Sri Lanka Rubber Industry Master Plan

2017 – 2026

A National Agenda

For

Rubber Industry Development

Main Document

Version 01

Sri Lanka Rubber Secretariat
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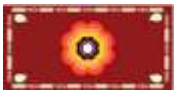

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இலங்கை சனாதிபதி

President of Sri Lanka

MESSAGE

I am pleased to send this message to the launching of the Rubber Industry Master Plan. The government is fully aware of the value of indigenous resources for strengthening the national economy and the imperative need to improve scientific research to enhance plantation crops that yield much revenue to the national economy.

Initiating action to implement a well-crafted Rubber Industry Master Plan prepared through a participatory process is a very positive opportune development. I warmly congratulate all ministries, institutions and persons including those from the private sector that were involved in this vital task, which I believe is of high national interest and relevance.

Rubber industry has been a long standing contributor to the island's economic and social well-being. While this is an undisputed fact, considering emerging global dynamics, industry future will depend on following a new direction, strategies and policies. The government wish to rely on sustainable resource based industry growth for economic development and the rubber industry is an ideal candidate for promotion and support. The Master Plan launched today aimed at fulfilling above stated objectives, receives government attention and support.

I earnestly request all industry stakeholders to work smart and in unison to achieve the vision enshrined in the Master Plan. One needs exceptional foresight, courage and perseverance to succeed when handling national level projects.

I wish the implementation team well in their endeavours in accomplishing the mission stated that will bring a stream multiple benefits to our nation. Let me also appreciate the contribution made by the Government of Australia through Asian Development Bank to complete the Rubber Master Plan.

Maithripala Sirisena

President of Sri Lanka

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இலங்கையின் பிரதம அமைச்சர்

Prime Minister of Sri Lanka

MESSAGE

The rubber industry has played a significant role in the Sri Lankan economy as a key sector, connecting Sri Lanka with the world. As a step towards the next stage of growth for the rubber industry, the Sri Lanka Rubber Industry Master Plan serves as the blueprint and has the support of our Administration. It forms an integral part of the third generation economic reform process. While ensuring a consistent level of socio-economical benefits for the people, it will herald sustained global competitiveness for the Sri Lankan rubber industry on a large scale.

The Master Plan consists of a well-articulated vision, a competitive strategy and outlines a series of practical projects that lay emphasis on adding value to the manufacturing of rubber products. Value addition will undeniably be the critical success factor that will drive the industry towards optimization of resources.

We have plans to initiate manufacturing hubs, giving Sri Lankan industries cutting edge capabilities in leading the region towards the acquisition of advanced technologies. Innovation, as we all know, will drive markets and make use of opportunities.

We plan not only to capture markets and focus on industry expansion. The benefits must trickle down to all stakeholders at a micro level such as smallholders, estate workers and factory floor-hands. Additionally, the industry needs to ensure that consistent and safe production processes that are environmentally friendly are set in motion. Over the last 140 years, the Sri Lankan rubber industry has made varied progress but is yet to realize its full potential. I am happy that this will present the ideal opportunity to engage in effective public-private partnerships, which will be assured of government backing as well.

I am pleased to note the importance of high quality technical assistance provided by The Asian Development Bank, through funds allocated by the Government of Australia.

Let me take this opportunity to offer my congratulations to the Master Plan team, led by the Minister of Plantation Industries for the successful undertaking of a mammoth task, which undoubtedly is worthy of recognition and commendation. I wish them well in their efforts to implement this plan, which will write the next phase of growth for the rubber industry in Sri Lanka.

Ranil Wickremesinghe

Prime Minister

Message from the Minister of Plantation Industries

The first Sri Lanka Rubber Industry Master Plan which is an outcome of strenuous stakeholder efforts heralds a new era in rubber industry development in Sri Lanka. I am indeed privileged to guide this transformation process since taking office. This remarkable feat has been achieved under the leadership of my ministry with extensive private sector participation and significant expert inputs. Other relevant government ministries and agencies have contributed significantly to the success of the planning process. The same level of enthusiasm, collaboration and support if prevails during the implementation, realizing the goals set by us collectively, will not be a difficult task but an invigorating one.

Rubber industry which is perceived by many as a plantation activity has been a key pillar of the Sri Lankan economy for over a century and its significance has not diminished. In fact, its stature is growing with the value added products segment reaching great heights having been recognized as world's preferred supplier of industrial solid tires and rubberized tracks. On the contrary, market share of Sri Lanka's raw rubber including famous Latex Crepe rubber has steadily declined. Nevertheless, in 2013, the entire rubber industry surpassed one billion dollar mark in total export value demonstrating its growth potential. To explore this opportunity, while consolidating our rubber production, a consensual and proactive national agenda for rubber industry development became a sine qua non as many diverse actors with varied strengths and business interests are involved in the industry value chain. This provided the impetus for a Rubber Industry Master Plan and, with technical assistance from Asian Development Bank the planning process was initiated by the government with the support of Sri Lanka Society of Rubber Industry making the way forward clear.

Our next challenge is effective implementation of the plan. For this purpose, we have created a novel public private partnership, the Sri Lanka Rubber Secretariat, which will coordinate different actors and spearhead the implementing process. This will be the forum for a continued public private dialogue essential to keep the momentum and also to introduce further refinements and adjustments to the plan in response to changing dynamics of competition. At the apex, the Master Plan Implementation Oversight Committee will provide directions to the Rubber Secretariat and project implementation teams.

Implementation of the Master Plan will be a huge team effort. My ministry cannot do it alone. We need the whole hearted cooperation and contributions of all relevant government ministries, departments and agencies. Policies and regulations that impact the performance of the rubber industry, either positively or negatively may emanate from such agencies from time to time. At the same time, programs of certain agencies may definitely catalyse rubber industry growth. This context warrants close and productive working relationships and an integrated approach.

While appreciating the timely assistance provided by Asian Development Bank and the Government of Australia, I wish to make a kind request to our development partners and bilateral agencies to support the implementation process which calls for substantial financial resources and technical assistance. Rubber is a renewable resource based industry with global linkages that sustains thousands of rural people, mostly womenfolk. We have launched projects to introduce rubber to the Northern and Eastern provinces and benefits could be significant. Your support therefore would be of great value at this stage.

I have a clear message to the private sector. Let us work together in a true win-win partnership and surpass the targets set in the first Master Plan early without waiting for another decade. The second Master Plan could set greater targets. Please also safeguard the interests of vulnerable rubber smallholders by helping them to be more productive. They provide industry's comparative advantage and must be nurtured as long as the rubber industry remains in our national economic agenda.

I gladly take this opportunity to thank profusely those unnamed here who made their valuable contributions to the preparation of the Master Plan with unceasing dedication and demonstrated professionalism. Without such commitment, the Master Plan would have been another unrealized dream of industry protagonists.

Navin Dissanayake

Minister of Plantation Industries

Message from the Deputy Minister of Plantation Industries

It is with great pleasure that I write these few words to the first Sri Lanka Rubber Industry Master Plan. As the Deputy Minister of Plantation Industries, my main duty is to enhance the performance in the value added products sector. Rubber products industry has a great potential to be developed as a leading export sector in our economy. I am very happy to note that the master plan has many projects aiming at improving the performance in the value added rubber products sector.

Value addition is the key driver of manufacturing industries world over. Manufacturing drives exports. Exports bring foreign income and improve our balance of trade. In general, value addition contributes to economic growth and improves standards of living of our people. That is the main objective of our government. Therefore the rubber master plan is a welcome development and receives fullest support of the Ministry of Plantation industries which has taken over the implementation responsibility.

To promote rubber industry development, it is important to establish links with overseas investors, buyers and technology providers. The project for "Strategic Promotion of Sri Lankan Rubber Products" is a crucial project that must receive priority. In support of this project, we are planning an international convention that will attract a large number of foreign buyers. "The Rubber City" project which is aimed at enhancing the global competitiveness of rubber products is timely considering the need for environmental impact mitigation and colocation advantages. This project also will fit into Megapolis development strategy of the government where a plantation city is planned in Avissawella. Value addition should be done in a very efficient manner managing costly scarce resources available. Therefore the proposed project for "Enhancement of Resource Use Efficiency and Productivity" is another vital project that needs stakeholder attention. To develop more advanced technologies, the project for "Establishment of Rubber Technology Consortium" will become a powerful catalyst.

Considering the portfolio of programs and projects proposed in the Sri Lanka Rubber Industry Development Master Plan, I am confident that the future of Sri Lankan rubber industry is going to be bright. Expected results will come when project implementation become effective. No one can achieve this task all alone. It is the paramount duty of all stakeholders, both in the government as well as the private sector, to work in tandem with a full understanding of ground realities until the desired results are achieved.

I congratulate the team who worked tirelessly to craft this development agenda which can be considered a comprehensive plan of highest quality keeping to international standards.

Lakshman Wasantha Perera

Deputy Minister of Plantation industries

Message from the Secretary, Ministry of Industry and Commerce

It is my pleasure to congratulate and thank the team that took the responsibility of preparing a Master Plan for Rubber sector in Sri Lanka. I am particularly happy about the substantial contribution made by the officials of the Ministry of Industry and Commerce along with other participatory agencies to make this gigantic task initiated and completed by the Ministry of Plantation Industries, a success.

Rubber Sector Master Plan has been prepared with a vision of increasing value generation from Sri Lanka's rubber sector to satisfy all its stakeholders who have diverse needs and interests. Its vision is to achieve global competitiveness through improving and augmenting every possible activity in supply and value chain of this sub sector in the economy. This plan has set an ambitious target of achieving a gross industry turnover of US $ 4,000 million in 2025 of which target set for rubber products manufacturing sub sector is US $ 3,600 million.

Attainment of global competitiveness for Sri Lanka rubber products in meeting an uphill target of US $ 3,600 m. within a short period of eight years assigns a greater responsibility on Sri Lanka's industrial sector. Industrial sector comprises public and private sectors and academia as the Ministry of Industry and Commerce considers, an combination of all three sectors are very important in fostering and promoting industrial development in this country.

Apart from availability of raw materials in required quality, quantity and price many other factors contribute to achieving global competitiveness in products and services. I wish to quote Michael Porter from his book 'The Competitive Advantage of Nations' as his arguments are very relevant in achieving goals of this Master Plan. *'The standard theory of trade rests in factors of production. Nations are endowed with different stocks of factors. A nation will export those goods which make intensive use of the factors with which it is relatively well endowed".* (In Sri Lanka Labour intensive apparel industry makes a success story mainly for this reason). *'Role of factors is different and far more complex in creating competitiveness". The factors most important to competitive advantage in most nations and industries are not inherited but are created within a nation through processes that differ widely across nations and among industries".*

Factors of production i.e., land, labour and capital could be further grouped into a number of broad categories. Human resources in quality, skills and cost per person; Physical resources with quality abundance and accessibility; Knowledge resources enriched in scientific, technical and market knowledge; Capital resources in required amount and cost; Infrastructure of the type, quality, and user cost, contribute immensely to make a nation or a particular industry globally competitive.

As we are not endowed with all these factors in required quality, quantity and cost we are compelled to explore and engage all avenues available in present day world to gain them. It could be bilateral and multilateral trade agreements, joint ventures, mergers or acquisitions, combined efforts of public, private and academia participation, purchased or developed within a fast tracked approach. These aspects play a vital role in making this Master Plan a success.

While assuring the fullest cooperation of the Ministry of Industry and Commerce, I wish all success in achieving the goals of this Master Plan that certainly will contribute to develop the country's economy and elevate the quality of life of people of Sri Lanka.

T M K B Tennakoon

Secretary
Ministry of Industry and Commerce

Foreword by Chairman, Sri Lanka Society of Rubber Industry (SRI)

Future of Sri Lanka's rubber industry rests on industry-wide productivity growth from small-farm based rubber production to large scale manufacturing operations. Achieving sustained global competitiveness will depend on our ability to shed age old unproductive practices and adopting of new technologies coupled with enhancing effectiveness in managing value chain activities. There is no other way to withstand relentless competition that emanate from unexpected sources making viable industries nearly irrelevant. The best example is Sri Lanka's Latex Crepe rubber which stubbornly refuses to change its character and image. It is at its last stage of a remarkable life cycle. If stakeholders remain complacent, even some of the rubber products made in Sri Lanka could experience a similar outcome.

We felt the necessity for a bold change as we intend to stay in the rubber based business that we value. We have served this nation for over a century and we want to be relevant to national economy for another century or more. As a versatile material demanded by makers of numerous products and applications, rubber can never be erased from inventories of industrial ventures. However, the rubber material has become an entirely different offering within the last few decades due to technological advances and innovations. Has the Sri Lankan industry kept pace with these changes and gained due successes? May be few and far between but otherwise the Sri Lanka rubber industry has been resting on its laurels. Can we afford to continue like this and ignore the competition?

ADB technical assistance which helped to draft the Sri Lanka Rubber Industry Master Plan enabled us to find answers to this billion dollar question. SRI decided to rally round this initiative simply because the private sector realized its own flaws and the need for change, not only at the firm level, but more importantly at the industry and national policy levels. We were eager to know the kind of change we must bring about and how to effect such a beneficial change. What are the unseen gaps and pitfalls? What should be our strategies and remedial programs critical to gain global competitiveness? Do we have necessary strengths and if not can we build those? There were myriad questions which no single person could provide straight answers.

Logically, the process of master planning became genuinely collaborative where a great team spirit prevailed. Four leading members of SRI volunteered to share the cost of setting up an action center, Sri Lanka Rubber Secretariat (SLRS). That met the local counterpart funding requirement of ADB which engaged consultants but we did not depend on such expertise entirely. In fact, they were assisting us to think strategically in participatory style. Among stakeholders there were exchanges of valuable information. We made informed decisions through a continuous learning process. At the end, we own a visionary Master Plan. It speaks for itself and it is not necessary to describe it here. I will only say that we made it happen and we want to implement it which means we will be responsible for our own future. Finally, rubber has hit the road.

While appreciating the support given by ADB and the Australian Government, on behalf of the industry, I am very pleased to thank our Government for providing financial support to initiate implementation of our plan. I highly appreciate the active support of the Minister of Plantation Industries and his able team of officials who have taken over the responsibility of implementation. We pledge our fullest support and await the transformation of SLRS into a solid public-private partnership. SLRS has acquired a distinct and highly productive work ethic and a fine mix of private public collaborative approach formed during the planning process. We hope to build on that and operationalize the Master Plan as intended. We firmly believe that we can work comfortably with the Government, as equal partners and realize our grand vision.

Let me now sincerely thank all the team members who created the Master Plan. I know how dedicated they were.

W T Ellawala

Chairman, Sri Lanka Society of Rubber Industry

Acknowledgements

Redacting a comprehensive master plan for a globally competitive industry which adopts best industry practices within a thriving management culture manned by renowned professionals is by no means an easy task. The challenge is heftier when the goal is to take the industry through the next cycle of growth and prosperity. The Ministry of Plantation Industries is proud to have accomplished this great feat using a grand strategy, i.e., unparalleled team work by a large team of invaluable people comprising of dedicated professionals, industry practitioners and experts, public leaders and state officials, industry leaders and investors, and organizations of various hues and status in public and private sectors.

Some, of course wouldn't have known that they were part of this team as their contributions were not regular albeit of great significance. There were a few devil's advocates who offered thoughtful suggestions. The role played by eternal critics, covertly and overtly, kept the core team of master plan protagonists on their toes all the time. All such contributions enabled us to make the final product more refined, relevant and acceptable. It is my wish to acknowledge the unique attributes of the team we assembled by indicating the services they rendered. I could miss many, I admit, with unforgotten gratitude.

I begin with recognizing the support of Asian Development Bank which sourced funds from the Australian Government to facilitate the master planning exercise with high caliber Technical Assistance. Our great team has vindicated their generous contributions, I am certain, which fact may convince them to do more.

The blessings, advice and support we receive from H E the President and Hon Prime Minister will be immensely useful in implementing the Master Plan efficiently. The keenness of the Minister of Plantation Industries to quicken the implementation of the plan prompted us to shorten the process. Plans of the Deputy Minister of Plantation industries for value addition will strongly support key projects in the Master Plan. The defining approval granted to proceed with implementation of the Master Plan by the Cabinet Committee on Economic Management is very much welcomed by all stakeholders. Recommendations of the Official Committee of Economic Management were useful to determine implementation modalities. The Ministry of Finance endorsed the master plan with a generous allocation of funds.

Our key collaborator is the Sri Lanka Society of Rubber Industry (SRI), the apex body of rubber industry cluster which is steered by a team of reputable industry captains with a zealous mission. They worked closely with ADB and provided a work environment conducive to perform, courtesy four leading rubber products manufacturers, that smoothened the arduous planning process conducted at a fine location as Sri Lanka Rubber Secretariat (SLRS) operating beyond hours and its able team needs admiration for hard work, efficiency and demonstrated professionalism. The SLRS will continue as an exemplary public-private partnership at a new location provided by the Ministry of Plantation Industries.

From the Government there were many willing partners. At the outset, the Ministry of Industries & Commerce supervised this initiative admirably getting this novel activity off the ground. Other agencies such as Export Development Board, Board of Investment and Industrial Development Board extended their fullest co-operation during deliberations. The Department of External Resources liaised with ADB and monitored the progress closely while making attempts to obtain further support from donors. The Department of National Planning patiently listened to the planning team while making valuable suggestions.

The Rubber Development Department and the Rubber Research Institute which comes within the purview of my ministry contributed to planning sessions sharing information and expertise. Although there were many rules to follow and plenty of paper work, ADB being a rule based organization, the officials at my ministry which was the TA implementing agency, managed such challenges well.

Let me now appreciate the valuable roles played by the team of planners. Necessary technical expertise was provided by a group of experienced consultants who conducted a series of studies which provided the basis for project development. Their inputs influenced stakeholders to make better strategic choices. Contributions made by resource persons from academic institutions such as the Institute of Policy Studies, Postgraduate Institute of Management and the local Universities enhanced the quality of deliberations. A Technical Working Committee

comprising of senior industry specialists linked over 15 eminent workgroups of industry representatives that studied different aspects of rubber value chain with the support of consultants. Many hours spent by the workgroups, purely on a voluntary basis, over a year vouches for their commitment to the cause of the rubber industry. In fact, they are the true authors of the Master Plan. The editorial team simply edited their thoughts. Final draft was reviewed by a committee of renowned industry leaders who did a painstaking job. Their comments enabled editors to reshape the final draft. Industry stakeholders admire the professional acumen, perseverance and dedication demonstrated by the small team of editors who labored to bring the final product to this level.

At the last stage too, we received the support of a small team of senior government officials and industry leaders to update the document incorporating the latest policy directions and industry dynamics. That further enhanced the quality of the final document.

The Rubber Industry Master Plan Oversight Committee (RIMPOC) has given me added strength by accepting to share the responsibility in guiding the implementation process. I earnestly hope that they will continue to provide wise counsel in all policy matters related to the master plan.

The most admirable success factor was the willingness of industry stakeholders to volunteer their time and resources in a novel exercise with great but perceived expectations that is going to be a reality. This motivation, I believe, is seldom seen in other sectors. That is a revelation. Finally, I truly acknowledge the need to deliver planned outcomes and delight all those unnamed stakeholders by fulfilling their dreams beyond expectations.

Upali Marasinghe

Secretary, Ministry of Plantation industries

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Abbreviations

ADB	Asian Development Bank
ANRPC	Association of Natural Rubber Producing Countries
ARR	Annual Replanting Rate
Australian Aid	An agency of the Australian Government's Department of Foreign Affairs and Trade
BOI	Board of Investment of Sri Lanka
BR	Butyl Rubber (Synthetic rubber type)
CAGR	Compounded Annual Growth Rate
CBSL	Central Bank of Sri Lanka
CCED	City Cluster Economic Development (integration of industry growth with urban growth)
CESS	Commodity Export Subsidy Scheme
CPD	Continuous Professional Development
CR	Polychloroprene Rubber (Synthetic Rubber type)
CRTA	Colombo Rubber Traders' Association (oldest rubber industry association in the country)
DNP	Department of National Planning (currently under the Ministry of National Policies & Economic Affairs)
DRC (drc)	Dry rubber content (in rubber latex, either field latex or concentrated) w/w
EDB	Export Development Board
EIC	Eco Industrial Clusters (resource efficient environmentally friendly industry clusters)
EPZ	Export Processing Zone
FEASC	Finite Element Analysis Simulation Center
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GIVC	Global Industrial Value Chain
GOSL	Government of Sri Lanka
Ha	Hectare (2.471 acres)
HR	Human Resources
IDB	Industrial Development Board
IFAD	International Fund for Agricultural Development, a specialized UN agency
IRRDB	International Rubber Research and Development Board
IRSG	International Rubber Study Group
ITI	Industrial Technology Institute
IWMP	Integrated Water Management Project, a CCED Phase II Project funded by ADB
JEDB	Janatha Estates Development Board
JV	Joint Venture
k/h/y	Kilograms per hectare per year, a metric of relative rubber yields
Kg/ha	Kilogram per hectare
LC	Latex Concentrate (Centrifuged latex is one type of LC)
Men	Ministry of Mahaweli Development & Environment
MF	Ministry of Finance
MI&C	Ministry of Industries and Commerce
MNU	Million Units
MOU	Memorandum of Understanding
MPI	Ministry of Plantation Industries
MSME	Micro Small and Medium Enterprises
MT	Metric Ton
M&E	Monitoring and Evaluation
N&E	North & East (two provinces in Sri Lanka where rubber is not traditionally grown)

NR	Natural Rubber
NWSDB	National Water Supply and Drainage Board
PA	Planters' Association of Ceylon
PFU	Project Facilitation Unit
PMU	Project Management Unit (dedicated management units for individual projects)
PPP	Private Public Partnership
PRISL	Plastics & Rubber Institute of Sri Lanka
PRT	Progress Review Team
R&D	Research and Development
RCYN	Rubber Cluster Young Network
RDD	Rubber Development Department
RITC	Rubber Industry Technology Consortium
RIWDC	Rubber Industry Workforce Development Council
RMP	Rubber Master Plan/Sri Lanka Rubber Industry Master Plan
RPC/RPCC	Regional Plantation Company/Companies
RPDSC	Rubber Products Development Services Centre
RRISL	Rubber Research Institute Sri Lanka
RSS	Ribbed Smoked Sheets (a conventional type of natural rubber)
SBR	Styrene Butadiene Rubber (Synthetic rubber type)
SLAMERP	Sri Lanka Association of Manufacturers and Exporters of Rubber Products
SLGC	Sri Lanka Gamma Centre (Multipurpose Gamma Irradiation Facility, state owned)
SLR	Standard Lanka Rubber (generic term is TSR)
SLRS	Sri Lanka Rubber Secretariat (Phase I launched by SRI in 2012 with ADB assistance)
SMART	Specific, Measurable, Attainable, Relevant and Timely
SME	Small and Medium Enterprise
SPC	State Plantations Corporation
SPEnDP	Smallholder Plantations Entrepreneurship Development Program (IFAD funded)
SR	Synthetic Rubber (petro chemical based)
SRI	Sri Lanka Society of Rubber Industry
ST	Secretary to the Treasury
STaRR	Smallholder Tea and Rubber Revitalization project (IFAD funded)
TA	Technical Assistance
TAC	Technical Advisory Committee (at RMP implementation stage)
TASC	Technical Assistance Steering Committee for ADB RETA 6337 SP-16
TBD	To be determined
TSR	Technically Specified Rubber (new process type of NR, block rubber/crumb rubber)
TWC	Technical Working Committee (Supervised the technical aspects of the Master Plan)
UOM	University of Moratuwa
US	United States
U$	United States Dollar
$MM	Dollar Million, US
USJ	University of Sri Jayewardenepura
UVT	University of Vocational Technology
WFD	Work Force Development
WG	Work Groups (a team set up to address a specific issue of the rubber industry)
WRC	Wellassa Rubber Company Limited (a consortium of rubber products manufacturing firms which set up a rubber plant nursery in 2007 in Moneragala to support smallholders)

Prologue

The Sri Lanka Rubber Industry Master Plan (RMP) is not a tool designed to ‘‘command’’ the rubber industry’s future or impose a rigid intervention plan albeit certain directions, strategies and targets are chosen. It is the result of an intense collaborative effort to improve and realign rubber industry value chain activities which demonstrate certain rectifiable slacks of serious nature, with the new dynamics of the global market economy, to ensure sustainable delivery of superior goods to the market competitively, while assuring increasing living standards of contributing stakeholders along the supply and value chains with special emphasis on the bottom of the workforce pyramid and the rural folk operating at the source of the supply chain. The Master Plan also avoids conflicts between market rules and socio-ecological priorities. Instead, it integrates the two objectives mutually supporting each aspect as these two are indissoluble and strengthened by the nation’s culture.

All the programs and projects included in the RMP are designed to solve a value chain specific problem identified collectively by stakeholders who face unrelenting market forces when competing in their respective market niches. Effective implementation and closure of projects will enhance their global competitiveness owing to a number of measurable outputs and outcomes. These are increased productivity, reduced costs, enhanced skills and competencies, technological superiority leading to new innovations and an ability to produce and market higher value branded products. Among other positive results would be transforming the industry to an ecologically and socially responsible sector integrated with relevant global value chains enabling the industry to capture a larger share of the global market for sophisticated rubber products.

The positive impact felt by the investors due to increased profitability will ensure the expansion and growth of Sri Lanka’s rubber industry. The government and the society at large will reap the benefits generated by the outcomes and overall impact of the projects implemented. The outcomes mentioned above would ensure public support for the rubber industry catalyzing further support which will be translated to policy and resource allocation measures ensuing a self-reinforcing virtuous cycle leading to long-term accelerated growth until the grand vision is realized.

Broad roles are assigned to industry protagonists. With public support, the state will strengthen the industry by providing critical industry infrastructure both soft and hard that cannot be created solely by the private sector, and creating an enabling environment conducive for growth. Entrepreneurs will take risks, strategize and make investment decisions. A competent workforce with dynamic attitudes will work smart, deliver products to serve modern customers and help capture lucrative markets. The roles are complimentary, harmonious and synergistic.

A wonderful gift of nature, the tree *Hevea brasiliensis* came to Sri Lanka in 1876 as an alien species and has changed its landscape and socio-economic status irreversibly. The British brought the tree and produced raw rubber for export to feed industries in Europe. Today, the Sri Lankan small farmers produce rubber for local industrialists to make products, and collectively they have made an indelible mark in the global market. The grand vision of current industry stakeholders is to see this great industry continue to be of social, economic and ecological relevance even after one and a half centuries, through 2025. That is the unarticulated spiritual goal of the Master Plan which is an outcome of a unified dream of public leaders and industry players at all levels. This document amply demonstrates that the dream is beautiful, clear and realizable. The realization will become effective when informed stakeholder collaboration is manifest in its operationalization.

EXECUTIVE SUMMARY

Background: The rubber industry in Sri Lanka is yet to reach its full potential in capturing global markets. A comprehensive strategic plan validated by stakeholders needs to be implemented to ensure its growth, competitiveness and sustainability. Formulation of the Sri Lanka Rubber Industry Master Plan (RMP) or the National Agenda for Rubber Industry Development is the first step in this direction which is a success achieved by rubber industry stakeholders. At the request of the Government, Asian Development Bank (ADB) supported this pioneering effort under the City Cluster Economic Development (CCED) Project. This first Rubber Master Plan is a result of an intense and inclusive participatory process enriched with inputs from a multitude of experts. All aspects of the rubber industry value chain, in the context of intense global competition, have been considered in determining the goals, strategies and action programs and projects.

Rationale: As a resource based technologically sophisticated industry with global linkages, rubber industry plays an important role in Sri Lanka's economy. Its center of gravity has shifted rapidly to value addition from raw rubber production. This transformation needs to be nurtured and managed and consolidated to optimize benefits. Government expects the rubber industry to be among the top export income earners and this plan provides a clear Strategy and a method for collaborative action to advance the industry status. It creates a unified Vision providing a rallying point for all stakeholders in the public and private sectors guiding them to act synergistically. The Mission gives them a clear purpose for making strenuous efforts until the Goals are realized. The planning process adopted enabled them to learn global industry dynamics and helped uncover new vistas and hidden opportunities. The Projects selected aim at minimizing value chain slacks while synchronizing efforts of individual players and allocating scarce national resources efficiently in achieving common goals. Significantly, a new awareness has been created as to where the industry players should head as a cohesive team. Implementation of the plan will be a dynamic process with manifold value that has far reaching impact and the expected grand outcome is the contribution to sustainable socio-economic development of Sri Lanka through rubber industry growth and competitiveness.

Planning horizon and updates: This Master Plan embodies programs, projects and strategic initiatives to be implemented in a ten year period beginning 2017. Certain critical projects, however, will continue after the initial ten years extending even up to 2050 and beyond. This makes the initial ten year timeline tentative which necessitates periodic updating of the Master Plan in response to emerging market dynamics, technological developments and competitive challenges. A collaborative methodology to achieve this purpose is proposed to make this plan dynamic and relevant.

Composition: The Master Plan comprises of a Main Document with annexes and data tables, supplemented by a series of other documents which include a Working Paper (WP) and analytical reports on varied aspects of the industry. The WP is the detailed base document which comparatively analyses all links in the rubber industry supply and value chain activities. This requires periodical updating to incorporate relevant status changes leading to necessary updating of the Master Plan. Individual reports analyze prioritized thematic issues and contain specific program/project proposals and policy/position papers that aim at eliminating critical gaps which hinder competitiveness while developing distinct competencies industry-wide. They provide the required information to the WP enabling its cyclical review thus making it current and relevant.

Structure of the main document: The Main Document contains an **Executive Summary** which puts the Master Plan in condensed form. **Introductory Section** provides a macro-view of the Sri Lanka rubber industry in the context of global and national economies and offers a rationale for the Master Plan. The **Section 2** analyses the current industry status in all aspects, explain its competitive position and discusses the existing policy environment. **Section 3** charts the future which is depicted as Vision, Mission, Goals and Objectives that are to be realized through the execution of strategies and implementation of action programs and projects enumerated therein. Essential programs and projects to be implemented are outlined in the same section. Envisioned status is described in **Section 4** in terms of performance targets with expected outputs, outcomes and impact. Implementation arrangements which include partner institutions, administrative structures and resource needs are presented in **Section 5** which also highlights potential risks. Concluding remarks are made in the final section, **Section 6.** There are two annexes which provide summarized industry data and information relevant and provide brief descriptions of all the projects.

