Urgent National Land-Based Investment (LBI) Interventions under a Presidential Task Force

Mr. Rohana Hapugaswatte

Rohana Hapugaswatte, a senior Special Grade officer of the Sri Lanka Administrative Service, has demonstrated a consistent record of strategic leadership, institutional reform, and execution discipline across complex public-sector mandates. From early leadership roles during his formative years through senior administrative appointments—including service as Additional Secretary to the Ministry of Justice—he has built a reputation for translating policy intent into operational outcomes within constrained and politically sensitive environments.

As Director General of the Rubber Development Department, Hapugaswatte has exhibited the core competencies required to lead Sri Lanka's next-phase rubber transformation. His approach reflects strong capability in **strategy formulation**, aligning long-term national production targets with realistic land, labour, and financial constraints. More critically, he has shown strength in **strategy execution**, evidenced by high capital-budget utilization, nationwide land and crop data rationalization, and the shift toward evidence-based planning.

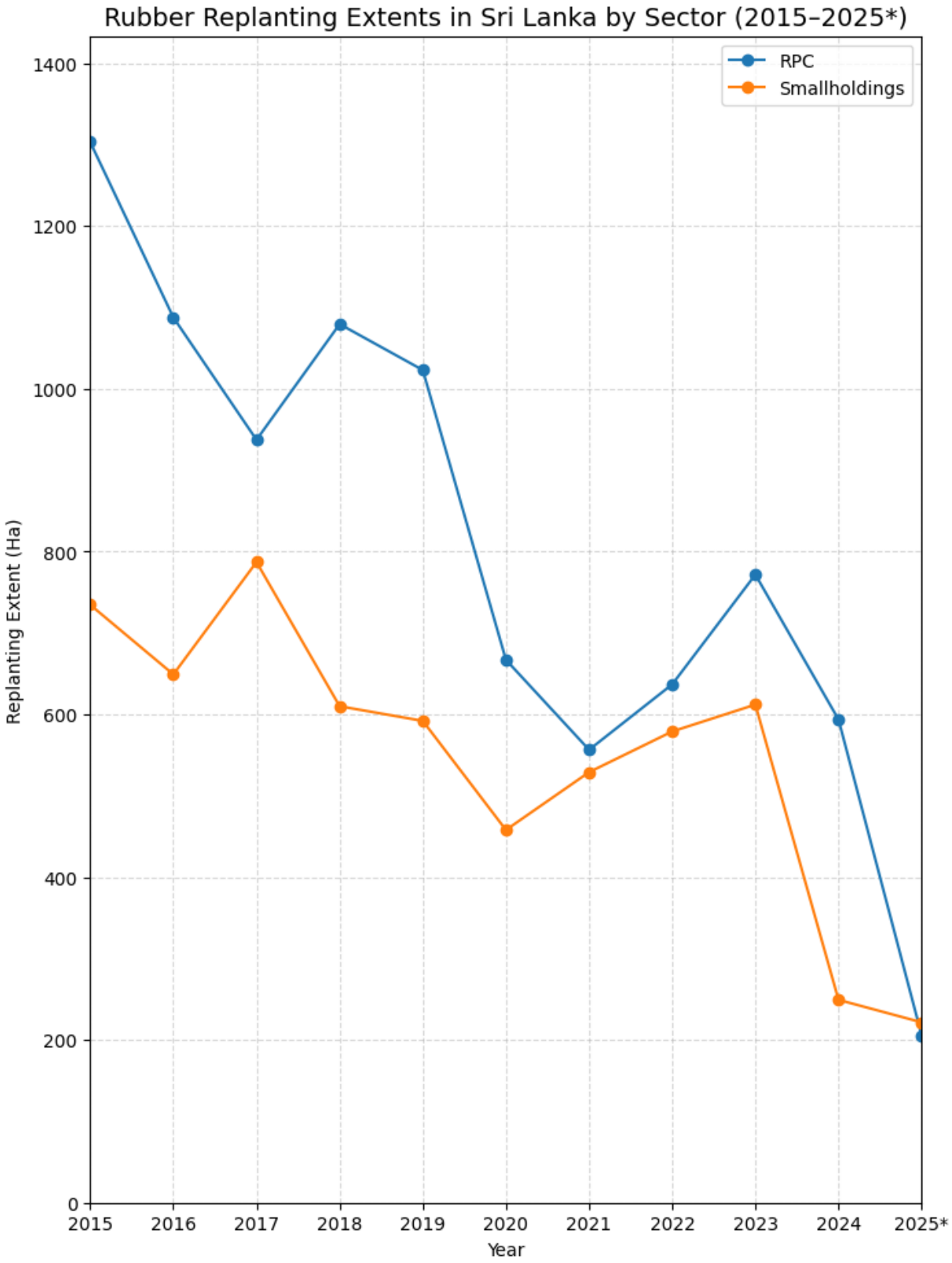
From a change-management perspective, Hapugaswatte has prioritized **HRM system strengthening**, institutional accountability, and the introduction of **IR 5.0–aligned digital tools**, including geospatial mapping, QR-based traceability, and digital information systems to support growers and policymakers alike. These competencies position him well to drive a **150,000-hectare rubber cultivation Programme**, achieve **1,400 kg/ha productivity**, and institutionalize a **3% annual replanting discipline**, addressing the structural behavioral weaknesses revealed in the past decade of sector performance. We gratefully acknowledge Mr. Hapugaswatte for his prompt and proactive response in providing the required information and data. The successful completion of this report was made possible by his dedicated and timely intervention.

