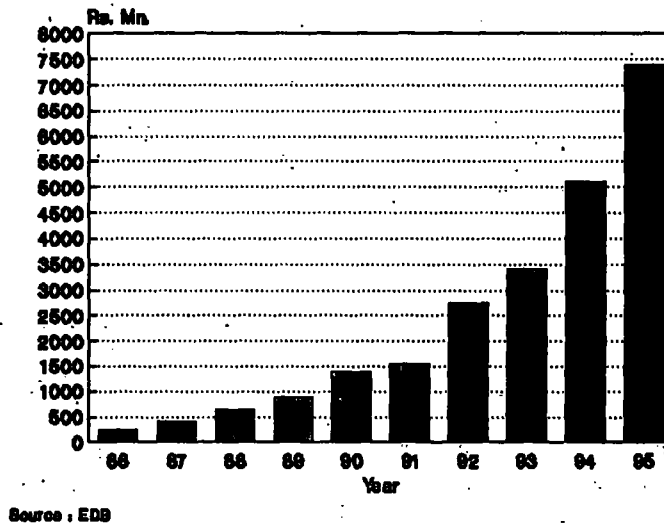


Fig. 5. Rubber product industry: Annual growth in exports (1986-1995) Sri Lanka

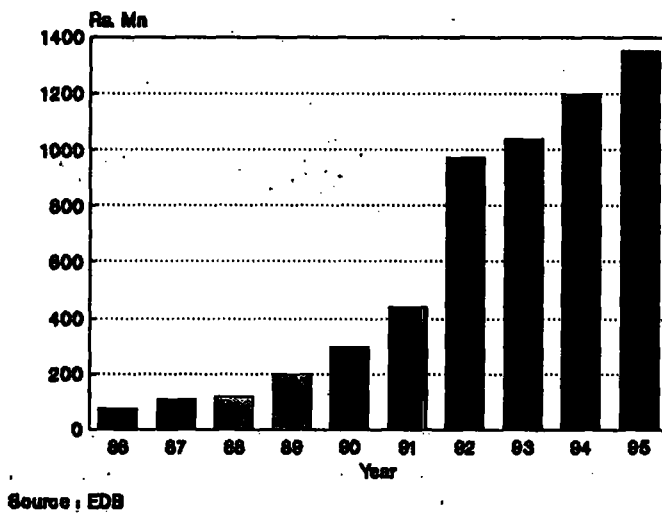
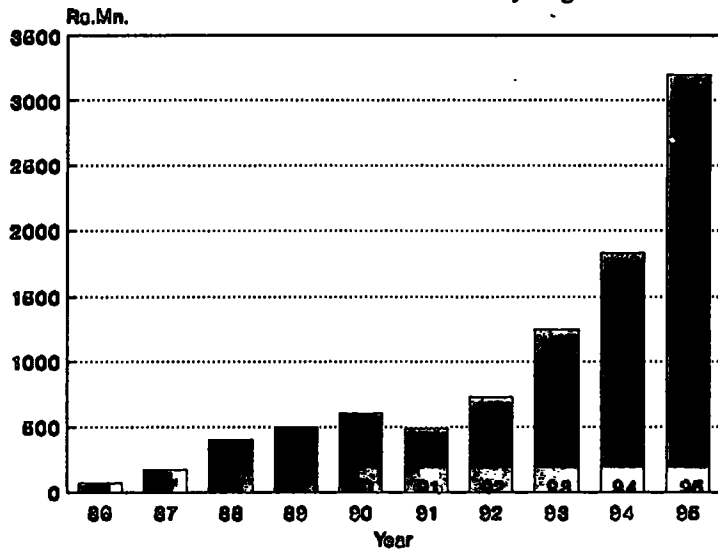