The vision and path: The grand vision of the industry is to create value to satisfy the diverse needs of stakeholders including consumers, investors, entrepreneurs, employees and the public in a sustainable manner. This vision will be realized through collaborative action of stakeholders guided by a set of core values. The mission is to attain global competitiveness through overall performance enhancement in supply and value chain activities. Goals and objectives will be reached in accomplishing the mission through a strategic action framework which include (i) Expansion of Rubber Production, (ii) Rubber Products Market Share Expansion, (iii) Value Addition to Rubber Wood, (iv) Workforce Development, (v) Technological Capability Development, (vi) Industry Information Management, (vii) Strengthening MSME Sustainability and (viii) Promoting PPPs in Implementing the Master Plan. At the outset, twenty five action projects under ten programs are to be implemented, supplemented by three strategic initiatives aimed at improving (a) the enabling environment, (b) institutional effectiveness and, (c) industry collaboration. Realization of the vision is contingent upon the effective implementation of these programs, projects and strategic initiatives.

Industry targets: The Master Plan targets achieving an annual gross industry turnover of nearly US$ 4,400 million by 2025 over the base year i.e., 2015, at a CAGR of 10.0%. This is the aggregate value of raw rubber production ($M 448), rubber products manufacturing ($M 3,600), and the income from rubber wood based products ($M 362). The value created by the rubber industry will account for nearly 2% of the GDP forecast in 2025. In the export scene, the projected share will be around 15% compared to the current 8%. These targets are in line with the new economic policy of the Government and consistent with private sector investment and growth plans.

Strategic thrusts: The competitive strategy has three prongs. First, to obtain **maximum productivity from existing rubber farms** while **expanding the extent of farms** to sustain the comparative advantage of industry by assuring the supply of a critical mass of locally produced natural rubber for value addition. Second, to **make differentiated and branded products by adding a higher value to raw rubber**, both locally produced and procured abroad including synthetic rubber, to capture lucrative niches in the global market using advanced technology, superior human competencies and relentless innovation as competitive advantages. Third, to provide necessary **soft and hard infrastructure facilities along with policy and regulatory support** to enable expanding markets and trade, attract new investments and also to make current investments more effective. The defining strategy will be the collaboration of stakeholders.

Rubber products as the key driver: Key driver of the RMP is the Rubber Products Market Share Expansion strategy to be operationalized through four projects aimed at (a) export promotion of rubber products, (b) establishment of a dedicated Industry Park for rubber products with specified zones, (c) efficient management of water resource within the rubber industry and, (d) improving productivity and efficient use of all resources within the industry. MSMEs will receive special attention with a project to be initiated by the IDB at Zone 2 in the Rubber Industry Park that will cater to MSMEs. In ten years, rubber products sector will generate a turnover of U$ 3,600 million. The strategy is innovation and product differentiation for niche market segments adding more value per ton of rubber used in addition to expanding current lines of products to serve existing markets.

Rubber production as the critical success factor: Achieving Master Plan goals requires the effective operationalizing of Rubber Production Expansion Strategy which comprises of ten projects that aim at increasing the annual rubber output to an estimated peak quantity of 305,200 metric tons that will be realized by 2046 although in the short run, by 2024, the volume would decline to 101,070 metric tons due to essential replanting to be done at an accelerated rate of 4%. Maximum national average yield expected is 1,806 k/h/y by 2046 but the average yield in 2024 will be around 1,046 k/h/y. The two pronged production strategy is to expand the current area by adding another 37,000 ha and enhancing overall productivity of rubber farms with the popularization of new clones coupled with vigorous replanting. Provision of quality planting materials will be done through a state-of-the-art nursery network. Expanding the production base and increasing the overall productivity simultaneously will ensure a steady supply of a critical mass of raw rubber for value addition.

Value added rubber wood: Equally significant will be the Rubber Wood Value Addition strategy which has a program to set up five central wood processing units to supply high quality sawn rubber timber to local wood based industries. Accelerated replanting project will increase the future availability of rubber wood to be converted to higher value added products for export markets. Part of the rubber wood extracted will also serve the fuel needs of various industries including rubber products manufacturing. Rubber wood based products will earn over U$ 350 million by 2025.

Auxiliary strategies: The Master Plan comprises of a set of other necessary and sufficient strategies that will sharpen the competitive edge of the rubber industry and improve its overall capacity to become functionally efficient and effective. These include (i) workforce development; (ii) technological capability development; (iii) industry information management; (iv) enhancing the sustainability of MSMEs and (v) fostering public-private partnerships that are vital, cross-cutting and overarching. Such soft infrastructure projects are crucial to enhance overall industry performance.

Strategic Initiatives: Planned strategic initiatives that are not clearly defined in terms of time-bound projects aim at (a) strengthening the enabling policy and regulatory environment, (b) building capacities of existing network of institutions to be more effective and (c) promoting collaboration among stakeholders by broad basing and strengthening the Sri Lanka Society of Rubber Industry (SRI). These will be important steps that facilitate the effective implementation of the Master Plan.

Investments: Total new investments to be made in the rubber industry during the program period would be around U$ 1,500 million to augment the existing investments estimated at U$ 800 million in production, processing, value added manufacturing and supporting industries. Cost of the ten programs in the Master Plan would be around U$ 500 million and the resource mobilization strategy will be determined on case-by-case basis. Firm specific investments will depend on their markets

and corporate plans. Considering the turnover targets set and actual industry averages, such private investments could exceed U$ 1,000 million. The government annual budgetary allocations may depend on early successes, national priorities as well as donor support.

Implementation: The Government will mobilize resources and facilitate the implementation efforts through the Sri Lanka Rubber Secretariat which is a novel public-private partnership. Relevant government and private sector institutions will take up appropriate roles as program or project managers and execute different projects efficiently with the necessary capacities built and strengths enhanced. Policy guidance and monitoring will be the responsibility of the Rubber Industry Master Plan Implementation Oversight Committee (RIMPOC) which comprises of senior government officials of key ministries and industry leaders. PPP model will be adopted in project implementation.

Stakeholder benefits: The key benefit to industry will be the increased global market share resulting from utilization of new strengths developed through the projects implemented successfully. Industry firms will enter lucrative niche markets, expand their activities and enhance profitability. This will engender high quality employment with higher earnings. Small and medium firms in addition to related and supporting industries will expand. Imports of rubber products would decline. Rubber producers including rural farmers will become more productive, profitable and sustainable. These outcomes are in addition to the ecological benefits that arise from rubber farming. The aggregate result will be a sustainable rubber industry manned by satisfied stakeholders that contributes significantly to the national economy through increased GDP, export incomes and tax revenue.

Risks and challenges: Risks may arise due to trade, technological, environmental and social issues. Global market for rubber products is ever expanding but the investors consider declining raw rubber production in Sri Lanka as an investment risk. Natural rubber will continue to be in demand also with new varieties such as Guayule entering the market but the key challenge is enhancing yields and reducing cost of production to withstand cyclical price shocks with due resilience. The answer lies in the use of best practices known to enhance productivity. In the rubber products sector, environmental issues pose a challenge but common infrastructure and new technologies provide solutions. Attracting the workforce required may be difficult but a profitable industry with a modern outlook can attract and retain good employees. From a managerial view, the largest risk is the weak propensity of stakeholders to engage in pre-competitive collaboration and build strong public-private partnerships but this can be overcome with visionary and inspiring industry leadership.

Conclusions: The Rubber Master Plan is a pragmatic and futuristic action program based on a bundle of specific projects integrated judiciously aimed at laying a stable foundation to achieve growth and global competitiveness. It has set targets, clarifies the industry future and reduces uncertainty to a great extent which is important for investors, employees and policy makers. It also sets a new trend in stakeholder collaboration. The implementation phase requires concerted efforts by committed stakeholders with government paving the way and the private sector playing its part making investments and adding value as relevant. This will be a complex learning and adaptation process where many leaders will emerge at different levels, especially from the young industry professionals who have a larger stake in the industry's future. Considering the superior gains to be realized, it is logical that all stakeholders coalesce around the Rubber Master Plan and strive to derive intended benefits. That will be a compelling national duty to be performed by all rubber industry stakeholders.

Section 1: Introduction

1.1 Background

National significance: In 2013, Sri Lanka earned U$ 10.4 billion through exports of merchandise[1] and the contribution of the rubber sector exports, which include raw rubber, rubber products and rubber-wood based products, with an income of around U$ 1 billion, was 10% of this value. The government aims at increasing income from the export of merchandise to U$ 15 billion by 2016 and rubber industry has been allocated a share of U$ 1.7 billion[2]. Along with rubber, other industries such as garments, tea, gem and jewelry and spices will contribute to the total target of U$ 15 billion. The national export income target for 2020 has been set at U$ 20 billion and the share of the rubber industry in this endeavor is estimated at around U$ 2 billion under normal circumstances. The Master Plan has raised the performance bar and specifies a strategic direction.

Development potential: The rubber industry has a great untapped potential which needs to be exploited for the benefit of the nation. Considering the long history of the industry and its distinctive competencies accumulated over the years, stakeholders have set a higher target of over U$ 3 billion to capture 15% share of the national export income by 2025. Industry stakeholders, both in the state and private sectors, need a well-crafted medium to long term plan to achieve this target. The plan also should facilitate close public-private collaboration. The Ministry of Plantation Industries (MPI) and Sri Lanka Society of Rubber Industry (SRI) embarked on this ambitious exercise in 2012 and drafted the Master Plan which fulfilled this dual need. During the implementation of the Master Plan, ample opportunities would be available to all industry players to improve their performance in their own activities along the respective supply chains and value chains. Collaborative programs with projects and strategic initiatives have been designed for this purpose. This comprehensive plan validated by all stakeholders is now recognized as Sri Lanka's National Agenda for Rubber Industry Development.

Government initiative: In 2011, the Government agreed[3] with the Asian Development Bank to utilize technical assistance (TA) to formulate a Master Plan for rubber industry development. The TA was funded by the Australian Government. The private sector (SRI) joined hands with the Ministry of Plantation Industries and the Ministry of Industries and Commerce (MI&C) in implementing the TA activity[4] which was monitored by a Steering Committee (TASC) chaired by Secretary, MPI. The planning and project development exercise was an intense participatory process operationalized from the Sri Lanka Rubber Secretariat (SLRS) established by SRI at the request of the government.

Planning model: The Master Plan was drafted by a team of Sri Lankan specialists with wide industry experience who functioned as ADB consultants[5] and was supported by ten Workgroups (WG) representing different industry value chain segments. A Technical Working Committee (TWC) comprising of fifteen leading industry professionals provided guidance to the planning process. All

[1] ICT BPO income not included
[2] EDB figures
[3] TA Letter Agreement between GOSL and ADB signed by Secretary, Ministry of Finance & Planning on 14th June 2011
[4] TA proper commenced in April 2012 and closed in May 2013.
[5] Engaged through a national consultancy firm according to ADB procedures

TA activities were conducted from the SLRS[6] which has since become a promising private public partnership that will be strengthened and expanded to lead the implementation process.

Stakeholder participation: A large number of high-ranking government officials and senior industry executives participated in regular deliberations sharing their valuable ideas, information and valuable time contributing to the success of the Master Planning process. When necessary, academics and guest experts were invited to add value to deliberations. All necessary and sufficient issues were dealt with although the industry issues highlighted were numerous. As a whole, the entire Master Planning process was participatory, transparent and consensual subject to occasional disagreements on preferred solutions.

Validation: The Master Plan was subjected to an exhaustive validation process. First, after several rounds of deliberations that led to certain important amendments, the private sector validated the plan at a summit held on 17th June 2014. The government acceptance of the plan came through an administrative process involving the approvals[7] from the Cabinet of Ministers and the Cabinet Committee on Economic Management.

1.2 Overview of Sri Lanka Rubber Industry

Milestones: Sri Lanka embarked on the rubber industry in 1876 with planting of a few hundreds of Brazilian rubber seeds received from Kew Gardens in London which resulted in large extents of land coming under rubber in the wet zone by early 1900s. By the 1970s, over 200,000 hectares were under rubber that includes estates as well as smallholdings. Rubber was among the three main income earners in the national economy and had a strong impact on the socio-economic conditions of thousands of people in the country. Landmark events associated with the rubber growing industry is the rubber price boom engendered with the Korean War in 1950s and the Rubber Rice Pact[8] with the Peoples' Republic of China executed in 1952. Both these events had a significant impact on the Sri Lankan economy and society. Although value addition to raw rubber began in the 1940s, the real impetus came when the economy was liberalized in late 1970s especially since the 1980s opening doors for industrial investments, both local and foreign, attracting not only funds but technology, management and markets. This set the foundation for a modern rubber products manufacturing industry that has made an indelible mark in global markets with industrial tires, latex gloves and numerous other assorted products.

Rubber trade: Produce from rubber plantations were exported as commodities to international markets until mid-1960s. Colombo rubber auctions held twice a week under the auspices of Ceylon Chamber of Commerce still plays a key role in linking numerous buyers and sellers via a well-organized network of dealers, traders, brokers, shippers and financiers. The behavior of players in the trade is governed by the rules established by the Colombo Rubber Traders' Association. Although the volumes traded through auctions have declined over the years[9], the significance of the auction system has not diminished at all in terms of general price discovery and determination. The

[6] Established by SRI, the SLRS was ceremonially opened on 19th March 2012 at 236/14, Vijaya Kumarathunga Mawatha, Colombo 5
[7] CP No. 15/0537/612/015 of 2015-05-20, CP No. 16/0425/726/007 of 2016-02-29; CCEM meetings dated 2015-05-26 and 2016-03-16
[8] Hailed as one of the most effective and enduring trade agreements in the world and lasted for 30 years
[9] Owing to direct local sales to consuming factories as well as direct sales to overseas customers

matter for concern is the declining market for Sri Lanka's premium type of rubber which is Latex Crepe.

Value addition: Manufacturing of value added products based on raw rubber commenced gradually since 1940s and at present the center of gravity of Sri Lankan rubber industry has shifted to rubber products manufacturing. In 2013, value of rubber based products[10] made locally exceeded U$ 1,084 million whereas export value of all types of raw rubber was U$ 71 million. Although Sri Lanka is not a producer of Synthetic Rubbers (SR), the consumption of SR was over 12% of total rubber consumption in 2013 which rose to 17% in 2015[11]. Rubber wood based industry too makes a contribution which is estimated at around U$ 80 million today.

Market position - NR: As a producer, Sri Lanka has a current market share of around 0.7% of the global market for natural rubber. Once upon a time[12], Sri Lanka ranked 5th as a rubber producer in the world but regrettably this rank dropped to 14th place by 2015. A multi-pronged action program to arrest this decline is included in the Master Plan. This is to ensure the sustained supply of a critical mass of locally produced rubber for the sustenance of growing value added products industry.

Market standing of value added products: Albeit the expansion of value added rubber products sector, with a turnover of around U$ 1 billion, Sri Lanka's global market share in this segment is estimated at 0.25%. The global market for rubber products which is estimated at around U$ 400 billion today is expected to reach U$ 600 billion by 2025. Demand for industrial rubber products alone in the world is estimated to be over U$ 200 billion by 2025[13]. This is a huge opportunity for Sri Lankan rubber industry considering the diverse manufacturing competencies and other competitive advantages it has acquired over the last three decades that must be exploited to capture a larger share of the global market.

Future potential: In essence, rubber industry which is a resource based industry with linkages to global value chains has a large untapped potential to be utilized. Since early 2000s, there were many expert opinions expressed[14] on the undisputed potential of rubber industry to lead Sri Lanka's industrialization efforts. The wisdom of the government to treat rubber industry as a thrust area or a priority sector is therefore farsighted. However, the absence of a well-crafted holistic long term plan has so far prevented stakeholders achieving this goal. The Master Plan fulfills this long-felt need of national significance.

1.3 Multiple Benefits of the Master Plan

To balance differing objectives: Rubber industry cluster is made up of diverse players that either directly participate in supply chain and value chain activities or influence such activities. Among them are producers, manufacturers, traders and marketers, various suppliers to the industry, technology developers and disseminators, knowledge service providers, human resource developers,

[10] Includes local sales and rubber wood based items
[11] Total rubber consumption was 115,894 metric tons in 2013 which increased to 166,000 in 2015
[12] In the 1970s Sri Lanka produced over 155,000 metric tons per year whereas production in 2015 is estimated at 88,567 Mt.
[13] Estimated by the leading market research firm, Freedonia Group
[14] Refer to World Bank Study 1997; JICA Industrialization Master Plan- 2000; USAID Competitiveness Strategy 2002; GTZ Value Chain Analysis 2003; CDC London survey 1979

policy makers and regulators and industry associations that engage in advocacy as and when required. All these players are actively engaged in the rubber industry cluster in some form but may have differing objectives and agendas depending on their industry perspective. While each and every private sector player is interested in improving bottom-line results commensurate with investments and opportunity costs, policy makers and regulators may prioritize socio-economic growth and sustainability according to the existing policy of the government. A common plan developed using a participatory approach enables the balancing of diverse perspectives in line with the national industry vision.

To promote collaboration: The situation stated above is compounded by the fact that the rubber industry is overseen by more than a couple of government ministries, departments and statutory bodies that have institutional agendas not congruent with each other's or an overarching national goal. Profit maximizing private sector players active in different supply chain links may see other players as competitors or threats and therefore collaboration may not result naturally. To increase the market share, industry players can either compete vigorously among each other or collaborate selectively. Modern theory of competitiveness, however, proves the value of pre-competitive collaboration among industry players which reduces common industry infrastructure costs and transaction costs. It also affords the opportunity to share other collaborative advantages such as supply chain management, technological innovation, human capacity building and marketing at a lower cost. A national agenda provides space for collaboration for mutual benefit.

To plan collectively: Such collaboration requires careful planning and implementation to make it sustainable. A collectively developed transparent plan can address all contentious issues and accommodate different agendas in a single plan in a fair manner. It will have no hidden agendas but will use the diversity of players as a competitive advantage by integrating diverse strengths to realize a national agenda based on a comprehensive plan.

To promote collective learning: Designing of a national agenda or a Master Plan for an industry facilitates the participation of all industry stakeholders in analyzing industry issues, strategizing for reaching competitiveness and conceptualizing of projects to reach targets efficiently and effectively. The process compels them to understand industry issues from different angles and allows them to look beyond their boundaries shifting their operational paradigms. This paves the way for future collaboration and resource optimization. This is important as Sri Lanka is not a resource rich country and the industry must optimize the use of available resources while learning from each other.

To obtain a strategic view: A Master Plan helps prevent unbalanced growth in product/market portfolios as the Master Planning process provides an opportunity to take a bird's eye view to assess the industry holistically and in relation to each other's activities. It is risky for a national industry to depend on few products or a few markets[15] especially when thousands of rural poor are dependent on it. It is absolutely necessary to have a fresh look at the industry performance without being complacent as current success can be short lived considering the competitive market dynamics and technological changes that are taking place. The master planning processes allow re-examining of existing business strategies and understand industry weaknesses and threats looming in the horizon.

[15] Big-ticket products may attract unexpected threats by way of protectionist action by foreign competitors – allegation of unfair trade that leads to antidumping or countervailing duty measures are an example. Government support can be construed as unfair trade advantage.

To achieve policy congruency: Achieving policy congruence is another important outcome of a Master Plan. The planning process highlighted policy conflicts, deficiencies and regulatory weaknesses which allowed stakeholders to identify policy and regulatory revisions aimed at supporting the achievement of agreed industry targets.

To be a change agent: A Master Plan itself as a change agent will compel the stakeholders to find answers to all the above issues while having a better clarity about their own future, risks and potential rewards. Not only the plan but the planning process also will be an important change catalyst because of its ability to influence and change the attitudes of stakeholders on industry matters. This makes the development of Sri Lanka Rubber Industry Master Plan a turning point of unique significance which will usher a new era that promotes competitive collaboration among all stakeholders with a view to propel the rubber industry into greater heights in the global market.

To induce implementation of programs: Effective implementation of this Master Plan is certain due to the enthusiasm demonstrated by stakeholders, especially since the completion of the draft document. Nothing can be done without a plan although problems may persist. Will to change the status quo although strong cannot be fulfilled unless programs, projects and initiatives are designed and adequately resourced. Completion of a plan with a clear way forward compels the industry leaders to take the next logical step, i.e., implementation.

To create leaders: The effective implementation of such a grand plan will require a strong, committed and visionary leadership at different levels and the planning process catalyzed the emergence of a new class of leaders from different industry segments including young corporate managers. Also, as evident, there is no dearth of such dedicated public leaders in the government and related institutions. To make the implementation efficient, however, leaders need the support of equally motivated teams of industry members willing to persevere until the goals are achieved. This again was seen in abundance during the planning process which augurs well for the future of Sri Lanka's rubber industry.

To promote investments: A national industry master plan will always be referred to by prospective investors who value stability, policy congruency and predictability. As a marketing tool, the RMP will be of immense value to all stakeholders in resource mobilization. It reduces the uncertainty and investors are able to dovetail their individual plans to derive optimum advantage from the programs and projects planned.

Section 2: Analyses of the Current Status

2.1 Industry Performance

General: Sri Lanka Rubber Industry value chain comprises of both upstream and downstream activities supported by necessary related and supporting industries. Its comparative advantage is derived from natural rubber produced locally which is perennially available. As an industry cluster, it has achieved a fair degree of competitiveness in a few niche segments in the global market. In terms of GDP, the rubber sector has accounted for 1.5% and contribution to total exports hovers around 8% of total national export income. If a performance comparison is made, it is clear that while the downstream activities shows considerable growth, upstream sector has shrunk over the last four decades. It is essential to maintain a healthy balance between the two sectors.

Upstream activities: Upstream activities involve farming of rubber, processing and marketing of produce which is carried out at different scale by smallholders, private estates and plantation companies where smallholders' share is over 72%. Rubber farms are scattered over an extent of 133,000 ha spread over 3 major and 15 minor rubber growing districts. At present, a multitude of clones are used in these farms based on the recommendations of the Rubber Research Institute of Sri Lanka with a view to maximize productivity while reducing certain risks. Total employment in upstream activities is estimated to be around 200,000 persons of which, around 40% are women. Sri Lanka can proudly claim that child labor has never been an issue in this sector. It is evident however that the competitiveness of the upstream segment is under severe strain due to many factors.

Rubber processing: Field latex output is processed in the farm itself or at different locations that include small individual processing units and central processing plants. Such units use traditional process technologies that may require improvements. Large estates manage their own factories which sometimes cater to smallholder latex. Sri Lanka produces almost all types of raw natural rubber including RSS, Crepe, TSR, Latex Concentrate and Specialty Rubbers. RSS is still the major type produced. Total rubber production in 2015 is estimated at 88,567 MT which is only 0.75% of world NR output. The current cost of production[16] varies between Rs. 160 and Rs. 300 per kg depending on the producer, type of product and the quality of management inputs.

Sale of rubber: Raw rubber produced is marketed to local manufacturers and exporters through well-established trade channels. In 2015, total value of raw rubber produced was nearly U$ 225 million[17]. Local industry consumed 88% of locally produced rubber. Crepe rubber leads exports with a share of 84%. In contrast, less than 2% of RSS produced was exported. Sri Lanka is still the largest exporter of Latex Crepe and Sole Crepe rubbers but the volume was a mere 8,750 metric tons in 2015 which accounts for 0.07% of global NR market that shows the sharp decline in demand for Sri Lanka's premium rubbers[18] which screams for action. Farm gate prices are related to world markets and at most times tend to better the global market prices[19] due to demand by local manufacturers.

[16] Including factory level or farm level processing costs
[17] Determined basically by factors affecting international commodity prices
[18] Mainly Latex Crepe which is regarded as Champagne of NR. Sole Crepes are considered a unique finished product.
[19] Local demand premium appears to be around LKR 20 to 30 per kilogram which vary depends on supply situation.

Farm productivity: Productivity measured in terms of annual yield obtained from a hectare is the key contributor to profits hence viability**.** In terms of productivity, Sri Lanka in 2014 ranked low with an average national yield of 914 kg per ha. In comparison, Thailand and Vietnam record yields in the range of 1,600 to 1,700 kg per ha per year[20]. It is inexplicable why Sri Lanka records low productivity because the RRISL has developed some of the best yielding clones in the NR world while the RDD has a long history of providing extensive extension services including generous subsidies. Rubber production segment may not survive for long unless effective measures are taken to enhance farm productivity to match with international benchmarks.

Constraints: The upstream sector is constrained by increasing labor costs/shortages, inadequate transfer/absorption of technology, and poor adaptation of innovations that leads to low productivity in general. Shortage of workers including rubber tappers is a serious threat. Availability of land for rubber cultivation in traditional rubber growing districts is also becoming scarce due to diversification of crops and urbanization. All these have led to a dearth of new investments in the upstream segment. A concerted long-term effort is required to manage these constraints.

Downstream activities: Easy access to all types of raw NR has led to a burgeoning value added products manufacturing industry that generates a total turnover of over U$ 1,000 million. In 2015, consumption of rubber produced locally for value addition was 78,167 metric tons and another 48,260 metric tons were imported[21] to bridge the shortfall and also to take advantage of low-cost overseas supplies. Another important fact is the need to use synthetic rubbers (SR) to make high-value rubber products. In 2015, around 30,000 MT of SR were consumed by the industry which is around 20% of total rubber consumption. As a rule of thumb, globally competitive manufacturers use over 40% SR in their formulations. Rubber products are being manufactured entirely by the private sector comprising of large, medium and small firms. However, around 15 major firms account for over 90% of the turnover. Few mid-sized firms generate 5% of the turnover while all other SMEs may account for 5%. This provides a great opportunity for a new breed of mid-sized techno-savvy and entrepreneurial SMEs to grow.

Status of MSMEs: MSMEs play a significant role in developed countries as technological innovators. Sri Lanka rubber industry MSMEs are saddled with a combination of problems that include competition from influx of cheap imports, financial constraints, HR issues, technological deficiencies, management/ownership issues and marketing barriers which hinders achieving competitiveness, growth and sustainability. Most of them are technological laggards weak in managerial effectiveness. Success of a few large firms doesn't indicate sound industry health. Only a couple of MSMEs have become success stories within the last three decades although large firms have grown well. A more robust MSME development policy is a prerequisite for industry expansion.

Products, markets and investors: Major rubber product categories marketed include industrial off-the-road solid and pneumatic tires, car and cycle tires, latex gloves and automotive components. The most important markets are the US, Germany, Italy and Belgium respectively among others. A fairly large local market also exists for tires, both new and retreaded, automotive components and engineering products, which is estimated at around U$ 195 million. The private sector investments in

[20] Computation of national yield figure is different to the measure of grams per tree per tapping (GTT) and affected by non-technical factors such as market price, availability of labor and rain interference.
[21] Exporting BOI companies enjoy substantial Customs duty waivers for raw rubber imports.

this industry are over U$ 700 million and over 60% has come from FDIs under the BOI regime. Rubber products sector employs around 40,000 persons and some jobs are in high skill categories which require technological competencies. Sri Lanka has become the largest exporter of industrial solid tires and the fifth largest exporter of latex gloves. Considering the wide variety of types of rubber products made in the world, Sri Lanka need to be cautious as to not to put all eggs in a single basket. Steps need to be taken to diversify product portfolios as well as markets.

Rubber-wood: Need to replant rubber in 33 year cycles provides materials for a lucrative sub sector that uses rubber wood for value addition. Total turnover of the rubber wood based industry is estimated at U$ 80 million which is much below its true potential when compared with countries such as Malaysia. A major portion of rubber wood is also being used as fuel-wood or bio-mass in a variety of industries to generate energy which helps save foreign exchange[22] spent on imported liquid fuel. Sustainability of rubber farms could be improved if rubber wood can be converted to higher value products such as furniture.

Upstream industry cluster: Upstream activities are supported by service providers and suppliers of fertilizer, chemicals and machinery, repair and maintenance services, packaging materials, R&D services and technology providers, HR/training providers, marketing and trading facilitators among others. Much improvement is essential in most of these activities to enhance the performance of upstream activities.

Downstream industry cluster: Downstream industry is served by suppliers of chemicals and process materials, dies and moulds, energy and fuel, packaging materials, water suppliers, central waste disposal and effluent treatment facilitators; machinery and equipment suppliers; engineering service providers; transport, shipping and logistics providers; laboratory services providers; R&D service providers; HR services and training providers etc.. Most of these services are not up to international standards and manufacturers expect improvements in these services which contribute significantly to the rubber manufacturing industry competitiveness. It is pertinent to note here that large OEM investors such as Toyota and Mazda have abandoned auto projects in Vietnam because of concerns about the underdeveloped support industries[23]. Cluster-wide development is a crucial factor.

Government agencies: The key government ministry with the mandate for policy development and implementation related to rubber industry is the Ministry of Plantation Industries. The Ministry of Industries and Commerce also plays an important supporting role in respect of value added manufacturing. The Ministry of Finance allocates resources. The private sector is consulted by them when necessary, prior to such policy determination. Under the ministries mentioned, the statutory bodies and departments mentioned below operationalize the policies determined. However, there is an apparent gap between the desired policy impact and actual results. This may be due to a variance in understanding of private sector needs by the government and vice versa which needs to be reduced. Sri Lanka Rubber Secretariat is established to address this inconsistency.

Institutional support: Rubber industry cluster is supported by various institutions from the public and private sectors. Historically, the government directed, guided and assisted the upstream

[22] Estimated foreign exchange saving is USD 60 million
[23] Rubber India, March 2014, p52

operations mainly through the programs of RDD and the RRISL that come under the purview of MPI. Additionally, the Thurusaviya Fund (TF) is mandated to support smallholders through provision of processing and marketing facilities using smallholder development societies. The National Institute of Plantation Management (NIPM) is involved in plantation related human resources development. Downstream activities are being supported by IDB, EDB, BOI and ITI, which provide investment, technological and marketing support. The RRISL too provides support for downstream operations but within certain limitations.

Development partners: Frequently, agencies such as ADB, USAID, GTZ (GIZ), JICA, IFAD and WB too have provided grants, technical assistance and long-term loans. However, the only ongoing project in the rubber sector is the Moneragala Rubber Development Project[24] supported by IFAD/UN which has completed its first phase of 5,000 ha of smallholdings development. The second phase (STaRR) will cover another 3,000 ha of smallholdings in Moneragala and Ampara districts.

