A ROAD MAP FOR ATTAINING SELF-RELIANCE IN NATURAL RUBBER PRODUCTION IN INDIA BY 2030

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Indian natural rubber (NR) plantation sector supports an industry that is vital to the nation's industrial and economic growth. Sustained extension efforts supported by focused research and development by the Rubber Board in the past more than 60 years helped establish a robust NR production base in the country, characterised by a steady expansion in area under cultivation and increase in productivity and total production. This helped India achieve near self-sufficiency in NR production until 2010. The rubber products manufacturing industry and earnings from export of value added rubber products registered a robust growth over the years. As the Indian economy is expected to maintain its buoyancy in growth, it is estimated that by 2030 the country would require about 20 lakh tonnes of NR per year. Present production is in the range of 6 to 7 lakh tons per year, although there exists the potential to produce about 10 lakh tons a year. Between now and 2030, the country should double its domestic NR production potential to become self-reliant and avoid excessive dependence on import of this critical and strategic industrial raw material. This calls for a mission mode approach with sufficient public and private investments to expand NR cultivation to more areas, replant old and senile holdings and increase productivity of existing holdings for which a road map is presented.

Key words: Export, GDP, Import, Indian rubber industry, Natural rubber, Rubber Board, Self-reliance

INTRODUCTION

Natural rubber plays a pivotal role in the economy of a fast developing nation like India (Joseph and Jacob, 2018) through its direct role in industrial growth. Based on the proportion of natural rubber (NR) and synthetic rubbers (SRs) consumed, it is estimated that the per capita NR consumption in India is hardly 0.76 kg, whereas the world average is 1.66 kg (Rubber Board, 2017; Population Reference Bureau, 2015). In developed and fast developing economies including China, this is well above 2.5 kg yr^{-1}. Demand for NR in the country will steadily grow even as Indian economy remains buoyant and NR is likely to continue to play a catalytic role in India's industrial and economic growth (Joseph and Jacob, 2018).

Major NR consuming countries in the world have strategies to ensure uninterrupted supply of this critical raw material for their industry. Although China doesn't have large extents of climatically suitable regions to grow NR, it grows NR in the southern

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provinces marked by low productivity and high cost of production. China has 11.6 lakh ha of NR which is 40 per cent more than the total NR area India has (ANRPC, 2017). Chinese companies also hold or control large extents of NR plantations outside the country and keep a large reserve stock of NR like certain developed countries do (George, 2015). China, the largest NR consumer in the world thus has a well thought out long term vision and aggressive strategy to ensure adequate captive supply of this important raw material. India is the second largest consumer of NR in the world and it cannot be found wanting for this vital industrial raw material which plays a catalytic role in the country's industrial and economic growth. India also requires a pragmatic and prudent plan to consolidate and increase NR production in the country in the best interest of Indian rubber industry and the economy at large. The present study examines the current status of the Indian rubber industry and its relevance to economic growth and attempts to draw a road map to attain self-reliance in NR production by 2030.

Current status of Indian rubber industry

Research and extension efforts made by the Rubber Board in the past more than 60 years established a robust NR production base in the country. This helped India achieve near self-sufficiency in NR production until 2010. Since then domestic production declined in tandem with a sharp decline in NR price. India has a proven capability of about 8.5 to 9 lakh tonnes NR production per year as of 2011-12 (Rubber Board, 2013) which dropped to less than six lakh tonnes during 2015-16 (Rubber Board, 2017a) largely due to falling NR price. Based on the statistics of replanting/new planting and the highest productivity obtained (Rubber Board, 2013; 2017a), it is estimated that presently there exists a potential to produce about 10 lakh tons of NR per year in the country.

Rubber Board through its meticulous research and development and grassroots level extension has achieved remarkable expansion in area (Fig. 1) cultivated with high yielding hybrid rubber clones developed by the Rubber Research Institute of India (RRII) which have one of the highest yield potentials in the world. As a result, both total production and productivity increased steadily. Today, India has about 8.2 lakh ha of NR, out of which, about 33 per cent is outside of Kerala (Rubber Board, 2017), the state which had a near-monopoly of NR cultivation in the past (Fig. 1).

Until the present decline in domestic NR production started with the sharp fall in NR price since 2011, consumption of NR in India closely matched its domestic production (Fig. 2). Prior to 2008-09, NR was imported occasionally, but the quantity imported was only a small fraction of the total consumption as can be seen from Figure 2.