LBI

We draw your attention to the chart below. This is no longer the stage to assign blame; rather, it is imperative to understand the structural causes behind the persistent downward performance trend. The evidence clearly demonstrates a systemic failure, not an isolated or short-term deviation.

We strongly urge that plantations—irrespective of scale—be formally reclassified and repositioned as **Land-Based Investments (LBI)**. This reframing is a critical eye-opener to the urgent national requirement for a coherent **National Agriculture Policy**, supported by a robust **Plantation Policy** and a legally enforceable **National Plantation Act, 2026**.

Time is no longer a luxury we possess. Decisive action is required now. Both **www.vivonta.lk** and **www.planters.lk** stand ready to support the Government in executing these reforms swiftly and effectively. It is for this reason that we have proposed the establishment of a **Presidential Task Force on Perennial Crop Development**, structured around four non-negotiable pillars: **Strategy, Structure, Technology, and Human Resources**—recognizing that the right people ultimately drive sustainable business outcomes.



2025 data provisional up to reporting date

Below is a **behavior-diagnostic analysis** grounded **only on the validated chart (2015–2025*)**, separating **structural weaknesses**, **year-by-year assumed causal factors**, and **decennial summaries** for **RPCs vs Smallholders**. I keep assumptions explicit and policy-relevant (not speculative agronomy).

1. Structural weaknesses revealed by the last 10 years (by sector)

A. RPC Sector – Prominent weaknesses

1. **High volatility**
   Sharp rises and collapses indicate **investment is episodic**, not programmatic.
2. **Replanting treated as discretionary CAPEX**
   Cuts during stress years suggest replanting is postponed to protect short-term cash flow.
3. **Execution dependency on labour availability**
   Sudden drops (e.g., 2020, 2024–25*) imply inability to mobilise labour at scale.
4. **Weak biological asset governance**
   No evidence of enforced minimum replacement discipline.
5. **Policy-reactive behavior**
   Replanting increases only when incentives, approvals, or financing align.

B. Smallholder Sector – Prominent weaknesses

1. **Cash-flow fragility**
   Sharp collapses when costs rise or subsidies delay (notably post-2023).
2. **Subsidy timing sensitivity**
   Spikes coincide with favorable incentive cycles (2017).

3. **High exposure to wage & input inflation**
   Replanting drops faster than RPCs during inflationary years.
4. **Limited access to bridging finance**
   Immature-phase risk discourages replanting continuity.
5. **Fragmented decision-making**
   No coordinated planting windows or pooled execution capacity.

2. Year-by-year behavioral diagnosis (assumed causal factors)

Base year = 2015

2015 → 2016

- **RPC:** Decline
  Assumed causes: early cost pressures, cautious capital allocation.
- **Smallholders:** Decline
  Assumed causes: low price expectations, subsidy uncertainty.

2016 → 2017

- **RPC:** Further decline
  Assumed causes: estate-level cash tightening, labour migration.
- **Smallholders:** Sharp spike
  Assumed causes: favourable subsidy execution, strong extension push, optimism bias.

⇾ Divergence year – shows **policy instruments affect sectors differently**.

2017 → 2018

- **RPC:** Recovery
  Assumed causes: delayed approvals executed, catch-up planting.

- **Smallholders:** Sharp fall
  Assumed causes: subsidy cycle ends, cost shock absorbed at household level.

2018 → 2019

- **RPC:** Mild decline
  Assumed causes: stabilization, but no long-term commitment.
- **Smallholders:** Flat/slight decline
  Assumed causes: marginal profitability, risk aversion.

2019 → 2020

- **RPC:** Severe collapse
  Assumed causes: labour unavailability, operational disruption, execution paralysis.
- **Smallholders:** Sharp decline
  Assumed causes: income shock, inability to finance immature phase.

→ Systemic shock year – both sectors fail simultaneously.

2020 → 2021

- **RPC:** Partial recovery
  Assumed causes: backlog execution, easing of constraints.
- **Smallholders:** Recovery
  Assumed causes: necessity-driven investment, survival planting.

2021 → 2022

- **RPC:** Moderate recovery
  Assumed causes: renewed confidence, delayed projects resume.
- **Smallholders:** Moderate recovery
  Assumed causes: short-term optimism, adaptive resilience.

