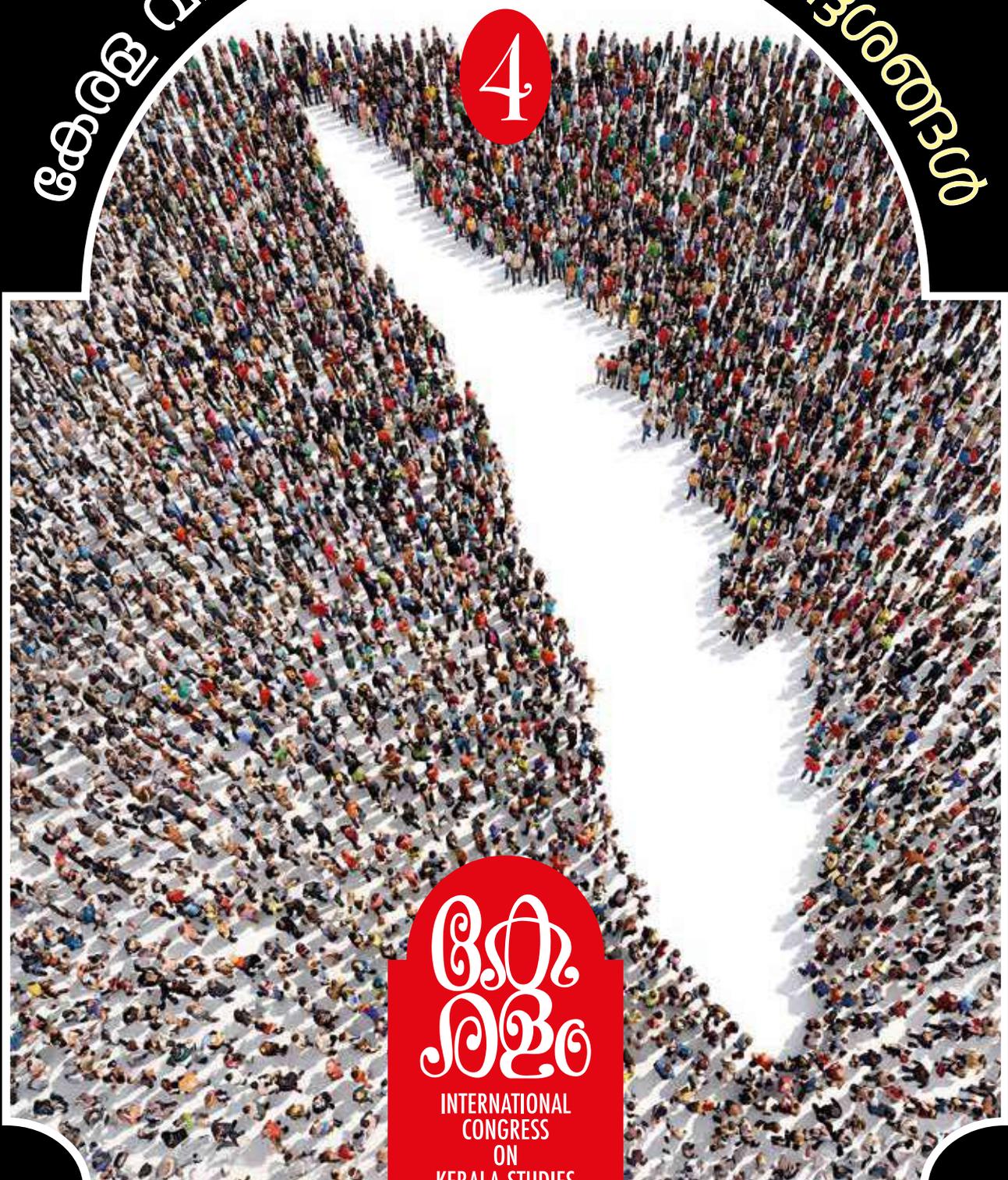


കേരള വികസനം ജനകീയ നിർദ്ദേശങ്ങൾ

സഞ്ചിക

4



കേരളം

INTERNATIONAL  
CONGRESS  
ON  
KERALA STUDIES

അഞ്ചാം അന്താരാഷ്ട്ര കേരളപഠനകോൺഗ്രസ്സ്

21-22 ഫെബ്രുവരി 2026 • എ.കെ.ജി. പഠനഗവേഷണകേന്ദ്രം • തിരുവനന്തപുരം



Anniversary  
INVEST KERALA  
GLOBAL SUMMIT



# KERALA *is* WELCOMING



Total EoIs

**449**

Construction  
Started Projects

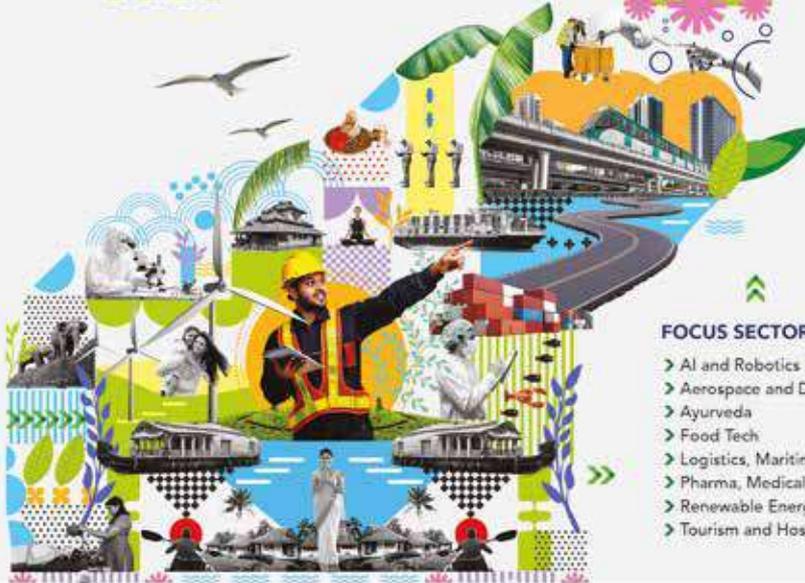
**115 nos**

Investment in Construction  
Started Projects

**₹ 54908.22 Cr**

Employment in Construction  
Started Projects

**66073**



#### FOCUS SECTORS

- > AI and Robotics
- > Aerospace and Defence
- > Ayurveda
- > Food Tech
- > Logistics, Maritime and Packaging
- > Pharma, Medical devices, Bio tech
- > Renewable Energy
- > Tourism and Hospitality



**INVEST  
KERALA**  
GLOBAL SUMMIT

ഒരു  
മുദ്ര

INTERNATIONAL  
CONGRESS  
ON  
KERALA STUDIES



**അഞ്ചാം അന്താരാഷ്ട്ര കേരളപഠനകോൺഗ്രസ്സ്**  
2026 ഫെബ്രുവരി 21-22 • തിരുവനന്തപുരം

പ്രസിദ്ധീകരണം  
എ.കെ.ജി. പഠനഗവേഷണകേന്ദ്രം  
തിരുവനന്തപുരം

കവർ ഡിസൈൻ & ലേ-ഔട്ട്  
ഗോഡ്ഫ്രെയ്സ് ഗ്രാഫിക്സ്  
കോപ്പി: 3500

അച്ചടി  
ഓറഞ്ച് പ്രിന്റേഴ്സ് പ്രൈവറ്റ് ലിമിറ്റഡ്, തിരുവനന്തപുരം



സഞ്ചിക

4

# കേരള വികസനം വിദഗ്ധ നിർദ്ദേശങ്ങൾ

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INTERNATIONAL  
CONGRESS  
ON  
KERALA STUDIES

## അഞ്ചാമത് അന്താരാഷ്ട്ര കേരളപഠനകോൺഗ്രസ്സ്

21-22 ഫെബ്രുവരി 2026

എ.കെ.ജി. പഠനഗവേഷണകേന്ദ്രം • തിരുവനന്തപുരം



# ആമുഖം

അന്തർദേശീയ കേരള പഠന കോൺഗ്രസിലെ രേഖകൾ നാല് വാല്യങ്ങളായിട്ടാണ് പ്രതിനിധികൾക്ക് നൽകുന്നത്. അതിൽ ഒന്നാം വാല്യം ഉദ്ഘാടന സമ്മേളനങ്ങളുമായി ബന്ധപ്പെട്ടുള്ള പ്രസംഗങ്ങളും രേഖകളുമാണ്. രണ്ടും മൂന്നും വാല്യങ്ങളിലാണ് പഠന കോൺഗ്രസ് ചർച്ച ചെയ്യുന്ന സമഗ്രവികസന റിപ്പോർട്ട് 45 അധ്യായങ്ങളായി അവതരിപ്പിക്കുന്നത്. നാലാമത്തെ വാല്യത്തെ പരിചയപ്പെടുത്തുന്നതിനാണ് ഈ ആമുഖം

ഒന്നാം പഠന കോൺഗ്രസിന്റെ മുന്നോടിയായി സ. ഇഎംഎസ് കേരളത്തിലെ രണ്ടായിരത്തിൽപ്പരം പണ്ഡിതരോട് സഹകരണം അഭ്യർത്ഥിച്ചുകൊണ്ട് കത്ത് അയക്കുകയുണ്ടായി. അവരിൽ പ്രധാനപ്പെട്ടവരെല്ലാം പ്രബന്ധങ്ങൾ തന്നെ നൽകിക്കൊണ്ട് കോൺഗ്രസിൽ പങ്കെടുക്കുകയും ചെയ്തു.

1994-നെ അപേക്ഷിച്ച് കേരളത്തിലെ പണ്ഡിതലോകം ഏറെ വളർന്നിട്ടുണ്ട്. അതിലുപരി വലിയൊരു സംഖ്യ പ്രൊഫഷണൽ വിദഗ്ധരും കേരളത്തിൽ ഇന്നുണ്ട്. അവരിൽ ഒട്ടേറെ പേർ അനുബന്ധ സെമിനാറുകളിൽ പങ്കെടുക്കുകയും ചെയ്തിട്ടുണ്ട്. കേരളത്തിലെ പണ്ഡിതരുടെയും വിദഗ്ധരുടെയും അതിവിപുലമായ പങ്കാളിത്തത്തോടെ വേണം പഠന കോൺഗ്രസിന്റെ രേഖ തയ്യാറാക്കാൻ എങ്ങനെയെന്ന് ഞങ്ങൾക്ക് ആഗ്രഹമുണ്ടായിരുന്നു.

അവരോടൊന്നും സഹകരണം അഭ്യർത്ഥിച്ചുകൊണ്ട് അഞ്ചാമത് കേരള പഠനകോൺഗ്രസിന്റെ മുഖ്യരക്ഷാധികാരി എന്ന നിലയിൽ മുഖ്യമന്ത്രി പിണറായി വിജയൻ 2000-ത്തോളം പേർക്ക് കത്ത് അയക്കുകയുണ്ടായി. അക്കാദമിക് പണ്ഡിതർ, നയരൂപീകരണ വിദഗ്ദ്ധർ, സാമൂഹ്യപ്രവർത്തകർ, ഗവേഷകർ, വിദ്യാർത്ഥികൾ തുടങ്ങിയവർ ഇങ്ങനെ കത്ത് അയച്ചവരിൽ ഉൾപ്പെടും.

ഈ കത്തുകൾക്കു ലഭിച്ച പ്രതികരണങ്ങളാണ് നാലാമത്തെ വാല്യത്തിൽ പ്രസിദ്ധീകരിച്ചിട്ടുള്ളത്. ഇപ്പോഴും അഭിപ്രായങ്ങൾ ഇ-മെയിലിൽ വന്നുകൊണ്ടിരിക്കുകയാണ്. എന്നാൽ അവയെല്ലാം ഉൾക്കൊള്ളിക്കുന്നതിനു സമയം അനുവദിക്കുന്നില്ല. എങ്കിലും അവരുടെ അഭിപ്രായങ്ങളെല്ലാം പഠന കോൺഗ്രസിലെ രേഖയ്ക്കു അവസാനരൂപം നൽകുമ്പോൾ പരിഗണിക്കുമെന്ന് ഉറപ്പു നൽകുന്നു.

പ്രതികരണങ്ങൾ അയച്ച എല്ലാ ബഹുമാന്യസുഹൃത്തുക്കളോടും നന്ദി പറയുന്നു. ഡോ. സുമേഷ് ദിവാകരന്റെ നേതൃത്വത്തിൽ സിജു എസ്, പ്രണവ്, വിവേക് എന്നിവരുടെ സാങ്കേതികസഹായത്തോടെ വിവിധ വിഷയമേഖലകളായി തരംതിരിച്ച ഈ പ്രതികരണക്കുറിപ്പുകൾ പരിശോധിച്ച് പ്രസിദ്ധീകരണയോഗ്യമാക്കുന്നതിൽ പി.എസ്. രാജശേഖരന്റെ നേതൃത്വത്തിൽ വി.എസ്. ശ്യാം, ഡോ. താര ഇ ടി, നിമി എ എസ്, ധന്യ ലാൽ, ആര്യ എ ടി, ഭാവപ്രിയ ജെയു എന്നിവരുടെ ഒരു ടീം കഴിഞ്ഞ ഏതാനും ദിവസങ്ങളായി പ്രവർത്തിക്കുകയായിരുന്നു. അവരെല്ലാവരോടും അക്കാദമിക് സമിതിക്കുവേണ്ടി നന്ദി പറയുന്നു.

എസ്. രാമചന്ദ്രൻപിള്ള  
ചെയർമാൻ

ടി.എം. തോമസ് ഐസക്  
സെക്രട്ടറി

ഡോ. ആർ. രാഘവൻ  
കൺവീനർ

അക്കാദമിക് സമിതി, അഞ്ചാമത് കേരള പഠനകോൺഗ്രസ്  
എകെജി പഠനഗവേഷണകേന്ദ്രം



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## 1 Digital Communication, Trust, and SaaS Innovation: Strategic Pathways for Kerala's Digital Economy

**AMAR CP**

Kerala's economy is undergoing a significant digital transition, driven by a vibrant MSME sector, a strong IT talent base, and an expanding startup ecosystem. From tourism and Ayurveda to spices, handloom, and IT services, small and medium enterprises form the backbone of the state's productive economy. However, as global markets become increasingly digital, competitiveness is no longer determined solely by product quality but also by digital communication capacity, data trustworthiness, and technological innovation. Strengthening digital marketing infrastructure, building robust data privacy and communication compliance frameworks, and positioning Kerala as a specialised SaaS and Marketing Technology (MarTech) hub are therefore critical to sustaining growth and enhancing global competitiveness.

Kerala's MSMEs require affordable and compliant digital communication tools to effectively compete in global markets. Incentivising the adoption of email marketing automation and CRM platforms—particularly India-built SaaS products—can bridge this gap. Subsidised onboarding programmes, digital literacy workshops on email authentication protocols (SPF, DKIM, DMARC), and data privacy compliance training aligned with India's DPDP Act 2023 can significantly enhance outreach capacity. Integrating communication automation adoption into existing MSME digital transformation schemes, with measurable KPIs around digital engagement capability, will ensure structured progress.

Simultaneously, Kerala can pioneer a state-level Digital Trust and Communication Compliance Framework to strengthen consumer confidence in digital communication. Encouraging authenticated email practices such as DMARC enforcement and BIMi adoption, reducing phishing and spam from Kerala-based domains, and aligning with global deliverability standards will enhance the sender reputation of Kerala's businesses. Establishing a Digital Communication Standards initiative in partnership with industry stakeholders can position the state as a leader in responsible digital governance, benefiting its IT and BPO sectors.

Beyond infrastructure and compliance, Kerala has the potential to emerge as a specialised hub for SaaS and MarTech enterprises. With high literacy, strong technical expertise, and growing startup momentum, the state can introduce targeted incentives such as startup grants, GST relief for early-stage SaaS firms, dedicated co-working ecosystems, and international market access programmes. A focused MarTech/SaaS corridor initiative under Kerala Startup Mission can provide funding, mentorship, and global linkages, transforming organic growth into strategic industrial development.

By integrating digital communication infrastructure enhancement, trust-based compliance frameworks, and targeted SaaS ecosystem development, Kerala can create a cohesive digital growth strategy. Such an approach strengthens MSME competitiveness, enhances consumer trust, and fosters high-value technology entrepreneurship. In doing so, Kerala can position itself not merely as a participant in India's digital economy, but as a forward-looking leader in responsible digital communication, innovation-driven enterprise, and globally competitive technology development.

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## 2 Startup-Led Digital Transformation for MSMEs in Kerala: Policy Suggestions

**HARIS I M**

*Founder, CEO & Managing Director, myResto Today Pvt Ltd*

Kerala's development strategy must increasingly recognise the role of startups in strengthening MSMEs, particularly in the food and hospitality sector. Based on field-level experience in building technology solutions for restaurants, cafés, and bakeries, the following policy suggestions are proposed for consideration in the Fifth International Congress on Kerala Studies.

First, the state may actively support startups that develop affordable and practical digital solutions for MSMEs. Many small food businesses struggle to adopt technology due to high costs and complex systems. Introducing subsidised digital adoption schemes or digital vouchers would enable MSMEs to implement POS systems, inventory management tools, AI-based analytics, and integrated operational platforms. A structured Startup-MSME Digital Partnership Scheme under Kerala Startup Mission or the Industries Department could facilitate pilot deployments and faster market access. Incentives should also be extended to encourage expansion of such solutions into Tier II and Tier III towns to ensure inclusive digital growth.

Second, building trust and transparency within the food ecosystem is critical. The rise of fake or paid reviews has reduced consumer confidence. Startups offering verified, experience-based customer feedback systems and authenticated review platforms should be supported through appropriate regulatory and policy frameworks. Establishing a verified review and transparency mechanism can enhance food quality standards, protect consumers, and reward genuine businesses.

Third, AI and data-driven innovation require focused policy attention. AI tools can assist MSMEs in understanding customer preferences, reducing food wastage, optimizing pricing strategies, and improving sustainability outcomes. The state may consider introducing AI-focused innovation grants, structured pilot programs, and performance-linked incentives tied to measurable indicators such

as revenue growth, employment generation, and sustainability impact. Simplified compliance processes and faster approval mechanisms will further strengthen the early-stage startup ecosystem.

In addition, capacity-building initiatives should be prioritised. Digital literacy workshops and structured training programs for MSME owners on AI adoption, cybersecurity, data privacy, and digital communication standards will improve long-term technology integration. Aligning these measures with Kerala's broader digital economy vision can position the state as a startup-friendly and MSME-supportive innovation hub.

Strengthened collaboration between policymakers, startups, and MSMEs can create sustainable growth pathways and enhance Kerala's competitiveness in a rapidly evolving digital landscape.

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### 3 Integration of Humanoid Robots and Information Technology in Modern Workplaces

**SOBHANA N V**

#### 1. Humanoid Robots in Professional Environments

The integration of humanoid robots into workplaces involves deploying human-like robotic systems to support operational, technical, and service-oriented tasks. Designed to function in human environments, these robots can use existing tools, machines, stairs, and workspaces without major modifications. They collaborate with employees to enhance productivity, improve safety, and perform repetitive or physically demanding tasks with precision and consistency.

##### Key Benefits

- **Human-like Interaction:** Seamless collaboration in shared workspaces.
- **Automation and Productivity:** Continuous, fatigue-free performance increases efficiency and output.
- **Workplace Safety:** Suitable for hazardous environments such as chemical plants, nuclear facilities, mining, and construction sites.
- **Flexibility and Adaptability:** Advanced AI and sensors enable multitasking in dynamic settings.
- **Long-Term Cost Efficiency:** Reduction in labour costs, errors, downtime, and injury-related expenses over time.
- **24/7 Operation:** Uninterrupted functioning without shift limitations.
- **Data Monitoring:** Real-time quality control, fault detection, and production analysis.
- **Labour Shortage Support:** Addresses workforce gaps in manufacturing, logistics, and warehousing.
- **Consistent Performance:** Delivers stable quality with minimal errors.
- **Scalability:** Implementation can expand as technology advances.

#### 2. Humanoid Robots in Skill Development and Employment

Humanoid Robots are highly beneficial in skill development. Employment relations, Information technology also has a big role in Employment. Employment relation, Industry skill development and opportunities

**Conclusion:** The integration of humanoid robots and Information Technology significantly enhances productivity, safety, innovation, skill development, and

employment opportunities. Together, these technologies drive modernization, efficiency, and inclusive growth across contemporary workplaces.

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## 4 Kerala Meets Global Remote Work Converting Government Rest Houses into 4-Star Staycation Facilities for Global Professionals

**RENJU S RAJ**

### **Concept Overview**

Kerala has strong potential to position itself as a premium yet affordable “Work-from-Kerala” destination by upgrading existing Government Rest Houses into 4-star staycation facilities. These properties can cater to foreign nationals, digital nomads, NRIs, and professionals seeking medium-term stays (4–8 weeks) while working remotely.

By leveraging existing public infrastructure, world-class hospitality experiences can be created with relatively low capital expenditure, generating recurring revenue and employment opportunities.

### **Target Audience**

- Foreign nationals working remotely
- NRIs seeking extended stays
- Professionals from high-pollution urban centers such as Delhi and Kolkata
- Digital nomads, startup founders, consultants, researchers, and creative professionals

### **Key Value Proposition**

- Affordable 4-star hospitality compared to private hotels
- Long-stay friendly weekly and monthly packages
- Scenic, peaceful environments conducive to productivity
- Authentic Kerala experience aligned with international comfort standards

### **Core Features**

- High-speed internet and dedicated workspaces
- Modern 4-star accommodation amenities
- Western and Indian cuisine options
- Trained hospitality staff with global service standards
- Wellness services including Ayurveda and yoga
- Secure and professionally managed premises

### **Implementation Strategy**

#### **Infrastructure Utilization**

- Renovation of select Government Rest Houses without major structural changes
- Upgrading interiors, connectivity, and utilities to meet 4-star benchmarks

#### **Human Capital Development**

- Training programs in international hospitality standards
- Culinary training in Western and diverse dietary preferences
- Emphasis on hygiene, safety, and service excellence

#### **Operations & Management**

- Public-Private Partnership (PPP) or managed-service operational model
- Engagement of professional hospitality operators for efficient management

### Marketing & Positioning

- Branding under “Work from Kerala – Stay, Work, Rejuvenate”
- Partnerships with global remote-work platforms and expatriate networks

### Benefits to Government and State

- Revenue generation from underutilized public assets
- Employment creation and skill enhancement
- Year-round tourism growth beyond seasonal travel
- Strengthened global positioning as a remote-work-friendly destination
- Promotion of sustainable, low-impact tourism

### Conclusion

The proposed initiative converts existing infrastructure into a future-ready hospitality ecosystem, attracting global talent while fostering economic growth, cultural exchange, and sustainable tourism.

Kerala can emerge as India’s leading Work-from-Anywhere destination without the need for constructing new hotel infrastructure.

## 5 Advancing Digital Inclusion and Citizen-Centric Governance in Kerala

**PROF. DR. RASMI P.S**

To ensure equitable development, Kerala should expand digital literacy programmes across rural and coastal regions, with targeted outreach to students, women, senior citizens, and informal workers. Public digital infrastructure and e-governance platforms must be strengthened to improve accessibility, transparency, and citizen-centric delivery of government services.

## 6 Enhancing Employability Through Finishing Schools and Skill Programs in Kerala

**DINESH K**

UG students and participants of professional courses should have access to finishing schools and similar programs aimed at improving employability. These initiatives can provide industry-relevant skills, soft skills, and practical training, preparing graduates for effective workforce integration.

## 7 Key Focus Areas for Kerala’s Economic Development

**ARUNDEV K**

- **Strengthen the Startup & Innovation Ecosystem:** Foster innovation hubs, incubators, and support mechanisms to nurture startups across the state.
- **Promote Rural Digital Economy:** Expand digital access, e-commerce, and skill development programs in rural areas to drive inclusive growth.

- **Support Sustainable Tourism and Local Entrepreneurship:** Encourage eco-friendly tourism initiatives and empower local businesses to boost regional economic resilience.

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## 8 Skill Quality and Employer Protection in the Professional Sector

**SHAFEEQUE PARAKULATH**

*CEO, LeEYE-T Techno Hub LLP*

The professional sector faces a shortage of high-quality professionals, resulting in financial losses for employers and investors who invest heavily in training and skill development. These challenges are often linked to gaps in education quality, practical skills, and professional behaviour.

Labour protection frameworks are largely employee-focused, with limited safeguards for employers and investors who bear the risks of recruitment and training, highlighting the need for better education standards and more balanced policy support.

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## 9 The Role of AI and Emerging Challenges in Kerala's Service Sector

**GEETHU SIVAKUMAR**

AI plays a major role in emerging industries, but it is also causing job losses among less-skilled employees. Separate initiatives are needed to address this issue, as the state's economy is largely service-sector oriented. People need to be trained to use AI as a tool to enhance their skills and deliver more efficient and higher-quality output.

There is also a challenge in attracting skilled professionals from other states to work in Kerala due to limited entertainment options and nightlife, particularly in Thiruvananthapuram and Calicut. This issue needs to be addressed more quickly before IT parks in other states move further ahead in terms of growth and talent attraction.

The IT sector often lacks adequate banking support, as there is usually no machinery involved and the primary cost is manpower. Kerala has a large number of IT companies that generate significant employment opportunities. Therefore, dedicated funding support for software-related service companies is necessary to strengthen and sustain the sector's growth.

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## 10 Promoting Product and Platform Companies in Kerala

**HOMIN VIJAYAN**

*Founder and CEO, Nerve Digital P Ltd.*

Kerala has the potential to emerge as a hub for product and platform-based technology companies, particularly in the area of cloud computing and intellectual property creation. Observations from industry experience indicate that focusing

on innovation-driven enterprises can significantly contribute to economic growth, employment, and technological self-reliance.

### **1. Focus on Product and Platform Companies**

Experience shows that regions like America’s Silicon Valley and China’s technology clusters have succeeded by promoting the development of proprietary platforms and intellectual property (IP). Product and platform companies, especially those developing cloud technologies, form the foundational layer for process automation and AI-driven solutions that are essential for both private and public sector transformation. Policies and incentives that encourage the establishment and growth of such companies in Kerala would not only nurture local innovation but also protect data sovereignty by promoting domestic cloud platforms. Special focus on enterprises that develop indigenous platforms can position Kerala as a significant player in the global technology landscape.

### **2. Strengthening Institutional Support and Awareness**

Policies alone are insufficient without effective institutional support and awareness among government agencies and intermediaries. Entrepreneurs often face procedural challenges, delays, and lack of understanding from the staff handling start-up programs. To address this, it is recommended to:

- Establish a dedicated team to identify and support high-potential technology enterprises focused on IP creation.
- Train government personnel and intermediaries to understand innovation processes, customer-centric product development, and global best practices.
- Promote mentorship, exposure to global technology ecosystems, and guidance for scaling local innovations.

By proactively identifying promising companies and providing focused support, Kerala can accelerate the growth of technology enterprises, enhance innovation capacity, and elevate local employment and economic outcomes.

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## **11 Making Kerala a Hub for Sustainable Packaging and Green Manufacturing**

**MIHAMMAD ASIF K**

As the global economy shifts towards eco-friendly, recyclable, and biodegradable alternatives, sustainable packaging—especially paper- and fibre-based solutions—offers significant growth potential. To leverage this opportunity, the Government of Kerala may introduce a dedicated Green Manufacturing and Sustainable Packaging Policy to attract investments in biodegradable materials, circular-economy-driven industries, and responsible manufacturing.

The establishment of Green Industrial Parks with shared infrastructure such as renewable energy systems, effluent treatment facilities, and waste recovery units would reduce entry barriers while ensuring environmental compliance. Targeted incentives, including capital subsidies, power tariff concessions, and fast-tracked approvals for certified green industries, can further enhance investment attractiveness.

Integrating sustainable manufacturing with industry-linked skill development is equally important. Training programmes aligned with modern manufacturing, automation, and sustainability standards can create high-quality local employment

and reduce skilled migration. Additionally, assured procurement support from government departments and public sector institutions can help strengthen MSMEs in the green manufacturing sector.

By prioritising sustainable packaging and green manufacturing, Kerala can simultaneously promote environmental sustainability, industrial growth, and job creation, positioning itself as a model state where economic development aligns with ecological responsibility.

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## 12 Work Near Home and Cooperative IT Hubs in Kerala

**DEEPAK P**

During the COVID-19 period, many Malayali IT professionals working in cities across India returned to their hometowns and continued working remotely. The subsequent growth of the IT sector in Kochi and other centres further encouraged professionals to relocate to Kerala. In this context, the government proposed the “Work Near Home” concept to provide well-equipped offices with reliable internet connectivity in nearby towns for those living in rural and semi-urban areas.

These workspaces can be gradually transformed into small cooperative IT enterprises by identifying skilled young professionals, forming small teams, and expanding such models across districts. Allocating small projects from government and local self-government institutions to these units would promote skill development and local employment, with guidance from organisations such as UL Technology Solutions (ULTS) further strengthening the initiative.

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## 13 Leveraging IT and Autonomous Electric Water Vehicles for Kerala’s Industrial Growth

**GOKUL B ALEX**

For the industrial development of Kerala, it is essential to advance information technology through innovative and modern pathways. Presenting a unique and indigenous model in this sector can create significant market potential and drive further growth.

Today, autonomous electric water vehicles can open up a highly promising new market for the state. These self-operating electric water vehicles can be effectively used in seas, backwaters, and lakes to prevent pollution and support environmental protection. They will also be highly useful for ocean research and climate studies.

For this, advanced technologies in artificial intelligence can be utilised. In addition, Kerala’s progress in electric vehicle research can be effectively integrated to support the development and deployment of such innovative systems.

വിഷയ മേഖല: വ്യവസായം, തൊഴിൽ  
ഉപശാഖ: നൈപുണ്യവികസനവും തൊഴിലും

Main Track: **Industries, Labour**  
Sub Track: Skill Development and Labour

## 1 Skill Mobility in an Energy Transition Era A Kerala–Germany Framework for Reskilling, Language Training, and Ethical Labour Export. Policy White Paper Human Capital Circulation during Global Industrial Transition

**ROHITH M J**

### **Abstract**

Germany faces a chronic and structural shortage of industrial and technical labour driven by demographic decline, energy transition requirements, and the collapse of vocational pipelines. Simultaneously, regions such as Kerala are experiencing the return or displacement of skilled and semi-skilled workers from oil-dependent Gulf economies. This white paper proposes a state-backed Kerala–Germany skill mobility framework centered on German language training, industrial reskilling, and ethical labour export. Rather than low-skill migration, the framework emphasizes certified industrial technicians trained to German standards prior to migration. The paper outlines institutional architecture, training models, certification pathways, and political safeguards necessary to make such a program viable, scalable, and mutually beneficial.

### **1. Introduction: Two Transitions, One Opportunity**

Germany is undergoing a profound demographic and industrial transition. Its population is ageing rapidly, while its industrial base requires technicians to maintain and adapt complex systems in energy, manufacturing, automation, and infrastructure. At the same time, Kerala is navigating the consequences of a global oil transition that is reducing labour absorption in Gulf economies. Large numbers of experienced workers are returning or facing uncertainty. These parallel transitions create a unique opportunity for structured human capital circulation.

### **2. Germany’s Structural Labour Shortage**

Germany’s labour shortage is not cyclical but structural. It affects skilled trades, mechatronics, electrical systems, industrial maintenance, tooling, HVAC, and power systems. Wage increases alone cannot solve the problem because the

vocational training pipeline has weakened and domestic demographics are unfavorable. Germany increasingly relies on international skill mobility to sustain its industrial ecosystem.

### **3. Returning Workers from the Oil Economy**

Kerala has a long history of labour migration to Gulf countries. As oil economies automate and restructure, demand for mid-skill construction and maintenance roles is declining. Returning workers possess discipline, industrial exposure, and migration readiness, but often lack formal certification aligned to European standards. This mismatch creates both risk and opportunity.

### **4. Why Kerala Is a Suitable Partner**

Kerala offers rare advantages: high basic education, a culture of overseas employment, familiarity with industrial work, and state capacity to run training institutions. These conditions make Kerala an ideal site for pre-migration skill and language preparation rather than ad-hoc recruitment-driven migration.

### **5. The Case for State-to-State Skill Corridors**

Private recruitment-led migration often leads to exploitation, skill mismatch, and political backlash. A durable model requires bilateral cooperation between the Kerala government and German federal states. State-backed skill corridors provide legitimacy, visa predictability, employer trust, and worker protection.

### **6. Integrated Language and Technical Training**

German language proficiency is essential for workplace safety, documentation, and integration. Language training must be integrated with technical instruction rather than treated as a separate preparatory phase. Training centers in Kerala should offer German up to B1/B2 levels alongside trade-specific technical German.

### **7. Certification and Standards Alignment**

Training must map to German vocational logic, including DIN and VDE standards where relevant. Germany values demonstrable competence and safety compliance over formal degrees. Certification pathways must therefore be co-designed with German institutions to ensure acceptance by employers.

### **8. Priority Skill Domains**

Initial focus areas should include industrial electricians, mechatronics technicians, CNC and tooling specialists, industrial maintenance workers, HVAC technicians, and power and grid technicians. These domains align with Germany's energy transition and infrastructure needs.

### **9. Ethical Mobility Framework**

Political sustainability requires strong worker protections. The program must guarantee transparent contracts, zero or minimal worker-paid fees, language and integration support, and clear pathways for residency or return. Ethical design reduces backlash and builds long-term trust.

### **10. Benefits for Kerala**

Beyond remittances, the framework enables skill circulation. Returning technicians bring advanced industrial practices, safety culture, and automation exposure back to Kerala. This can upgrade local industry and reduce brain waste.

### **11. Benefits for Germany**

Germany gains a predictable, pre-trained workforce with lower integration risk. Workers arrive with language skills, technical certification, and cultural readiness. This reduces onboarding costs and stabilizes industrial operations.

## 12. Risks and Mitigation

Risks include politicization of migration, exploitation by intermediaries, and skill mismatch. These can be mitigated through state oversight, transparent certification, and limited pilot cohorts before scaling.

## 13. Implementation Roadmap

A pilot program of limited size should be launched, followed by evaluation and gradual scaling. Institutional anchors must include German state governments, Kerala training agencies, and industry partners.

## 14. Conclusion

This proposal reframes labour export as structured human capital circulation during global transition. With careful design, Kerala and Germany can create a model that is economically productive, socially ethical, and politically sustainable.

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# 2 Strengthening Skill Development through PPP Initiatives

**INDHU T R**

*PhD Scholar, GIFT, CUSAT*

Skill development has emerged as a cornerstone of inclusive and sustainable economic progress in the contemporary development paradigm. As economies become increasingly knowledge-driven and technology-oriented, the alignment of training systems with market requirements is essential to ensure that educational investments yield tangible employment outcomes. In this context, the integration of Public–Private Partnership (PPP) models into skill development initiatives represents a strategic approach to bridging the gap between institutional training and industry demand. By fostering collaboration between government institutions and private enterprises, PPP frameworks enhance the relevance, responsiveness, and quality of vocational education and training systems.

The participation of the PPP model in skill development, particularly through NSDC-linked programmes, strengthens ITI training by aligning curriculum and competencies with real labour market needs. Through employer engagement, structured placement support, and continuous skill upgradation, the PPP framework improves employment absorption and enhances job readiness among trainees. Initiatives such as PETC and PPP-based skill development thus function as effective institutional mechanisms for converting human capital investments into sustainable livelihood opportunities, especially for marginalised communities. By institutionalising such collaborative approaches, policymakers can advance equitable growth and ensure that skill development translates into long-term economic empowerment.

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# 3 Kerala at the Crossroads: Preparing for the Gulf Transition and the AI–Robotics Shock.

## A Long-Term Policy Note on Labour, Development, and Economic Resilience (5–15 Year Horizon)

**ROHITH M J**

### **1. Introduction**

Kerala is entering a decisive phase shaped by two structural forces: the gradual transition away from oil-driven growth in Gulf economies and the rapid adoption of artificial intelligence and robotics in global labour markets. While structural adaptation has occurred in the past, the combined impact of these transitions presents compounded risks requiring coordinated, forward-looking policy action.

### **2. The Gulf Oil Transition**

Energy diversification in Gulf countries is expected to moderate long-term demand for traditional migrant labour. Sectors such as construction, transport support, plant maintenance, and low-to-mid skill services may experience slower hiring growth and shorter employment cycles. Remittances, historically a stabilizing force for households in Kerala, may become more volatile and regionally uneven.

### **3. AI and Robotics Disruption**

Automation is increasingly substituting routine and repetitive tasks across port operations, warehousing, logistics, clerical services, and segments of healthcare administration. Although new employment opportunities will emerge in robotics maintenance, systems supervision, and digital services, these roles demand higher technical skills and continuous learning.

### **4. Combined Impact**

Declining remittance stability combined with domestic automation reduces traditional household fallback options. Without intervention, potential outcomes include higher income volatility, expansion of informal employment, and increased labour tensions.

### **5. Limits of Traditional Responses**

Resistance to technology adoption is unlikely to provide sustainable protection. Conventional strike-based responses have limited influence in automated environments. Similarly, generic training programs without employment linkages risk skill oversupply and worker frustration. A transition-management approach is therefore essential.

### **6. Strategic Objectives**

Policy priorities should focus on stabilizing household incomes, reducing re-employment timelines, expanding diversified income opportunities, and ensuring that productivity gains from automation generate local economic benefits.

### **7. Institutional Framework**

Recommended measures include:

- Establishment of a Kerala Transition Task Force
- Creation of Regional Robotic Reskilling and Transition Centers
- Formation of a Labour and Automation Observatory
- Introduction of a dedicated Transition Finance Window

These institutions should coordinate labour data, finance, regulatory responses, and skill development strategies.

### **8. Robotic Reskilling and Transition Centers**

District-level centers should deliver modular, short-duration training in robot operation, industrial software, safety systems, and digital service support. Programs must be directly linked to apprenticeships and job placements to ensure measurable employment outcomes.

### **9. Income Smoothing Mechanisms**

Time-bound wage insurance and structured transition stipends can protect households during reskilling phases. Support mechanisms should remain conditional, transparent, and focused on rapid reintegration into productive employment.

### **10. Automation Cooperatives**

Worker- and community-owned automation cooperatives can retain productivity gains within Kerala's economy. These entities may own or lease robotic systems and provide services to local industries, creating skilled technical employment.

### **11. Evolving Role of Labour Unions**

Labour unions should transition toward partnership-based models, supporting apprenticeship systems, certifying skills, negotiating transition safeguards, and participating in cooperative ownership structures.

### **12. Monitoring and Evaluation**

Progress should be measured using clear indicators:

- Household income volatility
- Time to re-employment after displacement
- Skill-to-market transition lag
- Number of viable income streams per household

Early-warning metrics should trigger adaptive policy adjustments.

### **13. Timeline for Action**

Within two years, pilot reskilling centers and income-support mechanisms should be operational. Over the following decade, successful models should scale statewide, embedding structured automation governance and labour-transition norms.

### **14. Risks and Mitigation**

Potential risks include political capture, skill mismatches, and institutional resistance. Mitigation strategies require transparent governance, employer-aligned curriculum design, and inclusive stakeholder engagement.

### **15. Conclusion**

Kerala has the opportunity to lead India in managing the social dimensions of technological and economic transition. Early preparation, institutional coordination, and a focus on long-term stability can convert dual structural shocks into a pathway toward resilient and inclusive development.

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## 4 Skill Development and Employment

**HARSHA PUTHUSSERRY**

*Founder and MD of Iraaloom, Iraaloom*

The handicrafts and decor industries in Kerala possess significant potential for generating sustainable employment. However, despite the presence of traditional skills and products that have received Geographical Indication (GI) recognition, these sectors have not been able to realize their full potential due to insufficient promotion and limited market linkages. Targeted policy interventions are particularly necessary to ensure stable employment opportunities for women and youth in these fields.

Kerala's GI-registered handicrafts, handloom, and decor products such as Kasaragod Saree, Balaramapuram Handloom, Aranmula Mirror, Aroor-Cherthala Coir Products, Nettipattam, and Thekkady Bamboo Products require focused protection and expanded promotion. Dedicated government support schemes should be introduced for GI products, concentrating on design upgradation, quality standardization, certification, branding, and packaging. To facilitate access to national and international markets, special sections for GI-tagged products should be arranged in exhibitions, trade fairs, and e-commerce platforms.

Greater emphasis should be placed on employment generation in the decor sector, as it provides opportunities for women and youth to work from home or through community-based production units. Integrated schemes combining training, production support, and structured market linkages for eco-friendly decor products made from locally available materials such as jute, coir, bamboo, cotton, coconut, and clay should be implemented. Provision of stipend-based training, small loans, and micro-grants for women and youth entering this sector would support employment continuity and long-term sustainability.

To attract the younger generation to sustainable sectors including GI products, handicrafts, and decor industries, skill exposure programs at school and college levels, design workshops, apprenticeships, and startup incubation support mechanisms should be introduced. By integrating traditional knowledge with modern design approaches and market-oriented strategies, a long-term sustainable employment ecosystem can be developed in Kerala with increased participation of women and youth.

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## 5 Strengthening Small Enterprises as Sustainable Workplaces in Kerala

**NEHA GOPINATH**

Kerala's entrepreneurship and MSME policies should extend beyond start-up creation and financial support to focus on the organizational capability and workplace sustainability of small enterprises. Research consistently shows that the long-term survival and social contribution of small firms depend not only on capital and skills but also on leadership practices, autonomy, fair work relations, and employee wellbeing.

Small enterprises account for a significant share of employment in Kerala, yet many face high stress, informal management practices, and fragile labor relations.

Supporting these enterprises as healthy workplaces can improve productivity, reduce attrition, and enhance employment quality without requiring large capital investment.

To achieve this, the state could integrate basic leadership, people management, and wellbeing modules into MSME and entrepreneurship support programs. Advisory and mentoring support should be provided for owner-managers of small firms and cooperatives. Additionally, “decent work” and workplace sustainability should be recognized as explicit policy goals within entrepreneurship and MSME development schemes.

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## 6 AI-Based Skill Development and Employment for Kerala

**DR. NEEM M**

Kerala has significant potential to leverage **Artificial Intelligence (AI)** for skill development and employment generation. The following strategic recommendations highlight approaches to enhance workforce readiness and promote innovation-driven growth in the state.

### **1. Establishment of State-Level AI Skill Development and Certification Centers**

State-level AI skill development centers can be established in collaboration with universities, IT parks, and industrial sectors. Courses can be offered in data science, machine learning, deep learning, cloud computing, and AI ethics. Providing training aligned with industry requirements for students, educators, and job seekers can enhance employment opportunities in sectors such as IT services, healthcare, fintech, e-governance, and smart city initiatives.

### **2. Promotion of AI-Based Startups and Innovation Ecosystems**

Greater support should be provided to AI-based startups through Kerala Startup Mission and technology parks. Encouraging young entrepreneurs through financial assistance, mentoring, and access to real-world datasets is essential. Special focus should be given to applications in agriculture advisory systems, fisheries management, tourism analytics, disaster warning systems, and healthcare diagnostics.

### **3. Integration of AI Skills with Traditional and Emerging Sectors**

AI training should be integrated with sectors such as agriculture, healthcare, education, logistics, and new energy domains. Specialized programs in precision farming, medical image analysis, intelligent tutoring systems, and smart energy management can generate new employment opportunities while enhancing productivity. This will also ensure job availability for youth in rural and semi-urban areas.

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## 7 Positioning Kerala as a Leading AVGC-XR Hub in the Creative Economy

**DENSIL ANTONY**

The Creative Economy, anchored by the AVGC-XR sector—Animation, Visual Effects, Gaming, Comics, and Extended Reality—represents a powerful emerging growth engine for Kerala. Globally, the AVGC-XR industry is projected to contribute over USD 500 billion to GDP by 2030. In India, the sector is expected to expand into a USD 40–50 billion opportunity, generating more than 20 lakh direct and indirect jobs across creative, technical, and entrepreneurial roles.

Kerala is uniquely positioned to capitalize on this momentum. The state’s rich cultural heritage, traditional art forms, visual storytelling traditions, and vibrant ritual expressions such as Theyyam provide a deep reservoir of original content that can be transformed into globally marketable games, animation properties, and immersive AR/VR experiences with significant economic value. In addition, a substantial number of skilled professionals from Kerala currently hold leadership and specialist roles in national and international animation, VFX, and gaming studios. Strategically leveraging this talent pool can accelerate the development of a strong, home-grown AVGC-XR ecosystem.

With both Union and State AVGC-XR policies in place, along with recent budget allocations supporting the Creative Economy, a solid foundation has already been established. The next critical step is to operationalize this vision through a structured institutional mechanism that brings together industry, academia, and government. Such coordination can enable targeted skilling, intellectual property creation, startup incubation, and global market access, thereby positioning Kerala as a leading AVGC-XR hub and a significant contributor to the state’s long-term economic growth.

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## 8 Integrated Skill-to-Employment Digital Platform for Kerala

**DR.MUHAMMED SHA S**

By integrating student skill profiles, certification records, internship details, and placement histories from recognised institutions, employers can easily verify candidates’ competencies and recruit job-ready youth. Institutions will also be able to track employment outcomes and update their courses in line with industry demand.

Such a unified skill-to-employment portal will help reduce skill mismatch, improve placement rates, and further strengthen Kerala’s position as a hub for skilled human resources.

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## 9 Strengthening Kerala's Employment Portals through Skill Integration

**DR.MUHAMMED SHA S**

Kerala currently has government job portals such as Employment@KERALA and the Kerala Private Employment Portal, which aim to connect jobseekers with private employers and job opportunities. The Private Employment Portal, launched by the Department of Labour, enables employers to post vacancies and allows jobseekers to apply online free of cost, while also supporting features such as job fairs and recruitment reports.

However, these portals have certain limitations:

- They primarily function as job posting and search platforms and lack structured integration of skill certification data from educational institutions, making it difficult for employers to accurately assess the skills and competencies of candidates.
- The registration and profile management processes focus mainly on basic resume and job-related information, with limited automated matching based on skill profiles and training outcomes.
- There is limited real-time linkage between training providers (schools, colleges, and skill centres) and employer demand, which can create a disconnect between the skills students possess and those required by employers.

To enhance their effectiveness, the State could consider developing an upgraded employment portal that:

1. Integrates skill certifications and training records from both government and private skill education institutions into the job portal database.
2. Utilises automated matching algorithms to align candidates' skills with employer requirements.
3. Provides dedicated dashboards for employers, institutions, and jobseekers to update information, post vacancies, and track applications.
4. Links job postings with industry demand data and feedback, enabling institutions to tailor training and certification programmes based on actual market needs.

Such an integrated platform would strengthen the education-to-employment linkage, reduce skill mismatch, and foster a more reliable, transparent, and efficient ecosystem for job placements and employer hiring in Kerala.

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## 10 Worker-Friendly Alternatives for the Gig Economy in Kerala

**DEEPAK P**

Today, Kerala has numerous gig-based platforms operating in sectors such as food delivery, online taxi services, and grocery delivery. However, many of these platforms are also associated with worker exploitation, where long hours of work often leave workers with very limited earnings after expenses. Moreover, gig workers are largely excluded from the labour-friendly protections historically ensured in the State.

There is therefore a need to develop worker-friendly digital alternatives to these platform-based workplaces. Establishing a research unit to study and design such alternatives can help create and manage fair digital platforms that ensure equitable work allocation, income stability, and reduced competition-driven uncertainty among workers. These systems should be built using appropriate technologies and continuously improved based on workers' experiences and feedback.

It would also be useful to study global worker-centric platform models and adapt them to Kerala's social context, while examining local initiatives such as K-Taxi, Kerala Savari, and Yatri. A fair and efficient alternative ecosystem can not only ensure better livelihoods for workers but also promote dignity, security, and collective awareness in the evolving digital labour market.

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## 11 Kerala Lifelong Skills and Work Guarantee Mission

**DR PREM SANKAR C**

Kerala should transition from fragmented, department-led training schemes to a universal lifelong skills ecosystem that guarantees every citizen the right to learn, reskill, and access dignified work. A Kerala Lifelong Skills and Work Guarantee Mission can establish district-level Skill Labs directly linked with industry, MSMEs, startups, and local governments.

Each individual can be provided with a digital Skill Passport that records competencies and enables smooth mobility across jobs, apprenticeships, and enterprises. Training should be closely integrated with paid work opportunities in emerging sectors such as AI, the green economy, healthcare, and creative industries.

Such a mission would help transform Kerala from a job-seeking society into a future-ready, employment-generating economy driven by continuous learning and skill mobility.