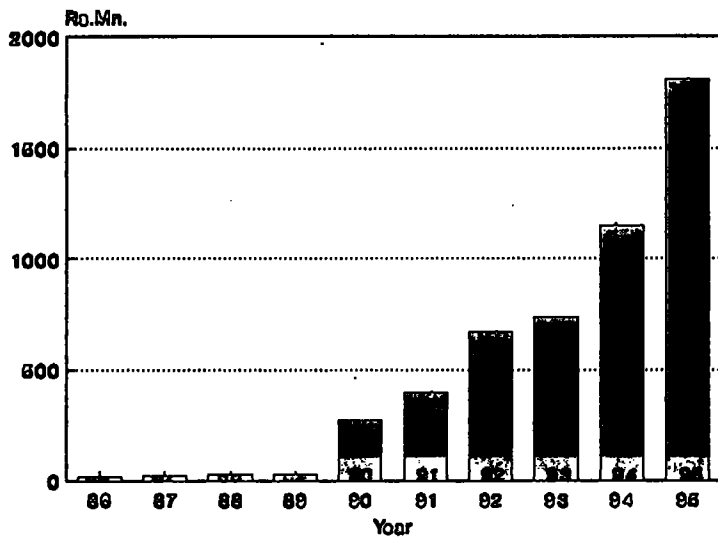
Fig. 6. Rubber apparel and clothing indus: Annual growth in exports (1986-1995) Sri Lanka

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Source : EDB

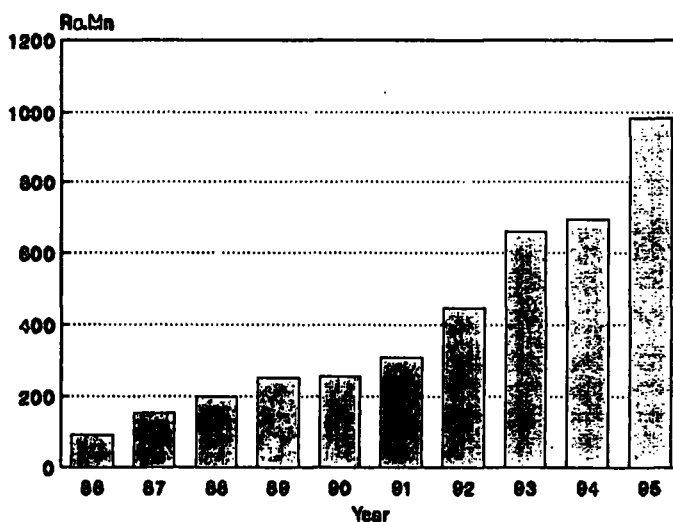
Fig. 7. Tyre and tube industry annual growth in exports (1986-1995) Sri Lanka



Source : EDB

Fig. 8. Footwear industry annual growth in exports (1986-1995) Sri Lanka

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Source: EDB

Fig. 9. Articles of unhardened rubber industry: Annual growth in exports (1986–1995) Sri Lanka

Future outlook

The future of NR as a primary export commodity will continue to be uncertain due to unfavourable fluctuations in prices. Production of value added products offer the best long-term solution as it not only provides a market for the plantations crop but more importantly helps to generate valuable foreign exchange, much needed for rapid industrial development.

At present, Sri Lanka is the sole producer of latex crepe rubber which is the cleanest form of rubber made specially for the manufacture of surgical and pharmaceutical rubber products, infant toys and also for the manufacture of rubber products used in contact with food. However, so far, there is not even a single such factory set up in Sri Lanka to utilize this clean commodity for the manufacture of value added pharmaceutical products. Hence, attempts will be taken in the near future to attract such end products manufacturers as well as cellotape and adhesive manufacturers to invest in Sri Lanka to utilize this unique resource.

Although Sri Lanka exports a sizable quantity of boots annually; there is not a single boot factory installed so far to utilize our sole crepe rubber which is considered as ideal for making winter boots due to its exceptional ability to grip on ice. If winter boots are made using latex crepe soles, they will definitely perform better than any other natural or synthetic sole. The other types of rubber products which have a great potential to exploit the export market in Europe are given in Annex 7.

Under the SAPTA automotive product manufacturers of member countries such as Fiat are expected to invest in Sri Lanka.

In 1996 the expected investment in the rubber sector for both expansion of the present industry as well as for new investment would be in the region of 60 Mn US\$ compared to 35 Mn US \$ for both in 1995.

Production of O rings by NSR Singapore is expected to commence at the end of 1996. The world reputed Korean firm; Dewoo too, is expected to start producing auto spares in 1997.