2022 → 2023

- **RPC:** Peak
  Assumed causes: catch-up replanting, policy pressure, estate-scale mobilization.
- **Smallholders:** Peak
  Assumed causes: lagged response to earlier incentives, last affordable planting window.

2023 → 2024

- **RPC:** Sharp decline
  Assumed causes: wage inflation, liquidity stress, prioritisation of maintenance over replanting.
- **Smallholders:** Collapse
  Assumed causes: fertiliser cost shock, no cash-flow bridge, subsidy erosion.

2024 → 2025* (Provisional)

- **RPC:** Near collapse
  Assumed causes: structural capital withdrawal, labour cost ceiling breached.
- **Smallholders:** Near collapse
  Assumed causes: complete risk aversion, replanting no longer affordable.

→ Behavioral conclusion:
Replanting has become **economically irrational** for both sectors without systemic correction.

3. Decennial summary (2015–2025*)

RPC Sector – 10-year behavioral summary

- **Average replanting:** High but unstable
- **Pattern:** Boom–bust
- **Key weakness:** No enforced minimum replacement rate
- **Risk outcome:** Future tappable area volatility, bark weakness
- **Strategic diagnosis:**
  RPCs *can* replant, but **do not replant consistently**.

Smallholder Sector – 10-year behavioral summary

- **Average replanting:** Moderate but steadily declining
- **Pattern:** Incentive-driven spikes, cost-driven collapses
- **Key weakness:** Immature-phase financing gap
- **Risk outcome:** Progressive exit from replanting
- **Strategic diagnosis:**
  Smallholders *want* to replant, but **cannot absorb the risk**.

4. Cross-sector insight (most important)

The failure is not agronomic.
It is behavioral and systemic.

- RPCs fail due to **governance and capital discipline**
- Smallholders fail due to **cash-flow and risk exposure**
- Both fail when **immature rubber is unmanaged as a time-bound asset**

5. Policy-relevant conclusion

The past decade proves that **voluntary, incentive-only replanting will never achieve**:

- 150,000 ha
- 3% annual replacement
- 15% immature ceiling
- 200 million kg production stability

The Road Map **must hard-wire behavioral correction**, or the next decade will reproduce the same graph with higher costs and lower yields.

Sustainable Strategic Rubber Development Road Map (2026–2035):

An Evidence-Based Policy Essay Anchored in Replanting Behavior

Sri Lanka's ambition to restore rubber as a strategic national crop—capable of supporting 150,000 hectares, producing 200 million kilograms annually, and strengthening domestic value-added manufacturing—cannot be achieved through aspirational targets alone. The empirically validated replanting data for the past decade provides a clear behavioral signal: the rubber sector has not failed due to lack of agronomic knowledge, but due to systemic inconsistencies in replanting behavior, immature-phase management, and execution discipline across both the RPC and smallholder sectors.

The final, certified replanting graph (2015–2025*) demonstrates three critical behavioral realities. First, national replanting has remained structurally below the biologically safe replacement rate. Second, replanting behavior has been volatile and policy-reactive rather than programmatic and time-disciplined. Third, the immature phase has increasingly behaved as an unmanaged liability rather than a controlled investment stage. Any credible Road Map for 2026–2035 must therefore correct these behavioral failures—not merely restate numerical goals.

The national target of expanding rubber extent to 150,000 hectares while achieving an annual production of 200 million kilograms implies an average productivity of approximately 1,330 kg per hectare per year. This yield level is agronomically realistic under Sri Lankan conditions, provided that bark quality, tapping discipline, and labour productivity are preserved. However, the decade-long replanting behavior clearly shows that future tappable area is already being compromised by delayed, inconsistent, and inadequate replanting decisions. Without immediate correction, the yield target will become mathematically unattainable regardless of market incentives or downstream demand.

At the core of this Road Map lies the principle of biological replacement discipline. A minimum annual replanting rate of 3 percent—equivalent to approximately 4,500 hectares per year at the target extent—is not a policy preference but a biological necessity. When replanting falls below this threshold, the age structure of the national rubber stand becomes distorted, leading inevitably to weak bark, declining latex flow, and rising unit labour costs. The historical data confirms that Sri Lanka has repeatedly violated this replacement rule, particularly during periods of fiscal stress or institutional delay. The Road Map therefore treats replanting as a mandatory system function, not a discretionary program.

Equally critical is the management of the immature phase. The Road Map adopts a firm policy ceiling of 15 percent immature extent, with a non-negotiable requirement that immature rubber must enter tappable maturity within 60 months. This requirement directly addresses the behavioral pattern evident in the graph, where delayed maturation has silently accumulated risk in the system. Immature rubber beyond five years does not merely postpone production; it erodes investor confidence, strains household cash flows, and inflates the cost base of the entire value chain. From 2026 onward, immature rubber must be treated as a time-bound liability with explicit performance expectations.