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## 12 Technology-Driven Innovation and Research in Kerala

**S. SWAPNA KUMAR**

*Professor & HoD, Department of Electronics and Communication Engineering, APJ Abdul Kalam Technological University*

1. Kerala may introduce Internet of Things (IoT) and Wireless Sensor Network (WSN)-based systems for monitoring floods, water resources, healthcare services, and transportation. This will enhance public safety and enable efficient resource management.
2. A centralised research funding and mentoring mechanism can be established to support innovation in engineering colleges, particularly in areas such as AI, IoT, and WSN aligned with Sustainable Development Goals. This will promote quality research, startups, and technological innovation.
3. Structured industry-academia collaboration programmes should be developed to provide students and faculty with hands-on training, internships, and real-world projects in domains such as Industry 5.0 and embedded systems.

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## 13 A Kerala Model for Readily Employable Youth

**DR RADHAKRISHNAN NAIR**

Kerala does not merely need more educated youth; it needs industry-integrated, hands-on, confident, and readily employable young professionals.

To achieve this, a comprehensive transformation is required across education, skill development, practical training, job placement, and long-term career retention. Although Kerala has high literacy levels and strong social indicators, there remains a gap between academic qualifications and industry-specific skills, as well as limited exposure to real-world work environments. Bridging this gap through industry-aligned curricula, experiential learning, internships, and structured placement support will be essential to make the State's youth immediately employable and future-ready.

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## 14 Strengthening Skill Development and Streamlining Industrial Policy for a Future-Ready Workforce

**DR.K.T.MADHAVAN**

*Retired Senior Scientist, National Aerospace Laboratories (NAL)*

More programmes and projects for skill development should be initiated at all levels, from primary education to higher education, to build a strong and future-ready workforce.

1. Industrial policies must be further streamlined to ensure ease in project approvals by reducing red tape and delays in implementation. This will significantly enhance the investor-friendliness of the State.
2. Early identification of students' skills and aptitudes during the initial stages of education is essential, along with proper encouragement and systematic nurturing. A great deal can be achieved by promoting relevant, industry-oriented diploma courses that equip students with practical and employable skills.

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## 15 Policy Recommendation: Advancing Kerala as a Digital and Innovation-Driven Economy

**HARI KRISHNAN SM**

*Managing Director, DIV10X Business Solutions Pvt Ltd, Module 14, Gayathri, Phase -1, Technopark, Trivandrum, Kerala, India, 695 581*

Kerala should adopt a comprehensive strategy to position itself as a global digital services and GCC (Global Capability Centre) technology hub, particularly targeting GCC countries, African nations, and emerging markets. Leveraging its highly skilled workforce, time-zone advantage, strong diaspora linkages, and cost competitiveness, the State can attract offshore digital services, fintech operations, and cross-border technology enterprises. Policy support for GCC-linked IT parks, fintech sandboxes, and facilitation of cross-border digital trade will accelerate export-oriented growth and generate high-value employment opportunities.

Simultaneously, a structured state-level Industry–Academia–Skill integration framework is essential to align higher education with emerging job markets. Curricula across universities and technical institutions should be synchronised

with industry demand in high-growth domains such as artificial intelligence, data analytics, fintech, cybersecurity, and cloud computing. Incentivising industry-led skill laboratories, paid apprenticeships, live project collaborations, and outcome-based training models will significantly enhance graduate employability while reducing outward talent migration.

Further, the State must promote technology-driven MSMEs and digital entrepreneurship as engines of inclusive growth. Targeted measures should include affordable digital infrastructure, incentives for ERP and digital tool adoption, simplified access to innovation capital, and structured mentoring support. Strengthening collaboration between startups and traditional MSMEs—particularly in health-tech, agri-tech, fintech, and governance technology—will drive productivity gains, market expansion, and job creation. Together, these measures can transform Kerala into a competitive, knowledge-driven economy anchored in digital innovation and future-ready skills.

## 1 From Fabric to Value: Why Kerala Handloom Needs Branding, Pricing Discipline, and Provenance Verification

ROHITH M J

### **Positioning Kerala Handloom as a Weaver-Owned Global Luxury Ecosystem**

Kerala's handloom weaving traditions represent one of the oldest continuous textile cultures in South Asia. Despite their material quality, cultural depth, and relevance to contemporary global luxury aesthetics, weaver societies remain structurally poor. The central problem is not craft, design, or relevance, but value capture. .... Kerala handloom risks aesthetic appreciation without economic dignity.

#### **1. Quality Without Prosperity**

Kerala handloom textiles, particularly kasavu cottons from clusters such as Balaramapuram and Kuthampully, align naturally with global demand for sustainable, minimalist, and climate-appropriate clothing. Yet the average weaver household earns marginal incomes while garments made from the same fabric sell internationally at premium prices. This paradox arises from structural misalignment in the value chain, not from declining relevance.

#### **2. Designer-Led Value Capture**

Most innovation beyond sarees and mundus—shirts, kurtas, skirts, dresses, and resort wear—is led by external designers. While design value is added, these actors control brand narrative, price anchoring, and trust. Weavers remain raw material suppliers, capturing only a small fraction of final value.

#### **3. Why “Handloom” Is Not a Luxury Signal**

In global markets, handloom signals ethics but not luxury. Luxury requires verifiable authenticity, scarcity, and narrative discipline. Without independent verification and strong signaling, Kerala textiles are easily copied and underpriced.

#### **4. Luxury as a System**

Luxury emerges from systems that integrate narrative authority, pricing discipline, verification, and constraints. Kerala weaving already satisfies material and cultural constraints but lacks institutional infrastructure to convert them into value.

## 5. Brand Narrative and Provenance

Effective luxury narratives emphasize origin specificity, process rules, and continuity. Weaver societies must function as collective luxury houses, positioning weavers as authors of value rather than beneficiaries of welfare.

## 6. Pricing Architecture

Cost-plus pricing guarantees poverty. Luxury pricing must be anchored to scarcity and irreversibility. Tiered fabric pricing—archive, signature, and everyday—allows income growth without volume expansion.

## 7. Verification and Traceability

QR-based provenance systems are essential infrastructure. Each fabric roll or garment should link to loom identity, material specifications, batch data, and reorder constraints. This shifts trust from intermediaries to source.

## 8. Beyond Government Tags

Government handloom marks signal compliance, not excellence. A Kerala-specific provenance label with enforceable standards would transform geography into economic protection.

## 9. Ownership and Governance

Branding and verification must be owned by weaver collectives, supported—but not controlled—by designers and institutions. Without weaver ownership, extraction persists.

## 10. Conclusion

Kerala handloom stands at a crossroads. Without systemic change, it will remain aesthetically admired and economically marginal.

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# 2 Design Interventions for the Promotion of Khadi and Handloom Textiles of Kerala

**DR. CAROLIN BABY**

1. Innovative designs can be developed using Kerala Khadi and handloom fabrics by drawing inspiration from the State's art, culture, traditions, folklore, and architecture. Product diversification can be achieved through surface embellishment techniques such as printing, dyeing, embroidery, appliqué, and patchwork, along with the use of locally available natural dyes for eco-friendly production.

2. Strengthening brand image and market reach requires integrated marketing strategies, including standardised brand logos, labels, price tags, attractive packaging, and visual merchandising. Cost-utility analysis and demand forecasting based on consumer feedback should guide pricing and production decisions.

3. Along with traditional products like dhothis, sarees, shirts, and kurtas, contemporary fashion items such as designer shirts, kurtis, crop tops, trousers, and babywear can be developed using Khadi and handloom fabrics. Value addition through eco-friendly antibacterial finishes and modern designs can help attract younger consumers and global markets.

വിഷയ മേഖല: വ്യവസായം, തൊഴിൽ  
ഉപശാഖ: വ്യവസായം

Main Track: **Industries, Labour**  
Sub Track: Industries

## 1 Strengthening MSME Ecosystem in Kerala: Policy Reforms for Finance, Infrastructure, and Skill Development

**SADDAM HAKIM**

Micro, Small, and Medium Enterprises (MSMEs) form the backbone of Kerala's industrial and entrepreneurial landscape. However, several structural bottlenecks continue to hinder the growth of emerging enterprises, particularly those operating in rented premises, facing high infrastructure costs, or lacking access to specialized technical training. Addressing these constraints through targeted policy reforms can significantly improve ease of doing business, reduce entry barriers, and enhance the competitiveness of small entrepreneurs across the state.

### **1. Relaxation of Loan Norms for Enterprises Operating in Rented Buildings**

**Problem:** Although the CGTMSE scheme exists to facilitate collateral-free credit, banks often insist on a registered lease agreement for enterprises functioning in rented premises. In many cases, building owners are unwilling to execute registered agreements, leading to denial of eligible loans.

**Recommendation:** In situations where a registered lease agreement is unavailable, banks may be instructed to consider notarized lease agreements along with Udyam Registration as sufficient documentation for sanctioning CGTMSE loans.

### **2. KSEB to Bear Basic Infrastructure Cost for Industrial Power Connections**

**Problem:** For obtaining industrial electricity connections, entrepreneurs are currently required to bear the full cost of installing transformers, RMUs, and related infrastructure on public roads, often amounting to several lakhs of rupees. This imposes a heavy financial burden at the initial stage of enterprise formation.

**Recommendation:** The cost of electrical equipment installed in public spaces (such as RMUs or transformers) may be borne by KSEB. Alternatively, a reimbursement mechanism can be introduced whereby the amount is adjusted in installments through reductions in future electricity bills.

### 3. Establishment of Food Processing Technical Training Centres

**Problem:** Kerala lacks scientific and practical training institutions in specialized areas such as wheat milling technology and other food processing sectors. Entrepreneurs are compelled to depend on institutions outside the state for technical training.

**Recommendation:** The Department of Industries or KINFRA may initiate short-term practical courses and technical centres in food processing, particularly in milling technology. Collaboration with reputed institutions such as CFTRI can help establish district-level training infrastructure to build local technical capacity.

#### Conclusion

A progressive MSME policy must go beyond financial incentives and address structural barriers related to credit access, infrastructure costs, and skill development. By reforming loan documentation norms, rationalizing power infrastructure costs, and establishing specialized technical training centres, Kerala can create a more enabling ecosystem for entrepreneurs. Such targeted interventions will not only encourage enterprise formation but also strengthen industrial resilience, employment generation, and sustainable economic growth across the state.

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## 2 Strengthening Early-Stage Startup Financing in Kerala

HARIS I M

Innovation-driven growth depends significantly on the survival and success of early-stage startups. In Kerala, many promising ventures struggle during the idea, prototype, and pre-revenue stages due to limited access to timely and flexible financial support. Even when startups identify real market gaps and develop strong concepts, the absence of structured pre-seed and seed funding often prevents them from progressing beyond the initial phase.

Early-stage financial assistance—through grants, seed funding, and startup-friendly government support—plays a crucial role in enabling entrepreneurs to build prototypes, hire small teams, validate products, and acquire initial customers without excessive financial stress. Particular attention should be given to first-time founders, technology-driven startups, and MSME-focused innovations, where revenue realization typically takes longer. Simplified grant procedures, faster approval mechanisms, and integrated mentoring support can significantly improve startup survival rates. By strengthening early-stage financing frameworks, Kerala can nurture innovation, generate employment, and build a resilient startup ecosystem that contributes meaningfully to long-term economic development.

A robust early-stage funding ecosystem is not merely financial assistance—it is an investment in future economic capacity. By institutionalizing accessible pre-seed and seed support mechanisms, along with mentorship and streamlined processes, Kerala can transform innovative ideas into scalable enterprises. Supporting startups at their most vulnerable stage will foster entrepreneurship, encourage risk-taking, and position the state as a sustainable innovation hub in the years to come.

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### 3 Strengthening Governance Impact and Enhancing Entrepreneurial Visibility in Kerala

**NITHIN MULLOOLY**

Every project introduced by the Government of Kerala reflects an iconic and visionary approach. It is essential that the benefits of these landmark governance initiatives reach all sections of society.

One of the key challenges faced by entrepreneurs in the Kerala market is the lack of adequate promotional support, which makes it difficult for products to gain sufficient visibility and recognition.

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### 4 Expanding Kerala's Focus Beyond the Tertiary Sector

**PRAVEEN R**

*Startup Founder, Yuga AI*

Currently, Kerala emphasizes the tertiary or service sector. However, opportunities exist in the **quaternary** and **quinary** sectors, which focus on the knowledge economy:

**Quaternary sector:** White-collar workforce engaged in research, technology, and information services.

**Quinary sector:** High-level decision-making professionals, or “gold-collar” workforce.

A proposed model is **Deep Tech Cooperatives**, where AI and robotics operate core functions, and qualified professionals serve as members. Profits generated are shared among members, with higher returns for higher profits, promoting innovation-driven, knowledge-based economic growth.

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### 5 Vision Statement: “Vikasita Keralam 2035” From “God’s Own Country” to “God’s Own Industry 4.0 Hub”

**ANUP KUMAR C V**

*Founder Director, AVB Global Exim*

**Core Philosophy:**

To achieve true economic resilience by 2035, Kerala must transition from a “Consumer State” to a “High-Value Creator State,” fostering growth that enhances rather than degrades the environment. This vision rests on three pillars:

1. **Clean-Tech Industrialization:** Lab-based manufacturing using Robotics and 3D Printing.
2. **Knowledge-Driven Exports:** Moving from manpower exports to high-IP engineering solutions.
3. **Global Trust Capital:** Leveraging Kerala’s reputation in healthcare and tourism for a trust-based AI-powered service economy.

**Recommendation 1: Restoring Founder Confidence via Industry 4.0 Micro-Clusters**

**Context:** Brain drain persists despite premier institutions (NIT Calicut, IIM Kozhikode). Traditional industries deter founders due to pollution and operational friction.

**Proposal:**

**Smart Manufacturing Micro-Clusters:** Multi-story, zero-pollution zones for Industry 4.0 technologies within cities.

**Startup Concierge Desk:** Fast-track regulatory and dispute resolution within 72 hours.

**Alumni Re-Engagement:** Market clusters to NIT/IIM alumni as “The Green Silicon Valley.”

**Recommendation 2: Kerala as India’s Green Additive Manufacturing Hub**

**Context:** Strict environmental regulations discourage traditional industries, yet industrial growth is vital. Additive Manufacturing (3D Printing) offers a zero-liquid-discharge, minimal-waste, high-value solution.

**Proposal:**

**Aerospace & Space:** Supply lightweight, topology-optimized components leveraging VSSC proximity.

**Defense Corridor Support:** Act as a “Digital Forge” for Tamil Nadu Defense Corridor clusters.

**Medical Implants:** Manufacture patient-specific titanium implants and surgical guides locally.

**Recommendation 3: Democratizing Applied AI for Exports & Medical Tourism**

**Context:** Educated but unemployed youth, combined with underdeveloped high-value engineering exports (~50 EEPC members), leave a gap in global trade participation.

**Proposal:**

**Smart Engineering Merchant Exporter Program:** Train youth to become virtual exporters using AI sourcing tools, creating a dense exporter network and eventual EEPC Kerala chapter.

**AI for Export Intelligence:** Subsidize AI for market analysis, compliance automation, and global bidding efficiency.

**AI-Augmented Medical Tourism:** Implement AI-assisted surgery, digital twins for preoperative planning, and remote patient monitoring to build “Zero-Distance” trust with international patients.

This submission envisions a **future-ready Kerala**, leveraging clean-tech industrialization, knowledge-driven exports, and AI-powered global trust to establish the state as a high-value, environmentally sustainable Industry 4.0 hub by 2035.

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## 6 Elevating Kerala’s Global Standing: Key Recommendations

**RAGHUNATH NAIR**

Kerala has a distinctive global imprint, yet the contributions of Malayalis on the international stage remain underrepresented. Achieving global prominence

requires a combination of accountable governance, efficient institutional leadership, and innovative development strategies. Strengthening public service accountability is a critical first step. Public service must prioritize citizen welfare, and Kerala has already set a precedent by dismissing over 200 police officers in the past decade for failing to perform their duties—an unprecedented move in India. Extending similar accountability-driven measures across all government departments could foster transformative change throughout the state.

Leadership in public sector undertakings (PSUs) also requires reform. Currently, civil service officials are routinely appointed as PSU heads, which can limit efficiency and competitiveness. Assigning leadership roles to professionals with proven expertise in business, commerce, and enterprise management would ensure sustainable growth and improve operational performance. Alongside this, Kerala must adopt innovative, self-reliant strategies to address persistent central government neglect. Divesting 25–49% equity in profitable PSUs could unlock capital, enhance governance, and strengthen operational efficiency while promoting financial autonomy.

The industrial ecosystem can be further strengthened by encouraging Industries Department officials to conduct regular field-level inspections within industrial clusters. Direct engagement with entrepreneurs allows officials to identify operational challenges and resolve issues on the ground, fostering a supportive and growth-oriented environment for businesses. In parallel, the Panchayat and Revenue departments require restructuring to become more transparent, responsive, and citizen-friendly. Pragmatic elements of the Chinese development model—particularly execution-focused governance, accountability mechanisms, and infrastructure-led growth—can be selectively adapted to Kerala’s socio-economic context to accelerate development while maintaining social stability.

Implementing these measures, centered on accountability, professional leadership, self-reliant strategies, and citizen-centric governance, will strengthen Kerala’s socio-economic foundation and elevate the state’s global standing. A coordinated approach combining institutional reforms, industrial engagement, and innovative governance will ensure that Kerala not only preserves its distinctive social model but also emerges as a globally competitive, high-value economy.

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## 7 Kerala Semiconductor Policy: Opportunities and Strategic Advantages

**SANTHOSH K M**

There is a need to discuss a semiconductor policy and framework suitable for Kerala. The state has many similarities with Taiwan, Malaysia, and Singapore.

- High talent pool
- Good road, rail, and air connectivity
- Vizhijam Port is a major advantage
- Good air quality and stable electricity are essential for semiconductor chip manufacturing
- The Indian semiconductor market is expected to grow to 100 billion USD, which will support the next phase of economic development in Kerala and India after IT.

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## 8 Kerala AI-Driven Employability and Skill Development Framework

**I T NOUFAN**

*Founder and CEO, Fit My Job*

Kerala should establish a state-wide AI-driven employability framework that integrates colleges, private skill platforms, and employers. This system would continuously identify skill gaps, update curricula, and connect students with real job opportunities prior to graduation.

Public-private skill partnerships should be institutionalized, allowing verified private platforms to collaborate with the government in delivering outcome-based skill programs. These programs must align with actual industry hiring needs, particularly for youth and first-time job seekers.

Additionally, a **State Career Intelligence System** should be developed to track emerging roles, migration trends, and future skills demand. This system will enable students, educational institutions, and policymakers to make informed, data-driven decisions about careers and workforce planning.

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## 9 Strengthening Defence and Strategic Sector in Kerala

**MANISH KUMAR M U**

1. **Regulating Officer Unions:** Formulate policies to manage officer-level union activities in defence projects and prevent retaliatory practices, ensuring smooth operations.
2. **PSU-Startup Integration:** Create a framework for collaboration between PSUs and startups to boost exports of defence and strategic products.
3. **Ecosystem Study:** Analyze other states' policies to build supportive ecosystems that retain defence startups and prevent migration.

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## 10 Strategic Framework for Advancing Creative Industries and Media Sector in Kerala

**ARUNDEV K**

- Strengthen policy support for creative industries and the film sector to enhance employment opportunities for youth and promote sustainable sectoral growth.
- Establish training and research centres to advance digital media, cultural content creation, and innovation in emerging creative domains.
- Expand Film Tourism initiatives across the state by integrating cinema with tourism to increase cultural visibility and economic impact.
- Institute a Kerala Creative Economy Mission to coordinate and promote sectors such as cinema, OTT content, animation, music, gaming, and digital media, positioning the state as a national hub for creative industries.
- Develop a Global Film and Media Infrastructure Hub through public-private partnerships, including film cities, post-production studios, and VFX and virtual production labs, to attract investment and generate employment.

- Launch a Digital Creative Skills and Innovation Academy to provide advanced training in AI, filmmaking, VFX, game design, and media technology, thereby equipping youth with future-ready skills.

## 11 Strategic Framework for SME Scale-Up and Value-Added Growth in Kerala

**DR. SUHAIL PALAKKOD**

Kerala has successfully completed the initial phase of economic transformation by fostering a strong ecosystem for startups and micro-enterprises. To ensure long-term macro-economic stability, the focus must now shift from enterprise creation to enterprise scaling, enabling Small and Medium Enterprises (SMEs) to become globally competitive through diversification, market expansion, and innovation.

### **I. SME Scaling Framework: From Local Enterprises to Global Competitors**

The next phase of growth should prioritize the expansion of existing enterprises rather than merely increasing new registrations. A structured scaling strategy may be built on three key pillars:

- Strategic Diversification:** Encouraging SMEs to move beyond single-product dependency into high-value and related sectors.
- Market Penetration and Expansion:** Providing systematic support for integration into national and international markets and global supply chains.
- Mentor-Capital Ecosystem:** Creating a dedicated pool of industrial mentors and strategic investors to provide technical guidance, financial support, and scaling assistance.

### **II. Mission Spice Capital: Advancing Value Addition in Spices and Horticulture**

Historically, Kerala has been a global hub for the spice trade, largely functioning as a supplier of raw materials. In the modern economy, greater prosperity depends on value addition and advanced processing. A “Spices and Horticulture 2.0” mission should focus on:

- Technological Integration:** Adoption of advanced extraction, dehydration, and bio-processing technologies to produce essential oils, oleoresins, and nutraceutical products.
- Global Branding:** Transitioning from commodity exports to a premium “Product of Kerala” identity in the global wellness and luxury markets.
- Modernization and Standards:** Leveraging geographical indications, traceability systems, and Industry 4.0 standards to meet stringent international quality and regulatory requirements.

### **III. Economic Impact: Value Creation and Quality Employment**

Shifting from a raw agrarian supply model to a technology-driven value-added processing ecosystem can significantly enhance economic returns. This transition is expected to capture higher value margins currently realized by overseas processors while generating high-quality employment in areas such as food technology, biotechnology, international marketing, and supply chain management.

**Policy Insight:** Kerala’s historical market advantage must now be complemented by technological advancement and value addition, enabling the state to evolve

from a traditional production base into a global hub for innovation, processing, and high-value exports.

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## 12 Strategic Roadmap for Sustainable and Innovation-Driven Industrial Development in Kerala

**DR RAJEEV N**

Industrial development in Kerala should be aligned with the State's current industrial policy, with a clear emphasis on building a modern, high-tech, sustainable, and investment-friendly ecosystem. Strengthening infrastructure and enhancing institution–industry collaboration are essential to foster growth in key sectors such as artificial intelligence, information technology, biotechnology, informatics, robotics, and automation. Simultaneously, targeted measures are required to improve skill development among students and employees to meet evolving industry demands.

Priority should also be given to supporting MSMEs in rural areas, promoting electric vehicles, nanotechnology-based industries, and modernizing traditional sectors such as coir, cashew, handloom, and sericulture. Agro-based sustainable innovations, particularly in food processing and green initiatives, should be encouraged to ensure balanced and inclusive industrial growth.

Startup promotion must be strengthened to generate employment opportunities, especially for women, and to reduce the migration of young and skilled professionals seeking better career prospects abroad. In addition, comprehensive survey studies should be conducted to assess the current status of enterprises in industrial estates across the state, as a significant number of units are reportedly sick or underperforming. Strategic revival measures, along with investment-friendly policies, are necessary to attract private, domestic, and foreign investment.

Further, the promotion of deep-tech startups should be prioritized by encouraging engineers and entrepreneurs to develop solutions based on advanced scientific and engineering knowledge. Enhanced support for research and development, creation of intellectual property, and effective commercialization mechanisms will be critical to positioning Kerala as a competitive and innovation-driven industrial hub.

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## 13 Exploring Kerala's Potential Role in India's Nuclear Energy Program

**RAVI MADHAVAN**

Consideration to be given to Kerala's role in, and opportunities to contribute to, India's nuclear energy program. Despite periodic references to the state's significant thorium deposits, limited tangible progress has been made in terms of policy development and practical implementation. Given the growing global and national interest in nuclear energy as a critical source of clean and green power, this may be an appropriate time for the conference to devote focused attention to the subject.

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## 14 Enhancing Kerala's MSME Sector for Greater Contribution to India's Economic Growth

**B. JYOTHIKUMAR**

*Professor of Practice, Saintgits Institute of Management Kottayam*

India has been making significant strides in economic development and is on track to become the third-largest economy in the world. It is important to examine the domains and sectors where Kerala has contributed to this growth and explore opportunities to further align the state's core competencies with the drivers of national economic progress. Doing so will enable Kerala to capture a fair share of the benefits of India's expanding economy. One critical area of focus is the Micro, Small, and Medium Enterprises (MSME) sector.

Kerala has made commendable progress in developing its MSME sector, yet there remains substantial potential for further advancement. The existing institutional infrastructure is not weak, but other states have advanced more aggressively. For example, Andhra Pradesh has actively restructured its institutional support mechanisms and policies to propel MSME growth, particularly by channeling Government of India funds to promote enterprises within the state.

To achieve a higher trajectory of MSME growth, Kerala should:

1. Develop proactive policies that accelerate the growth of MSMEs and maximize their contribution to the state's economy.
2. Realign the institutional framework, ideally by establishing a specialized and lean professional agency to integrate the activities of various departments and organizations engaged in promoting MSMEs in Kerala.

Such measures would enhance coordination, leverage resources more effectively, and strengthen Kerala's position as a key contributor to India's economic development.

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## 15 Promoting Data Centre Construction in Kerala

**RAMESH R**

*Managing Director, Norris Electronics Pvt Ltd.*

Kerala explore opportunities in the rapidly growing Data Centre Construction sector. States such as Tamil Nadu, Karnataka, Telangana, and Maharashtra are actively focusing on this industry, while India currently has only about 2% of the required data centre capacity. According to projections from the Confederation of Indian Industry (CII), the sector is expected to achieve a 30% growth by 2027.

The sector is particularly suitable for Kerala, as it requires relatively low land density. Furthermore, the central government has already offered significant incentives to attract major corporate players, including Google and Amazon. Developing this sector in the state could enhance investment, create employment opportunities, and strengthen Kerala's position in the growing digital infrastructure landscape.

It is recommended that appropriate policy measures and promotional strategies be considered to attract investments and facilitate the development of data centres in Kerala.

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## 16 Promoting Sustainable Industries and Biofuel Development in Kerala

**MOHAMMED ASHARAF**

1. Kerala should develop its own biofuel policy to promote renewable energy and sustainable fuel alternatives.
2. A system should be established to recycle all recoverable and reusable materials collected within the state, ensuring local processing and reducing waste export.
3. The government should provide incentives for industries engaged in biofuel production, recycling, and other sustainable sectors.
4. A permanent platform should be created to connect startups with investors, facilitating funding and collaboration.
5. Banks should implement mechanisms for faster loan processing to support the growth of startups and sustainable enterprises.

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## 17 Strengthening Decentralized Industrialization and Employment in Kerala

**PRASANTH KUMAR SASIDHARAN PILLAI**

Kerala should promote decentralized industrialization by strengthening agri-linked processing and manufacturing units across districts. Agricultural, fisheries, and food-processing residues can be converted into value-added products such as food ingredients, feed materials, and bio-based products through standardized processing and manufacturing pathways. Shared infrastructure and common facility centers would enable MSMEs, cooperatives, and startups to participate in industrial activities with lower capital risk.

Employment generation should be aligned with science-driven manufacturing sectors, including food processing, fermentation-based industries, and sustainable materials. Skill development programs must focus on technician-level roles, process operators, and quality control personnel, and should be closely integrated with industrial clusters to ensure direct employability.

Supportive policy frameworks that facilitate MSME-led industrial growth, simplify regulations, and ensure coordinated implementation will help translate innovation into scalable manufacturing and stable employment. Such measures will strengthen Kerala's industrial base and enhance long-term economic resilience.

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## 18 Indigenous Biomedical Industries and Socially Relevant Health Innovation in Kerala

**DR. VINODKUMAR JACOB**

Strengthening local biomedical production can enhance healthcare affordability, technological self-reliance, and system resilience.

The State offers a favourable ecosystem for biomedical industries due to its extensive public and private healthcare network, skilled biomedical and electronics workforce, strong academic institutions, and strategic infrastructure at Kochi and

the emerging port-led logistics advantages of Vizhinjam. Rather than focusing on full-scale manufacturing of complex scanners, Kerala can prioritise feasible and high-demand segments such as portable X-ray systems, ultrasound probes and imaging accessories, DICOM-compliant imaging workstations, and AI-enabled imaging consoles. Equally promising are cardiac and vital-sign monitoring devices, including ECG machines, multiparameter patient monitors, Holter systems, and ICU-grade pulse oximeters, which align with the State's high healthcare demand. Other viable sectors include neurodiagnostic and mental health devices (EEG, EMG, neurofeedback systems), point-of-care diagnostic tools, rehabilitation and assistive technologies suited to an ageing population, disaster and emergency medical equipment such as portable ventilators and field monitoring systems, and medical sensors and biomedical instrumentation components. Co-development of AI-enabled medical software, clinical decision-support systems, and low-cost diagnostic analytics can further leverage Kerala's strengths in IT, research, and digital health.

In parallel, Kerala provides an ideal environment for socially relevant healthcare projects across educational and research levels. Community-oriented initiatives may include AI-based disease prediction for dengue and leptospirosis, portable health screening kits for rural and coastal regions, and smart maternal and tribal health monitoring systems. Student and interdisciplinary projects can focus on low-cost prosthetics adapted to humid conditions, stress and mental health monitoring devices, antibiotic resistance surveillance, and platforms integrating Ayurveda with modern diagnostics. Environment-health interface studies, such as water quality-disease correlation, flood-related disease analytics, and occupational health monitoring for fisherfolk and traditional workers, are particularly relevant to the State's socio-environmental context.

At the research level, advanced work in medical imaging, biomedical signal processing, and AI-driven diagnostics—such as oral cancer detection, TB lung damage quantification, cardiometabolic risk prediction using ECG data, and explainable AI for low-resource healthcare settings—can be actively encouraged through academic-industry collaboration.

By integrating indigenous biomedical industries with socially relevant, community-focused health projects, Kerala can strengthen its healthcare system, stimulate innovation, generate high-skilled employment, and emerge as a national model for inclusive, affordable, and technology-driven health development.

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## 19 EV Industrial Park and Advanced Battery Pilot Facility for Kerala's Green Industrial Transition

**DR. ASOK KUMAR A**

As part of Kerala's long-term strategy for sustainable industrial development and energy transition, the State, through the Kerala EV Consortium and K-DISC, proposes to establish an Electric Vehicle (EV) Industrial Park integrated with a Pilot Production Facility for advanced EV battery cells and packs. The initiative aims to create a unified ecosystem linking research, innovation, manufacturing, and commercialization within the State.

The EV Industrial Park is envisioned as a multi-functional cluster supporting battery pack assembly, power electronics, Battery Management Systems (BMS), motor and

drive-train systems, thermal management, and EV subsystem integration. By co-locating these capabilities, the park can reduce supply-chain fragmentation, attract technology-driven enterprises, and enable faster prototyping and deployment. It will also provide a collaborative platform for MSMEs, startups, and research institutions, promoting innovation, technology transfer, and skilled employment.

Complementing the park, a Pilot Production Facility at Travancore Titanium Products Ltd. (TTPL) is proposed for Lithium Titanate Oxide (LTO)-based advanced battery cells and packs. This facility will act as a bridge between laboratory research and commercial manufacturing by enabling validation of cell chemistries, form factors, and pack architectures, thereby reducing technology and investment risks while strengthening Kerala's position in the battery value chain.

Strong government support through policy backing, fiscal incentives, infrastructure development, and institutional coordination will be essential to attract private investment and accelerate technology deployment. Together, the EV Industrial Park and the pilot facility can position Kerala as a national hub for advanced EV technologies, battery innovation, and sustainable manufacturing, aligned with the State's goals of green growth, energy security, industrial diversification, and high-quality employment generation.

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## 20 Positioning Kerala as India's Remote Work Capital and Innovation Hub

**DR GEETHA G**

Kerala can position itself as India's Remote Work Capital by establishing "Digital Work Zones" in every district, equipped with robust digital infrastructure and co-working facilities. Providing tax incentives for global companies that hire Kerala-based remote employees can further attract investment and expand employment opportunities.

Although Kerala faces recurring floods and climate risks, these challenges can be transformed into opportunities by promoting climate-resilient, decentralised work ecosystems. At the same time, while the State produces a large number of graduates, there is a need to nurture more entrepreneurs. Introducing compulsory startup incubation exposure in undergraduate courses and offering innovation credits in addition to traditional examinations can foster creativity, entrepreneurship, and a future-ready workforce.

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## 21 Strengthening the Service Sector to Retain Talent in Kerala

**DR. AJAY KUMAR AYAPPAN PILLAI**

Kerala has never suffered from a lack of talent; professionals such as engineers, nurses, teachers, accountants, and IT specialists are employed across India and abroad. The real challenge is the limited availability of meaningful employment opportunities within the state to absorb this skilled workforce.

Due to geographical constraints such as limited land, high population density, and a long coastal belt, large-scale heavy industrialisation is not always practical.

Instead, the service sector offers a more sustainable and suitable pathway for growth, as it relies primarily on skills, connectivity, and a supportive ecosystem—areas where Kerala already excels.

Expanding decentralised digital employment through IT hubs, co-working spaces, and strong digital infrastructure across districts can enable professionals to work from their hometowns and strengthen local economies. Healthcare is another key area, where Kerala can expand into medical tourism, elderly care, rehabilitation, and home-based healthcare services, generating significant employment within the state.

Sustainable tourism, including eco-tourism, cultural tourism, and community-based tourism, can also create steady income opportunities for local communities. In addition, positioning Kerala as a training hub for global service-sector jobs and promoting professional services such as finance, legal support, and digital consultancy can generate high-quality employment without straining land resources.

Alongside this, strengthening allied sectors like agriculture, fisheries, and responsible mineral-based activities can support livelihoods in coastal and rural areas. By prioritising the service sector with supportive policies, strong digital infrastructure, and industry-relevant education, Kerala can retain its talent, improve quality of life, and achieve balanced, sustainable development.

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## 22 Vizhinjam Port, Global Value Chains, and Export-Led Growth Strategy for Kerala

**C VEERAMANI**

*Professor and Director, Centre for Development Studies*

The operationalisation of the Vizhinjam International Seaport marks a structural shift in Kerala's economic geography and presents a historic opportunity to reposition the state within global production and trade networks. In the context of fiscal constraints and demographic transitions, Kerala's growth strategy should rely more on policy clarity, institutional reform, and catalytic public investment rather than large expansions in public expenditure.

### 1) Export-Led Growth and the Strategic Role of Vizhinjam Port

Vizhinjam International Seaport should be treated not merely as a logistics asset but as a strategic anchor for an export-led growth model. Vision-2031 can position exports as a core pillar of economic development by linking port-led infrastructure with industrial policy, logistics, trade facilitation, and skill development. Priority sectors may include value-added agriculture and agri-processing, niche medium- and high-technology manufacturing, and knowledge-intensive services. Public investment can act as a catalyst by developing integrated logistics parks, cold-chain systems, and quality testing and certification infrastructure, while private investment drives production and service delivery. A coherent export-oriented strategy would enhance competitiveness, scale, and employment generation.

### 2) Integrating Kerala into Global Value Chains (GVCs)

Kerala's next development phase requires a strategic shift from self-contained industrial growth to deliberate integration into global value chains. Rather than attempting to build entire value chains domestically, the state can specialise in specific tasks and segments where it holds comparative advantages across

manufacturing, agri-processing, and services. Systematic value-chain mapping can help identify competitive niches and guide targeted investment policies. Establishing a dedicated GVC facilitation mechanism can coordinate investors, local suppliers, skilling institutions, and regulatory bodies, thereby reducing coordination gaps and improving value-chain participation.

The services sector, in particular, offers strong potential for export-led growth. Kerala can attract Global Capability Centres in areas such as analytics, engineering services, finance, healthcare support, and digital technologies. With its high human development indicators, quality of life, and skilled workforce, selected urban centres can be positioned as preferred destinations for advanced service activities, supported by investments in digital infrastructure and advanced skilling. Industry-academia partnerships can further promote applied research, innovation, and cross-sectoral spillovers.

### **3) Role of Multinational Enterprises and Domestic Partnerships**

Attracting lead firms, including multinational enterprises, should be a strategic priority in Kerala's trade and industrial integration efforts. In sectors such as agriculture, plantations, and food processing, these firms can support compliance with global standards, improve quality, and facilitate market access.

Equally important is the integration of domestic firms, MSMEs, and farming communities into global value chains through supplier linkages and subcontracting. This requires institutional frameworks that ensure legal clarity in contracts, reduce risks for small producers, and support compliance through shared infrastructure, extension services, and dispute-resolution mechanisms. Public agencies can play a facilitative role in fostering such partnerships while ensuring inclusivity and broad-based economic participation.

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## **23 Panchayat-Led Women Enterprises and Innovation Models**

**DR. RUBY S.**

### **1. Institutionalising Panchayat-Led Women Enterprise Ecosystems**

#### **Recommendation:**

Establish Women Enterprise Support Cells (WESCs) and Facility Centres within Local Self-Government Institutions to strengthen women-led micro and small enterprises.

#### **Expected Impact:**

- Strengthened local economic development through coordinated institutional support
- Improved sustainability and scalability of women micro-enterprises
- Transformation of Panchayats into active facilitators of entrepreneurship rather than welfare implementers

### **2. Recognising Context-Specific and Inclusive Innovation Models**

#### **Recommendation:**

Adopt a Kerala Micro-Innovation Framework that recognises technological, process, market, social, and community-based innovations emerging from women-led enterprises.

#### **Expected Impact:**

- Inclusive innovation policies sensitive to local realities
- Greater visibility and validation of grassroots innovations
- Stronger linkages between academic institutions and community enterprises

### **3. Strengthening Evidence-Based Development through Micro-Level Research Integration**

#### **Recommendation:**

Establish a Kerala Studies–Policy Interface Mechanism to systematically integrate academic research into state and local development planning.

#### **Expected Impact:**

- Research-informed Panchayat and state-level development plans
- Continuous feedback among researchers, policymakers, and practitioners
- Reinforcement of Kerala’s model as a knowledge-driven and participatory development paradigm

## **24** Industry and Employment: Establishment of Knowledge Villages and Industrial Hubs

**PROF. M.P. RAJAN**

*Professor, IISER Thiruvananthapuram*

#### **Action Plan:**

- Establish a “Knowledge Village and Industrial Hub” in each Assembly constituency to promote decentralised industrial growth and employment generation.
- Set up cluster-based R&D centres within these Knowledge Villages by linking well-performing colleges, universities, and incubation centres in the respective constituencies.
- Develop a Global Fintech City, on the lines of GIFT City, with world-class infrastructure and regulatory support to attract international firms and create high-quality job opportunities.
- Introduce industry-ready, skill-based multidisciplinary curricula in colleges and universities, along with strong industry–academia partnerships for research and development projects.
- Establish incubation centres in every college to nurture innovation, startups, and entrepreneurship among students.
- Develop specialised industrial parks in sectors such as electronics, biotechnology and life sciences, pharmaceuticals, solar cell production, battery development, mechatronics and electric vehicles, and rare earth processing. These parks may be integrated with or located within Knowledge Villages, with special policy support for MSMEs.
- Create an industrial corridor that connects the Knowledge Villages to enhance logistics, collaboration, and regional economic integration.
- Explore the feasibility of reviving the Cochin Stock Exchange to strengthen the state’s financial ecosystem and support capital access for emerging enterprises.

വിഷയ മേഖല: വ്യവസായം, തൊഴിൽ  
ഉപശാഖ: തൊഴിൽ ബന്ധങ്ങൾ

Main Track: **Industries, Labour**  
Sub Track: Labour and Employment Relations

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## 1 Inclusive Employment on a Rotation Basis in Kerala

**DR JAGET BABU N.R.**

### **Employment for the Educated Unemployed:**

Introduce employment on a rotation basis to ensure that all educated unemployed individuals receive time-bound work opportunities. Rotational assignments in public institutions and development projects can provide income, experience, and skill enhancement.

### **Employment for the Less Privileged:**

Adopt a similar rotational employment model to provide structured job opportunities for economically weaker sections. This approach can ensure fair access to income, promote inclusion, and support long-term social and economic stability.

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## 2 Strengthening Employment Coordination and Inclusive Sectoral Growth in Kerala

**AKSHAY SUNIL**

Kerala has emerged as one of the country's leading entrepreneurial hubs, with a steady rise in new enterprises and job opportunities each year. Despite this progress, a significant gap remains between the evolving job market and the services designed to support it. Greater alignment is required, particularly through the active involvement of large enterprises and emerging businesses in government-led skill development initiatives.

Currently, much of the state's employment generation comes from companies operating within the information technology services sector. However, policy incentives and institutional focus are often perceived as being concentrated primarily on software and manufacturing industries. Overlooking the broader service sector, which plays a critical role in job creation, may limit balanced economic growth. Policy frameworks must therefore ensure equitable attention and support across all employment-generating sectors.

A sustainable solution lies in establishing an integrated platform that connects new ventures, established corporations, and government agencies. A centralized employment coordination center functioning under direct governmental or ministerial supervision could streamline workforce identification, skill mapping, and job placement processes, thereby improving efficiency and accountability.

An inclusive employment strategy must also eliminate distinctions between technical and non-technical roles in terms of recognition and institutional support. Equal value for diverse skill sets is essential to building a resilient and balanced employment ecosystem capable of sustaining long-term economic stability in the state.

വിഷയ മേഖല: ആരോഗ്യം, വിദ്യാഭ്യാസം, ഗവേഷണം  
ഉപശാഖ: പൊതുജനാരോഗ്യം

Main Track: **Health, Education and Research**  
Sub Track: Public Health

## 1 Gender Violence Prevention and Geriatric Care Reform Framework for Public Health

**DR. JAYAKUMARY MUTTAPPALLYMYALIL & DR. JAYADEVAN SREEDHARAN**

*College of Medicine & Thumbay Institute of Population Health,  
Gulf Medical University, Ajman, United Arab Emirates.*

### **#Address Violence Against Girls and Women as a Public Health and Social Development Priority for Kerala's Future Development Agenda: -**

Violence against girls and women in Kerala is a critical public health, human rights, and development challenge with lasting physical, mental, social, and intergenerational consequences. Addressing it requires a coordinated, prevention-oriented, multi-sectoral approach integrating health, education, law enforcement, social welfare, and local self-government institutions.

First, violence must be formally recognised as a public health and development priority, with prevention mainstreamed across policies and focused on transforming harmful gender norms and engaging men and boys. Second, education and community systems should promote gender equality, respectful relationships, early identification, safe reporting, and stigma-free responses through schools, local bodies, and community networks. Third, survivor-centred, integrated services—including medical care, mental health support, legal aid, shelters, and rehabilitation—must be strengthened through effective referral pathways and one-stop mechanisms to prevent secondary victimisation. Finally, robust law enforcement, gender-sensitive policing, timely judicial processes, and improved monitoring systems with standardised indicators are essential for accountability and evidence-based action. A coordinated, rights-based framework will protect women and girls while advancing Kerala's goals of equity, social justice, and sustainable development.

## #Healthy Ageing and Integrated Geriatric Care Reform Framework: -

Kerala's gains in longevity, literacy, and health have led to rapid population ageing, shifting the focus from longer lives to healthier, more independent, and socially connected years. The State must adopt a public health preparedness approach centred on functional ability, equity across the life course, and integrated health and social care systems. Healthy Life Expectancy (HALE), disability-free life years, and functional metrics such as ADL and IADL should guide planning through a State Healthy Ageing Monitoring Framework.

Primary healthcare must anchor integrated geriatric care, embedding routine screening for frailty, multimorbidity, polypharmacy, and functional decline within Family Health Centres, linked to rehabilitation, mental health, and social services. A life-course prevention strategy should reduce avoidable hospitalisations and long-term care dependency.

Loneliness and social isolation should be addressed as major public health risks through age-friendly communities, senior hubs, intergenerational programmes, social prescribing, and Kudumbashree-led initiatives, supported by accountability frameworks. Healthy ageing should also be integrated into school and university curricula, faculty training, intergenerational engagement, and dedicated research funding. Together, these measures will enhance functional longevity, reduce morbidity, strengthen social cohesion, and position Kerala as a national leader in healthy ageing policy and research.

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## 2 Community-centric Mental Health & Wellbeing Infrastructure

**ALAN SINDHU DINSHA**

*Founder & CEO, Innodots Innovations Private Limited*

Kerala has made commendable progress in healthcare; however, mental health and emotional well-being require deeper, community-level intervention. The Government shall undertake measures to strengthen the Mental Health Department and Social Welfare systems by adopting a community-centric mental health framework that contributes to long-term social stability, productivity, and quality of life. Such an approach shall enable early identification and prevention of mental health issues, reduce social stigma, improve academic performance and workplace productivity, strengthen family well-being, and build emotionally resilient communities.

Community mental health and counselling units shall be established at the taluk and panchayat levels and integrated with Primary Health Centres. The State shall also introduce school- and college-based mental health support systems, including trained counsellors and peer-support programmes, and leverage digital platforms and tele-counselling services to reach remote and underserved populations. Furthermore, the State shall create safe, stigma-free spaces for youth, the elderly, caregivers, and individuals facing social or economic distress.

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### 3 Modernise Surveillance Systems into Integrated Health, Demographic, Environmental, and Economic Surveillance Systems (HDESS)

**DR RAKESH N PILLAI, PHD**

Kerala has successfully achieved key traditional health milestones, including significant reductions in maternal and child mortality. The next step shall be to expand Health, Demographic, Environmental, and Economic Surveillance Systems (HDESS) by incorporating new, quality-oriented indicators that measure the effectiveness of health services. For example, surveillance systems may track the proportion of patients who return to productive employment following critical illnesses such as myocardial infarction, intensive care admissions, or major accidents, as well as monitor rehabilitation outcomes, workforce reintegration, and long-term quality of life. This shift shall ensure that surveillance mechanisms reflect not only survival rates but also the broader social and economic outcomes of healthcare delivery.

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### 4 Blood Availability and Biomedical Workforce Development

**ASHFAQ ASHRAF**

Kerala shall ensure that blood availability is the responsibility of the blood bank system rather than the patient or bystanders. In situations where required blood is unavailable, the blood bank shall proactively identify suitable donors and facilitate procurement to ensure uninterrupted access for patients. The State shall work towards declaring 100% assured blood availability for all citizens. Kerala shall further aim to guarantee safe blood access within a 20-kilometre radius, or approximately 15 minutes of travel time, for at least 95% of the population.

The State shall also develop a specialised biomedical engineering workforce through structured training programmes, supported by incentives similar to IT internship models. By building advanced technical capacity, Kerala can position itself as a global supplier of trained biomedical engineers to healthcare systems worldwide.

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### 5 Responsible Data Sharing for Evidence-Based Public Health Governance

**HASEENA RAJEEVAN**

*Research Scientist, Yale University*

#### **# Health Data Sharing for Public Health Research:-**

From a public health perspective, the systematic supply of health data for research is critical, as it enables scientists and policymakers to diagnose disease patterns, understand risk factors, and formulate preventive strategies. High-quality, diverse, and comprehensively representative data help researchers identify health inequities, assess the impact of interventions, and allocate resources more effectively. While protecting data privacy remains essential, the responsible and regulated sharing of health data can significantly enhance population health, strengthen community

resilience to diseases, and support evidence-based policymaking. Integrating and coordinating private and public health infrastructures into a unified or centralised health data system would provide researchers with a more complete picture of disease trends, treatment outcomes, and post-medical care trajectories. By identifying gaps in healthcare delivery, improving surveillance, and enabling targeted interventions, such an integrated system would strengthen public health decision-making.

#### **#Air Quality Index Data for Public Health:-**

Air pollution irritates respiratory and cardiovascular systems and increases the risk of asthma, heart disease, and premature death. Long-term exposure to air pollution can impair lung development in children and increase their susceptibility to respiratory infections. For example, Nitrogen dioxide poses direct health risks, particularly to children and sensitive individuals, by increasing airway inflammation and reducing lung function during breathing, which can trigger or worsen asthma attacks. Exposure to PM2.5 is associated with the development or worsening of ischemic heart disease, which may lead to non-fatal heart attacks, hospitalisation, or premature death. These fine particles, measuring less than 2.5 micrometres in diameter, can penetrate deep into the lungs, enter the bloodstream, and cause systemic inflammation and vascular damage. PM2.5 and NO<sub>2</sub> primarily enter the air through fuel combustion, with major sources including emissions from cars, trucks, buses, power plants, and off-road equipment. To address this issue, monitoring stations should be established to regularly track all major air pollutants. The collected data should be shared with the public, and citizens should be made aware of the daily Air Quality Index so that they can take informed precautions.