Policy and regulatory framework: Policies and regulations applicable to rubber industry have been evolving over a long period since the colonial times. Rubber was then a strategic material which fact influenced certain policies and regulations determined by respective administrations. "Controls" were then considered necessary[25]. Since independence, rubber industry became part of national development agenda and policies were geared to promote socio-economic growth and equitable income distribution. Most of the policies and regulations govern and support upstream rubber production and trading activities. More recently, certain modifications were made to the policy framework with the aim of developing the downstream manufacturing industry. However, as the rubber industry comprises of a continuous chain of interdependent activities, an integrated policy and institutional framework that covers the entire value chain is of paramount importance. As a whole, the industry feels the need for a complete review and revival of the policy, regulatory and institutional framework to create an enabling environment conducive for rapid development of the industry, thus enabling the realization of its true potential.

Private sector institutions: The rubber industry is served by four strong industry associations that are members of the industry apex body, Sri Lanka Society of Rubber Industry (SRI). They are (i) Colombo Rubber Traders' Association (CRTA), (ii) Planters' Association of Ceylon (PA), (iii) Sri Lanka Association of Manufacturers and Exporters of Rubber Products (SLAMERP) and, (iv) Plastics and Rubber Institute of Sri Lanka (PRISL). These institutions meet specific professional and trade objectives while the industry apex body SRI focus on macro aspects. As a collaborative platform, the Sri Lanka Rubber Secretariat was established in 2012 to support the master planning initiative and to facilitate public private cooperation.

2.2 Status of Competitiveness

NR production: Being a pioneer in the NR industry in Asia, Sri Lanka was at an advantageous position in the market for NR vis-à-vis its global competitors. However, an analysis of the current status demonstrates weaknesses in performance compared with many new comers to the NR

[24] IFAD funded SPEnDP which began in 2008 entered the second phase in 2016 as STaRR

[25] Establishment of Rubber Control Department which at present remodeled as Rubber Development Department although the basic character remains more or less the same.

industry especially in the areas of production, productivity and technological innovations. Position of traditional Sri Lankan NR ‘‘brands’’ has eroded over the years due to lack of initiatives and innovations. These factors have led to lower profitability at times of cyclical price decline, which is an inevitable condition in commodity markets linked to stochastic systems. This has affected the decisions of producers in relation to replanting, new planting and even production.

Rubber products: As far as rubber products manufacturing industry is concerned, the position of Sri Lankan players can be considered somewhat mixed. Although the sector turnover recorded a steady rise, the increase in terms of value addition[26] is moderate. Global industry average conversion rate, measured in terms of value per ton of rubber used, is around U$ 15,000 whereas specialized manufacturing firms record over U$ 30,000 per metric ton of rubber converted[27]. Sri Lanka recorded U$ 9,300 per metric ton in 2013 which has declined to U$ 7,300 by 2015. This sudden decline however is due mainly to market factors but highlights the comparative value deficit that needs to be bridged. This gap is attributed to the deficiencies in technological capability, innovation systems, human resources, investments, common infrastructure, marketing and branding, among others which suggests the need for holistic industry wide improvements. Lack of product diversification and differentiation is another factor. Compared with competitors, the level of technological innovation among most manufacturers is weak with relatively low investments in R&D and HR. Collaborative efforts among industry players in areas such as R&D, procurement, logistics etc. is not common although industry-university partnerships are slowly emerging.

Productivity: Compared with global standards, Sri Lanka ranks low in terms of most productivity measures. As mentioned before, land productivity or latex yields in rubber farms stay below world averages. In the manufacture of rubber products, export value per employee is estimated at around U$ 25,000. In 2010, Canada rubber industry achieved U$ 159,350 per employee. These two basic benchmarks demonstrate the status of industry although no information is available on important indicators such as Total Factor Productivity[28] growth. Absence of regular studies and benchmarking exercises to monitor industry performance is hindering effective policy making and strategic planning which could make an industry a laggard. The need is for an institutionalized process to conduct such studies to be set up by stakeholders. This will be an essential part of the master plan updating process.

NR bias: Sri Lankan rubber products industry at present is based mostly on Natural Rubber. This is expected as Sri Lanka is a natural rubber producer. Synthetic Rubber (SR) consumption, either in blends or as SR alone, is less than 12.5% of the total rubber consumed whereas global average is 58%. SR provides unique opportunities to manufacturers to create new products with certain special performance characteristics. Natural rubber producers, especially the smallholders believe SR to be a threat to their survival. Unfortunately, this is a wide spread belief which is a misconception owing to lack of proper industry information. In reality, SR compliments NR in achieving superior performance standards in sophisticated rubber products such as automotive and engineering components. Modern rubber products manufacturers use both types in right proportions to make the products to suit market needs.

[26] Addition of value per ton of raw rubber converted (product sales value in USD/rubber consumed in MT).
[27] In 2010, Japan recorded USD 33,703 per MT for non-tire rubber products such as automotive and health care products.
[28] Considered the real driver of growth, TFP is primarily a function of technological dynamism and human competencies in an industry

Infrastructure: Need for common infrastructure is becoming increasingly important considering the emerging environmental issues. For example, while countries such as India, China[29], Malaysia and Thailand have set up ‘‘Rubber Cities’’, or planning to set up, Sri Lanka has not achieved its goal of having a dedicated rubber industry park though it was mooted as far back as the year 2000[30]. It is pertinent to mention an example for action delayed. It took nearly twelve years to build and commission the Multipurpose Gamma Irradiation Facility (Sri Lanka Gamma Centre) which was proposed in 2001 and required by the latex glove industry to produce surgeon’s gloves. Such undue delay in building common infrastructure facilities hinders income generation and industry development.

Related and supporting industries: Rubber industry needs the support of a wide variety of related and supporting industries which form the rubber industry cluster[31]. Compared with developed countries, the level of service available from such local industries are less than desirable. For example, availability of precision mold making facilities is inadequate. Suppliers of machinery and equipment and engineering services are insufficient. Pre-vulcanized latex and custom compounded rubber for value added industry are not readily available as in advanced rubber manufacturing countries. As a whole, cost and quality of such services are not competitive, resulting in most manufacturers opting for overseas sourcing that causes delays and drain of funds. This is a major constraint faced by the MSME sector.

Marketing: Marketing strategies are critical to sustain competitiveness in global markets. Although a few firms have shown remarkable success, percentage of globally branded Sri Lankan rubber products is not significant. In the raw rubber sector too, Sri Lankan producers have not increased their respective shares in the markets they serve. Except for a few firms, forward integration into distribution is not practiced by many firms. Cost of global marketing is not affordable as the volumes offered by Sri Lankan producers are small compared to large scale global manufacturers. Brand values are not realized by most manufactures. Collective action may be beneficial in effective marketing as collaboration can bring down initial costs associated with distribution and overseas market promotion.

2.3 Policy Environment

Government interventions: Historically, in almost all the NR producing countries in Asia, rubber industry has been nurtured by respective governments primarily due to the involvement of millions of vulnerable smallholders in the supply chain. Thus the policy environment has been created to serve the rubber producers with less focus on manufacturing industries which is the area dominated by the resilient private sector. The policy of the government has a major impact on industry competitiveness. Sri Lanka has been influenced by other rubber producing countries in policy formulation and collaborates with other governments in rubber industry matters. The Association of Natural Rubber Producing Countries (ANRPC) is an intergovernmental body that promotes rubber industry interests and provides a platform for information sharing and making collective decisions.

[29] China’s Rubber Valley in Qingdao, a 494 acre bustling rubber industrial town in Shandong Province is equated to Silicone Valley

[30] At the request of the Sri Lanka Rubber Cluster, Ministry of Industries identified land in Kalutara District for the Rubber City in the year 2000. Refer International Rubber Quarterly Malaysia, March 2003, page 5-6

[31] ‘‘Competitiveness of Nations’’ by Prof. M. Porter who advanced the theory of industry clusters.

Sri Lankan policy environment pertaining to the rubber sector, therefore, resembles that of most Asian NR producing countries.

Upstream: Competitive dynamics are somewhat different in the two main industry segments which are upstream (rubber production) and downstream (value addition). Competition in upstream activities comes from other NR producing countries among which are some new entrants that possess comparative advantages such as fertile virgin land and abundance of low cost labor. Leading NR producing countries have developed a very supportive policy and institutional framework to assist producers who are mostly smallholders. As producers, they are gaining a lead because their policies are coherent and consistent with national economic growth plans that are long-term. Further, their policies and regulations support long-term industry development plans with clear targets and strategies. The institutions responsible are adequately resourced and manned by competent staff well trained and motivated. They implement national plans with necessary dynamism and achieve desired results. Sri Lanka seems to lack such integrated long-term plans and effective implementation mechanisms adequately funded.

Downstream: In the downstream segment which is driven by the private sector, more relevant to competitiveness is the macro-economic framework. In countries where rubber products industry is highly competitive, macro-economic conditions are strong. At a micro or firm level, competitiveness of downstream activities depends on costs of inputs such as water and energy, labor regulations, innovative R&D inputs, superior HR competencies and availability of common infrastructure. Trade and tariff policies including preferential trade agreements facilitate global trade. All these are policy dependent and competitive countries offer a facilitating environment for industries to grow. Although improvements are being made, especially with regards to infrastructure, Sri Lankan conditions are relatively neutral at best and the current dismal performance of the MSME rubber products sector provides clear evidence of this situation. This particular sector needs special policy, infrastructure and institutional support.

Investments: Growth of downstream activities depends on continuous investments in expanding existing businesses and promoting new ventures. Investments are policy driven and may come from local firms, FDIs or through JVs. Considering the internal NR supply decline, one cannot expect large scale FDIs to come as happened in the 1980s. Even the large local firms may opt to expand outside Sri Lanka getting closer to steady rubber supplies. Policy imperative is to support existing local firms to be globally competitive by developing local competitive advantages such as technological sophistication and human competencies in addition to providing critical infrastructure. This is in addition to sustaining the comparative advantage of having a steady supply of raw natural rubber which again is investment dependent considering the seven year gestation period of a new plantation. It is important, therefore, to create an environment conducive to attract investments required to expand both downstream and upstream segments.

MSME development: In developed countries with competitive industries, MSMEs play a significant role and sometimes contribute to at least 30% of the industry turnover. In the Sri Lankan rubber manufacturing industry, MSME contribution appears to be less than 5%. This is due to the absence of an integrated policy and a plan on MSME growth and development. It is important to

enhance the performance of the Rubber Products Development and Services Centre (RPDSC)[32] to support the growth of a vibrant MSME sector. Provision of common infrastructure in suitable industrial parks too will benefit upcoming SMEs which face locational issues.

Public-private partnerships (PPP): Promotion of PPPs is of vital importance in developing new businesses and improving hard and soft infrastructure at minimum cost to the government. Rubber industry cannot boast of any such effective PPPs, except the Wellassa Rubber Company[33] nursery set up in 2007 to serve smallholders in Moneragala. Such joint ventures can be launched to undertake projects in R&D, HR and industry infrastructure development. This is an area that the stakeholders need to address with government involvement. For example, the RPDSC can be expanded and upgraded to serve the MSMEs on a PPP basis. Even the RRISL could be more effective in promoting technological innovations through demand driven research projects run on the basis of PPPs.

Industry-institutional relationships: Policies pertaining to industry-institutional relationships can be further improved by facilitating more effective and frequent target oriented working relationships among the private sector firms and state institutions such as universities and relevant research institutions. Existing arrangements are few and far between and results are not shared industry-wide. Private sector has funds and research needs whereas state institutions and universities have excellent academic and scientific competencies in addition to reasonable infrastructure facilities. If both parties work together, result would be superior technological competencies, both in the private sector and universities, which could be converted to innovative products in lucrative markets. Project based technology consortia is a proven way of promoting such industry-institutional partnerships.

Sustainability: Rubber industry is unique in terms of environmental sustainability though with an apparent dichotomy. Large tracts of rubber farms extending over 130,000 ha in the country provide man-made renewable forests. Since the maturing of 5,000 ha of SPEnDP rubber smallholdings in Moneragala, locals claim that there is an apparent improvement in the micro-climate[34]. Rubber trees are efficient in Carbon sequestration and may qualify for Carbon credits. On the other hand, rubber manufacturing sector is facing certain issues with regards to environmental pollution to be resolved but technology is available for mitigating adverse impacts and also to convert industrial and post-consumer waste into marketable products. To derive optimal benefits, policies are required to facilitate and encourage sustainability measures such as recycling and reuse of effluent water and other industry waste. Government initiatives are required to obtain Carbon trading benefits and policy measures may be needed to promote Eco-Industrial Clusters or Green manufacturing Zones. In terms of the other two pillars of sustainability which are economic vitality and social inclusion, the rubber sector has no major issues although improvements are required. Nevertheless, economic viability of rubber production may be in jeopardy unless required productivity improvements are effected. This in turn may affect the economic viability of rubber products manufacturing sector if the local producers cannot produce and supply the critical mass of raw rubber required. The programs and projects included in the master plan are aimed at finding solutions to the above issues.

[32] Coming under the purview of Industrial Development Board/Ministry of Industries & Commerce
[33] WRC is a JV among seven leading rubber products manufacturing firms which promoted the Moneragala Rubber Project
[34] This could be a perception as people feel comfortable when surrounded by rubber trees but perception is the reality!

Section 3: The Way Forward

3.1 Charting the Future

A blueprint for future action: The foregoing sections highlight the industry background, current status and competitiveness position of the Sri Lankan rubber industry and explain the rationale of the Rubber Master Plan which aims at reaching an exalted position. Once the existing relative strategic position of the industry is clear to stakeholders, it is possible to prepare a blueprint for a future growth path by a) envisioning an achievable and desirable state illustrated by goals and objectives, b) synthesizing strategies to reach the desired state and, c) crafting best solutions to existing and potential problems by way of action programs and projects. Creating suitable mechanisms to implement projects designed is to be followed. All these steps are an integral part of a comprehensive endeavor to be undertaken by all stakeholders in a collaborative manner and this Master Plan has been developed following the steps mentioned above.

Targeting growth: Global markets show signs of slow recovery from the financial crisis in 2009. Sri Lanka rubber industry could enter Western markets aggressively to capture a larger share now. Although China shows growth constraints, developing Asia, Africa and Latin America will increase the per capita use of rubber products in keeping with improved standards of living. Identification of these opportunities and the resolve which emerged during the planning deliberations enabled the stakeholders to develop a grand vision for the Sri Lanka rubber industry. A national agenda emerged which became a long-term plan with an ambitious but achievable target. This Master Plan has been drafted on the premise that the industry will achieve a steady growth of over CAGR 10 percent once the priority projects are implemented and necessary and sufficient infrastructure, policy support and other facilities are provided. The collective aim is to reach an aggregate annual industry turnover[35] target of nearly U$ 4.0 billion by 2026.

Plan for growth: The Master Plan which is the agreed plan for industry growth and competitiveness comprises of a Vision, Core Values, Mission, Goals and Objectives, Strategies and actionable Programs that include a series of projects backed by important Strategic Initiatives. The stakeholders have identified twenty five (25) projects within ten (10) programs necessary and sufficient to reach industry objectives. The plan also provides sufficient flexibility and a robust method to add more projects or improved versions depending on future industry needs.

Timelines: At the outset, stakeholders wished to craft a 10 year plan but it was imperative to extend the plan scope beyond 10 years considering the nature of rubber planting and replanting programs that cannot be implemented in short to medium term. Therefore the plantation projects may go well beyond 2040 for completion. Implementation of the first Rubber Master Plan is scheduled to begin in 2016 and most of the projects, excluding rubber planting projects, would conclude successfully within 5 to 10 years. Being a rolling plan, a series of updated rubber master plans will continue to be implemented to sustain rubber industry's global competitiveness.

[35] Aggregate market values of: (i) raw rubber produced (exports + consumption), (ii) exports of rubber products, (iii) exports of rubber wood products and (iv) local sales of all products including rubber goods and rubber wood products such as furniture etc.

Related documents: The main master plan document is derived from number of other working papers which provide detailed information on industry status including global competitiveness issues, best practices and benchmarks that led to the programs and projects selected. Relevant analytical models were used to comprehend industry dynamics. When necessary, new working papers will be prepared to analyze evolving issues with a view to propose appropriate solutions thus making the rubber master plan a dynamic, relevant and responsive document. All the working papers are available at the Sri Lanka Rubber Secretariat for perusal and revision in future.

3.2 The Vision and Mission

Vision

The Master Planning process facilitated the rubber industry stakeholders to deliberate and craft an overarching vision that describes the ideal futuristic industry status. The grand vision articulated is:

> ***"Sri Lanka Rubber industry to be a desired area for investors and entrepreneurs that provides superior stakeholder value, attractive employment to its workforce and socio-ecological benefits to the citizens while occupying a preeminent position in the national export scene with a significant presence in global markets."***

The vision expressed will be supported by a series of core values that set the performance standards and guide the accomplishment of the mission. The core values presented below which are deeply held traditionally by the Sri Lankan rubber industry will be upheld by the stakeholders when implementing the Master Plan.

Ten Core Values

Core or shared values are standards which govern the collective behavior of players in the industry which demonstrate basic convictions of industry leaders. The overarching theme among the proffered values is that they ensure the continuation of the preferred behavior. By adhering to these values, Sri Lanka rubber industry will be able to produce superior customer value consistently satisfying all stakeholders. Core values depict the ethical foundation of the industry which distinguishes it culturally from other businesses and industries.

01. Superior customer value in functional integrity of products and services
02. Unequivocal excellence in all aspects of the industry operations
03. Displayed professionalism, responsibility and accountability
04. Science and Technology based learning and innovation
05. Development of workforce parallel to growth of the industry and firm
06. Collaboration in pre-competitive areas and in resolving disputes
07. Productive public-private partnerships based on openness and fairness
08. Corporate social responsibility, stewardship and gender equity
09. Sustainable production and resource optimization
10. Equitable sharing of benefits

Mission

To realize the articulated vision, while adhering to the stated core values, industry stakeholders will accomplish the following mission which is:

> ***"To attain and sustain global competitiveness of Sri Lanka rubber industry by enhancing performance in all value chain activities related to manufactured products while strengthening the local rubber supply chain to be a reliable source of raw materials that gives a comparative advantage."***

3.3 Goals and Objectives

Goals

Realization of the mission depends on achieving a series of specific goals which are indicated below.

i. Capture 0.5% share of the global market for rubber products.
ii. Gain 1.0% share of the global NR market.
iii. Add value to at least 90% of the rubber produced in the country.
iv. Export the balance 10% as differentiated specialty raw rubber under a Sri Lankan brand.
v. Convert 50% of harvested rubber wood to high value added products for export.
vi. Develop a thriving MSME sector that links to major firms and global value chains.
vii. Double the quantum of investments in the rubber products manufacturing industry.
viii. Establish a dynamic and effective technological platform to enable innovations.
ix. Develop a world class workforce with required competencies and work ethics.
x. Make the rubber industry an environmentally and socially responsible eco-industry cluster.

Achievement of the above goals will require a time span that extends beyond this master plan period of ten years, commencing 2016, which necessitates periodical updates to the master plan.

Objectives

The goals stated above are further elaborated below quantitatively.

i. Increase the area under rubber to 169,000 hectares by 2025.
ii. Increase local rubber production to 300,000 metric tons per annum by 2045.
iii. Reach national rubber plantation yield to 1,700 kg per ha year by 2045.
iv. Establish the Rubber City, a dedicated Rubber Industry Park by 2018 that will have a capacity to generate a turnover of U$ 1 billion.
v. Turnover of rubber products industry to exceed U$ 5.0 billion by 2030.
vi. Increase consumption of rubber to 240,000 tons (157,000 metric tons of NR types and 72,000 tons of SR types in addition to 11,000 Semi-processed types) by 2025.
vii. Attract investments and develop markets for Latex Crepe based products by 2020.
viii. Reach a conversion value equal to U$ 15,000 per ton of rubber used by 2025.
ix. Increase value of rubber wood based products turnover to US$ 350 million by 2025.
x. Double the contribution of MSMEs to industry turnover by 2025.

3.4 Competitive Strategies

Strategic approach

The integrated three pronged strategic approach to be adopted to achieve the goals and objectives include: (a) developing essential common infrastructure facilities, both soft and hard, for value added industry that must be innovative to embark on the next cycle of growth and reach a sustainable competitive status in respect of customer value, sophistication of products, productivity and profitability, (b) strengthening and consolidating the supply side with the development of a reliable supply line comprising of highly productive and hence resilient smallholder rubber farms and estates and, (c) providing enabling policy, institutional and investment support which is a sine qua non for rapid growth of the industry. This approach considers the rubber industry cluster from a holistic perspective and intends to serve national interests while achieving industry goals.

The following excerpt from an ADB document confirms the appropriateness of the strategic approach adopted in developing the Rubber Master Plan.

> *"Sri Lanka must develop expertise, products and services, and increase the productivity of workers to compete with the world's innovators in high income countries. If Sri Lanka is not able to adequately develop the expertise and innovation of its people and industries, it could be stuck in what economists call the 'middle-income trap', where the country breaks out of poverty but cannot move to the next level of prosperity". (Asian Development Bank's Development Effectiveness Brief (2015) on Sri*

Operationalization of strategies

The strategy is operationalized through the following specific initiatives.

- **Supply superior rubber products for niche markets:** Creation of a dedicated rubber industry park, ‘‘The Rubber City’’ with three multi-functional zones that will have a satellite network of auxiliary facilities and services integrated within a cohesive framework.
- **Produce sufficient raw materials locally:** Ensure a critical mass of local rubber supplies by expanding new smallholdings in non-traditional areas, replanting at an accelerated rate and enhancing productivity in traditional rubber growing areas while bringing suitable underutilized lands in the estate sector under rubber cultivation.
- **Convert rubber wood to a value added material:** Derive maximum value from rubber wood which is a unique renewable material of high demand.
- **Enhance competencies at industry level to increase market responsiveness:** Upgrade technological competencies and innovative capacity through technology consortia among research institutions, universities and private sector firms**.**
- **Develop a dynamic workforce:** Improve workforce performance and productivity through an industry**-**wide program implemented by a representative Workforce Development Council**.**
- **Create an enabling environment:** Refining the existing policy and institutional framework to match the current global competitive dynamics and unpredictable market changes.

- **Sustainability:** Ensure all sustainability measures are adopted in respect of environment, social and economic fronts.

Catalytic support measures

The following important support measures will be introduced to achieve operational efficiency and effectiveness in implementing the Master Plan.

- Establish Sri Lanka Rubber Secretariat as the Master Plan implementation support platform.
- Promote public-private partnerships to assure implementation efficiency and synergy.
- Strengthen collaboration among industry stakeholders to enhance cluster functionality.

3.5 Action Programs for Operationalizing Strategies

The Master Plan consists of ten Action Programs that aim at operationalizing the strategies stated earlier. The five main programs are as follows.

i. Expansion of national rubber production base
ii. Productivity enhancement in rubber plantations
iii. Development of sustainable farming systems
iv. Enhancement of the global competitiveness of rubber products
v. Rubber wood industry development

The above five main programs are supported by five ancillary programs that are:

i. Workforce development and productivity enhancement
ii. Technological capability development and innovation
iii. Industry information management
iv. Strengthening MSME sustainability
v. Effective implementation of the Rubber Master Plan

3.6 Rubber Master Plan Strategies, Programs and Projects

The Table 1 summarizes all strategies, programs and projects validated by stakeholders that will be implemented to achieve Master Plan goals. The Table 1.1 lists the strategic initiatives required to create an environment conducive to industry growth. A sound participatory mechanism is available to modify the project list as appropriate to suit emerging industry dynamics.

All the twenty-five projects are described using a common format in Annex 2 (Project Papers). Pre-feasibility of some of the projects have been completed during the planning process but full feasibility studies will be conducted on all the projects proposed prior to resource allocations and implementation.

Table 1: List of Programs and Projects

Strategy/Program	Project Title	Code	No
Strategy 1: National Rubber Production Expansion		ST 1	
Program 1: **Expansion of National Rubber Production Base**	Project 01: New Smallholdings in Non Traditional Regions Suitable for Rubber Growing	Pg1/Pj01	1
	Project 02: Developing New Farming Clusters (Nucleus/Plasma) by the Private Sector	Pg1/Pj02	2
	Project 03: Expanding the Extent of Rubber in Estates Managed by RPCs, JEDB and SLSPC	Pg1/Pj03	3
	Project 04: Expanding the Extent of Rubber Smallholdings in Traditional Rubber Growing Areas	Pg1/Pj04	4
Program 2: **Productivity Enhancement in Rubber Plantations**	Project 01: Accelerated Replanting Rubber Farms Nearing the End of Economic Life	Pg2/Pj01	5
	Project 02: Adoption of New Technologies and Good Management Practices in Rubber Production	Pg2/Pj02	6
	Project 03: Establishment of a Network of Certified Nurseries	Pg2/Pj03	7
Program 3: **Sustainable Farming Systems**	Project 01: Rubber Producers' Income Stabilization Scheme	Pg3/Pj01	8
	Project 02: Incentivization of rubber tappers	Pg3/Pj02	9
	Project 03: Transforming smallholdings to resilient business units	Pg3/Pj03	10
Strategy 2: Rubber Products Market Share Expansion		ST 2	
Program 4: **Enhancing Competitiveness of Rubber Products**	Project 01: Strategic Promotion of Sri Lankan Rubber Products	Pg4/Pj01	11
	Project 02: The Rubber City, A Dedicated Industrial Park	Pg4/Pj02	12
	Project 03: Latex Industry Integrated Water Management Project (IWMP)	Pg4/Pj03	13
	Project 04: Enhancement of Resource Use Efficiency and Productivity in Rubber Manufacturing Industry	Pg4/Pj04	14
Strategy 3: Value Addition to Rubber Wood		ST 3	
Program 5: **Rubber Wood Industry Development**	Project 01: Establishment of Multi-functional Central Rubber Wood Processing Units	Pg5/Pj01	15
Strategy 4: Workforce Development		ST 4	
Program 6:	Project 01: Rubber Industry Workforce Development Council	Pg6/Pj01	16

Rubber Industry Workforce Development	(RIWDC)		
Strategy 5: Technological Capability Improvement		ST 5	
Program 7: **Industry-wide Technological Capability Development**	Project 01: Establishment of Rubber Industry Technology Consortium (RITC)	Pg7/Pj01	17
	Project 02: Introduction of Refinements to Current Technological Practices in Rubber Production	Pg7/Pj02	18
	Project 03: Designer Rubber Project (Eco-Industrial Cluster)	Pg7/Pj03	19
	Project 04: Finite Element Analysis Simulation Centre (FEASC)	Pg7/Pj04	20
Strategy 6: Industry Information Management		ST 6	
Program 8: **Rubber Industry Information Management**	Project 01: Effective Use of Rubber Industry Data for Decision Making	Pg8/Pj01	21
Strategy 7: MSME Sustainability		ST 7	
Program 9: **Strengthening MSME Sustainability**	Project 01: Capacity Enhancement of Rubber Products Development Centre (RPDC)	Pg9/Pj01	22
Strategy 8: Public-Private Partnerships		ST 8	
Program 10: **Implementation of the Rubber Master Plan**	Project 01: Capacity Building of the Sri Lanka Rubber Secretariat (SLRS)	Pg10/Pj01	23
	Project 02: Establishment of a Project Facilitation Unit (PFU) at the SLRS	Pg10/Pj02	24
	Project 03: Strengthening Rubber Cluster Young Network (RCYN)	Pg10/Pj03	25

Table 1.1 Rubber Master Plan Strategic Initiatives

Code	Strategic Initiative	Objective
SI 1	Reformulation of Policies, Rules and Regulations	To improve the enabling environment
SI 2	Institutional Strengthening and Capacity Building	To improve efficiency and effectiveness of relevant institutions
SI 3	Broad basing the Sri Lanka Society of Rubber Industry	To enhance inclusiveness, communication and collaborative synergies

3.7 Policy Philosophy

The Master Plan is the key policy document relevant to Sri Lanka's rubber industry and it is relevant to assess the process of policy determination. The level of development of a country determines the type of industrial policy required to guide the industrial and economic development towards utilizing the comparative advantages of the country and its unique selling propositions. Sri Lanka is yet a developing country[36] and its rubber industry, albeit no more nascent, has not reached the peak in competitiveness which warrants targeted stimulating policy interventions. Provision of industry cluster-wide public goods is needed to ensure prudent resource allocation to help creation and distribution of wealth in an equitable and sustainable manner. It is not adequate to leave the private sector to compete only on its own strengths behaving the way that they are comfortable with. The government determines the exalted destination of the nation and the industry will create the wealth needed to reach that aim. The imperative therefore is for the government and the industry to reach consensus on the key intervention processes required that will lead to effective policy development and execution in a concerted way.

The contemporary industrial policies adopted by many countries will not support industries directly but fuel the economic engines that drive relevant industries in private markets. Rubber industry engine is fueled mainly by technological innovations, competencies of its workforce and sparks of entrepreneurship which highlights where the major policy drivers need to focus. Further, the policy framework will neither create a stultifying bureaucracy nor allow regulatory capture by private and public entities who wish to preserve the status quo but catalyze structural transformation of the rubber industry cluster.

The use of a rigid industrial policy, however, should be minimal but will remain as an option to achieve specific objectives such as increasing national incomes[37] and to enable the government to achieve national development goals thus striking the right balance between market forces and government support. The specific industrial policy is expected to be strengthened with sound fiscal, monetary and regulatory policies. In this context, the Master Plan identifies following meta/macro level policy guidelines which are in harmony with the competitive industry strategies crafted.

Realm	Policy Guide
Industry Structure	Sri Lanka Rubber industry comprises of two key segments. Raw rubber production with an agricultural focus and value added manufacturing which is industrial by nature. Both segments are globally linked and could "survive" without the other. Although one feeds the other, from a policy perspective these two segments will be treated as two independent segments. One segment will not be supported at the cost of the other segment. Each segment will become competitive and self-supporting as a distinct enterprise. One will not subsidize the other. However, close collaboration between the two segments will be promoted through integration, both vertical and horizontal.

[36] According to World Bank, a developing country is one in which the majority lives on far less money—with far fewer basic public services—than the population in highly industrialized countries. This shows the relevance of industrialization strategy in escaping the middle income trap and reconfirms the relevance of Rubber Industry Master Plan in Sri Lanka's long-term growth efforts.