Without the robust domestic NR production base, the Indian rubber industry would not have grown to its present pre-eminent status with a value of output of rubber products manufacture of around Rs. 74000 crore during 2014-15. Indian rubber industry is the second largest in the world, next to China in terms of the amount of NR it consumes. Sixty five per cent of the total rubber consumed in India is NR which indicates the importance of NR in the Indian rubber industry. In the total agricultural GDP of the country, NR cultivation contributed as much as 1.04 per cent and 0.68 per cent during 2013-14 and 2014-15, respectively (Joseph and Jacob, 2018). Indian rubber industry contributed 3.93 per cent and 0.64 per cent of the country's

manufacturing and total GDP, respectively during 2014-15.

A flourishing Indian rubber goods manufacturing industry fueled by a steady increase in domestic NR production has been making big gains from export of value added rubber products from early 2000 onwards (Fig. 3), leading to a healthy balance of trade in finished rubber products. However, the balance of trade in rubber and rubber products sector in its totality was negative due to the inflow of synthetic rubbers and NR (Joseph and George, 2016).

Value of exports of rubber products from India was US $ 2.57 billion during 2014-15 which was only marginally less than the combined values of export of spices, coffee and tea (US $ 2.88) (Fig. 3). Export of automotive tyre alone contributed nearly 70 per cent of the export earnings from rubber products (GoI, 2017). Unlike other commodities such as coffee, tea and spices, the extent of backward and forward linkages is much more in the rubber industry resulting in significant trickle-down and spill-over effects on the economy. Moreover, the scope of value addition both in terms of the range and versatility of finished products is far more in rubber than in the other commodities.

Rising demand, declining production and growing import of NR

As the Indian economy is expected to maintain its buoyancy in growth, it is estimated that by 2030 the country would require more than 20 lakh tonnes of NR (Rubber Board, 2018). This estimate assumes that the current consumption pattern of the Indian rubber industry, particularly the mix of NR and SRs and the strong correlation between GDP and NR consumption will not undergo major changes in the immediate coming years.