Achieving maturity within 60 months requires more than agronomic prescriptions; it demands coordinated behavioral correction across planting material supply, soil and nutrient management, financial structuring, labour deployment, and governance oversight. The first behavioral correction concerns planting material itself. The Road Map mandates a transition to high-vigor, early-girth clones validated under Sri Lankan conditions, coupled with strict nursery accreditation. The replanting data shows that periods of high replanting volume have not consistently translated into timely maturity, indicating that genetic and nursery quality has been uneven and insufficiently regulated.

The second correction addresses early-phase growth acceleration through soil and nutrient management. The immature period is most vulnerable to under-investment, particularly among smallholders facing cash-flow stress. Blanket fertilizer recommendations have repeatedly failed to close growth gaps. The Road Map therefore requires site-specific soil diagnostics, integrated nutrient programs, and early biological soil conditioning as standard practice, not optional extensions. Accelerated canopy closure and root development are essential to compress the immature phase within the 60-month window.

The third behavioral fix responds directly to the financial signals embedded in the replanting graph. The sharp contractions observed in certain years reflect not farmer disinterest, but rational withdrawal in the face of delayed subsidies, rising wages, and prolonged zero-income periods. To correct this, the Road Map replaces lump-sum replanting incentives with structured, performance-linked immature-phase support spread over the first four years. Immature rubber must be recognized by banks and insurers as a managed biological asset, enabling credit continuity rather than forcing distress-driven abandonment.

The fourth correction integrates Controlled Labour-Sensitive Development (CLSD) principles into the immature phase itself. The historical tendency to focus CLSD only at maturity has contributed to weak bark development and delayed tappability. From 2026 onward, CLSD protocols will govern growth management from Year Two, ensuring that girth expansion and bark strengthening progress in parallel. Premature or delayed tapping will be institutionally discouraged through monitoring and enforcement mechanisms.

The fifth and most transformative correction is governance-driven. The Road Map institutionalizes Digital Twin–based monitoring for all replanting programs, whether under RPCs or clustered smallholders. The replanting graph has shown that delays and collapses are detected only after the damage is done. Digital monitoring of planting dates, girth progression, nutrient status,

and climate stress will allow early intervention long before a block becomes biologically or financially irrecoverable. National dashboards will track immature-to-mature conversion rates as a core KPI, elevating execution discipline to Cabinet-level visibility.

In conclusion, the Sustainable Strategic Rubber Road Map 2026–2035 is built on a simple but uncompromising insight derived from validated data: Sri Lanka's rubber future will not be secured by declarations of intent, but by disciplined correction of replanting and immature-phase behaviour. If rubber planted in 2026 does not enter safe tapping by 2031, the policy will have failed irrespective of hectares planted or funds allocated. By enforcing replacement discipline, compressing the immature phase, and aligning agronomy with finance and governance, Sri Lanka can credibly reach 150,000 hectares, stabilise 200 million kilograms of production, and restore rubber as a bankable, investable, and sustainable national asset.

“Proprietary Growers: Where National Vision Becomes Profitable Land, Measurable Yields, and Sustainable Growth (2026–2035).”

Below is evidence-based interpretation of the past 10-year district-wise replanting data for the *smallholder sector only*, derived from the decennial district table (page 1) of the uploaded data sheet provided by the DG RDD on request.

1. Highest → Lowest smallholder rubber replanting districts (decennial behavior)

Tier 1 – Structurally dominant smallholder districts

Kalutara – Kegalle – Ratnapura

Justification (economic & behavioral):

- These districts consistently record the largest annual replanting figures across the decade, often exceeding 100–200 ha/year in peak years.
- They represent the historic smallholder rubber heartland, with:
    - Dense grower networks
    - Strong extension reach
    - Better replanting subsidy uptake
- Behaviorally, these districts respond positively and quickly to incentives, confirming high replanting elasticity.

Conclusion: These three districts together account for the majority share of national smallholder replanting over the past decade.

Tier 2 – Secondary but resilient contributors

Gampaha – Kurunegala – Monaragala

Justification:

- Moderate but stable replanting behavior, typically in the 30–80 ha/year range.

- These districts show:
    - Strong recovery after downturns (e.g. post-2019)
    - Greater sensitivity to labour costs and subsidy delays

Rubber competes with alternative crops (coconut, banana, paddy), reducing dominance.

Conclusion: These districts are strategically important swing regions—capable of scale-up if immature-phase risks are addressed.

Tier 3 – Marginal / declining rubber smallholder districts

Galle – Matara – Badulla – Kandy and others

Justification:

- Persistently low replanting extents (often <10–20 ha/year).
- Rubber is not the primary livelihood crop.
- Behavior indicates exit or stagnation, not cyclical recovery.

Conclusion: These districts should not be prioritized for scale-driven rubber expansion, but may be relevant for niche or rehabilitation programmes.