[37] As categorized by the World bank, Sri Lanka is a Lower-Middle Income Country (LMIC) with $78.82 billion GDP and a population of 20.64 million (2014). LMIC has Gross National Income (GNI) per capita within the range of $ 1045 to 4125. India is still a LMIC whereas China has become an Upper Middle Income Country due to efficiently managed industrialization efforts.

Infrastructure **Hard and soft**	Government focus will be on the provision of common industry infrastructure such as industrial parks, efficient supply of utilities (power and water) that ensure colocation advantages with reduced transaction costs; platforms for technological innovations and development of competent human resources with special focus on small and medium enterprises.
Collaboration	Policy driven collaboration among industry firms, industry associations and between the government entities and the private sector will be promoted to increase (a) pre-competitive collaboration among firms and, (b) the effectiveness of developing and implementing micro level policies. Inter-agency collaboration will be institutionalized at operational level. Public-private partnerships will be a preferred investment model. Donor assisted programs too will promote all types of collaborative activities among industry stakeholders. Ultimate goal is to remove conflicts and create synergistic effects.
Communication	Government-private sector communication process will be reoriented as a dynamic two-way process with regularity and transparency to ensure mutual learning and productive outcomes. Such mechanisms are to be promoted and sustained through institutionalized policy measures.
Key Industry drivers	Technological innovation will be the key determinant of global competitiveness and therefore exhaustive policy measures will be adopted to make the rubber industry a technology driven industry sector to be in par with global industry leaders. Workforce competencies become a key driver in creating differentiated value. Entrepreneurship, especially at MSME level is essential to develop new products and new markets. These key drivers will be supported through enabling policy instruments.
Planning horizon	Policies will encourage and enable the implementation of long-term strategic plans. Taking uninformed ad hoc policy measures to overcome recurrent issues faced by industry stakeholders are ineffective. Short-term policies adopted due to public expediencies create adverse effects that are very costly to the industry as well as tax-payer. As a policy, long-term industry development plans will be drawn through an institutionalized intense participatory process. Plans will comprise of pragmatic programs and projects with strategic initiatives to support efficient implementation.
Resource mobilization	Sound development interventions are stalled due to government resource constraints although industries are run by the private sector. If a particular project benefits the private sector, policies must catalyse private sector investments with necessary risk safeguards. Those who are willing to take calculated risks should be allowed to reap commensurate benefits. Therefore, policy of encouraging Public-Private Partnerships is important when industry development plans are implemented.
Implementation accountability	Accountability for results is the key driver in implementing national level plans. Policy will promote joint accountability mechanisms that bring the public and private sectors together working in tandem. Monitoring, evaluation and timely course correction will be an essential part of implementation and private sector role here is important.

Section 4: Envisioned Status

Effective implementation of programs, projects and strategic initiatives in the Master Plan will lead to radical repositioning of Sri Lanka rubber industry in a different league in terms of global competitiveness. What is expected is a well-integrated and functional rubber industry cluster devoid of any slacks in its value chain. The resultant transformation or the envisioned status could be described in terms of outputs, outcomes and impact which portray the industry performance from different perspectives. This is important because different stakeholders and industry players may evaluate the performance from different facets based on their own interests.

4.1 Outputs

Outputs are the amount and value of goods produced over a period of time or measurable changes that will occur within the cluster as a result of the implementation of programs and policy initiatives. The private sector is mainly concerned with outputs in terms of quantities and quality parameters that affect their market capabilities and hence bottom lines. These outputs are excellent indicators of the status of health and growth of the rubber industry. Critical outputs include annual raw rubber production, volume of rubber products manufactured and the value of rubber wood based products. Relevant aggregate output targets are given in Tables 2, 2.1 and 2.2.

Table 2: Progressive Performance and Projected Outputs (Raw Rubber) – up to 2024[38]

Indicator	Unit	2013 (Baseline)	2019	2024	CAGR %
UPSTREAM					
1. Total Rubber Extent	Ha	132,000	150,500	169,000	*2*
2. Mature Rubber Extent	Ha	105,500	97,930	97,000	*-1*
3. Average Rubber Yield	Kg/ha	1,043	1,042	1,046	*0*
4. Raw Rubber Production (Projections at 4% ARR)	MT	110,000	102,000	101,070	*-1*
5. Raw Rubber Exports	MT	23,585	18,000	15,570	*-4*
6. Local Raw Rubber internal consumption	MT	86,415	84,000	85,500	*0*
7. Value of locally consumed local rubber	$M	243	273	318	*3*
8. Export income from Raw Rubber	$M	71	63	64	*-1*
9. Total Value of Raw Rubber produced[39] (7+8)	$M	314	336	382	*2*
IMPORTS					
10. Raw Natural Rubber	MT	9,900	55,000	65,000	*21*
11. Synthetic rubber (40% for rubber products)	MT	14,355	23,000	69,000	*17*
12. Semi-processed rubber (20% of gross weight)	MT	5,224	6,000	7,000	*3*

[38] This table comprises of projections computed for the first draft of the master plan for 2015-2024 period where baseline was 2013.
[39] Raw rubber segment is considered as an independent business that may not depend on local products manufacturing segment for its existence. Therefore duplication of value doesn't occur.

Table 2.1: Progressive Performance and Projected Outputs (Downstream) – up to 2024

DOWNSTREAM					
Indicator	**Unit**	**2013 (Baseline)**	**2019**	**2024**	**CAGR %**
13. Total quantity of Rubber (NR+SR) Consumed	MT	115,894	168,000	226,500	*7*
14. Rubber Products[40] value of exports	$M	889	1700	3000	*13*
15. Rubber Products value of local sales	$M	195	240	300	*4*
16. Rubber Products – Aggregate Turnover	$M	1,084	1,940	3300	*12*
17. Value of rubber wood based products sold	$M	80	157	289	*14*
18. Total Industry Turnover (9+16+17)	$M	1,478	2,433	3,971	*10*
LOCAL MARKET FOR PRODUCTS					
19. Value of Rubber products imported	$M	118	250	275	*9*
20. Local market for rubber products (15+19)	$M	313	490	575	*6*

Table 2.2: Key Performance Ratios – up to 2024

PERFORMANCE RATIOS/INDICATORS					
Indicator	**Unit**	**2013 (Baseline)**	**2019**	**2024**	**CAGR %**
21. End value of products per MT of rubber used	US$	9,353	11,548	14,570	*4*
22. Per capita consumption of rubber	KG	5.6	8.0	10.5	*6*
23. Employment – direct in all segments	Persons	238,000	273,000	305,000	*3*
24. Employment – indirect in all segments	Persons	50,000	52,000	55,000	*1*
25. Investments in the sector (includes private)	$M	700	1500 +		TBE

Source: Computations done by the Sri Lanka Rubber Secretariat (ADB CCED Phase III work) based on data obtained from the Department of Customs, Department of Census and Statistics, Ministry of Plantation Industries, Export Development Board, Sri Lanka Association of Manufacturers and Exporters of Rubber Products (SLAMERP), Tyre Retreaders' Association and Wood-based Industry Association

The outputs shown above, which are self-explanatory reflect the improved industry performance projected within the Master Plan core period[41] which lays a strong foundation for future growth. However, the lack of rapid progress in terms of rubber production and yields are unavoidable and is the result of aggressive replanting program to be implemented which will be a corrective measure taken to clear a backlog. More important will be the succeeding years beyond the initial 10 year period during which the industry will reach greater heights as depicted in page 53, Annex 1.7, Table B4.

[40] Rubber products include finished goods, compounded rubber and other semi-processed items

[41] The Master Plan period was originally intended to be from 2015 to 2024 which is now shifted by one year forward i.e., from 2016 to 2025. This will have no bearing on the projects to be implemented.

There will be many other outputs that are not captured in the above tables. Examples include (i) additions to different sectors in the workforce, (ii) increase in capital stock, (iii) and changes in related and supporting industries cluster –wide.

4.2 Outcomes

There will be many notable outcomes arising from the implemented Master Plan. In the long-run, increased rubber supplies from more productive replanted rubber farms in traditional regions and newly developed rubber smallholdings in non-traditional regions will feed an expanding manufacturing sector sustaining the industry. Farm productivity increases will make rubber producers profitable, more resilient and less dependent on state assistance.

A core manufacturing sector producing more sophisticated and differentiated export oriented products[42] which offers high value products for niche markets under Sri Lankan brands will be the most important outcome. Enhanced industry-wide technological capabilities will lead to frequent product and process innovations and Sri Lanka will be able to capture an increased share of the global market for rubber products. Ability to avoid the risk of getting locked into a few product segments and the pressures to reduce costs leading to environmental, safety and health standards is another result.

The competent workforce with right attitudes and training will be more productive resulting enhanced earnings and lower turnover making the rubber industry more attractive for employment. Average wages in the industry is expected to rise in relation to other industries.

Another important outcome will be the emergence of a vibrant MSME sector[43] that could perform well in their respective markets producing general rubber goods for domestic market and replacement parts for local industries. Few can be export oriented enterprises manufacturing specialty products. Success of MSMEs will be catalyzed by the technology and workforce initiatives.

The rubber sector will attract more investments, private and public, foreign and local, and thereby common industry infrastructure facilities will improve. The ‘‘Rubber City’’ or the dedicated industry park for rubber products will set an example for other industry clusters. Collaboration among industry players in pre-competitive areas will lead to synergistic effects in industry operations. As a whole the industry will record higher profits and attractive returns on investments.

The Master Plan will be a valuable marketing tool that can be used effectively by the institutions such as BOI and EDB to attract investments and promote export marketing. When there is a plan that embodies a strategically drawn path, investment risks decrease. Investors can make prudent investment decisions based on the space and facilities available within the Master Plan. The government too will have no hesitation in making policy and public investment decisions as uncertainties are few but manageable.

[42] Higher to middle income developing countries are suppliers of differentiated products.
[43] MSMEs comprise 85% of the companies involved in rubber products manufacturing in Malaysia with annual turnovers ranging from LKR 10 million (micro) to LKR 1,000 million (medium enterprises) Source: MREPC Stretch 1Q2012.

The Eco-Industrial Cluster project will produce positive outcomes in terms of environmental sustainability transforming the rubber industry to a socio-ecologically responsible industry.

Successful implementation of the RMP will encourage other industry clusters to emulate and develop their own collaborative plans for growth thus enhancing national economic strength.

4.3 Impact

The impact of successful implementation of the Master Plan will be felt long after the initial ten years in terms of contribution to Sri Lanka's socio-economic transformation expected by its people. It will assure further growth of the rubber industry cluster which would benefit by the impetus created and explore new opportunities.

Main impact will come from an expanded manufacturing base that utilizes a superior workforce, technological innovations and more investments resulting increased earnings leading to progressively higher GDP, per capita incomes and improved standards of living. At the end, rubber industry will be able to react to unpredictable market changes by adopting rapidly responsive and flexible manufacturing systems.

Development of a competitive smallholder sector will create and sustain vibrant micro rural economies in new rubber growing regions that could include Northern and Eastern locations. Impact on environmental sustainability arising from natural rubber plantations will be of immense value in future fraught with serious impacts of climatic change.

The RMP provides a solid conceptual framework and metrics that would help policy makers and industry leaders to fully understand the interrelationships between various value chain links and to make better decisions that may help the rubber industry to progress as expected.

4.4 Global relevance

In the modern globalized world economy, no industry operates in isolation. The rubber industry is interconnected with other major industries such as automotive, agriculture, mining, engineering, medical, leisure and comfort among many others. The RMP will change the industry outlook by making it an integral part of complex global industry value chains (GIVC) which reflect 21st Century production that are rapidly expanding and inseparably interlinked into the global economic, trade and social systems. GIVCs transcend regional boundaries and intermediate goods may cross borders many times in the process by which raw materials are transformed into finished products.

While rubber raw material feeds into rubber products manufacturing, such manufactured rubber products feed into various other industries accumulating value before meeting the ultimate consumer. A product exported by a Sri Lankan firm may be only an intermediate product to its importer. Developments of such other interconnected industries will therefore impact the future of the rubber industry as well. GIVCs do not respond to piecemeal approaches to policy change. A "whole-of the-supply-chain" approach is needed which can effectively address supply chain barriers including infrastructure, workforce, innovation and facilitation of SMEs to participate in GIVCs.

Although benefits from GIVC participation are not automatic, GVICs offer the best opportunity to integrate in the world economy at lower costs. Further, gains will be more if the industry operates at the high end of the value chain. The government is obliged to understand these complexities and provide policy support for the firms to enhance their global competitiveness by finding niches in which they make the most of their capabilities.

In drafting the RMP, stakeholders have considered the implications of GIVCs and introduced policy reforms and strategies to enable the Sri Lankan rubber industry to prepare itself and receive maximum benefits by integrating with GIVCs.

Figure 1: Sri Lanka Rubber Industry, Snapshot 2013

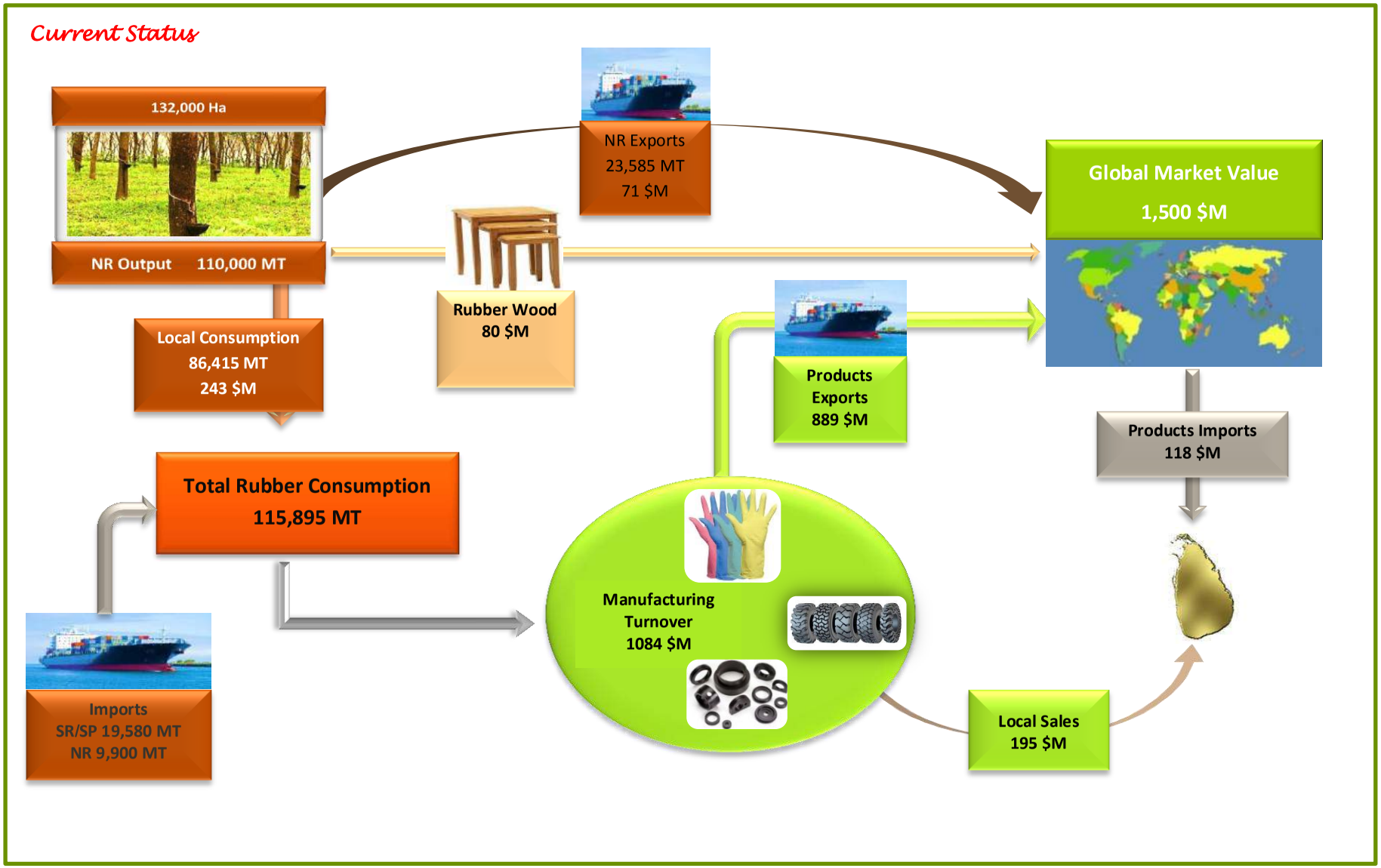
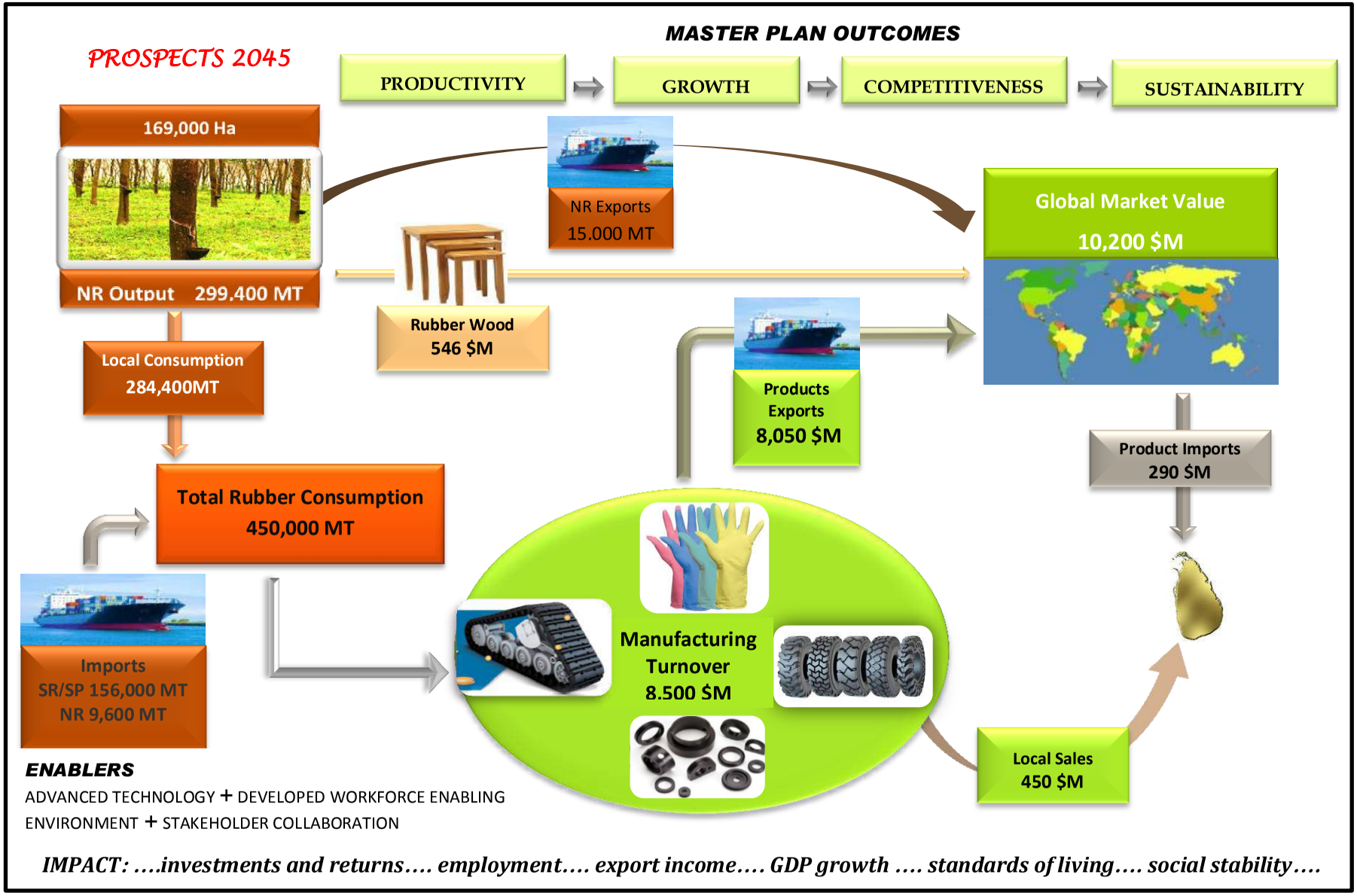


Figure 2. Sri Lanka Rubber Industry: Future Prospects



Section 5: Implementation Arrangements

5.1 Key Institutions

Effective implementation of the RMP will be the collective responsibility of a network of relevant existing institutions that will be coordinated by the MPI and SLRS. This set up includes a representative monitoring and evaluation mechanism to ensure timely progress review, feedback for further improvements and course corrections when required. The key ministries, departments and institutions relevant and their primary responsibilities pertaining to the implementation of the Master Plan are given in Table 3. This, however, will not affect their routine responsibilities arising from normal institutional mandates.

Table 3: Key Implementing Institutions and Primary Roles

Institution	Prime Roles
Ministry of Plantation Industries	General responsibility for the successful implementation of the RMP with stakeholder collaboration via the SLRS. In particular to lead the implementation of all upstream development projects with particular emphasis on rubber smallholder development and plantation sector technology management. Creation of enabling policy environment in support of sustaining rubber production.
Sri Lanka Society of Rubber Industry	As the private sector protagonist of the Master Plan, SRI will facilitate the implementation efforts by coordinating with all relevant stakeholders both in the state and private sectors. Support and participate in activities of SLRS including joint monitoring and evaluation. Take follow-up action until the Master Plan is fully implemented. Ensure the implementation of RMP projects assigned to SRI. Recommend and advocate policy alignment. Take action to revise the Master Plan as and when relevant based on updated working papers.
Ministry of Industries & Commerce	Lead implementation of downstream development activities with special focus on the MSME sector and rubber-wood industry development. Create enabling policy environment in support of meeting value added industry growth targets. Facilitate trade and commerce, especially at international level. Support industry infrastructure projects.
Ministries of (a) National Policies and Economic Affairs, (b) Finance, (c) Development Strategies and International Trade	Relevant departments (DER, DNP, DPMM etc.) under these ministries will assist the program implementation with allocating Technical Assistance, Grant Funds and Concessionary Loans as project funds from donor agencies to relevant projects. Divesting of *Cess* funds through annual budget for Master Plan projects as appropriate on the recommendation of DNP. Create an environment conducive to attract investments to rubber industry. The departments concerned will actively involve in progress review and updating the RMP.

Department of Commerce	To promote new and expanded markets for rubber products and rubber wood based products through favorable bilateral trade agreements, regional economic cooperation and other special arrangements.
Rubber Development Department	To ensure achieving national rubber production and productivity targets with efficient provision of extension services and planting subsidies to farmers. Timely release of accurate national data and information pertaining to rubber industry. Ensure the implementation of RMP projects assigned to RDD. Take action to revise the Master Plan as and when relevant based on updated working papers.
Rubber Research Institute of Sri Lanka	To enhance the technological performance in plantations and manufacturing industry to a globally competitive level with a view to assure higher productivity and cost competitiveness over the long run with the provision of innovative technological solutions industry-wide. Ensure the implementation of RMP projects assigned to RRISL. Take action to revise the Master Plan as and when relevant based on updated working papers.
Thurusaviya Fund	To implement projects that uplifts the economic and social status of rubber smallholders through empowerment of rubber smallholder societies. Ensure the implementation of RMP projects assigned to TF.
National Institute of Plantation Management	To launch projects that supports the development of human competencies in the rubber production sector.
Export Development Board	To assist rubber products manufacturers to capture a larger market share in sophisticated niches in the global market and to promote special NR brands of Sri Lanka origin
Industrial Development Board	To promote the MSME sector to be more dynamic, enabling them to contribute at least to a 20% share of the industry turnover. Upgrade and expand the services offered by the RPSDC.
Industrial Technology Institute	To assist rubber products manufacturers to develop new production technologies, necessary certification regimes and up to-date product testing facilities
Board of Investment of Sri Lanka	To facilitate new investments in rubber industry by establishment of the Rubber Industry Park, ‘‘The Rubber City’’. Facilitate smooth and competitive importation of raw materials required for value addition.
Universities (UOM, USJ, UVT etc.)	To enhance the technological capabilities and workforce competencies of the rubber industry. To provide inputs to environmental and resource management. To be an integral part of the Technology Consortium and Workforce Development Council.
Sri Lanka Institute of Nano-technology	To collaborate with RRISL, other research institutions and universities in developing advanced technologies to enhance rubber industry competitiveness.

5.2 Specific Administrative Arrangements

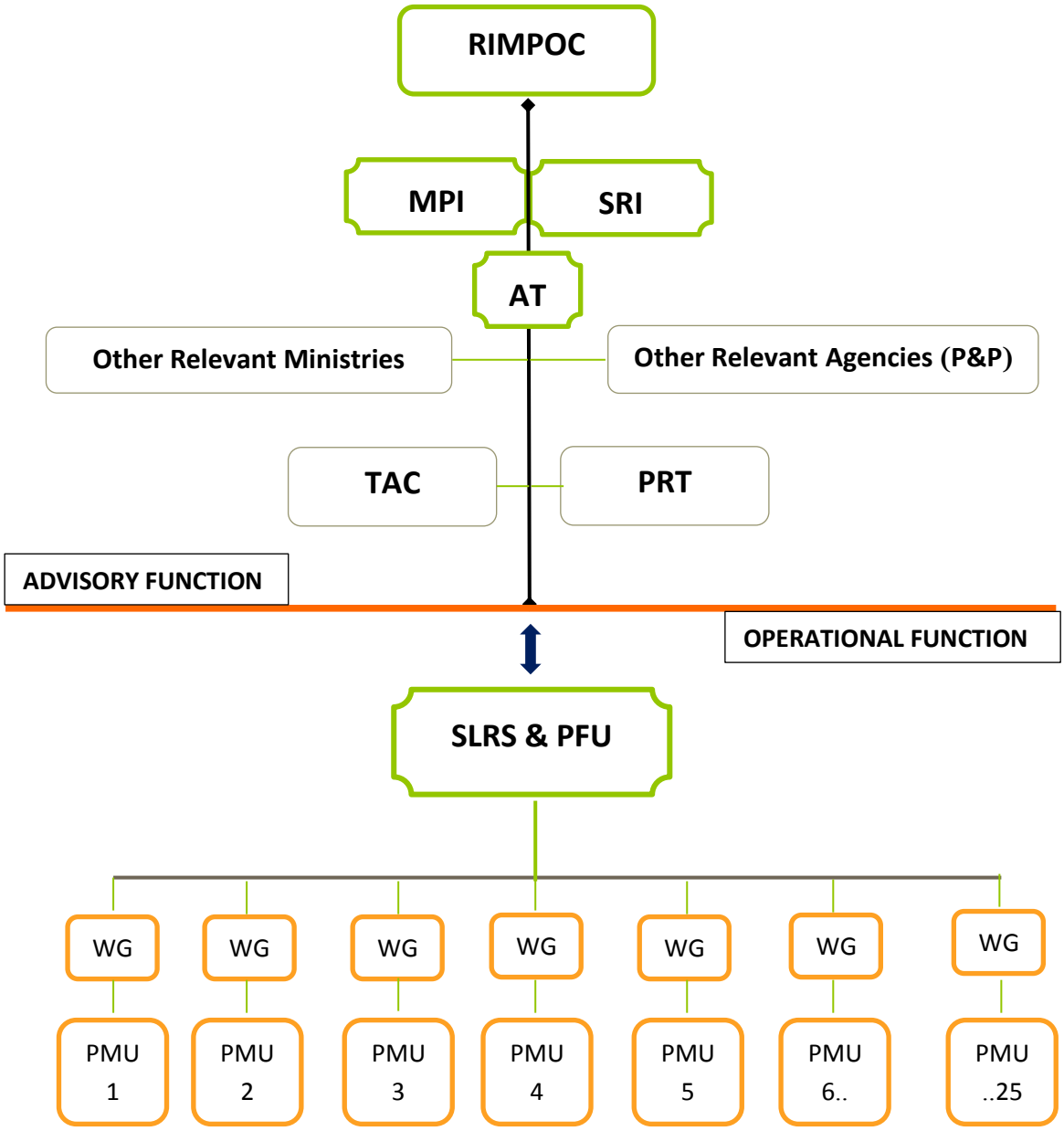
To coordinate the work related to implementation, the following administrative partnerships and operational arrangements will be created (Table 4). When required, ad hoc study teams or projects teams would be co-opted to carry out specific assignments.

Table 4: Specific Administrative and Operational Arrangements

Arrangement	Objective
Rubber Industry Master Plan Oversight Committee (RIMPOC), represented by senior officials of key ministries and senior industry representatives appointed by the Secretary/MPI.	To review the progress of implementation of the RMP and recommend necessary remedial action if improvements are required. Offer advice on resolving critical policy issues encountered.
Sri Lanka Rubber Secretariat, (public-private partnership) and the **Project Facilitation Unit** (PFU), established by MPI at a suitable location. The structure of the PFU may vary as per project needs.	To be the industry focal point and promote rubber industry competitiveness. Also promote industry stakeholder collaboration, RMP projects and facilitate project implementation through the dedicated PFU, updating the RMP and preparation of relevant working papers as well as policy papers.
Advisory Team: two senior professionals jointly appointed by MPI/SRI	To provide advice, guidance and directions to SLRS staff on RMP operationalization related issues.
Technical Advisory Committee (TAC), members to be nominated by MPI/SRI	To guide the operationalizing of technical aspects relevant to the RMP programs to be implemented.
Workgroups (WG) comprising of project implementing officials, direct beneficiaries, subject experts and relevant government officials.	Each and every specific project will be promoted by a WG comprising of beneficiary representatives, relevant experts and other stakeholders. It will be a consultation body that will guide the relevant PMU.
Project Management Units (PMU) under relevant program/project implementing agencies to work closely with the PFU during the initial project period.	Implement individual projects assigned. Achieve desired outputs and outcomes within timelines. Structure of the PMU will depend on project complexity. Report on progress to the RIMPOC through SLRS. Work closely with relevant WGs.
Progress Review Team (PRT) will comprise of nominees from MPI, SRI and DNP	To assess the progress and report to RIMPOC through MPI/SRI with necessary recommendations. SLRS will support this team with information and logistics as required. If necessary, external resource persons will be used to supplement the PRT.