Rubber Board's estimate shows that under the present business-as-usual-scenario

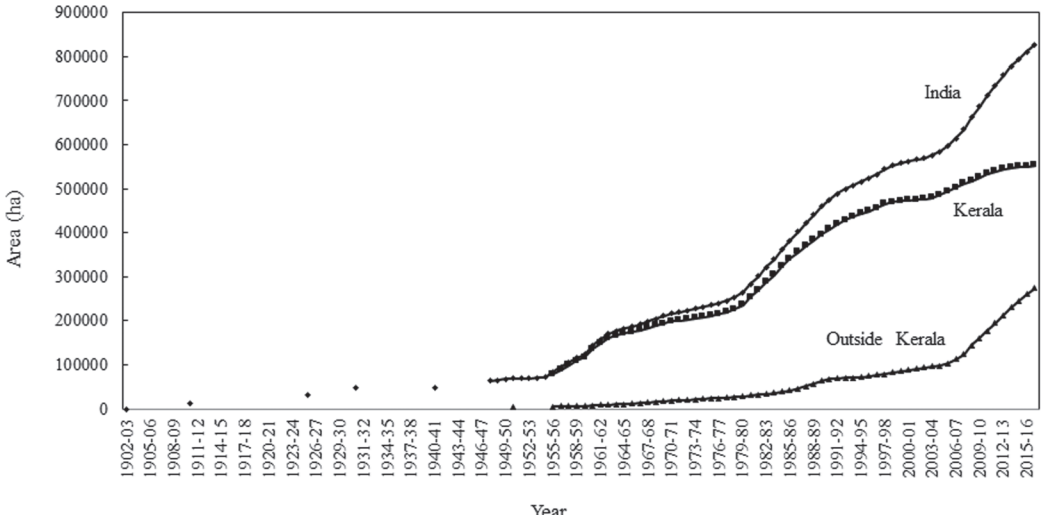

Fig. 1. Area under NR cultivation over the years

Source: *Indian Rubber Statistics (various issues) and Rubber Board (2017)*

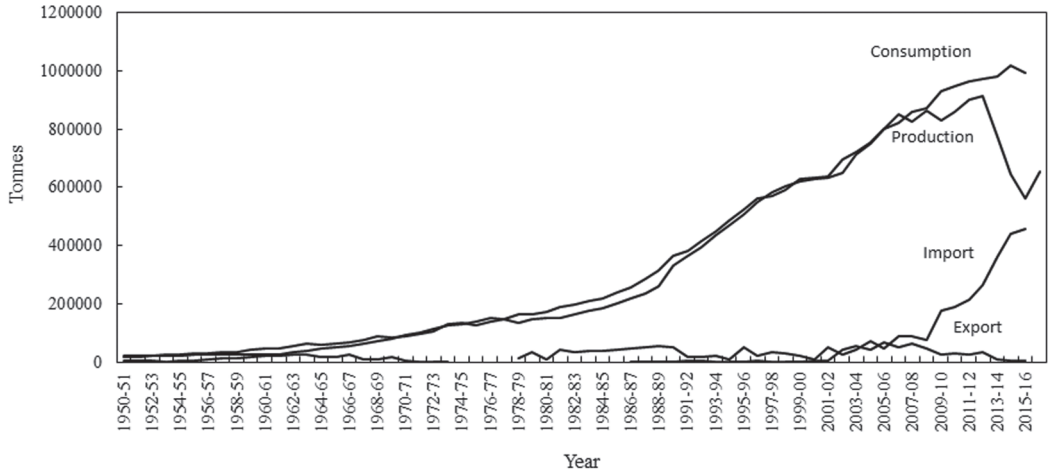

Fig. 2. Trends in production, consumption and external trade of NR

Source: Indian Rubber Statistics (various issues); Monthly Statistics of Foreign Trade of India (various issues); Export Import data bank, Department of Commerce, Ministry of Commerce and Industry, Government of India

the country will be able to produce only 14.43 lakh tonnes of NR per year which falls far short of its demand which will be in the range of 20 lakh tonnes per year by 2030-31 (Rubber Board, 2018). Hence, India should double its NR production potential from the present potential level of 10 lakh ton yr^{-1} between now and 2030 and no rubber holdings should remain untapped if we have to achieve self-reliance in NR production. If we fail, we may have to depend extensively on imported NR (or the current NR-SR consumption ratio of Indian rubber industry may tilt in favour of SRs, but SRs are unlikely to completely bridge the gap between NR production and consumption). Too much dependence on the international market for import of NR into the country can be risky for the developmental imperatives of the country (Joseph and Jacob, 2018). Therefore, it is important that India has a dependable and captive source of NR production in the country to ensure its seamless supply. This cannot be left to the uncertainties of international market which may become more volatile due to global politics, rethink by some countries on globalisation and free market, fast technological changes happening in the major NR producing/ exporting countries *etc*. (Joseph and Jacob, 2018).

The global NR demand-supply scenario to a large extent depends on how much the global economy will perform in the coming years. The global economy has already started showing signs of revival from a rather sluggish growth in recent years (IMF, 2018). As the global economy picks up momentum, one of the first sectors immediately responding to it would be the automobile industry. About 70 per cent of global NR production goes into the manufacturing of automotive tyres and tubes (IRSG, 2017) and therefore, a revival of global economy and the resultant growth in automobile industry

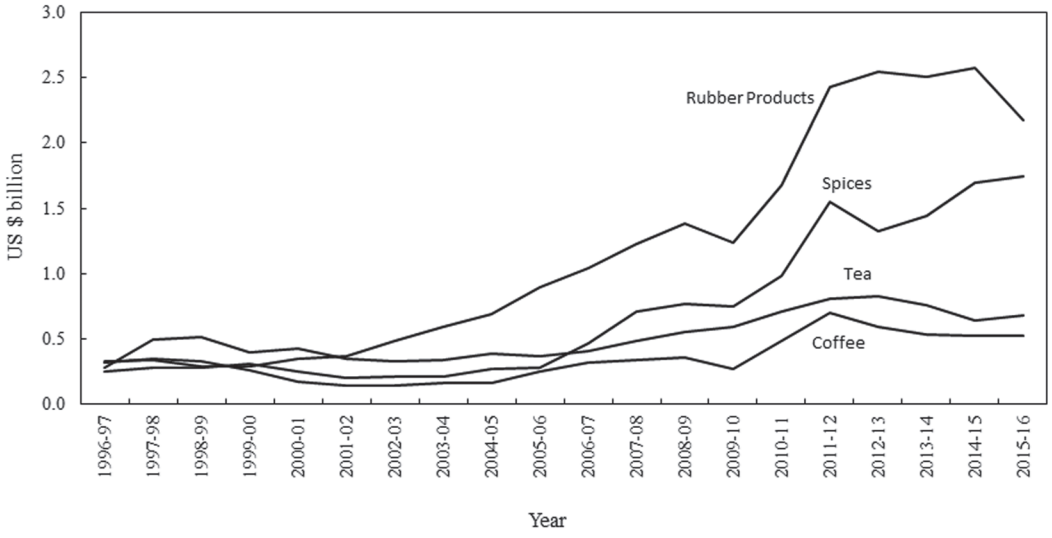

Fig. 3. Export earnings from rubber and rubber products, coffee, tea and spices

Source: Export import databank, Department of Commerce, Ministry of commerce and industry, Government of India

can put huge pressure on global NR supply. It is also pertinent to recall that the Automotive Mission Plan 2016-2026, a collective vision of government of India and the Indian Automotive Industry has set highly ambitious plans for development. By 2026 it is expected that India could become first in the world in production/sale of small cars, two wheelers, three-wheelers, tractors and buses and third in passenger vehicles and heavy trucks (SIAM, 2016).