2. Decennial behavioral summary – Smallholder sector (district lens)

Indicator	Observation
Replanting concentration	Highly skewed toward Kalutara–Kegalle–Ratnapura
Geographic risk	Over-dependence on 3 districts
Behavioral weakness	Collapse in marginal districts post-2023
Policy sensitivity	Strong response to incentives, weak response to delays

Structural issue	Immature-phase financing gap

3. Strategic implication for the 2026–2035 Road Map

The smallholder rubber future is not nationally uniform—it is geographically concentrated.

- 80% of scalable replanting impact will come from Tier-1 and Tier-2 districts.
- Attempting blanket national expansion will dilute resources and fail execution.
- A district-prioritized replanting and maturity-acceleration strategy is economically optimal.

4. Policy-ready concluding statement

"Over the past decade, Sri Lanka's smallholder rubber replanting has been structurally concentrated in Kalutara, Kegalle, and Ratnapura districts, with secondary contributions from Gampaha, Kurunegala, and Monaragala. Other districts have exhibited marginal or declining participation, confirming that future smallholder-led rubber expansion and the 3% annual replanting target can only be credibly achieved through geographically targeted interventions rather than uniform national programmes."

Grounded Research for the Road Map 2026- 2035

Grounded Research for the Road Map 2026- 2035

Below is a **structured set of high-value research questions** that can be **directly derived from the validated chart and district-wise smallholder data**, designed to **inform national policy formulation for the Rubber Road Map 2026–2035**.

Each question is framed to move from **descriptive evidence → causal diagnosis → policy action**.

I. Replacement Discipline & Biological Sustainability

1. **What is the minimum annual replanting volume required by district to maintain a biologically stable age structure under a 3% national replacement rule?**
   Policy use: District-wise replanting quotas.

2. **Which districts are currently accumulating "hidden biological debt" (over-aged stands + delayed replanting)?**
   Policy use: Priority intervention zones.

3. **How many future tappable hectares will be lost by 2035 if 2024–2025 replanting levels persist?**
   Policy use: Justify emergency replanting corrections.

II. Immature Phase Risk & Time-to-Tapping

4. **What is the average immature-to-maturity duration by district and how does it differ between high- and low-performing districts?**
   Policy use: Enforce a 60-month maturity rule.

5. **Which agronomic or financial constraints most strongly explain delayed maturity in smallholder systems?**
   Policy use: Redesign immature-phase support.

6. **What is the optimal immature-extent ceiling (≤15%) by district to stabilise national output?**
   Policy use: National biological governance KPI.

III. Behavioral Economics of Replanting

7. **How sensitive is smallholder replanting behavior to subsidy timing versus subsidy size?**
   Policy use: Shift from lump-sum to phased incentives.
8. **What wage or input-cost threshold triggers replanting collapse across districts?**
   Policy use: Introduce counter-cyclical support.
9. **Why do some districts recover replanting after shocks while others permanently exit?**
   Policy use: Resilience-based district classification.

IV. Spatial & Institutional Targeting

10. **Which 5–6 districts deliver the highest marginal return per hectare of public replanting investment?**
    Policy use: Focus national resources geographically.
11. **Should national expansion targets (150,000 ha) be re-allocated by agro-economic zone rather than administratively by province?**
    Policy use: Evidence-based zoning policy.
12. **What district-level institutional capacities (extension density, nursery quality, banking access) correlate with sustained replanting?**
    Policy use: Institutional strengthening roadmap.

V. Productivity & Yield Transformation

13. **What proportion of the 1,400 kg/ha yield gap is explained by delayed replanting versus poor immature-phase management?**
    Policy use: Prioritize biological over price interventions.

14. **Which districts are most capable of reaching 1,400 YPH under current replanting behavior if maturity timing is fixed?**
    Policy use: Early success demonstration zones.

VI. Finance, Risk & Investment Readiness

15. **How does access to immature-phase credit affect replanting continuity across districts?**
    Policy use: Design rubber-specific loan products.
16. **Can immature rubber be insured as a biological asset to stabilise replanting behavior?**
    Policy use: Insurance-linked replanting policy.
17. **What is the fiscal cost of under-replanting versus the cost of proactive support?**
    Policy use: Treasury justification memo.

VII. Governance, Monitoring & IR 5.0

18. **How can Digital Twin dashboards convert replanting targets into enforceable execution KPIs?**
    Policy use: National monitoring architecture.
19. **What real-time indicators would have detected the 2020 and 2024 collapses early?**
    Policy use: Early-warning system.
20. **How should responsibility for replanting failure be institutionally assigned and corrected?**
    Policy use: Accountability framework.

VIII. Strategic Synthesis Question (Most Important)

21. **If Sri Lanka enforces a 60-month maturity rule, district-based targeting, and 3% replanting discipline from 2026, what is the**

probability of achieving 200 million kg by 2035?

Policy use: Final feasibility validation of the Road Map.