Remarks: The TAC, WGs and PMUs are not permanent mechanisms**.** Once the intended purpose is served and a project becomes embedded in the relevant organization, continuation is not required**.** The SLRS, on the other hand, will continue to function as the **"**Center for Rubber Industry Competitiveness**"** promoting rubber industry growth and global competitiveness**.**

Figure 3: Master Plan Implementation Model



Key

RIMPOC: Rubber Industry Master Plan Oversight Committee
MPI: Ministry of Plantation Industries
SRI: Sri Lanka Society of Rubber Industry, the apex body of Sri Lankan rubber industry
AT: Advisory Team
TAC: Technical Advisory Committee comprising of senior professionals and industry experts
SLRS: Sri Lanka Rubber Secretariat, a public-private partnership
PFU: Project Facilitation Unit that undertake project facilitation and initialization work
WG: Workgroup comprising of project promoters, beneficiaries and subject specialists
PMU: Project Management Unit dedicated to the specific project and responsible for implementation
PRT: Progress Review Team responsible for progress evaluation
P&P: Public and private sector agencies as relevant

5.3 An Overview of the Sri Lanka Rubber Secretariat

Type: categorized as a Project

Genesis: SLRS Phase I established as a PPP in March 2012 in pursuant to TA agreement between the GOSL and ADB in relation to the operationalizing of City Cluster Economic Development Project.

Legal validity: based on a Cabinet decision, SLRS Phase I will be continued through Phase II to enable the implementation of Sri Lanka Rubber Industry Master Plan (RMP).

Nature: Public Private Partnership. An MOU will be signed between the GOSL and Sri Lanka Society of Rubber Industry (SRI) to make the partnership effective.

Primary functions: (i) Effective management of the RMP, (ii) to be the facilitation platform for public-private collaboration, (iii) feed into rubber sector policy process through collaborative analysis after identifying policy imperatives, (iv) be the portal for external agencies including donors, investors and the public etc. In short the SLRS will perform as the Centre for Rubber Industry Competitiveness.

Management Staff: will be governed by (a) relevant decisions of the Cabinet of Ministers and advice of Official Committee on Economic Management, (b) circulars issued by the Department of Management Services. The SLRS will be headed by Secretary General (SG) assisted by support staff.

Other Staff: recommended by the SG based on work programs, approved jointly by Secretary MPI and Chairman SRI, ratified by RIMPOC, complimented by resource persons assigned by SRI and augmented by Experts provided through Technical Assistance projects funded by donors. When necessary, government officials may be released on the basis of internal arrangements.

Premises: provided by the Government

Office facilities: shared by the Government and private sector (SRI) as indicated in the MOU

Recurrent expenditure: annual budgetary allocation from the Treasury

Reporting responsibilities: SG/SLRS reports to MPI/SRI through Advisory Team (refer Table 4, RMP). Other staff reports to SG. Since there will be teams working on projects which include government officials released on internal assignment basis, private sector representatives and experts working in teams, a balanced matrix structure is the most desirable organizational structure which will evolve in accordance with the workload.

Advisory relationships: for necessary consultations and advice, SLRS will have access to (i) Advisory Team, (ii) Technical Advisory Committee and, (iii) Workgroups, at different levels. Such relationships are crucial to the success of the entire program.

RMP projects directly related to SLRS: Projects 1 and 2 of Program 10.

Progress monitoring and evaluation: will be done by the Progress Review Team based on objectives and a set of indicators and measures to be developed (refer Table 4, RMP) with MPI/SRI agreement.

Key management staff:

1. Secretary General
2. Project Management Specialist

5.4 Interdependency of Projects

The projects selected for implementation are interdependent to a greater or a lesser degree. Very few projects are stand alone. Even such projects will support the performance enhancement of the rubber industry with many links in a single value chain. Inter-project coordination is therefore vital for effectiveness. This is the rationale for the operation of Sri Lanka Rubber Secretariat and Project Facilitation Unit that will be the center for stakeholder coordination and communication. It will act as the bridge between all relevant parties who are crucial for timely implementation of projects and responsible for results.

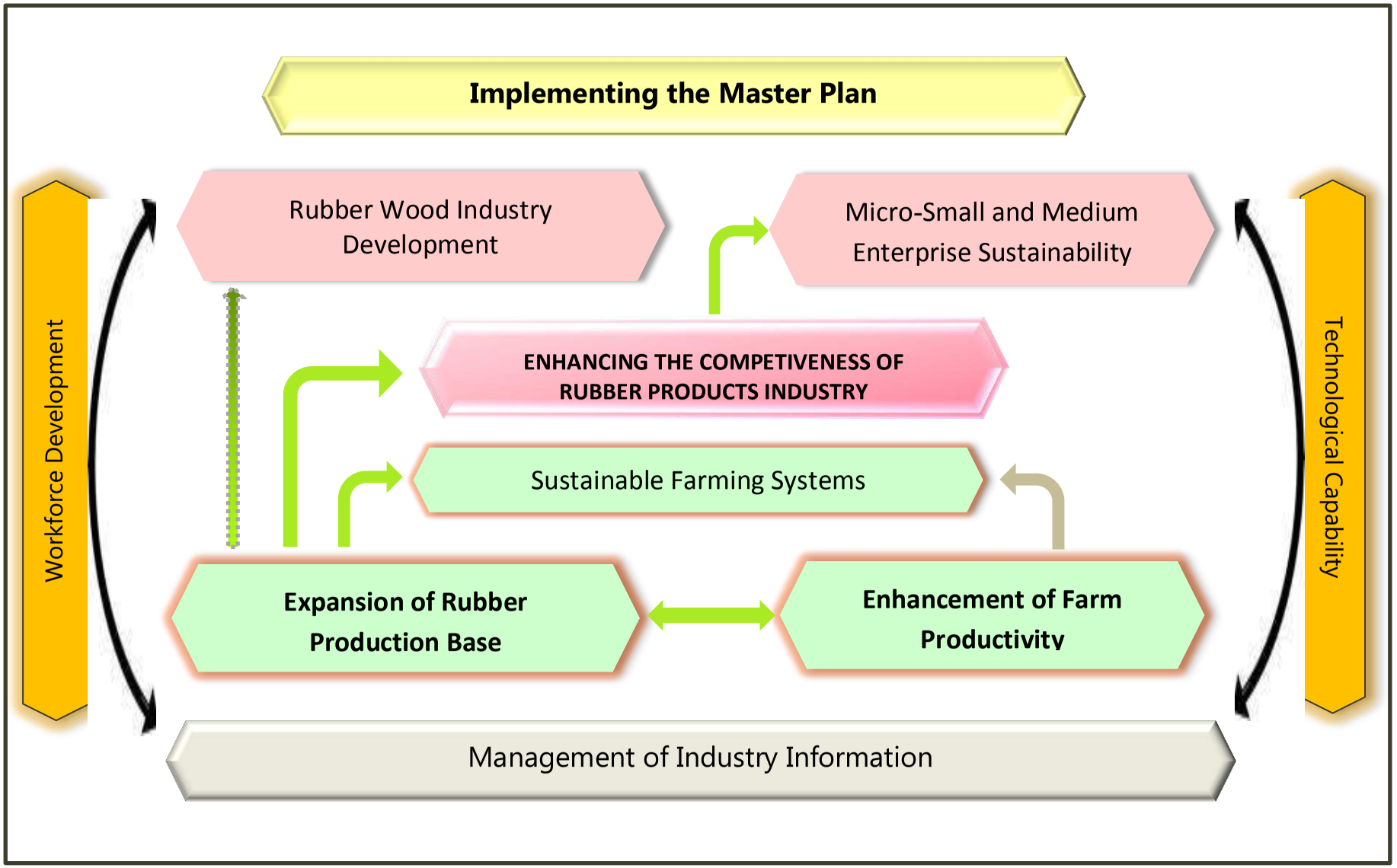
5.5 Harmonizing of Projects

Goals and objectives set in the Master Plan will be achieved through sequential harmonization of projects in support of core value adding activities. Capturing a larger share of the market for rubber products is the underlying goal that will be achieved by private sector firms in concert with relevant industry cluster players. It is the private sector that will take risks and invest in creation of products to capture markets in a profitable manner. This arduous process involves an array of value adding activities such as Supply Chain Management, Research and Development, Workforce Development, Brand Building, Market Development and Market Penetration, Environmental Management, Infrastructure Development etc. among others. The purpose of implementing a Master Plan is to provide support and added strength to these vital activities while creating synergies through collaborative action leading to reduced transaction costs of mentioned business processes.

Effectiveness of the support measures designed will be assured through integration of planned programs and projects across boundaries that artificially segment the rubber industry cluster or the value chain. From a business perspective, rubber industry is a well synchronized set of value adding activities that ultimately deliver value to demanding consumers with diverse needs. From purely an administrative perspective, supporting varied rubber industry activities have been allocated to different state entities and chances for a truly integrated approach appear to be limited. In this context, the Master Plan provides a clear roadmap, a robust framework and necessary space for all players to act together in the interest of the industry and its stakeholders. In this sense, the Master Plan can be considered a beautiful mosaic that depicts the significance of relative and relevant roles of all concerned industry entities.

The Rubber Industry Master Plan Oversight Committee (RIMPOC) will ensure highest level coordination among all relevant entities to achieve speedy implementation of projects. While the primary responsibility of implementing a project rests with an identified agency or a partnership, other agencies too will provide unstinted support where relevant. Relevant private sector stakeholders will always work in tandem with the government agency and provide fullest cooperation. In some cases, the private sector will lead project implementation with government support.

Figure 4: Interrelationships of Programs



5.6 Program Costs

Implementation of programs and projects in the Master Plan requires resources of diverse nature. Depending on the nature and structure of the project, resources will be mobilized and allocated using a consensual process. Public investments would be mostly catalytic and cross cutting that would generate industry-wide benefits. Such public investments would leverage larger scale private investments that would be focused more at firm level producing marketable outputs. Ultimately, benefits would far outweigh the costs involved in implementation.

Estimated resource requirements are given in Table 5. These are preliminary cost estimates that will be refined with detailed feasibility studies and projects design.

Table 5: Program Costs - Preliminary Estimates

US$ Million

	Program/Project	Estimated Cost U$ M
1	Expansion of national rubber production base (up to 2040)	93
2	Productivity enhancement in rubber plantations (up to 2032)	342
3	Sustainable farming systems (up to 2025)	14
4	Enhancing competitiveness of rubber products (up to 2020)	28
5	Rubber wood industry development (up to 2020)	10
6	Rubber industry workforce development (up to 2025)	5
7	Industry-wide technological capability development (up to 2025)	3
8	Rubber industry information management (up to 2018)	1
9	Strengthening MSME sustainability (up to 2025)	2
10	Implementation of the Rubber Master Plan (up to 2025)	2
	TOTAL COST ESTIMATED	**500**

All 24 projects to be implemented under the first Master Plan would require investments of approximately U$ 500 million[44]. Plantation development will require nearly 90% of this amount that will spread over 25 years providing sufficient spread and flexibility in allocating funds. Investments in plantations and smallholdings are justified due to the crucial advantage it provides to manufacturing. Investments in direct value added manufacturing will be the prerogative of the private sector while the government will add common industry infrastructure. However, government investment in R&D will be crucial. Irrespective of Master Plan projects, enterprising individual firms will keep investing in expansions and new ventures. The programs and projects are expected to attract and leverage more investments by individual firms and new entrepreneurs including foreign investors.

[44] Costs computed in 2014 in LKR and converted to USD at 130.

5.7 Investments Required

By 2025, rubber industry cluster will earn an estimated revenue of over U$M 4,000 if industry expansion takes place as envisioned while the master plan programs are being implemented. Total supplementary investments required to achieve turnover targets will be in the region of U$ 1,500 million within the period of project implementation which may require a minimum of U$ 1,000 million[45] in private sector direct firm level capital investments in addition to the U$ 500 million mentioned above which may take the form of PPPs. Estimated private sector investment requirements are based on actual investments made by benchmarked Sri Lankan firms made in certain production facilities to generate a turnover based on the level of technological sophistication and market capability.

5.8 Returns on Investments

Returns on investments will accrue as increased revenue and profits earned by all value chain actors from smallholder rubber producers to large manufacturing firms. Such revenue streams cannot be predicted accurately and will depend on how the players will respond to market forces through being global competitive. Master Plan programs are aimed specifically to boost industry competitiveness. Economic returns on investments will be ascertained once full feasibility studies are completed[46]. Nevertheless, tentative estimates suggest that sufficient financial returns would accrue within 5 to 8 years in relation to most projects. Plantation projects, however, would take much longer to gestate. Overall, economic returns will far outweigh the costs to be incurred.

5.9 Resource Mobilization

Implementation of projects requires diverse resources. Once the full feasibility studies provide accurate cost estimates and receive consent for implementation, stakeholders will determine the best resource strategy. This will be done on a case-by-case basis as there are many options available including commercial borrowings and concessionary funds from development partners. Public-private partnerships can be used effectively if formulated diligently on a fair risk and reward sharing basis. As far as possible, it is necessary to use the beneficiary pays or industry pays principle. Nevertheless, positive externalities generated by the rubber industry justify public expenditure on Rubber Master Plan projects.

5.10 Risk Mitigation

Risks associated with implementing the Master Plan and achieving its goals may entail social, market related, technical and environmental risks that may affect the operations of rubber supply chain and value chain activities. For example, although cyclical, a continued low price regime would dissuade rubber producers from rubber growing unless their resilience is enhanced.

[45] A leading SL tire manufacturer has investments of over U$M 250 accumulated in a few decades, which is supplemented by U$M 30 to 50 per annum for expansion/modernization. In comparison, a modern branded tire factory of mid-size may cost over U$ 500 million.
[46] Prefeasibility studies have been concluded for a few projects.

From the perspective of market- dynamics including possibility of material substitution, stakeholders have not foreseen any major risks pertaining to rubber products manufacturing as rubber products are ubiquitous and mankind cannot live without efficient mobility at least for another century. Hevea based natural rubber production and consumption will continue in future although new varieties of natural rubber such as Guayule are being developed by some large consuming companies. The key challenge is enhancing productivity and reducing costs in producing rubber. In rubber products sector, managing environmental issues may pose a serious challenge but technology and effective management can provide solutions here while the Rubber City will help to manage this risk with recued transaction costs.

As far as the manufacturing of rubber products in the country is concerned, investors may seriously consider the risk of not having adequate supplies of locally produced rubber for value addition. This risk may be real as evident from the current production trends especially in a low price situation. The seven RMP projects planned to increase production at a higher productivity level must be implemented efficiently to give confidence to investors.

Another risk, although not for the rubber industry, is the degree of relevance of a particular project to the Master Plan that may change with changing industry/market dynamics. If the early assumptions were imperfect or unexpected developments take place, a project may lose its relevance. Such projects may be repealed or replaced with more relevant projects. The Working Paper and Workgroup procedure provides the best framework for this exercise.

It is necessary to consider the potential risk of fluctuating rubber prices which sometimes dip below the cost of production. Low prices are usually associated with declining petroleum prices that the world experiences occasionally which in turn reduce the price of SR allowing consumers to switch to SR based recipes when technically feasible. Over supply of NR by large producing countries is another contributory factor. Economic downturns experienced by developed nations reduce the demand for rubber products and in turn creates a lower demand for raw rubber. There are several other factors that keep prices low at times such as speculation effects. Anyway, the impact of low prices is exacerbated when productivity is poor. This will impact the rubber production sector adversely and curtail national output of rubber irreversibly. What is important is to strengthen the resilience of rubber farmers through the inculcation of a robust business approach among farmers.

From a management perspective in relation to the implementation of RMP, the stakeholders should be concerned with are, (i) the ability of industry leaders to sustain collaborative efforts and public-private partnership required to implement the Master Plan, (ii) the ability to mobilize resources required in a timely manner, (iii) the ability to manage projects effectively and, (iv) the ability to attract policy and institutional support required to create the enabling environment. These can be easily mitigated with unity of purpose, collaborative action and strong public-private partnerships.

Figure 5: Rubber Master Plan Implementation Schedule

Implementation Schedule

- **Phase I - preliminary**

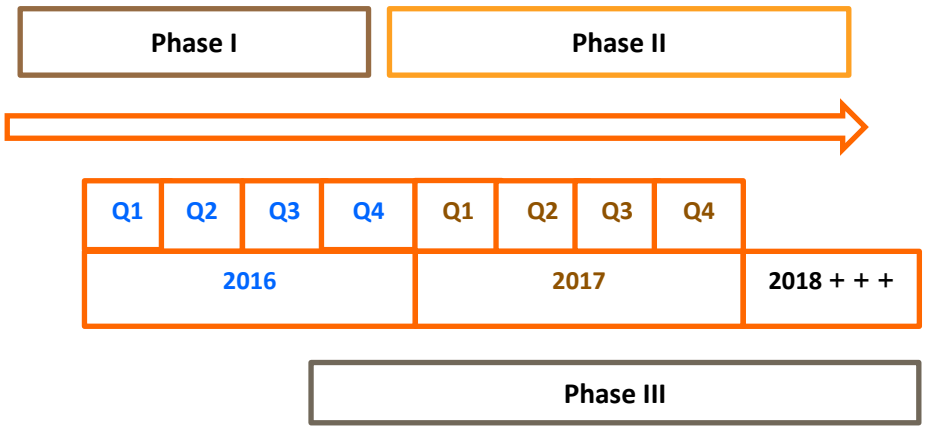
  Finalization of the Master Plan, Private sector validation, Government approval, Public presentations and launch, Stakeholder MOU and establishment of a Public-Private Partnership to lead implementation efforts. Establish Master Plan Oversight Committee.

- **Phase II - preparatory**

  Strengthen the Sri Lanka Rubber Secretariat, set up the Project Facilitation Unit (PFU) and form TAC, WGs and identify project management units. Conduct feasibility studies of prioritized projects and complete full designs. Begin resource mobilization, investment promotion and formation of project implementing structures such as PPPs, JVs and special purpose units.

- **Phase III – operative**

  Continuation of the Phase II. Implementation of Programs/Projects with resources mobilized, monitoring and evaluation, developing new projects, Up-dating the Master Plan and Working Papers as appropriate.



Section 6: Conclusions

A SMART Plan: The Rubber Master Plan has fulfilled a long-felt need of the nation by offering a comprehensive agenda for holistic development of rubber industry which is steeped in a history that exceeds fourteen eventful decades. Over these years, rubber industry has sustained the livelihoods of hundreds of thousands of Sri Lankans, especially in the rural regions, and earned much valued foreign exchange. Recently, value addition has come to the fore. The RMP intends to convert this industry into a technologically sophisticated and globally competitive industry that affords sustained benefits to thousands of young Sri Lankans imbued with the aspirations of the contemporary world. This feat is achievable as the plan embodies a clear vision, effective strategies and sound projects.

Aim to reposition: The Sri Lankan economy traditionally based on tea, rubber and coconut has changed dramatically with export of knowledge, skills and garments taking pride of place. The services sector will play the lead role in the economy though agriculture will continue to have a major impact on livelihoods assuring fair income distribution. Sri Lanka is yet to benefit from advanced industrialization that will result from functional clustering. In this context, the RMP provides directions to reposition the rubber industry in the national economic landscape as well as the global market as a competitive player embedded in Global Value Chains.

Projects as change catalysts: The 10 programs and 25 projects enumerated in the RMP are expected to change the status of the industry positively across all value chain links helping to earn additional revenue. Most of the projects are catalytic in nature and will lead to vast improvements in all value addition processes. As needed, further projects can be accommodated in the plan to meet future challenges. Although the RMP has a time horizon of ten years, the programs will continue to have a long-term impact with growing benefits.

Implementation challenge: Implementing the Master Plan will be more challenging than its preparation. The stakeholders have an opportunity now to rally round their own plan, improve it continuously to making it dynamic while effecting efficient monitoring and follow-up throughout its implementation. The Master Planning process has laid the foundation for such action with a new breed of leaders emerging displaying a unified vision, persistent passion bestowed with an important mission to accomplish. Ultimately, the implementation process will become an experiential learning process which will be similar to the Master Planning process but much larger in scope.

Stakeholders to collaborate: Key stakeholders are in the private sector as well as the public sector where multiple agendas are in existence which need harmonization. What is of paramount importance is therefore the wholehearted collaboration among all industry stakeholders in getting the projects off the ground in a timely manner with resources mobilized. Development partners too will collaborate, providing assistance as done effectively in the past.

Government to lead and delegate: The success of implementation pivots on a strongly committed visionary leadership supported by a strong coalition of collaborators. In this respect, the facilitating role of government, being the national trustee of this vital industry, will be crucial. Where the government leads and the path is right, the private sector will follow with confidence until the collective Vision is realized. PPPs are the vehicle for delegation of government will and authority. This is the singular path to fulfill the National Agenda for Rubber Industry Development.

Annex 1

Sri Lanka Rubber Industry Master Plan 2017 – 2026

Data Tables

A. Current Industry Status

A.1 Export Performance 2015

A.2 Impact of Import of Rubber and Rubber Products 2015

A.3 Rubber Production Status and Performance 2014

B. Future Targets and Projections

B.1 Targets for National Rubber Production

B.2 Market Targets for Rubber Products

B.3 Key Performance Indicators

B.4 Projected Overall Performance Data

Annex No. 1.1

A.1. Actual Export Performance 2015
Raw Rubber, Semi-processed Rubber and Rubber Products

Item		Unit	Quantity	Value	
				LKR MN	U$ M[47]
A.	**Raw Rubber**				
i.	RSS	MT	903	217	1.6
ii.	Crepes including Sole Crepe	MT	8748	3063	22.5
iii.	TSR	MT	410	137	1.0
iv.	Centrifuged latex (dry wt)	MT	32	10	*<0.1*
v.	Other types (specialty rubber)	MT	280	121	1.0
	Total raw rubber types	**MT**	**10,373**	**3,548**	**26.1**
B.	**Semi-Processed Rubber**				
i.	Reclaimed Rubber	MT	453	31	0.2
ii.	Rubber Scraps & Waste	MT	2,456	126	1.0
iii.	Rubber Compound/camel back	MT	5,480	1,679	12.3
	Total semi processed rubber	**MT**	**8,389**	**1,836**	**13.5**
C.	**Rubber Products**				
C.1 Tires & Tubes in Units					
i.	Solid Tire	MNU[48]	18.6	41,036	301.9
ii.	Pneumatic Tires	MNU	14.1	22,300	164.0
iii.	Rubber Tubes	MNU	3.5	527	3.9
	Sub total	MNU	**36.2**	**63,863**	**469.8**
C.2 Gloves (by weight)					
i.	Surgical Gloves	MT	4,379	5,338	39.3
ii.	Industrial and Examination Gloves	MT	22,155	16,999	125.0
	Sub total		**26,534**	**22,337**	**164.3**
C.3 Other Articles					
i.	Auto/machine components	MT	21,200	9,389	69.1
ii.	Cellular/Non Cellular Products	MT	4,648	2,683	19.7
iii.	Gaskets, Washers, Seals	MT	1,337	1,574	11.6
iv.	Floor Covering/ Mats	MT	5,839	1,307	9.6
v.	Miscellaneous items	MT	964	274	2.0
	Sub total		**33,988**	**15,227**	**112.0**
D.	**Total export value of rubber products**			**101,427**	**746.1**
E.	**TOTAL VALUE OF RUBBER INDUSTRY EXPORTS**			**106,811**	**785.7**
F.	**Total value of exports including rubber wood based items[49]**			**110,835**	**815.3**

Rubber wood based products

Exported rubber wood based products	**$M**	*Estimated value*	29.6
Local sales of rubber wood based products	**$M**	*Estimated value*	50.4
Total turnover	**$M**	*Estimated value*	**80.0**

Source: Sri Lanka Customs (Cover HS codes 40.01 to 40.17 Rubber and articles thereof – chapter 40 Section VII)

[47] 2015 average annual exchange rate LKR 135.94 per 1 US$
[48] MNU: Million Units $M: Dollar Millions
[49] Value of rubber wood based items estimated by Wood Based Industry Association

Annex No. 1.2

A. 2. Impact of Import of Rubber and Rubber Products - 2015

Import Activity/Items	Unit	Quantity	Value	
			LKR MN[50]	U$ M[51]
A. Imports for Industry Use				
1. Raw Natural Rubber				
RSS	MT	38,182	8,994	66.2
Special types	MT	16	4	-
TSR	MT	892	188	1.4
Centrifuged Latex (dry rubber content)	MT	9,172	2,505	18.4
Sub total	**MT**	**48,262**	**11,691**	**86.0**
2. Synthetic Rubber (SR)[52]				
Dry Form (SBR,BR,CR,NBR)	MT	46173	10,853	79.8
Latex Form (SBR,CR,NBR & other)	MT	25526	4,789	35.2
Sub total	**MT**	**71,699**	**15,642**	**115.0**
3. Semi-Processed Rubber				
Reclaimed Rubber	MT	25,634	2,307	17.0
Rubber Scraps & Waste	MT	12,470	750	5.5
Rubber Compound (rubber content)	MT	8,297	3,239	23.8
Un-vulcanized including Camel- back	MT	7,908	996	7.3
Sub total	**MT**	**54,309**	**7,292**	**53.6**
B. Imports for Consumer Use				
1. Rubber Products				
i. Tires & Tubes	'000			
Solid Tire & Retread	Nos.	519	332	2.4
Pneumatic Tire for Vehicle	Nos.	3,170	10,539	77.5
Rubber Tube	Nos.	4,674	1,953	14.4
Subtotal i	'000 No.	**8,363**	**12,824**	**94.3**
ii. Surgical & Industrial Gloves **Subtotal ii**	**MT**	**389**	**321**	**2.4**
iii. Other Articles				
Auto/machine components	MT	1,926	1,527	11.2
Gaskets, Washers, Seals	MT	546	1,090	8.0
Tubes, Pipes, Hoses	MT	1,283	751	5.5
Conveyor/Transmission belts	MT	1,105	856	6.3
Cellular/ Non Cellular Products	MT	1,058	670	4.9
Thread & Cord	MT	918	281	2.1
Miscellaneous items	MT	3,001	1,295	9.5
Subtotal iii			**6,470**	**47.6**
C. TOTAL VALUE OF IMPORTED RUBBER & RUBBER PRODUCTS			**54,242**	**399.0**

Source: Sri Lanka Customs

Remarks: import of rubber products by rubber products manufacturing countries is not abnormal. For example, in 2011, Malaysia being a leading rubber products manufacturing country, imported rubber products worth RM 4.5 billion while exporting products worth RM 14.5 billion or U$ 4.5 billion.

[50] Sri Lanka rupees millions

[51] At LKR 135.94 per 1 US$ in 2015

[52] From the above total amount of SR imported, rubber industry consumed an estimated 40% or 14,355 MT to the value of LKR 4090 million (USD 32 million).

Annex No. 1.3

A.3. Rubber Production Status and Performance 2014

Status/Activity	Unit	Quantity/Value	%
1. **Total Extent Under Rubber Farming**[53]			
i. Smallholding (up to 20 ha unit size)	Ha	81,000	61
ii. Medium Estates (above 20 ha unit size)	Ha	4,100	3
iii. Regional Plantation Companies	Ha	46,409	35
iv. State Owned Plantations	Ha	1,432	1
Total area under rubber	**Ha**	**132,941**	**100**
1.1 Mature & Immature Extent			
i. Mature: Smallholdings and Medium Estates	Ha	74,650	56
Estate Sector (RPCs & State)	Ha	33,237	25
ii. Immature: Smallholdings and Medium Estates	Ha	10,450	8
Estate Sector (RPCs & State)	Ha	14,604	11
Total area under rubber	**Ha**	**132,941**	**100**
2. Ownership : (a) Number of Smallholdings < 20 ha	No	133,000	
(b) Number of Medium Sized Estates > 20 ha	No	140	
(c) Number of Estates owned by RPCs and the State	No	145	
3. Size distribution of Smallholdings: Farms less than 2 acres	Ha	35,468	45
(2010 survey data) Farms between 2 to 10 acres	Ha	28,413	36
Farms above 10 acres	Ha	14,619	19
4. Extent by Main Clones : PB 86	Ha	43,550	33
RRIC 100	Ha	33,200	25
RRIC 121	Ha	28,950	22
5. Extent in 3 Main Districts : i. Kegalle	Ha	37,165	28
: ii. Kalutara	Ha	28,765	22
: iii. Ratnapura	Ha	26,600	20
6. Replanted Area in 2014:			
i. Smallholding Sector	Ha	1,343	1.3
ii. Estate Sector	Ha	1,542	1.2
7. New planted Area in 2014:			
i. Smallholding Sector	Ha	1,428	1.1
ii. Estate Sector	Ha	133	0.1
8. Sector Wise NR Production : Smallholding	MT	71,198	72
: Estate	MT	27,375	28
9. Total national NR production	**MT**	**98,573**	**100**
10. NR Production by Main Types: RSS	MT	48,539	49
Crepe	MT	15,264	15
TSR	MT	7,615	8
Centrifuged latex and other (drc.)	MT	27,155	28
11. Total value of NR Produced Locally (estimated FOB value of U$ 2495/MT)	$M	246	
12. Rubber Yield kg/ha/year (National average in 2014)	**KG**	**914**	
13. Cost of production of RSS in smallholdings per Kg	LKR	160	
14. Cost of production of Crepe in Estates per Kg	LKR	282	

Source: Ministry of Plantation Industries and Rubber Development Department.