Major NR growing countries are not only consolidating their NR production base but also increasing their products manufacturing capacities (Joseph and Jacob, 2018). Hence, though NR is available in the international market at low prices as of now, this may not be the case always in future. Competition for NR, its availability in the international market and unfavorable geopolitical scenarios are also other potentially serious concerns for NR imports in future. Taking a cue from recent political developments in US and Europe, India will have to remain vigilant about inward-looking policies and economic protectionism in developed and developing economies. Global political and trade/commercial climate need not be congenial for easy and cheap import of NR in future. All these can have serious repercussions for the Indian tyre and non-tyre industries. Too much dependence on global market for importing NR will not augur well for the Indian rubber goods manufacturing industry or the industry at large. A shortage of NR in the next decade will adversely affect Indian tyre and non-tyre industries competiveness which will have far reaching implications. This potential and serious risk can be avoided if concerted efforts are made immediately to boost NR production in the country.

National NR mission

For India to become self-reliant in NR production and remain competitive in the rubber products manufacturing sector, a mission mode approach is needed to consolidate the NR production base in the country by expanding NR cultivation to more areas, replant old and senile holdings and increase productivity. For a perennial tree crop like NR with a gestation period of about seven years (or even longer in agro-climatically less suitable non-traditional areas where most expansion of its cultivation is now occurring (Fig. 1), followed by an yielding phase of another twenty years, it takes almost a decade after planting the trees for realizing any tangible increase in production. Therefore, any strategy to boost NR production in the country should have at least a decadal time scale of vision and planning. In other words, if appropriate efforts are made today on a proactive basis, we will see positive results in NR production towards 2030 and beyond. In the absence of such an effort, the best that can be expected under the present scenario will be a total production potential of around 14.43 lakh tonnes per year by 2030 (Rubber Board, 2018) which is much less than what India will require by then if the present rate of growth in rubber industry is to sustain. If rubber prices continue to remain low, NR production is unlikely to reach even this low projected target which will make the situation more grave.

To bridge the gap between demand and supply by 2030 and beyond, a quick analysis shows that India should have a total area of at least 10 lakh ha of yielding plantation (as against the present six lakh ha of mature area) with a productivity of 2 tonnes ha^{-1} yr^{-1}. At least two lakh ha of the present mature holdings that are old and senile should be replanted immediately. By 2030 about two lakh ha of immature fields will additionally come into maturity. Additionally, another two lakh ha should be planted in the next six years to obtain 10 lakh ha of mature plantation in 2030. Area expansion should concentrate in North Eastern states, particularly in the state of Assam and also in parts of Karnataka and Maharashtra where land is available and productivity has the potential to go up compared to other non-traditional areas in the country. Simultaneously, on a yearly basis regular replanting should also be done in the traditional areas and low yielding holdings in the non-traditional areas so that share of poorly yielding old/senile plantations will not continue to go up as is the case now (Jacob and George, 2016).

India could already achieve a productivity of 1.8 tonnes ha^{-1} yr^{-1} in the recent past (Rubber Board, 2013). By planting the high yielding RRII hybrid clones and adopting scientific cultivation practices recommended by RRII, it is safe to assume that it will be possible to achieve a mean productivity of at least 2 tonnes ha^{-1} yr^{-1}. It may be noted that yield variations are anywhere between 1 and 2.5 tonnes ha^{-1} yr^{-1} depending on the climate, soil, age and health of the trees, quality of tapping and general care and management of the trees. Bridging this yield divide is key to increasing average productivity, reducing cost of production, improving net farm income of growers and also key to reducing the demand-supply gap at the national level. Location-specific high yielding, climate-resilient clones and cost-saving farming practices should be adopted on a war footing if India should continue to have a flourishing rubber industry.