In view of the above context, if current trend continue, the local consumption too is expected to rise close to 50% of the total production before the year 2000. Attempts are therefore being made to increase the rubber production within a shortest possible period to 125000 MT in order to sustain the present levels of raw rubber exports while catering to the increasing domestic needs.

Nearly 10 rubber product factories in Sri Lanka have already got ISO 9000 registration. Other factories including latex crepe factories are at least half way through in obtaining this important quality registration without which products of Asian region will not be permitted to USA, Japan and EC countries.

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Annex 1

Classification of BOI rubber based products (as at end of 1995)

		Number of Projects
1.	Location	
	1.1 Katunayake EPZ	03
	1.2 Biyagama EPZ	10
	1.3 Outside EPZ	30
2.	Type of Products	
	2.1 Glove industry	11
	2.2 Tyres and tubes	06
	2.3 Elastic tapes/bands	05
	2.4 Rubber masks	02
	2.5 Latex foam	04
	2.6 Others ¹	15
1	Leather Bags, Boots, "O" rings, Cor mattress, Latex foam, Rubber Balloon, TSR components, Kiln - Dried Rubber Wood, Knitting Plastics.	

Annex 2

Pioneer rubber manufacturers in Sri Lanka: Product types and annual consumption (1995-1996)

Manufacturer	NR consumption (MT)	Major products
1. Richard Peries & Co. Ltd.	2693	Mats and flooring Tyre retreads Extruded products Rings for food jars Latex foam, Balloons, Toys
2. Associated Motorways Ltd.	1400	Tyre retreads Bicycle tyres and tubes Motor cycle tyres and tubes OTR tyres Hardened rubber appliances

Annex 3

The major latex based glove manufacturers in Sri Lanka and production capacities (1995)

Manufacturer	Type of glove	1995
1. Ansell Lanka Ltd.	Surgical Ambidextrous	62.2 336.4
2. Latexam	Examination	83.0
3. Hanwella Rubber Products Ltd.	Examination	20.0
4. Dipped Products Ltd.	Household and Industry	45.0
5. Bensiri Rubber Industry	Household	4.1

Annex 4

Solid tyre manufacturers in Sri Lanka: Annual production (1995)

Manufacturer	Number of tyres
1. Bergougnan Lanka Ltd	181,000
2. Vorwerk & Son Asia (Pvt) Ltd	66,078
3. Loadstar (Pvt) Ltd	450,000
4. Elastomeric Engineering	4,000,000

Annex 5

The main traditional shoe manufacturers in Sri Lanka: Annual rubber consumption (1995)

Manufacturer	Rubber consumption (MT)
1. D. Samson Industries (DSI)	2177
2. Bata Shoe Co. Ltd.	828
3. Leather Products Ltd.	650

Annex 6

The main shoe manufacturers in the Free Trade Zones: Monthly production (1995)

Manufacturer	Production (Pairs/Month)
1. Plymouth Industries	65,187
2. Micheal Angelo Ltd.	150,000
3. Asia Ltd.	90,000
4. Korea Ceylon Ltd.	198,952

Type of products	Examples
1. Tyre and related products	a) Bicycle and Wheelbarrow flaps b) Solid tyres for forklift, Wheelbarrow and castors
2. Industrial rubber products (High vol. sales)	a) Fan and belts, multi V belts, timing belts and flat belts b) Water and oil Suctions/Delivery Houses, Laboratory and other tubing c) Anti abrasion and general purpose vulcanised rubber sheets
3. Industrial rubber products (Spe. prod)	Not much of a potential
4. Industrial Rubber Products (Missell)	Flooring, Dam Seals and Dock Fenders
5. Automotive Rubber products	Fan belts, Mats, Exhaust suspension
6. Military applications	Combat boots, Jungle boots, Fishing and Canvas boots
7. Footwear	Industrial boots, Wellington boots, Fishing and hunting boots
8. Sports and leisure	Tennis balls, balloons
9. Health and Pharmaceutical	a) Examination gloves, Surgical gloves b) Wheels and castors
10. House and Garden	a) Gloves, rubber thread, rainwear b) Rubber bands c) Flooring and tiles, bath and soap mats, cow mats