#### **#Establish PFAS Monitoring Facilities: -**

Per- and polyfluoroalkyl substances (PFAS) are synthetic “forever chemicals” that persist in the environment for thousands of years and accumulate in human blood. PFAS (“forever chemicals”) primarily enter water supplies through industrial manufacturing facilities, the use of firefighting foam (AFFF) at airports and military bases, landfills, and wastewater treatment plants. These contaminants can also leach into groundwater and surface water from consumer products such as non-stick cookware, stain-resistant fabrics, and food packaging materials. PFAS in drinking water can accumulate in the body over time and increase the risk of cancer, thyroid disorders, and immune system dysfunction. These chemicals are highly persistent, meaning they do not break down naturally and can continue contaminating water sources for decades. Even low levels of exposure have been associated with developmental problems in children and potential impacts on reproductive health. PFAS monitoring facilities for drinking water shall be established in all districts.

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## **6** Biomarker Tracking Platforms for Strengthening Public Health Systems

**RONY K ROY**

*Senior Technology Fellow, Kerala Startup Mission, Malabar Innovation Corridor*

The development of biomarker tracking platforms that integrate and standardise clinical data from diverse sources, and deliver real-time insights through a simple and secure dashboard, can help in early disease detection and continuous patient monitoring, thereby enabling improved clinical decision-making and better health outcomes. Startups such as GMBRC are already engaged in the research and development of such biomarker tracking platforms. These systems can significantly

strengthen the State's public health framework. The Government may therefore consider creating an enabling platform and providing institutional support to scale up such innovations within the public health infrastructure.

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## 7 Integrating Nutrition, Gut Health, Mental Well-Being, and Lifestyle for Healthy Ageing and Societal Wellness

**DR SUBRAMONIAM A**

*Former Director, Tropical Botanical Garden, Palode*

Nutrition, nutraceuticals, probiotics, mental health, and lifestyle collectively determine healthy living and healthy ageing. These five factors must be systematically addressed with regard to public health to build and sustain a healthy society.

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## 8 Address Emerging and Climate-Linked Health Challenges

**DR SREEDIVYA K M**

Kerala's developmental agenda shall incorporate a dedicated discussion stream exclusively focused on Public Health and Health Systems in the State, covering the primary healthcare model of Kerala, health equity and access, public health financing, and the role of local self-governments in health governance. Special emphasis shall be placed on emerging health challenges, recognising that Kerala's disease profile is undergoing significant change. Priority areas shall include the rising burden of lifestyle diseases such as diabetes, hypertension, and cardiac conditions; mental health and suicide prevention; geriatric health in the context of an ageing population; antimicrobial resistance; and post-pandemic health system preparedness.

In addition, the health impacts of climate change shall be addressed, given Kerala's vulnerability to floods, heat stress, and vector-borne diseases. Focus areas shall include climate-related disease patterns, disaster preparedness and health system resilience, and strengthened control of water-borne and vector-borne diseases to ensure sustainable and adaptive public health planning.

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## 9 Strengthening Healthcare Access and Accountability

**DR. RAJULA HELAN K P**

*Assistant Professor & Head Department of Economics, Dr. John Matthai Centre, University of Calicut*

The State shall ensure the provision of quality and adequate healthcare services to marginalised communities, particularly tribal mothers and children. Additionally, the State shall institute robust monitoring and evaluation mechanisms to oversee expenditure on public health schemes and ensure the effective and transparent utilisation of allocated funds.

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## 10 Implementing Community-Based Inclusive Rehabilitation (CBIR) program

**DR SUNITHA VIJAYAN**

The State shall consider the implementation of a Community-Based Inclusive Rehabilitation (CBIR) program to support road traffic crash victims who face long-term functional disabilities, mobility challenges, and psychological distress resulting from severe injuries. Recognising that many victims—particularly those from the low-income strata—experience crisis due to a lack of home-care awareness and cognitive support, this initiative could integrate rehabilitative services with the local healthcare system (such as Family Health Centres). The program would empower family caregivers through technical training while providing decentralised physical and cognitive therapy. Social Integration Facilities shall be established as peer-led hubs for the victims, as these environments are vital for overcoming psychological distress, sharing recovery strategies, and preventing social withdrawal among survivors. By bridging the gap between clinical discharge and social reintegration, the State can mitigate the profound socio-economic burden on vulnerable families and also mitigate the long-term human capital loss within Kerala's economy.

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## 11 Application of Nuclear Science and Technology in Human Health

**SOJI SEBASTIAN**

Nuclear science and related technologies shall be integrated into the State's health and development strategy, with a focused agenda on cancer diagnostics and treatment, public health advancement, and the strategic utilisation of mineral sand resources along the Kerala coast in supporting public health initiatives. Nuclear science and related technologies, together with Kerala's unique mineral sand resources, can potentially contribute to sustainable economic growth, reduced carbon emissions, improved public health outcomes, and the development of robust nuclear science and technology infrastructure in the State. Such an initiative could become a strategic pivot towards sustainable diversification of Kerala's economy in the coming decades.

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## 12 Suggestions for the Public Health Sector Improvement

**DR. B. EKBAL**

### **# People's Health Campaign to Reduce Morbidity in Kerala:**

The high morbidity rate in Kerala is a matter of grave concern. The State faces a double burden: a rising incidence of chronic diseases such as diabetes, hypertension, cancer, and mental illness, alongside the re-emergence of infectious diseases and the emergence of new infectious diseases. Despite significant government spending on healthcare, individuals' out-of-pocket expenses are steadily rising, further compounding the challenge. While life expectancy continues to increase, the quality of life of Keralites is declining. Many of these health issues could be prevented or controlled through simple lifestyle changes and basic preventive measures. This

calls for urgent attention to preventive healthcare and lifestyle interventions to improve overall well-being.

To control the rising morbidity in Kerala, it is crucial to prioritise disease prevention, health education, and health promotion alongside strengthening curative care facilities. A comprehensive People’s Health Education Campaign, modelled on the success of the Total Literacy Campaign, should be launched. This initiative must involve people’s science movements, senior citizens’ associations, women’s organisations, and youth organisations working in tandem with government efforts. Such a collective approach can foster widespread awareness and promote healthier lifestyles, thereby significantly improving the State’s overall health outcomes.

**# Re-envisioning School Health Programme:**

The seeds of chronic diseases like diabetes, hypertension, and heart-related ailments, which emerge later in life, are sown during childhood and adolescence. The number of overweight individuals across all age groups is increasing day by day. It has been found that approximately forty percent of school and college students are either overweight or obese. Just like physical health, the mental health status of children is also alarmingly deteriorating. Poor mental health is a primary, undeniable reason behind the increasing anti-social tendencies observed even at the school level, such as excessive alcohol consumption, drug abuse, and gender-insensitive and aggressive behaviour.

Given these serious circumstances, it is imperative to adopt a comprehensive, systematic approach to improving students’ physical and mental health, rather than confining efforts to isolated programmes. There should be no further delay in re-envisioning the much-neglected school health programme. In addition to routine physical check-ups, the programme should include regular mental health assessments, counselling support, and education on nutrition and healthy lifestyles. Mental well-being must be recognised and addressed with the same seriousness as physical health.

Sports training, which has been neglected, must be revived as an integral part of the school curriculum. Concurrently, the vacant positions for physical education teachers in schools should be filled immediately. This comprehensive approach will help ensure holistic health protection for students at all levels, from primary to higher education, and lay the foundation for the physical and mental resilience of future generations.

**#Control Out-of-Pocket Health Expenditure in Kerala: -**

Kerala’s public health system has achieved commendable progress in recent years. According to the National Health Accounts Committee, Kerala is among the states with the highest Out-of-Pocket Expenditure (OOPE) incurred directly by the public. The recently published National Health Accounts Report (2021-22) indicates that Kerala’s total health expenditure is Rs. 48,034 crore. Of this, government expenditure is Rs. 15,618 crore (32.5% of total expenditure; per capita Rs. 4,338), while private expenditure stands at Rs. 28,400 crore (59.1% of total expenditure; per capita Rs. 13,343).

Considering these circumstances, some urgent measures have to be adopted to reduce healthcare expenditure, such as: -

1. Reduce Disease Burden: To reduce treatment costs, various measures to lower the disease burden must be adopted. Interventions such as health education, disease prevention, health promotion, and early detection and treatment of diseases are

essential. Currently, the primary focus is on increasing treatment facilities. Disease prevention must be integrated into the mainstream of health policy.

2. Regulation of Private Hospitals: To alleviate the excessive financial burden on patients, clear treatment protocols, codes of conduct, and fixed fee structures must be established. These can be incorporated into the Clinical Establishments Act.

3. Price Control of Medicine and Medical Devices: To reduce outpatient treatment costs, medicines and other health products must be made available at reasonable prices. The existing facilities of fair price drug and device shops should be further expanded.

4. Control mental health problems: Studies conducted on the mental health status of Kerala's population present a worrying picture. Data from the period between 2002 and 2018 indicates a dramatic increase in mental health issues, climbing from 272 per thousand in 2008 to 400 per thousand by 2018. This suggests that a vast section of Kerala's population is facing severe mental health challenges, with an estimated 12 percent suffering from severe mental illnesses that necessitate hospital treatment and care. Authoritative studies, such as the National Mental Health Survey 2015-16 (NMHS 2015-16), confirm this reality, showing that rates of Depression, Anxiety Disorders, and Suicidal tendencies are significantly higher than the national average in the state. Furthermore, Kerala's poor mental health status is a primary contributing factor to several growing social evils, including drug addiction, violence against women, alcoholism, aggression/violence, and superstitions.

5. Addressing the Crisis: Strategy, Coordination, and Manpower Deficiency: Resolving this crisis requires the implementation of comprehensive mental health programs spanning from childhood to old age. Health programs in educational institutions must be revamped to protect both mental and physical health, providing students with necessary health education. The functioning of existing counselling centres at the school and college levels must be scientifically evaluated. Teachers and parents should receive training, and counsellors must undergo refresher training appropriate for the modern age. The operations of the Health Department, Medical Colleges, the three Mental Health Hospitals (Thiruvananthapuram, Kozhikode, Thrissur), the Institute of Mental Health and Neurosciences (IMHANS) in Kozhikode, and the State Mental Health Authority must all be coordinated and strengthened. Furthermore, the services offered by the private sector and voluntary mental health organizations should be strategically utilized to broaden the support network. Critically, the severe shortage of mental health practitioners must be addressed. While the recommended norm is 3 professionals per 10,000 people (Psychiatrists, Clinical Psychologists, Psychiatric Social Workers, and Rehabilitation Workers), the actual numbers in Kerala are distressingly low: 0.12, 0.06, 0.006, and 1, respectively. Urgent steps, such as increasing the number of seats in existing courses and launching new programs at additional centres, are necessary to address this massive shortage of trained manpower. Kerala does not accord the same urgent priority to mental health issues that it gives to communicable and non-communicable lifestyle diseases, and the surge in the suicide rate is a direct consequence of this neglect. Especially now, given that the increase in suicides has become a widespread and critical topic of debate, society must recognize this problem as a major public health crisis. The government, the Health Department, health experts, and professional organizations must all strive, without delay, to advance comprehensive, long-term action plans to improve mental health and ensure expert treatment for the people of Kerala.

**# Functional Autonomy to Government Medical Colleges:-**

The Committee appointed by the Left Front governments in 2007 to suggest measures for improving the performance and standards of Government Medical Colleges and Allied Institutions, as well as the Committee constituted in 2017 to formulate the Health Policy for Kerala, recommended that functional autonomy should be granted to medical colleges.

Cumbersome administrative procedures with very little administrative autonomy to the Principals and Superintendents prevent Medical Colleges from functioning efficiently and effectively. Transfers from college to college are one of the reasons doctors do not pursue careers in the medical education sector. This is also a factor impeding long-term projects and research. As a solution, full functional autonomy shall be provided to the Government Medical Colleges. Faculty and staff recruitment shall be handled by each individual institution so that, over time, transfers are completely eliminated. Existing staff shall be given options to continue in the institution of their preference as far as possible. The existing dual Government funding structure (Plan and Non-Plan) for Medical Colleges should be continued, ensuring stability in both developmental projects and routine expenditures.

New administrative rules, including purchase rules and general administrative procedures, must be formulated specifically for Medical Colleges. These new rules must prioritize the unique needs of medical education, advanced research, and patient care, superseding generic state administrative rules where necessary. The financial powers delegated to the Principal and the Superintendent must be significantly revised and enhanced. This revision should allow for faster decision-making, procurement, and expenditure necessary for maintaining specialized hospital and laboratory infrastructure. Principals and Superintendents should be appointed from among doctors who have received formal training in Hospital Administration or Healthcare Management. The Kerala University of Health Sciences (KUHS) should be mandated to institute comprehensive long-term and short-term courses in Hospital Administration to create a pool of qualified medical managers. The position of Medical Superintendent must be strictly a full-time administrative role. Appropriate and definitive changes must be made to the rules and regulations governing Hospital Development Committees (HDCs). These changes should enhance their financial transparency, streamline decision-making processes, and clearly define the roles of community and administrative members.

While granting standalone functional autonomy to medical colleges, the status and role of the Directorate of Medical Education will have to be redefined. DME may still have a role to play in co coordinating medical education, implementing Medical Council of India recommendations, etc. Moreover, DME is also conducting several paramedical courses that need to be continued.

**#Cooperative Hospitals: Initiate Innovative Ventures:-**

Cooperative hospitals act as a buffer between the government and private sectors, aiming to ensure affordable healthcare for the public at rates lower than those charged by large private hospitals. Nursing and paramedical educational institutions also operate within the cooperative sector. Initiatives to conduct PG medical training have commenced in some of these hospitals. Around twenty-five cooperative super-specialty hospitals, including EMS Cooperative Hospital (Perinthalmanna), NS Cooperative Hospital (Kollam), AKG Hospital (Kannur), Shihab Thangal Hospital (Tirur), Indira Gandhi Cooperative Hospital (Ernakulam), and MVR Cancer Centre (Kozhikode), are functioning excellently. However, these hospitals face significant challenges, including the scarcity of specialists and financial constraints. While trying to overcome these hurdles, the cooperative sector should adopt a

“handholding” approach with the government health sector to foster collaboration and address Kerala’s healthcare crisis. The state’s healthcare landscape is grappling with increasing morbidity, rising out-of-pocket expenses, and the proliferation of large hospitals, which often lead to the closure of socially relevant, medium- and small-scale hospitals. Taking all these into consideration, the cooperative sector should venture into new areas of health care, such as:

1. Medium and Small Scale Hospitals: The rapid expansion of large private hospitals and private medical colleges has led to the closure of relatively low-cost, medium and small-scale hospitals that functioned with social responsibility. This is contributing to increased healthcare costs, a deviation from the basic healthcare and preventive approach, and various other public health issues. The cooperative sector must step into the void created by the loss of these medium and small-scale hospitals in Kerala.

2. Geriatric Care Hospitals: In this context, the cooperative sector should lead the establishment of hospitals focused on geriatric care, prioritizing comprehensive health management for senior citizens to reduce morbidity. By establishing geriatrics treatment centres that emphasize disease prevention and early-stage treatment, the State can mitigate the need for expensive super-specialty care and reduce healthcare costs. It is crucial to distinguish between palliative care, which alleviates suffering in terminally ill patients, and geriatrics, which adopts a comprehensive approach to improve the quality of life for older adults.

3. PG Course in Geriatrics: Currently, geriatrics PG courses are available only at Amrita Medical College, and family medicine training is available only at Kozhikode Medical College. The Government should immediately, in consultation with the Kerala University of Health Sciences, begin courses to train the necessary geriatric and family medicine specialists for geriatric hospitals and family health centres.

4. Primary Health Centres: The cooperative sector shall establish primary health centres by adopting a family doctor approach, particularly in panchayats where the required number of centres per population is lacking, and in urban areas (municipalities and corporations) where adequate government facilities are lacking. A network of government-cooperative primary health centres can be formed to implement public health programs, disease prevention initiatives, and health education schemes, reducing morbidity and health expenditure in Kerala.

5. Fair-price stores: The cooperative sector should also consider establishing a chain of fair-price stores under the Cooperative Department, modelled after the Government Medical Services Corporation, to procure quality medicines, medical equipment, and medical technology and make them available at reduced prices to the public and to small-scale government and cooperative hospitals.

The cooperative sector should strive to initiate timely, relevant projects, in cooperation with the government, through joint government-cooperative ventures, to address the health crises facing Kerala.

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## 13 Kerala One Health Mission

**DR RADHAKRISHNAN NAIR**

Kerala has the potential to become a national and global leader in One Health-enabled, microbiome-informed environmental and public health governance. Kerala’s distinctive geography—including the Western Ghats’ biodiversity, extensive backwaters, monsoon-driven hydrology, dense population, and significant human-

animal interfaces—presents both opportunities and challenges at the intersection of environment, health, microbiomes, flora, and fauna. Microbiomes, encompassing humans, animals, soil, water, plants, and built environments, function as sensitive indicators of ecosystem health, disease emergence, and environmental stress. Despite their significance, Kerala currently lacks a coordinated, genomics-based translational framework to systematically leverage microbiome data for public health preparedness, environmental management, and sustainable development. The State shall create an integrated, genomics-driven One Health surveillance, research, and translational platform that links environmental ecosystems, human and animal health, and policy decision-making across Kerala.

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## 14 From Treatment-Centric to Technology-Driven Preventive Public Health

**AJITH KUMAR PERAKATHU SOMASEKHARAN**

*CEO, Intelligent Assist Ltd*

Healthcare transformation from sick care to preventive care is essential for the State's health system to provide the best services to the community. However, this transition has been limited due to inadequate technology and the current e-health system not being up to the required standard. A unified health governance framework aligned with WHO standards is needed.

Health Post Offices and Health Exchange services are essential, but the current systems lack the required technological capability. Rural healthcare delivery suffers from poor execution due to technological gaps. With increasing population density and rising disease burden, the necessary reforms in primary and secondary care are not being effectively adopted, largely due to design limitations in the existing Electronic Health Record management system. There is currently no effective system to manage population health comprehensively, including early intervention and chronic disease management. Although the number of private hospitals and clinics is increasing, public trust in the government health system remains strong. This presents an opportunity for transformative reform. Kerala has the potential to demonstrate global leadership in health innovation.

Institutions such as RCC, SCT, primary health centres, community health centres, and secondary care centres can be integrated into a connected health network to strengthen family health services and improve overall health outcomes in the State. Kerala is already recognised as a key destination for medical tourism and can further enhance this position through systemic reforms.

In addition, the State shall also focus on research and development processes in the domain of healthcare. Improved coordination among stakeholders, including colleges and institutions in science, technology, and allied health, is essential. A central coordinating committee may be established to integrate advanced research capabilities—such as genomics, proteomics, and metabolomics—particularly for chronic disease management. As global health innovation is advancing rapidly, Kerala's strong human resource base must be strategically leveraged. With appropriate leadership and institutional support, including mobilisation of CSR funding, Kerala can build a robust platform to position itself as a global leader in healthcare innovation. The State also has expertise in Digital Twin technology for healthcare, which can be further developed to demonstrate a well-developed healthcare framework.

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## 15 Public Health Strengthening through Healthcare, Nutrition, Sanitation, and Mental Well-Being

**DR. ARANYA K SASI**

*Assistant Professor, SN College, Sivagiri, Varkala*

The State shall strengthen healthcare services by enhancing the capacity and infrastructure of primary health centres, deploying mobile health clinics in rural and underserved areas, and ensuring access to affordable or free medical tests and essential medicines. In parallel, comprehensive nutrition and lifestyle interventions shall be prioritised, including the improvement of child nutrition programmes, the integration of nutrition education within school curricula, and the promotion of regular physical activity and yoga. Sanitation and environmental health measures shall ensure access to clean drinking water, improved waste management systems, and the elimination of open waste dumping practices. Furthermore, mental health shall be addressed through the establishment of counselling centres, public awareness initiatives on stress, addiction, and depression, and the introduction of mental health education at the school level.

വിഷയ മേഖല: ആരോഗ്യം, വിദ്യാഭ്യാസം, ഗവേഷണം  
ഉപശാഖ: ആരോഗ്യം, ചികിത്സ

Main Track: **Health, Education and Research**  
Sub Track: Health and Medical Care

## 1 AI-driven Health-Data Governance for the State's Public Healthcare System

**G SUNIL KUMAR**

Kerala possesses a robust public health infrastructure with comprehensive healthcare coverage across multiple dimensions, including diverse population and age groups as well as various disease categories. The State's welfare schemes and initiatives address the full spectrum of care, ranging from disease screening and diagnosis to palliative care. The Government of Kerala can further strengthen its health infrastructure and contain healthcare expenditure by leveraging the predictive and data-analytic potential of AI to transform from a predominantly curative model to a preventive model of healthcare.

Kerala's proactive Annual Health Screening (AHS) initiative has generated a substantial health dataset through the *SHAILI* app, covering millions of citizens for lifestyle diseases. The State could integrate a specialized AI-based Predictive Risk Stratification Layer into this existing health registry to transition from "screening" to "pre-emptive intervention." By utilizing machine learning algorithms to analyze longitudinal health data (blood pressure trends, BMI trajectories, and family history), the State will be able to assign a "Risk Score" to each citizen. This would enable the *Aardram* Mission to prioritize high-risk individuals for early medical consultation before they develop chronic complications, thereby significantly reducing the long-term financial burden on the State's tertiary care hospitals and the *Karunya Arogya Suraksha Padhathi* (KASP) insurance scheme.

Kerala has the highest demographic share of elderly people among Indian States, and with a robust Elderly Budget for 2026–27, there is a pressing need to promote "Aging in Place" technologies. The deployment of AI-driven Remote Patient Monitoring (RPM) systems and computer vision-based fall detection technologies within the State's palliative care framework can generate real-time alerts to local Family Health Centres (FHCs) or *Kudumbashree*-led care units when a senior citizen experiences a fall, physical injury, or abnormality in vital signs. Such a system could function as a "digital companion," extending the reach of Kerala's limited healthcare workforce while ensuring that the State's commitment to "Dignified Aging" is reinforced by world-class, 24/7 safety infrastructure.

The *Nirnaya* Lab Network is a landmark “hub-and-spoke” model for diagnostic equity in Kerala. To further maximize its efficiency, the State can integrate AI diagnostic assistants for radiology (X-rays and scans) and pathology (blood smears and biopsy slides) at the taluk and district levels. By utilizing AI algorithms—similar to those deployed in the successful *Nayanamritham* 2.0 eye-screening model—the State can generate instant, high-accuracy preliminary reports even in the absence of on-site radiologists. This “task-shifting” approach will allow general practitioners to make faster clinical decisions and ensure that specialist doctors can focus on complex, referable cases, thereby significantly reducing diagnostic turnaround times for rural and semi-urban populations.

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## 2 Upgrading Government Medical Facilities into 4-Star Medical Tourism Centres

**RENJU S RAJ**

Kerala has enormous potential to become a global hub for affordable, high-quality medical tourism. The State is internationally recognized for its highly skilled doctors and nurses, its unique integration of Ayurveda and modern medicine, and its affordable treatment costs. However, despite the strong clinical capability and medical expertise available in Government hospitals, medical tourists often choose private institutions primarily due to superior accommodation, service standards, and overall hospitality experience. A well-structured medical tourism initiative could bridge the gap between clinical excellence and patient experience by upgrading patient accommodation and comfort and enhancing hospitality patient-care standards within Government medical campuses, while retaining Kerala’s core strengths of clinical excellence and cost advantage. The core offerings may include four-star grade patient rooms and recovery suites, dedicated international patient lounges, multilingual support and care coordinators, hygienic Western and Indian dietary options, high-speed internet access, companion stay facilities, and integrated wellness services such as physiotherapy and post-treatment rehabilitation in select Government medical facilities.

For the proposed medical tourism initiative, Government Medical Colleges, hospitals, or suitable ESI buildings could be identified, optimised and upgraded, with existing wards or unused blocks converted into premium medical stay units. The focus should remain on non-clinical enhancements, such as interiors, sanitation, hygiene, and overall patient comfort. Parallely, service and hospitality standards may be strengthened by training healthcare and support staff in international patient handling, hospitality etiquette, and cultural sensitivity, while introducing hotel-style housekeeping and food services. Operationally, the model could function through a Public-Private Partnership (PPP) or management contract arrangement, wherein private partners manage accommodation and other non-clinical services, while the Government of Kerala retains full control over medical services and regulated pricing. A dedicated digital strategy, including a centralized medical tourism booking portal, tie-ups with global insurance firms and medical tourism agencies, and branding under a campaign such as “Heal in Kerala,” would support international outreach.

Since the initiative specifically identifies foreign nationals seeking affordable surgeries and treatments, Non-Resident Indians opting for long-term care and recovery in Kerala, Ayurveda and wellness tourists, as well as post-operative patients

requiring extended stays to be its intended beneficiaries, the revenue model could include premium room tariffs for international patients, companion accommodation charges, curated wellness and rehabilitation packages, and structured long-stay recovery programs ranging from two to eight weeks.

The initiative has the potential to generate additional revenue for Government hospitals, enabling cross-subsidization of public healthcare services and strengthening financial sustainability. Infrastructure upgrades introduced for international patients would simultaneously benefit domestic patients, improving overall standards of care and comfort. Furthermore, the initiative could promote skill development among healthcare professionals and support staff and create additional employment opportunities for nurses, hospitality personnel, and rehabilitation therapists, while enhancing Kerala's global recognition for excellence in public healthcare delivery. While promoting an ethical, transparent, and affordable medical tourism framework that aligns with Kerala's public health ethos, it would remain inclusive and ensure that public access to healthcare is not compromised.

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### 3 Strengthening Medical Education Through District & Taluk Hospitals and Addressing Regional Healthcare Inequities

**ALAN SINDHU DINSHA**

*Founder & CEO, Innodots Innovations Private Limited*

Strengthening medical education through the systematic upgrading and integration of major District and Taluk Hospitals with medical institutions for teaching, training, and research purposes is essential for improving healthcare delivery across the State. Such integration would significantly improve the quality of healthcare services at the grassroots level while providing richer clinical exposure for medical students. It would also help reduce the patient load on tertiary care hospitals and strengthen public healthcare systems across regions by ensuring a more balanced distribution of services and expertise.

Furthermore, the Government of Kerala should urgently address the serious concern that Kasaragod district still does not have a medical college, despite the district recording several health-related challenges. Establishing a medical college in Kasaragod would help reduce regional healthcare inequities and improve access to quality medical services in the area. It would also contribute to the development of skilled healthcare professionals locally and strengthen public health preparedness in the northern region of Kerala.

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### 4 Vision 2035: A City-scale Health Transformation Vision for Thiruvananthapuram

**MR MANOJ K S**

Vision 2035 reimagines healthcare as an integrated citywide ecosystem linking prevention, care, science, and well-being, shifting upstream to prioritize early detection and lifestyle interventions that enhance population healthspan over episodic treatment. The vision goes beyond replicating models like Singapore's Novena or Boston's BIO Corridor, aiming instead to deliver cost-effective, high-end

innovation and position Thiruvananthapuram as a Health Innovation Bridge for South Asia, Africa, and the Middle East. Thiruvananthapuram is ideally positioned, as the city benefits from strong institutional density that hosts nationally significant medical centres, advanced space and engineering research institutions, and one of India's most mature non-metro digital economies. It is the clinical backbone of the State, anchored by institutions such as SCTIMST (renowned for cardiac and neurosciences), Regional Cancer Centre, and Government Medical College, Thiruvananthapuram, which together provide a strong foundation of public-sector credibility and clinical excellence. In addition, Digital Science Park and Technopark supply the AI and data analytics infrastructure essential for next-generation medicine. The global connectivity enabled by Vizhinjam International Seaport positions the city as a potential global MedTech export hub, linking research, innovation, and manufacturing directly to international markets.

The Health City is built on four pillars: Clinical Excellence, advancing tertiary care and medical education into global referral and research hubs; Biomedical Innovation, translating genomics, regenerative biology, and AI into therapies; MedTech Manufacturing, driving device and diagnostics exports through Vizhinjam's connectivity; and Wellness and Longevity, integrating lifestyle medicine, Ayurveda, and nature-based infrastructure with preventive care.

Vision 2035 treats Thiruvananthapuram's natural landscape as an active clinical partner in healthcare delivery. The blue-green corridors formed by Akkulam and Vellayani lakes can function as health spines within the city, supporting metabolic health, preventive lifestyle interventions, and rehabilitation programmes. The coastline provides ideal conditions for cardiopulmonary recovery, while the forested highlands of Neyyar offer low-stimulation and restorative environments suited for mental health care and neurorehabilitation.

The vision integrates brain sciences into the city's healthcare transformation by linking clinical psychiatry at Peroorkada, advanced neuroscience and neuro-engineering at SCTIMST, and therapeutic urban design to create stress-resilient, cognitively supportive cityscapes.

The vision also proposes the development of global academic campuses—such as an AIIMS/SCTIMST Global Campus to foster international academic collaboration—alongside Precision Oncology Centres integrating genomics and molecular diagnostics. It further envisions a robust digital backbone supported by National Digital Health and AI-enabled platforms to enable interoperable health records and advanced population health analytics.

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## 5 Digital Health Education and Skill University Model for Medical Technology

**ABIJEETH TIWARI**

The Kerala Digital Health Workforce Mission envisions the creation of a state-level program dedicated to training healthcare professionals in digital health systems, artificial intelligence in medicine, telemedicine and remote care, and health data management. By building structured capacity in these emerging domains, Kerala can position itself as India's first fully AI-enabled public health ecosystem.

In addition, a Skill University Model for Medical Technology can be established to develop a Kerala-led certification ecosystem in areas such as Medical AI, Digital

Pharmacy, Health Informatics, and Clinical Data Science. This initiative can be implemented through government–private training partnerships, integration with the Additional Skill Acquisition Programme (ASAP), and hybrid, skill-based learning programmes. This would benefit job-ready youth with global employment opportunities in the rapidly expanding digital health sector.

Furthermore, Kerala can strategically position itself as a Global Hub for Digital Health Education, serving as a training destination for GCC countries and other international healthcare markets. By exporting highly skilled digital health professionals and expertise, the State can significantly boost economic growth, generate employment, and enhance its international recognition as a leader in healthcare innovation and education.

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## 6 Transforming Kerala into a Hub for “Deep-Tech” Medical Device Component Manufacturing

**VIJOSH VIJAYAKUMAR**

Kerala is well-positioned to become a premier hub for “deep-tech” medical device component manufacturing.

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## 7 Policy Recommendations for Establishing Preventive Biotechnology, Biomaterials, Diagnostics & Translational Health Innovation and Infrastructure in Kerala

**DR. BLESSY M MANI**

*Founder, EXOVEDA LLP*

Kerala’s strong record in public health, education, and social equity now faces demographic and economic transitions that demand a forward-looking framework integrating biotechnology innovation with population health and knowledge-based industry growth. Rapid aging and youth migration are increasing pressure on healthcare and long-term care systems, even as the State’s biodiversity, medical literacy, and startup ecosystem create opportunities in preventive healthcare, allergy science, biomaterials, and cosmetic biotechnology.

Kerala should prioritize a State Preventive Health and Healthy Aging Biotechnology Mission to address its rising burden of age-related and chronic diseases, shifting from curative to preventive and early-intervention care. The Mission would advance early diagnostics, biomarker discovery, microbiome-based and non-invasive preventive strategies, and integrate screening into primary healthcare systems. Supported by translational funding, public–private partnerships, regulatory facilitation, and incentives for indigenous manufacturing, it shall aim to improve geriatric health, reduce long-term healthcare costs, and position Kerala as a leader in preventive biotechnology innovation.

Kerala should consider establishing Regional Allergen Detection and Immunotherapy Centres to address its high burden of allergic disorders by developing locally relevant allergen biobanks, cost-effective diagnostics, and translational immunotherapy research, while integrating screening into public

health systems and reducing reliance on imported panels. Simultaneously, the State should create Sustainable Biomaterials and Cosmetic Innovation Hubs to leverage its medicinal plant diversity for scientifically validated, globally competitive dermaceutical and cosmetic biotechnology. These hubs would support advanced formulation, regulatory validation, startup scale-up, and integration with wellness and medical tourism, positioning Kerala as a leader in climate-linked allergy science and evidence-based herbal innovation. Policymakers should establish shared formulation labs and pilot manufacturing facilities, along with IP support, export guidance, and global branding initiatives to strengthen market access for Kerala-based products. These measures aim to build a high-value bio-economy, generate employment, accelerate startups, enhance Kerala's global cosmetic science presence, and integrate traditional medicine with modern biotechnology innovation.

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## 8 Research Development in Biopharmaceuticals and Life Sciences

**DR CN RAMCHAND**

It is recommended that research development be strategically strengthened in the domains of biopharmaceuticals and life sciences, with targeted emphasis on novel biologics, next-generation diagnostics, and advanced medical device innovation.

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## 9 Women's Health

**SWETHA RS**

Women's health must be given due attention across the entire life cycle — from menarche to menopause. There is also a need to normalize physiological childbirth, where medically appropriate, while emphasizing that pregnancy is not a disease but a natural and celebratory phase of life.

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## 10 Enabling Market Access in the Academia–Startup–Hospital Pipeline

**ARUN**

Kerala has strong academic research, skilled clinicians, and emerging health startups. However, many promising innovations fail to reach patients because market access and early clinical adoption remain the weakest links. Addressing this gap requires government intervention at clearly defined stages. By sequentially enabling access, validation, adoption, visibility, and outcome-based procurement, the Government can transform Kerala's health innovation ecosystem from research-driven to impact-driven, ensuring that indigenous innovations reach patients at scale.

The first barrier faced by health innovation startups is access to government health systems. Startups often face fragmented ethics approvals, unclear institutional points of contact, and prolonged engagement cycles within government hospitals. Establishing a State-level Innovation Access Cell as a single-window mechanism could streamline coordination of ethics approvals, clinician engagement, and multi-hospital pilot programs, thereby significantly reducing time-to-clinic.

Once access is enabled, innovations require credible evaluation. Kerala should institute government-backed clinical validation panels comprising clinicians, scientists, and health administrators to ensure rigorous and transparent assessment. Products successfully validated through this process should receive official State endorsement, thereby avoiding repetitive evaluations across individual hospitals.

Validation must then be followed by adoption. Government hospitals can serve as early reference users by conducting limited, paid pilots or initiating early procurement of clinically validated indigenous innovations, particularly in public health priority areas. This first-buyer role would build clinician confidence and unlock wider market adoption.

Beyond research and development funding, sustained market access support and visibility are essential. Government support should include facilitation of hospital demonstrations, participation in scientific conferences, and recognition as Kerala-origin, clinically validated innovation, enabling sustainable commercialization without prolonged subsidy dependence. Finally, procurement frameworks should evolve from lowest-price selection to outcome-based evaluation, particularly in areas such as chronic wound care, diabetes management, ageing care, and rehabilitation. This approach would incentivize solutions that demonstrably reduce long-term healthcare burden.

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## 11 Nano Ayurvedic Medicine and Cancer Biology for Public Health and Sustainable Development of Kerala

**PROF. MANU LOPUS**

*PhD, FRSC, FMASc, Associate Professor of Biology, UM DAE Centre for Excellence in Basic Sciences, Mumbai*

Kerala may consider promoting translational research that integrates its rich Ayurvedic heritage with modern nanotechnology to develop affordable and effective therapeutics, with a long-term vision of incorporating validated nano-Ayurvedic interventions into public health policy where appropriate. Establishing dedicated innovation hubs within the State would help validate and scale such integrative approaches, ensuring scientific rigor and global competitiveness.

Simultaneously, structured capacity-building programs should be developed to foster interdisciplinary collaboration among biologists, clinicians, Ayurvedic practitioners, and technologists. Introducing sabbatical programmes of six months to one year, in partnership with leading research institutes in Kerala, could attract non-resident Keralite scientists and academicians, strengthening knowledge exchange and talent engagement. Together, these measures can advance Kerala's development agenda by harmonizing cultural heritage with cutting-edge science, positioning the State as a leader in holistic, sustainable, and equitable healthcare innovation.

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## 12 Medical Tourism for Reverse Migration and Talent Retention in Kerala

**DR.K C JAMES RAJU**

*Senior Professor, University of Hyderabad*

Medical tourism is steadily gaining momentum worldwide, and Kerala is uniquely poised to utilize this opportunity due to the high social respect accorded to the medical profession and the availability of a large pool of skilled healthcare professionals originating from the State. At present, many of these professionals seek opportunities abroad. A strategic question, therefore, is whether Kerala can create an ecosystem that enables them to earn comparable revenues through medical-related services within the State itself. This would require the planned development of medical infrastructure in identified clusters, supported by domestic, NRI, and international investments. Such an ecosystem could not only strengthen tertiary care services but also expand affordable medical education avenues for Kerala students, reducing the need to pursue medical training outside the State. An innovative proposal in this regard is to utilize the large number of currently unoccupied NRI homes in Kerala by integrating them into medical tourism clusters as accredited accommodation facilities for international patients and their families. This approach would optimize existing real estate investments, enhance the overall patient experience, stimulate local economies, and potentially encourage future investments and reverse migration trends.

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## 13 Universal, Assured Palliative Care Coverage in Kerala

**PROF. HARI KURUP K K**

Kerala should commit to universal palliative care as a right, ensuring that every identified palliative care patient is formally assigned a designated provider accountable for regular (daily) care and follow-up. This would institutionalise continuity of care, uphold the dignity of patients at the end of life, and correct persistent regional inequities in access. A rights-based palliative care framework would also prevent unnecessary suffering and the physical, emotional, and financial trauma caused by aggressive and medically futile end-of-life interventions, while promoting humane, patient-centred care.

Kerala should create a patient-wise palliative care registry at the local government level, supported by structured capacity-building and training programs to ensure the effective utilization of the recently launched palliative care grid, integrated with the Kerala Health Portal and the *Sannadhasena* volunteer portal. Each identified patient should be assigned a designated palliative care provider or a palliative care team responsible for regular follow-up. For financing, the State may adopt a blended model combining public funding, public-private partnerships, community-based organizations, crowdfunding mechanisms, and earmarked local government resources. Additionally, the role of Local Governments (LGs) as coordinators of service delivery, monitoring, and community engagement should be strengthened. Building upon Kerala's strong community health tradition, this model has the potential to position the State as a global leader in compassionate end-of-life care.

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## 14 Expanding KASP Coverage Through Broader Private Hospital Empanelment

**DR. MINI P P**

The Kerala Arogya Suraksha Padhati (KASP) should serve economically vulnerable populations by empanelling a broader range of private hospitals beyond eye care hospitals and dialysis centres.

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## 15 Encouraging State-origin Startups to Develop AI for Immunity Research

**GOKUL B ALEX**

The overall immunity of the community appears to be declining in recent years due to multiple challenges arising from lifestyle changes. An urgent and comprehensive study of this issue is of critical importance. The State may consider using AI models developed within Kerala to support research in vaccine development and therapeutics aimed at strengthening immune health. In particular, encouraging state-origin startups to develop domain-specific small language models could significantly enhance research capacity and innovation in this area.

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## 16 Kerala as India's Hub for Health Assurance and AI-Driven Innovation

**JIJI MATHEW**

*Founder & CEO, Tecforz Innovations Pvt Ltd / Nucleic Health Innovations Pvt Ltd*

Kerala should move beyond healthcare delivery and position itself as India's Pilot State for Health Assurance Infrastructure, integrating clinical care, diagnostics, insurance, and outcomes. This includes digitising hospital-insurer contracts, enabling deterministic claims, and ensuring predictable reimbursement timelines. Such an approach will reduce disputes, improve hospital sustainability, and protect patients from financial uncertainty, which is particularly relevant for Kerala's ageing population and high NCD burden.

Kerala must also create District-level Advanced Diagnostics and Emergency Imaging Hubs

It must prioritise district-level access to advanced diagnostics (MRI, molecular imaging, stroke imaging) with on-call readiness. Emergency-linked diagnostics should be treated as essential public health infrastructure, not optional services. Policy support for co-location, workforce accommodation, and rapid access protocols will significantly improve outcomes in stroke, trauma, and oncology, especially in non-metro districts.

Furthermore, Kerala should be promoted as a Hub for AI-Driven Healthcare & Life-Science Innovation. The State has the talent and institutional depth to become a leader in AI-enabled healthcare, genomics, and diagnostics-led life sciences. A focused policy framework supporting startups in medical AI, health data interoperability, and regulated innovation sandboxes will generate high-skill employment and knowledge exports, while strengthening the public health system.

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## 17 Integrated Health Care System – Outcome-Driven Model

**DIVYA T**

Healthcare should be treated as a primary national responsibility, similar to compulsory primary education. The Government of Kerala must ensure universal access through strong public infrastructure, integrated digital systems, and clear regulatory frameworks. The State should build a unified national health platform connecting diagnostics, electronic prescriptions, medication supply, hospital records, insurance processing, and outcome tracking across all government hospitals and empanelled facilities. Every citizen should be covered under 100% basic health insurance, funded or guaranteed by the Government, ensuring no out-of-pocket burden for essential care. Hospitals—public and private under the scheme—should be reimbursed through insurance based on measurable outcomes, not volume of procedures. Payments can be linked to recovery rates, reduction in readmissions, patient health improvement metrics, preventive compliance, and long-term wellness indicators.

In addition, a centralized digital monitoring system should track treatment outcomes, average cost per case, preventive care adherence, chronic disease management, mental and physical health indicators, and longevity and quality-of-life improvements. This model shifts focus from reactive treatment to preventive and long-term health management. Active auditing and AI-driven analytics can reduce fraud, optimize resource allocation, and continuously lower average healthcare costs while improving national health outcomes. The objective is not just universal access to treatment, but measurable improvement in life expectancy, productivity, mental well-being, and overall quality of life across the population.

വിഷയ മേഖല: ആരോഗ്യം, വിദ്യാഭ്യാസം, ഗവേഷണം  
ഉപശാഖ: ആരോഗ്യം, ചികിത്സ

Main Track: **Health, Education and Research**  
Sub Track: General Education

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## 1 From Mathematics to Artificial Intelligence: Bridging Theory and Contribution

**VINU GEORGE**

*Manipal Health Enterprises Pvt.Ltd*

Mathematics education-covering calculus, matrices, probability, statistics etc., could better prepare students to become contributors to artificial intelligence rather than mere users. Despite strong theoretical foundations, many graduates lack exposure to practical and applied aspects of advanced science, limiting their ability to innovate. Closing the gap between theory and real-world is critical for the next generation. Core mathematical concepts directly underpin neural networks and data science, and practical insights can foster innovation, strengthen AI capabilities, and position the state as a technology and capital-attraction hub with measurable outcomes.

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## 2 Integration of Language Proficiency with Skill Development, HR Development and Digital Innovation within the Education Sector

**JOS MUNDENCHERRY**

### **#Integration of Communication Skills within Skill Kerala and Vocational Education:-**

While Kerala produces a highly educated workforce, a significant proportion of youth lacks industry-ready communication and spoken English skills, limiting access to global employment opportunities. Kerala's next phase of development must build upon literacy by ensuring intelligibility, upon education by ensuring employability, and upon digital access by ensuring meaningful skill acquisition. Therefore, the state needs to mandate the integration of spoken English, phonetics, and workplace communication modules within Skill Kerala, ITIs, polytechnics, and vocational programmes and employment enhancement programmes, supported by blended learning tools and practical assessments. The expected outcomes of the integration of communications skills with vocational training include higher

placement and migration readiness, increased youth confidence and workplace adaptability, and stronger alignment between education and labour market needs.

#### **#Digital, App-Based Pronunciation Training for Teachers under Digital Kerala:-**

Teacher quality is vital to Kerala's educational outcomes, yet many educators face social and psychological barriers to improving spoken English through traditional methods. A confidential, Digital Kerala-enabled app-based pronunciation programme with AI-assisted, self-paced feedback can help teachers upgrade skills privately and effectively. Aligned with Digital Kerala, teacher professional development, and digital education infrastructure, this initiative would enhance classroom language modelling, strengthen students' communication skills, and provide scalable, cost-effective training.

#### **#State-Level Framework for Spoken English Proficiency through Phonetics:-**

While Kerala's literacy and higher education achievements are globally recognised, gaps in spoken English intelligibility continue to affect employability and global mobility, especially among students from government and aided institutions. The State should implement a phonetics-based spoken English framework aligned with the International Phonetic Alphabet (IPA) across schools and higher education, focusing on mastery of the 44 core English sounds without adding academic burden. Aligned with the Kerala Development Model, NEP, and Skill Kerala Mission, this reform aims to improve workforce intelligibility, reduce language-based inequality, and enhance global competitiveness.

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## **3 Transforming Kerala's Education System Through Skill-Based, Project-Oriented Learning**

**MOHAMMED SHAHIN**

Kerala's education system requires a structural shift toward a skill-based, application-oriented curriculum beginning at the primary level, ideally from Grade 3 onwards. Moving beyond theoretical instruction toward project-based learning will help establish more R&D centres in the state and attract more technology-based companies to avail themselves of its services. A curriculum may be defined across multiple domains such as agriculture and agri-technology, information technology, automobile systems, mechanical and manufacturing technologies, renewable energy, biotechnology, and digital media. The long-term vision is clear: to create an ecosystem where the next generation need not migrate for opportunities; rather, global enterprises and research collaborations will look to Kerala as a centre of excellence, innovation, and sustainable development.

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## **4 Holistic Educational Reform Framework for Schooling in Kerala**

**ASHA BINEESH**

#### **#Strengthening Mother Tongue Proficiency (Malayala Bhasha) Beyond Examination Scores:-**

Despite students achieving high or even full marks in examinations, there is a visible decline in practical proficiency in Malayalam, especially in reading comprehension,

expressive writing, confident speaking, and social usage. There is a need to reframe language learning from rote assessment to lived usage, with policies that emphasise functional literacy and articulation, reading culture and creative writing, and social interaction and cultural expression through the mother tongue.

This will protect linguistic heritage while also improving cognitive and communication skills.

#### **#Selective Subject Choice Framework in Higher Secondary Education:-**

After Class 10, students should be given the mandatory option to choose at least one additional subject (from a curated list of minimum 10 future-oriented subjects) apart from their core stream, enabling alignment with individual interests and career aspirations rather than studying only for examination purposes.

Indicative subject areas in Plus One & Plus Two may include Foundations of Law & Civic Literacy, Artificial Intelligence & Machine Learning (Basics), Robotics & Automation, Aerospace & Aeronautical Fundamentals, Sports Science & Physical Education Studies, Psychology & Human Behaviour, Environmental & Climate Studies, Entrepreneurship & Financial Literacy, Media, Communication & Digital Storytelling, and Design Thinking & Creative Technologies.

The flexibility of choice can significantly reduce academic disengagement and help students make informed life choices early.

#### **#Establishment of a Dedicated Higher Education Guidance Cell in Every School:-**

A structured guidance unit should be set up in every school - a “PATHFINDER Cell (Progression, Aptitude, Talent & Higher Education Roadmap)” - to support students from Class 9 onwards. This cell should offer aptitude and interest mapping, provide awareness on national and international education pathways, guide on emerging careers and skill requirements, and assist students and parents in informed decision-making. Such institutionalised guidance can prevent confusion, dropouts, and misplaced academic pressure.

#### **#Systematic AI & Digital Tool Literacy for Students and Teachers:-**

There is an urgent need to introduce organised learning modules on AI tools and free/open-source software for both students and teachers, not as optional exposure, but as core competency. This will ensure that Kerala’s education system remains future-ready and inclusive.

#### **#Emotional Strength, Social Adaptability & Well-being as Core Educational Outcomes:-**

Alongside academic learning, policies must formally integrate programmes that nurture emotional resilience, social adaptability and self-worth and mental well-being. With rising student stress and suicide rates, well-being must be treated not as an add-on, but as a foundational learning outcome, supported by trained counsellors, peer-support models, and life-skills education embedded in the curriculum.

#### **#Awareness-Based Prevention of Substance Abuse Through Decision-Making Education:-**

Rather than relying primarily on prohibition or restriction, schools should focus on awareness-driven, choice-based education on smoking, alcohol, drugs, and other addictions.

Students should be trained to understand consequences scientifically and socially, build strong personal decision-making abilities, and develop refusal skills and

self-regulation. Empowering students to choose wisely is more sustainable than controlling behaviour externally.

### **#Inclusion of Aptitude-Based Learning and Mental Ability Development Programmes in the Academic Curriculum :-**

At present, there is no organised aptitude development programmes within the formal learning & academic curriculum, particularly in areas such as logical reasoning, analytical thinking, problem-solving, and mental ability development. It is strongly recommended to integrate such learning modules across school education to identify students' natural strengths and learning styles early, enhance reasoning, critical thinking, and cognitive flexibility and support informed academic and career decision-making. Such an inclusive integration will move the system from marks-oriented learning to ability-oriented human capital development.

