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A STATUS REPORT OF PROCESSING AND MARKETING OF TECHNICALLY SPECIFIED RUBBER IN INDIA

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Production and marketing of technically specified rubber started in India in the first half of 1970s. Six TSR factories were set up in the1980s under the Kerala Agricultural Development Project, with aassistance from the World Bank and the Rubber Board. The early success of these factories prompted conversion of some of the commercial crepe mills into TSR factories. New factories were also established in private and joint sectors. The Rubber Board established a model TSR factory under the India Rubber Project, with the financial assistance from the World Bank. However, the production of TSR in India remains at 63000 tonnes, which is less than 10 per cent of the total NR production in the country. As the Indian rubber industry is now exposed to global competition, it is essential to encourage TSR production. This paper reviews the current status of the TSR processing sector in India and suggests ways and means of improving efficiency in the sector.

INTRODUCTION

Technically specified rubber (TSR) is a modern marketable form of rubber which can be produced from latex, field coagulum or a blend of both. The production of TSR started only during the 1960s, prior to which raw natural rubber was marketed in conventional forms such as sheet and crepe. The Standard Malaysian Rubber (SMR) scheme introduced in Malaysia for the production of block rubber was a resounding success, as it gained popularity among the major consuming countries. The Rubber Research Institute of Malaysia and the Government of Malaysia encouraged conversion of crepe mills to crumb rubber factories as TSR was preferred by the major NR consuming countries in the developed west as a substitute for synthetic rubber, marketed in block form with technical specifications. The conversion of crepe mills to TSR factories was total in Malaysia within a few years of introduction of the SMR scheme. The International Organization for Standards at its meeting in New Delhi in 1964 drew up draft standards for technical grading and presentation of natural rubber (NR). The Indian standards were laid down by the Indian Standards Institute (ISI) in 1968 and commercial production of TSR started in India in 1973. TSR conforming to the IS specifications is designated as Indian Standard Natural Rubber (ISNR). ISI has now been renamed as the Bureau of Indian Standards (BIS). Initially it was expected that the commercial crepe mills operating in India would also be converted to TSR processing facilities as in the case of Malaysia. However, such large scale conversions did not take place in India mainly on account of the protected market enjoyed by natural rubber in India. However, the need for quality upgradation of field coagulum (FC) and lower grade sheet rubber was felt as early as in 1970. The success of the TSR factories set up in 1980's under the Kerala Agricultural

Development Project encouraged the private sector to establish TSR processing facilities. The Board spearheaded a movement to organise small holders at the village level and supported them both financially and technically to form processing and trading companies. The Board also established a model TSR factory under the India Rubber Project, implemented with financial assistance from the World Bank.

Indian NR production is reported as 631400 for the year 2001-02. (Table 1). The production of TSR has been steadily increasing though the market share of TSR remained consistently below 10% of the total. The scenario was satisfactory until the integration of the Indian economy with the global economy in the 1990's. As a consequence of India joining WTO, trade and tariff protection available to NR has been thinning.

The tyre sector is the major consumer of NR in India, accounting for about 45% of the total NR consumption (Table 2). The major tyre companies prefer to use TSR. These companies are in the forefront demanding quality upgradation of TSR.

Table 1. **Production of NR in India 1986-87 to 2001-02 (tonnes)**

Year	Total	TSR
1986-87	219520	8500
1987-88	235197	11246
1988-89	259172	15354
1989-90	297300	17160
1990-91	329615	16980
1991-92	366745	25870
1992-93	393490	27107
1993-94	435160	31240
1994-95	471815	40390
1995-96	506910	41110
1996-97	549425	51960
1997-98	583830	49910
1998-99	605045	59715
1999-00	622265	60095
2000-01	630405	60225
2001-02	631400	62845

Table 2. **Consumption of NR in 2001-02**

Products	NR (tonnes)
Auto tyres & tubes	285275
Cycle tyres and tubes	82592
Camel back	38104
Footwear	70547
Belts and hoses	38220
Latex foam	31620
Dipped goods	32081
Cables and wires	1719
Battery boxes	1865
Others	49452

TECHNICAL SPECIFICATIONS OF ISNR GRADES

The main demand by the consuming industry is consistency in quality especially with reference to dirt, initial plasticity (Po) and plasticity retention index (PRI). The Bureau of Indian Standards has specified limits for different parameters. (Table 3)

Dirt is the foreign material insoluble in mineral turpentine and its presence affects the technological properties of finished goods. Volatile matter is mostly moisture, along with small amounts of volatile acids