The target should be to produce at least 20 lakh tonnes of NR per year by 2030 from

10 lakh ha and this is achievable (Table 1) if there is a focused mission mode approach with adequate public investment. The present subsidy for replanting and new planting is only a tiny fraction of the developmental cost of the plantations (Chandy *et al*., 2015). Unlike other standard cash-out subsidies, rubber planting subsidy is an incentive for good performance of the rubber holdings. The subsidy is released over a period of seven years after periodic inspection of the holdings by the extension officers of Rubber Board to ensure that these are maintained well and the growth of the rubber trees is satisfactory. This grass root level extension is important to raise healthy and high yielding NR plantations. Effective extension is expected to enhance adoption of the recommended good agricultural practices and improve yield by at least 500 kg ha^{-1} yr^{-1} in an otherwise poor yielding plantation. Thus, the performance-linked rubber planting subsidy is expected to generate an additional production of NR worth Rs. 12.5 lakh ha^{-1} over a period of 20 years at the current price. This is exceptionally

Table 1. **A road map for new planting and replanting to make India self-sufficient in NR production by 2030**

Type of plantation	Area (ha)	Remarks
Mature area (2016-17)	5,86,000	Out of this two lakh ha should be replanted in the next six years in a mission mode, *i.e.* roughly @ 33,000 ha $year^{-1}$ as these are old/senile holdings
Immature area (2016-17)	2,32,000	Present immature holdings which will be mature for tapping by 2030
Normal replanting in the next six years	42,000	Estimated based on the current rate of replanting which is roughly @ 7,000 ha yr^{-1}
Additional area to be newly planted in the next six years	1,40,000 (@23,333 ha yr^{-1})	In addition to the two lakh ha identified for replanting above, another 1.4 lakh ha new planting is needed to get 10 lakh ha mature area by 2030. This much area will be available in North Eastern Region. RRII is using satellite-based remote sensing technology and GIS to identify lands for expanding NR cultivation in the North East.
Total mature area by 2030	10,00,000	As per the road map given above, which is not insurmountable if there is a mission mode approach, there will be 10 lakh ha available for tapping by 2030. More than 70 per cent of this will be young and mature area grown with the latest high yielding hybrid clones and therefore, productivity can be expected to be more than 2000 kg ha^{-1} yr^{-1}. This will ensure supply of 20 lakh tons of NR which is roughly the expected demand in the country by 2030.

As per this road map, about 63,000 ha should be either replanted or new planted per year for six years to achieve 10 lakh ha of productive area by 2030. The best planting rate achieved by Rubber Board was nearly 40,000 ha per year during 2008-09 (Rubber Board 2013). If there is a mission mode approach, planting 63,000 ha per year is achievable.

high returns if the present planting subsidy of Rs. 19500 ha^{-1} during one planting cycle is rightly considered as an investment. Several countries that export NR to India subsidize their NR production at a much higher rate than India. For example, in Thailand the rubber planting subsidy is 436 per cent higher and in Malaysia it is 597 to 957 per cent higher than in India (Chandy *et al*., 2015).

Road map for optimum area to be replanted/newly planted

As such there are no strict norms about optimum rate of replanting of rubber holdings. But in large estates, considering various practical and logistic issues such as labour management, size of the estate, the need to have steady NR production from the estate *etc*., roughly 30 per cent of the total area is normally maintained as immature plantation and the rest will be mature area under regular tapping at any given point of time. This implies that on an average, about 4.3 per cent of the total area will be regularly replanted (assuming the immaturity period is about 7 years). However, this thumb rule normally implemented in large corporate estates under single management cannot be implemented nationally, because there are well over 1.2 million small rubber holders in the country who replant their holdings as per their individual situations.

As of 2016-17, 28.4 per cent of the total cultivated area of 8,18,000 ha was immature and the rest is mature area. Incidently, this proportion was largely conforming to the replanting norm mentioned above. Considering the various aspects discussed above, a road map for achieving self-reliance in NR production by 2030 is given in Table 1.

CONCLUSION

Indian rubber industry's developmental imperatives are so large, critical and urgent and their stakes in the nation's economic growth are high. The country can ill afford to let global market forces alone decide the future of the Indian rubber industry which has a catalytic role to play in its economic growth. It should not go unappreciated that the flourishing rubber industry that we have in the country today owes its very existence to the efforts made by Rubber Board in the past 60 years. What is immediately needed is a prudent strategy to consolidate and increase NR production in the country. For this, sufficient investments should be made to support research and extension which are the core activities of Rubber Board, the only nodal agency concerned with NR promotion in the country as well as incentivize plantation development to attain high productivity and area expansion. A mission mode approach to implement the road map proposed above is essential to keep the pace of growth of rubber industry in India with minimal dependence on external supply of NR that cannot be taken for granted indefinitely.

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