Concluding Insight

The chart is not merely historical evidence—it is a diagnostic instrument. It allows policy to shift from **area expansion rhetoric** to **behavior-correcting system design**.

Research Agenda and Research Protocol

suitable for submission to **Cabinet, Treasury, development partners (World Bank / ADB / FAO), national research institutes, and universities**,

and

aligned with **OECD, FAO, CGIAR, and IR 5.0 research-governance standards**. It is **grounded explicitly in the validated replanting chart and district-wise data**, not abstract theory.

PART I

National Research Agenda

Sustainable Strategic Rubber Road Map (2026–2035)

Sri Lanka

Title

"Behavioral, Biological, and Institutional Determinants of Sustainable Rubber Replanting and Productivity in Sri Lanka (2026–2035)"

Overall Research Purpose

To generate **policy-actionable evidence** that enables Sri Lanka to:

- Achieve **150,000 ha** of sustainable rubber cultivation,
- Maintain **≥3% annual replanting discipline**,
- Control immature extent to **≤15%** with **≤60-month maturity**, and
- Stabilise national production at **200 million kg/year** with **≥1,400 kg/ha productivity**.

Research Themes & Core Questions (Agenda)

Theme 1: Replacement Discipline & Biological Sustainability

- What district-wise replanting volumes are required to maintain biologically stable age structures?
- Where is "hidden biological debt" accumulating due to under-replanting?
- What is the long-term production loss if recent replanting behaviour persists?

Theme 2: Immature Phase Risk & Time-to-Tapping

- What explains variation in immature-to-maturity duration across districts?
- What interventions reliably compress maturity to ≤60 months?
- How does immature extent correlate with yield volatility and labour cost escalation?

Theme 3: Behavioral Economics of Replanting

- How do subsidy timing, wage inflation, and input prices affect replanting decisions?
- Why do some districts recover after shocks while others permanently exit?
- What behavioral thresholds trigger replanting collapse?

Theme 4: Spatial Targeting & Institutional Capacity

- Which districts deliver the highest return per hectare of public investment?
- How do extension density, nursery quality, and banking access influence outcomes?
- Should national targets be reallocated by agro-economic zone?

Theme 5: Productivity & Yield Transformation

- What proportion of the 1,400 kg/ha gap is caused by delayed replanting vs immature-phase mismanagement?
- Which districts can reach 1,400 YPH fastest under corrected behaviour?

Theme 6: Finance, Risk & Investment Readiness

- How does access to immature-phase finance affect replanting continuity?
- Can immature rubber be insured as a biological asset?
- What is the fiscal cost of inaction vs proactive intervention?

Theme 7: Governance, Monitoring & IR 5.0

- How can Digital Twins convert policy targets into enforceable KPIs?
- What early-warning indicators prevent system-wide collapse?
- How should accountability for replanting failure be institutionally assigned?

PART II

Research Protocol (Globally Compliant)

1. Research Design

Design Type:

Mixed-methods, longitudinal, policy-grounded research

Approach:

- Quantitative analysis of decennial replanting, maturity, and yield data
- Qualitative institutional and behavioral analysis
- Spatial (district-level) econometric modelling

Frameworks Applied:

- FAO Sustainable Crop Systems
- OECD Evidence-Based Policy Design
- CGIAR Impact Pathways
- IR 5.0 (Human-centric, resilient, digitally enabled systems)

2. Study Units & Scope

Units of Analysis

- **Primary:** Smallholder rubber districts
- **Secondary:** RPCs (benchmarking only)
- **Tertiary:** Institutions (RDD, extension, banks, nurseries)

Spatial Coverage

- Tier 1 districts (Kalutara, Kegalle, Ratnapura)
- Tier 2 districts (Gampaha, Kurunegala, Monaragala)

- Tier 3 districts (marginal/declining zones)

Temporal Scope

- Retrospective: 2015–2025 (validated dataset)
- Prospective simulation: 2026–2035

3. Data Sources (Grounded & Verifiable)

Primary Data

- Structured grower surveys
- Field-level immature block monitoring
- Extension officer interviews
- Labour and input cost diaries

Secondary Data

- RDD district-wise replanting records
- TRI / RRISL agronomic standards
- Bank lending and subsidy disbursement data
- Climate and rainfall datasets

Digital Data

- GIS / geospatial land-use layers
- Digital Twin field logs
- QR-coded replanting records

4. Key Variables & Indicators

Category	Indicators
Biological	Girth growth rate, months to tapping
Economic	Cost per immature year, ROI
Behavioral	Replanting elasticity to incentives
Spatial	District productivity clusters
Governance	Replanting compliance rate
Digital	Early-warning signal accuracy

5. Analytical Methods

- Descriptive trend analysis
- District-level panel regression
- Survival analysis (time-to-maturity)
- Cost–benefit and fiscal impact analysis
- Scenario modelling (with/without policy correction)
- Digital Twin simulation modelling