Table 3. **Technical specifications for ISNR (IS 4588, 1986)**

Characteristics	Limits				
	ISNR 3L	ISNR 5	ISNR 10	ISNR 20	ISNR 50
Dirt, percent by mass, Max	0.03	0.05	0.10	0.20	0.50
Volatile matter, percent by mass, Max	0.80	0.80	0.80	0.80	0.80
Ash, percent by mass, Max	0.50	0.60	0.75	1.00	1.50
Nitrogen, percent by mass, Max	0.60	0.60	0.60	0.60	0.60
Initial plasticity, Po (Min)	30	30	30	30	
Plasticity retention index (PRI), Min	60	60	50	30	

and other components. Volatile matter is controlled by proper size reduction, washing and drying. The parameter is determined in the laboratory by recording the loss in weight of a preweighed sample after heating at 100± 5°C for 2 h in an air oven. Presence of a higher percentage of ash and nitrogen in ISNR enhances absorption of moisture by the rubber compound and the rate of cure also is likely to be affected. This leads to poor technological properties of the vulcanizates, especially those used in dynamic functions.

P_o and molecular weight are related properties. If molecular weight is low, P_o will be less and vice versa. Low P_o is indicative of the degradation of rubber on account of over-exposure to oxidizing conditions. Oxidative breakdown of the rubber is accelerated by the presence of metallic impurities as metallic ions such as Cu, Mn etc are pro-oxidants for rubber.

Colour is a parameter for ISNR 3L. This grade is particularly used for light coloured and high quality rubber products. The colour of the rubber is compared with that of standard colour scales. A numerically higher index value indicates deeper colour. The basis of calibration is the Lovibond colour scale in amber units.

Viscosity is specified for constant viscosity grades. Mooney viscosity can be at the desired range and accelerated storage hardening test (ASHT) gives an indication of the extent of viscosity stabilization attained. The ASHT involves the measurement of the rapid plasticity of standard test pellets before and after a short period of storage under conditions, which accelerate the storage hardening reaction.

The main customer requirements includes globally competitive quality and price and steady supply of raw material in the interest of zero inventory policy of the industry.

GLOBAL MARKET CONDITIONS

General purpose synthetic rubbers developed as substitutes for NR, are generally available in the market in block form. NR in the same form is preferred by overseas customers on account of its ease of handling. The choice between NR and synthetic rubber (SR) by a customer is predominantly guided by commercial considerations when both are available in the same form, size and quality. The share of NR in the global elastomer market will depend on factors such as relative price, technical requirements of the product, technological developments, especially development of cost effective substitutes, political and economic stability of producing and consuming nations etc. The current trend is towards minimizing trade barriers and WTO is the platform for multilateral trade negotiations.

MARKET CONDITIONS IN INDIA

Conventional forms of dry rubber like sheet and crepe are more susceptible to mould growth on storage as their equilibrium moisture content is higher than that of TSR. Production during the peak period (September to January) is more than 55% of the total production. There is a need to store the surplus rubber produced during the peak season to ensure steady supply during the lean period. The problems faced by the industry include small size of the processing units (average installed capacity is 2500 tonnes per annum, compared to 30,000 tonnes per annum in other major NR producing countries), non-availability of funds to invest (for modernization of machinery or enhancing the installed capacity) and low capacity utilization (less than 50%). TSR production in India is wholly dependent on availability of field coagulum in the forms of tree lace and cuplump. Total generation of field

coagulum (about 15% of the total NR production) is not sufficient to meet the requirements of the TSR and EBC processing sectors. Low processing margin is realized due to the high raw material price as a consequence of unhealthy competition among TSR and EBC processors for the available field coagulum. The integration of Indian economy with global economy is inevitable and irreversible. Indian rubber growers are more informed than their counterparts in other NR producing countries. The Indian work force is more skilled and productive. Regular technology upgradation is essential to become a global player. NR import and export may take place simultaneously. All operations of farming, processing, maintaining the supply chain and rubber goods manufacturing should be profitable for sustainability. Over exploitation of one sector by another would be counter productive. Integrated development of the rubber industry is the key to success. Government support and subsidies are likely to dwindle, leaving the stakeholders to fend for themselves. The anticipated demand for NR by the domestic tyre sector alone is about 3.80 lakhs tonnes per annum as against an installed capacity of barely 1.33 lakhs tonnes per annum of TSR

IMPORT/EXPORT SCENARIO

During the seven year period from 1995-96 to 2001-02 the average domestic price of ISNR 20 was higher than the price of SMR 20 (Table 4) and hence export of ISNR was not considered as a feasible option. However, the current price trend indicates a strong case for export of ISNR (Figure 1).