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## **5 Institutional Integration of Structured Financial Literacy within Kerala's Formal Education System and Public Financial Governance Framework**

**AADISANKAR S PUTHIAMADOM**

Despite Kerala's high general literacy rate, financial literacy, particularly in areas such as savings, investments, capital markets, taxation, insurance and digital finance remains significantly low among youth and first generation earners. This gap affects household wealth creation, responsible borrowing behaviour, retirement preparedness, and participation in formal financial systems.

A state-supported policy initiative should be introduced with certified financial education modules at the higher secondary and undergraduate levels, supplemented by practical exposure through investment simulation labs, public market awareness programs, and collaborations with regulated financial institutions. In parallel, local self governments and public administrative bodies may integrate community level financial awareness campaigns, ensuring inclusion of rural populations, women and economically weaker sections. Such a policy would strengthen Kerala's long-term economic resilience, improve capital formation, promote responsible investing culture, and align citizens with emerging digital and AI-driven financial ecosystems.

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## **6 Nutrigenomics, Chronic Disease Prevention, and Personalised Wellness**

**ADNAN MUHAMMAD**

*Chief Executive Officer, Abizen Nutrition Private Limited (KYEAL), Kannur, Kerala*

Kerala stands at a strategic inflection point. While our health indicators remain among the best in India, the rising burden of lifestyle disorders such as diabetes, cardiovascular disease, obesity, and metabolic syndromes calls for a shift from reactive healthcare to predictive and preventive models. Advances in genomics, digital health, and nutrition science present Kerala with a unique opportunity to lead this transition nationally. The State shall integrate precision nutrition and genomics into public health frameworks, promote health-tech innovation ecosystems leveraging Kerala's academic and research institutions, and strengthen preventive healthcare policies to reduce long-term economic and social costs.

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## 7 Education Reform for the Age of Automation and Artificial Intelligence

**KRISHNA SANGEETH KS**

### **#Reorient Education from Knowledge Accumulation to Problem Solving in the Age of AI :-**

Kerala's education system, like much of the world, is still rooted in an industrial-era model that prioritises rote learning and intellectual accumulation. In the age of Artificial Intelligence—where information access and cognitive tasks are increasingly automated—the core value of education must shift towards problem identification, critical thinking, systems thinking, and solution design. Curriculum reforms should focus less on “what to know” and more on how to think, adapt, and solve real-world problems across disciplines. The world is entering an era in which intelligence will be available on a tap, rendering many previously valued skills less relevant. The education system must therefore be fundamentally restructured to future-proof students and equip them to effectively navigate the profound changes emerging in this new landscape.

### **#Embed Entrepreneurial Mindset as a Core Educational Outcome, Not an Optional Skill:-**

Entrepreneurship should not be treated as a niche or post-education activity, but as a foundational mindset cultivated from school onwards. This includes encouraging risk-taking, ownership, experimentation, and learning from failure. Project-based learning, local problem challenges, student-led initiatives, and exposure to real societal and economic problems should be integrated into mainstream education—across arts, sciences, and professional streams.

### **#Shift the Social Narrative from Job Seekers to Problem Solvers :-**

Kerala's greatest strength is its people. If even a fraction of students graduate with the mindset of “seeing problems as opportunities to create value”, the societal impact would be transformative. Public policy, educational institutions, and social messaging must collectively work to shift aspirations—from primarily seeking stable employment to using education as a tool to solve problems in society, economy, governance, and sustainability. An “army of problem solvers” will be far more resilient to uncertainty than a workforce trained only for predefined jobs.

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## 8 Capacity development with Proper maintenance in School Infrastructure and Value Education in School Curriculum

**AAKASH B. ASHOK**

*CEO, Studyquotientedu Pvt Ltd*

There has been a visible change in school infrastructure in Kerala. However, day-to-day maintenance is often lacking, which frequently derails the entire process of capacity development. Capacity development should therefore be followed up with proper maintenance and regular maintenance audits.

Furthermore, value education should be made part of the curriculum. Children, especially in the post-COVID-19 period and with the influx of social media and the increased use of cell phones, often mimic the unsocial actions to which they are

exposed. There is a visible change in the moral values of children, and this erosion of values often leads to an increase in substance abuse, sexual exploitation, and related concerns. Value education should therefore be incorporated into the curriculum from the beginning, including essential components such as building civic sense (behaviour in public spaces, use of public amenities, understanding of law, road safety, etc.), sexual education, moral education, and technology education.

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## 9 Emerging Technologies and Protecting Children from Exponential Online Harms

**NIDHI SUDHAN**

*Co-Founder and Director, Citizen Digital Foundation, Thiruvananthapuram*

Given the rapidly evolving online risks and harms associated with emerging technologies—particularly those affecting children and adolescents—the State must introduce urgent and coordinated policy measures to prevent and mitigate their exponential rise and the consequent immediate and long-term risks to society and democracy, rather than succumbing to their pitfalls.

Online risks to children are classified under the 4Cs framework: content, contact, conduct, and contract risks. These may impact children directly (such as grooming, cyberbullying, and image-based abuse) and indirectly (including addictive design, data extraction, and algorithmic manipulation). The complexity of technological innovation and its unintended consequences necessitate policy interventions that mandate preventive and systemic approaches, in addition to mainstreaming accessible redressal mechanisms.

Prevention requires inoculating children against online harms through the introduction of media and information literacy curricula in schools, fostering a multidisciplinary innovation culture in higher education, and holding technology platforms accountable for age-appropriate engagement and algorithmic transparency. Redressal mechanisms must be strengthened through robust, accessible reporting systems developed in partnership with civil society organizations to ensure effective and prompt responses. By combining these two approaches, a holistic and healthy ecosystem for growing children—addressing legal, social, and technological dimensions—can be established.

There also exist public utility platforms that map preventive and reactive resources and solutions across India onto a single network. For instance, *Margi*—a prototype developed by the non-profit Citizen Digital Foundation—is a free, open, crowdsourced, single-window public utility platform that enables users to access local and national support services within three clicks. Such prototypes can be scaled as State-supported cooperative solutions to both prevent and respond to techno-social harms and risks affecting online child safety.

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## 10 Dedicated Coastal Sub Plan for the Education of the Fisherfolk

**ARAVINDH PANIKKAVEETIL**

*Assistant Professor, Department of Economics, Christ University, Bangalore*

Public expenditure on the education of coastal communities in Kerala is extremely low, especially in comparison to expenses under the SC Plan (SCP) and Tribal Sub Plan (TSP). In the case of rural fisherfolk, expenditure on projects aimed at their educational upliftment, disbursed through District Panchayats (DP), is quite low, in most districts. A large chunk of the expenditure goes only for the maintenance of fisheries schools. Introducing a targeted Coastal Sub Plan like the SCP and TSP to comprehensively address the educational backwardness among Kerala's fisherfolk is highly recommended. Projects including skill development, language development, emotional and psychological support, and improved nutrition programmes can be implemented under the aegis of a dedicated Coastal Sub Plan for the education of the fisherfolk.

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## 11 Measures to Bridge the Gap Between Education and Industry

**PYARELAL**

The State shall recognise that the current education system does not adequately meet industry requirements, resulting in business entities spending up to six months training fresh graduates in the latest trends and technologies before engaging them in core operations. Curriculum and syllabus development processes shall incorporate structured inputs from job providers and industry stakeholders as well, ensuring that academic content—particularly in engineering colleges—is regularly updated and aligned with current technological advancements and market needs.

Foundational education up to Class 6 shall focus on two languages and strong mathematical foundations, with greater emphasis on developing responsible citizens alongside academic learning. From Class 7 onwards, a graded system may be introduced in each subject, enabling students who demonstrate strength in particular areas to pursue higher-level learning, while others may continue at a lower grade of evaluation based on their aptitude.

Industries shall be given opportunities to sponsor futuristic subjects aligned with their workforce requirements and to support outstanding students through sponsorships, enabling access to appropriate talent upon completion of education. Industry experts shall be permitted to deliver lectures incorporating real-time data and practical experience to enhance student understanding and relevance. Additionally, students shall be provided opportunities for long-term internships within industries to gain exposure to future opportunities and align their studies accordingly.

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## 12 Green Campus and Institutional Sustainability Programme

### NATURE'S GREEN GUARDIANS FOUNDATION

In alignment with the goal of attaining Carbon Neutrality by 2050, the State shall implement a comprehensive programme to sensitise students within academic institutions to adopt green lifestyles. Environmental awareness and sustainability practices shall be integrated into academic engagement to encourage responsible behaviour among the next generation. Academic institutions shall be encouraged to undertake self-conducted green audits to assess emissions and implement measurable reduction strategies, thereby progressing towards Green Campus status. Institutions shall also be supported in creating Rapid Intense Forests using Miyawaki technology as bio-fencing around campus perimeters to enhance carbon sequestration and strengthen ecological sustainability. The programme may be scaled up to include public offices, corporate houses, and private organisations, adopting similar strategies to promote broader institutional participation in emission reduction and sustainable environmental practices.

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## 13 Education–Research–Employment Integration

### PRASANTH KUMAR SASIDHARAN PILLAI

The experience of implementing the National Education Policy in Kerala over the past five years highlights the need to strengthen the link between education, research, and meaningful employment to retain local talent and attract back skilled professionals who have migrated out of the state. Higher education and research institutions should be aligned with priority sectors such as agriculture, food processing, decentralized manufacturing, and sustainable industries, enabling students to see clear career pathways within Kerala. Research and innovation must focus on pilot-scale deployment, industry collaboration, and community engagement so that knowledge generation leads to visible societal and economic impact rather than remaining limited to academic publications. Creating strong university–industry–local government linkages will provide opportunities for high-quality jobs, entrepreneurship, and research leadership within the state, helping Kerala both retain its talented youth and encourage the return of experienced professionals to contribute to long-term development.

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## 14 Importance of Pre-school Education

### MALLIKA M G

The importance of pre-school education shall be recognised as foundational to addressing Kerala's long-term social and economic challenges. Meaningful and impactful interventions must be undertaken in the care, development, and early education of children up to the age of five, acknowledging this stage as a critical and formative period in human development.

Anganwadi workers shall not be assigned non-core duties that divert them from their primary responsibility of childcare and early childhood education. They must

be enabled to focus exclusively on the holistic development, nutrition, safety, and learning needs of children attending Anganwadis.

Specialised curriculum committees shall be constituted to design age-appropriate, developmentally informed pre-school curricula. Additionally, greater emphasis shall be placed on research in early childhood education.

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## 15 Technology-enabled Applications as Integrated Educational Support System

**SUNIL KUMAR**

India has millions of teachers burdened with manual evaluation, and millions of children whose innate abilities remain unidentified until it is too late. Technology should reduce workload and reveal potential—not add complexity. The State shall deploy technology-enabled applications to build an integrated educational support system that respects teachers’ time and nurtures children’s potential.

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## 16 Strategic Initiatives to Position Kerala as a Global Knowledge and Scientific Hub

**THUSHARA G.S. PILLAI**

*Research Scientist, MIT Haystack Observatory, Massachusetts*

### **#Establishment of a Kerala International Collaboration Center for Science and Education (KICCS):-**

Kerala’s exceptional achievements in literacy and education have created a strong foundation for scientific excellence, yet the state lacks dedicated infrastructure for sustained engagement between its researchers and the global scientific community. ....A dedicated International Center for Science and Education that would instead bring the international research community to Kerala for, e.g., week-long collaboration meetings and research conferences would drastically mitigate this problem — and at the same time turn Kerala into an internationally recognized research hub. Such a center could be modeled after other successful examples, such as the International Center for Interdisciplinary Science and Education in Vietnam (ICISE, <https://www.icisequynhon.com>) and the Lorentz Center in the Netherlands (<https://www.lorentzcenter.nl>). Hosting of such a facility in Kerala — which would be unique in South Asia — would permit Kerala-based researchers to tap into national and international research networks.

The proposed Centre is not primarily a physical infrastructure project — Kerala already possesses adequate conference venues — but rather an institutional framework that streamlines the process for national and international researchers to organize meetings in the state.

### **#Establishment of the Kerala Astronomy Heritage Museum:-**

A Kerala Astronomy Heritage Museum would present the legacy of Kerala in mathematics and astronomy with the scholarly care it deserves — contextualising these achievements honestly within global astronomical traditions rather than making inflated priority claims that undermine credibility. The museum would combine historical preservation with science education through interactive exhibits demonstrating how mathematical innovations served practical astronomical

computation, manuscript collections with proper critical scholarship, and a planetarium situating Kerala's contributions within humanity's broader quest to understand the cosmos. Such an institution would serve multiple purposes: providing local role models for scientific inquiry, offering international historians of science a dedicated research centre, and — perhaps most importantly — educating Kerala's own public that the School's significance extends well beyond the infinite series that occasionally appears in popular accounts.

#### **#Establishing Kerala as an International Higher Education Destination:-**

Kerala faces unprecedented educational emigration — no longer at the postgraduate level but increasingly among undergraduates, often to undistinguished foreign institutions financed through substantial debt. The motivation is less about academic quality than cultural experience and emigration pathways. Meanwhile, Kerala's genuinely strong institutions — IISERs, IIST, NIT Calicut, Central University — remain invisible globally. Simply urging youth to stay is ineffective; Kerala must reposition itself within international higher education flows.

The proposed strategy operates on two interconnected tiers. The first tier focuses inward: creating structured pathways for students at local colleges and universities to engage meaningfully with distinguished faculty and world-class research. This can be in the form of local in-person collaborations, as well as virtual experiences connecting students to researchers overseas. ....A consortium of Kerala institutions could partner with mid-tier European and Asian universities for semester exchanges, joint degrees, and summer programs, targeting niches like environmental science or public health. Scholarships and curated cultural programming would be essential initially. This is a generational project, but pilot programs can begin immediately and limited effort would go a long way, a first step would be to just get information out internationally, and to streamline the process for international students to visit Kerala.

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## **17** Multidisciplinary Collaborative Curriculum

**DR G HARIKRISHNAN**

Kerala must develop a multidisciplinary collaborative curriculum for better job opportunities.

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## **18** Higher Education Institutions for Practical Skill Development, Innovation, and Economic Growth

**JOSNA VR**

Kerala shall transform its colleges into dynamic hubs of employability, applied research, and industry-connected learning through an integrated reform framework. A minimum 8–10 week credit-linked paid internship or structured field apprenticeship shall be made compulsory, across all undergraduate programs, to ensure meaningful workplace exposure and reduce skill gaps. Every institution shall establish a College Innovation and Applied Research Cell (CIARC) to mentor interdisciplinary student projects addressing local development challenges such as waste management, water systems, mobility, tourism, public health, and agriculture. Simultaneously, a Faculty Industry Immersion Program (FIIP) shall be instituted,

mandating periodic industry or research lab attachments and certified digital pedagogy training to align teaching with emerging technologies and sectoral needs. Together, these measures shall reposition Kerala's higher education institutions as engines of practical skill development, innovation, and sustainable economic growth.

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## 19 Outcome-oriented and Application-based Curriculum Reform

**DR. SREELA SASI**

Undergraduate programs shall be revised based on the jobs they are intended to prepare students for after graduation. The same shall be implemented at the postgraduate level. Instruction at both levels shall be based on experiential learning, with hands-on projects included for important topics. Students shall be trained to take up jobs immediately after graduation.

School education shall also be restructured on similar lines. Education shall be application-oriented. Students shall understand why they are learning a subject and where it can be applied. Deep understanding shall be ensured.

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## 20 Holistic School Education Reform for Civic Responsibility, Life Skills, and Physical Well-Being

**DR RAJ KURUP**

Kerala shall prioritise the cultivation of self-discipline, civic sense, and societal responsibility within school education, emphasising community well-being alongside individual achievement. Schools shall incorporate structured, rotational responsibilities such as the daily cleaning and organisation of classrooms and school premises by students, fostering accountability, dignity of labour, and collective ownership of shared spaces. Education shall not be limited to academic instruction alone but shall consciously aim to develop responsible citizens who take ownership of both personal conduct and community welfare. While Kerala has commendable initiatives such as school youth festivals that preserve and promote traditional arts, greater emphasis shall be placed on structured civic training and character development to balance the current academic focus.

With appropriate risk management policies in place, students should also be taught practical life skills from the primary level onwards. This shall include home economics such as cooking, food preparation, and healthy eating habits. Action-oriented and experiential learning consistently generates higher student engagement and interest in academic activities compared to purely book-based learning.

Furthermore, physical education shall be accorded the same level of importance and institutional recognition as other subject areas, including structured assessment and evaluation. Schools shall allocate a minimum of three days per week for 45-minute sessions dedicated to compulsory physical training. During these sessions, students shall actively participate in structured activities such as gym-based exercise, yoga, or organised sports to promote physical fitness, discipline, and overall well-being.

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## 21 Regional Skills Development and Career-oriented Courses

**PROF. SURESH C. PILLAI**

Recent EU–India, US–India, and broader global partnerships are accelerating opportunities in high-technology, life sciences, pharmaceuticals, semiconductors, and advanced manufacturing. These engagements will increase demand for highly skilled professionals in biomedical sciences, biotechnology, materials science, data-driven technologies, and related sectors.

India’s pharmaceutical sector—valued at US\$ 50–55 billion and known as the “Pharmacy of the World”—ranks third globally by volume, supplies over 20% of global generics and nearly 60% of vaccines, and is shifting toward innovation in drug discovery, biologics, advanced formulations, medical devices, and digital health. This transition is driving demand for highly skilled professionals in biomedical sciences, pharmaceutical chemistry, molecular biology, materials science, data science, and AI/ML. Simultaneously, India’s semiconductor industry is expanding rapidly—from US\$ 13.54 billion in 2025 to a projected US\$ 100+ billion by 2030—supported by initiatives such as the India Semiconductor Mission and major investments by Tata Electronics–PSMC and Micron. This growth will require expertise in semiconductor fabrication, thin films, nanomaterials, device physics, cleanroom processes, lithography, and advanced characterisation. Kerala, with its strong higher education base and large pool of science graduates from government-aided arts and science colleges, is well positioned to supply this future-ready workforce. However, limited industry exposure leads to underutilisation of scientific talent. A comprehensive revamp of science education—integrating interdisciplinary, career-oriented curricula; hands-on laboratory and cleanroom training; advanced instrumentation (HPLC, FTIR, NMR, FESEM, TEM, Raman); computational skills; regulatory knowledge; and industry partnerships—is essential. Aligning education with pharmaceutical, biotechnology, semiconductor, electronics, and AI sectors will enhance employability, innovation capacity, and Kerala’s long-term economic and technological competitiveness. Top of Form Bottom of Form

Similar workforce shifts are also occurring across renewable energy, advanced materials, 3D/4D printing, medical devices, agri-biotechnology, food processing, climate technologies, space and defence, quantum, cybersecurity, fintech, and data-driven services—each requiring specialised, interdisciplinary skills beyond conventional arts and science curricula. Without timely curriculum modernisation, many colleges risk academic irrelevance, and graduates will continue to face unemployment or underemployment in low-skill sectors, resulting in personal hardship and a significant loss of public investment in higher education.

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## 22 Statewide Civic Sense and Social Responsibility Training Initiative

**DR. K C JAMES RAJU**

*Senior Professor, University of Hyderabad*

A large-scale, structured initiative shall be undertaken to impart civic sense and social responsibility to students at all levels of education. The objective shall be to ensure that Kerala’s students demonstrate exemplary public conduct, social

awareness, and civic discipline wherever they are in the world. A comprehensive training program shall be developed to address civic behaviours that increasingly affect public perception and social harmony.

The program shall cover areas including social etiquette; respectful treatment of women, the elderly, persons with disabilities, and children in public spaces; basic first aid and response during accidents or emergencies; assisting visitors unfamiliar with local languages; maintaining cleanliness in public places; following queues and avoiding crowding; responsible mobile phone use in public; supporting less-educated individuals; and respecting personal privacy.

The initiative shall be designed as a cost-effective model by leveraging partnerships with NGOs and Corporate CSR programs, with the Government providing leadership and coordination. The first step shall be the preparation of a detailed action plan and standardised reference materials. This shall be followed by phased, large-scale training programs to ensure that the entire student community is systematically trained and actively engaged.

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## 23 Collaborations with Foreign Universities

**PRADEEP KUMAR**

The State shall develop academicians through structured collaborations with foreign universities to enhance teaching standards and improve graduate employability.

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## 24 Strengthening Foundational Numeracy for Competitive Exams and High-Skill Employment

**MOHAMMED AJMAL C**

Kerala's weak performance in JEE, NEET, UPSC, and CUET, along with widening employability gaps in high-skill sectors, signals a serious mathematics and numeracy crisis. Foundational numeracy is now a state capacity issue in an AI- and data-driven economy. ASER 2022 shows only 37.6% of rural Classes VI–VIII students can solve basic division—dropping to 26–32% in some districts—while NAS 2021 indicates only about 10% of Class X students are proficient in Mathematics. This suggests most students enter higher secondary and higher education without adequate mathematical readiness. The State shall launch a time-bound Kerala Math Literacy Mission covering Classes VI through undergraduate level and treat numeracy as the foundation for both competitive exam performance and future employment. The mission shall include a curriculum and pedagogy reboot for “Math for the AI era,” prioritising number sense, algebra readiness, reasoning, problem-solving, and core statistics and data literacy, while reducing rote procedures and increasing competency-based practice. District-level Math Remediation Sprints for Classes VIII–X shall combine diagnostic testing, targeted modules, and re-testing, with a focus on addressing misconceptions and strengthening problem-solving skills.

Teacher enablement should be scaled through intensive training in concept-based instruction, worked examples, and deliberate practice, supported by a statewide misconception bank and standardised rubrics. A transparent annual outcomes dashboard should track district- and programme-level progress using NAS and ASER-style indicators. To strengthen the school-to-work transition, a mandatory

first-year undergraduate Math and Data Reasoning bridge course—especially for science, engineering, economics, and commerce—should be introduced, along with stackable micro-credentials in quantitative and data skills aligned with employability.

Kerala’s board exam results indicate possible grade inflation and predictability despite weak foundational math outcomes. DHSE (Plus Two) students scoring A+ in all subjects rose from 455 (2007) to 30,145 (2025)—a 66-fold increase—while SSLC figures climbed from around 4,000 (2005) to 61,449 (2025), peaking at 1,21,318 in 2021. In contrast, only 26.9% of Standard VIII rural government-school students can perform division (ASER 2024), and just 10% of Class 10 students are proficient in mathematics (NAS 2021), risking false confidence and weak college readiness. To restore assessment integrity, Kerala should establish an independent Assessment and Standards Unit for psychometrics, blueprint discipline, moderation, and annual technical reporting to maintain grade consistency. Exams should reduce predictability, increase cognitive demand, limit pattern questions, and include structured open responses. A public grade-integrity dashboard should track distribution trends alongside NAS, ASER, and competitive outcomes to guide corrective action. Finally, a math-first remediation strategy for Classes 8–12 should strengthen algebra, problem-solving, and numeracy, addressing mathematics as a critical bottleneck for STEM, commerce, and AI-era careers.

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## 25 Strengthening School Education through Communication Reform, Life Skills Integration, and Student Support Systems

**RENJISH RAJU**

Language education in schools should be restructured to move beyond a predominantly textbook-based approach that focuses mainly on reading and writing skills. Language learning is fundamentally based on four core competencies: listening, speaking, reading, and writing (LSRW). At present, assessment systems largely emphasise reading and writing, leading to limited development of communication skills among students. To address this gap, the total marks for language subjects could be systematically divided among the four competencies: listening, speaking, reading, and writing.

Assessment tools such as oral examinations, listening tests, presentations, and interactive activities can be formally integrated into evaluation processes, and teachers can be provided with appropriate training and resources to implement this comprehensive assessment framework. This reform will enhance students’ communicative competence, confidence, and readiness for higher education and employment.

Similarly, structured life skills and vocational education may be formally incorporated into the school curriculum from Class 6 onwards, with at least one dedicated lesson per week. These lessons may include practical and creative skills such as cooking, stitching, basic design, digital skills, crafts, and other vocational options. Students should be given opportunities to choose activities based on their interests and aptitudes. The key objectives of this initiative are to promote self-reliance and practical problem-solving abilities, prepare students for real-life challenges and responsible adulthood, recognise and nurture diverse talents beyond

academic performance, and strengthen students' emotional, social, and economic resilience. Such an initiative could contribute to the holistic development of learners and better align education with life and work realities.

Finally, comprehensive career guidance and mental health support systems may be introduced across public schools through a cluster-based model. At present, many students experience academic pressure, career-related uncertainty, and emotional stress arising from examinations, social expectations, and family circumstances. The absence of systematic counselling support often leads to anxiety, low motivation, and, in some cases, school dropouts. To address these concerns, trained career counsellors and qualified psychologists may be appointed at the school cluster level to serve multiple institutions, and regular sessions may be conducted on career pathways, vocational and skill-based opportunities, higher education options, and emerging employment sectors. Programmes on stress management, emotional resilience, and self-awareness can be integrated into the school timetable, and mental health awareness and basic psychological literacy can be incorporated into the curriculum in age-appropriate ways. The establishment of such support systems will promote students' emotional well-being, enhance self-confidence, reduce dropout rates, and enable learners to make informed and realistic life choices.

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## 26 Strengthening Implementation and Learning Outcomes in Kerala's Public Education System

**DR. SREEPRIYA S.P.**

*Independent researcher*

Kerala's public education system stands as a model not only for India but also in a global context. Government schools in the state are widely regarded as centres of excellence, and the system holds the potential to further strengthen its position as a benchmark for other states. However, despite significant infrastructural development and curriculum reforms, the continued migration of students away from public schools remains a persistent and serious challenge. If Kerala's progressive education policies are to translate into long-term contributions to the state's social, economic, political, and cultural advancement, greater attention must be given to strengthening implementation at the ground level.

Although the public education system is supported by well-conceived and thoughtfully designed policies at the policymaking level, gaps remain in their effective classroom execution. At the foundational level—where policies must translate into practice—teachers may not always be adequately equipped to fully implement reforms or convey their intended benefits to students. Focused professional development programmes should therefore be instituted to strengthen pedagogical capacity and reform alignment. In addition, systematic mechanisms must be established to assess whether students are receiving the intended academic and developmental benefits. Constructive feedback systems, including structured student responses, can help evaluate instructional quality. Where gaps are identified, teachers should be supported through mentoring, training, and performance-improvement frameworks rather than punitive measures.

Another important consideration is the increasing academic load resulting from curriculum reforms, particularly the growing volume and weight of textbooks. In subjects such as social sciences, content may be simplified and streamlined to enhance conceptual clarity and reduce cognitive overload. Simplified and well-

structured lessons that prioritise understanding would enable students to engage more meaningfully with the material while maintaining academic rigour.

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## 27 Establishing a State-Level Advanced Drone Skill and Manufacturing Ecosystem for Technology-Driven Growth

**DRONIMAGINATION PRIVATE LIMITED**

*A startup company under Kerala Startup Mission*

Kerala should establish a State-Level Advanced Drone Skill and Manufacturing Training Ecosystem to address the rapidly expanding drone industry and emerging commercial applications. With increasing demand in infrastructure inspection, agriculture analytics, disaster response, cinematography, surveying, logistics, and industrial monitoring, the State must move beyond basic pilot licensing and focus on specialised, use-case-oriented training. A structured curriculum should be introduced through accredited training centres and technical institutions, covering drone design and building, propulsion systems, flight controllers, payload integration, GIS mapping, AI-based data processing, maintenance, and commercial compliance frameworks. Dedicated modules for sector-specific drone building—such as mapping drones, inspection drones, agricultural spraying drones, and cinematic platforms—can create skilled technicians, innovators, and entrepreneurs rather than just operators. Industry-aligned certification pathways, incubation support, and R&D integration will enable students to prototype and commercialise indigenous drone solutions. This approach will position Kerala as a hub for drone technology talent and micro-manufacturing, generate high-value employment, reduce dependence on imports, and create a sustainable ecosystem where training directly feeds innovation, enterprise creation, and the State’s long-term technology-driven economic growth strategy.

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## 28 Reorienting Kerala’s Curriculum for Critical Thinking and Future Skills Development

**BALA MURALI**

Over the next ten years, global skill needs will shift rapidly toward critical thinking. The curriculum should therefore focus on creativity, the humanities, scientific process, and argumentation. Kerala is perhaps uniquely positioned to take advantage of this shift. Expensive models of college education may not thrive in the coming decade, making foundational skill development more important. Singapore’s 2004 “Teach Less, Learn More” (TLLM) policy offers a relevant model for Kerala. In this context, Bloom’s Taxonomy can be used as a curriculum audit tool by conducting a systematic review of Kerala’s current curriculum against the Revised Bloom’s Taxonomy.

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## 29 Preservation, Capacity Building, and Digital Modernisation of Kerala's Archival and Historical Infrastructure

**DEEPTHI MURALI**

*Art and Cultural Historian of South Asia, Assistant Professor at the Department of History and Art History, Affiliate faculty at the Roy Rosenzweig Center for History and New Media at George Mason University*

Kerala's State Archives hold a vast treasure of historical documents, including numerous ola (cadjan) leaf manuscripts, some dating back to the sixteenth century. Many of these records were reportedly digitised, or were in the process of digitisation, during the past decade. However, during this process, the manuscripts appear to have been disordered, and there is currently no reliable way to access them in their original, structured form. Leaves from different manuscripts have been tied together, creating significant archival confusion. A large-scale and systematic restoration effort is urgently required to undo this misarrangement. At present, researchers visiting the archives are often provided with detailed indexes prepared by the government in the 1930s, rather than access to the original manuscripts themselves. Moreover, the physical storage conditions of these documents raise serious concerns. At the Fort Archives in Thiruvananthapuram, many manuscripts can be seen in deteriorating condition within semi-open structures in the courtyard of the archival complex. Without immediate preservation measures, there is a real risk that these materials may be irretrievably lost within the next two decades. Equally concerning is the inaccessibility of the supposedly digitised copies. These digital records are neither publicly available nor easily traceable for scholarly research, and even archival staff appear uncertain about their status or location. The urgent reordering of the original ola manuscripts, along with the proper cataloguing and public accessibility of their digitised versions, is essential for safeguarding and sustaining Kerala's historical heritage.

The State shall also strengthen institutional capacity in archival and manuscript studies by addressing the acute shortage of specialists in older Malayalam and Vattezhuthu scripts at the Fort Archives. Dedicated academic and training programmes shall be developed to systematically train students and scholars in older Malayalam and other historical scripts used in medieval and early modern Kerala, including Tamil and Grantha. The Government shall review and, where necessary, establish sponsored and supported programmes to build sustained expertise in these areas. Simultaneously, higher education institutions shall enhance the academic preparation of history students undertaking archival research. Structured training in classical languages, palaeography, and historical research methodology shall be integrated into university curricula. Recognising that language proficiency and historical method are interdependent, the higher education system shall be modernised to deliver rigorous, skill-oriented historical education that enables meaningful engagement with Kerala's archival resources.

Finally, the State shall recognise that Kerala remains significantly behind in leveraging digital platforms to educate the public about its history. Existing official websites are underdeveloped, and there is no comprehensive institutional mechanism—beyond the Kerala Council for Historical Research (KCHR)—to systematically disseminate historical knowledge to the wider public. The Government shall therefore allocate greater resources toward teaching and promoting Kerala's rich and diverse multicultural history through strengthened digital infrastructure and other

public-facing initiatives. In addition, the State shall prioritise digital history skill development among students, particularly in areas that enable public engagement.

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## 30 Institutionalising Civic Sense Education for Responsible Citizenship

**PRANAV SURESH**

The State shall introduce Civic Sense as a compulsory, credit-bearing subject for Grades 3–12 to impart practical civic knowledge, responsible public behaviour, and community engagement. The curriculum shall be developed and implemented through an expert committee responsible for defining the syllabus, pedagogy, and assessment framework, ensuring that the programme remains low-cost and scalable. The subject shall aim to produce students who understand how public systems function—including traffic norms, waste disposal practices, and queuing discipline—behave responsibly in shared spaces, engage constructively with local institutions, and practise ethical digital citizenship. This initiative is expected to yield tangible civic outcomes by improving everyday public conduct, reducing anti-social incidents, strengthening sanitation and road safety practices, and enhancing public health standards, while imposing minimal additional administrative burden through phased implementation within the current education framework.

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## 31 Strengthening Student Support, Foundational Recovery, and Parental Engagement in Kerala’s Public Education System

**MUHAMMED MAZIN PT**

*Founder and CEO, Mashmagic Learning Pvt Ltd*

Kerala’s public education system has achieved significant progress in infrastructure and enrolment; however, structured academic and emotional mentoring remains uneven across institutions. The Government shall therefore introduce a Statewide Student Mentorship Framework in all public schools, under which each student is assigned a trained mentor responsible for tracking academic progress, providing emotional and behavioural support, facilitating parent–school coordination, and identifying learning gaps at an early stage. This system shall extend beyond subject teaching to focus on holistic student development, supported by a standard mentoring protocol, reporting structure, and monitoring mechanism to improve learning outcomes and reduce dropout rates.

In addition, the Government shall implement a Learning Gap Identification and Bridge Program to address post-COVID and foundational recovery needs. Despite Kerala’s educational advancements, many students continue to experience hidden learning gaps, particularly in foundational literacy, numeracy, and language skills. A state-level Learning Gap Audit Program shall therefore be introduced, incorporating standardised baseline academic assessments for Grades 1–10, individualised remediation plans, structured bridge courses within schools, and technology-enabled personalised follow-up. This initiative shall ensure that no student progresses to higher classes with foundational weaknesses, thereby strengthening long-term academic quality and competitive readiness.

The Government of Kerala shall also integrate Parent Engagement and Academic Transparency Systems in public schools, recognising that parental involvement is a key determinant of student success. Structured communication between parents and schools shall be strengthened through the development of a Digital Academic Transparency Platform that provides regular performance updates, enables mentor–parent interaction, tracks attendance and behavioural indicators, and shares personalised academic improvement plans. This approach shall enhance trust in public education, increase accountability, and position Kerala as a model for participatory school governance in India.

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## 32 Advancing Inclusive Education and Campus-Based Innovation for Sustainable Development

**ALAN SINDHU DINSHA**

*Founder & CEO, Innodots Innovations Private Limited*

Kerala shall move toward a more inclusive education model in which differently abled students and other students learn together within the same educational environment, supported by appropriate infrastructure, trained educators, and assistive technologies, thereby fostering empathy, social responsibility, and mutual respect from an early age and contributing to a more inclusive and cohesive society. At the same time, the State shall strategically utilise the underused infrastructure of spacious educational institutions, particularly engineering colleges and arts and science colleges, to incubate startups and innovation hubs, support small-scale manufacturing and prototyping, encourage student entrepreneurship, and promote grassroots industry–academia collaboration, thus accelerating local employment generation, innovation-led growth, and practical skill development.

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## 33 Implement a ‘Catch Them Early’ Policy for Skills Development

**DR RAKESH N PILLAI, PhD**

Kerala’s higher education system produces graduates who often lack employable skills in data analytics, IT, and applied sciences—skills that international students acquire much earlier. To bridge this gap, the State shall introduce foundational training in data science, information technology, and analytical skills from the 7th standard onwards. This initiative need not require changes to the existing curriculum; instead, structured skill modules may be delivered through scheduled sessions within schools. Rather than relying solely on existing teachers or general skill upgradation, the programme shall engage working professionals with hands-on industry experience to conduct these sessions. Such an approach will enhance student skill development while also contributing to overall instructional quality within the education system.

വിഷയ മേഖല: ആരോഗ്യം, വിദ്യാഭ്യാസം, ഗവേഷണം  
ഉപശാഖ: ദേശീയവിദ്യാഭ്യാസ നയം - 5 വർഷങ്ങൾ

Main Track: **Health, Education and Research**  
Sub Track: National Education Policy-Five Years

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## 1 Ensure Context-Sensitive and Balanced Implementation of NEP Reforms

**DR RENJU JOSEPH**

There is a need for context-sensitive implementation of the National Education Policy (NEP), as five years after its introduction it has become evident that uniform implementation across states presents practical limitations. While the NEP promotes institutional autonomy, multidisciplinary education, and research orientation, public universities require enhanced financial, infrastructural, and academic support to effectively implement these reforms. Furthermore, although the shift toward multidisciplinary education is a positive reform, implementation must carefully balance multidisciplinary with disciplinary depth, ensuring that academic rigour and subject expertise are not compromised.

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## 2 Call for a New and Improved Education Policy

**DR. JOHNSON Y**

The State shall formulate a new education policy by setting aside the communal and corporate orientations of NEP-2020 and by incorporating the positive elements of earlier education policies in India.

വിഷയ മേഖല: ആരോഗ്യം, വിദ്യാഭ്യാസം, ഗവേഷണം  
ഉപശാഖ: ഉന്നത വിദ്യാഭ്യാസം

Main Track: **Health, Education and Research**  
Sub Track: Higher Education

## 1 Enhancing Global Engagement, Thematic Focus, and Interdisciplinary Integration for Future-oriented Policy Dialogues

**DR SREEDIVYA K M**

Global academic engagement can be expanded by organising dedicated academic and policymaking sessions that invite greater participation from foreign universities, research centres, and diaspora scholars working on Kerala-related themes. Joint sessions with international institutions should be conducted, and co-authored research presentations encouraged. These measures will enhance global visibility, foster comparative perspectives, and advance the State's education and research development agenda.

Kerala is confronting new-generation challenges that warrant focused attention. Dedicated thematic emphasis should be given to climate change and coastal vulnerability, the digital economy and AI in governance, ageing populations and healthcare systems, and sustainable urbanisation. Such focus areas will make policy-oriented engagements more future-oriented rather than merely reflective.

Furthermore, interdisciplinary integration shall be strengthened. As Kerala studies encompass economics, sociology, environment, technology, culture, and governance, sessions addressing Kerala-related policy agendas should be conducted through cross-disciplinary panels rather than isolated subject-based sessions. The State may also introduce integrated theme-based days, such as a "Sustainable Kerala Day."

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## 2 Biotechnology Education for Bioeconomy and Healthcare Innovation

**SIVA PRASATH**

By strengthening and modernising student training programmes in biotechnology, the State can significantly boost the bioeconomy. Biotechnology is an increasingly promising field with strong future potential, and such initiatives will create employment opportunities while contributing to Kerala's economic growth. In parallel, this approach will sharpen the State's focus on healthcare innovation, positioning Kerala as a hub for vaccine and biosimilar manufacturing. This will enable the production of affordable medicines for society while generating substantial export revenue, thereby benefiting both public health and the regional economy.

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## 3 Creating a Purpose-Driven Generation in the AI Era

**DIVYA T**

Kerala shall work towards creating a purpose-driven generation that is competent, confident, empathetic, and socially responsible, capable of thriving in an AI-driven world while remaining rooted in values, culture, and community. Education must develop character, resilience, and collective responsibility alongside intelligence from early childhood. Rapid technological advancement can create digitally skilled but emotionally disconnected individuals, and without value-based grounding, societies may face rising anxiety, weakened social bonds, and ethically unanchored innovation. Purpose and social awareness ensure that technology strengthens humanity rather than weakening it. Such a community will produce confident, employable, and ethical individuals with strong family values and social commitment, promoting collaboration, resilience, mental well-being, and balanced leadership in a high-tech environment. Implementation shall embed competency-based learning, skills development, emotional intelligence, ethical reasoning, and technology literacy from the early years, while integrating culture, sports, teamwork, community engagement, and continuous evaluation to build confidence, social responsibility, and responsible citizenship.

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## 4 Fostering Industry–Academia Research Ecosystems

**DR JINU JOHN**

The State shall strengthen antimicrobial resistance control in Kerala through innovation, regulatory measures, and community engagement. Similarly, the State shall advance translational and collaborative research by fostering strong industry–academia ecosystems.

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## 5 Reimagining Education for the Fourth Industrial Revolution

**VINOTH RENGARAJ**

*Founder of School ONE, School ONE*

The Fourth Industrial Revolution—driven by artificial intelligence, automation, robotics, data science, and cloud computing—has made technological literacy essential rather than optional. Traditional rote-based, exam-centric models are increasingly inadequate in preparing students for higher education and dynamic career pathways. Education must evolve into a hands-on, skill-oriented, and future-ready system that prioritises how to think over what to memorise. Structured innovation labs, gamified learning pathways, and project-based assessments can cultivate logic, computational thinking, systems thinking, creativity, and problem-solving from an early stage. Integrating AI, robotics, coding, and applied technology into school curricula—supported by digital platforms such as SchoolONE—can effectively bridge the gap between classroom learning, higher education requirements, and industry expectations. Teachers should be empowered as facilitators and mentors who guide experiential, interdisciplinary learning. By shifting from memorisation to application-based and innovation-driven education, schools can nurture confident creators, adaptive thinkers, and responsible technology users. Such reforms will equip students with resilience, critical thinking, and the capacity to thrive in a world defined by continuous technological transformation.

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## 6 Strengthening Soft Skills and Professional Readiness in Higher Education

**DR JIKKU JOSE**

There is a critical need to strengthen soft skills and professionalism within higher education in alignment with Kerala’s evolving socio-economic and employment landscape. Higher education curricula shall formally integrate communication skills, ethics, leadership, emotional intelligence, teamwork, and workplace professionalism as credit-based components across all disciplines to enhance graduate employability, adaptability, and social responsibility. Structured academia–industry engagement shall be expanded through internships, mentorship programmes, live projects, and experiential learning opportunities that expose students to real-world professional environments. Such initiatives will bridge the gap between academic learning and workplace expectations. In parallel, continuous faculty development programmes shall be institutionalised to equip educators with contemporary pedagogical approaches for teaching soft skills, professional ethics, and career readiness alongside domain-specific knowledge.

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## 7 Strengthening Engineering Research and Translational Innovation Ecosystems

**SMITHA B**

The State shall enhance funding support for engineering research in academia to strengthen institutional research capacity and outcomes. The doctoral research

screening process at APJAKTU shall be reviewed to enable greater interaction between doctoral faculty and prospective research scholars, ensuring improved alignment of research interests and supervision quality. The Government shall facilitate the establishment of state-of-the-art collaborative research platforms to advance translational research and promote effective academic collaboration. Further, while initiatives such as K-DISC and YIP successfully promote idea generation and conceptualisation, structured measures shall be introduced to strengthen the implementation phase of projects to ensure timely execution and meaningful outcomes.

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## 8 Expanding Higher Education Capacity to Address Educational Migration in Kerala

**PRAVEEN R**

*Startup Founder, Yuga AI*

Kerala's Gross Enrolment Ratio (GER) in higher education stands at approximately 41%. While this is higher than the national average, it remains significantly lower than that of advanced education systems such as the United States (around 88%) and China (around 60%). Comparisons with Scandinavian countries are even more instructive: Sweden and Denmark report GERs above 80%, while Finland and Norway exceed 100%, reflecting inclusive systems that accommodate adult learners and repeat enrolments.

This indicates that Kerala's higher education carrying capacity remains relatively limited in comparison to global benchmarks. The constrained absorption capacity, particularly in quality and globally competitive institutions, may be contributing to the increasing outflow of students pursuing higher education abroad. Expanding access, enhancing institutional capacity, and improving global competitiveness are therefore critical to reducing educational migration and strengthening Kerala's knowledge economy.

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## 9 Proposal for a Continuous Evaluation System in Higher Education Admissions

**DR JAGET BABU N.R.**

In higher education, entrance tests for courses such as Medicine, Engineering, and related disciplines may be replaced with a Continuous Evaluation System (CES). The CES shall begin from Class IX and continue through Classes X, XI, and XII. Its components may include assignments, tests, take-home tests, open-book examinations, aptitude tests, and student portfolios containing papers and write-ups on selected topics. Each year, a Multiple Choice Question test based on the student's chosen higher education field may be conducted as an open-book test. An Assessment Card reflecting the student's aptitude in chosen subjects shall be issued. At the end of Class XII, after the final examination, each school shall conduct an open-book "Commencement Test" assessing subject knowledge and aptitude. Grades or marks shall be awarded based on (1) the Assessment Card and (2) the Commencement Test. Admission rank lists for higher education shall be prepared using these two components, thereby dispensing with entrance examinations. The

system aims to reduce stress, fear, and anxiety, and to motivate students through voluntary and continuous engagement.

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## 10 Ensuring Transparent and Merit-based Recruitment of Qualified Faculty

**SIJO K JOSEPH**

Academic institutions must be strengthened through transparent and merit-based recruitment of qualified faculty, since capable and research-oriented educators are essential to revitalise universities. Strategic focus areas such as Artificial Intelligence and Quantum Computing should be prioritised. Institutions should also actively recruit faculty with startup and industry experience. The State should ensure that qualified professionals are provided opportunities to remain and contribute within Kerala, thereby reducing talent migration and generating employment locally. Substantial investment must also be directed toward translational research initiatives

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## 11 Strengthening Education Mobility, Employability, and Career Guidance in Kerala

**NANDHU SAJI**

*Owner, Adhyaya (Education Consultancy)*

Kerala possesses strong human development indicators, academic credibility, and global diaspora linkages, positioning the State to emerge as a regional hub for education mobility. The Government shall establish a transparent, state-supported framework for international education guidance, ethical student recruitment, and structured global institutional partnerships. Processes related to overseas education, healthcare education pathways, and professional migration shall be streamlined to ensure quality, credibility, and student protection. The State shall be promoted internationally as a destination for education in healthcare, nursing, Ayurveda, technology, and allied sciences, strengthening global academic presence and generating economic and knowledge inflows.

Kerala shall also strengthen the linkage between higher education, skills, and employability by shifting from a qualification-centric to an outcome-driven framework. Industry-integrated curricula, credit-based internships, and apprenticeship models shall be institutionalised, supported by structured collaboration between educational institutions, industry bodies, and professional consultancies to align programmes with emerging labour market demands. Formal career guidance and counselling shall be introduced from secondary school onwards, supported by trained professionals. Data-driven career mapping and public-private partnerships shall enhance awareness, aptitude assessment, and parental engagement, improving student outcomes and long-term employability.

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## 12 Enhancing Academic Excellence through Merit-Based Faculty and Industry-Aligned Education

**JYOTISHKUMAR PARAMESWARANPILLAI**

*Professor & Director, Centre of Excellence (AU – Sophisticated Test and Instrumentation Center)*

Kerala shall ensure the appointment of merit-based faculty with international exposure in universities and aided colleges to strengthen academic quality and global engagement. Education shall shift toward greater emphasis on practical, application-oriented learning rather than predominantly theory-based instruction. Furthermore, new and relevant courses shall be introduced along with industry collaborations.

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## 13 A Vision for Benchmark Educational Institutions

**DR. SUHAIL PALAKKOD**

Kerala stands as a global benchmark in public education, with internationally acknowledged achievements in access, equity, and social inclusion. Having largely addressed the challenge of access, the State must now decisively focus on quality—particularly learning outcomes, institutional excellence, and global competitiveness. Despite Kerala’s strong human capital, digital readiness, and social infrastructure, the State lacks iconic institutions with sustained global recognition. The limitation is not of capability, but of institutional ambition and scale. To position Kerala meaningfully within the global knowledge economy, incremental reform is insufficient. The State must commit to establishing marquee, globally benchmarked institutions across strategic domains including science and technology, business, liberal arts, and public policy, built on academic autonomy, research intensity, and international collaboration. As a strategic first step, a standalone School of Business and Leadership may be established under Kerala Digital University, benchmarked nationally against ISB Hyderabad and globally against INSEAD in faculty quality, curriculum innovation, research output, and leadership impact. This institution should evolve into a globally connected centre of excellence, shaping ethical and future-ready leaders, and marking Kerala’s transition from access-driven education to globally recognised academic excellence.

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## 14 PPP Expansion, Industry-Aligned Curriculum, and State-Focused Research & Innovation

**ROBIN AUGUSTINE**

*Research Associate, Qatar University, Doha*

It is essential to establish more private universities and Public–Private Partnership (PPP) model universities in Kerala, while also permitting reputed foreign universities to set up campuses in the State. This will attract international students from regions such as Europe, the Middle East, and Africa, retain education-related expenditure within Kerala, and facilitate foreign capital inflows. It will also generate employment opportunities and enable educated youth to remain in the State.

Higher education in Kerala must be redesigned in alignment with societal needs and labour market demands. Traditional disciplines such as Botany, Zoology,

Mathematics, Statistics, History, Political Science, and Languages should be modernised through practical, interdisciplinary, and application-oriented approaches. For instance, Botany may be restructured as Plant Science and Agricultural Management, Zoology as Animal Science and Livestock Management, and Mathematics/Statistics as Data Science and Analytics. Such reforms will enhance employability and connect knowledge with social productivity.