6. Ethics, Integrity & Quality Assurance

- Informed consent for all primary data
- Data anonymization and PDPA compliance
- Independent technical review panel
- Transparent replication protocols
- Separation of analysis and policy advocacy phases

7. Outputs & Deliverables

Core Outputs

- National Rubber Replanting Diagnostic Report
- District Priority Investment Atlas
- Immature-Phase Risk Framework
- Digital Twin KPI Dashboard

Policy Outputs

- Cabinet Memorandum
- Treasury Cost–Benefit Note
- Ministerial Directive Templates
- Implementation Handbook (RDD)

8. Implementation Timeline (Indicative)

Phase	Duration
Design & validation	2 months
Field data collection	4 months
Analysis & modelling	3 months
Policy synthesis	2 months
Review & adoption	1 month

9. Governance Structure

- **Lead Agency:** Rubber Development Department
- **Technical Partners:** TRI, RRISL, Universities

- **Policy Oversight:** Ministry of Plantation Industries
- **Independent Review:** Multidisciplinary expert panel
- **Digital Backbone:** IR 5.0–compliant Digital Twin system

Strategic Closing Statement

This Research Protocol transforms the rubber road map from a planning document into an execution system. It ensures that the failures visible in the past decade's replanting behavior are **not repeated**, but corrected through disciplined, evidence-driven policy.

1) What is the "population" for this Rubber Road Map research?

A. Target population (policy population)

All rubber smallholders in Sri Lanka who:

- currently cultivate rubber **or**
- have cultivable land suitable for rubber **or**
- have rubber stands due for replanting within 2026–2035.

B. Study population (measurable population)

All smallholder rubber land parcels / holdings that can be enumerated through:

- RDD district registries
- GN-level lists / agrarian service centers
- subsidy beneficiary lists (replanting/planting support)
- bank loan portfolios tagged as rubber
- GIS/remote-sensing rubber layer + field verification (if available)

Unit of analysis (choose and lock):

- **Holding/plot** (recommended for replanting and maturity outcomes), and/or
- **Grower household** (recommended for behavioral and finance variables).

2) Can we sample "100% population"? (A true census)

When 100% is feasible

A **100% census** is feasible if:

- the population size is manageable (e.g., ≤50,000 holdings) **and**

- you are collecting only "thin" variables (ID, location, area, age-class, replanting status) **and**
- you can use digital capture + administrative registers.

Best practice approach:
Two-layer census

1. **100% administrative census** of all holdings (core variables only)
2. **sampled deep survey** for economics/HRM/behavior/IR5.0 readiness

This is the global standard used in large national programs.

3) Recommended design: "100% frame + stratified deep sample"

Layer 1 — 100% population coverage (Census / Registry)

Goal: Create a complete national rubber smallholder "master list" and map.

Minimum census variables (per holding/plot):

- Unique holding ID
- District / DS / GN
- GPS point or polygon
- Total rubber area (ha)
- Stand age class (immature / mature / senescent)
- Replanting history (last 10 years)
- Expected replanting window (2026–2035)
- Clone/planting material source (if known)
- Tapping status (yes/no)

Output: **National Rubber Register + GIS layer**
This becomes your **sampling frame** and policy monitoring base.

Layer 2 — Deep research sample (for causal drivers)

Goal: Explain *why* replanting collapses and *what policy levers work*.

Sampling method (globally compliant)

Stratified multi-stage sampling, stratified by:

1. District tier (high/medium/low replanting districts)
2. Farm size bands (e.g., <1 ac, 1–2 ac, 2–5 ac, >5 ac)
3. Immature status (immature vs mature)
4. Participation in subsidy/credit programs (yes/no)

Sample size (rule-of-thumb)

- For national inference: **~800–1,200 households** is strong
- For district-level inference in priority districts: **200–300 per Tier-1 district** (Kalutara/Kegalle/Ratnapura) plus smaller samples elsewhere

4) "100% census" options by population type

100% census of holdings (recommended)

Feasible because it's mostly administrative + GIS.

- Highest policy value
- Lowest respondent burden
- Enables accurate 3% replanting enforcement

5) Quality controls to make "100% population" real (not a paper claim)

To certify a census:

- **Deduplication** (one holding = one ID)
- **Ground-truthing**: random 5–10% field verification

- **Coverage audit**: compare RDD lists vs subsidy lists vs bank lists vs GIS rubber layer
- **Missingness rules**: GN-level completeness thresholds

6) Policy relevance: how census enables 3% replanting + 60-month maturity rule

A 100% holding register lets you enforce:

- **District replanting quotas** (3% rule)
- **Immature ceiling ≤15%**
- **Time-to-tapping KPI ≤60 months**
- Early warning of blocks going "late"

Without the census frame, replanting targets remain "estimated" and non-auditable.