[53] Based on RDD Census of Rubber Lands 2010, updated for 2013

Annex No. 1.4

B.1. Targets for National Rubber Production

Project Code	Projects	UNIT	Year			
			2013 Baseline	2019	2024	2036
Pg1-Pj01	New Smallholdings in Non-traditional Regions	Ha	0	11,000	22,000	22,000
		MT	0	0	3,520	39,600
Pg1-Pj02	Nucleus Plasma Farming Clusters	Ha	0	2,500	5,000	5,000
		MT	0	0	850	9,500
Pg1-Pj03	Expanding Rubber Extent in the Estate Sector (RPCs and State owned estates)	Ha	49,400	1,500	3,000	3,000
		MT	29,500	0	510	5,700
Pg1-Pj04	Expanding Smallholdings in Traditional Regions	Ha	82,600	3,500	7,000	7,000
		MT	80,500	0	1,190	13,300
Pg2-Pj01	Accelerated Replanting of Existing Rubber Farms[54]	Ha	132,000	132,000	132,000	132,000
		MT	110,000	102,000	95,000	148,000
Pg2-Pj02	Adoption of New Technologies and Good Management Practices	Ha	N.A	*Impact of these two crucial projects will be felt as improved performance in all rubber farms in terms of yields, productivity and reduced costs, hence increased profitability.*		
		MT	N.A			
Pg2-Pj03	Establishment of a Network of Certified Nurseries	Ha	N.A			
		MT	N.A			
	Grand Total Hectares	**Ha**	132,000	150,500	169,000	169,000
	Grand Total Metric tons[55]	**MT**	110,000	102,000	101,070	216,100
	Used for local consumption	**MT**	86,415	84,000	85,500	201,100
	Exports	**MT**	23,585	18,000	15,570	15,000

Remarks:

(i) Market value of outputs is not projected as the price of rubber depends on prevailing market dynamics.

(ii) Pg1-Pj03 and Pg1-Pj04: Figures under 2019, 2024 and 2036 depict incremental changes expected.

(iii) Pg2-Pj01: Yields from this project are expected to peak in 2046 producing 243,000 MT from the 132,000 ha although the entire project target area of 105,500 reaches maturity in 2042.

(iv) Pg2-Pj02 & Pg2-Pj03: Catalytic Projects that will have an overarching impact over all other projects due to its capacity to enhance yields and productivity while reducing cost of production.

(v) Exports of raw rubber will decline except specialty rubber types due to increased local demand for Crepe rubber.

[54] **Ha**: Include the total area coming under the project including (a) immature, (b) mature and, (c) uprooted area

[55] All the seven projects when implemented successfully would yield a maximum of **299,000 MT after 2046**.

Annex No. 1.5

B.2. Market Targets for Rubber Products (in US$ M)

Product Categories		Value in US Dollar Million			Growth Rate %	
		2013[56]	2019	2024	10 Year	CAGR
FOR EXPORT MARKET[57]						
1	**Tires Industrial/Agricultural/Construction**					
A	Off the Road Solid	313	505	700	*223*	8.5
B	Off the Road pneumatic	135	270	600	*444*	16.0
C	Rubber tracks	35	70	150	*428*	15.5
	Sub-total – A	483	845	1450	***300***	**11.5**
2	**Tires Automotive**					
A	Bus and trucks	30	70	140	*466*	16.5
B	Light trucks and car	8	25	60	*750*	22.0
C	Motor cycle and cycle	32	60	90	*281*	11.0
D	Tire retreads	0	5	15	*1500*	31.0
E	Tubes/flaps	3	5	10	*333*	13.0
	Sub-total – B	73	165	315	*431*	16.0
	Total tire products	**556**	**1010**	**1765**	***317***	**12.0**
3	**Latex Based products**					
A	Surgical and examination gloves	64	160	270	*421*	15.5
B	Value added gloves	132	250	425	*322*	12.5
C	Foam cushions	20	50	70	*350*	13.0
D	Coated textile fabrics	0	30	110	*1100*	60.0
	Total latex products	**216**	**490**	**875**	***405***	**15.0**
4	**Other products**					
A	Industrial rubber goods	70	125	240	*343*	13.0
B	General rubber goods	12	45	110	*916*	25.0
C	Reclaimed rubber and compounds	35	30	10	*-285*	-12.0
	Total other products	**117**	**200**	**360**	*307*	12.0
	Total export market	**889**	**1700**	**3000**	***337***	**13.0**
FOR LOCAL MARKET[58]						
5	Total tire products	151	165	190	*125*	2.5
6	Total latex products	9	10	15	*166*	5.0
7	Industrial and General products	25	35	45	*180*	6.0
8	Reclaim and Compounds	10	30	50	*500*	17.5
	Total sales at local market	**195**	**240**	**300**	***154***	**4.5**
	GRAND TOTAL (US$ M)	**1084**	**1940**	**3300**	***304***	**12.0**

Remarks: (1) Local market (Sri Lanka) expansion opportunities will be comparatively less due to (i) small market size of 21 million persons, (ii) competition from cheap unrestricted imports as per WTO rules and FTAs, (iii) brand loyalty in tire products. Nevertheless, there is untapped potential for import substitution (eg. Surgical gloves, condoms, shoes, latex thread etc.). **(2)** Growth strategy is to increase value of products rather than volumes traded. That is why the two Master Plan Programs on (i) Technological capability development and, (ii) Workforce development are crucial.

[56] Assumption 1: baseline data for 2014 or Y-0 and 2013 to be similar. Master Plan Year 1 is 2015 and by 2024, 10 years will be completed

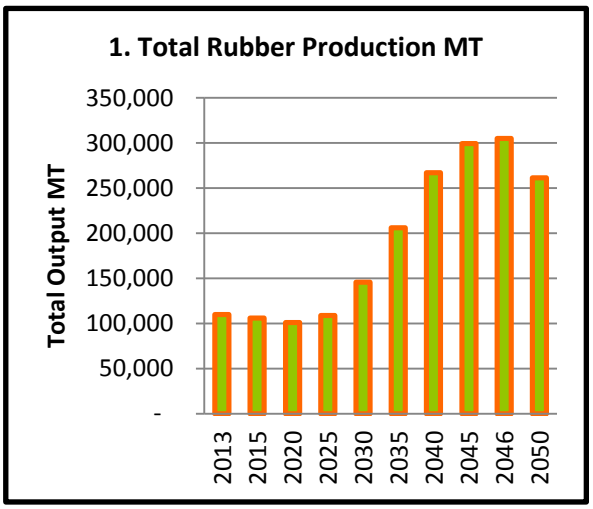
[57] Current Global Market for rubber products is estimated at U$ 400 billion which will grow to U$ 600 billion by 2024 (author's computations based on Freedonia Group Research). Sri Lanka's current global market share is 0.27%. Target is to capture 0.55% by 2024.

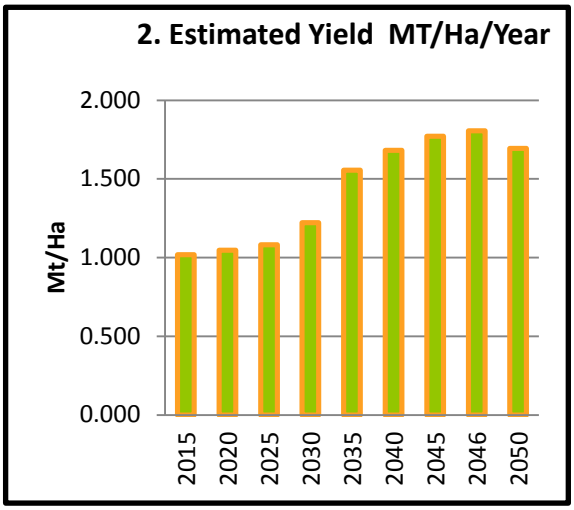
[58] Local market is served by (a) locally made locally sold products and (b) imported rubber products. In 2013, total local market for rubber products was estimated at U$ 341 million which include U$ 195 million worth products made locally and U$ 146 million worth imported rubber products. The targets given in this Table (items 5, 6, 7 and 8) refer only to locally made products to be sold locally.

Annex 1.6

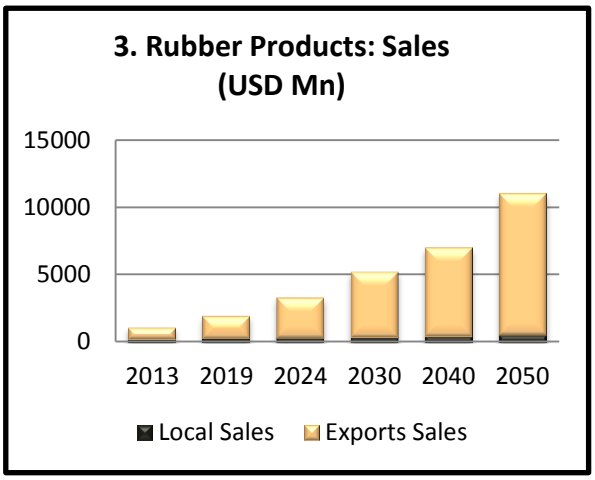
B.3: Key Performance Indicators

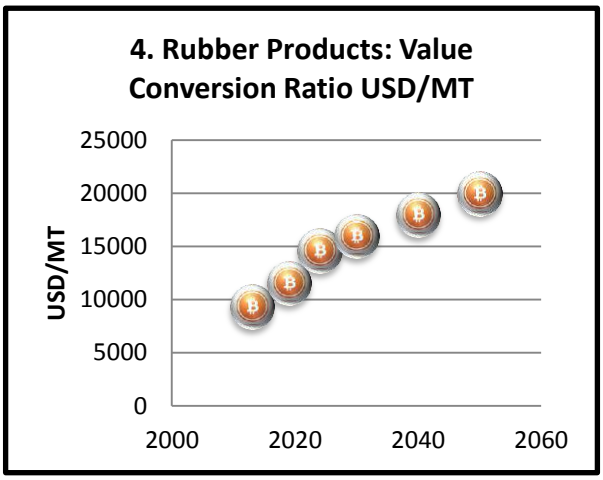
The following charts depict the performance of key indicators under the Master Plan regime. Sri Lanka rubber industry cluster's value chain has two core segments, i.e., raw rubber production and value added products manufacturing. Performance of these two segments can be ascertained by measuring: (i) total volume of output and production per unit area of land (Yield per Ha) and, (ii) total sales value and value added per metric ton of rubber consumed.





Charts 1 and 2: Initial decline in national raw rubber output is inevitable due to the intensified replanting program planned. Peak output may reach around 2045, thirty years from now. An appreciable growth in average yields may be noticed by 2035, twenty years from now. These facts may have a significant impact on socio-economic sustainability of farms and it is desirable to have further projects included in the Master Plan to alleviate any negative consequences that might arise.





Charts 3 and 4: Sales of value added rubber products, both export sales and local sales, will see a significant growth with enhanced private sector investments in manufacturing and marketing. Steadily increasing conversion ratio is the result of technological sophistication, product innovation and differentiation of products which would increase the market share in niche segments.

Annex 1.7

B.4 Overall Performance Projections 2015 - 2050

	Item		Unit	2013	2015	2019	2020	2024	2025	2030	2035	2040	2045	2046	2050
A	**Raw rubber production**	Total rubber extent	**Ha**	132,000	135,700	150,500	154,200	169,000	169,000	169,000	169,000	169,000	169,000	169,000	169,000
1		Matured Extent	Ha	105,500	103,986	97,930	96,416	97,000	100,700	119,200	132,400	158,900	169,000	169,000	154,200
2		**Outputs**	MT	**110,000**	**106,000**	**102,000**	**101,000**	**101,070**	**108,990**	**145,720**	**205,900**	**267,100**	**299,400**	**305,200**	**261,340**
3		Yield	MT/Ha	1.04	1.02	1.04	1.05	1.04	1.08	1.22	1.56	1.68	1.77	1.81	1.69
4		Exports	MT	23,585	*23,000*	18,000	*17,500*	15,570	*15,000*	*15,000*	*15,000*	*15,000*	*15,000*	*15,000*	*15,000*
5		Local sales	MT	86,415	*83,000*	84,000	*83,500*	85,500	*93,990*	*130,720*	*190,900*	*252,100*	*284,400*	*290,200*	*246,340*
6		Export value	U$M	71	*70*	63	*61*	64	*68*	*68*	*68*	*68*	*68*	*68*	*68*
7		Local sale value	U$M	243	*228*	273	*263*	318	*381*	*529*	*773*	*1021*	*1152*	*1175*	*998*
8		**Total sales**	U$M	**314**	***298***	**336**	***324***	**382**	***448***	***597***	***841***	***1089***	***1219***	***1243***	***1065***
.															
B	**Rubber wood**	Output of wood	**M^3**	150,150	241,150	241,150	241,150	241,150	241,150	241,150	241,150	241,150	273,000	273,000	273,000
1		RWP exports	U$M	30	53	78	145	203	271	386	386	386	437	437	437
2		Local sales	U$M	50	80	78	96	87	90	96	96	96	109	109	109
3		Total sales	U$M	**80**	**133**	**157**	**241**	**289**	**362**	**482**	**482**	**482**	**546**	**546**	**546**
.															
C	**Reclaimed rubber**	Output	MT	7,000	7,700	8,470	9,317	10,249	11,274	12,401	13,641	15,005	16,506	18,156	19,972
1		Exports	MT	583	770	847	932	1025	1127	1240	1364	1501	1651	1816	1997
2		Export value	U$M	0.3	0.5	0.9	1.0	1.7	2.0	2.8	3.1	3.4	3.7	4.1	4.5
3		Local sales	U$M	2.9	4.2	5.3	5.9	11.4	13.7	20.1	27.6	30.4	33.4	36.8	40.4
4		Total sales	U$M	**3.2**	**4.7**	**6.2**	**6.8**	**13.1**	**15.7**	**22.9**	**30.7**	**33.8**	**37.1**	**40.9**	**44.9**
.															
D	**Rubber products**	Consumed LNR	MT	86,415	*83,000*	84,000	*83,500*	85,500	*93,990*	*130,720*	*190,900*	*252,100*	*284,400*	*290,200*	*246,340*
1		Consumed INR	MT	9,900	21,500	55,000	53,000	65,000	63,010	82,780	36,600	2,900	9,600	31,800	83,660
2		Consumed SP & RC	MT	5,224	5,500	6,000	6,500	7,000	11,000	11,500	12,500	15,000	16,000	18,000	20,000
3		Consumed SR	MT	14,355	20,000	23,000	40,000	69,000	72,000	100,000	110,000	120,000	140,000	160,000	200,000
4		Total rubber used	MT	**115,894**	**130,000**	**168,000**	**183,000**	**226,500**	**240,000**	**325,000**	**350,000**	**390,000**	**450,000**	**500,000**	**550,000**
5		Export sales	U$M	889	1,100	1,700	1,940	3,000	3,280	4,850	5,520	6,590	8,050	9,540	10,500
6		Local sales (e.)	U$M	195	200	240	260	300	320	350	380	410	450	460	500
7		Total Turnover	U$M	**1,084**	**1,300**	**1,940**	**2,200**	**3,300**	**3,600**	**5,200**	**5,900**	**7,000**	**8,500**	**10,000**	**11,000**
.															
D	**Total Export market value**		**U$M**	990	1224	1842	2147	3268	3621	5306	5976	7046	8558	10048	11009
E	Conversion value ratio $/MT		**US$**	9,353	10,000	11,548	12,022	14,570	15,000	16,000	16,857	17,949	18,889	20,000	20,000
F	**Products imports**		U$M	118	150	250	250	275	275	280	280	280	290	290	300
.															
	Abbreviations:	B.1: RWP-Rubber wood based products; D1: LNR-Locally produced natural rubber; D.2: INR - Imported natural rubber; D.3: SP-Semi-processed rubbers including rubber compounds;													
		D.4: SR- Synthetic rubbers													
		(e.) Estimated figure													

Annex 2: Project Papers

Sri Lanka Rubber Industry Master Plan 2017 – 2026

Project 01: New Smallholdings in Non-Traditional Regions Suitable for Rubber Growing
Project 02: Developing New Farming Clusters (Nucleus and Plasma type)
Project 03: Expanding the Extent of Rubber in Estates
Project 04: Expanding Rubber Smallholdings in Traditional Rubber Growing Areas
Project 05: Accelerated Replanting of End of Economic Life Rubber Farms with High Yielding Clones
Project 06: Adoption of Productive Technologies and Management Practices
Project 07: Setting up a Network of Certified District Nurseries
Project 08: Rubber Producers' Income Stabilization Scheme
Project 09: Incentivizing Rubber Tappers
Project 10: Transform smallholdings into Resilient Business Units
Project 11: Strategic Promotion of Sri Lankan Rubber Products
Project 12: Establishment of a Dedicated Rubber Industrial Park for Rubber Products Manufacturing: "The Rubber City".
Project 13: Effective Management of Water Resources in Latex Based Industries (IWMP)
Project 14: Enhancement of Resource Use Efficiency and Productivity in the Rubber Products Industry
Project 15: Establishment of Multi-functional Central Rubber Wood Processing Units
Project 16: Establishment of Rubber Industry Workforce Development Council
Project 17: Establishment of Rubber Industry Technology Consortium
Project 18: Introduction of Refinements to Current Technological Practices in Rubber Production
Project 19: Eco-Industrial Rubber Cluster, "The Designer Rubber project".
Project 20: Finite Element Analysis Simulation Centre (FEASC)
Project 21: Effective Use of Rubber Industry Data
Project 22: Capacity Enhancement of Rubber Products Development Centre (RPDC)
Project 23: Capacity Building of the Sri Lanka Rubber Secretariat
Project 24: Establishment of a Master Plan Project Facilitation Unit (PFU)
Project 25: Strengthening the Rubber Cluster Young Network (RCYN)

Program 1: Expansion of National Rubber Production Base

Project Code: Pg-1/Pj-01

Project 01: **New Smallholdings in Non-traditional Regions Suitable for Rubber Growing**	
1	**Objective:** To increase national rubber production by 12% through expansion of rubber cultivation in to suitable non-traditional regions with favorable agro-climatic conditions where land and labor is available.
2	**Rationale:** In the regions where rubber is grown traditionally, land utilized for rubber is being diversified gradually for more profitable use. New plantings are meager and replanting rate is becoming poor in these regions. Hence there is a decline in the total rubber extent. To compensate for the loss of rubber producing land, one alternative is to expand rubber in regions where suitable land is available with a lesser opportunity cost. Extensive research by RRISL has identified new regions suitable for commercial rubber planting. Socio-economic conditions in these regions too make them suitable for rubber smallholdings. It is proposed to bring around 22,000 ha under rubber in these regions.
3	**Description:** To cultivate 22,000 ha of new smallholdings in non-traditional regions such as Monaragala (5,000 ha), Ampara (10,000 ha), Vavuniya (3,000 ha), Mullativu (3,000 ha), Hambantota (500 ha) and Puttalam (500 ha). Planned development of 3,000 ha of smallholdings under proposed STARRP[59] in Ampara and Monaragala districts is also considered within this project. District nurseries will be set up in relevant districts to provide guaranteed quality high yielding plants. Intercrops and parallel crops will be introduced to ensure the sustainability of smallholders. Smallholders will be organized under Thurusaviya Fund.
4	**Outputs and timelines:** a. Planting outputs: By 2019 – 11,000 ha; By 2025 – 22,000 ha (all lands to be matured by 2032) b. Production outputs: By 2019 – nil; By 2024 – 3,500 metric tons; By 2045 – 37,000 metric tons
5	**Milestones:** 1. Full feasibility study completed and validated. 2. Land identification completed. 3. Nursery network established. 4. Smallholders identified. 5. Regional project offices (RDD/RRI) established. 6. Planting commenced. In respect of the STARRP (to be funded by IFAD), loan agreement signed and project launched.
6	**Outcomes and impact:** ▪ Rubber yields from these plantations will begin to realize from 2023 and by 2032 all farms will come into bearing adding around 37,000 metric tons to national production at peak level. ▪ Local consumption of this volume of raw rubber will create a value of over U$ 536 million which adds to industrial output, export incomes and national GDP. ▪ When smallholdings mature and reach peak yield, as farm gate incomes, nearly 19 billion rupees or U$ 148 million will circulate among smallholders in the targeted regions boosting the local/regional economies and uplifting rural standards of living. Intercrops and non-farm activities will provide additional income.
7	**Cost estimates:** Total estimated cost is LKR 6,600 million at LKR 300,000 per ha without considering beneficiary contributions, mostly in kind. Possible price escalations are not considered.
8	**Resource strategy:** Since this project is aimed at developing smallholders, the government will provide necessary funds sourced from (a) cess collection, (b) annual treasury allocations and, (c) donor funds. In-kind contributions from smallholder beneficiaries are not considered in estimating the cost but this may equal to 50% of the total development cost.
9	**Institutional mechanisms:** This project will come under the purview of the Ministry of Plantation Industries and implementation will be done by RDD with RRI technical expertise. The private sector will purchase rubber produced for value addition. Relevant provincial authorities will provide support at local level.
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** Regional environment will be positively impacted with emerging rubber plantations which will add to natural forest cover improving the micro climate.
12	**Social impact:** With employment opportunities and additional incomes, social standards will improve. Land security will improve entrepreneurial activities. Rural urban migration will be reduced. The targeted regions were affected by the conflict in the past and sustainable employment and income will be a great relief for such persons and families, especially for women/widows.

[59] STARRP: Smallholder Tea & Rubber Revitalization Project to be supported by International Fund for Agricultural Development

Program 1: Expansion of National Rubber Production Base

Project Code: Pg-1/Pj-02

Project 02: **Developing New Farming Clusters (Nucleus/Plasma) by the Private Sector**	
1	**Objective:** To add 5,000 ha of new rubber farms utilizing private sector strengths in support of rubber production through backward integration based on Nucleus/Plasma model.
2	**Rationale:** Facilities available in non-traditional regions allow the deployment of different production models with success. In addition to smallholder model and estate model, the nucleus/plasma model also has the potential to be successful where parcels of land are available in right extents for establishment of a nucleus facility around which scattered smallholding plasma can be developed. Suitable features of contract farming model will be adopted.
3	**Description:** This activity aims at developing 5,000 ha of nucleus/plasma rubber farms in non-traditional regions. Each sub-project will have a **nucleus** facility of around 100 ha to be developed and managed by a private sector entity that consists of a model plantation, nursery, training facility and a manufacturing facility. The **plasma** will comprise of a large number of smallholders clustered around the nucleus. All smallholders will come under the RDD subsidy scheme though the nucleus facility will provide supplementary extension services as required. There will be around 10 such nucleus/plasma units that cater to over 5,000 smallholders cultivating over 4,000 ha of plasma rubber farms.
4	**Outputs and timelines:** a. Planting outputs: By 2020 – 2,500 ha; By 2025 – 5,000 ha total b. Production outputs: By 2020 – nil; By 2024 – 850 metric tons; By 2045 – 9,000 metric tons
5	**Milestones:** Land allocation policy paper approved. Interested firms selected. Land allocation completed and nucleus farms established. Plasma land identified and allocated. Nursery network developed. Plasma smallholdings developed.
6	**Outcomes and impact:** ▪ Rubber yields will begin to realize from 2023 and by 2032 all farms will come into bearing. This project at its peak will add around 9,000 metric tons to national production at peak yields. ▪ Local consumption of this volume of raw rubber will create a value of over U$ 130 million[60] which adds to industrial output, export incomes and national GDP. ▪ Nearly 4.6 billion rupees or U$ 36 million will be circulated among smallholders in the targeted regions boosting the local/regional economies and uplifting rural standards of living.
7	**Cost estimates:** Total estimated cost of planting of 5,000 ha is LKR 1,500 million at LKR 300,000 per ha without considering in kind contributions from plasma beneficiaries. Investments in the nucleus by the private sector will depend on the type of processing and value added manufacturing to be introduced.
8	**Resource strategy:** Since this project engages smallholders, the government will provide necessary funds sourced from (a) cess funds, (b) annual treasury allocations, (c) donor funds. In kind contributions from smallholder beneficiaries are not considered in estimating the cost but this may equal to 50% of the total development cost. The private sector will bear the cost of developing nucleus and other facilities at the center.
9	**Institutional mechanisms:** Smallholder development component of this project will come under the purview of Ministry of Plantation Industries and implementation will be done by RDD with RRI technical expertise. The private sector entity which manages the nucleus will supply planting material and provide supplementary extension services based on clear agreements with RDD. Purchase of latex and primary processing will be done at the center.
10	**Policy implications:** Existing policy framework is adequate to operationalize this project. The government will provide land for setting up of nucleus estates on long lease. If available, private lands could be obtained.
11	**Environmental impact:** Regional environment will be positively impacted with emerging rubber plantations which will add to natural forest cover improving the micro climate.
12	**Social impact:** With employment opportunities and additional incomes, social standards will improve. Land security will improve entrepreneurial activities. Rural urban migration will be reduced. The targeted regions were affected by the past conflict and sustainable employment and income will be a great relief for such persons and families, especially for women/widows.

[60] Value addition per MT of raw rubber (NR+SR) used is estimated at U$ 13,000 by 2024. In 2013, this value was U$ 9250.

Program 1: Expansion of National Rubber Production Base

Project Code: Pg-1/Pj-03

Project 03: Expanding the Extent of Rubber in the Estates Managed by RPCs, JEDB and SLSPC	
1	**Objective:** To convert 3,000 ha of suitable underutilized lands available in the estate sector into productive rubber plantations.
2	**Rationale:** The government policy promotes productive use of every inch of underutilized land available in estates managed by RPCs and state owned estates. It has been estimated that there are over 15,000 ha of such land of which around 5,000 may be suitable for rubber growing. It will be feasible to target 3,000 ha for this project. This will improve incomes of estates and contribute to national rubber production.
3	**Description:** This activity aims at developing 3,000 ha of additional rubber farms in estates located in traditional rubber growing regions. Land suitable for rubber growing will be identified from hitherto underutilized lands within the estates managed by RPCs, JEDB and SLSPC. Elkaduwa Plantations too own similar unutilized lands.
4	**Outputs and timelines:** a. Planting outputs: By 2019 – 1,500 ha; By 2025 – 3,000 ha total b. Production outputs: By 2019 – nil; By 2024 – 510 metric tons; By 2040 – 5,700 metric tons
5	**Milestones:** (i) Feasibility study completed. (ii) Policy paper approved. (iii) Identification and survey of suitable lands in estates. (iv) Planting of rubber
6	**Outcomes and impact:** ▪ By 2032, all farms will come into bearing adding around 5,700 metric tons to national production at peak level. ▪ Local consumption of this volume of raw rubber will create a value of over U$ 82 million which adds to industrial output, export incomes and national GDP. ▪ Nearly 3 billion rupees or U$ 22 million will be added to the income of RPCs and JEDB/SLSPC.
7	**Cost estimates:** Total estimated cost is LKR 1,500 million at LKR 500,000[61] per ha without other overhead costs.
8	**Resource strategy:** The estates concerned will bear the cost of development supplemented by RDD subsidy scheme.
9	**Institutional mechanisms:** Relevant estates will implement this activity as part of their field development plans.
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** Environment will be positively impacted with emerging rubber plantations which will add to natural forest cover improving the micro climate.
12	**Social impact:** Estates will provide more employment to workers resulting increased incomes to the community.

[61] Cost per ha will be higher than the cost incurred by a normal smallholdings due to higher overheads and labor costs

Program 1: Expansion of National Rubber Production Base

Project Code: Pg-1/Pj-04

Project 04: Expanding the Extent of Rubber Smallholdings in Traditional Rubber Growing Areas	
1	**Objective:** To minimize the declining extent of rubber smallholder farms in traditional rubber growing regions and to increase the extent of rubber smallholdings and rubber output.
2	**Rationale:** The extent of rubber smallholdings in traditional rubber growing regions is declining owing to various reasons that include profitability issues, production cost increases and labour issues in addition to opportunity costs of land. This will lead to loss of indigenous tacit knowledge as well. This trend can be reversed if relative profitability can be enhanced with innovative practices in smallholder farms. New production technologies could increase productivity thus decreasing the cost of production. This project will promote such new techniques and practices that will be an incentive to grow more rubber in traditional regions thus increasing the number and extent of smallholdings.
3	**Description:** This activity aims at developing 7,000 ha of additional rubber smallholdings in traditional regions and the project will be implemented by RDD with TF participation. Present extent of smallholdings is 82,600 ha cultivated by 133,000 smallholders in all rubber growing districts including non-traditional regions. The increase therefore will be 8.5% over the existing extent of smallholdings. Beneficiaries of this project will include new smallholders as well as existing smallholders.
4	**Outputs and timelines:** a. Planting outputs: By 2019 – 3,500 ha; By 2025 – 7,000 ha total b. Production outputs: By 2019 – nil; By 2024 – 1,200 metric tons; By 2045 –12,600 metric tons
5	**Milestones:** Planting of rubber based on annual targets indicated above
6	**Outcomes and impact:** ▪ Rubber yields will begin to realize from 2023 and by 2032 all new smallholdings will come into bearing adding around 12,600 metric tons to national production at peak level in 2045. ▪ Local consumption of this volume of raw rubber will create a value of over U$ 182 million which adds to industrial output, export incomes and national GDP. ▪ Nearly 6.5 billion rupees or U$ 50 million will be the additional income received by smallholders
7	**Cost estimates:** Total estimated cost is LKR 2,450 million at LKR 350,000 per ha excluding beneficiary contributions. Expenses are to be incurred over a period of 10 years.
8	**Resource strategy:** RDD subsidy scheme will support this project. This project will come under a specially assigned officer responsible for achieving targets.
9	**Institutional mechanisms:** RDD and RRI under the supervision of MPI. TF as the partner organization.
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** Environment will be positively impacted with emerging rubber plantations which will add to natural forest cover improving the micro climate.
12	**Social impact: I**ncreased incomes to smallholders will improve their standards of living.