Research should align with Kerala's development priorities, including healthcare, agriculture, climate resilience, and tourism. Students and researchers should be encouraged to establish startups based on research outcomes. Faculty members may be permitted to serve on the boards of such startups, promoting innovation and the social application of knowledge, thereby supporting knowledge-based development oriented toward public welfare.

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## 15 Positioning Kerala as India's Leading Education Hub

**DEEPSHIKHA JAIN**

Kerala is one of the most highly educated and literate states in India; therefore, it should strategically focus on positioning itself as a leading education hub in India.

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## 16 Establishing Kerala as an International Higher Education Destination

**THUSHARA G.S. PILLAI**

*Research Scientist, MIT Haystack Observatory, Massachusetts*

Kerala is witnessing unprecedented educational emigration, increasingly at the undergraduate level, often to institutions abroad that offer limited academic advantage. The primary motivations are cultural exposure and migration prospects rather than educational quality, frequently financed through substantial debt. Meanwhile, Kerala's strong institutions—such as IISERs, IIST, NIT Calicut, and the Central University—remain under-recognised globally. Rather than urging youth to remain, Kerala must strategically reposition itself within international higher education flows. A two-tier strategy is proposed. First, strengthen inward pathways by creating structured opportunities for local students to engage with distinguished faculty and world-class research through in-person collaborations and virtual international partnerships. This will provide global academic exposure without necessitating emigration. Second, reverse the flow by actively attracting international students from the US, Europe, Africa, Southeast Asia, and beyond. Kerala can leverage its comparative strengths—tropical ecology, biodiversity, integrative medicine, monsoon and climate systems, and development studies—combined with English-medium instruction and cost advantages. Implementation may begin through institutional consortia, exchange programmes, joint degrees, and targeted scholarships, alongside streamlined international admissions processes and global outreach. Even initial pilot efforts can catalyse long-term transformation.

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## 17 US–Kerala Visiting Faculty Summer School and Exchange Pathway

**PROF. VARGHESE MATHAI**

Kerala may pilot a US–Kerala Visiting Faculty Summer School and student-exchange pathway centred on 1-week intensive short courses addressing Kerala’s monsoon extremes, river and coastal management, and hazard mitigation. Themes shall include hydrology, geomorphology, fluid mechanics, flood forecasting and hydrologic modelling, coastal dynamics and storm impacts, sea-level rise, and environmental flows. Courses can be hosted at leading institutions in Kerala to reach strong BTech/BSc students, while enabling participation from nearby colleges and remote attendees. The model can be low-cost and practical: invite US faculty—particularly those already visiting India for sabbaticals or family trips—to add a 5-day teaching stop in Kerala. The host institution would provide domestic travel, accommodation, and logistics. Visiting faculty may offer 2–5 day courses at minimal cost beyond local support. A transparent “teach + experience Kerala” component scheduled outside teaching hours can enhance participation. Each course may include a structured session on funded US MS/PhD pathways, offering guidance and interaction with students. Where feasible, lectures can be recorded to create reusable academic resources. Funding support may be pursued through India’s GIAN programme for foreign faculty short courses. Over successive summers, the pilot can scale into a sustained training and collaboration pipeline between Kerala and US institutions.

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## 18 Social Justice Heritage and Global Research Excellence

**DR. PK YASSER ARAFATH**

*Fulbright Fellow, Associate Professor, University of Delhi*

Kerala shall establish a Dalit Museum to showcase the history, culture, struggles, resistance, and resilience of formerly untouchable castes, on the lines of the Black museums in the United States. Such a museum can become an important centre for both research and tourism.

The State shall also organise a Global Social Science Research Conclave that brings together scholars and professors from different parts of the world. This platform can enable them to share their research and inspire the next generation of young researchers from Kerala. Given the large number of scholars researching in Kerala, across India, and in different parts of the world, the State deserves research journals of international standing. Therefore, the State shall encourage and publish international research journals in collaboration with reputed global publishing houses. The editorial board should consist of active scholars from diverse schools of thought, and the peer-review process must be conducted with complete academic integrity.

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## 19 Professors of Practice to Enhance Management Education Quality

**B. JYOTHIKUMAR**

*Professor of Practice, Saintgits Institute of Management Kottayam*

The State shall strengthen the quality of management education by institutionalising the structured engagement of industry experts as Professors of Practice, in alignment with AICTE and UGC guidelines. Recognising that many institutions lack the capacity or willingness to independently appoint such professionals, Universities in Kerala shall empanel qualified industry experts across various domains of management and business expertise. Their service will enhance practical exposure, bridge the gap between theory and industry practice, and improve the overall quality and relevance of management education in the State. It shall be made mandatory for all management institutes to engage empanelled Professors of Practice for a minimum prescribed number of teaching or mentoring hours each academic year. These experts shall be paid directly by the respective institutes, based on standardised remuneration slabs notified by the concerned Universities.

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## 20 Protecting Faculty Rights and Empowering Youth through Employment and Entrepreneurship in Kerala

**DR. ATHIRA M**

The State shall protect the basic rights of the faculty community in the self-financing sector by ensuring fair salary structures and transparent, standardised HR policies. Simultaneously, under the vision of “Empowering Minds, Enriching Lives,” the State shall focus on creating job opportunities and strengthening an entrepreneurial ecosystem for youth in Kerala, thereby enabling productive engagement and steering them away from drug usage.

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## 21 Need-Based Higher Education in Science

**JAYACHANDRAN KOCHUPURACKAL**

*Professor, Mg University*

Higher education is undergoing significant transformation at both global and national levels. Kerala must advance in alignment with global changes while critically adapting to national level reforms. The ongoing Four-Year Undergraduate Programme and the proposed One-Year Postgraduate Programme, along with their emphasis on skill development and entrepreneurship, offer promising opportunities. However, to ensure effective implementation and to guarantee employment opportunities for students in science disciplines, clear and structured action plans are required—especially in emerging domains such as biotechnology, artificial intelligence, and data science, which are opening new frontiers across sectors.

A Need-Based Higher Education Strategy (NBES) is therefore essential. Since “need” drives change and relevance, adopting a need-based approach can address several existing challenges in higher education. For example, waste management is a pressing societal need. Although research is being conducted in universities and research institutions, knowledge about practical applicability remains

limited. A structured strategy is required to align curricula with local needs, such as wastewater management, through expert committees that evaluate regional contexts and recommend curriculum reforms. Biotechnology and other emerging fields can significantly contribute if systematically integrated. This approach can be extended across disciplines. State-level surveys should audit existing programmes and identify demand as well as assess pressing scientific and societal needs. Based on their findings, subject expert committees can recommend timely reforms. Need-based higher education reform will enhance public investment efficiency, improve employability, and ensure that scientific advancements meaningfully reach society.

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## 22 Economic Returns to Higher Education and a transition to Research-integrated, Application-driven Learning In Kerala

**DR. REMYA MOHAN**

*Assistant Professor, Baselius College, Kottayam*

Education as an investment can be evaluated through its rate of return, defined as the discount rate equating the present value of educational costs with future earnings. While extensive literature exists globally, studies estimating returns to higher education in India—particularly in Kerala—remain limited. Kerala has high literacy (93.91%, Census 2011), high enrolment ratios, and high unemployment. This raises important questions regarding the economic returns to higher education in the State. Findings show that costs are lowest in government/aided colleges and highest in technical and self-financing institutions. Urban students, hostellers, higher-income groups, and non-scholarship recipients incur higher costs. Earnings increase with higher educational levels, particularly in technical education and government employment. Postgraduates earn more than undergraduates overall. The rate of return is 53.7% for general undergraduates, 30.8% for postgraduates, 79.3% for B.Tech, and 10.7% for M.Tech. The overall return to higher education is 64.8%, with demand strongly influenced by rate of return. State policies shall emphasise on the aspect of economic returns to the higher education sector in Kerala to take informed policy-making decisions.

Furthermore, Kerala's higher education system requires a shift from exam-oriented, syllabus-bound teaching to research-integrated, application-driven learning that strengthens practical competence and employability. Faculty roles must evolve toward industry-linked research and real-world problem solving. To achieve this, institutions should establish MOUs with leading national and international universities and industries, promote faculty sabbaticals and post-doctoral collaborations, mandate structured industrial training for faculty, and introduce student exchange programmes. Additionally, centralized instrumentation centres in major government engineering colleges and advanced training for laboratory technicians are essential to strengthen research infrastructure and practical exposure. These measures will enhance academic quality, industry relevance, and global competitiveness.

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## 23 Strengthening Institutional Quality and Student Well-Being in Higher Education

**SHREELEKSHMI R**

*Professor and Head, Marian Engineering College*

The State shall take measures to strengthen institutional quality and student well-being. A mandatory daily 40-minute wellness session for students and teachers, incorporating physical activity, yoga, and reading, shall be introduced to promote physical and mental health in response to increasingly sedentary lifestyles. Adequate faculty strength shall be ensured in high-demand engineering branches, particularly Computer Science and Engineering, by creating new positions or reallocating posts from institutions or departments with surplus faculty. Furthermore, academic and administrative autonomy shall be granted to leading engineering institutions such as the College of Engineering Trivandrum and Government Engineering College, Thrissur, with institution-specific faculty recruitment to enhance accountability, academic excellence, and research quality.

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## 24 Recommendations on Higher Education, Scientific Temper, and Economic Resilience

**KARL I. JACOB**

*Professor, George W. Woodruff School of Mechanical Engineering*

Kerala's higher education institutions face faculty shortages, infrastructure gaps, and the need for curriculum reform, contributing to talent drain as students and skilled professionals migrate for better opportunities. A strong public-private partnership model supported by a steady, long-term strategic plan is essential to enhance institutional quality and retain talent.

Although Kerala has a vibrant startup ecosystem, nearly 80% of startups fail within three years due to lack of market need, limited funding, weak business models, and talent retention challenges. The Government and higher education institutions shall provide structured support for developing viable business models, entrepreneurial mentoring, and strategic planning to improve startup sustainability.

Despite high literacy, there is a growing erosion of scientific temper, reflected in the rise of pseudoscience and superstition. Education policy shall reinforce rational, evidence-based thinking while respecting fundamental rights, ensuring that scientific inquiry and critical reasoning are strengthened through curriculum and cultural engagement.

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## 25 Education, Research, and Industrial Development for Community-Centred Growth

**PRASANTH KUMAR SASIDHARAN PILLAI**

Kerala should adopt a strategic approach that directly links education and research with industrialisation and community development. Academic research and higher education programs must be aligned with agri-linked manufacturing and decentralized industrial clusters, ensuring that research outputs translate into

practical solutions, technologies, and employment opportunities. Universities and public research institutions should prioritize pilot-scale validation, field deployment, and industry-linked training rather than focusing solely on academic publications. Community outreach programs, extension activities, and skill-based education should be integrated into research mandates so that farmers, cooperatives, MSMEs, and local entrepreneurs directly benefit from scientific advances. By embedding education and research within industrial and community ecosystems, Kerala can create a feedback loop where innovation drives employment, improves livelihoods, and strengthens local economies, while simultaneously building a skilled workforce and a socially responsive research culture.

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## 26 Strengthening Scientific and Social Science Research Ecosystems in Kerala

**RAJU PARAKKAL**

*Professor of International Relations, Thomas Jefferson University*

Kerala shall significantly expand science and social science research through enhanced government and private funding for basic, applied, and policy-oriented research. Comprehensive and equitable development requires the systematic creation and dissemination of first-rate scholarly knowledge about Kerala's own society, economy, and environment. At present, the State lacks a strong collaborative research profile that brings together domestic and international scholars to address issues critical to long-term development. To address this gap, the Government shall establish a dedicated research funding body to transparently evaluate proposals and award grants to meritorious projects, similar in function to leading international research councils. Strengthening public-private collaboration in research funding and implementation will be essential to building a robust knowledge ecosystem and ensuring Kerala's sustained and long-term development.

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## 27 Kerala's Potential as a Global Knowledge and Higher Education Hub

**FR JAISON PAUL MULERIKKAL CMI**

*Principal, Rajagiri School of Engineering and Technology (Autonomous), Kochi,*

Kerala is well positioned to become a natural global higher education hub, given its high literacy rate, strong elementary education system, advanced civic sense, natural beauty, and high tourism intensity. However, policy hurdles must be addressed to unlock this potential. The State currently does not have a single Deemed-to-be or private university, and there are very limited seats in niche areas such as AI, Computer Science, IoT, Chip Design, and B.Des. Seat expansion and rational fee revisions are constrained by restrictive regulatory controls. To create a world-class higher education system, Kerala must undertake meaningful policy reforms that unleash its inherent strengths and academic capacity. A dedicated working group should be constituted to recommend necessary changes, supported by clear political will to implement them. Creating an enabling ecosystem to institutionalise these reforms is the need of the hour for advancing a knowledge-driven economy in Kerala.

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## 28 Anchoring Kerala's Knowledge Economy: Universities, Innovation, and Public Purpose

**PROFESSOR THANKOM ARUN**

*University of Essex, Professor*

Many Western countries—particularly the United Kingdom—are expanding their higher-education presence in India through campuses, joint ventures, and research partnerships, creating a timely strategic opportunity for Kerala to proactively attract a select number of high-quality international universities and position itself as a regional and global education hub. The value of such institutions lies not merely in degree delivery, but in their ability to engage deeply with Kerala's development priorities by contributing advanced research capabilities, pedagogical innovation, global networks, and frontier technologies. Kerala already possesses strong foundations in IT services, digital platforms, health, education, and creative industries; however, the key challenge is value retention—generating innovation locally, creating intellectual property, and anchoring firms within the State. Strategically embedded international universities can catalyse joint research programmes, doctoral training, incubation ecosystems, and industry-linked innovation platforms, helping Kerala move up global value chains rather than remaining primarily a supplier of skilled labour. Through close partnerships with local universities, research centres, incubators, and public institutions, these collaborations can ensure that knowledge, intellectual property, and skilled employment are retained locally, accelerating Kerala's transition to an inclusive, innovation-driven, and globally connected knowledge economy.

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## 29 Biotechnology and AI in Medicine Education

**MATHEW**

The State shall initiate undergraduate programmes in Biotechnology in Government colleges, along with healthcare-oriented academic programmes and specialised courses in Artificial Intelligence in Medicine, particularly through collaboration with reputed foreign universities such as UIC or other global institutions.

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## 30 Improve Kerala's Skill Certification Ecosystem

**DR.MUHAMMED SHA S**

Kerala has a strong skill development ecosystem with more than 126 Skill Development Centres and over 200,000 trained students under various government programmes. However, many private training institutions depend on universities from other states for certification, paying Rs. 3,000 to Rs. 8,000 per student. Since UGC-recognised certificates are essential for overseas and corporate jobs, this leads to a large outflow of revenue from Kerala every year. The Government of Kerala may consider empowering state universities to provide standardised, UGC-recognised certifications for diploma, advanced diploma, certificate, and B.Voc programmes offered by private institutions within the state. This will help retain revenue, improve quality, and strengthen trust in Kerala-based certifications. In addition, creating a state-supported digital job portal connecting certified skill graduates and employers will improve employability and strengthen the skill-to-employment ecosystem.

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## 31 Facilitate Knowledge Ecosystems through Infrastructure, Multidisciplinary Research, and Industry Experience

**SARITHA UNNIKRIISHNAN**

The State shall facilitate knowledge growth for the next generation of educators and students in university campuses and integrate industry experience into campuses. This shall include building the required IT and high-performance computing infrastructure in universities; initiating government funding to support multidisciplinary research centres that facilitate collaboration between universities; and offering industry-led placements and industry-informed courses across universities. For this purpose, course validation panels comprising both industry representatives and academic representatives shall be constituted to review and approve proposed university course structures.

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## 32 Sustainable Development Goals (SDGs) in Higher Education

**DR. UPAMA RAJAN M.N.**

The State shall undertake a comprehensive transformation of higher education by integrating Sustainable Development Goals (SDGs), Artificial Intelligence (AI), and global competitiveness into a unified reform framework. Universities shall mainstream SDG principles across curriculum, research, governance, and campus management, aligning learning outcomes with sustainability goals and promoting interdisciplinary, mission-oriented research addressing national priorities such as energy, climate resilience, health, water, and digital inclusion. Dedicated funding mechanisms shall support SDG-focused centres of excellence, innovation hubs, and industry–government–academia collaborations to accelerate knowledge creation and societal impact.

Simultaneously, the State shall prepare institutions for the AI era by redesigning curricula toward dynamic, industry-aligned, and competency-based models. Universities shall adopt AI-enabled teaching, adaptive learning platforms, intelligent tutoring systems, and digital assessment frameworks to ensure personalised, inclusive, and outcome-driven education. Research ecosystems shall leverage AI for data-driven discovery, modelling, and simulation, strengthening innovation cycles and national competitiveness. Assessment systems shall transition toward continuous, formative, and skill-based evaluation supported by academic integrity technologies. To position Kerala as a global higher education hub, the State shall develop internationally benchmarked centres of excellence in future-oriented domains such as artificial intelligence, data science, health technologies, sustainability studies, marine sciences, and digital governance. Nature-integrated, environmentally sustainable education–industry campuses shall be established to attract global talent and foster innovation-driven economic growth. A “Study Local, Work Global” model shall be promoted through remote-work hubs, global research collaborations, scholarships, and startup integration. Higher education institutions shall be systematically aligned with the State’s IT and startup ecosystems to create clear, local pathways from education to high-quality employment

and entrepreneurship, ensuring talent retention and long-term knowledge-led development.

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## 33 Engineering Education for Socially Responsive and Community-Centred Innovation

**DEEPAK P.**

*Associate Professor of AI, Queen's University, Belfast*

The State shall reorient engineering education, particularly in the IT and computing sectors, toward addressing local social and developmental priorities. Recognising the growing tendency to treat engineering education primarily as a pathway to employment in large multinational corporations, the State shall introduce structural measures to reduce the disconnect between technical education and societal needs. Final-year projects, as a core academic requirement, shall be redesigned to encourage socially relevant, community-oriented problem solving. A State-level repository of priority themes addressing key local challenges—such as public health, agriculture, climate resilience, mobility, waste management, and digital inclusion—shall be developed to guide project selection. To ensure academic rigour and meaningful impact, a State-level panel of research-oriented faculty and domain experts shall be constituted to mentor and periodically review such projects. Students undertaking socially aligned projects shall be provided structured review opportunities with members of this expert panel during the project cycle. Further, a State-level recognition and award mechanism shall be instituted to incentivise excellence in socially responsive innovation. Colleges shall also be encouraged to balance industry internships with community-engaged learning models. Through these measures, engineering education shall foster social responsibility, contextual innovation, and locally grounded technological solutions, thereby strengthening the capacity of the technical education system to meaningfully contribute to Kerala's societal and developmental needs.

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## 34 The Need for Research Integration, Curriculum Relevance, and Faculty Development in Kerala's Higher Education System

**DR RENJU JOSEPH**

The State shall strengthen Kerala's higher education system by reinforcing research-teaching integration, curriculum relevance, and faculty capacity. Universities shall move beyond a predominantly teaching-centric model toward a research-integrated university system, embedding research within academic programmes and encouraging closer alignment between classroom learning and knowledge creation. Curricula shall be periodically revised to incorporate industry exposure, digital skills, ethical foundations, sustainability perspectives, and local socio-economic challenges, ensuring that graduates are employable while remaining socially responsible and contextually grounded. Structured mechanisms shall be developed to align academic content with emerging sectors without compromising academic depth or public purpose. Simultaneously, the State shall prioritise continuous professional development of faculty through pedagogical

training, research engagement, international exposure, and academic leadership programmes. To institutionalise these efforts, a dedicated Kerala Higher Education Faculty Development Mission shall be established to nurture academic leadership, enhance teaching quality, strengthen research culture, and retain talent within the public university system.

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## **35** Academia Collaboration, Research Innovation, and Inclusive Digital Access in Higher Education

**DR. DIPU VARGHESE**

The State shall strengthen industry-academia collaboration to improve employability by aligning curricula with emerging sectors relevant to Kerala, including IT, AI, biotechnology, healthcare, tourism, maritime studies, and renewable energy. Universities shall expand internships, apprenticeships, live industry projects, and co-designed courses at both undergraduate and postgraduate levels to equip students with job-ready skills and entrepreneurial exposure. The State shall also upgrade research capacity and innovation ecosystems by investing in well-funded centres of excellence across government and self-financing institutions, promoting interdisciplinary research, and incentivising faculty and student research through grants and global collaborations. Incubators, startup support cells, and technology-transfer offices shall be strengthened to translate research into societal and economic value. Further, quality, access, and digital transformation shall be enhanced through continuous faculty training, international exposure, and performance-based incentives. Digital and blended learning platforms shall be expanded, evening batches introduced to support working professionals, open educational resources promoted, and satellite centres of high-quality institutions established to improve access for rural, working, and marginalised learners while maintaining academic standards.

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## **36** Introduce interdisciplinary Curricula

**DR G HARIKRISHNAN**

Kerala shall introduce interdisciplinary curricula across all streams of higher education to foster Research and Development.

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## **37** Policy Recommendations for Strengthening Higher Education and Research in Kerala

**DR. JACOB THOMAS V**

The State shall adopt targeted measures to strengthen postgraduate education, research capacity, global engagement, and employability within Kerala's higher education system. Focused scholarships and financial incentives shall be introduced to promote enrolment in postgraduate engineering programmes, thereby nurturing advanced technical expertise and reinforcing Kerala's position as a leading centre for engineering education. To expand research depth, generous scholarships and competitive research fellowships shall be instituted to attract PhD scholars in

emerging and high-demand domains such as Artificial Intelligence, Data Science, Cyber Security, and other interdisciplinary frontier areas, accelerating innovation and strengthening the State's knowledge economy.

Industry–institute collaboration shall be systematically enhanced by encouraging industries to sponsor research projects, establish joint laboratories, and support applied research aligned with real-world challenges. Skill enhancement centres shall be expanded across institutions, with structured incentives to attract students and programmes focused on employability skills, emerging technologies, and entrepreneurship.

Structured foreign language programmes—particularly in Japanese, German, Chinese, and other globally relevant languages—shall be promoted to enhance international mobility and global employability. Simultaneously, hostel and campus infrastructure shall be upgraded to attract international students, especially from SAARC nations, as well as students from India's North Eastern states, positioning Kerala as a globally competitive and inclusive higher education destination.

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## 38 Comprehensive Higher Education Reform Framework for Access, Quality, Innovation, and Equity in Kerala

**GEORGE TOM VARGHESE**

*St. Joseph's College of Engineering and Technology, Palai (Autonomous)*

The State shall pursue a comprehensive higher education reform agenda centred on access, quality, innovation, equity, and governance. Gross Enrolment Ratio shall be significantly increased by expanding seats in underserved regions and among marginalised communities, strengthening outreach in northern and tribal districts, and expanding flexible pathways through open and distance learning institutions to support working adults and rural learners. Quality and global competitiveness shall be enhanced through mandatory NAAC/NBA accreditation, robust State-level quality assurance mechanisms, institutional autonomy with accountability, interdisciplinary innovation, and global academic partnerships. Research and innovation ecosystems shall be strengthened by establishing centres of excellence in emerging domains such as artificial intelligence, renewable energy, biotechnology, and marine sciences, alongside stronger industry–academia linkages, campus incubators, and technology parks. Digital infrastructure, advanced laboratories, and virtual learning platforms shall modernise teaching and research. Curricula shall be redesigned toward outcome-based, future-ready models integrating problem-solving, ethics, digital literacy, vocational pathways, and emerging technologies including AI and robotics. Equity measures shall expand scholarships, mentorship, counselling, and mental health support, while ensuring inclusive academic policies. Financial sustainability shall be secured through sustained public investment complemented by industry partnerships, CSR contributions, alumni engagement, and research grants. Governance reforms, aligned with a Vision 2031 roadmap, shall modernise institutional frameworks while safeguarding academic freedom and accountability.

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## 39 AI-native & Entrepreneurial Paradigm Shift in Education

**PROF. DR. (ENGG.) VARGHESE PANTHALOOKARAN**

*Senior Professor, Rajagiri School of Engineering and Technology*

As the very meaning of “learning” is transformed by intelligent machines, the State shall undertake a comprehensive overhaul of early childhood, school, higher, and lifelong education systems. Education as a whole has to make a radical AI-native & Entrepreneurial Transition.

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## 40 Bringing Kerala’s Global Talent Back Home

**MR TIRTHANKAR ROY**

Kerala’s greatest economic strength lies in its highly skilled people, many of whom have built distinguished careers abroad as scientists, researchers, and scholars. The State shall strategically leverage this global Malayali expertise by establishing structured mechanisms to encourage overseas experts to collaborate with local universities. Such engagement shall aim to elevate research standards, enhance global academic reputation, and strengthen university–industry partnerships.

Drawing lessons from international experiences where diaspora engagement significantly accelerated university advancement, the Government shall introduce supportive measures including competitive research grants, startup funding, flexible recruitment policies, and research autonomy to enable scholars to build high-impact research teams. Universities shall be empowered to align roles with individual expertise, provide access to quality research infrastructure and data resources, and permit flexible or dual appointments to sustain international collaborations.

Recognising that financial incentives alone may not be the primary motivation for diaspora scholars, the State shall also design engagement frameworks that acknowledge emotional and cultural aspirations. Opportunities to contribute meaningfully to Kerala’s development, mentor local students, and reconnect with familial and cultural roots shall be central to this initiative. By combining academic freedom, institutional respect, and targeted professional incentives, Kerala can create a mutually beneficial collaboration model that mobilises its global talent pool to strengthen research excellence and global competitiveness in higher education.

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## 41 Fostering an Industry-oriented Research Ecosystem in Higher Education

**DR GEETHA G**

In the higher education system, an industry-oriented research culture shall be established not only in premier institutions but also across Tier 2 and Tier 3 institutions, enabling broader participation in innovation and supporting India’s progress toward the highest global benchmarks. The teacher–student ratio shall be improved to optimal levels through the recruitment and development of qualified faculty, alongside sustained capacity-building initiatives to enhance academic quality.

Curriculum shall be aligned with evolving market and industrial demands—particularly in emerging areas such as Artificial Intelligence, Data Science, and other advanced technologies—to strengthen graduate employability and industry relevance. Further, higher education institutions shall integrate online and offline learning through blended and flexible models to meet contemporary societal requirements, expand access, and enhance learning effectiveness while maintaining academic rigour.

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## 42 Autonomy, Curriculum Reform, and Innovation Ecosystems in Government Engineering Colleges

**DR. AJAYAN K R**

The State shall undertake measures to transition Government engineering colleges in Kerala from affiliation under KTU to autonomous status in order to enable academic flexibility and industry-aligned reforms. The syllabi shall be restructured to closely align with industry requirements. The first year shall bridge the gap between science and engineering, while laying a strong foundation in Artificial Intelligence and its application development. The second year shall focus on strengthening fundamental subjects within the core areas of each discipline. The third year shall integrate AI and blockchain applications relevant to specific branches of engineering. The final year shall emphasise project-based learning and incorporate a finishing school concept, allowing students from any branch to specialise in a chosen area of engineering.

Technology parks shall be established in all Government engineering colleges to enhance students' entrepreneurial capabilities and promote innovation-driven activities. Additionally, the College of Engineering Trivandrum shall be transformed into an institution of national significance by upgrading its academic and research ecosystem and converting it into a fully functional 24-hour campus.

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## 43 Credential-Based Academia and Global Integration in Higher Education

**VISWANATH C NARAYANAN**

*Assistant Professor, Govt. Engineering College, Thrissur*

The State shall ensure that faculty appointments in Aided Colleges and Universities across Kerala are conducted strictly on a transparent, merit-based framework, eliminating practices influenced by caste, community, financial considerations, or political affiliations. The State shall also create a policy framework to permit high-quality foreign universities—particularly those ranked within the top 200 globally—to establish centres in Kerala. The State shall also make efforts to bring together an expert panels of scientists and academicians across the State selected purely on measurable research credentials, including recognised indices such as Scopus and Google Scholar H-Index metrics.

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## 44 Social scientific perspectives on Science and Technology Studies (STS)

**DR. SHIJU SAM VARUGHESE**

Social scientific perspectives on science and technology are essential for harnessing their potential to address the developmental and ecological problems that Kerala faces today. Methodologically informed perspectives on S&T, offered by the academic field of Science and Technology Studies (STS), are particularly valuable in training young minds to become socially responsible scientific researchers and teachers. Unfortunately, discussions often continue to revolve around the redundant perspective of scientism, a viewpoint that restricts understanding of how social processes and scientific and technological knowledge are co-shaped. This narrow framing limits the ability to grasp the complexity of development and ecological challenges. Therefore, it is relevant to establish research and teaching departments in the field of Science and Technology Studies (STS) within Kerala's universities and research institutes (such as CDS, for example) in order to influence intellectual and policy debates and practices. Such institutional initiatives will help address developmental and ecological problems in their complexity from an interdisciplinary perspective. They will also contribute to organising science education more effectively and to formulating more informed and socially grounded science and technology policies.

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## 45 Strengthening Mixed-method Approaches, Research Culture, and Academic Freedom in Kerala's Higher Education System

**SANKAR VARMA**

There is a broad concern that many higher education institutions in Kerala continue to rely on age-old methodologies. There is a need to promote mixed-method approaches that build on both quantitative and qualitative traditions. Such an approach would make doctoral theses and other research outputs more interdisciplinary, nuanced, and methodologically robust. Public universities may also take note of the growing research orientation visible in certain private institutions. Greater emphasis must be placed on high-quality publications, including Scopus-indexed journal articles as well as meaningful academic contributions to periodicals and newspapers, as part of responsible academic profiling. While a few scholars from Kerala have achieved visibility in this regard, such engagement should not remain limited to select individuals. A more democratic and collaborative research culture must be fostered across institutions. It is important to encourage balanced institutional collaboration between public and private research bodies, avoiding ideological polarization in academic spaces. Safeguards must be in place to ensure academic freedom and prevent excessive conservatism or bias from influencing research topics and doctoral work. Finally, doctoral degrees and research qualifications should be strengthened as genuine contributions to knowledge creation, rather than being pursued merely for career advancement or salary benefits within academic positions.

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## 46 Centre of Excellence in Rare Earth Materials and Development of Functional Nutraceutical Food Products

**M T SEBASTIAN**

Government of Kerala shall institute a Centre of Excellence in Rare Earth Materials at the University of Kerala. Rare earth elements are crucial for electronics and permanent magnets. In view of the importance highlighted in the Union Budget and the proposed Rare Earth Corridor across Kerala–Tamil Nadu–Odisha, the State shall develop advanced research and technology capabilities in this strategic sector.

Government of Kerala shall institute a Centre of Excellence in Rare Earth Materials at the University of Kerala. Rare earth elements are crucial for electronics and permanent magnets. In view of the importance highlighted in the Union Budget and the proposed Rare Earth Corridor across Kerala–Tamil Nadu–Odisha, the State shall develop advanced research and technology capabilities in this strategic sector. The State shall also produce functional and nutraceutical food products with high health value. Universities and research institutions shall be encouraged to develop low-sugar, health-oriented food products incorporating medicinal plants, spices, and fruit powders indigenous to Kerala. Examples include fortified bakery products such as moringa leaf powder–based cookies, spice-infused products containing cardamom, nutmeg, cinnamon, pepper, and cloves, and formulations incorporating medicinal plants such as naruneendi, kurunthotti, and aloe vera. Fruit-based functional products using guava, mango, jackfruit, etc. This initiative shall promote agro-based innovation, public health, entrepreneurship, and export-oriented food technology development.

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## 47 Enhancing Enrolment in Basic Sciences

**DR. SUNILKUMAR P. N.**

When pre-degree courses functioned within colleges, students benefited from early exposure to laboratories, senior students, and faculty engaged in advanced teaching and research. This environment encouraged curiosity and helped build a strong academic identity in science. After delinking, higher secondary education became more school-centred and examination-oriented, with increasing emphasis on marks and entrance preparation, which gradually reduced exploratory engagement in core science subjects. A more practical and equitable strategy to enhance enrolment in Basic sciences within Kerala's higher education is to strengthen collaboration between schools and colleges rather than change institutional structures. Academic partnerships—such as shared laboratory access, mentoring, lectures, and enrichment programmes—can provide early exposure to higher-level science learning while keeping students within supportive school environments. Carefully designed pilot initiatives and improved visibility of career pathways in basic sciences through internships, research exposure, and competitive training programmes can further enhance student motivation. Strengthening this academic continuum offers a more sustainable path to revitalising basic science education.

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## 48 Recommendations for Strengthening Governance, Research Decentralisation, and Accountability in Higher Education

**SUDHEEP N.M.**

*Post Doc Fellow, Mahathma Gandhi University*

The State shall establish a transparent and standardised framework for course equivalency and research experience evaluation, ensuring uniform, timely, and non-discriminatory recognition of degrees obtained from UGC-recognised and reputed institutions outside Kerala for admissions, employment, and academic progression. Evaluation of research experience shall be decoupled from fellowship amounts and instead assessed through structured criteria including duration, research outputs, institutional credibility, and nature of scholarly contribution.

Research capacity shall be decentralised beyond a few universities and metropolitan centres through targeted funding, shared research facilities, and mentorship-based consortium models to strengthen regional and emerging institutions. Universities shall be formally mandated and incentivised to undertake problem-driven research aligned with State development priorities in sectors such as agriculture, environment, health, fisheries, and local self-government.

Common minimum standards shall be instituted for doctoral supervision, coursework quality, mentoring, and progress review, alongside structured training in research ethics, data integrity, academic writing, and open science. Digital infrastructure shall be leveraged to enable inter-university course sharing, virtual laboratories, joint supervision, and expert lecture networks to optimise resources. Finally, outcome-based public accountability frameworks shall be introduced to evaluate societal impact, student progression, regional relevance, and research utilisation, thereby strengthening governance, transparency, and evidence-based policy reform.

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## 49 Integrating Practical Research Training and Industry Exposure in Postgraduate Education

**AYSHA JASMIN M P**

*Intern student, Kerala State Planning Board*

The State shall include, within the postgraduate syllabi of higher education streams, a dedicated paper that provides hands-on or practical training in the research tools and software required for advanced study. In addition to theoretical instructions, appropriate industry exposure shall be ensured so that students can relate their theoretical learning to practical and professional contexts.

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## 50 Engineering the Future Faculty: Strategic Reforms to Revive M.Tech and Recruit Tomorrow’s Professors

**NELWIN RAJ N. R.**

*Assistant Professor, Dept of ECE, Sree Chitra Thirunal College of Engineering, Pappanamcode*

The State shall prioritise the theme of “Engineering the Future Faculty” by undertaking strategic reforms to revive M.Tech programmes and build a strong pipeline of future professors. Top of Form

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## 51 Advancing Postgraduate Life Sciences Education through Biotechnology Training

**DR.ACHUTHAN RAGHAVAMENON**

*Associate professor, Amala Cancer Research Centre*

The State shall integrate adequate hands-on training in advanced technological aspects of life sciences—such as molecular biology, gene editing, molecular diagnostics, protein chemistry, and related domains—into postgraduate curricula as a mandatory component. To support this objective, advanced startup and technology centres in relevant biotechnology fields shall be established and strengthened with a focus on delivering high-end services in research, medicine, and education. During the initial stages, these centres shall collaborate with nearby and distant colleges to provide structured practical training programmes for postgraduate students in coordination with institutional authorities. This initiative shall enhance the quality and attractiveness of postgraduate education in life sciences and position Kerala as a hub for product-oriented advanced biotechnology. It shall create employment opportunities for locally trained professionals and promote research and production of high-value biomolecules for medical applications, including monoclonal antibodies, advanced drug development (including vaccines), and advanced diagnostic methodologies. Over time, such investments shall strengthen Kerala’s capacity for biotechnology innovation and contribute toward greater self-reliance in critical biomedical technologies.

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## 52 Establishing an Overseas Higher Education Guidance and Information Framework

**DR. USHA MENON**

The State shall establish a transparent and credible Overseas Higher Education Guidance Framework to support students from Kerala seeking admission to universities in countries such as Canada, the United States, the United Kingdom, and Australia. Recognising the academic, financial, and emotional challenges faced by many students due to inadequate or misleading information, the Government shall create an official advisory mechanism that provides accurate, evidence-based, and regularly updated guidance on international higher education systems. This framework shall provide clarity on selecting accredited and reputable universities and programmes; understanding the differences between universities and colleges; visa regulations and compliance requirements; realistic expectations regarding part-time work, post-study employment, and permanent residency pathways; and

common pitfalls in immigration procedures. It shall also address ethical concerns and red flags associated with unregulated international education agencies, which often present unrealistic promises related to admissions, employment, and migration outcomes. Through awareness programmes, verified counselling services, and collaboration with credible institutions, the State shall promote informed decision-making among students and families. This initiative will reduce financial and legal risks, improve student preparedness, and ensure that Kerala's aspiring international students make responsible and well-informed educational choices.

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## 53 Knowledge Economy Transformation and Mission-Oriented Higher Education Reform

**PROF. RADHAKRISHNAN E.K.**

*School of Biosciences, MG Univeristy, Professor*

Kerala shall undertake a knowledge economy-aligned transformation of the higher education sector as well as strategically network the facilities, resources, and expertise of all higher education institutions to address problems of State relevance. A coordinated, mission-driven approach shall be adopted whereby a single theme of strategic importance is identified annually, and all academic programmes, training modules, internships, and projects—including those under the Four-Year Undergraduate Programme (FYUGP)—are aligned to work on the selected theme in an interdisciplinary manner. This annual knowledge mission shall function as a statewide academic movement, generating measurable outcomes for development while providing large-scale, structured, and socially relevant training opportunities for FYUGP students. By integrating academic work with real societal challenges, students shall gain practical exposure while contributing meaningfully to Kerala's development priorities.

Further, the State shall initiate a parallel mission to transform at least 50% of existing research positions toward entrepreneurship-oriented roles, with a focus on technology development, application, innovation, and startup creation. This shift shall strengthen the innovation ecosystem, promote knowledge-based enterprises, and ensure that research outputs translate into economic and societal value for the State.

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## 54 Industry–Academic Integration, Digital Globalisation, and Decentralised Research for Development

**JOBIN VARGHESE**

The State shall establish Industry–Academic Fusion Hubs in every university through structured partnerships with leading industrial houses to bridge the skill gap and address graduate unemployment. 'Co-creation Labs' shall be instituted within campuses to promote applied research, innovation, and industry-relevant skill development. Under the Four-Year Undergraduate Programme (FYUGP) framework, the final semester shall be dedicated to industry-integrated internships, ensuring sustained practical exposure and strengthening Kerala's transition toward a robust knowledge economy.

To democratise access to international-quality education, the State shall extend the ‘Global School’ model to higher education by promoting dual-degree programmes in collaboration with reputed foreign universities through hybrid (online and offline) modes. High-speed digital infrastructure shall be strengthened, particularly in rural and regional colleges, to enable access to global lectures, research mentorship, and international academic networks.

Research decentralisation shall be pursued by aligning university research projects with the developmental challenges of Local Self-Government Institutions (LSGs). ‘Local Development Fellowships’ shall be introduced to support researchers in addressing region-specific issues such as waste management, agricultural crises, and sustainable resource management, ensuring that academic research directly contributes to community development and policy outcomes.

## 55 Knowledge Economy–Driven Reform for Kerala’s Higher Education System

**GIN JOSE**

Kerala shall undertake a transformative, knowledge economy–aligned reform of its higher education sector through a comprehensive and structurally integrated policy framework. Recognising that university rankings alone do not adequately reflect societal impact, the State shall reposition universities as engines of employment generation, regional development, and interdisciplinary knowledge creation. The State shall formulate a comprehensive Higher Education Policy bringing all higher education and research institutions under a single Department of Higher Education, Research and Innovation; modernize university governance and improve faculty–student standards, alongside comprehensive restructuring of the Higher Education Council and enactment of a revised Kerala Universities Act. Major state universities shall be developed into large, multidisciplinary, research-oriented institutions with global standards within a defined timeframe.

A minimum additional annual investment of Rs. 10,000 crore shall be allocated to enable infrastructure expansion, faculty strengthening, research capacity building, and internationalisation. Curricula—including the FYUGP framework—shall be reoriented toward research-based, interdisciplinary, and skill-oriented learning models. A Kerala Research and Innovation Agency (KRIA) shall be constituted as a unified state-level funding body, with dedicated allocations from various departments to support mission-driven research. Strategic emphasis shall be placed on emerging scientific disciplines, Centres of Excellence, health research, elderly care systems, sustainable development, and diversity. Structured linkages between higher education institutions shall be strengthened to build long-term academic pathways.

## 56 Kerala as a Pioneer in Open Knowledge and Open Science

**DR. GIREESH KUMAR T. K.**

Kerala may be positioned as a national and international model for Open Knowledge and Open Science by strengthening policies that promote open data,

open research, and open educational resources. Building on the state's strong public education system and digital infrastructure, coordinated efforts among government departments, universities, and research institutions can further ensure transparency, public access to knowledge, and citizen participation in scientific and social research. Kerala can further consolidate its contributions to the Open Access movement by encouraging publicly funded research to be published in open-access platforms and by strengthening institutional repositories in universities and research institutions. Support for open-access journals, capacity-building for researchers and librarians, and alignment with global Open Access policies will help democratize knowledge, enhance research visibility, and promote equitable access to scholarly information.

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## 57 Need for Comprehensive Policy Frameworks in Higher Education Reform

**SIBU SIMON**

The higher education sector is increasingly struggling to attract, develop, and retain high-quality human resources. Research careers remain uncertain, poorly incentivized, and weakly aligned with long-term employment opportunities, leading to a steady loss of trained talent. There is an urgent need for comprehensive policy frameworks that make research careers financially viable, professionally rewarding, and structurally stable, while also ensuring clear pathways for researchers to transition into suitable academic, industrial, and societal roles. State shall take measures for Immediate policy intervention in this regard as the need of the hour. Also, the connection between academic research and tangible societal benefit is often overlooked, despite its central role in sustainable development. Research outputs frequently remain confined within academic circles, limiting their broader impact. Dedicated policies and institutional platforms should therefore be created to facilitate regular, structured, and meaningful dialogue between academicians and the general public. Such bilateral engagement will not only improve public understanding of science but also help align research priorities with real-world societal needs.

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## 58 Reverse Migration, Global Education Clusters, and Medical Tourism–Driven Development Strategy

**DR.K C JAMES RAJU**

*Senior Professor, University of Hyderabad*

The State shall promote reverse migration by establishing world-class higher education cluster zones in Kerala through private and international investment. These institutions shall deliver global-standard education at fees lower than major international destinations but higher than prevailing domestic rates, enabling cross-subsidisation to ensure affordability for Kerala students. This model shall attract NRIs and foreign students, generate employment across skill levels, and encourage highly qualified Keralites abroad to return. Anchor institutions such as Kerala Digital University may catalyse the development of specialised, globally competitive centres across sectors.

Kerala shall also develop an integrated medical tourism ecosystem through internationally benchmarked healthcare clusters supported by NRI and global investment. Strengthened medical infrastructure will help retain skilled professionals, generate domestic revenue, and expand affordable medical education within the State. Unused NRI homes may be integrated into structured accommodation networks for medical tourists, maximising existing investments and stimulating economic activity.

A statewide civic education initiative shall also be implemented across all levels to cultivate civic sense, responsible conduct, and global citizenship among students, enhancing Kerala's social standing globally,

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## 59 Cross-Domain Research in Performing Arts and Arts Integrated Sciences

**DR. METHIL DEVIKA**

*Post-Doc Fellow, The Kerala State Higher Education Council*

The Government of Kerala shall explore and encourage possibilities of cross-domain research in performing arts and arts integrated sciences.

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## 60 Establish Kerala Research Cluster

**DR B EKBAL**

A research cluster has been formed based in the capital city (Thiruvananthapuram), involving eight Central Government research institutions located there. The Kerala Government should engage with the Central Government to establish a comprehensive Kerala Research Cluster that is not limited to Central Government institutions in the capital. This cluster should also include approximately 9 institutions under the Kerala State Council for Science, Technology, and Environment (KSCSTE) and other Central Government institutions located in different districts. Furthermore, this newly formed Kerala Research Cluster must establish academic ties with universities across Kerala. It should be possible to jointly formulate and implement innovative interdisciplinary courses by utilizing the research and laboratory facilities of the research institutions. Experts from these research institutions can be deputed to universities to teach relevant courses. Efforts should also be made to expand internships at these institutions to allow research-oriented students to participate in the rich, diverse research environment they offer.

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## 61 Higher Education, Research, and Health Tourism Transformation

**PROF. M.P. RAJAN**

*Professor, IISER Thiruvananthapuram*

The State shall launch “Destination Kerala – Higher Education & Research” as a flagship initiative to transform Kerala into a leading global hub for higher education and research. A comprehensive restructuring of curricula shall be undertaken, progressively converting undergraduate programmes into four-year international-

standard degrees with research and development as a core component. Each university shall establish 4–5 state-of-the-art International Research and Development Centres of Excellence, recruit high-calibre faculty, and significantly enhance R&D funding. Interdisciplinary, skill-based, and socially responsible curricula shall be introduced, alongside modern courses aligned with emerging global demands. Industry–academic partnerships, International Advisory Boards, and dedicated International Admission Offices shall be institutionalised. Kerala shall actively participate in the Study India Programme, target students from South-East Asia, SAARC nations, and Africa, and globally promote “Study in Kerala” in synergy with tourism. Accreditation, NEP-2020 alignment, enhanced institutional autonomy, and social responsibility credits linked to local governance engagement shall be ensured. Parallely, the State shall implement “Health Care and Welfare for All – Health Tourism” by establishing a world-class medicity integrating advanced treatment, research, and Ayurveda. Government medical colleges shall be upgraded as Centres of Excellence with improved infrastructure and NRI seats. Universal floating medical insurance shall be introduced, and medical tourism shall be globally promoted. Palliative care units shall be established in every panchayat to ensure inclusive healthcare access.

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## 62 Enhancing Research Quality and Accountability in Health and Life Sciences

**DR SATISH C NAIR**

*Director, Medical Research, John Hopkins International*

To ensure higher returns on public investment and strengthen the quality of research and education in health and life sciences, the State shall introduce structural reforms focused on global benchmarking, accountability, and excellence. All major education and research projects shall be subject to periodic review and vetting by qualified international experts to ensure adherence to global standards and measurable outcomes. A structured public–private partnership (PPP) framework shall be established to Build, Operate, Transfer, and Monitor high-impact education and research initiatives, ensuring professional oversight, sustainability, and performance accountability. The State shall actively pursue internationally recognised accreditations—such as AAHRPP and other relevant global certifications—to enhance institutional credibility, ethical compliance, and international collaboration. Furthermore, a State-level registry of exceptional researchers and educators in health and life sciences shall be developed based on objective criteria including peer-reviewed publications, patents, translational impact, and recognition by global peers. This merit-based registry shall inform strategic appointments, advisory roles, and funding priorities. Through these measures, Kerala can position itself as a first mover in building a knowledge economy driven by research excellence, patents, global ratings, human capital development, and collaborative funding.

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## 63 Research Excellence, Academic Accreditation, Community Health, and Civic Infrastructure Development

**SUNI EBBY**

*Lecturer, University of Sharjah*

The State shall strengthen advanced research infrastructure across universities by investing in modern laboratories, interdisciplinary research wings, and competitive fellowships, while promoting university–industry collaborations to translate innovations into societal and economic value. Dedicated support mechanisms shall be instituted to enable institutions—both public and private—to obtain national and international accreditations, improve global rankings, and expand joint degree programmes and faculty exchange partnerships.

To enhance public health outcomes, the State shall implement ward-level awareness seminars on mental health and lifestyle diseases, alongside screening campaigns for early detection of non-communicable diseases. These initiatives shall be integrated into a strengthened community-based health framework by coordinating local self-government institutions, Kudumbashree networks, and ASHA workers to ensure outreach, preventive care, and sustained community engagement.

Civic infrastructure shall be improved through the systematic installation of walking pavements and comprehensive waste management systems, including adequate trash bins—not limited to bottle disposal units—across villages and towns, ensuring proper collection and disposal mechanisms to promote public hygiene and sustainable urban development.

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## 64 FYUGP for Research-oriented Topics

**ASHA LAKSHMIKUTTYAMMA**

Government of Kerala shall develop a four-year undergraduate program with an emphasis on topics that equip students to pursue research.