10 NATIONAL RUBBER REPLANTING POLICIES

Strategic Policy Set for Rubber Development Road Map (2026–2035)

Policy design principle:

Every policy below is **failure-responsive** (addresses why replanting collapsed), **implementation-anchored** (not aspirational), and **investment-enabling** (bankable, insurable, measurable).

Policy 1 – National Mandatory Rubber Replanting Obligation Policy

Policy intent: Arrest biological collapse caused by aging stands.

Key directives

- Mandate a **minimum 4% annual replanting rate** per registered rubber holding (RPC and non-RPC).
- Non-compliance beyond 24 months → **ineligibility for subsidies, credit guarantees, or processing quotas**.
- Replanting plans must be **digitally lodged and geo-tagged** at GN level.

Policy 2 – Replanting-Linked Finance & Credit Guarantee Policy

Policy intent: Remove the cash-flow trap that blocks replanting.

Key directives

- Establish a **Rubber Replanting Credit Guarantee Window** covering immature-phase risk.
- Loan tenures minimum **10–12 years**, with **grace until tapping year 6–7**.
- Interest subsidies allowed **only if survival >90% at year 2**.

Policy 3 – Clone Zoning & Compulsory Certified Planting Material Policy

Policy intent: Eliminate biological underperformance.

Key directives

- District-wise **clone zoning maps** declared legally binding.

- Only **RRISL-certified nurseries** permitted to supply planting material.
- Nursery production data uploaded quarterly to a **national clone balance dashboard**.

Policy 4 – Smallholder Block Aggregation & Cooperative Replanting Policy

Policy intent: Solve fragmentation-driven inaction.

Key directives

- Smallholders <2 ha must replant through **cluster-based blocks (minimum 20 ha)**.
- Shared services: land prep, planting, disease control, insurance.
- Cluster leaders remunerated on **block survival and yield KPIs**.

Policy 5 – Labour Productivity & HRM Reform Policy for Rubber

Policy intent: Align labour economics with replanting sustainability.

Key directives

- Introduce **kg-per-tapper-per-day norms** as the national productivity unit.
- Enable **task-based and output-linked wage models** under labour law exemptions.
- Mandatory tapper skill certification linked to wage bands.

Policy 6 – National Rubber Digital Registry & Monitoring Policy

Policy intent: End data blindness that masks decline.

Key directives

- All rubber lands (RPC + non-RPC) must be **registered as business units**.
- Each holding issued a **QR-coded geo-referenced ID**.

- Replanting, survival, disease, yield tracked in real time.

Policy 7 – Disease Risk Governance & Research Protocol Policy

Policy intent: Restore investor confidence under CSLD risk.

Key directives

- Make the **national rubber disease research protocol public and enforceable**.
- Replanting eligibility linked to **approved disease management compliance**.
- Establish **early-warning disease dashboards** tied to extension alerts.

Policy 8 – Profit-per-Hectare Benchmark & Economic Viability Policy

Policy intent: Replace yield obsession with investment logic.

Key directives

- Declare **LKR 500,000 net profit/ha/year** as the national sustainability threshold.
- Annual publication of **district-wise IRR, NPV, COP benchmarks**.
- Public support withdrawn from models failing viability tests.

Policy 9 – Climate, Carbon & Land Security Integration Policy

Policy intent: Convert replanting into a climate-financed opportunity.

Key directives

- Replanted rubber qualifies as **carbon-sequestering land use**.
- Enable aggregation of **carbon MRV at cluster/national level**.
- Replanting prioritized on degraded lands and erosion corridors.

Policy 10 – Institutional Accountability & Performance Contract Policy

Policy intent: End diffusion of responsibility.

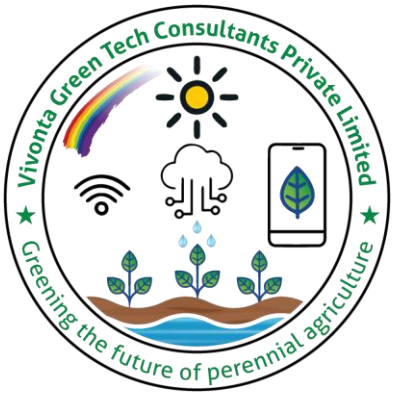
Key directives

- Annual **performance contracts** for institutions and senior officers tied to:
    - hectares replanted,
    - survival rates,
    - yield recovery.
    - % Plants achieved girthing rates – to be reviewed annually and corrective action flowed back objectively
- Independent **Rubber Road Map Steering Council** empowered to intervene.
- Public annual scorecard published.

Strategic Closure

Why this policy set is different from past plans

- It **forces replanting** (Policy 1), not encourages it.
- It **makes replanting bankable** (Policy 2), not subsidized.
- It **prices labour and disease risk realistically** (Policies 5 & 7).
- It **measures success in profit, not hectares** (Policy 8).
- It **assigns responsibility with consequences** (Policy 10).



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