Program 2: Productivity Enhancement in Rubber Plantations

Project Code: Pg-2/Pj-01

Project 05: Accelerated Replanting of Rubber Farms Nearing the End of Economic Life	
1	**Objective:** To increase the average yields of rubber plantations from 1,040 kg/ha (in 2013) to 1,780 kg/ha within 30 years. This will add another 125,000 metric tons to national production by 2045.
2	**Rationale:** Sri Lanka's yield records are poor compared to many NR producing countries. Main reasons include: (i) prevalence of low yielding clones in existing plantations, (ii) over aged rubber trees not being replaced with latest and more productive clones at the appropriate time as recommended by the RRISL, (iii) number of tappable trees per hectare falling far below the economic level. It is essential to implement an accelerated replanting program to bring the national rubber tree age curve to an optimum level while introducing high yielding clones developed by RRISL that could yield over 2,500 kg per ha per year. This project aims at increasing the replanting rate to 4% until the entire backlog of low yielding farms is replanted by 2035. If the project adopts the standard rate of replanting which is 3% per year, it will take another 13 years to clear the backlog and the project will get extended unduly until 2048.
3	**Description:** This project will revise the national rate of replanting to 4% from the current actual rate of 2% per annum. In 2013, the total extent of rubber was 132,000 ha of which 26,500 ha were immature plantations. Present total mature area is estimated at 105,500 ha with around 35,000 ha with over 25 years of age which needs immediate replanting. According to the age analysis of farms, bulk of the matured area needs replanting. To maintain the proper average age distribution, around 5,300 ha need to be replanted yearly with high yielding clones following the national clone distribution policy[62]. By 2042, the project will bring 105,500 ha of highly productive mature rubber farms with capacity to yield higher volumes of rubber by keeping to global best agronomic practices. Replanted fields would yield around 2,000 kg/ha per year at full maturity. Since the success of this project will depend entirely on propagating high quality certified plants, a network of around 10 district nurseries will form an integral part of the project. Farmers' efforts will be supported with effective extension services including technological inputs. The project covers all rubber growing districts.
4	**Outputs and timelines:** a. A network of 10 certified nurseries with a total output of 5,000,000 plants per year b. Total replanted area matured: By 2024 – 10,600 ha; By 2034 – 63,600 ha, By 2042 – 105,500 ha c. Increased production: additional yield of 740 kg/ha per year which would result in an increase in production to a total of 224,000 MT from the same extent of 132,000 ha once the project reaches full maturity in 2042. d. This project will extend beyond the first Master Plan period from 2016 to 2025 until all farms are replanted
5	**Milestones:** Replanting of rubber based on annual targets as indicated above.
6	**Outcomes and impact:** ▪ National production will increase by 125,000 MT. ▪ Rubber producers including smallholders will make better profits and become viable. ▪ Local consumption of this additional volume of raw rubber will create a value of over U$ 1.8 billion which adds to employment, industrial output, export incomes and national GDP. ▪ Nearly 3.8 billion rupees or U$ 500 million will be the additional income received by relevant growers which will support a viable rubber production sector.
7	**Cost estimates:** Cost up to end of 1st year of planting will be LKR 400,000 per ha but may vary depending on the farm structure (smallholdings/large estate). Total cost will be LKR 42,200 million for 105,500 ha. The cost of subsidy payments will be over LKR 683 million per year at LKR 175,000 per ha.
8	**Resource strategy:** RDD subsidy scheme will support this project.
9	**Institutional mechanisms/key players:** RDD and RRISL under the supervision of MPI with TF as a partner.
10	**Policy implications and risks:** Existing policy framework is adequate to operationalize this project. However, the ability to motivate growers to replant early and availability of funds may pose a risk.
11	**Environmental impact:** Environmental impact is expected to be positive with emerging rubber plantations which will add to natural forest cover improving the micro climate of relevant areas.
12	**Social impact:** Increased incomes to smallholders will improve standards of living of many people. Increased employment in manufacturing industries also will bring social benefits.

[62] To be determined by the MPI based on RRISL recommendations and in consultation with RDD and rubber farmers/plantation companies.

Program 2: Productivity Enhancement in Rubber Plantations

Project Code: Pg-2/Pj-02

Project 06: Adoption of New Technologies and Good Management Practices in Rubber Production	
1	**Objective:** To increase the overall productivity of all farm operations through popularizing proven modern plantation practices thereby reducing the cost of production and enhancing profitability in plantations.
2	**Rationale:** Current average national yield is 1,040 kg/ha/ year which ranks Sri Lanka as the 7th among NR producing countries in terms of productivity. Low average national yields can be attributed to inefficient or non-adoption of proven technologies practiced in well managed plantations in other countries. For example, Sri Lanka has failed to adopt the more productive technique of Root Trainers[63] in nurseries instead of polybags. This project will take special measures to popularize a series of productivity enhancing techniques and good management practices among all rubber producers. This would result in yield increases in rubber plantations while reducing the overall cost of production making rubber plantations economically viable and smallholders more resilient. This is important as rubber has to compete with other crops like oil palm and tea.
3	**Description:** Activities will include: (a) use of more efficient rain guards in at least 70% of plantations, (b) proper use of fertilizer both organic and chemical types, (c) effective use of stimulants, (d) proper use of exploitation/tapping methods and introducing new techniques, (e) adopting correct planting intensity, (f) better nursery practices such as Root Trainers to ensure superior plants and, (g) any other techniques in keeping with global best practices and as recommended by RRISL and recognized as widely accepted national planting procedures. These activities will be supported by the supplementary project, Pg-6/Pj-02, Refinement of Available Technological Practices in Rubber Production.
4	**Outputs and timelines:** a. Increase yields by 50% b. Increase output by 20%. c. Reduce cost of production by 20% d. Increase labour productivity by 30%
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ Increased productivity in estates and smallholdings. ▪ Reduced cost of production and increased profitability over the medium to long term. ▪ Sustainable rubber plantation industry
7	**Cost estimates:** The total cost may exceed LKR 2,000 million at the rate of LKR 12,000 per ha for 169,000 ha of projected total extent by 2025.
8	**Resource strategy:** RDD subsidy scheme will support this project.
9	**Institutional mechanisms:** RDD and RRISL under the supervision of MPI
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** no negative impact.
12	**Social impact: I**ncreased incomes to estates and smallholders will improve their standards of living.

[63] Root Trainer technique is widely practiced in India since 2005 where the average yields exceed 1,800 kg/ha/year. A few Sri Lankan nurseries have tried this technique with poor results which shows the need for projects of this nature.

Program 2: Productivity Enhancement in Rubber Plantations

Project Code: Pg-2/Pj-03

Project 07: Establishment of a Network of Certified Nurseries	
1	**Objective:** To ensure timely availability of sufficient quantities of high quality certified planting materials to meet the needs of national planting program by augmenting the existing system of nurseries.
2	**Rationale:** The critical success factor of any rubber planting program is the availability of high quality planting materials in adequate numbers at the right time in keeping with national clonal composition policy[64]. However, it is apparent that the existing national nursery system (managed by RDD, RRISL, RPCs and the private sector) is operating at a sub-optimal level which has led to planting of significant volumes of poor quality planting materials especially by smallholders. To remedy this situation, establishment of a more reliable nursery system is proposed. That will combine the technical strengths of RRISL, structural strengths of RDD and management skills of the private sector where relevant.
3	**Description:** This project will augment the existing system of nurseries with around 10 state-of-the-art closely supervised and well managed nurseries located centrally in rubber growing districts to provide certified plants to growers on demand. These nurseries will deliver around 5,000,000 plants per year which are sufficient to plant/replant over 9,000 ha per year. Most modern nursery techniques such as the use of Root Trainers[65] will be adopted. Number of plants produced will be according to the national clone propagation policy.
4	**Outputs and timelines:** a. Two new nurseries set up by 2017 with sufficient bud-wood banks. b. Three additional new nurseries set up by 2019 c. All ten new nurseries set up by 2020
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ Rubber planting programs will not be constrained by shortage of planting materials. ▪ Increased productivity in estates and smallholdings.
7	**Cost estimates:** LKR 250 million for all 10 nurseries.
8	**Resource strategy:** RDD subsidy scheme will support this project.
9	**Institutional mechanisms:** Under the supervision of MPI, the RDD will implement this project with technical support from RRI and private sector participation (RPCs and Wellassa Rubber Co. included).
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** no negative impact.
12	**Social impact: I**ncreased incomes to estates and smallholders will improve their sustainability and standards of living.

[64] To be determined by the MPI

[65] A technique widely practices in India that offers significant advantages over polybag planting. The India Rubber Board and the RRI India promotes this technique.

Program 3: Sustainable Farming Systems

Project Code: Pg-3/Pj-01

Project 08: Rubber Producers' Income Stabilization Scheme	
1	**Objective:** To assure a stable remunerative income to productive rubber producers during cyclical price depressions.
2	**Rationale:** Natural rubber which is a commodity experience sharp price cyclical fluctuations that affect the economic viability of rubber farms, especially of the smallholders creating ripples in their livelihoods. Unattractive prices if remain long compel rubber farmers to either diversify or abandon the farms discouraging upkeep, renewal and expansions. If this happens, national production volumes will decline alarmingly threatening the sustainability of the expanding rubber products industry which derives a comparative advantage by using locally produced rubber. Rubber production sector has both entry as well as exit barriers in terms of availability of land, long immaturity period and the time required to recoup investment costs. Further, rubber production in traditional rubber growing regions has reached a ceiling in many aspects. Once a decision is taken to leave rubber production and uproot trees, rarely a farmer will return to rubber. To prevent this, the industry must ensure productive farmers receiving a fair remunerative price to retain them in rubber farming while encouraging new rubber farms.
3	**Description:** The Ministry of Plantation Industries will appoint a task group (TG-RPS) to develop a proposal for introducing a mechanism to assure remunerative incomes to rubber producers. Before making conclusions, the TG-RPS will consider (i) international price structures, (ii) farm-gate prices realized by rubber farmers in selected NR producing countries, (iii) local prices and pricing mechanisms, (iv) existing price differentials at various points in the supply chain, (v) existing productivity levels and cost of production at farm-gate level, (vi) factors that affect economic viability of rubber producers (controllable/uncontrollable), (vii) relevance of auction prices to major transactions, (viii) impact of the CESS on local rubber prices and different actors, (ix) impact of subsidies on cost of production and, (x) benefit/cost analysis of implementing a floor price. Possibility of adopting an insurance product to cover the risks associated with rubber planting is to be considered. The scheme will not be classified as an unfair trade practice leading to imposition of countervailing or anti-dumping duties by importers of rubber products. The TG-RPS will make recommendations on (a) most appropriate international benchmark price to be used as a guide, (b) floor price that a reasonably productive rubber farmer must receive to be economically viable, (c) a formula to derive the floor price with explanations, (d) how to mobilize resources to operationalize the floor price with justification, (e) how to operationalize the floor price effectively without any inefficiencies, leakages and high overheads (f) sustainability measures required to maintain the integrity of the mechanism. The proposal will include recommendations on long-term measures required to assure a remunerative income to rubber farmers.
4	**Outputs and timelines:** a. Task Group formed, terms of reference finalized and work commissioned – May 2017 b. Task Group report submitted – August 2017 c. Government approves the proposal through budget – November 2017 d. Proposal implemented – January 2018
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ Rubber producers become more confident to be in the business of rubber farming ▪ Rubber manufacturing industry continue to rely on local comparative advantage
7	**Cost estimates:** to be determined by the TG-RPS
8	**Resource strategy:** To be determined by the TG-RPS
9	**Institutional mechanisms:** MPI, MF&P, RDD and Thurusaviya Fund
10	**Policy implications:** Existing policy framework is adequate to operationalize this activity
11	**Environmental impact:** neutral
12	**Social impact:** positive

Program 3: Sustainable Farming Systems

Project Code: Pg-3/Pj-02

Project 09: Incentivizing Rubber Tappers	
1	**Objective:** To attract and retain a sufficient number of competent and motivated rubber tappers to sustain rubber production activities.
2	**Rationale:** Shortage of rubber tappers is an industry-wide issue**.** Although rubber tapping is not an attractive vocation, efficient rubber production is largely dependent on the skills and reliable performance of competent rubber tappers. Number of tappers and smallholder cum tappers engaged in tapping is estimated at around 100,000 comprising of both men and women. Most of the existing tappers are reaching retirement age but it has become difficult to attract replacement entrants due to economic and social reasons. Tapping as a vocation is impacted by certain dynamics such as possible tapping days which depend on rain interference and also the prices realized at farm gates. These two factors determine the income realized by the respective farms and hence tappers. Cyclical price depressions if remain over long periods compel rubber tappers to look for alternative income opportunities. Once they leave and get accustomed to better and steady income streams, it is difficult to re-enlist them. Finding competent new tappers is considered a very difficult task. Therefore, it is essential to have a scheme to attract, train and retain skilled and productive tappers on a long-term basis.
3	**Description:** The Task-group (TG-RPS) to be appointed by the Ministry of Plantation Industries for Pg3/Pj01 will develop a proposal for introducing a mechanism to achieve above mentioned objectives. Before making conclusions, the TG-RPS will consider (i) existing tapper income models, (ii) international practices related to engaging rubber tappers, (iii) incomes realized by tappers in other NR producing countries, (iv) comparative productivity of tappers in other countries, among other relevant factors. The TG-RPS will specially study the recently implemented tapper incentive scheme launched by Malaysian authorities during the 2014 Ramadan period. The RRISL too has made a proposal in this regard which needs to be evaluated. It is essential to obtain the recommendations of the RPCs in finding solutions. The TG-RPS will make recommendations on (a) a standard formula to derive the minimum wage for a tapper based on productivity norms, (b) a range of incentives that must be offered to keep a motivated tapper pool without deficit, (c) steps required to enhance the efficiency of present tapper training programs, (d) any other measures appropriate.
4	**Outputs and timelines:** e. Task Group formed and terms of reference finalized – October 2016 f. Task Group report submitted – Mid November 2016 g. Government approves the proposal – end November 2016 h. Proposal implemented – January 2017
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ Exodus of rubber tappers reduced ▪ Rubber production stabilizes
7	**Cost estimates:** to be determined by the TG-RPS
8	**Resource strategy:** To be determined by the TG-RPS
9	**Institutional mechanisms:** MPI, RRISL, RPCs and Thurusaviya
10	**Policy implications:** Existing policy framework is adequate to operationalize this activity
11	**Environmental impact:** neutral
12	**Social impact:** positive

Program 3: Sustainable Farming Systems

Project Code: Pg-3/Pj-03

Project 10: Transform Smallholdings to Resilient Business Units	
1	**Objective:** To enhance the economic resilience of rubber smallholders to face cyclical price shocks
2	**Rationale:** rubber production is dominated by smallholders accounting to over 70% of national production. When rubber prices decline due to global market dynamics, smallholders become the hardest hit among producers as their resilience is low and vulnerability is high. They are unable to cope with this situation on their own and often attempt to seek government assistance. When costs are unaffordable, they will neglect their rubber farms. This adversely affects the rubber industry. It is necessary to strengthen farmers to face such market dynamics on their own by taking measures to guide them to transform their smallholdings into economically viable business units.
3	**Description:** The project will take steps to change attitudes of farmers towards rubber growing. In a selected area, rubber farmers will be exposed to business oriented practices that include cost management, productivity enhancement and quality improvement. By sharing resources, farmers will be trained to achieve economies of scale thus increasing bargaining power. Micro level cost management will be introduced through a simple but all-encompassing farm accounting method. Value of productivity in reducing costs and enhancing profits even when prices are low will be stressed. Suitable non-farm and off-farm activities to be introduced to improve incomes. A significant transformation process is expected to take place enhancing farmer knowledge, confidence and performance. These activities will be conducted through Thurusaviya Societies. Recently initiated STARR project funded by IFAD also aims to enhance the resilience of rubber smallholders. It will be necessary to work closely with STARR team to share experiences and improve project design and implementation model.
4	**Activities, Outputs and timelines:** i. Detailed design of the project ii. Selection of Thurusaviya Societies for the pilot project iii. Implementing the project iv. Up scaling after one year
5	**Milestones:** Project design and resource allocation, selection of pilot societies, smallholders become productive and efficient, more societies added to the program
6	**Outcomes and impact:** Enhanced resilience of farmers, rubber production by smallholders to continue without government handouts.
7	**Cost estimates:** to be determined
8	**Resource strategy:** To be determined
9	**Institutional mechanisms:** Thurusaviya Fund, RRISL, RDD. STARR project as a partner organization.
10	**Policy implications:** Existing policy framework is adequate to operationalize this activity
11	**Environmental impact:** neutral
12	**Social impact:** positive

Program 4: Enhancing Competitiveness of Rubber Products

Project Code: Pg-4/Pj-01

Project 11: Strategic Promotion of Sri Lankan Rubber Products	
1	**Objective:** To increase the volumes and value of rubber products exported from Sri Lanka by capturing a larger global market share through the promotion of Sri Lankan brands of rubber products with differentiated value.
2	**Rationale:** At present, there is no concerted effort to market Sri Lankan origin rubber products. Individual manufacturers do their own marketing and some of them have entered profitable niche export markets. However, not all are operating within their true potential although they have developed necessary marketing capabilities. The government support they receive is the occasional assistance provided by the EDB through participation in trade fairs. What is required is a sustained and intense market promotion campaign done in a collaborative manner based on a clear promotional strategy. Such collaborative action with government support is expected to give the manufacturers an edge in export markets. Special attention to be paid for the acquisition of distribution channels.
3	**Description:** This project will bring the EDB (government) and the SRI (private sector) together to plan and implement a program aimed at realizing the above objective. A stable mechanism will be established to (a) market Sri Lanka as a source for high quality and sophisticated rubber products produced under socially responsible conditions, (b) promote a Sri Lanka mark for rubber products of Sri Lanka origin, (c) assist companies in collaborative market promotion and acquiring distribution channels, (d) assist marketing products of capable SMEs. Since brand building is a very expensive and time consuming process, the possibility of acquiring a brand and a distribution network from overseas for the benefit of SMEs will be explored. It is desirable to focus on high value and low volume rubber products such as (a) automotive rubber components (non-tire) and, (b) medical rubber devices.
4	**Outputs and timelines:** a. Project strategy validated and participants identified – 3Q 2016 b. Project format, structure and budget/ finalized- TBD – 4Q 2016 c. SRI and EDB sign a MOU – 4Q 2016 d. Services of a rubber products marketing expert obtained - TBD e. Export promotion unit established - TBD f. Activities implemented - TBD
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ Sri Lankan brand image ▪ Increased export incomes from rubber products and higher GDP ▪ Increased turnovers and profitability of manufacturing firms ▪ Increased employment
7	**Cost estimates:** LKR 1,300 million over a period of 10 years (approximately U$ one million per year)
8	**Resource strategy:** EDB and SRI/SLAMERP cost sharing with supplementary treasury funds.
9	**Institutional mechanisms:** EDB and SRI to jointly supervise the market promotion unit
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** no negative impact.
12	**Social impact:** increased export incomes and company profits will contribute to better standards of living

Program 4: Enhancing Competitiveness of Rubber Products

Project Code: Pg-4/Pj-02

Project 12: The Rubber City	
1	**Objective:** to establish a dedicated rubber industrial park with four zones and common infrastructure facilities**.**
2	**Rationale:** Competitiveness of rubber products depend on differentiation, quality, delivery and cost parameters. To achieve optimum performance in these aspects, it is necessary to establish a dedicated industrial park for rubber products. This will reduce transaction costs of firms. Its design will incorporate solutions to emerging sustainability issues. Modern industrial parks are designed to be innovation systems and functional industry clusters. At present, rubber product manufacturers operate from state owned industrial parks or from their own sites. Such locations do not provide rubber industry specific common facilities or clustering advantages of co-location in activities such as joint procurement, collaborative R&D, product innovation, common effluent treatment and HR development etc. Collaboration among manufacturing firms in pre-competitive areas is not facilitated. Individual manufacturing sites are frequently exposed to environmental and social pressures. A dedicated park tailor made for rubber industries is expected to make manufacturing operations more efficient. Environmental solutions would be common, more effective and economical. This is the trend in many other countries[66] (India, Malaysia, Thailand and China provide fine examples).
3	**Description:** This project will establish a custom designed rubber industrial park with 4 zones in a suitable location within the Western Province Megapolis region. The extent required is a minimum of 100 hectares that need to be confirmed with the feasibility/market study. Zone A will be allocated to large/medium industries based on dry rubber. Zone B will be for latex based industries. Zone C will cater to SME types and house incubators, innovation systems, common testing and R&D facilities, HR services including training, Engineering services with central workshops etc. A Zone D will be for related and supporting industries and services suppliers such as chemical suppliers and mould makers. Solid-waste management and recycling of rubber materials will be done in a special location. The Park will be built either by the BOI or MI&C and the management will be assigned to a special purpose Public-Private Partnership. It is possible to find foreign investors to develop the park on a JV/PPP basis.
4	**Outputs and timelines:** a. An interest group (public/private) convened to promote the project by June 2016 b. Feasibility study (FS) – to be completed by December 2016. c. Based on the FS, detailed designs and action plans to be formulated d. Implementation of action plans e. Rubber City established and operational – Phase I by 2Q 2018
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ Increased investments including FDI in the rubber industry ▪ Reduced transaction costs of rubber products manufacturers and increased profitability ▪ Increased employment opportunities ▪ Effective environmental management and managed social issues
7	**Cost estimates:** LKR 2,000 million to develop park infrastructure facilities.
8	**Resource strategy:** Investments by the government possibly through loan financing
9	**Institutional mechanisms:** The Ministry of Industries will lead this project with the support of SRI. BOI will provide necessary assistance. SLAMERP will provide planning inputs from beneficiary side.
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** Positive impact due to centralized effluent treatment and waste recycling.
12	**Social impact**: Industry expansion, increased export incomes and profits will lead to better standards of living among relevant stakeholders.

[66] India has 2 rubber parks functioning successfully (first is KINFRA at Ernakulam is run as a private company and owned jointly by the Govt of India and Govt of Kerala) and the 3rd rubber park is on the drawing boards. China's Rubber Valley in the port city of Qingdao located in northeastern Shandong province is a manufacturing powerhouse which is now world famous and designed to be rubber industry's Silicone Valley. Malaysia and Thailand plan to set up a rubber park as a joint venture. Sri Lanka's plan for Rubber City emerged in 2000 as a rubber cluster project (read International Rubber Quarterly: March 2003, page 5) which is yet to materialize.

Program 4: Enhancing the Global Competitiveness of Rubber Products

Project Code: Pg-4/Pj-03

Project 13: Latex Industry Integrated Water Management Project (IWMP)	
1	**Objective:** To introduce cutting-edge technological solutions to problems in sourcing, procurement, efficient use and safe discharge of water to environment in latex based industries.
2	**Rationale:** Latex industry consumes large volumes of water which is becoming a scarce and expensive commodity. This is a threat that needs avoidance. Depending on the location of plants, manufacturers use different supply sources. The NWS&DB is the major supplier to industrial zones but such zones have supply constraints. Drawing of water from other sources also has severe limitations. Discharge of effluent, even after proper treatment has become a serious socio-environmental issue and threatens industry competitiveness and good-will. These factors contribute to the escalation of cost of water significantly and also threaten the industry viability. It is of paramount importance that the industry, together, develops and implements a holistic and effective solution to this crucial problem. IWMP feasibility study[67] conducted during CCED Phase III confirms the possibility of providing effective and feasible solutions to this problem. It is necessary to adopt IWMP recommendations, first as a pilot and demonstration project, and expand across the latex industry with further improvements.
3	**Description:** Feasibility study of this project has been completed in 2013 with technical assistance from ADB CCED Phase III which recommends establishing the IWMP as a pilot and demonstration project that can be scaled up and improved with practice. The demonstration project will be launched at a latex glove factory at SEPZ as recommended in the feasibility study. The project design incorporates 3R (reuse, recycling and reclaim) principles and uses latest technologies such as membrane technology and reverse osmosis. This project will be complimentary to The Rubber City project (Pg3/Pj02)
4	**Outputs and timelines:** a. An interest group (public/private) convened to promote the project by 4Q 2016 b. Detailed designs by 2Q 2017 c. Implementation of action plans
5	**Milestones:** to be achieved as stated above within 5 years
6	**Outcomes and impact:** ▪ Reduced cost of water in latex based industries. ▪ Sustainable water supplies to industry ▪ Effective environmental management and fairly managed social issues
7	**Cost estimates:** LKR 250 million
8	**Resource strategy:** PPP (Relevant companies, BOI and NWS&DB)
9	**Institutional mechanisms:** PPP (BOI, NWS&DB and relevant latex based industries)
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** latex industry becomes socially responsible and non-polluting industry.
12	**Social impact:** No one will be affected by water pollution from rubber industry

[67] The study was conducted at Seethawaka Export Processing Zone (SEPZ) managed by the BOI courtesy of Lalan Rubbers Ltd owned latex glove manufacturing plant which consumes around 1,500 cubic meters of process water per day supplied by BOI/NWS&DB. Current (2016 April) cost is Rs. 87 per cubic meter (75 for supply and 12 for effluent treatment) and it is projected that the cost may reach Rs. 150 per cubic meter by 2020. The SEPZ faces water shortages which prevents expansions and attracting further industries. The ADB expert team developed a solution incorporating the principles of recycling and reuse based on novel technologies such as membrane technology. Based on their findings, the ADB provided TA to BOI (during July/Oct 2014) to design a PPP to augment water supplies at the SEPZ which at present consumes nearly 9,000 meter cubes of water per day. The aim is to increase this to 15,000 MC per day.

Program 4: Enhancing Competitiveness of Rubber Products

Project Code: Pg-4/Pj-04

Project 14: Enhancement of Resource Use Efficiency and Productivity	
1	**Objective:** To introduce cutting-edge technological innovations and best management practices to manufacturing firms enabling them to use costly resources with optimum efficiency making the industry more competitive.
2	**Rationale:** Rubber products manufacturing industry is highly resource intensive in terms of fuel and energy, water, manpower, process materials and, capital investments (plant and machinery including laboratory equipment). Most of these costly inputs are imported at a relatively higher cost. This makes it imperative to innovate and introduce more efficient methods and techniques to use these resources in the most effective manner. Another strategy is resource sharing which is one of the fundamental principles adopted in Eco-Industrial Clusters. Sri Lankan rubber industry is expected to become an eco-industrial cluster. These steps supported by Resource Efficiency policies will lead to enhanced competitiveness.
3	**Description:** This project will introduce novel management practices such as lean manufacturing, energy audits and new ISO Standards in addition to implementing a program to develop positive attitudes among the workforce. These improved techniques will be introduced after a series of careful studies that will assess the existing status of the industry in terms of global benchmarks and best practices. Such approaches include: Low Carbon Industrial Production – LCIP; Resource Efficient and Cleaner Production-RECP; Transfer of Environmentally Sound Technologies (TEST) approach; Environmental Management A promoted by UNIDO/UNEP. The EU promotes Sustainable Process Industries through Resource & Energy Efficiency (SPIRE PPP) project. This activity will be an ongoing continuous process as innovative improvements have no limits.
4	**Outputs and timelines:** a. Benchmarking studies across the industry – 4Q 2016 b. Design of individual sub projects and programs 1Q 2017 c. Implementation of action plans 2Q 2017 onwards
5	**Milestones:** to be achieved as stated above in 5 years
6	**Outcomes and impact:** ▪ Increased productivity ▪ Reduced cost of inputs ▪ Reduced waste ▪ Increased competitiveness
7	**Cost estimates:** LKR 150 million
8	**Resource strategy:** Investments on improvements by individual firms. Initial studies sponsored by the RMP budget.
9	**Institutional mechanisms:** SRI, SLAMERP with relevant government institutions and universities. Assistance from international organizations such as UNEP, UNIDO, EU and JICA will be sought for technical assistance. National Cleaner Production Centre and Sri Lanka Productivity Secretariat also will play a supporting role.
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** Reduction in use of scarce resources will have a positive impact.
12	**Social impact:** (i) industrial environment will become more conducive to work and better performance, (ii) increased competitiveness will lead to better compensation to workforce

Program 5: Rubber Wood Industry Development

Project Code: Pg-5/Pj-01

Project 15: Establishment of Multi-functional Central Rubber Wood Processing Units	
1	**Objective:** To expand the availability of high quality sawn rubber timber to cater to the demand of export oriented value added rubber wood products manufacturers by demonstrating and popularizing best practices and new techniques in rubber wood processing.
2	**Rationale:** Rubber-wood is known as ''Asian Oak''. Rubber wood based furniture items are in great demand in the West and fetch attractive prices. At present the wood based products industry does not receive adequate volumes of high quality rubber wood. Non-availability of modern processing and treatment facilities in addition to lack of technological skills is the main reason. Demand for untreated rubber wood for other uses (as bio-mass feed for energy, chips for boards etc.) is another reason. R&D doesn't support this sector and there are training need gaps. Establishment of multi-functional rubber wood processing centres will increase the supply of high quality rubber wood to the industry and catalyze the development of a profitable rubber wood products sector. This is necessary as the new 4% ARR replanting programs (RMP Project No. 4) will lead to higher volumes of uprooted rubber trees[68].
3	**Description:** The project will establish three multi-functional Rubber Wood Processing Centres (RWPC) in selected rubber growing districts. Exact locations will be determined after a survey of rubber farms to determine availability of old trees and demand for high quality rubber timber in the region. These units will perform the above mentioned functions serving the industry. Procuring of rubber wood, treatment and processing, R&D, training, quality management, demonstrating products manufacture, selling high quality sawn timber to industrialists will be the key functions of a RWP Centre.
4	**Outputs and timelines:** a. Feasibility studies - TBD b. Design of centers - TBD c. Establishment of centers – TBD
5	**Milestones:** to be reached as stated above
6	**Outcomes and impact:** ▪ Knowledge transfer ▪ Availability of certified quality sawn rubber wood to make value added products for export ▪ New products and processes
7	**Cost estimates:** LKR 1200 million for 3 units
8	**Resource strategy:** TBD
9	**Institutional mechanisms:** Ministry of Industries and Commerce, Wood Based Industry Association, SRI
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** no negative impact.
12	**Social impact:** uprooted rubber trees and rubber wood will attract better prices. Smallholders who uproot old farms will receive additional financial benefits.

[68] Presently, a mature rubber tree fetches between LKR 2,000 to LKR 3,000 at the time of uprooting depending on the accessibility and proximity to roads. A hectare would yield around 250 to 300 trees on average.