There had been a steady increase in value of exports thanks to the favourable conditions prevailing in the international market. Promotion of export of rubber based products will be more beneficial to the Indian rubber industry as a whole. NR should be made available to the manufacturing sector at internationally competitive quality. The above observations indicate the need for large scale investments for expansion of the TSR processing sector.

Table 4. **Export/Import of NR**

Year	NR export (tonnes)	Price of ISNR 20 (Rs)	NR import (tonnes)	Price of SMR 20 (Rs)
1995-96	1130	48.93	51635	48.95
1996-97	1598	45.78	19770	43.25
1997-98	1415	33.87	32070	32.50
1998-99	1840	27.59	29534	26.26
1999-00	5989	29.20	20213	27.61
2000-01	13356	28.40	8970	27.98
2001-02	6995	28.19	49769	26.23

HOW TO MEET THE DEMAND

Expansion and modernization of the existing TSR processing facilities should be promoted. Merger/ acquisition of existing TSR processing facilities and forward integration with major consumers of NR are the options to be explored. A paradigm shift in the post-harvest operations by organizing purchase of whole latex coagulum from small holders directly or through agents/ primary dealers will ensure steady raw material availability.

BENEFITS

The shift to TSR production will lead to reduction in environmental pollution in the small holders' premises. Better price realization by improving marketing efficiency, is a direct benefit to the farmer. As sheeting is not required tapping task can be increased.

Supply of good quality raw material will improve the efficiency of processing operations and reduce cost of processing. Use of good quality TSR will lead to reduction in wastage and rejects, thereby the cost of manufacture.

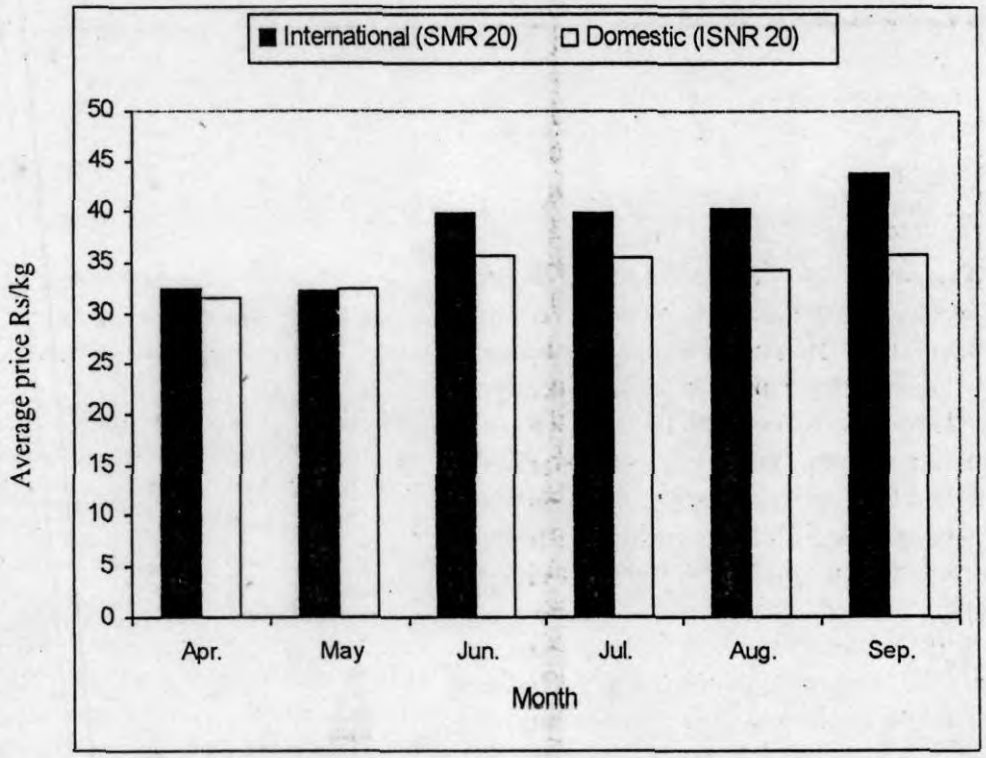

Figure 1. A comparison of the domestic and international prices for TSR. (April – September 2002)

Global competitiveness of the NR consuming sector will lead to increase in consumption of NR, increased employment generation for skilled work force, reduction in loss of employment opportunity in the plantation sector and increase in export potential and foreign exchange earnings.

CONCLUSION

An integrated approach to the development of the Indian rubber industry will be beneficial to all stakeholders as it will promote closer interaction among them and foster better understanding of each others strengths and weaknesses. The production of TSR from whole latex coagulum and expansion of the existing TSR production capability in line with the global trend will ensure steady growth and development of the Indian rubber industry. ■