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## 65 Abolition of Equivalency and Migration Certificate Requirements within Recognised Indian Institutions

**DR ISMAIL THAMARASSERI**

The present practice of demanding equivalency certificates and migration certificates from students who have completed their studies in UGC-recognised universities or AIU-recognised institutions is an outdated and unjust barrier to academic mobility. This procedure causes unnecessary financial burden, procedural delays and psychological hardship to students, particularly those seeking admission to postgraduate programmes, employment, or further studies within Kerala. When the degrees are already issued by statutorily recognised institutions of India, subjecting learners to additional verification mechanisms reflects institutional mistrust and contradicts the spirit of the National Education Policy that promotes seamless credit transfer and student mobility.

Kerala should take a progressive policy decision to abolish the mandatory requirement of equivalency and migration certificates for admissions, appointments and higher studies within the State for qualifications obtained from UGC/AIU approved institutions. Instead, a simple online verification through DigiLocker, ABC ID or university portals must be accepted as sufficient proof. This reform will reduce exploitation by middle agencies, prevent loss of academic opportunities due to bureaucratic delay, and affirm Kerala's commitment to learner-friendly governance in higher education.

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## 66 Structured Research Capacity Building and Strategic Research Planning

**CHANDRA NAIR**

The State shall direct higher education and research institutions to institute expert-led short-term intensive training modules of two to four weeks' duration to strengthen methodological and technical competencies among graduate students and early-career researchers. These modules shall complement existing academic programmes by offering focused, practice-oriented training under the guidance of nationally and internationally recognised experts. Unlike conventional symposia, these structured engagements shall provide sustained, interactive learning experiences that bridge theoretical understanding and research readiness. The objective is to cultivate a skilled research cohort capable of contributing meaningfully to priority areas of scientific and technological advancement.

Simultaneously, all academic and research departments shall be required to formulate comprehensive long-term strategic research agendas. These agendas shall clearly define thematic priority areas for sustained capacity building and knowledge generation, ensuring coherence, continuity, and alignment with nationally and globally significant research frontiers. By reducing fragmented efforts and encouraging investment in domains of enduring scientific and strategic relevance, this approach shall strengthen institutional research ecosystems and enhance international competitiveness.

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## 67 AI-Co-Creation Framework for Higher Education and Lifelong Learning

**ANJU JOHNSON**

The State shall establish a statewide "Kerala AI-Co-Creation University Framework" by 2028, positioning Kerala as the first Indian state to mandate ethical, curriculum-integrated generative and agentic AI as structured co-learning partners across all higher education disciplines, including STEM, humanities, social sciences, and professional programmes. AI co-creation modules shall be embedded in all undergraduate and postgraduate curricula, supported by AI Innovation Labs established in every university and college cluster. A comprehensive Kerala AI Ethics and Governance Framework for Education shall be formulated to ensure responsible use, transparency, data protection, and academic integrity.

The State shall also create "AI-for-Kerala Interdisciplinary Capstone Hubs" within university clusters to co-develop locally relevant AI solutions through cross-

disciplinary teams. Priority areas may include Malayalam-language AI tutors for lifelong learning, AI-driven flood and agricultural predictive tools, personalised healthcare interfaces in Malayalam, and skill-matching platforms for migration returnees.

Additionally, free “AI Upskilling Extensions” under Samagra Plus shall be launched for higher education alumni and community learners through public libraries and digital hubs, enabling lifelong learning in emerging technologies and strengthening Kerala’s knowledge economy in the context of high migration and rapid technological change.

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## 68 “AI for All” Education Program

**KAPIL CHALIL MADATHIL**

*Professor, Department of Industrial Engineering, Clemson University*

Kerala shall launch an “AI for All” Education Program to build foundational AI literacy and applied AI skills across society. The program should span schools, ITIs, colleges, universities, and reskilling platforms, with a focus on the practical use of AI, human–AI teams, ethical awareness, and decision oversight rather than coding alone. Delivery should be multilingual (including Malayalam), and accessible through schools, community centres, libraries, and online platforms to reach rural populations, women, and marginalized groups. Focus should be on AI education for every student for better employability. Kerala should also develop regional AI innovation hubs that connect academia, startups, industry, and local governments (focusing on the key issues in that region). These hubs should focus on solving local and state-level challenges, including healthcare delivery, disaster preparedness, climate resilience, agriculture, fisheries, mobility, and governance, through applied, problem-driven AI. The hubs should support concept design, rapid prototyping, pilot projects, and real-world deployment in public systems. A dedicated AI startup funding stream should be created under the AI for All program to support new and early-stage companies. This should include seed grants, challenge-based funding, and early-stage venture support for AI solutions with social and economic impact. Government support and funding shall be provided for Keralites to start AI-based businesses and create jobs.

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## 69 Research and Development in Engineering and Technology across University and Institutional Levels

**DR.K.T.MADHAVAN**

*Retired Senior Scientist, National Aerospace Laboratories (NAL)*

The State shall significantly strengthen research and development in engineering and technology across university and institutional levels, ensuring that advanced research is not confined to a few select institutions but widely supported across Kerala. Targeted investment and strategic policy support shall be extended to expand high-end research infrastructure, laboratories, and funded doctoral programmes in emerging and critical engineering domains.

Special emphasis shall be placed on developing focused research capacity in aeronautical engineering, aerodynamics, and Unmanned Aerial Systems (UAS/UAV), recognising their growing importance in national defence, strategic autonomy,

and technological competitiveness. Dedicated research centres, faculty recruitment drives, and postgraduate specialisations in aerospace and UAV technologies shall be promoted, including in premier institutions, to bridge the existing gap compared to neighbouring states. Faculty members and postgraduate/research scholars shall be actively encouraged to undertake multidisciplinary research, moving beyond compartmentalised approaches. Institutional mechanisms shall be created to enhance awareness and access to national funding agencies such as DST, DRDO, and AR&DB, alongside strengthened grant facilitation cells. The Kerala Government shall provide sustained financial support through competitive grants and mission-mode programmes to position the State as a model for advanced engineering and aerospace research excellence.

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## 70 Establish an Institution of Advanced Study in Kerala

**KESAVAN VELUTHAT**

*Formerly Professor of History, University of Delhi*

The State shall establish an Institution of Advanced Study in Kerala, modelled on globally reputed centres such as the Maison des Sciences de l'Homme (Paris), Wissenschaftskolleg (Berlin), the Institute for Advanced Study (Princeton, USA), and the Indian Institute of Advanced Study (Shimla).

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## 71 Institutionalising Public History, Digital Humanities, and Archival Digitisation for Democratic Knowledge Access in Kerala

**CHANTHU S**

The State shall promote the institutionalisation of Public History by establishing dedicated programmes or centres within universities and research institutions. These centres shall train students in archiving, conservation, preservation of documents, oral history methodologies, and history communication, equipping them to engage critically with sources and counter misinformation in the post-truth era. Emphasis shall be placed on application-based learning, enabling students to communicate complex historical processes to the public in accessible language while strengthening their engagement with archives. Workshops and collaborative initiatives for archive creation and democratisation shall be encouraged to foster broader public participation in historical knowledge production.

Kerala shall also promote Digital Humanities as an interdisciplinary field integrating history, technology, media, and design. Training modules shall introduce students to digital storytelling, animation, digital mapping, and data visualisation to make existing scholarship more accessible and engaging, particularly in a changing reading culture. Such initiatives shall foster collaboration between historians, technologists, and creative professionals.

Additionally, the State shall undertake systematic digitisation of select newspapers, journals, and archival materials dispersed across libraries to ensure preservation and open access. This shall include documentation of oral histories capturing lived experiences of public policies, thereby strengthening inclusive, accessible, and democratised knowledge systems.

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## 72 NEP 2020, Global Standards, and Skill-Based Workforce Development

**PROF. SURESH RANGARAJAN**

*Dean School of Global Studies Central University Kerala*

The State shall implement the National Education Policy (NEP) 2020 as a national-level initiative. Reputed foreign universities may be permitted to establish campuses within the State, enabling Kerala to retain students who would otherwise pursue higher education abroad and gradually elevate institutional standards to international levels. The Higher Education Council shall be reconstituted to include experts from diverse academic and professional fields in order to strengthen governance and decision-making. Vocational education shall be strengthened across institutions, with expanded focus on practical skill development. Training programmes in areas such as driving, plumbing, air-conditioning mechanics, and other technical trades shall be enhanced, recognising the growing demand for skilled professionals in European Union countries and other international labour markets.

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## 73 Positioning Kerala as a Global Centre for Sanskrit, Ayurveda Studies

**PROF. CHRISTOPHE A M VIELLE**

*UCLouvain, Belgium, Professor Extraordinaire*

Government shall undertake measures to make Kerala the leading centre for Sanskrit studies and Ayurvedic Studies. Kerala's ancient manuscript heritage must be preserved with high tech modernity solutions in the service of the preservation of ancient traditions

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## 74 Provide Students with the Opportunity to Undertake Meaningful and Technically Relevant Projects

**VISHNU PRADEEP**

*Clinical Director, ADHD Now*

The State shall ensure that higher education institutions provide students with the opportunity to undertake meaningful and technically relevant main projects as part of their academic requirements. Institutions shall not restrict students to repetitive and outdated project themes.

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## 75 Research-Oriented Higher Education

**SRUTHI NARAYANAN**

**#Strengthening Climate-Resilient Agriculture: -**

Research must be prioritized to develop climate-resilient crop varieties and sustainable agroecosystem management practices. In regions such as Kerala, agricultural lands increasingly face extremes—either excessive rainfall and waterlogging or prolonged dry spells. At the same time, daily temperatures are rising during the cropping season. These conditions demand crop varieties with improved

tolerance to drought, flooding, and heat stress. Addressing these challenges will require coordinated efforts across traditional crop and soil sciences, plant breeding, and advanced tools such as gene editing. Because resilience depends on a system-level approach, improved crop genetics must be complemented by regenerative and resource-conserving agricultural practices.

**#Building a Skilled Research and Development Workforce: -**

A highly skilled workforce is essential for effective research and development. One attainable strategy is to expand exchange programs that enable students and scholars to undertake short-term research visits at international institutions. Reciprocal visits by international researchers can further stimulate innovation and strengthen collaborative R&D. Such programs play a vital role in long-term capacity building and in fostering globally connected scientific communities.

**#Reforming Higher Education to Strengthen R&D Capacity: -**

Enhancing human resources in research and development will also require restructuring curricula in higher education institutions, including agricultural universities. Academic programs should equip students to address societal challenges while meeting evolving industry demands. Universities should more effectively integrate research experiences, internships, and experiential learning into their curricula. Degree programs should also ensure that students graduate with tangible scholarly or professional outputs (e.g., peer-reviewed publications or applied research products), strengthening their competitiveness at the international level.

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## 76 Integrated Governance, Historical Awareness, and Skill-Based Employment Reform in Higher Education

**SHWETA GEORGE**

The State shall establish a unified and integrated governance framework bringing all colleges and universities under a common organizational structure to ensure standardization in quality, accountability, and student outcomes across districts. While respecting academic diversity in syllabi and curriculum, a single regulatory and administrative framework shall reduce disparities among institutions and ensure equitable access to quality education. Greater oversight shall be exercised to prevent fragmented policy implementation by individual managements or cooperatives, ensuring that institutional governance aligns with broader public educational objectives.

Further, greater emphasis shall be placed on integrating historical literacy across disciplines. Orientation and awareness programmes on Kerala's historical figures, institutions, and socio-cultural transformations shall be introduced to strengthen students' contextual understanding of society and civic responsibility.

The State shall also enhance the role of research and skill-based education as viable employment pathways. Subject-specific skill development programmes, including language proficiency and digital competency training, shall be integrated into curricula to improve practical application of knowledge. Structured placement mechanisms with fair remuneration within Kerala shall be developed to retain talent and reduce outward migration. The State shall also establish more subject-specific research institutions in Kerala to provide stable funding and career opportunities for emerging researchers. Strengthening local research ecosystems will reduce brain

drain and harness intellectual talent for the State's scientific and socio-economic development.

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## 77 The Kerala Engineering Mobility & Immersion (KEMI) Framework

**RAJEEV KUMARASWAMY**

*CEO, Cognifluenz Deeptech Private Limited*

The State shall introduce a Human Capital Exchange model to transform industry-academia engagement from transactional collaboration to structural integration. Under the Industrial Quality Improvement Program (I-QIP), faculty members shall be deputed for up to three years in recognised industry R&D laboratories, with salary and service benefits protected by the Government and evaluation standards equivalent to traditional academic QIP pathways. Participating faculty shall serve as Associate Consultants to their parent institutions, facilitating internships, sponsored projects, and applied research collaborations. Where industries assume salary responsibility, equivalent public funds shall be redirected as research seed grants to the concerned departments.

Parallely, an Industry Practitioner Visiting Program (IPVP) shall establish long-term Professor of Practice roles for senior R&D professionals (minimum two-year tenure) with dual responsibilities in curriculum redesign and IP-driven project leadership. These practitioners shall serve on Department Advisory Boards to ensure curriculum agility and industry alignment.

A three-year implementation horizon shall target measurable outcomes: industry-integrated curricula, increased pre-placement offers, patent filings, industry-academic satellite labs, consultancy revenue, deep-tech placements, startup spin-offs, and improved NIRF/NAAC rankings. The initiative shall begin with a pilot across selected engineering colleges and priority sectors, supported by KTU regulatory alignment and standardised IP-sharing frameworks.

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## 78 Fair Employment Practices and Transparent Recruitment in Kerala's Higher Education Sector

**DR. SREEPRIYA S.P.**

*Independent researcher*

Although Kerala is a leader in higher education, unemployment within the sector remains a serious concern. In universities and colleges, guest faculty are often appointed on a contract basis; however, many such positions are filled by retired personnel who simultaneously receive pension and guest faculty remuneration, thereby limiting opportunities for newly qualified candidates. The system should be revised to prioritise younger applicants and ensure fair access to employment. Contract appointments may be structured for fixed terms of three to five years with rotational provisions to widen opportunities. Similarly, in the learning support centres of Sree Narayana Guru Open University, counsellors are frequently appointed from among retired staff or serving faculty in government and aided colleges, who receive pension or salary in addition to hourly wages. A regulation should ensure that only one form of remuneration is permitted in such cases. Further, appointments of differently abled persons in the aided sector should be

conducted through the Employment Exchange to promote transparency and prevent irregularities in recruitment.

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## 79 Transforming Kerala's Higher Education

**DR RAJKUMAR M R**

Kerala's higher education system needs a comprehensive overhaul. Research should be an essential component of academics in today's information-driven and rapidly developing world. The majority of engineering colleges in the state, including government engineering colleges, continue to teach according to a prescribed syllabus, and students approach subjects mainly from an examination perspective. Many students fail to secure jobs through campus placements because they lack in-depth knowledge of their subjects, particularly from a practical standpoint.

In the modern world, where information can be accessed with a single click, the role of a teacher has shifted from merely imparting classroom knowledge to exploring subjects from a practical perspective in order to stimulate students' interest. In this regard, it is crucial that educators work on real-world industrial projects and collaborate with distinguished faculty members from leading institutions such as the Indian Institutes of Technology, Indian Institute of Science, Indian Institute of Space Science and Technology, and National Institutes of Technology, as well as reputed universities abroad. This will enhance instructors' practical expertise, and when they approach teaching from an application-oriented perspective, students will become more engaged. This will improve the quality of higher education in the state. To achieve this goal, educational institutions should enter into Memoranda of Understanding (MoUs) with other universities—both domestic and international—as well as with industries. Faculty members should be granted a one-year sabbatical to pursue post-doctoral fellowships at prestigious universities in India and abroad. This will enable them to collaborate with distinguished academics and expand research activities on their home campuses. It should be mandatory for faculty members to undertake six months of industrial training in an industry relevant to their specialization. Institutes should also implement six-month student exchange programmes. To oversee and manage advanced laboratory facilities, leading government institutions such as the College of Engineering Trivandrum, Government Engineering College Thrissur, and Government College of Engineering Kannur should establish centralized instrumentation centres. Laboratory technicians should be required to undergo a four-week training programme on the latest equipment.

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## 80 Making History, Education and Culture Accessible to the General Public for Better Futures of Coexistence.

**CHANTHU S**

*chanthu.s@gmail.com*

### **#Public History:**

The State shall promote the institutionalisation of Public History by establishing dedicated programmes or centres within universities and colleges. These institutions may train students in archiving, conservation, and preservation of documents, and offer short-term courses in oral history and related historical methods. In the

present post-truth context, it is essential to equip young people with critical skills and methodological tools to understand and challenge misinformation and false narratives. Greater emphasis should be placed on making history application-oriented. Students must be encouraged to engage in history communication—similar to science communication—so they can present complex historical processes to the general public in clear and accessible language. The widening gap between academics and the public makes such training urgent. The archive remains the central point of convergence between academic and popular history. Democratising archives and training students to interpret and construct narratives from archival sources should therefore be prioritised. Workshops and practical initiatives, such as those conducted by Milli Archives, can support students and young researchers interested in establishing and managing archives.

#### # Digital Humanities: -

In rapidly changing times, Digital Humanities offers significant scope, particularly for the younger generation, who can be introduced to its skills and possibilities. Collaborative initiatives—such as historians working with animators and digital designers—can present historical narratives in more engaging and accessible formats. A vast body of academic scholarship already exists, but changing reading practices require new modes of dissemination to reach wider audiences. Digital Humanities can also promote interdisciplinary collaboration and innovation across fields.

#### # Digitisation Projects: -

The State may actively undertake digitisation projects for select newspapers and journals currently dispersed across libraries in Kerala, ensuring their preservation and universal access, similar to initiatives like Granthapura. Such projects may also include systematic documentation of oral histories capturing how people across Kerala have experienced and benefited from various government schemes. Recording these lived experiences will help preserve social memory and demonstrate how public policies have shaped communities over time.

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## 81 Encouraging research in bio-inspired innovation: Neurotechnology and Optogenetics

**DR. SUNSU KURIAN**

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The State may invest in emerging neurotechnology and bio-inspired innovation by promoting research in photosensitive neuron models and optogenetics. Advanced bio-inspired sensors that mimic human neural processes can be integrated into smart city infrastructure to detect, process, and respond to light stimuli in real time, thereby improving intelligent lighting, traffic management, surveillance systems, and energy efficiency. Simultaneously, focused research in optogenetics—which enables precise control of neuronal activity—should be encouraged for its potential clinical applications in treating neurodegenerative diseases, epilepsy, blindness, and related neurological conditions. Such initiatives would strengthen both technological innovation and biomedical research capacity while positioning the State at the forefront of next-generation scientific advancement.

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## 82 Advancing Life Sciences and Healthcare Education in Kerala

**MATHEW THOPPIL MATHEW**

*mtmathew@uic.edu*

The State may initiate undergraduate Biotechnology programmes in Government colleges to strengthen foundational capacity in life sciences. Healthcare-oriented courses should also be introduced. In addition, an AI in Medicine programme may be developed in collaboration with UIC or other foreign universities to promote advanced interdisciplinary training in healthcare and emerging technologies.

## 1 Urbanisation and the Need for Integrated Smart Mobility Infrastructure in Kerala

**MITHULAJ JAMALUDEEN**

Kerala is rapidly urbanising, with expanding national highways (including NH66), airports, districts, semi-urban regions, and major tourism destinations. However, the State currently lacks an integrated 24×7 smart mobility infrastructure that connects these critical nodes in a seamless and coordinated manner. This fragmented system has resulted in service disparities, regulatory challenges related to private vehicle operations, and safety concerns—particularly for travel between airports and rural areas, as well as inter-district journeys.

As Kerala continues to grow as a major tourism destination, the absence of reliable round-the-clock roadside mobility hubs and on-road support facilities further limits the safety, predictability, and inclusiveness of the transportation system. Night-time and off-hour mobility infrastructure remains especially inadequate, affecting both residents and visitors.

Establishing integrated 24×7 roadside mobility hubs across the State would align with sustainable development principles and global best practices followed in leading international tourism destinations. Such hubs could provide coordinated transport access, passenger safety mechanisms, regulated services, and essential support infrastructure.

Strengthening night-time mobility systems would enhance traveller confidence, improve service reliability, and support regulated, inclusive transportation networks. Moreover, a unified smart mobility framework would reduce operational inefficiencies and enhance connectivity between highways, airports, districts, and tourism centres.

In conclusion, Kerala's urban growth demands a modern, integrated smart mobility ecosystem. Developing 24×7 roadside mobility hubs and coordinated transport infrastructure is essential to ensure safety, accessibility, and service equity. Such an initiative would not only strengthen urban governance but also position Kerala as a reliable, inclusive, and internationally competitive tourism destination.

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## 2 Sustainable Urbanisation: Environmental Compliance and Green Upgrades for Industrial Facilities

**DR. ANILKUMAR S H**

Rapid urbanisation requires industrial and transport hubs to adopt environmentally responsible infrastructure practices. Facilities such as the Pappanamcode workshop, located near the Karamana River, must address concerns related to liquid waste, scrap handling, and hazardous material management to prevent ecological damage and protect public health.

### 1. Modernize Liquid Waste and Oil Handling

Workshop drainage has been linked to heavy metal contamination (iron, copper, nickel) in nearby water bodies. Immediate measures should include:

- Effluent Treatment Plant (ETP): Install a dedicated system to treat wash-water before discharge into public drainage.
- Oil-Water Separators: Deploy industrial interceptors at washing and engine-service bays to capture oil, grease, and lubricants.
- Used Oil Management: Partner with Kerala State Pollution Control Board (KSPCB)-authorized recyclers for regular collection of used engine oil and coolants.

### 2. Streamline Scrap and Solid Waste

As a major bus body-building hub, the volume of metal and rubber scrap is substantial.

- Material Recovery Facility (MRF): Establish a structured scrap-sorting area (aluminum, steel, rubber, glass) to enhance resale value and recycling efficiency.
- Tire Disposal: Channel unfit tires to waste-to-energy plants or certified recyclers instead of open storage.
- Digital Scrap Tracking: Implement a digital inventory system to ensure transparency in scrap generation and timely auctioning.

### 3. Implement “Green Protocol” (Malinya Muktha KSRTC)

- Declare a Zero-Plastic Zone within workshop premises.
- Integrate with Haritha Karma Sena for periodic removal of non-biodegradable waste.
- Ensure source segregation with clearly labeled bins (hazardous, recyclable, organic).

### 4. Hazard Mitigation and Safety

- Conduct quarterly soil and water testing for heavy metals.
- Store lead-acid batteries on acid-resistant flooring under cover and return under buy-back schemes.
- Provide PPE and specialized training for workers handling paints, solvents, and hazardous chemicals.

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## 3 Centralised Smart Parking System for Urban Transformation

**AJAYA JOSE**

As cities expand, managing parking efficiently has become essential to reducing congestion and improving urban mobility. A Centralised Smart Parking Management System (SPMS), designed for Smart Cities, aims to modernise parking infrastructure using digital and AI-driven technologies. As part of the Smart Cities Mission in India, this initiative focuses on enhancing user convenience, optimising space utilisation, and supporting data-driven traffic management.

The SPMS integrates major parking hubs under a unified digital platform, managed through public and private partnerships. It leverages real-time monitoring, digital payments, and central command integration to improve operational efficiency.

### Key Features of SPMS

- **Real-Time Availability:** Users can check parking availability through a mobile application or digital signboards installed at major city locations.
- **Contactless Digital Payments:** Supports UPI, credit/debit cards, and e-wallet payments for seamless transactions.
- **Advance Booking Facility:** Allows users to reserve parking spaces in select locations through the mobile app.
- **Command and Control Integration:** Connected to the city's Command Control Centre, enabling authorities to analyse parking data and improve traffic regulation.

### Benefits of a Comprehensive Smart Parking System

- **Reduced Traffic Congestion:** Minimises time spent searching for parking spaces.
- **Enhanced User Convenience:** Fast, automated, and cashless operations.
- **Efficient Space Utilisation:** Maximises use of available parking infrastructure.
- **Lower Carbon Emissions:** Reduces unnecessary vehicle idling.
- **Improved Security:** ANPR (Automatic Number Plate Recognition) and surveillance cameras help prevent illegal parking and enhance monitoring.

### Conclusion

A centralised Smart Parking Management System represents a significant step toward building technologically advanced and efficient urban spaces. Fully aligned with the Smart City vision, SPMS can transform urban mobility by integrating digital innovation with sustainable infrastructure planning.

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## 4 Design-Led Urbanisation for Sustainable Development in Kerala

**DR. MANOJ KUMAR**

Urbanisation presents both opportunities and challenges for Kerala. A design-driven development framework is essential to achieve Sustainable Development Goals (SDGs) and secure a resilient future. While the foundational policies exist,

effective interdepartmental coordination and a clear implementation strategy are urgently needed.

### **Strategic Recommendations**

#### **1. Implement a State Design Policy:**

A structured Design Policy must be operationalised across departments to align infrastructure, environment, and social development goals with SDG targets.

#### **2. Establish a Centre of Excellence for Urban Planning and Design:**

A state-controlled Centre of Excellence can lead research, capacity building, and coordinated action plans to address urban challenges systematically.

#### **3. Create an Urban Design and Landscape Cadre:**

A dedicated professional cadre within the state establishment should be formed to design, manage, and maintain urban spaces and landscapes—critical for Kerala’s international image and identity.

#### **4. Strengthen Operation and Maintenance (O&M) Mechanisms:**

Many public investments remain under-utilised or poorly maintained. A stringent O&M framework, supported by dedicated managers and minimal additional investment, can significantly enhance resource efficiency.

#### **5. Promote Design Awareness and Education:**

Introduce design literacy at the school level to foster long-term cultural and civic responsibility toward urban spaces.

#### **6. Establish a Design and Skill University:**

A specialised institution can build professional capacity in design, architecture, landscape, and urban innovation.

#### **7. Urban Green Liveability Guidelines:**

Develop state-level guidelines focusing on sustainability, green cover, and climate resilience.

#### **8. UNESCO Nomination for Cultural Landscapes:**

Kerala possesses 44 cultural landscapes, including regions like Odanad and Valluvanad. Securing UNESCO recognition would strengthen cultural preservation and boost tourism.

### **Conclusion**

Design-led governance is central to sustainable urbanisation. By integrating policy, education, professional capacity, and cultural recognition, Kerala can enhance liveability, global visibility, and long-term economic growth.

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## **5** Enhancing Urban Safety through Emergency Escape Innovation

**M C DAVID**

*Founder & CEO, Dynamit Innovations Pvt. Ltd.*

Rapid urbanisation has led to a significant increase in high-rise buildings across Kerala. While modern infrastructure continues to grow, emergency evacuation systems for multi-storey structures remain limited. Currently, there is no widely adopted rapid evacuation device that enables safe and efficient escape during emergencies such as fire or structural hazards.

Dynamit Innovations Pvt. Ltd. has developed and secured an Indian patent for an **Emergency Escape Sliding Chute System**, designed specifically for high-rise buildings. This life-saving system enables occupants to evacuate quickly and safely during critical situations. The technology is simple, efficient, and designed for easy deployment within existing and new buildings.

The proposed system has universal applicability, particularly in countries where multi-storey residential, commercial, and institutional buildings are prevalent. By integrating such a solution into urban building regulations and safety frameworks, authorities can significantly reduce evacuation risks and enhance public safety standards.

Despite submitting proposals to relevant government agencies and innovation bodies, the project has not yet progressed toward implementation. However, the innovation is fully developed, patented, and ready for deployment.

### **Conclusion**

As urbanisation accelerates, prioritising building safety innovations is essential. The adoption of an Emergency Escape Sliding Chute System can play a critical role in safeguarding lives during emergencies. This proposal merits serious consideration as part of Kerala’s broader urban safety and disaster preparedness strategy.

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## **6 Rethinking Urban Development and Place-Making in Kerala**

**SANKAR VARMA**

Kerala’s contemporary development discourse is widely recognised as inclusive and progressive. However, certain underlying assumptions—particularly in the context of urban growth—require critical reflection. This need is especially urgent in rapidly transforming cities such as Kochi.

As a researcher in Urban Studies, with doctoral work focused on Kochi City (supported by KCHR), I have observed that development is not merely about infrastructure expansion but also about social and cultural processes. One key question that arises concerns migrant labour. Are we, as Keralites, “containerizing” migrant workers through housing and spatial segregation, or are migrant communities choosing such arrangements for practical reasons? Furthermore, does the continued use of the term “*Athithi Thozhilali*” carry subtle undertones of “othering,” reinforcing social distance rather than integration?

Kochi’s current expansion reflects a form of peripheral urbanism that increasingly resembles a “copy-paste” development model similar to Bengaluru. While economic growth and infrastructure expansion are important, this approach risks diluting the city’s unique cultural layers and historical plurality. Kochi’s identity has long been shaped by multiple cultures, trade histories, and lived urban experiences. Rapid modernization, if not carefully contextualized, may lead to cultural reductionism.

On the positive side, Kochi’s integrated mobility system—metro, water metro, and bus connectivity—has significantly improved accessibility and urban movement. These advancements reflect a forward-looking development trajectory.

However, while infrastructure development appears to be on the right path, the deeper issue of *place-making* remains unresolved. Urban development must move beyond physical expansion toward creating inclusive, culturally rooted, and socially integrated spaces.

## Conclusion

Kerala's urban future should not merely replicate global models but reimagine development in ways that preserve identity, dignity, and diversity. Sustainable urbanisation must combine infrastructure growth with thoughtful place-making and social integration.

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## 7 Positioning Kerala's Cities as Engines of Economic Growth

**C VEERAMANI**

*Professor and Director, Centre for Development Studies*

Kerala's cities have traditionally functioned as centres of social development, delivering progress in health, education, and welfare. However, they must now also be recognised as key engines of economic growth. To achieve this shift, the State requires an integrated urban strategy that aligns infrastructure investments with economic reform.

Such a strategy should combine investments in transport connectivity, affordable housing, and high-quality public spaces with reforms that improve the ease of doing business and labour market efficiency within cities. Urban infrastructure must not only enhance liveability but also support productivity and innovation.

Enhancing urban liveability will be critical for attracting and retaining skilled talent. Cities that offer efficient mobility, vibrant public spaces, reliable services, and inclusive housing are more competitive in the knowledge economy. Talent retention directly influences entrepreneurship, job creation, and long-term economic dynamism.

Institutional reforms are equally important. Strengthening the financial and administrative autonomy of Urban Local Bodies (ULBs), particularly in revenue mobilisation and capital investment planning, will enable cities to respond effectively to emerging economic opportunities. Empowered local governments can make timely infrastructure decisions aligned with local needs.

At the same time, metropolitan-level planning institutions must be strengthened to coordinate infrastructure development, land-use regulation, and regional growth strategies. Integrated metropolitan governance can prevent fragmented planning and improve overall competitiveness.

## Conclusion

By reimagining cities as both social and economic drivers, Kerala can unlock new growth pathways. An integrated, reform-oriented urban strategy will position the State's cities as resilient, productive, and globally competitive urban centres.

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## 8 Reimagining Walkable and Climate-Resilient Cities in Kerala

**NIPESH PALAT NARAYANAN**

Kerala has historically been a walking-oriented society. However, over the past decade, pedestrian infrastructure has been significantly neglected. Many roads lack proper footpaths, and neighbourhood streets are increasingly designed for higher

vehicular speeds. As a result, activities once performed on foot are now being replaced by short vehicle trips, largely due to safety concerns.

Urban infrastructure must be reimagined holistically—not merely as a mobility network, but as a framework for public wellbeing. Walkable cities contribute to lifestyle-linked exercise, reduced dependence on private vehicles, lower noise levels, and improved air quality. Revitalising pedestrian pathways and promoting non-motorised transport options such as cycling can enhance public health while also supporting sustainable urban development. Safe sidewalks, traffic calming measures, and integrated cycling networks should become foundational components of urban planning.

At the same time, Kerala’s coastal cities face growing risks from climate change, particularly rising sea levels and extreme weather events. Urban planning must integrate climate resilience into its core framework. This includes reconsidering urban form, strengthening food distribution networks, protecting vulnerable coastal zones, and ensuring community-level preparedness.

Building resilient cities requires adaptive infrastructure, nature-based solutions, and long-term planning that balances economic growth with environmental sustainability.

**Conclusion**

Kerala’s urban future should prioritise walkability and climate resilience as twin pillars of development. By investing in pedestrian-friendly design and forward-looking resilience strategies, the State can foster healthier communities and more sustainable cities.

## 9 Climate-Responsive Urban Strategies for Kerala

**BIJEY NARAYAN**

*Professor, College of Architecture Trivandrum*

Kerala’s urban future must be shaped by climate resilience, community wellbeing, and sustainable economic planning. One immediate priority is the transformation of urban water bodies. Many ponds, canals, and wetlands within cities can be redesigned as multi-functional, water-sensitive public plazas. These spaces should combine flood mitigation, groundwater recharge, ecological restoration, and community use. By functioning as “sponge infrastructure,” they can address climate risks while serving as inclusive civic and cultural hubs.

Urban agriculture is another strategic intervention. The State may incentivise terrace farming, kitchen gardens, and community farming initiatives to enhance food security and reduce dependence on external supply chains. Students from planning, agriculture, and design institutions can be encouraged to volunteer, while experts from engineering and farming sectors can provide structured technical guidance. Such collaborative efforts will strengthen local self-reliance and promote healthier urban lifestyles.

In addition, development planning should adopt a structured sustainability framework. Alongside Systems Thinking, the Government may institutionalise a Triple Bottom Line approach—balancing People, Planet, and Profit in every major policy and project. Evaluating initiatives through these three dimensions will ensure that economic growth does not compromise environmental stability or social equity.

By revitalising water bodies, promoting urban agriculture, and embedding sustainability frameworks into policy decisions, Kerala can build cities that are resilient, inclusive, and aligned with long-term developmental goals.

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## 10 Junction Improvement Programme for Kerala: Enhancing Safety and Network Efficiency at the Top 100 Critical Nodes

**DR. SUVIN PADINJARE VENTHURUTHIYIL**

*CEO, DromoLys Research and Development*

Kerala’s mobility losses and road-safety risks are disproportionately concentrated at junctions. At-grade intersections are the most critical points in an urban road network where conflicts occur, queues spill back onto corridors, buses lose schedule reliability, and pedestrians face the highest safety exposure. Even minor operational disturbances can trigger system-wide congestion. A targeted junction improvement programme therefore offers one of the highest returns on public investment by addressing both safety and operational inefficiencies simultaneously.

It is recommended to launch a **Kerala “Top 100 Junctions” Mission** using an evidence-first, quick-build, measure-and-scale approach. The guiding philosophy should be: Select → Observe → Diagnose → Treat → Verify.

The Top 100 junctions should be selected using a transparent scoring method combining safety risk (fatal and serious crash records), operational delay and spillback, impact on bus reliability, and exposure of vulnerable road users near schools, markets, hospitals, and transit hubs. The list may include 50 safety-priority and 50 efficiency-priority junctions across urban and rural contexts.

Movement patterns should be observed through permitted drone monitoring with privacy safeguards. Video data can be converted into trajectory-level datasets to quantify near-miss conflicts using surrogate safety measures (TTC, PET), along with delay, queue buildup, and corridor reliability indicators. Crash records alone often under-represent actual risk.

Rapid, Kerala-ready quick-build interventions—such as channelization, improved signal phasing, pedestrian refuge islands, bus-stop repositioning, kerb management, and high-visibility markings—should be implemented first, with permanent works following measured success. Each junction should have a combined Design + Signal + Operations + Enforcement plan.

### **Conclusion**

A Top 100 Junctions Mission offers Kerala a practical, measurable pathway to reduce crash risk and unlock network-wide efficiency by systematically improving its most critical mobility nodes.

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## 11 Urbanisation and Mobility: Towards a Networked Kerala

**A. V. JOSE**

*Former Director, Gulati Institute of Finance and Taxation*

Kerala's settlement pattern and socio-economic profile offer a distinctive model of urban development. Instead of promoting concentrated metropolitan growth, the State can evolve as an extended urban enclave—almost an enlarged village—enabled by faster connectivity in transportation and communication. Given Kerala's high population density and relatively even spatial distribution of towns and services, such a model is both practical and aligned with its development history.

The foundation of this approach lies in strengthening rail-based mobility. Emphasis should be placed on faster and more efficient rail transport linking cities and statutory towns. A reliable, high-frequency rail network can serve as the spine of the State's mobility framework, significantly reducing travel time and integrating regional economies.

Equally important is the establishment of well-coordinated feeder services connecting census towns and smaller settlements to major rail corridors. By ensuring seamless last-mile connectivity, residents can access employment, education, healthcare, and other urban opportunities without relocating permanently to large cities. This reduces urban sprawl, limits infrastructure pressure in major centres, and supports balanced regional growth.

Such a mobility-driven approach can lower the social, economic, and environmental costs associated with rapid urbanisation. It encourages people to remain in their native towns while enjoying access to urban amenities through efficient daily commuting.

### **Conclusion**

By integrating faster rail systems with strong feeder networks, Kerala can develop as a connected, decentralized urban region—minimising congestion, reducing costs, and promoting sustainable and inclusive growth across the State.

## 1 Road Traffic Accidents as a Public Health Priority in Kerala

**DR. JAYAKUMARY MUTTAPPALLYMYALIL**

*College of Medicine & Thumbay Institute of Population Health, Gulf Medical University, Ajman, UAE*

Road Traffic Accidents (RTAs) represent a major public health and development challenge in Kerala. Beyond the number of deaths, RTAs contribute significantly to Years of Life Lost (YLL), as many victims are young adults, resulting in decades of lost productive life. Despite Kerala's strong health indicators, the State continues to report a high burden of road traffic injuries, particularly among pedestrians, two-wheeler users, older adults, and young adults. These injuries lead to long-term disability, reduced productivity, and economic strain on families and the health system.

Many road traffic injuries are preventable and linked to modifiable factors such as unsafe road design, speeding, alcohol-impaired driving, low helmet and seatbelt compliance, and gaps in trauma care. Addressing this issue requires a coordinated, multi-sectoral public health approach.

### **Key Recommendations**

- 1. Adopt a Safe Systems Approach:** Recognise road traffic injuries as a preventable public health issue and integrate efforts across health, transport, police, education, urban planning, and local self-government.
- 2. Strengthen Local Self-Government Engagement:** Panchayats and municipalities should identify accident-prone areas, support enforcement drives, promote technology-based monitoring (speed cameras, CCTV), and integrate road safety into local development plans.
- 3. Improve Road Infrastructure:** Prioritise vulnerable road users through safer crossings, footpaths, cycling lanes, speed-calming measures, lighting, and mandatory road safety audits.
- 4. Enhance Enforcement and Behaviour Change:** Strengthen speed, helmet, seatbelt, and drink-driving enforcement while integrating road safety education into schools and licensing processes.

5. **Strengthen Trauma Care:** Improve pre-hospital emergency response, trauma referral systems, and district-level trauma capacity, along with community first-responder training.

6. **Establish Monitoring and Accountability:** Develop standardised monitoring frameworks tracking compliance, black spot correction, response times, and injury trends.

Reducing road traffic injuries is essential to protect Kerala’s human capital. A public health-led, evidence-based, and accountable road safety strategy can significantly reduce preventable deaths, disabilities, and years of life lost, strengthening both social well-being and economic development.

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## 2 Strengthening KFON: A Strategic Roadmap for Digital Infrastructure Expansion

**MUHAMMAD SHAFI**

### Major Infrastructure

Kerala Fibre Optic Network (KFON) was launched with the vision of “Internet for All,” with an investment of approximately Rs. 2000 crore. Despite three years since project initiation, the total number of connections provided stands at around 1.5 lakh. While this represents a significant step toward digital inclusion, the growth trajectory remains modest compared to the State’s digital potential.

In contrast, Kerala Vision—the company appointed to support public outreach and service delivery—currently serves approximately 35 lakh connections. However, reports indicate that many local operators are not actively providing KFON connections even when requested by subscribers. This gap between infrastructure creation and effective last-mile delivery requires urgent attention.

For KFON to achieve its intended impact, a clear and time-bound growth strategy is essential. This should include:

- Strengthening last-mile partnerships and operator accountability
- Transparent service-level agreements with measurable targets
- Incentives for private and local operators to promote KFON connections
- Public awareness campaigns highlighting affordability and reliability
- Digital service bundling (education, health, e-governance) to increase demand

A structured expansion roadmap, backed by monitoring mechanisms and performance evaluation, can significantly accelerate subscriber growth. Aligning operational efficiency with the original social objective of universal internet access will ensure optimal utilisation of the substantial public investment.

Kerala has the infrastructure foundation in place; what is needed now is strategic execution and accountability. An opportunity to present a detailed growth framework for KFON’s expansion would be valuable in strengthening this major digital infrastructure initiative.

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# 3 Reimagining Mobility in Kerala: A Strategic Framework for EVs, KSRTC and Rail

**JITHU SUKUMARAN NAIR**

*Chief Strategy Officer, Titagarh Rail Systems*

*Founder Director, VAAN Electric Moto Pvt. Ltd. & Eceego Energy Pvt. Ltd.*

Kerala stands at a defining moment in mobility transformation. Electric mobility, public transport reform, and rail modernization must now move from policy ambition to integrated execution.

## 1. Electric Mobility: From Policy to Powerhouse

Kerala has strong EV penetration, but the next phase must focus on heavy-duty and commercial ecosystems.

- **Rare Earth Advantage:** With the Union Budget 2026 highlighting the Kerala Rare Earth Corridor, the State should incentivize local magnet and motor manufacturing. This will transform Kerala from an EV consumer into a global supplier.
- **Green Hydrogen Corridors:** Following the MoA between CIAL and BPCL for hydrogen buses, Kerala should pilot hydrogen trucking corridors along the Vizhinjam–Kochi–Mangaluru stretch.
- **Charging as Public Infrastructure:** EV charging must be treated as a public utility. Through KSEB, a “Right to Charge” mandate should apply to new apartments and commercial hubs.

## 2. KSRTC: Structural Survival Through Reform

For KSRTC, “Green” must also mean “Profitable.”

- **SWIFT Evolution:** Expand the KSRTC-SWIFT model for premium and long-distance routes to improve operational efficiency.
- **Wet Lease Strategy:** Scale the Gross Cost Contract (GCC) model, allowing private operators to own and maintain e-buses while KSRTC manages branding and routes.
- **Asset Monetization:** Convert KSRTC’s prime real estate into multi-modal hubs with EV charging, retail, and co-working spaces to boost non-fare revenue.

## 3. Rail: The Elevated Compromise

The shift toward a Regional Rapid Transit System (RRTS) offers a pragmatic alternative.

- **Viaduct Model:** Prioritize elevated corridors to minimize land acquisition and protect natural water flows.
- **Inter-State Integration:** Align Kerala’s rail network with the Mangaluru–Coimbatore–Kanyakumari corridor to strengthen regional economic integration.
- **Technical Synergy:** Integrate expert rail engineering insights to ensure technical feasibility and Central approval for high-speed targets.

## The Verdict

Kerala must move toward **Mobility as a Service (MaaS)**—one app, one ticket, and one seamless journey integrating rail, KSRTC e-buses, and water transport.

A unified mobility vision will position Kerala as a national leader in sustainable, integrated transport.

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## 4 Strengthening Environmental Safeguards through Infrastructure Upgrades

**DR. ANILKUMAR S H**

### **Major Infrastructure**

Industrial and service facilities located near sensitive ecosystems require immediate infrastructure upgrades to prevent environmental contamination. In areas such as automobile service zones and mechanical yards, improper flooring, drainage, and storage practices pose a significant risk of soil and water pollution, particularly to nearby water bodies such as the Karamana River.

### **Proposed Infrastructure Improvements**

#### **1. Flooring Modernisation**

Porous soil surfaces and cracked concrete floors in oil-change and mechanical work areas should be replaced with epoxy-coated, non-porous flooring. This will prevent seepage of oil, lubricants, and other hazardous substances into the soil and groundwater, ensuring long-term environmental protection.

#### **2. Scientific Drainage Systems**

Closed and properly lined drainage channels must be constructed to prevent surface runoff from carrying oil residues, metallic particles, and other pollutants into nearby water bodies. A controlled drainage system will significantly reduce contamination risks to rivers and local ecosystems.

#### **3. Regulated Storage Infrastructure**

A designated “Scrap Yard” with a raised plinth and covered roofing should be developed to store metallic scrap and hazardous materials. This will prevent rainwater from washing away metallic dust, toxins, and other contaminants into surrounding soil and waterways.

Upgrading flooring, drainage, and storage infrastructure is essential to safeguard environmental quality and public health. Implementing these measures will ensure regulatory compliance, protect water resources like the Karamana River, and promote sustainable infrastructure practices.

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## 5 Strengthening Road Governance and Enforcement in Kerala

**ANTO J RAJ**

### **Major Infrastructure**

Kerala currently ranks among the highest in India in road traffic accidents, posing a serious challenge to public safety and infrastructure governance. Addressing this issue requires a stronger enforcement framework and the promotion of a responsible driving culture across the State.

**1. Strengthen Road Safety Enforcement:** With Kerala ranking second in road accident statistics nationally, road safety must become a top priority. Enforcement

mechanisms should be strengthened through stricter monitoring, technology-enabled surveillance, and consistent penalties for violations. Alongside enforcement, awareness campaigns and driver education programs should be intensified to foster a disciplined driving culture and reduce preventable accidents.

## **2. Establish a Tax Intelligence and Investigation Wing**

Tax evasion by vehicles entering from other states remains a persistent concern. To address this, the State should consider establishing a dedicated Tax Intelligence and Investigation Wing within the transport governance framework. This unit can monitor cross-border vehicle movements, ensure tax compliance, and prevent revenue leakage.

## **3. Strengthen Joint Enforcement Against Drug Trafficking**

There is growing concern regarding the transportation of narcotic substances through vehicles entering from other states. A coordinated enforcement mechanism involving the Motor Vehicles Department, Excise Department, and Police is essential. Joint roadside inspections and intelligence-sharing systems should be strengthened to curb illegal trafficking and ensure public safety.

### **Conclusion**

A comprehensive approach combining enforcement, intelligence mechanisms, and inter-departmental coordination is essential to enhance road governance in Kerala. Strengthening regulatory systems will improve road safety, prevent revenue loss, and address cross-border criminal activities effectively.

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# **6** Towards Integrated and Climate-Resilient Mobility in Kerala

**DR. DEVIKA BABU**

## **Roads and Other Modes of Transport**

Kerala's future mobility framework must prioritise integration, efficiency, and sustainability. With growing urbanisation and increasing private vehicle use, a coordinated transport strategy is essential to reduce congestion, improve accessibility, and ensure environmental resilience.

### **1. Integrated Public Transport**

Kerala should establish a fully integrated public transport system connecting rail, metro, buses, and water transport. A statewide common ticketing system and coordinated service schedules will ensure seamless travel across modes. This approach can significantly reduce congestion and dependence on private vehicles while improving commuter convenience.

### **2. Efficient Road and Traffic Management**

Road development should focus on optimising existing corridors rather than indiscriminate widening. Intelligent Transport Systems (ITS), data-driven traffic control, and structured parking management should be adopted to improve efficiency. Such measures enhance mobility while minimising land acquisition and environmental disruption.

### **3. Climate-Resilient, People-Centric Mobility**

Transport infrastructure must be designed to withstand climate risks and ensure user safety. All projects should prioritise pedestrian pathways and cycling infrastructure,

promoting accessible and inclusive mobility. A people-centric approach will improve urban liveability and overall quality of life.

### **Conclusion**

An integrated, efficient, and climate-resilient mobility framework will strengthen Kerala's transport ecosystem. By focusing on coordination, smart management, and sustainable design, the State can create a safer, greener, and more accessible transportation network.

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## **7** Developing a Model International-Standard City in Kerala

**RAJU PARAKKAL**

*Professor of International Relations, Thomas Jefferson University*

### **Major Infrastructure**

Kerala should consider systematically developing one city that meets at least 80% of internationally accepted urban standards. This city can serve as a pilot project and prototype for replication across other regions of the state—and potentially the country.

The first phase of implementation should focus on core sectors that define global urban excellence: healthcare systems, quality education infrastructure, resilient physical infrastructure, environmental sustainability, public safety, and well-designed buildings, roads, and streets. Special attention should be given to urban aesthetics, efficient public services, green spaces, and accessible civic amenities to ensure both functionality and liveability.

By concentrating efforts on one strategically selected city, the State can demonstrate measurable improvements in governance, service delivery, and infrastructure quality. A structured monitoring mechanism should be established to document planning processes, investments, policy interventions, and outcomes. Maintaining detailed records of implementation challenges and solutions will be critical for scaling the model elsewhere.

This pilot initiative can create a benchmark urban framework for Kerala—combining sustainability, safety, innovation, and design excellence. Once validated, the experience gained can guide future urban transformation projects across the state.

### **Conclusion**

A well-planned model city project can position Kerala as a leader in structured, standards-driven urban development. With careful planning, phased implementation, and continuous evaluation, this initiative can lay the foundation for replicable and sustainable urban growth.