Program 6: Rubber Industry Workforce Development

Project Code: Pg-6/Pj-01

Project 16: Rubber Industry Workforce Development Council (RIWDC)	
1	**Objective:** To set up a stakeholder driven collaborative mechanism to strategize, plan, coordinate and implement improved workforce development activities in the rubber industry.
2	**Rationale:** Workforce development (WFD) is a broader concept than recruitment and training. It takes a holistic approach that covers all personnel in an organization at all levels. It integrates workforce analysis and planning, human resource management and capability development to strengthen organizational success by aligning the workforce to both current and future service demands. At present the concept of WFD is not widely practiced effectively within the rubber industry although institutions such as PRISL and individual firms are engaged in formal technical education and training. To reach high productivity standards and also to attract and retain best quality talent to the rubber industry it is essential to have a far sighted plan for WFD backed by appropriate policies, systems and structures. The task entrusted to RIWDC will be to take all measures necessary to develop enabling policies, systems and structures that will design and deliver a series of WFD projects required to develop the industry's future workforce. The RIWDC will guide and support all WFD partnering organizations such as PRISL, Universities and private sector institutions.
3	**Description:** RIWDC will be a body mandated to take necessary steps to develop future rubber industry workforce through a WFD program which will have many sub projects to be implemented by relevant organizations. The Council will have representations from different segments of the industry, universities and other training providers, rubber industry associations, relevant government institutions and ministries. RIWDC will have supervising authority to monitor and evaluate the activities of relevant partnering organizations that will submit project proposals and receive assistance for implementation. Council members will be selected by SRI and implementation of programs will be the responsibility of SRI and its affiliates.
4	**Outputs and timelines:** a. Determination of RIWDC mandate, tasks and composition – 4Q 2016 b. Selection and appointment of members to RIWDC – 1Q 2017 c. Rubber Industry WFD Policy and Program developed – 2Q 2017 d. WFD Project formulations by partnering organizations – 3Q 2017 e. Implementation of projects – beginning 4Q 2017
5	**Milestones:** to be reached as stated above
6	**Outcomes and impact:** ▪ Workforce Development Policy and Program 2017-2025 ▪ New policies, systems and structures ▪ Improved capacities of rubber industry WFD organizations ▪ Competitive workforce with positive attitudes who will be more productive
7	**Cost estimates:** LKR 650 million over a 10 year period
8	**Resource strategy:** TBD
9	**Institutional mechanisms:** SRI, PRISL, NIPM, Universities and all other relevant institutions.
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** not applicable.
12	**Social impact:** positive.

Program 7: Industry-wide Technological Capability Development

Project Code: Pg-7/Pj-01

Project 17: Establishment of Rubber Industry Technology Consortium (RITC)	
1	**Objective:** To achieve technological superiority. The rubber industry is technologically driven and it is essential to promote innovations through enhancing technological capabilities at industry level by sharing available resources in the public and private sectors.
2	**Rationale:** Technological innovation is a key driver of the rubber products manufacturing industry. For example, nanotechnology[69] could enhance the performance of tires in the future. While a few rubber companies have developed advanced technological capabilities on their own, other firms in industry are weak in their capacity to innovate which reflect poorly in competitiveness. Developing and acquiring technology is a costly[70] and time consuming process and therefore a resource sharing collaborative approach strengthened by necessary policy support is recommended. Further, this will ease the problem of limitations in expert manpower in terms of technologists and scientists (The RRISL is experiencing a severe brain drain). The project will bring together existing institutions that possess technological capabilities to work in collaboration with the industry in finding solutions to common problems that falls within the scope of precompetitive collaboration.
3	**Description:** RITC will be a collaborative mechanism for stakeholders to identify technological gaps, develop strategies to bridge the gaps, agree on action plans, coordinate and implement technological solutions to advance the rubber industry. The network of participating institutions will include RRISL, ITI, IDB, PRI, UOM, USJ and other relevant institutions together with the private sector. The RITC will develop and implement a collaborative R&D program geared towards serving industry needs. Resource requirement will be assessed on project basis. Intended beneficiaries will share the costs and manage the R&D project. The RITC will assess the SLINTEC model and develop its own operational model with necessary adaptations. Being the pioneer rubber research institute, RRISL will be the lead implementer of this project. All R&D activities will be demand driven which implies the active participation of the industry in this project.
4	**Outputs and timelines:** a. Prepare the blueprint for the consortium – 3Q 2016 b. Identification of partners and finalizing agreements – 3Q 2016 c. Establishment of the RITC – 4Q 2016 d. Augmentation of RRISL facilities to conduct relevant R&D activities – 4Q 2016 through 2017. e. Implementation of collaborative R&D projects – beginning 1Q 2017.
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ Effective results oriented R&D projects launched ▪ Optimization of resource utilization in R&D at industry level. ▪ Rubber products industry gains access to better technologies and innovations ▪ Firms ability to produce and market more sophisticated value enhanced products ▪ Expansion of existing markets and access to new markets by manufacturers
7	**Cost estimates:** Government allocation of LKR 100 million for five years to be leveraged by private sector funds. A sum of LKR 20 million will be required in 2016 to initiate activities.
8	**Resource strategy:** Driven by the beneficiaries pay principle. Catalytic role by the government.
9	**Institutional mechanisms:** RRISL (lead agency), SRI and relevant universities and supported by NRC and NSF.
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** positive as the RITC could find effective solutions to waste disposal and effluent treatment issues that have raised public concerns.
12	**Social impact:** Positive

[69] Nanotechnology is a very promising technology frontier. Sri Lanka's SLINTEC is working as a public-private partnership towards developing innovations based on nanotechnology and two leading rubber industry firms are active in this partnership. The RITC project aims at creating a platform for ensuing more similar R&D partnerships.

[70] Leading tyre companies spend over 3% of their sales value on R&D which means expenses on tyre R&D is over U$ 4,000 million per year. Without spending substantially on R&D, Sri Lanka cannot get a foothold in the global tyre market although Loadstar, a niche player, was ranked 49 among global tyre companies in 2010.

Program 7: Industry-wide Technological Capability Development

Project Code: Pg-7/Pj-02

Project 18: Introduction of Refinements to Current Technological Practices in Rubber Production	
1	**Objective:** To make technological practices currently in use more relevant, effective and productive at farm level through innovation and further refinement based on adaptive R&D and participatory field trials based on a demand/market driven approach.
2	**Rationale:** Current agronomic/technological practices adopted in plantations are of acceptable standards but the results in terms of yield per ha, tree stand per ha, immature period, dry trees etc. show inadequacy related to productivity compared to competing NR producing countries[71]. Low land productivity leads to low profits and hence sustainability of rubber plantations has become uncertain. It is necessary to innovate more efficient and effective farm practices based on a concerted technology development project using a participatory bottom-up approach. Effectiveness of technology transfer to grassroots level is known to be poor in Sri Lanka which needs to be rectified. Not only are the smallholders, large estates too are somewhat slow in proactively absorbing new technologies widely practiced in other countries. Non-adoption of Root Trainer technology in nurseries and slow adoption of low intensity harvesting are examples. Attitudinal and behavioral changes are necessary to improve farm performance.
3	**Description:** Lead implementer of this activity will be the RRISL and universities or any other relevant institutes in the public/private sectors will become collaborators. First, an activity benchmarking exercise will be conducted to assess and identify performance and technological gaps in relation to global best practices. Secondly, appropriate target groups with high absorption capacity and readiness will be identified as ensuring early success is important. Operational modalities will be selected based on a few pilot studies. If solutions to fill the gaps are already known, project extension team will follow-up with producers until the relevant practices are adopted. If solutions are not readily available, new practices need to be innovated or adapted through the project. Technology dissemination will form an important component of this activity which will consider sociological constraints as well. Finally, the innovated practices will be promoted throughout the plantations until producers begin to adopt such practices as standard procedures. Exposure to best practices in addition to annual best performance awards will be an integral part of the change process. This will be a continuous change process.
4	**Outputs and timelines:** a. Project partners and institutional mechanism finalized – 3Q 2016 b. Benchmarking of activity chain to identify performance/productivity gaps – 3Q 2016 c. Selection of target groups and implementation modalities – 4Q 2016. d. Identifying and introducing known solutions – 4Q 2016 onwards e. Augmenting existing R&D facilities at the RRISL – 4Q 2016 through 2017 and 2018 f. Innovation and promotion of new practices to improve performance – 2017 through 2020
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ New technological practices lead to higher productivity in plantations ▪ Higher productivity leads to higher profits ▪ Higher profits and returns on investment makes rubber farming an attractive sustainable business ▪ Sustainability of rubber producing industry makes rubber products industry competitive
7	**Cost estimates:** LKR 150 million for five years. A sum of LKR 10 million will be required in 2016 to initiate activities.
8	**Resource strategy:** Year 1, from the consolidated fund as per 2016 budget proposal. Subsequent years TBD.
9	**Institutional mechanisms:** RRISL to be the lead agency. Partners include SRI, relevant universities, NRC and NSF.
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** positive as resource use will be optimized.
12	**Social impact:** Positive

[71] A closest comparison, Thailand records yields in excess of 1,800 kilos per year per ha while Sri Lanka averages around 900 kilos. Low yields when coupled with persistently ‘‘low’’ rubber prices could drive rubber producers away from the business of rubber farming searching for alternative uses for land. Yields are driven mainly by technological factors in addition to a basket of managerial and human factors involving ‘‘choices’’.

Program 7: Industry-wide Technological Capability Development

Project Code: Pg-7/Pj-03

Project 19: **Designer Rubber Project: Eco-Industrial Cluster**	
1	**Objective:** To transform the rubber industry to an environmentally friendly sustainable industry cluster, an Eco-Industrial Cluster (EIC)[72].
2	**Rationale:** Raw materials used in the rubber products industry including raw rubber are very costly and reduction of use, reuse and recycling (3R) where possible will reduce costs substantially. The 3Rs when practiced effectively would reduce the negative impact on the environment including the carbon footprint. It is estimated that, by 2024, over 60,000 MT of polymer materials will be available in Sri Lanka for recovery and reuse. At present, we recover only 20% of such materials. To reach a target of 98% recovery, this project will implement action plans aimed at: (a) developing required technological competencies, (b) developing required human competencies, (c) attracting investments required and (d) popularizing the use of designed polymers. The same principle is applicable to the integrated water management project (IWMP).
3	**Description:** The project will introduce the principles of a) reduce, b) reuse and c) recycling of all materials including polymers used and generated by the rubber manufacturing to the industry. Water is not included as the IWMP will develop solutions to water use related issues. Post-consumer materials will be collected for recovery. All the recovered materials will be converted to **specially-designed polymeric materials** that can be marketed in Sri Lanka as well as in other countries. This will be done through a process involving (i) establishment of a consortium of stakeholders who are interested in participation, (ii) feasibility study and full project design (iii) implementation. Key activities of the consortium will include: (a) R&D aimed at innovating new technological processes to enable superior designs, (b) workforce development as appropriate, (c) establishment of processing plants, (d) supply chain management and, (e) branding and marketing.
4	**Outputs and timelines:** a. 40,000 MT used rubber tires reclaimed - TBD b. 5,000 MT used rubber products reclaimed - TBD c. 10,000 industrial waste recovered - TBD d. 5,000 MT post-consumer polymer products recovered - TBD **e.** 50,000 MT of Designer Polymer Materials marketed – TBD
5	**Milestones:** 1. Establishment of the Consortium, 2. Feasibility Study complete, 3. Company Formation, 4. Launch of Activities
6	**Outcomes and impact:** ▪ Environmental benefits, enhanced profitability of firms, import substitution, livelihoods/employment and improved national incomes
7	**Cost estimates:** LKR 200,000,000
8	**Resource strategy:** (i) shareholder funds, (ii) Green Fund[73], (iii) donor funds
9	**Institutional mechanisms:** SRI, MI&C, M of Env. and SLAMERP
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** Extremely positive.
12	**Social impact:** Positive

[72] ECI is a geographic concentration of interconnected industrial units in a specialized field that cooperate with each other and with the local community to efficiently share resources (water, energy, infrastructure, information etc.) leading to improved environmental quality, economic gains and equitable enhancement of human resources for both the industry and local community (ADBI). EIC aims at integrating industrial systems with natural systems. Example: Kawasaki City, Tokyo

[73] To be collected through a levy on environment polluting activities to be determined

Program 7: Industry-wide Technological Capability Development

Project Code: Pg-7/Pj-04

Project 20: **Finite Element Analysis Simulation Centre (FEASC)**	
1	**Objective:** To enhance the capabilities of rubber products manufacturers in design, prototyping, developing and optimization of high performance rubber products for sophisticated markets realizing superior value.
2	**Rationale:** Performance of globally competitive rubber products manufacturers depend on breakthroughs in products, technology and brands. Technological advancements convert traditional products to commodities in no time. Product innovation is essential to capture and sustain markets. Rapid, superior and economical design capability is of utmost importance in responding to constantly changing market needs. FEA is an advanced ICT based powerful tool of design analysis that numerically investigates properties and performance of complex products. It plays a major role in developing and optimization of products such as high performance tires, automotive components and medical rubber devices. FEA simulation in laboratories reduces cost for live prototypes and testing and enhances the quality and performance of products. Sri Lankan manufacturers design their products using traditional methods –design-prototype-test-redesign-prototype-test….repeat until the product is right. This is very costly, time consuming and inefficient. FEASC will help such manufacturers to develop new products with better performance faster and at a lesser cost. New entrepreneurs and SMEs will receive most benefits while existing manufacturers with no FEA facilities will use the services extensively.
3	**Description:** The FEASC is an advanced laboratory manned by highly competent technologists and equipped with advanced computers installed with specialized software. It will be housed in a location conducive for technologists and researchers to work uninterrupted. It will be linked to other R&D institutions and technology centers to create synergies. It will have a team of core fulltime staff that will be supplemented by researchers from partner institutions including universities as the need arises. Stage II will involve setting up a common prototyping center. Training and capacity building of FEASC team as well as service users will be an integral part of the FEASC program. The project will be a public-private partnership and service users will pay a fee that cover costs of services. A scheme will be introduced to incentivize SMEs to use FEASC to make innovative products for export markets. If possible, FEASC services could be used by other industries.
4	**Outputs and timelines:** i. FEASC Feasibility study completed and project proposals submitted – June 2017 ii. Partner agreement signed – July 2017 iii. Procurement process and recruitment and training completed – October 2017 **iv.** FEASC commissioned – November 2017
5	**Milestones:** 1. Completion of the Feasibility Study, 2. Formation of the partnership (PPP) 3. Launch of the FEASC
6	**Outcomes and impact:** ▪ Enhanced technological competencies and skills of industry personnel – HR development ▪ Shortened design times, new product designs and superior products – market responsiveness ▪ New markets, branded products and increased export orders – industry expansion, profitability and GDP impact ▪ Globally competitiveness of Sri Lankan rubber products enhanced – growth and sustainability of industry
7	**Cost estimates:** Phase I: LKR 100 million
8	**Resource strategy:** (i) Government allocations, (ii) Private sector funds and (iii) donor funds and TA
9	**Institutional mechanisms:** MPI, SRI, SLAMERP, PRISL
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** Positive.
12	**Social impact:** Positive

Program 8: Rubber Industry Information Management

Project Code: Pg-8/Pj-01

Project 21: Effective Use of Rubber Industry Data	
1	**Objective:** To support decision and policy processes by enhancing the quality, timeliness and efficacy of information management systems pertaining to rubber industry performance.
2	**Rationale:** stakeholders have observed that the integrity of available data and processed information on rubber industry performance needs further enhancement to help arriving at valid decisions pertaining to past performance and future planning. This status can be improved through the adaptation of a new information management system to be operationalized as a collaborative public-private initiative. The private sector generates performance data and the government uses such data for economic analyses, national planning and industry policy making processes. Rubber Master Plan embodies the national policy and the series of annually reviewed Working Papers and other reports should contain accurate data and information leading to sound strategic decisions. This project will improve the quality and timely availability of such information.
3	**Description:** In addition to the current methods adopted by RDD in collecting and processing rubber production data, the MPI will work in close collaboration with the industry through the Sri Lanka Rubber Secretariat (SLRS) to collect all data and information related to holistic industry value chain performance in a timely manner. Based on such information, the SLRS will issue regular newsletters with critical analysis of information for the benefit of the private sector as well as the government. Relevant discussion groups also will be created to facilitate use of information. A website will be created to facilitate interactive communications among stakeholders. A portal will link SLRS with international and national organizations such as RDD, RRISL, CRTA, IRSG, and ANRPC etc. *(More details are given in the report titled "Industry Data and Information Management Strategy" ADB CCED Phase III TA REG 6337)*
4	**Outputs and timelines:** a. Design project activities in detail – 4Q 2016 b. Capacity Building of RDD, RRISL and SLRS – 1Q 2017 c. Implementation – 2Q 2017
5	**Milestones:** to be achieved as stated above within 3 years
6	**Outcomes and impact:** ▪ Availability of accurate, timely and comprehensive information ▪ More relevant and sound decisions taken by industry analysts, policy makers and industry firms
7	**Cost estimates:** LKR 125 million
8	**Resource strategy:** to be determined.
9	**Institutional mechanisms:** MPI, MI&C, EDB, Dpt. of Customs, RDD, RRISL, SRI/SLRS, relevant Int'l organizations
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** neutral
12	**Social impact:** positive

Program 9: Strengthening MSME Sustainability

Project Code: Pg-9/Pj-01

Project 22: Capacity Enhancement of Rubber Products Development Centre (RPDC)[74]	
1	**Objective:** To upgrade the facilities currently available at the RPDC to match the growing and diverse needs of a developing MSME sector that is expected to contribute to 20% rubber industry turnover by 2025.
2	**Rationale:** Current contribution of the MSME sector to rubber industry turnover is estimated at around 5% which is inadequate when benchmarked with other developing countries. To develop MSMEs in the rubber industry which is competitive and technologically oriented, it is essential to provide an effective assistance package combining business development services with technological facilities to upstarts and growing MSMEs. Present RPDC services are limited to providing semi-processed materials at market prices and testing of products. MSMEs will not sustain in the market place unless they adopt global best practices. The goal of the Master Plan is to make them export oriented. Without creating another institutional mechanism, the RPDC managed by the IDB will be upgraded and revitalized to serve the MSMEs.
3	**Description:** The RPDC will be subjected to a complete overhaul and upgrading with a completely changed scope, structures and systems. It will be one-stop-shop for the MSME enterprises and the link between the enterprises and the RPDC will become strong with a team of field officers visiting the factories frequently. The new scope will include production and quality, marketing and human resources, financial services and R&D inputs. The IDB will establish a fully-fledged arm of RPDC at Zone 3 of the Rubber Industry Park.
4	**Outputs and timelines:** a. Conduct a feasibility study – 1Q 2017 b. Prepare detailed designs – 2Q 2017 c. Implementation – 4Q 2017
5	**Milestones:** to be achieved as stated above within 5 years
6	**Outcomes and impact:** ▪ Improved capacity of RPDC to deliver effective services to MSME sector ▪ Enhanced performance by the MSME sector
7	**Cost estimates:** LKR 255 million
8	**Resource strategy:** TBD
9	**Institutional mechanisms:** IDB, RPDC, RRISL, SRI
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** neutral
12	**Social impact:** positive

[74] Set up in 1982 with World Bank assistance and located in Nuge Road, Peliyagoda, the RPDC comes under the purview of Industrial Development Board, Ministry of Industries & Commerce

Program 10: Implementation of the Rubber Master Plan

Project Code: Pg-10/Pj-01

Project 23: Capacity Building of the Sri Lanka Rubber Secretariat (SLRS)	
1	**Objective:** To improve the operational capacity of the SLRS to become a sustainable public-private partnership (PPP) to spearhead Sri Lanka's rubber industry development.
2	**Rationale:** SLRS, being a fledgling public-private partnership is expected to play a crucial role in Sri Lanka rubber industry development with particular focus on implementing the Master Plan. It needs to be the focal point that brings together all stakeholders in the rubber industry value chain and provides a professional forum to meet, discuss, debate and agree on growth strategies and action programs. The value of such interactions were evident during the ADB CCED Phase III implementation (April 2012 –March 2013). SLRS can be the Centre for Rubber Industry Competitiveness (studies, awareness creation, planning), a repository for industry information, generator of innovative ideas that can be converted to actionable programs/projects, a portal for external stakeholders including donors, other industries and other countries). The SLRS which was established in March 2012 needs to be strengthened further to develop its capacity to undertake above tasks.
3	**Description:** First, the MPI will enter into an agreement with SRI via a MOU regarding the operationalizing of the SLRS as a PPP. Next, a corporate plan will be formulated with a 10 year horizon. This will comprise of (i) business plan, (ii) financial plan and, (iii) sustainability model. The corporate plan will be implemented by SRI with government participation. Capacity building will involve providing infrastructure in addition to training and exposure of personnel. The project will continue until the SLRS is placed on a sound footing and the private sector is expected to play a major role in its operationalization. This activity is expected to be supported by development partners with appropriate technical assistance.
4	**Outputs and timelines:** a. MOU between MPI and SRI: 2Q 2016 b. Corporate Plan to be drafted and approved: 3Q 2016 c. Implementation of the Corporate Plan: 4Q 2016
5	**Milestones:** • Signing the MOU • Development partner support mobilized. • MPI and SRI assign a team to draft the Corporate Plan • MPI and SRI validate the Corporate Plan • Implementation of the Corporate Plan
6	**Outcomes and impact:** ▪ A functional secretariat for rubber industry ▪ SLRS operates more efficiently and effectively ▪ Master Plan projects being implemented as planned
7	**Cost estimates:** LKR 110 million for 10 years
8	**Resource strategy:** TBD
9	**Institutional mechanisms:** Sri Lanka Society of Rubber Industry, Ministry of Plantation Industries and Ministry of Industries & Commerce
10	**Policy implications:** Existing policy framework is adequate to operationalize this project.
11	**Environmental impact:** neutral
12	**Social impact:** positive

Program 10: Implementation of the Rubber Master Plan

Project Code: Pg-10/Pj-02

Project 24: Establishment of a Project Facilitation Unit (PFU) at the Sri Lanka Rubber Secretariat	
1	**Objective:** To augment the capacity of SLRS to initiate, promote and transfer the ownership of programs and projects in the RMP to relevant stakeholder groups who will take implementation responsibility.
2	**Rationale:** The vision of industry stakeholders is to be realized by effective implementation of the programs, projects and strategic initiatives included in the RMP. It is therefore essential to establish a sustainable mechanism, within the SLRS, to ensure timely implementation of proposed programs and projects with the collaboration of all stakeholders. Among various other responsibilities, this will be the core function of the SLRS. Since this is the most crucial function, it needs to be delegated to a dedicated team of professionals and the PFU is set up to accommodate this team. Monitoring of implementation effectiveness too will be the responsibility of the PFU.
3	**Description:** Under the SLRS, a specialized PFU will be established which will be headed by an experienced project management professional. Functions of the PFU includes (i) prioritizing of conceptualized projects, (ii) facilitate conducting feasibility studies, (iii) facilitate developing detailed designs/project formulations once feasibility is established, (iv) facilitate sourcing of funds either in the form of grants or loans, (v) develop suitable private public partnerships to manage and, (vi) monitor and evaluate implementing the project. The PFU will not manage projects directly as an implementing agency as there will be different stakeholder interest groups and implementing agencies relevant that will take charge of each project. However, the PFU will ensure that a project concept developed by stakeholders reaches the implementation stage. The PFU may assist stakeholders to develop new project concepts as relevant depending on industry needs that will be included in Master Plan Working Papers.
4	**Outputs and timelines:** a. SLRS draft the blueprint for PFU: 4Q 2016 b. Financial requirements met: 1Q 2017 c. Appoint Head of PFU and staff as required: 1Q 2017
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ Programs are promoted, resourced and implemented ▪ Master Plan being implemented ▪ Rubber industry performance improves
7	**Cost estimates:** LKR 140 million for 5 years
8	**Resource strategy:** to be determined (TBD)
9	**Institutional mechanisms:** SRI, MPI and MI&C
10	**Policy implications:** Existing policy framework is adequate to operationalize this activity
11	**Environmental impact:** neutral
12	**Social impact:** positive

Program 10: Implementation of the Rubber Master Plan

Project Code: Pg-10/Pj-03

Project 25: Strengthening the Rubber Cluster Young Network (RCYN)	
1	**Objective:** During the master planning process, it was observed that the young rubber industry professionals **(**25**-**45 years of age**)** had limited opportunities to participate in planning although they will hold senior industry positions by the time the RMP comes into fruition**.** This project aims to engage and build the capacity of young professionals linked to the rubber industry cluster directly and indirectly to participate in the activities of Sri Lanka Rubber Secretariat with particular emphasis on developing projects, reviewing the Master Plan, and project implementation processes including monitoring and evaluation.
2	**Rationale:** The First Rubber Master Plan has an implementation horizon of 10 years and most of its impact will be felt much later. By then, most of the current team of leaders who were involved in drafting the Master Plan may not be in active service to benefit from its results. In that sense, real stakeholders and beneficiaries will be the set of young professionals who are currently holding responsibilities at junior and middle levels. They have much in stake, know micro-level industry workings very well and therefore it is important to ensure their active participation in the entire process of planning and project implementation. This project will build their interest and ensure their active participation in SRI/SLRS action programs thus creating a new generation of industry leaders that possess a wider vision. This is important as the rubber industry is facing a dearth of middle managers.
3	**Description:** The SLRS has already created (in March 2013) a nucleus group named as Rubber Cluster Young Network which was keenly involved in certain activities conducted at the SLRS. This group must be expanded to become a more representative RCYN. This will be accomplished through (i) expanding RCYN membership to represent all segments of the industry, (ii) developing a series of value adding projects for them to engage in, (iii) convening sub-committees or workgroups to contribute to activities related to different aspects in rubber industry operations, (iv) conducting CPD programs for young professionals and, (v) providing leadership training.
4	**Outputs and timelines:** i. Broad based RCYN by 1Q 2017 j. Five Sub committees set up by 2Q 2017 k. CPD programs and leadership training launched: 3Q 2017
5	**Milestones:** to be achieved as stated above
6	**Outcomes and impact:** ▪ Young rubber industry professionals become engaged in Master Plan related projects and ownership created ▪ They become confident of their future within the rubber industry ▪ Rubber industry becomes an attractive vocation for young professionals resulting reduced turnover in managerial staff ▪ Developing a layer of middle managers that can be groomed to take over senior responsibilities.
7	**Cost estimates:** LKR 5 million for 5 years
8	**Resource strategy:** To be determined by SRI
9	**Institutional mechanisms:** SRI
10	**Policy implications:** Existing policy framework is adequate to operationalize this activity
11	**Environmental impact:** neutral
12	**Social impact:** positive

Glossary

Competitiveness: Competitiveness of a country is supported by the set of institutions, policies and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the level of prosperity that can be earned by an economy. The imperatives for global competitiveness involve addressing the following issues: macroeconomic policies; government practices and regulations; the cost of doing business; education and skills upgrading; level of R&D and innovation; sustainable environmental management; conformity with international standards; and total factor productivity (TFP). Since industries operate within the regulatory framework of the government, it assumes a very important role in enhancing competitiveness. Creating a more integrated coordinated and stronger network between government agencies, the private sector, and academia also will contribute to the enhancement of business competitiveness.

Industry Value chain: The generic value chain model was introduced by Professor Michael Porter in 1985. Value chain represents all the internal activities a firm engages in to produce goods and services. It is formed of primary activities that add value to the final product directly and support activities that add value indirectly. Both primary activities and support activities are equally important. In fact, support activities such as R&D and Information Systems are more crucial as sources of differentiation advantage. Value chain analysis is a strategy tool used to analyze industry and firm level activities. Its goal is to recognize, which activities are the most valuable (i.e. are the source of cost or differentiation advantage) to the firm and which ones could be improved to provide competitive advantage. Such analysis reveals where an industry's competitive advantages or disadvantages are. The RMP has used this model in analysis of issues and synthesis of solutions.

Industry cluster: A geographical proximate group of interconnected firms, production units and associated institutions in a particular industry sector, liked with commonalities and complementarities that share common infrastructure and collaborative advantages. An industry cluster includes all related and supporting industries in addition to the core industry that delivers end products to customers. There are functional industry clusters and dysfunctional ones which operate at different degrees of competitiveness. Value chains of functional industry clusters have minimum slack within the linkages and demonstrate higher productivity and innovativeness in operations which helps achieving competitiveness.

Cluster based economic development (CCED): Approach to urban/regional development which aims to foster a more demand-driven endogenous growth model to support local economic development in regions. CCED facilitates convergence of supply and demand driven factors while fostering pre-competitive collaboration within economic/industry clusters. Government private sector collaboration is ensued through effective public-private partnerships (PPP) in implementing critical industry infrastructure projects. Projects aim at reducing supply/value chain slacks while enhancing productivity and resource efficiency thus being eco-friendly and sustainable.

Strategies: Borrowed from the military and adopted in business, strategies are carefully planned action required to achieve a goal when faced with stiff competition or resource/time constraints. As a method chosen to bring about a desired future such as realizing a goal or solution to a problem, a strategy may involve the art and science of planning and mobilizing resources differently while creating advantageous conditions to meet competitive forces. A clever scheme used to outwit competitors as in modern day marketing. When competitions become tough, strategists become very innovative in their approach. Strategies are normally determined by highest level actors in organizations.

Public-Private-Partnerships: an evolving concept/arrangement that involves a long-term contract between a private entity and a government entity, for creating a public asset or providing a service, in which the private entity bears management responsibility and a significant risk where remuneration is linked to performance. Excluded are service contracts, turnkey construction projects, and privatization of utilities. In practice, different countries with different legal paradigms adopt different definitions and operational models. PPPs combine the skills and resources of both public and private sectors through sharing of responsibilities and risks. PPP agreements are carefully drafted clearly allocating risks and responsibilities and specifying governance and monitoring mechanisms.

Editorial Comment

Drafting of this document began in March 2012 with ADB technical assistance and the first draft was released in early 2013 with the ending of the ADB TA. Most of the basic data contained in this document came from government, institutional and international publications. The private sector provided very valuable information on all aspects of industry operations which were proprietary in nature. However, finding accurate, timely and credible data on industry value chain performance was a very challenging task. The editors have made their own computations, modeling and projections based on available information. Such analytical work is not included in this main document, but available at the Sri Lanka Rubber Scretariat for reference.

The Rubber Master Plan was validated by the private sector in June 2014 and the Government in May 2015. In the first draft, the base year was taken as 2011 and in this version which include certain updates the base year has been changed to 2013. Furthermore, in this printed version (Main Document Version 01), where possible, data for 2015 have been used in data tables to make the document currently relevant.

However, a comprehensive update was neither possible nor deemed necessary before printing the document for the public launch on 23rd February 2017 as such a revision will bring no material impact on industry issues, goals, strategies, programs and projects stated. Data pertaining to projected performance, industry targets including time periods specified, except timelines of projects, are still valid. Industry gaps remain the same making the projects proposed relevant. Necessary revisions can be introduced when the 2nd Rubber Master Plan is drafted in 2020. What is crucial at present is to implement the projects planned that will bring a definite change to industry status.

The editors wish to express their deep gratitude to those who supported this arduous endeavor at various times in numerous ways. They are the unsung heroes and unseen protagonists of the whole exercise. Although their names are not mentioned, their contributions are embedded in this pioneering document. That is how the editors wish to acknowledge their inputs and earnestly hope that they will continue their efforts in realizing their dreams.