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## 8 Smart Ghat Traffic Early-Warning & Monitoring System

**ALOAK MENON**

*Founder CEO, Spizaar Pvt Ltd*

### **Roads and Other Modes of Transport:**

The Wayanad Ghat Road (Thamarassery Churam) is a critical corridor connecting Wayanad and Kozhikode. Due to steep gradients, narrow curves, heavy tourist and goods traffic, and frequent breakdowns or accidents, this stretch often experiences sudden traffic blockages lasting three to four hours. A major concern is that vehicles continue entering the ghat without awareness of existing congestion, worsening gridlock and delaying emergency response. Currently, there is no dedicated real-time government early-warning system for this route.

### **Proposed Solution**

A low-cost **Smart Traffic Block Identification System** is proposed, using:

- Roadside cameras
- Vehicle count and speed sensors
- A central monitoring unit at the Kozhikode Police Control Room or a mini-unit at Adivaram

The system would detect abnormal vehicle buildup or sudden slowdowns and issue early alerts before full congestion develops.

### **How It Works**

- **Live Monitoring:** Cameras and sensors track vehicle flow at key points.
- **Smart Detection:** Software analyses traffic patterns to identify blockages.
- **Early Alerts:** Control room staff receive immediate notifications.
- **Quick Response:** Police can regulate vehicle entry and respond faster to incidents.
- **Public Interface:** A mobile app or web dashboard provides live traffic updates and enables citizen reporting.

### **Innovation & Benefits**

Unlike standard CCTV monitoring, this system integrates sensors, cameras, and predictive analysis tailored for hill roads. It is affordable, scalable, and suitable for pilot implementation.

Expected benefits include:

- Reduced long-duration traffic jams
- Faster emergency and accident response
- Improved travel planning for the public
- Lower fuel consumption and emissions
- Strengthened traffic management using simple technology

### **Implementation**

The Government can implement this through KELTRON or a PPP model, ensuring sustainability and potential revenue generation while retaining public control.

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## 9 Strengthening Road Infrastructure Governance through Digital and Sustainable Strategies

**DR. ANIL R**

### **Roads and Other Modes of Transport**

Kerala's expanding road network requires a modern, technology-driven governance framework to ensure efficiency, resilience, and sustainability. As part of the development agenda, the following prioritised policy recommendations are proposed to strengthen road infrastructure management across the State.

#### **1. Institutionalisation of Road Asset Management**

A unified **Road Asset Management System (RAMS)** should be institutionalised at the state level, covering PWD, Local Self-Government Department (LSGD), and rural road networks. This system would enable evidence-based planning, lifecycle cost-based budgeting, and outcome-oriented maintenance strategies. Such an integrated framework will optimise resource allocation and improve long-term infrastructure performance.

#### **2. Mainstreaming Advanced Digital Technologies**

A clear policy framework should guide the adoption of advanced digital tools such as Geographic Information Systems (GIS), Artificial Intelligence and Machine Learning (AI/ML)-based analytics, automated pavement condition surveys, and decision-support systems. These technologies will enhance transparency, operational efficiency, and accountability in road infrastructure management.

#### **3. Promotion of Smart and Sustainable Road Technologies**

Kerala should encourage policy-supported pilot projects focusing on smart pavements, recycled materials, climate-resilient construction techniques, and real-time performance monitoring systems. These innovations will improve durability, reduce environmental impact, and strengthen resilience against climate-related risks.

### **Conclusion**

A forward-looking approach combining institutional reform, digital transformation, and sustainable technology adoption is essential for Kerala's road infrastructure. Implementing these measures will improve asset longevity, optimise public expenditure, and align the State's transport network with global best practices in smart and sustainable mobility.

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## 10 Ethical Framework for Evaluating Mega Infrastructure Projects

**DR. JAYARAMAN C**

### **Major Infrastructure**

Mega infrastructure projects are traditionally evaluated based on technical feasibility and projected economic returns. While these parameters are essential, past experiences indicate that such assessments often fail to adequately account for ethical, social, and environmental risks. Large-scale projects can significantly impact local communities, ecological systems, cultural heritage, and long-term

sustainability—areas that may not be fully captured through purely economic or engineering analyses.

Kerala, with its dense population, fragile ecosystems, and socially conscious development model, requires a more holistic approach to infrastructure planning. It is therefore essential to develop a structured framework that integrates ethical considerations into the evaluation and approval process of major projects.

### **Key Components of an Ethical Evaluation Framework**

#### **1. Social Justice Assessment:**

Evaluate the impact on vulnerable populations, displacement risks, livelihood disruption, and equitable distribution of benefits.

#### **2. Environmental Responsibility:**

Assess long-term ecological sustainability, biodiversity protection, water resource management, and climate resilience.

#### **3. Intergenerational Equity:**

Ensure that development decisions do not compromise the rights and well-being of future generations.

#### **4. Transparency and Public Participation:**

Institutionalise meaningful stakeholder consultations and ensure transparent decision-making processes.

#### **5. Accountability Mechanisms:**

Establish independent review bodies and periodic impact audits throughout the project lifecycle.

### **Conclusion**

Infrastructure development must move beyond cost-benefit calculations to embrace ethical responsibility. A comprehensive evaluation framework grounded in social, environmental, and moral principles will enable Kerala to pursue development that is not only economically viable but also just, sustainable, and inclusive.

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## **11** Decentralised Development through High-Speed Connectivity

**UNNIKRISHNAN N.**

*Professor & Head (Rtd), Department of Civil Engineering, College of Engineering Trivandrum*

### **Roads and Other Modes of Transport**

Urban migration from rural areas in search of employment is a global phenomenon, particularly when transport systems are inadequate. As populations concentrate in cities, development becomes increasingly centralised, placing immense pressure on urban infrastructure originally designed for smaller populations. This results in congestion, housing stress, and overburdened civic services.

However, if people can commute 100 kilometres within one hour through efficient high-speed transport corridors, the need for permanent migration to cities may significantly reduce. Many individuals prefer to remain in their native places, where their social roots and community networks are strong. With reliable and fast connectivity, individuals employed in urban centres can continue residing in rural or semi-urban regions while accessing employment opportunities.

Such mobility would lead to decentralised development. When higher-income individuals choose to reside in rural areas, their presence stimulates local service sectors, housing development, education facilities, and supporting infrastructure. This, in turn, accelerates balanced regional growth and reduces urban overcrowding. Therefore, people-centric high-speed transport corridors can function as catalysts for decentralised economic expansion. Strategic investments in accessible, efficient, and affordable transport infrastructure can reshape settlement patterns and promote equitable development across the State.

The late Prof. Dr. P. V. Indiresan, former IIT Director, had articulated visionary urban concepts that resonate strongly with this idea of distributed growth supported by connectivity. Revisiting such frameworks may offer valuable insights for Kerala's long-term spatial and mobility planning.

### **Conclusion**

High-speed, inclusive transport systems can enable development decentralisation, reduce urban strain, and promote balanced regional prosperity. Integrating this perspective into Kerala's mobility planning deserves serious consideration.

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## **12 Real-Time Bus Tracking for Improved Public Transport Efficiency**

**MANISH T I**

*Professor and Head, in Department of Computer Science and Engineering, SCMS School of Engineering and Technology, Kerala*

### **Mobility Concerns (KSRTC, Rail, Water Transport)**

For public transport to be widely adopted, reliability and predictability are essential. One of the major challenges faced by KSRTC passengers is the unpredictability of bus arrival times. This uncertainty discourages many commuters from relying on KSRTC services, especially in urban areas.

To address this issue, KSRTC bus tracking should be integrated into an official web portal accessible to the public. A real-time tracking system would allow passengers to view the exact location of buses and obtain accurate arrival predictions.

### **Proposed Solution**

- Each KSRTC bus should be equipped with a GPS-enabled mobile device linked to the driver or vehicle.
- The live location data should be mapped to a central server.
- A public web portal (and mobile-friendly interface) should display real-time bus movement and estimated arrival times at major stops.

Such a system is already technically feasible and can be implemented effectively, particularly in urban areas where network connectivity is stable.

### **Expected Benefits**

- Improved passenger confidence and convenience
- Increased usage of KSRTC services
- Better trip planning for daily commuters
- Reduced dependence on private vehicles
- Enhanced operational monitoring for KSRTC management

**Conclusion:** Introducing real-time bus tracking and arrival prediction will significantly improve public transport reliability in Kerala. A transparent and

accessible tracking system can strengthen KSRTC's service quality and encourage greater public adoption.

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## 13 Advancing Resilient Infrastructure Delivery through Industrialized Construction

**RANJITH SOMAN**

### **Roads and Other Modes of Transport**

Kerala's Public Works Department (PWD) operates in a uniquely challenging environment defined by high population density, an extensive river–canal network, and increasingly unpredictable monsoon patterns. Traditional site-intensive construction methods are becoming harder to execute reliably under these conditions. Frequent monsoon interruptions, prolonged traffic diversions in dense corridors, inconsistent construction quality, and rising maintenance demands have reduced schedule certainty and public tolerance for long-duration works. As the need for resilient bridges and effective urban stormwater systems grows, it is timely to reconsider not only project scale but also delivery methodology.

One promising direction is the adoption of **Industrialized Construction (IC)** for routine bridge and drainage programs, especially in monsoon-affected and traffic-sensitive areas. Shifting major production activities to controlled manufacturing environments allows parallel site and factory operations, reducing delivery time by 30–50%. Program-level lifecycle costs can decline by 15–25%, driven by fewer weather-related delays, reduced rework, and extended asset life. Factory-controlled casting improves concrete strength consistency and durability, potentially extending service intervals two to three times longer than conventional builds. Installation windows may also shrink from months to days or weekends, minimizing disruption.

Kerala could initiate this transition through a standardized yet configurable “**Kerala Standard Bridge Kit**,” incorporating precast box culverts, prestressed beam systems, and U-girder solutions. Urban flood mitigation efforts could prioritize closed precast drainage systems and trenchless installation methods to enhance hydraulic efficiency and reduce traffic impact.

International precedents—particularly from the UK—demonstrate that product-based bridge delivery and Design for Manufacture and Assembly (DfMA) can halve construction durations on live networks while improving safety. Kerala's metro projects already provide a local benchmark for large-scale precast production and rapid installation. Leveraging inland waterways such as National Waterway-3 for transporting heavy precast elements, combined with digital governance tools like BIM-linked asset tracking, could further enhance transparency and lifecycle management.

### **Conclusion**

Adopting industrialized, digitally enabled construction methods can make Kerala's public works delivery more predictable, climate-resilient, and cost-effective—positioning the State as a leader in modern infrastructure governance.

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# 14 Industrialized Construction as a Public Sector Reform for Kerala's Road Infrastructure

**DR. RANJITH K SOMAN**

*Assistant Professor in Digital Construction, Delft University of Technology*

## Roads and Other Modes of Transport

Kerala's Public Works Department (PWD) operates in a physical, climatic, and social context that has outgrown traditional site-intensive construction methods. Recurrent monsoon disruptions, extended traffic diversions, variable execution quality, and rising public dissatisfaction now represent systemic risks rather than isolated challenges. The State requires a structural shift in infrastructure delivery.

This proposal recommends transitioning from weather-dependent, site-centric construction to **Industrialized Construction (IC)**. Under IC, bridges, culverts, and drainage components are manufactured in controlled factory environments and rapidly assembled on-site. Foundations and substructures can progress in parallel, significantly compressing delivery timelines.

## What Kerala Gains

- **Time Certainty:** Parallel manufacturing and site preparation can reduce project durations by up to 50% for repeatable asset types.
- **Monsoon Resilience:** Value-adding activities shift indoors, enabling year-round progress.
- **Consistent Quality:** Factory-controlled casting ensures uniform strength, inspection standards, and durability.
- **Reduced Public Disruption:** Night or weekend installations shorten traffic diversion periods.
- **Fiscal Efficiency:** Standardized designs lower lifecycle costs, reduce waste, and limit rework.
- **Workforce Stability:** Transitioning labour from temporary site roles to permanent industrial employment enhances skills and job security.

## Strategic Proposition

Industrialization should be treated as a **public sector reform**, not merely a contractor-driven innovation. PWD must define standards, typologies, digital governance frameworks, and quality assurance protocols, while industry operates within this structured system.

## Recommended Policy Decisions

1. Mandate precast/industrialized methods as the default for defined bridge and drainage categories, allowing exceptions only through formal waiver processes.
2. Establish a Standardization and Platform Task Force to develop a “Kerala Bridge Kit” and standardized culvert systems with a defined assurance regime.
3. Activate a manufacturing hub supported by two regional logistics nodes (hub-and-spoke model).
4. Launch two proof-by-performance pilots:
  - A Monsoon Bridge Renewal Pilot
  - An Urban Drainage / No-Dig Installation Pilot

**Conclusion:** Adopting industrialized construction as a governance reform can deliver predictable, climate-resilient, and fiscally responsible infrastructure for Kerala—transforming public works delivery from reactive to system-driven.

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## 15 Strengthening Urban Infrastructure through Waste Management and Long-Term Road Planning

**ANEESH SREEDHARAN**

### **Major Infrastructure**

Urban growth in Kerala demands practical, forward-looking infrastructure solutions that address both cleanliness and mobility challenges.

#### **1. Systematic Waste Bin Installation**

Cities should implement a planned network of waste bins placed at intervals of approximately 200 meters in urban areas. This will promote responsible waste disposal and reduce littering in public spaces.

#### **2. Structured Cleaning and Maintenance Mechanism**

Installation alone is insufficient without a robust cleaning system. A scheduled, monitored cleaning mechanism must be established to ensure timely waste collection and prevent overflow. Integration with municipal solid waste management systems and real-time monitoring (where feasible) can improve efficiency and accountability.

#### **3. Long-Term Road Widening Strategy**

Rapidly developing hubs such as Infopark and similar growth corridors require proactive planning. Road infrastructure around such areas should be designed and expanded with a 50-year horizon in mind. Anticipating future traffic growth can prevent repeated disruptions and costly modifications later.

Planned waste management and long-term transport infrastructure design are essential for sustainable urban development. By combining cleanliness, operational efficiency, and future-oriented road planning, Kerala can build resilient and well-managed urban spaces.

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## 16 Enhancing Public Transport Efficiency through Digital Integration

**ANEESH SREEDHARAN**

### **Mobility Concerns (KSRTC, Rail, Water Transport)**

Kerala's public transport system requires greater digital integration and passenger convenience to improve adoption and efficiency. Two immediate and practical reforms can significantly enhance commuter experience.

#### **1. Unified Travel Card**

A single, unified travel card usable across all modes of city transport—KSRTC buses, metro, suburban rail, and water transport—should be introduced. This integrated ticketing system will simplify travel, reduce transaction delays, and encourage seamless multi-modal journeys. A common mobility card aligned with

digital payment platforms can support the long-term vision of Mobility as a Service (MaaS).

## 2. GPS-Based Real-Time Bus Tracking

All KSRTC buses should be equipped with GPS-based tracking systems. Live bus location data should be integrated into a public web portal and display boards at major stops and bus stations. Real-time arrival predictions based on vehicle location will improve reliability and reduce uncertainty for passengers.

Such transparency will increase public confidence, improve ridership, and enable better operational monitoring for transport authorities.

### Conclusion

Digital integration through unified ticketing and real-time tracking can transform Kerala's public transport ecosystem. These reforms will enhance convenience, improve efficiency, and promote greater use of sustainable transport modes.

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# 17 Institutionalising Proactive Pavement Maintenance in Kerala

**JEE FRANCIS THERATTIL**

*Numismatist, Independant Researcher*

## Roads and Other Modes of Transport

Kerala's road maintenance system largely operates on a reactive model, where significant damage is repaired only after deterioration becomes severe. This approach often leads to higher long-term costs, increased public inconvenience, and safety risks. A strategic shift toward **Proactive Pavement Maintenance**, particularly pre-emptive patch repairs, is recommended as a core policy reform.

### 1. The Vision: From Reactive to Proactive

Kerala's Public Works Department (PWD) should adopt a proactive maintenance framework, addressing minor surface defects before they escalate into structural failures. This approach aligns with international best practices adopted in smart and resilient urban systems worldwide.

### 2. Strategic Benefits

#### Fiscal Prudence:

Early intervention through patch repairs is significantly more cost-effective than full-scale reconstruction. Small, timely investments prevent large future budgetary burdens.

#### Minimal Public Disruption:

Unlike extensive resurfacing projects that cause prolonged traffic congestion, targeted patch repairs can be executed quickly with limited disruption to daily movement and commerce.

#### Enhanced Road Safety:

Rectifying minor surface defects early reduces accident risks caused by potholes and uneven pavement, ensuring smoother and safer transit for citizens.

### 3. Implementation Goal

Proactive patch maintenance should be institutionalised as a **Standard Operating Procedure (SOP)** across road agencies. Making pre-emptive repairs the

preferred and routine practice for local authorities will help maintain road quality systematically rather than intermittently.

### Conclusion

A “stitch in time” approach to pavement maintenance can preserve public assets, optimise taxpayer expenditure, and enhance Kerala’s reputation as a modern, efficiently managed state. Institutionalising proactive maintenance is a practical and high-impact reform for sustainable road governance.

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## 18 Real-Time Driving Condition Monitoring and Regulatory Alert System

**MUKESH M**

*Owner, Exroute Vegatha (Start up)*

### Roads and Other Modes of Transport

Improving road safety in Kerala requires intelligent, technology-driven monitoring systems capable of detecting risky driving behavior in real time. The proposed system introduces an integrated mechanism to monitor both driver behaviour and vehicle operating conditions to enhance compliance with traffic regulations.

#### System Overview

The system consists of:

**User Data Sensors:** These sensors collect behavioural data of the driver, such as acceleration patterns, braking intensity, steering stability, and potential distraction indicators.

**Vehicle Data Sensors:** These monitor operational parameters including speed, engine performance, braking response, and other driving condition metrics.

A central **Control Unit** processes this data to assess the driver’s behaviour and the vehicle’s operating condition. Based on combined analysis, the system continuously evaluates overall driving conditions.

#### Key Functionality

- Real-time monitoring of driving behaviour and vehicle performance
- Identification of violations such as overspeeding, rash driving, or unsafe operational conditions
- Automated alerts to traffic control authorities when traffic regulations are breached
- Potential integration with centralized traffic monitoring systems

#### Expected Benefits

- Enhanced road safety through early detection of risky driving
- Faster intervention by traffic authorities
- Data-driven enforcement and compliance monitoring
- Reduction in accidents caused by behavioural and mechanical factors

### Conclusion

A real-time driving condition monitoring system can strengthen Kerala’s road safety framework through intelligent enforcement and preventive action. By integrating behavioural analytics with vehicle diagnostics, the State can move toward smarter, technology-enabled traffic governance.

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## 19 Context-Sensitive Planning for Mega Infrastructure in Kerala

**C S MEENAKSHI**

### **Roads and Other Modes of Transport**

When implementing large-scale infrastructure projects such as National Highways and high-speed rail corridors in Kerala, it is essential to carefully consider the State's unique geographical and environmental characteristics. Kerala's distinct climatic conditions, soil structure and composition, natural water flow patterns, wetland distribution, groundwater lines, and high population density must be integrated into the planning and execution process.

Mega infrastructure projects cannot be approached solely from a technical or economic standpoint. Kerala's terrain is ecologically sensitive, with interconnected rivers, backwaters, paddy fields, and wetlands forming a delicate hydrological network. Any alteration in land use or construction pattern can significantly affect drainage systems, agriculture, flood patterns, and local livelihoods.

Projects executed through global tenders by central agencies should ensure that local realities are reflected from the very beginning. During the planning stage itself, local governments, relevant state departments, farmers, and other stakeholders in the affected regions must be meaningfully involved. Their knowledge of the land, water systems, and agricultural practices can provide critical insights that may not be evident in centralized planning models.

Inclusive consultation and context-sensitive design are essential to avoid long-term environmental and social consequences. Infrastructure development must strengthen connectivity without compromising ecological balance or community sustainability.

### **Conclusion**

Sustainable infrastructure in Kerala requires participatory planning that respects its ecological complexity and social fabric. By integrating local expertise and environmental considerations at the design stage, mega projects can become resilient, inclusive, and better aligned with the State's long-term development vision.

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## 20 Human-Centred Road Development and Systems Thinking

**BIJEY NARAYAN**

*Professor, College of Architecture Trivandrum*

### **Roads and Transport**

Road construction is widely regarded as a key indicator of development, enhancing mobility and connectivity across regions. However, the absence of dedicated pedestrian pathways alongside many roads in Kerala significantly limits walkability in cities and small towns. This not only restricts safe human movement but also increases accident risks, particularly for children, elderly persons, and daily commuters. Therefore, unobstructed and continuous pedestrian paths should be made mandatory in all road construction and upgradation projects, ensuring that roads serve both vehicles and people.

Another pressing concern relates to the availability of clean and accessible public toilets along highways and major travel corridors. A large number of women rely on buses for long-distance travel within the State and face considerable inconvenience due to the scarcity of hygienic facilities. Even private vehicle users often struggle to find clean, safe, and visible restrooms. Establishing well-maintained roadside sanitation hubs—integrated with small retail outlets, cafés, and prayer/ablution facilities—can greatly enhance travel comfort and dignity. Such facilities could be developed as a structured government initiative or through public-private partnerships.

Finally, development planning must adopt a Systems Thinking approach. Infrastructure projects should not be designed in isolation but must consider interconnected impacts through feedback loops—social, environmental, economic, and safety dimensions. Moving away from silo-based decision-making toward integrated planning will help deliver holistic and sustainable outcomes.

### **Conclusion**

By prioritising pedestrian infrastructure, improving roadside amenities, and embedding Systems Thinking into planning processes, Kerala can ensure that road development remains safe, inclusive, and truly people-centred.

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## **21** Modernising Road Infrastructure Governance in Kerala

**DR. ANIL R,**

*Professor & Former HOD Civil, Transportation Division, Department of Civil Engineering, College of Engineering Trivandrum, Thiruvananthapuram*

Kerala should institutionalise a unified Road Asset Management System (RAMS) through a comprehensive state-level policy applicable across the Public Works Department (PWD), Local Self-Government Department (LSGD), and rural road networks. A centralised and interoperable framework will enable evidence-based planning, lifecycle cost-based budgeting, prioritised interventions, and outcome-oriented maintenance strategies. Such a system will optimise resource allocation, reduce premature road deterioration, and ensure long-term asset sustainability.

To strengthen governance and operational efficiency, advanced digital technologies must be mainstreamed within road infrastructure management. A clear policy framework should mandate the use of GIS-based mapping, AI/ML-driven analytics, automated pavement condition surveys, and integrated decision-support systems. These tools will facilitate real-time monitoring, predictive maintenance planning, improved transparency in project execution, and greater accountability in public expenditure.

The State should also promote smart and sustainable road technologies through structured pilot initiatives. Policy-backed demonstration projects may include smart pavements with embedded sensors, recycled and climate-resilient construction materials, low-carbon technologies, and real-time performance monitoring systems. These innovations will enhance durability, climate resilience, and environmental sustainability of Kerala's road network while positioning the State as a leader in modern infrastructure management.

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## 1 Strengthening GST Compliance through Structured Capacity Building

**DR. VIDYA V. DEVAN**

Enhancing GST compliance in Kerala requires sustained and structured awareness initiatives for both tax officers and taxpayers. Although Kerala has high literacy levels, practical gaps in understanding GST provisions, procedures, and frequent amendments continue to result in unintentional non-compliance and disputes. The complexity of the GST framework makes continuous capacity-building essential.

Regular training programmes for tax officers can ensure uniform interpretation of provisions and improve consistency in enforcement. Strengthening institutional knowledge will help reduce ambiguity in assessments and minimise procedural discrepancies. At the same time, targeted outreach programmes for taxpayers—especially small traders and professionals—are equally important. These programmes should be conducted in the local language to improve accessibility and comprehension.

Focused awareness efforts within Kerala can promote voluntary compliance, reduce litigation, and build greater trust between the tax administration and the public. Clear communication of compliance procedures and obligations can prevent inadvertent errors and improve revenue efficiency.

### **Conclusion**

Structured and continuous GST awareness programmes for officers and taxpayers can enhance compliance, reduce disputes, and contribute to a more transparent and efficient tax administration system in Kerala.

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## 2 Digital Literacy for Inclusive Financial Empowerment

**DR. GEETHA RANI V.**

Empowering local communities with digital literacy is essential for achieving modern self-sufficiency and inclusive development. As financial transactions and

government services increasingly move to digital platforms, lack of digital skills can limit access to essential services and economic opportunities.

Structured, hands-on workshops focused on mobile banking, access to online government services, and internet safety can effectively bridge the digital divide. Training programmes should prioritise practical application, enabling individuals to confidently conduct digital transactions, apply for welfare benefits, access public services, and protect themselves from cyber fraud.

Digital literacy not only improves financial inclusion but also enhances transparency, accountability, and efficiency in governance. When citizens are equipped with the skills to navigate digital systems independently, technology shifts from being a barrier to becoming a powerful enabler of economic participation and social mobility.

Such initiatives are particularly important in rural and semi-urban communities, where digital adoption gaps may be wider. Community-based training models can ensure that vulnerable groups are not excluded from the benefits of the digital economy.

### **Conclusion**

Strengthening digital literacy at the community level will promote financial inclusion, improve access to public services, and support sustainable economic and social growth in Kerala.

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## **3 Financial Inclusion and Household Wealth Creation for Kerala**

**THOMAS K. KADUTHANAM**

Kerala's development agenda must prioritise financial inclusion and long-term household wealth creation. Despite having one of the highest bank deposit bases in India, participation in regulated market-linked instruments such as mutual funds and pension products remains relatively low. A strategic shift from a savings mindset to systematic wealth creation is essential.

### **Recommendation 1: Kerala Household Wealth Mission (KHWM)**

A state-supported mission can promote Systematic Investment Plans (SIPs), starting from Rs. 500 per month, and integrate financial literacy into Kudumbashree networks, cooperative societies, and resident associations. A digital platform with district-level facilitation networks can guide households towards regulated investment avenues, leveraging bank and cooperative infrastructure as distribution touchpoints. This will strengthen household resilience and channel savings into productive capital markets.

### **Recommendation 2: Certified Financial Literacy & Micro-Advisory Network**

Training local graduates as Certified Community Financial Guides can address financial mis-selling and advisory gaps. These guides can educate families on budgeting, insurance, pensions, and mutual funds, assist onboarding to regulated platforms, and operate as micro-entrepreneurs in panchayats. This model promotes employment while improving last-mile advisory access.

### **Recommendation 3: Digital Registry for Household Financial Goals**

A voluntary Kerala Financial Health Registry can enable households to record financial goals, undergo risk profiling, receive automated guidance, and track

progress. With privacy safeguards, this data-driven system can improve financial decision-making and policy targeting.

### **Conclusion**

A coordinated approach combining financial literacy, technology-enabled advisory systems, and structured investment promotion can enhance household resilience, generate employment, and strengthen Kerala's long-term economic stability.

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## **4** Infrastructure Development through KIIFB: A Financial Perspective

**SARATHLAL P S**

*Assistant Professor, Christ University, Bangalore*

Infrastructure spending through the Kerala Infrastructure Investment Fund Board (KIIFB) has led to significant development across the State. Over the past decade, investments in schools, hospitals, bridges, and other critical infrastructure have improved the quality of life of citizens and strengthened public service delivery.

These developments reflect notable achievements, especially in the context of strict Fiscal Responsibility and Budget Management (FRBM) norms and the reduction in the State's share of central taxes. Despite fiscal constraints, the State has been able to sustain capital expenditure and implement large-scale infrastructure projects.

Capital spending through off-budget borrowings has enabled the Government to mobilise resources for infrastructure development without placing immediate financial strain on the State's regular budgetary framework. This mechanism has supported timely project execution and long-term asset creation.

The KIIFB model demonstrates how innovative financial instruments can be used to sustain public investment even under fiscal limitations. By focusing on infrastructure expansion, the State has strengthened its social and economic foundations.

### **Conclusion**

Strategic capital investment through KIIFB has facilitated infrastructure growth in Kerala while managing fiscal pressures, contributing to improved public services and overall development outcomes.

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## **5** Leveraging Remittances for Educational Hub Development

**DEEPSHIKHA JAIN**

Kerala receives one of the highest levels of remittances among Indian states, reflecting its strong global workforce presence and migration networks. This steady inflow of remittance income has significantly supported household consumption, real estate, and service sector growth. However, there is potential to strategically channel this financial strength toward long-term development.

Given Kerala's high literacy rate and strong educational base, the State can focus on developing itself as a national and international educational hub. Investment in advanced educational infrastructure, research institutions, skill development centres, and global academic collaborations can create new economic opportunities while reducing outward migration driven by limited local prospects.

Encouraging remittance-backed investments in education—such as private higher education institutions, specialised research centres, and innovation campuses—can generate employment, attract students from other states and countries, and build a knowledge-driven economy. Strengthening regulatory frameworks and quality standards will ensure that such expansion maintains academic excellence.

Positioning Kerala as an educational hub can diversify the State's economy beyond remittance dependency and create sustainable, knowledge-based growth.

### **Conclusion**

By leveraging high remittance inflows and its strong literacy foundation, Kerala can strategically invest in becoming a leading educational hub, fostering long-term economic resilience and human capital development.

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## **6 Reforming Tax Collection through Integrated Digital Systems**

**PYARELAL**

A technology-driven reform in tax collection can enhance transparency, simplify compliance, and strengthen fiscal federalism. One proposal is to introduce a UPI-based payment system for citizens and businesses in which applicable tax and GST components are automatically deducted at the point of transaction. Such a system could reduce the need for separate GST and tax filings by embedding compliance directly into digital payments.

Another proposal is the automatic distribution of collected tax and GST revenues to different layers of governance. A predefined sharing model—for example, 40% to local bodies (Panchayats, Municipalities, Corporations), 30% to District administrations, 20% to the State, and 10% to the Union—could ensure predictable and transparent fiscal flows to each tier of government. This mechanism may strengthen local governance and improve financial autonomy at the grassroots level.

Additionally, income tax and GST may be treated as interconnected fiscal instruments. Citizens who pay GST through transactions could receive corresponding adjustments or recognition in their income tax liabilities, and vice versa. Providing citizens with a GST-linked identification and contribution tracking system could increase awareness of individual tax contributions and promote accountability.

### **Conclusion**

Integrating digital payment systems with automatic tax deduction and transparent revenue sharing can modernise tax administration, improve compliance, and strengthen fiscal coordination across governance levels.

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## **7 Reforming Public Expenditure for Better Targeting and Equity**

**MEGHA SUSAN PHILIP**

Kerala's public expenditure policies require further restructuring to make them more leakage-proof and efficient. The State's achievement in eradicating extreme poverty is highly commendable and reflects sustained policy commitment and

welfare interventions. However, there remain concerns that certain expenditure patterns may unintentionally benefit relatively better-off sections of society, thereby magnifying pre-existing inequalities.

While universal and broad-based schemes have played an important role in improving social indicators, more refined targeting mechanisms are now necessary to ensure that public resources reach those who need them the most. Errors in inclusion and exclusion can dilute the effectiveness of welfare programmes and reduce the overall impact of government spending. Strengthening beneficiary identification systems, enhancing data integration across departments, and improving monitoring and evaluation frameworks can significantly reduce such leakages.

Greater transparency, use of technology for direct benefit transfers, periodic social audits, and outcome-based budgeting can further enhance accountability. Additionally, policy design must be sensitive to changing socio-economic conditions so that emerging vulnerabilities are addressed in a timely manner.

### **Conclusion**

Kerala's next phase of fiscal reform should focus on improving the precision and efficiency of public expenditure. By strengthening targeting mechanisms and reducing leakages, the State can ensure that its welfare architecture remains equitable, inclusive, and financially sustainable.

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## **8** Strengthening Kerala's State Finances: GST Reforms, Fiscal Federalism and Centre–State Transfers

**ANITHA KUMARY L**

Kerala's fiscal stress requires structural interventions within the GST framework and in Centre–State financial relations. As a consumption-led, service-oriented economy, Kerala imports goods worth nearly Rs. 1.5 trillion while exporting only around Rs. 550 billion to other states, resulting in a trade deficit of nearly Rs. 1 trillion (Khanna, 2020). Despite this, the IGST-to-SGST ratio remains low at around 1:1.2 instead of the expected 1:3, indicating revenue shortfall from IGST settlement. Delays in IGST settlement further aggravate fiscal strain. Kerala should urge the GST Council to amend the IGST Act to enable instant transfer of SGST and CGST portions when IGST is paid.

Regarding GST Compensation Cess, although collections continue, the cessation of compensation and merging of cess into CGST estimates reduce the divisible pool and tax devolution. A continuation of cess sharing, with at least 50% transferred to states, may be considered.

The absence of commodity-wise GST data hampers evidence-based policymaking. Periodic disclosure of such data is essential. Revenue neutrality has also been eroded due to rate reductions, especially the drastic shrinkage of the 28% slab. For consumer states like Kerala, this has reduced SGST share significantly. States may seek a higher SGST proportion and use AI-based tools to improve compliance and arrear recovery.

Under the 16th Finance Commission, Kerala's tax share increased marginally, but the abolition of revenue deficit grants and state-specific grants has resulted in a net resource decline. Additionally, centrally sponsored schemes often fail to reflect Kerala's second-generation developmental needs. Greater flexibility, state-specific schemes, and reduced conditionalities are necessary.

## Conclusion

Kerala must strategically engage with the GST Council and Union Government to restore revenue neutrality, improve devolution, enhance data transparency, and secure state-specific fiscal space to sustain development expenditure.

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## 9 Enhancing GST Compliance and Revenue Mobilisation in Kerala

**AKHIL M P**

*Assistant Professor, Gulati Institute of Finance and Taxation*

Kerala can broaden its GST base by formalising informal sectors through digital invoicing and structured compliance incentives. Bringing unregistered and semi-formal businesses into the tax net will expand revenue without increasing tax rates. Strengthening taxpayer education, simplifying return filing procedures, and offering dedicated e-filing support can significantly reduce unintentional defaults and compliance gaps.

Advanced data analytics should be leveraged to detect tax evasion patterns and high-risk transactions. Integration of e-way bill systems with GST data, along with collaboration with banks for real-time transaction tracking, can improve transparency and collection efficiency. Sector-specific GST compliance drives—particularly in high-revenue areas such as tourism, construction, and hospitality—can help capture untapped revenue potential.

Periodic audits and risk-based assessments should be institutionalised, supported by stringent penalties for deliberate fraud and evasion. At the same time, improved inter-agency coordination and proactive outreach initiatives can build trust between taxpayers and authorities. Modernising GST infrastructure and ensuring a user-friendly compliance ecosystem will enhance transparency, reduce disputes, and strengthen taxpayer confidence.

## Conclusion

A balanced approach combining digital enforcement, taxpayer facilitation, sectoral focus, and institutional coordination can substantially improve GST compliance and sustainably increase Kerala's revenue base.

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## 10 State Financial Management Modernisation through Technology and AI

**GOKUL B ALEX**

Assam has emerged as a model state in financial management systems in India. Its technology-driven framework in salary disbursement, treasury management, pension distribution, and bill auditing has demonstrated efficiency, transparency, and administrative control. These systems have streamlined public financial operations and reduced procedural delays.

Kerala can study and adapt such best practices while designing an even more advanced and secure state financial management model. By integrating artificial intelligence and data-driven monitoring tools, the State can enhance real-time tracking of expenditure, detect irregularities, automate audit processes, and

strengthen fiscal discipline. AI-enabled analytics can support predictive budgeting, fraud detection, and performance-based financial governance.

A secure, integrated digital financial management platform covering treasury, pensions, payroll, audit, and expenditure control would significantly improve accountability and efficiency in public finance administration.

### **Conclusion**

By leveraging advanced technology and artificial intelligence, Kerala can build a next-generation financial management system that ensures transparency, security, and fiscal prudence while setting a benchmark for other states in India.

## 1 Strengthening Fiscal Autonomy of Local Governments in Kerala

**SARATHLAL P S**

*Assistant Professor, Christ University, Bangalore*

The State Government may consider devolving more than 25% of its Plan allocation to Local Self Government Institutions (LSGIs) in Kerala to effectively address the diverse needs of people at rural and urban levels. Greater fiscal devolution will empower Gram Panchayats, Municipalities, and Municipal Corporations to design and implement locally relevant development programmes, thereby strengthening grassroots democracy and participatory planning.

Enhanced resource allocation to LSGIs will promote social justice and inclusive local economic development. In this context, the 7th State Finance Commission (SFC) of Kerala may recommend increased and predictable fund transfers to local governments, ensuring stability and long-term planning capacity.

Further, the State Government may periodically revise local tax and non-tax rates to reflect current economic realities. Strengthening the revenue-raising capacity of LSGIs will enhance their fiscal autonomy and reduce dependence on higher tiers of government. Improved autonomy in both revenue generation and expenditure management can stimulate local economic activities, support infrastructure development, and improve service delivery.

### **Conclusion**

Greater fiscal devolution, strengthened SFC recommendations, and enhanced revenue autonomy for LSGIs will deepen decentralisation, promote economic vibrancy at the grassroots level, and ensure social and economic justice across Kerala.

## 2 Ensuring Transparency and Accountability in Local Governance

**PULAPRE BALAKRISHNAN**

*Ashoka University, Professor*

Media reports have documented several instances of corruption occurring at the daily interface between citizens and the bureaucracy at the local governance level.

Such practices erode public trust, weaken institutional credibility, and undermine the objectives of decentralised governance in Kerala.

There is an urgent need to eliminate corruption in citizen-facing services delivered through local government institutions. Strengthening transparency mechanisms, digitising service delivery processes, introducing time-bound service guarantees, and ensuring strict accountability measures can significantly reduce opportunities for malpractice. Regular audits, social accountability tools, grievance redressal systems, and citizen feedback platforms should also be institutionalised to ensure integrity in public administration.

**Conclusion**

Eliminating corruption at the grassroots level is essential to uphold the spirit of decentralisation, restore public confidence, and ensure that local governance functions in a fair, transparent, and citizen-centric manner.

### 3 Planned Urban Transition for Census Towns in Kerala

**PROF. HARI KURUP K K**

Kerala should initiate a strategic, State-led programme to convert selected census towns into planned cities, with a clear emphasis on compact and vertical urban growth, in line with the recommendations of the 16th Union Finance Commission.

The strategy should include:

- Statutory recognition of eligible census towns as Urban Local Bodies (ULBs).
- Integrated spatial and transport planning to discourage horizontal sprawl and reduce infrastructure costs.
- Promotion of vertical development, mixed land use, and infrastructure-led densification.
- Alignment of urban planning with employment generation, housing affordability, and climate resilience.

Such an approach would enable Kerala to manage urbanisation pressures in a structured manner, improve service delivery efficiency, and prevent the proliferation of unplanned peri-urban growth.

**Conclusion**

A planned and policy-driven urban transition framework will help Kerala convert emerging settlements into sustainable, efficient, and climate-resilient cities while strengthening local governance and long-term fiscal stability.

### 4 Strengthening the Developmental Role of Local Governments in Kerala

**PROF. HARI KURUP K K**

Local governments in Kerala have moved well beyond the infancy stage and now possess significant tax buoyancy and revenue potential, in relative terms often exceeding that of the State. However, their developmental role continues to be largely confined to implementing schemes designed at higher levels, thereby limiting their scope for contextual adaptation and local innovation.

It is therefore recommended that:

- Local Governments (LGs) are explicitly enabled to supplement, adapt, and innovate upon State-level development schemes, rather than merely execute them.
- Critical gaps in human resources, technical capacity, and domain-specific knowledge within LGs be systematically addressed.
- Dedicated investments are made in data literacy, financial management, sectoral planning, and project design at the local level.

Such a shift is essential if decentralisation is to translate into substantive local economic development rather than procedural compliance. In the context of constrained State fiscal space following the introduction of GST and the erosion of independent tax handles, Kerala's mature local governments are well positioned to play a complementary and enabling role in sustaining and deepening the State's development trajectory.

### **Conclusion**

Empowering local governments with autonomy, capacity, and innovation space will ensure that decentralisation evolves into a dynamic engine of inclusive and locally responsive development in Kerala.

വിഷയ മേഖല: ഭരണനിർവഹണം, ധനകാര്യം  
ഉപശാഖ: ഭരണ നിർവഹണം

Main Track: **Governance, Finance**  
Sub Track: Governance

## 1 Administrative Reforms for Balanced Development and Tax Innovation

**PYARELAL**

The following proposals are submitted with the objective of strengthening administrative accessibility, regional balance, and tax system efficiency in Kerala:

### **1. Relocation of the Secretariat to Central Kerala**

Consider shifting the State Secretariat to a rural village located in the central part of Kerala, such as in Thrissur or Palakkad. This would enable citizens from all regions to access government offices more conveniently. It would also stimulate economic growth in northern and central districts by generating employment and infrastructure development around the new administrative hub.

### **2. UPI-Based Automatic Tax Deduction System**

Introduce a UPI-linked payment system through which tax and GST are automatically deducted at the time of each business transaction. This can eliminate the need for separate GST and income tax filing processes, thereby simplifying compliance and improving transparency.

### **3. Automatic Revenue Distribution Mechanism**

Taxes and GST collected from citizens may be automatically distributed across governance layers—40% to Local Bodies (Panchayats/Municipalities/Corporations), 30% to District level, 20% to the State, and 10% to the National level—ensuring transparent and equitable fiscal allocation.

### **4. Integration of GST and Income Tax Contributions**

Income tax and GST may be treated as linked systems, enabling citizens who pay GST to receive proportional deductions in income tax liability and vice versa. Citizens could also be assigned a GST-linked identification to track their contributions.

### **Conclusion**

These proposals aim to decentralize administration, modernize tax governance through digital innovation, and ensure transparent fiscal distribution across governance tiers.

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## 2 Strengthening Inclusive Governance and Institutional Transparency

V. SANTHAKUMAR

The following recommendations are proposed to enhance social justice, employment opportunities, gender participation, and transparency in governance:

### 1. **Effective Implementation of the Forest Rights Act (FRA)**

The Forest Rights Act should be implemented more effectively, with particular emphasis on recognizing and operationalising community forest rights. Ensuring community participation in forest governance will strengthen livelihoods, environmental stewardship, and social justice for forest-dependent populations.

### 2. **Targeted Skill Training through NORKA**

NORKA may design special programmes to train young men and women from Scheduled Caste communities for overseas employment opportunities, particularly in sectors such as nursing and caregiving. Structured training, certification, and placement support can enhance equitable access to global job markets.

### 3. **Infant Care Centres to Support Women's Work Participation**

In addition to existing childcare centres, the government may establish dedicated infant care centres for children between six months and three years. Such facilities would significantly support working mothers and improve female labour force participation.

### 4. **Institutional Mechanism for Private Investment Approvals**

While attracting private investment is important for economic growth, Ministers should not have direct involvement in investment approvals, as this may lead to cronyism. Instead, statutory bodies comprising qualified officials should evaluate and grant permissions to investors in a rule-based, transparent, and time-bound manner.

### **Conclusion**

These measures aim to strengthen inclusive development, promote women's and marginalized communities' participation in the economy, and reinforce institutional transparency in governance.

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## 3 Policy Proposal: Enhancing Administrative Accountability through a Universal Tracking System

JEE FRANCIS THERATTIL

To strengthen Kerala's commitment to transparent and citizen-centric governance, this proposal recommends the institutionalisation of a **Universal Receipt System** for all public petitions. Every citizen or organisation submitting a request—whether through digital platforms or physical offices—should receive an immediate and formal acknowledgement.

The core of this initiative is the introduction of a **Unique Tracking Number (UTN)** at the point of submission. This UTN would enable real-time monitoring of the file's progress through different administrative stages. Applicants would be able to track their requests transparently, reducing uncertainty and ensuring that no petition disappears within the system.

Such a mechanism would significantly enhance **departmental accountability**. By monitoring turnaround time (TAT) and identifying bottlenecks, leadership can promote efficiency and responsiveness across departments.

The system would also strengthen **public trust**, as citizens move from passive waiting to active, informed engagement with government processes. Additionally, aggregated tracking data can support **data-driven governance**, helping the government identify recurring issues and design proactive policy responses.

**Recommendation:**

It is proposed that no official request be accepted without the immediate generation of a traceable receipt. This simple yet powerful technological reform can set a benchmark for accountable, transparent, and responsive governance in Kerala.

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## 4 Administrative Reform and Digitisation in Lower Tiers of Governance: -

**VKC RAZAK**

*vrazak@vkcggroup.com*

Kerala has witnessed visible improvements at the higher levels of administration in terms of speed, efficiency, and reduced corruption. However, similar transformation is yet to fully reach the lower tiers of governance. Greater digitisation and system-driven decision-making must be implemented in offices where the public interacts directly, particularly in Local Self Government Department (LSGD), Village Offices, and Taluk Offices.

It is to be noted that although the State has introduced new policies to facilitate change of land use for house construction, considerable delays continue in processing public applications. Instances of corruption, coupled with the persistent involvement of middlemen, have effectively transformed the process into an intermediary-driven business. Establishing a transparent, time-bound, and fully IT-enabled infrastructure—eliminating manual intervention—would provide significant relief to the public. K-SMART has emerged as a high-impact governance reform, enabling fast issuance of building permits up to 3000 sq. ft. However, for approvals for high-rise buildings and large residential complexes, manual intervention continues to be a major bottleneck. Policymakers may consider bringing all categories of building permits fully under K-SMART. Compliance with building rules can be verified through the software itself, with permits granted automatically upon confirmation of rule adherence. Physical inspections may be dispensed with and limited. Completion of land digitisation in major LSGD areas would further enable end-to-end digital processing of permits through K-Smart

Similarly, for Micro, Small and Medium Enterprises (MSMEs), which are generally operated individually or by family units, inspections may adopt a facilitative approach. For a period of three years—similar to the licensing model under KSWIFT—no penal action may be initiated for procedural non-compliances that do not affect public health or the environment. Instead, inspecting authorities may issue corrective guidance and recommend compliance measures.

A further reform measure may be to fully digitise the entire approval process under the Electrical Inspectorate. The licensed electrical contractor submitting the project may be made legally accountable for compliance, on par with the responsibility assigned to engineers in approved building plans.

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## 5 Administrative and Industrial Reforms for Kerala's Global Rise

**RAGHUNATH NAIR**

(CEO), [www.sanjeevinilifecarevillage.com](http://www.sanjeevinilifecarevillage.com)

It is an undeniable truth that a distinctive Malayali imprint exists behind many developments across the world. Equally true, however, is that the scale and significance of Malayali contributions on the global stage have not been sufficiently highlighted or projected. It becomes imperative to introspect on how the State can be elevated to global prominence. One of the most critical factors is ensuring that government officials fully internalise the principle that public service is fundamentally about serving the people. If accountability-driven measures are consistently implemented across all departments, it would usher in transformative change within the State.

Furthermore, civil service officials should no longer be routinely appointed as heads of public sector undertakings. Instead, individuals with proven expertise in business, commerce, and enterprise management should be entrusted with these leadership roles to ensure efficiency, competitiveness, and sustainable growth. The persistent neglect by the Union Government must be addressed through innovative and self-reliant strategies. One such approach could be the divestment of 25 to 49 percent equity in highly profitable public sector undertakings, thereby unlocking capital, improving governance, and enhancing operational performance.

Officials from the Industries Department should undertake direct field-level inspections of industrial establishments, particularly within industrial clusters. By engaging closely with entrepreneurs, understanding their operational challenges, and resolving issues at the ground level, a more supportive and growth-oriented industrial ecosystem can be fostered. In addition, the Panchayat and Revenue Departments must be restructured to become significantly more people-friendly, transparent, and responsive.

In several respects, pragmatic elements of the Chinese development model—especially its emphasis on execution, accountability, and infrastructure-led growth—may be selectively studied and adapted to suit our socio-economic context.

വിഷയ മേഖല: കൃഷി, മത്സ്യം, മൃഗപരിപാലനം  
ഉപശാഖ: കൃഷി, കാലാവസ്ഥാ പ്രതിരോധം

Main Track: **Agriculture, Fisheries, Animal Husbandry**  
Sub Track: Agriculture and Climate resilience

## 1 Kerala Agriculture Vision 2030: A Strategic Framework

**DR. SREEJITH ARAVINDAKSHAN**

Kerala should develop a Kerala Agriculture Vision 2030 anchored in sustainability, climate resilience, innovation, and high-value agrifood systems because of Kerala's unique combination of high human capital, rich agro-biodiversity, strong decentralised institutions, dense urban markets, and long traditions of integrated farming, alongside mounting challenges of land fragmentation, labour scarcity, climate vulnerability, and declining farm profitability.....

### **Sectoral Context and Strategic Diagnosis**

Kerala's agriculture benefits from an educated population, strong cooperative culture, diversified homestead systems, and rising demand for quality food from urban households and tourism. However, productivity and profitability are constrained by small and scattered landholdings, high labour costs, limited mechanisation, weak post-harvest infrastructure, and increasing climate risks such as floods, droughts, and pest outbreaks. At the same time, significant opportunities exist in high-value crops, agro-processing, organic markets, digital services, and youth-led agribusiness. These can be unlocked through strong decentralised governance, research capacity, digital connectivity, and financial inclusion, while addressing barriers related to land consolidation, market inefficiencies, investment risks, and limited private sector participation.

Key priorities emerging from this diagnosis include:

- Improving farm profitability through value addition and market integration
- Reducing labour dependency through mechanisation and service provision
- Strengthening climate resilience across farming systems
- Converting innovation into large-scale impact

### **Digital Agriculture and Market Transformation**

Priority actions include:

- Statewide digital advisory platforms
- Integrated digital marketplaces and logistics systems

- Farm data registries for precision planning and insurance

### **Urban Agriculture and Niche Food Systems**

Priority actions include:

- Incentives for controlled-environment and rooftop farming
- Certification, traceability, and branding frameworks
- Direct marketing channels for premium produce

### **A Service-Led Agricultural Economy**

Priority actions include:

- Expansion of custom hiring centres
- Support for agritech startups and rural service enterprises
- Credit and incubation for youth entrepreneurs

## **2 Climate-Positive Agriculture, Carbon Farming, and Agroforestry**

Kerala should mainstream climate-positive practices that improve soil health and sequester carbon. Carbon farming systems should be linked to monitoring frameworks and carbon markets, while agroforestry should be scaled through coconut- and arecanut-based multi-tier systems integrating crops, trees, and livestock.

Priority actions include:

- Carbon sequestration incentive mechanisms
- Agroforestry expansion programmes
- Integrated rice–fish and crop–livestock systems

### **Circular Bioeconomy and Resource Efficiency**

Transforming agricultural waste into compost, biofertilisers, and biogas can reduce input costs, address environmental challenges, and stimulate green enterprises.

Priority actions include:

- Decentralised waste-to-input enterprises
- Nutrient recycling incentives
- Community-level bioenergy systems

### **Institutional Convergence, Research, and Innovation**

Transformation requires strong coordination across sectors and a shift towards mission-oriented research focused on climate resilience, digital agriculture, agroforestry, organic intensification, urban farming, and value addition, supported by innovation living labs.

Priority actions include:

- State-level agrifood systems coordination platform
- District-level convergence units
- Regional innovation living labs

### **Innovation Pipelines, Scaling, and Risk Management**

Proven solutions must be rapidly scaled through farmer organisations, private sector partnerships, and digital platforms, supported by climate risk insurance and early warning systems.

Priority actions include:

- Innovation-to-scaling frameworks
- Startup partnerships and procurement linkages
- Digital climate safety nets

### **Vision 2030 Outcome**

By 2030, Kerala's agriculture should be climate-resilient and carbon-positive, high-value and market-linked, digitally enabled and service-driven, innovation-led and employment generating, and ecologically sustainable and nutrition secure.

In essence, Kerala's Agriculture Vision 2030 should reposition farming as a modern, climate-positive, innovation-driven agrifood economy anchored in strong institutions, mission-led research, and large-scale scaling of proven solutions.

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## **3 Agricultural Vision 2035: Engineering Wellness through Bio-Resource Management**

**THARAYIL SHEREEF AMJATH BABU**

By 2035, Kerala should move beyond conventional farming and evolve into a system that engineers wellness. Agriculture must transform from a labour-intensive activity into a technology-enabled, sustainability-driven enterprise that simultaneously delivers human health and ecosystem health outcomes.

In this vision, the farmer is no longer viewed merely as a cultivator or labourer but as a **Bio-Resource Manager**. This new role involves overseeing integrated biological resources—soil, water, crops, biodiversity, and carbon systems—through digital tools, scientific management, and market-linked innovation. Farms become smart, climate-positive social enterprises that generate economic returns while contributing to environmental restoration.

The proposed Agricultural Vision 2035 emphasises a carbon-negative agrifood model where agricultural systems actively sequester carbon, improve soil health, enhance biodiversity, and promote nutrition security. The underlying business model integrates value addition, traceability, premium markets, and ecosystem service incentives. Agriculture thus becomes a platform for public health, environmental sustainability, and rural prosperity.

A deeper discussion of this vision would examine the economic framework, governance mechanisms, technology integration, financing models, and scaling pathways required to reposition Kerala's agriculture as a wellness-driven bioeconomy.

### **Conclusion**

Agricultural Vision 2035 reimagines Kerala's farming systems as technology-enabled, carbon-negative, wellness-oriented enterprises led by Bio-Resource Managers, ensuring sustainable livelihoods, ecosystem resilience, and long-term human health outcomes.

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## 4 Enhancing Land Productivity and Flexible Land Use in Kerala

**C. VEERAMANI**

*Professor and Director, Centre for Development Studies*

Low land productivity and underutilisation remain binding constraints on Kerala's growth, particularly in agriculture, plantations, and allied sectors. Addressing this structural limitation requires reforms that enable more flexible and productive land use while safeguarding social equity and environmental sustainability.

A key priority is revisiting land-use regulations to facilitate shifts towards higher-value activities. Encouraging diversification within plantation agriculture can improve income potential and resilience. Formalising land leasing arrangements will help bring idle or fragmented land into productive use, while enabling land pooling mechanisms can support collective cultivation and industrial utilisation where appropriate.

Institutional frameworks that promote contract farming and subcontracting between processors and farming communities can enhance scale, productivity, and income stability. Such arrangements can provide assured markets, technical support, and better price realisation for farmers, while strengthening value chains.

Complementary investment in shared infrastructure—such as irrigation systems, storage facilities, and processing units—is essential to support these reforms. Without adequate infrastructure, productivity gains and value addition efforts will remain limited.

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## 5 Circular Bio-Economy through Agricultural Waste Valorisation

**PRAGEESH P**

Kerala possesses significant potential to convert agricultural waste into economic value through circular economy models. At present, substantial quantities of farm residues are either burned, dumped, or remain underutilised, resulting in environmental pollution and the loss of additional income opportunities for rural communities. Transforming these residues into value-added products can simultaneously address ecological concerns and strengthen farm-based livelihoods.

An emerging example is the conversion of agricultural waste into high-value, mycelium-based biodegradable packaging materials. Such innovations replace conventional thermocol and other non-biodegradable materials while creating a structured market for agricultural by-products. By integrating waste management with agricultural production systems, residues become raw materials for bio-manufacturing, and the by-products generated can be used as compost to enrich soil fertility. This creates a closed-loop system that supports sustainable farming practices.

The Government of Kerala may facilitate this transition by promoting farmer-startup collaborations, supporting pilot bio-manufacturing units, and incentivising circular business models through green procurement policies and targeted subsidies. Establishing innovation clusters focused on agri-waste valorisation can also accelerate technology adoption and market development.

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## 6 Strengthening Agricultural Infrastructure through Statistical Assessment

PARVANA G

### **Agricultural Value Addition and Marketing**

Modernising Kerala's agriculture sector requires a systematic evaluation of its infrastructure base, particularly in pre-harvest and post-harvest facilities. While production-oriented policies have received attention, the infrastructure perspective of agriculture remains under-assessed. Conducting a comprehensive agricultural statistical survey to evaluate storage facilities, cold chains, grading units, processing centres, transportation networks, irrigation systems, and market linkages is essential.

Such a survey would generate data-driven insights into infrastructure gaps, inefficiencies, and regional disparities that affect productivity, value addition, and farmers' incomes. Post-harvest losses, inadequate storage, and weak logistics often reduce the benefits of increased production. A structured statistical assessment would help prioritise investments and guide evidence-based policy decisions.

Integrating "Agricultural Infrastructure" as a dedicated component in the Kerala State Budget would institutionalise this approach and ensure sustained funding, monitoring, and inter-departmental coordination.

Farmer-centric collectives should also be encouraged to establish shared storage systems, processing units, and branded value-added products. By promoting cooperative branding and collective marketing platforms, agricultural infrastructure and market access can be significantly strengthened while enhancing farmers' bargaining power and income stability.

വിഷയ മേഖല: കൃഷി, മത്സ്യം, മൃഗപരിപാലനം  
ഉപശാഖ: കാർഷികോൽപ്പന്ന മൂല്യവർദ്ധനവും വിപണനവും

Main Track: **Agriculture, Fisheries, Animal Husbandry**  
Sub Track: Value addition and marketing of agricultural produce

## 1 Strengthening Agricultural Value Addition and Market Connectivity

**PROF. SURESH RANGARAJAN**

*Dean, School of Global Studies, Central University of Kerala*

To strengthen agricultural value addition and improve farmer income, decentralised processing and market integration mechanisms must be prioritised.

Jackfruit processing units may be established in all Krishi Bhavans to support value addition, reduce wastage, and create local employment. Similarly, drumstick (moringa) collection and export units in all Krishi Bhavans can facilitate aggregation, quality control, and direct export opportunities, enhancing farmer returns.

Coconut farms are currently facing multiple challenges and require urgent intervention. Targeted policy measures, technical support, and institutional backing are necessary to stabilise production and improve profitability in this vital sector.

Organic farming should be actively encouraged through incentives, certification support, and awareness programmes. Promoting organic cultivation will enhance soil health, improve food safety, and open premium market opportunities.

The use of blockchain technology can directly connect farmers and consumers, ensuring transparency, traceability, and fair pricing. AKSHAYA Centres can play a facilitating role by helping farmers access digital platforms, reduce dependence on middlemen, and improve market linkages.

## 2 Towards an Integrated Agricultural Production System in Kerala

**DR. RAJ KURUP**

An integrated approach is required across agriculture, animal husbandry, and aquaculture systems to ensure long-term sustainability and resilience. Over the past decade, the Government of Kerala has made commendable progress in promoting local vegetable production to meet seasonal and festival demand. However, further progress towards a truly sustainable system must consider critical ground realities,

including insufficient manpower, the impacts of climate change, market demand fluctuations and price volatility, and environmental challenges such as pests and diseases.

Currently, operational diversity across sectors exists, but a unified and consistent support system for farmers and entrepreneurs remains limited. A more coordinated framework is necessary to strengthen integration and efficiency.

The first priority should be promoting farming as an integrated system combining aquaponics, precision agriculture, dairy, and other animal husbandry activities. Such integration would close nutrient and resource cycles, making production systems more self-supporting and resource-efficient.

Second, unique products should be identified at the ward or local government level. Encouraging place-based specialisation can create value addition opportunities and help farmers withstand market and price fluctuations, similar to the successful development of the jackfruit sector.

Third, local government-level working groups should be established, comprising agriculture officers, veterinary doctors, elected representatives, and farmer representatives. These groups should provide advisory support, conduct monthly meetings and Q&A sessions, and coordinate with Kudumbashree units to ensure grassroots engagement.

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### 3 Strengthening Agro Value Addition and Marketing in Kerala

**ALOAK MENON**

*Founder CEO, Spizaar Pvt Ltd*

Kerala has high potential to emerge as a global brand for natural and organic products, extending beyond raw materials to value-added products. With proper policy direction and structural support, the state can position itself strongly in the organic and plantation-based global markets.

Adopting a model similar to Sikkim's mass organic certification can be considered. Large areas of unused farmland can be brought under certified organic cultivation, with the Agriculture Department maintaining oversight and certification. Such certified lands may also be leased to companies seeking reliable organic produce. This approach can be extended to plantation crops such as coconut and coffee, which have strong international demand.

Access to common processing centres should be expanded to enable local producers to convert raw materials into finished products. While Kerala Agricultural University (KAU) has facilities, a Public-Private Partnership (PPP) model can be developed to scale up processing infrastructure, with the Government acting as a facilitator and connector.

Further, existing government transport services, including KSRTC logistics or other public transport systems, can be adapted to be e-commerce friendly. This would allow local brands to distribute products such as pickles, jams, and other value-added goods across Kerala and to cities like Bengaluru and Chennai through affordable, door-delivery-enabled systems.

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## 4 From Forest to Food Basket: Leveraging Wild Edibles for Nutrition, Livelihoods and Food Security in Kerala

**DR. A.G. PANDURANGAN**

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Kerala's rich biodiversity and traditional food systems historically integrated wild vegetables, pulses, tubers, and fruits into community diets. However, increasing dependence on monocultures, commercial crops, and market-driven consumption has led to the decline of these indigenous foods. The State remains highly dependent on neighbouring states for vegetables, pulses, rice, and other essentials, importing food worth approximately Rs. 1,17,760 crore annually. Despite initiatives such as the Vegetable Development Programme, deficits in food grains, vegetables, pulses, and fruits persist, contributing to price inflation and food insecurity. In this context, wild edibles—largely untapped—offer a strategic pathway to enhance nutrition, strengthen food security, and improve rural livelihoods.

Wild edibles include nutrient-dense greens (e.g., wild amaranths, Diger, Paruppu Cheera, Kattu cheera), traditional tubers (wild yams, Manjal kizhangu, Kuva), fruits (Ambazhanga, wild jamun, Nellikai, wild dates), and pulses that provide plant protein and enrich soil through nitrogen fixation. These species are rich in vitamins, minerals, fibre, antioxidants, and phytonutrients. At a time when Kerala faces micronutrient deficiencies (iron, vitamin A, folate), anaemia among women and children, and rising lifestyle diseases, diversifying diets with wild foods can combat “hidden hunger,” complement cereals, and reduce reliance on processed foods.

Wild edibles offer multiple advantages: they function as seasonal and emergency buffers, thrive in marginal lands, and are climate-resilient under low-input conditions. They conserve biodiversity, improve soil health, and have a low ecological footprint. Economically, they create opportunities for supplementary income through cultivation, collection, and value addition—particularly empowering women, tribal communities, and self-help groups. Processing into flours, powders, pickles, nutraceuticals, and ready-to-eat products can expand market reach and generate rural enterprises. Culturally, their revival strengthens food heritage, indigenous knowledge, and community identity.

To mainstream wild edibles, a multi-pronged policy strategy is required. This includes statewide documentation and conservation, seed and gene banks, research on propagation and yield improvement, and incentives for integrating wild crops into agroforestry, home gardens, and mixed farming. Processing infrastructure, quality standards, certification (including organic and GI), and inclusion in public nutrition schemes such as PDS and midday meals can expand demand. Strong market linkages, branding initiatives (e.g., “Kerala Wild Foods”), price support mechanisms, and digital marketing platforms are essential. Nutrition education, food festivals, media outreach, and curriculum integration can popularise consumption. Institutional support through an inter-departmental task force and community-led implementation with Panchayats, cooperatives, and SHGs, supported by robust monitoring frameworks, will ensure measurable impact.

With targeted policy support, Kerala can transform wild edibles from marginal resources into mainstream contributors to nutrition security, environmental sustainability, and rural prosperity.

വിഷയ മേഖല: കൃഷി, മത്സ്യം, മൃഗപരിപാലനം  
ഉപശാഖ: പ്ലാന്റേഷൻ

Main Track: **Agriculture, Fisheries, Animal Hisbandry**  
Sub Track: Plantatiion

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## 1 Preservation and Sustainable Utilisation of Paddy Fields

**GOLDA K.S.**

The preservation and proper utilisation of paddy fields should be given high priority in Kerala’s agricultural policy. Paddy fields are not only essential for food security but also play a crucial role in maintaining ecological balance, groundwater recharge, flood mitigation, and biodiversity conservation. Protecting existing paddy lands from conversion and ensuring their productive use will strengthen the State’s long-term environmental and agricultural sustainability.

In addition, there should be a focused effort to promote the production and distribution of organic vegetables and fruits. Encouraging organic farming practices can reduce dependence on chemical inputs, improve soil health, and enhance consumer confidence in locally produced food. Support mechanisms such as farmer training, certification assistance, market linkages, and branding initiatives can help expand the organic sector.

Strengthening these two areas—paddy field preservation and organic production—can improve food security, protect natural resources, and promote healthier consumption patterns across the State.

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## 2 A Structural Transition Framework for Kerala’s Plantation Agriculture:

**SIDDHARTH RAJAGOPAL**

Kerala’s plantation and smallholder agricultural economy is facing structural pressures including labour shortages, rising wage costs, ageing farmer demographics, declining youth participation, stagnant coconut productivity, fragmented landholdings, and climate variability. These challenges require a coordinated technological transition rather than incremental reforms.

### **1. Kerala Agricultural Robotics & Smart Mechanisation Mission**

A state-level mission should promote compact, modular, electric robotic systems tailored for coconut, arecanut, and rubber.

#### **Policy Measures:**

- Field-testing networks via Krishi Bhavans and universities
- Subsidies for robotic systems
- Innovation grants for startups and MSMEs
- Safety and operational standards

### **2. Electrified Agricultural Equipment with Solar Integration**

Transition from fossil fuel machinery to electric systems supported by decentralized solar infrastructure.

#### **Policy Measures:**

- Extend EV incentives to farm equipment
- Solar-Integrated Farm Mechanisation Scheme
- Net-metered solar farms
- Low-interest financing for solar + electric packages
- Pilot Solar-Mechanised Agriculture Clusters

### **3. Robotics Components & Edge Technology Ecosystem**

Develop local capabilities in motors, encoders, LiDAR, IMUs, and edge computing.

#### **Policy Measures:**

- Robotics Components Platform via Keltron
- Global technology partnerships
- Testing and validation facilities
- Electronics MSME clusters
- Standardized open hardware systems

### **4. Modular Agricultural Robotics Platform for Universities**

Create a state-supported modular robotic base platform for research institutions.

#### **Policy Measures:**

- Grant-supported platforms
- Annual Agricultural Robotics Challenges
- Industry mentorship
- Open documentation frameworks

#### **Integrated Development Outcomes**

- Revitalized plantation productivity
- Reduced labour dependency
- Lower energy costs via solar
- Skilled workforce development
- Domestic robotics capability
- Position Kerala as a national leader in climate-resilient, smallholder-focused agricultural innovation

വിഷയ മേഖല: കൃഷി, മത്സ്യം, മൃഗപരിപാലനം  
ഉപശാഖ: മത്സ്യമേഖല

Main Track: **Agriculture, Fisheries, Animal Hisbandry**  
Sub Track: Fisheries

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## 1 Export Promotion and Sustainable Value Addition in Fisheries

**BABITHA RANI**

*Principal Scientist, Aquaculture Division, Central Institute of Fisheries Education, Mumbai*

Export promotion of cultured tilapia and panga sous, as freshwater fish varieties, should be given priority. These species have growing demand in international markets, and structured export-oriented production can improve farmers' income and strengthen the fisheries economy. Along with export promotion, value addition of these freshwater fish varieties must be encouraged to enhance their market value and competitiveness.

An eco-village concept integrating fish farming, tourism, and promotion of value-added fish products can be developed, particularly in tourist destinations and backwater regions. Such an approach can combine sustainable aquaculture practices with tourism potential, generating diversified income opportunities while promoting local fish-based products in tourist spots.

AI-based eco-labelling and product tracking systems can be introduced to monitor both production methods and product quality. This will help ensure transparency in fish farming practices and enable traceability from farm to consumer. By certifying eco-friendly and healthy production systems through digital tracking, farmers can secure better market prices and build consumer confidence.

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## 2 Strengthening Coastal Communities for Sustainable Fisheries Development

**PROF. SURESH RANGARAJAN**

*Dean, School of Global Studies, Central University of Kerala*

Approximately 25 percent of Kerala's population lives within 50 kilometres of the coastal area. This demographic concentration highlights the strategic importance of coastal communities in the state's fisheries economy and overall development framework.

Sustainable development of the fisheries sector must therefore be linked with comprehensive improvement in social and physical infrastructure within coastal regions. Strengthening educational facilities is essential to enhance human capital and provide opportunities beyond traditional livelihoods. Improved medical facilities are equally critical, given the occupational risks associated with marine and coastal activities.

Road connectivity must be upgraded to ensure efficient transportation of fish and related products, reduce post-harvest losses, and improve access to markets and services. Provision of pure drinking water and adequate sanitation facilities is fundamental for improving health outcomes and overall quality of life in coastal settlements.

Diversification of skills among coastal communities should also be prioritised. Expanding training opportunities beyond traditional fishing—into value addition, processing, aquaculture, marine services, and allied sectors—can create alternative income streams and strengthen economic resilience.

### 3 Enhancing Inland Fish Production: Key Measures and Points to Consider

**V. SASHIKUMAR**

*Maitri Farm, Mahadevikad, Karthikappally, 2025*

*Fish Farmer Award Winner*

മത്സ്യബന്ധനത്തിന് കടലിൽ പോകുന്നത് വിലക്കിക്കൊണ്ട് നിരന്തരം അറിയിപ്പുകൾ വരുന്നതും കാലാവസ്ഥാ വ്യതിയാനങ്ങളും കാരണം കടലിലെ മത്സ്യ ലഭ്യത കുറഞ്ഞു വരുന്നു. ജല മലിനീകരണവും മറ്റു കാരണങ്ങളാലും ഉൾനാടൻ ജലാശയങ്ങളിലും മത്സ്യ സമ്പത്തു ഗണ്യമായി കുറഞ്ഞ പശ്ചാത്തലത്തിലാണ് വകുപ്പിന്റെ ഉന്നതാധികാര സമിതിയുടെ അനുമതിയോടെ പല പദ്ധതികൾ നടപ്പിലാക്കുന്നത്. വിവിധ തരം മത്സ്യ കൃഷിയിൽ മാത്രമായി 4671ലക്ഷം രൂപയാണ് മാറ്റി വെച്ചിരിക്കുന്നത്. അതിലൂടെ 49729 മെട്രിക് ടൺ മത്സ്യം അധികമായി ഉൽപ്പാദിപ്പിക്കാൻ കഴിയുമെന്നും 679.90 കോടി രൂപ വരുമാനം ഉണ്ടാക്കാമെന്നും ഉത്തരവു പറയുന്നു. 76770കർഷകർക്കു പ്രയോജനം ചെയ്യുമെന്ന് പറയുന്ന പദ്ധതി നടപ്പാക്കുമ്പോൾ മുൻ കാല അവ സ്ഥയും കണക്കുകളും വിശകലനം ചെയ്യേണ്ടതാവശ്യമാണ്. A വളർത്താനുദ്ദേശിക്കുന്ന മീനുകൾ. ഇനിയും മലയാളികൾ കഴിക്കാൻ തയ്യാറാകാത്ത സിലോപ്പിയക്കാണ് പ്രാധാന്യം നൽകിയിരിക്കുന്നത്. 676 ലക്ഷം രൂപ. മുൻ കാലങ്ങളെ അപേക്ഷിച്ച് വരാൽ കൃഷിക്കു 1614 ലക്ഷം രൂപ മാറ്റി വെച്ചിട്ടുണ്ട്. മദ്ധ്യ തിരുവിതാംകൂറിലുള്ളവരും അവിടെ, നിന്നും കുടിയേറിയവർക്കാണ് വരാലിനോടു പ്രിയം. വളർത്താനും പിടിക്കാനും എളുപ്പമുള്ളതും അച്ചാറിനും മറ്റു മുഖ്യധാമിഷ്ടിത മത്സ്യ ഉൽപ്പന്നങ്ങൾക്കും കയറ്റുമതിയ്ക്കും സാധ്യത ഉള്ളതിനാലാ വാം കർഷകർ അതിലേക്കു തിരിഞ്ഞത്. കേരളത്തിന്റെ ദേശീയ മത്സ്യമായ കരിമീൻ പ്രിയം കൊല്ലം മുതൽ വടക്കോട്ട് തൃശൂരിന്റെ തെക്കുഭാഗത്തുള്ളവർക്കും ടൂറിസ്റ്റുകൾക്കുമാണ്. വില കൂടുതൽ ലഭിക്കുന്ന ഈ മത്സ്യം കൃഷി ചെയ്യുന്നതാണ് കർഷകനുലാഭം. എന്നാൽ അതിന്റെ മോർട്ടാലിറ്റിയും തീറ്റച്ചിലവും കൂടുതലാണ്. കരിമീനെപ്പോലെ തന്നെ തോന്നുന്ന ഗിഫ്റ്റ് സിലോപ്പിയ രുചിയുള്ളതും ഉൽപ്പാദനച്ചിലവു കുറഞ്ഞതുമായതിനാൽ ഫിഷറീസ് വകുപ്പ് കഴിഞ്ഞ കുറേ വർഷങ്ങളായി അതിനാണ് പ്രാധാന്യം നൽകിയത്. B കൃഷിക്കുള്ള വിത്തു ലഭ്യത. സിലോപ്പിയ സിലോപ്പിയയുടെ വിത്തുൽപ്പാദനത്തിനായി ഫിഷറീസ് വകുപ്പിന്റെ കീഴിൽ മൂന്ന് ഹാച്ചറികൾ ആവശ്യത്തിന് കുഞ്ഞുങ്ങളെ ഉൽപ്പാതിപ്പിക്കുന്നുണ്ട്. കരിമീൻ കരിമീൻ കുഞ്ഞുങ്ങളുടെ കാര്യത്തിൽ ഫിഷറീസ് വകുപ്പിന്റെ കീഴിലുള്ള അഡാക്കിന് നാലഞ്ചു ഹാമുകളിൽ കരിമീൻ വിത്തുൽപ്പാതിപ്പിന് പദ്ധതികളുണ്ടെങ്കിലും സംസ്ഥാനത്തിനാവശ്യമായ കരിമീൻ കുഞ്ഞുങ്ങളെ സർക്കാർ അംഗീകൃത ഹാച്ചറികളിൽ നിന്ന് വാങ്ങി ഫിഷറീസ് വകുപ്പിനു നൽകുകയാണ്. എന്നാൽ കേരളത്തിലെ സ്വകാര്യ ഹാച്ചറികളിൽ നിന്ന് സംഭരിച്ച അഡാക്ക് ഇടനിലക്കാരായി നിന്നാണ് കർഷകർക്ക് കൂടുതൽ വിലയ്ക്കു നൽകുന്നത്. ആറേഴ് വർഷം മുൻപ് നിശ്ചയിച്ച അടിസ്ഥാന വില പോലും നൽകാതെ

യാണ് ഉൽപ്പാതകരിൽ നിന്ന് വാങ്ങുന്നത്. ഉൽപ്പാതനച്ചിലവ് കൂടിയ പശ്ചാത്തലത്തിൽ അടിസ്ഥാന വില കൂട്ടി കൃത്യസമയത്ത് പണംകൊടുക്കാനും നടപടി ഉണ്ടാകണം. വനാമി കൊണ്ട്. വനാമി കൊണ്ടു പ്രാദേശികവിപണനം ചെയ്യുന്നതിലും കൂടുതലായി കയറ്റുമതി ചെയ്യാനാണ് ഉദ്ദേശിക്കുന്നത്.

നിർദ്ദിഷ്ട അനാബസ് [ കരട്ടി ] വരാൽ, ആസാം വാള,പുമീൻ, വനാമി തുടങ്ങിയ വയുടെ കുഞ്ഞുങ്ങളെ ആന്ദ്ര, ബംഗാൾ, ഒറീസ തമിഴ് നാട് എന്നിവിടങ്ങളിൽ നിന്ന് ഏജന്റൻ മാർ വഴിയാണ്. ഇറക്കുമതി ചെയ്യേണ്ടിവരുന്നത്. അതിന്റെ ഗുണനിലവാരം പരിശോധിച്ചതിനു ശേഷമേ കൃഷിയായി ഉപയോഗിക്കാവൂ. കേരളത്തിൽ കൃഷിക്കായി വിതരണംചെയ്യുന്ന മത്സ്യ കുഞ്ഞുങ്ങൾ രോഗ വിമുക്തമാണെന്ന് പരിശോധിച്ച ഉറപ്പു വരുത്താൻ കൊല്ലത്ത് സീഡ് സെന്ററുണ്ട്. സീഡ് നിയമവും ഉണ്ടെങ്കിലും കഴിഞ്ഞ കുറച്ച കാലമായി ഇറക്കുമതി ചെയ്യപ്പെടുന്ന സീഡു പരിശോധന നടത്തി നടപടികൾ എടുത്തതായി റിപ്പോർട്ടില്ല. വൻകിട ഏജന്റൻ മാർക്കെതിരെ നടപടി എടുത്തിട്ട് നിയമത്തിന്റെ പഴുതു കളിലൂടെ അവർ രക്ഷപെടുന്നു. ഇന്ത്യയിൽ ആദ്യമായി നടപ്പിലാക്കിയ സീഡ് ആക്ട്കളിപ്പോൾ തിരുത്തി കൊണ്ടിരിക്കുകയാണ്. ഉൽപ്പാതിപ്പിക്കുന്ന മത്സ്യത്തിന്റെ അവസ്ഥ. കേരളത്തിൽ സിലോ പ്പിയക്കു പ്രിയം കുറയാൻ കാരണം ആന്ദ്രയിൽ നിന്ന് ലോറിക്കണക്കിന് രൂചിയില്ലാത്ത മാർക്കറ്റിലിറക്കി അൻപതും എഴുപതും രൂപക്കു വിറ്റ് ഇവിടെ ഉൽപ്പാതിപ്പിക്കുന്ന ഗിഫ്റ്റ് സിലോപ്പിയ വാങ്ങാനാളില്ലാതായപ്പോൾ കർഷകരും അതിൽ നിന്ന് പിൻമാറി. കോഴിയിറച്ചി മാലിന്യങ്ങളും, ഭക്ഷണ മാലിന്യങ്ങളും വേവിച്ചു കൊടുത്തു വളർത്തുന്ന ആറ്റുവാളയുടെ അധിക കൊഴുപ്പും രൂചിയില്ലാത്തതും കാരണം മലയാളികളിപ്പോഴതു വ്യർജിച്ചു കഴിഞ്ഞു. കഴിഞ്ഞ ഇടതുപക്ഷ സർക്കാറിന്റെ കാലത്ത് ആലോഷിച്ചു നടപ്പിലാക്കിയ കൂടു കൃഷി കർഷകർ ഉപേക്ഷിച്ചു. ജല മലിനീകരണവും, അകാലത്തിലുള്ള മഴയുമൊക്കെ കൂടുകളിലെ മത്സ്യം ചത്തുപോയി. നഷ്ടം വന്ന കർഷകരുടെ പ്രശ്നങ്ങൾ മനസ്സിലാക്കാനോ പരിഹാരം കാണാനോ കഴിയാത്തതു കൊണ്ടാണവർ ഉപേക്ഷിച്ചു പോയത്. കാർഷികവകുപ്പുനൽകുന്ന ഇൻഷുറൻസ് പദ്ധതി മത്സ്യകർഷകർക്കും നൽകണമെന്ന് കേന്ദ്രത്തോടും സംസ്ഥാനത്തോടും ആവശ്യപ്പെട്ടിട്ട് നടപടികളുണ്ടായിട്ടില്ല. പോയ സാമ്പത്തിക വർഷം ജനകീയ മത്സ്യ കൃഷിക്ക് വേണ്ട സഹായങ്ങൾ നൽകിയില്ലെന്നു മാത്രമല്ല സൗജന്യമായി മത്സ്യ കുഞ്ഞുങ്ങളെ മാത്രം നൽകാൻ തീരുമാനിച്ചിരുന്നു.. സബ്സിഡി എന്ന ആകർഷണം ഏതു കൃഷിക്കും സബ്സിഡി ആവശ്യപ്പെടുന്ന കേരളത്തിലെ കർഷകർ മത്സ്യ കൃഷിയിലേക്കും ആകൃഷ്ടരായത്. മത്സ്യ കൃഷിയിലേക്ക് ആകർഷിക്കപ്പെട്ടതും നാൽപ്പതു ശതമാനം വരെ സബ്സിഡി ലഭിക്കും എന്നതുകൊണ്ടായിരുന്നു.

കൃഷിയിറങ്ങിയവർ കുറെപ്പേർ തീറ്റയുടെയും, കുഞ്ഞുങ്ങളുടെയും അനുബന്ധ സൗകര്യങ്ങളുടെയും ബില്ലുകൾ നൽകി പണം കൈപ്പറ്റിയിട്ട് ഉപേക്ഷിച്ചു പോയി. 2021 ൽ വകുപ്പ് പ്രസിദ്ധീകരിച്ച കൈ പുസ്തകത്തിൽ പറയുന്ന 85000 രജിസ്റ്റർ. ചെയ്ത മത്സ്യ കർഷകരിൽ എത്ര പേർ ഉണ്ടെന്നു പരിശോധിച്ചു കണ്ടുപിടിക്കേണ്ടതാണ്. എല്ലാപഞ്ചായത്തിലേക്കും പ്രതിമാസം: പതിനായിരം രൂപ നൽകി പ്രൊമോട്ടർമാരെ നിയമിച്ചിരുന്നു. അവരാണ് അനുയോജ്യരായവരെ കണ്ടെത്തി മത്സ്യകൃഷിയിലേക്കു കൊണ്ടുവന്നിരുന്നത്. ഏറ്റവും കൂടുതൽ മത്സ്യ കർഷകരുണ്ടായിരുന്ന തിരുവനന്തപുരം ജില്ലയിൽ പോലും ആവശ്യത്തിൽ മത്സ്യം ഉൽപ്പാദിച്ചതായി തായി തോന്നിയിട്ടില്ല. പരാജയപ്പെട്ട ബയോ ഫ്ലോക് കൃഷി. വീട്ടുമുറ്റത്ത് ആധുനിക മത്സ്യ കൃഷിനടത്താനുള്ള പദ്ധതി വന്നപ്പോൾ ജോലിയിൽ നിന്ന് വിരമിച്ചവരും വിദേശത്തു നിന്നെത്തിയവരും വൻ സബ്സിഡി ആനുകൂല്യവും ലാഭവും പ്രതീക്ഷിച്ചിറങ്ങി ലക്ഷങ്ങൾ മുടക്കി പരാജിതരായി പിൻമാറി വീട്ടുമുറ്റത്ത് യന്ത്രങ്ങളും പൈപ്പുകളും സ്മാരകങ്ങളായി നിൽക്കുന്നുണ്ട്. സിലോപ്പിയ കൃഷി ചെയ്തതും, സുസ്ഥിരമായ വൈദ്യുതിയുടെ അഭാവമായിരുന്നു കാരണം. അവരിൽ .ചിലരിപ്പോൾ സിലോപ്പിയക്കു വരാലു കൃഷിയും വരാലിന്റെ മുല്യാ ധിഷ്ടിത പദ്ധതിയായ അച്ചാർ നിർമ്മാണത്തിലേക്കും., റെഡി ടു കുക്ക് എന്ന പേരിൽ വൃത്തിയാക്കി മസാല ചേർത്ത് വിപണിയിലിറക്കി വിജയിച്ചിട്ടുണ്ട്. ഒക്കെ പുസ്തകം സൂക്ഷ്മമായി പരിശോധിച്ചാൽ ഓരോ ജില്ലയുടെയും അവസ്ഥ മനസ്സിലാകും. 5208 പട്ടാകുളങ്ങളും., 2369 കേജ് ഫാമുകളുംമുണ്ടെങ്കിലും മിക്കതും ഉപേക്ഷിക്കപ്പെട്ട മട്ടിലാണ് സബ്സിഡിക്കു വേണ്ടി കൃഷിക്കു വന്ന വർ പിൻമാറാനുള്ള കാരണങ്ങളാൽ. സബ്സിഡി ബില്ലുകൾ സമർപ്പിച്ചു കഴിഞ്ഞാൽ ബില്ലു നൽകുന്ന സംവിധാനം ഉണ്ടായിരുന്നു., ഇതു മനസ്സിലാക്കിയ ഡിപ്പാർട്ട്മെന്റ്, വിളവെടുപ്പിനു ശേഷം തീറ്റയുടെ ബില്ലു പാസാക്കിയാൽ മതി എന്നും തീരുമാനിച്ചിരുന്നു. കൂടാതെ മീൻ കുഞ്ഞുങ്ങളെ വകുപ്പ് നേരിട്ടു നൽകുന്നതും കർഷകർ നൽകുന്ന ബില്ലുകൾ സ്വീകരിക്കാതിരിക്കുന്ന പശ്ചാത്തലത്തിലാണ് ബുഹുന്തായ പദ്ധതി നടപ്പിലാക്കാൻ പോകുന്നത്. മുൻ കാലങ്ങളെ അപേക്ഷിച്ച് ഇപ്പോൾ കാര്യക്ഷമതയോടെ പ്രവർത്തിക്കാൻ കഴിയുന്ന ധാരാളം ഫിഷറീസ് ബിരുദ / ബിരുദാനന്തര യോഗ്യതകളുള്ളവരുണ്ട്. ശാസ്ത്രീയമായ രീതിയിൽ കൃഷി ചെയ്തിക്കാനും

മാനേജുചെയ്യാനുള്ള പരിശീലനം ലഭിച്ചവർ ഡിപ്പാർട്ടുമന്റിൽ വന്ന സ്ഥിതിക്ക്, കൃഷി/ തദ്ദേശ വകുപ്പുകളിൽ ആധുനിക വിനിയമ സൗകര്യങ്ങളും, ആപ്ലിക്കേഷനുകളും ഉണ്ടാക്കിയതു പോലെ പ്ലാനിങ്ങ്, ഓപ്പറേഷൻ,മാനേജ്മെന്റ്, ഫിനാൻസ് വിഭാഗങ്ങൾ ജില്ലാ തലങ്ങളിൽ തന്നെ വേർതിരിച്ചു പ്രവർത്തനമുണ്ടാക്കിയാൽ ഫലം ഉണ്ടാകും. കർഷകർ മുതൽ മുകളിലോട്ടുള്ളവർക്കു വരെ ഡേറ്റ കൊടുക്കാനും എടുക്കാനുമൊക്കെയുള്ള ആപ്ലിക്കേഷൻ ഉണ്ടാക്കണം. ജല നിലവാരം ജലാശയങ്ങളുടെ വെള്ളത്തിന്റെ ഗുണനിലവാരം അവസ്ഥ, വേലിയേറ്റ വേലിയിറക്കങ്ങൾ, മത്സ്യങ്ങളെ ബാധിക്കുന്നതിൽ അതിനുള്ള പരിഹാര മാർഗങ്ങൾ കർഷകരെ അറിയിക്കാനും,നിർമ്മിത ബുദ്ധി ഉപയോഗിച്ച് സംശയങ്ങൾ തീർക്കാനുള്ള സംവിധാനവും ഉണ്ടാക്കണം. ഈ പദ്ധതി വിജയിക്കണമെങ്കിൽ ജലാശയങ്ങളിലെ വെള്ളത്തിന് നീരൊഴുക്കുണ്ടാക്കാനും ശുദ്ധമായിരിക്കാനും തദ്ദേശ വകുപ്പും ഇറിഗേഷൻ വകുപ്പും വിചാരിച്ചാലേ നടക്കൂ. ഫിഷറീസ്, തദ്ദേശ, ജലസേചന, മലിന നിയന്ത്രണ വിഭാഗങ്ങൾ ഏകോപിച്ചു പ്രവർത്തിച്ചാൽ മാത്രമേ വിജയിക്കൂ. പൊതു ജലാശയങ്ങൾ മാലിന്യ മുക്തമാക്കി അനുയോജ്യമായ മത്സ്യവിത്തുകളും കക്ക വിത്തുകളും പൊതു ജലാശയങ്ങളിൽ നിക്ഷേപിച്ച് മത്സ്യ സമ്പത്തു വർദ്ധിപ്പിക്കാവുന്നതാണ്. സ്ത്രീകളെയും ഈ രംഗത്തേയ്ക്കു കൊണ്ടുവന്ന് പരിശീലനം നൽകി മുഖ്യാധിഷ്ഠിത ഉൽപ്പന്നങ്ങളുണ്ടാക്കി പ്രാദേശിക മാർക്കറ്റുകളിലും വിദേശ മാർക്കറ്റുകളിലും വിപണനം നടത്താൻ സജ്ജമാക്കാം. കുടുംബശ്രീ പോലുള്ളവരെ ഇതിലേക്കു കൊണ്ടുവരണം.

വിഷയ മേഖല: പരിസ്ഥിതി, വനം, ജലം, തീരദേശം  
ഉപശാഖ: കാലാവസ്ഥാ വ്യതിയാനം, ദുരന്തനിവാരണം

Main Track: **Environment, Forest, Water, Coastal Zone**  
Sub Track: Climate Change, Disaster Management

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## 1 Climate Change, Disaster Management

**DR SANJU THOMAS**

*sanjujohnthomas@gmail.com*

“Kerala should establish a new business vertical titled ‘**Adaptation and Mitigation of Climate Change Impacts**.’ In many, many ways, we are blessed to be situated between the Western Ghats and the Arabian Sea—a narrow strip of land influenced by a cosmopolitan society. While we remain dependent on agriculture at a boutique level, our land utilization is primarily driven by a dense urban and peri-urban population.

We have the unique capacity to study, simulate, pilot, commercialize, and provide results for climate change impacts applicable worldwide, regardless of the terrain. We must approach adaptation and mitigation strategies as a viable business opportunity rather than just a survival necessity. By dividing Kerala’s terrain into distinct geo-demographic vertices, we can create a ‘business envelope’ of strategies to prospect and showcase globally.

We should prioritise this over the coming years, which are critical for implementation. This perspective should be a core alignment in the upcoming elections, signalling that we speak beyond mere politics and are deeply concerned with the coherence and safety of future generations.

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## 2 Environment, Western Ghat

**HARSHA PUTHUSSERRY**

*Founder and MD of Iraaloom, Iraaloom*

Climate change has weakened environmental relations. Floods, landslides, coastal erosion, and water scarcity are on the rise in Kerala. Therefore, the formation of an integrated ecosystem governance framework extending from the Western Ghats to the coastal areas is recommended. This approach should look at forest conservation, river basin management, and coastal protection as a single ecosystem. Strict protection of eco-sensitive zones, restoration of degraded forest lands, and

rejuvenation of water bodies, wetlands,, and mangrove forests should be included as a priority to ensure environmental sustainability.

As part of this model, the participation of tribal communities, fishermen, and forest and coastal dependents should be made critical, and surveillance systems should be strengthened with the support of scientific studies and local knowledge.

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### 3 Forest and Human Animal Conflict

**MOHAMMED ASHARAF**

*ashrafqtr12@gmail.com*

1. Drowning declared a state-specific disaster; Rs 4 lakh compensation to be given to the kin of the deceased
2. Wildlife loss solutions need to be comprehensively revised
3. The Supreme Court should be approached to make a uniform law in the country in this regard, and the Centre should take over the entire compensation.
4. In the case of wildlife violence, the Centre only maintains data related to elephants and tigers. This should change.
5. At least one mini zoo can be set up in a district in the state, and the aggressive animals and poisonous snakes caught from the inhabited areas can be kept there. It will also generate revenue for the government.

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### 4 Forest and Human Animal Conflict

**RAGHU A V**

*Principal Scientist, KSCSTE- Kerala Forest Research Institute*

“Human-Animal Interaction and Supporting Tribal Communities

To promote sustainable coexistence and support the livelihoods of tribal communities, a multifaceted approach is required.

1. Promotion of Coexistence Practices:

By encouraging cooperative farming initiatives, communities can pool resources to strengthen their defences against wildlife encroachment while promoting biodiversity.

2. Adaptation of Cropping Systems:

- Researching and promoting indigenous crops that are naturally less attractive to animals.

- Implementing agroforestry practices that involve planting trees or shrubs that can deter wildlife while providing shade and nutrition for crops.

- Offering training on wildlife-friendly agricultural techniques that minimise crop loss while fostering a harmonious relationship with local fauna.

3. Establishing Barriers and Deterrents:

- Developing eco-sustainable fencing solutions that reduce wildlife intrusion without causing harm.

- Encouraging the use of noise devices or selective fencing to deter animals while allowing non-harmful species to pass through.

4. Community Awareness and Education:

Building awareness within tribal communities about wildlife behaviours and management strategies is essential for effective coexistence. Workshops and informational sessions can equip community members with knowledge on:

- Identifying risk periods and patterns of wildlife activity.
- Understanding the ecological benefits of certain wildlife species and the importance of preserving their habitats.

#### 5. Branding and Marketing Tribal Products:

Establishing direct-to-consumer sales channels through farmers' markets, online platforms, or cooperative systems that allow tribal farmers to retain a higher percentage of profits.

#### 6. Partnership with Conservation Organizations:

To ensure the long-term sustainability of both tribal livelihoods and biodiversity, it is imperative to foster a cooperative approach to human-animal interactions. By reinforcing traditional practices, adapting crop selections, and promoting awareness and marketing, we can pave the way for a harmonious coexistence that respects the rights of tribal communities while preserving wildlife populations. The focus on coexistence, supported by innovative practices, will contribute significantly to the resilience and prosperity of these communities.”

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## 5 Climate Change, Disaster Management

**AAKASH B. ASHOK**

*CEO, Studyquotientedu Pvt Ltd*

Imparting knowledge to combat climate change at the early stage of schooling is very necessary. This should not be restricted just to environment classes but should lead to impact and hands-on exercises for children, like tree planting activities, cleaning drives, community activities, etc.

Newer tech should be used for afforestation, like drone mapping and seed ball dropping, especially in vulnerable areas, so that we can use tree cover to combat climate change and also to avoid natural calamities like landslides, such as the ones that happened in Wayanad.

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## 6 കുടിവെള്ളം

**ANUPRASAD SG**

*CEO, Vivestygran, Start Up company*

### “AI-Based Predictive Water Management Platform

Kerala should establish a statewide AI-enabled water management platform that integrates real-time data from sensors installed in treatment plants, reservoirs, pipelines, wells, and distribution networks across rural and urban areas. The system will monitor key parameters such as water quality, flow, pressure, and storage levels, and use AI-based analytics to predict shortages, detect leaks, identify contamination risks, and optimise treatment operations. Local bodies can access mobile dashboards and automated alerts for preventive maintenance and rapid response. This data-driven approach will reduce water losses, lower operational

costs, improve public health, and create a climate-resilient, transparent, and efficient drinking water system for the state.”

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## 7 Climate Change, Disaster Management

**SARITHA PANDYAT**

*Deputy Lead-FEMA REGION 2 SERVICE CENTRE, WSP*

I work in floodplain management and risk analysis in the USA, and considering the floods and impacts we had in 2018 and subsequent years, it would be good to have seminars on this topic. Would be good to discuss methods and strategies on how to improve the current processes in our state and how we can incorporate the effective strategies and solutions from other countries. Proper engineering methods and geospatial capabilities would help with this. Mitigation, zoning and prevention are key to success as well. Good preparedness will reduce the impacts and help with disaster recovery. I am sure there are great teams and processes currently in our state. I am interested in being involved and supporting.

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## 8 Climate Change, Disaster Management

**ARAVINDH PANIKKAVEETIL**

*Assistant Professor, Department of Economics, Christ University, Bangalore*

The following suggestions are being made based on an extensive field study among Kerala’s fishermen as part of my research under the Chief Minister’s Nava Kerala Post Doctoral Fellowship, undertaken at the Department of Atmospheric Sciences, CUSAT. The project analysed the climate vulnerability of Kerala’s marine fisherfolk and also examined the issues associated with the Punargaeham rehabilitation project. The suggestions are as follows:

Policy Recommendations: Coastal Resilience & Fisherfolk Rehabilitation

### 1. Transitioning to Nature-Based Coastal Management

Kerala’s reliance on “hard” structures (seawalls and groynes) is unsustainable. Locations north of Vizhinjam, Muthalapozhi, and Chellanam demonstrate how these structures disrupt wave dynamics and exacerbate downdrift erosion.

The Shift: Move from reactive engineering to Nature-Based Solutions (NbS) and “soft” infrastructure.

Action Plan: Implement the offshore artificial reef projects in Kollam and Cherayi as piloted models for the state.

Framework: Adopt the Climate Change Adaptation Guidelines for Coastal Protection (Black et al., 2018), prioritising sand bypassing (manual nourishment) and offshore reefs to dissipate wave energy before it reaches the shore.

### 2. Reforming the ‘Punargaeham’ Rehabilitation Project

Field research indicates a trust deficit among fisherfolk due to current execution flaws. To restore confidence, the project requires:

Flexible Compensation: Replace the flat ₹10 lakh rate with a location-based baseline that reflects local land values and economic realities.

Occupational Proximity: Avoid constructing housing (e.g., Narayanamangalam) more than 5 km from the coast, as it jeopardizes traditional livelihoods.

Empowerment through Ownership: Ensure superior build quality and the immediate transfer of land and property titles to inhabitants to guarantee long-term socio-economic security.

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## 9 Climate Change, Disaster Management

**RENJINI THAMPI**

*Founder, Vapasee Designs Pvt Ltd.*

Climate change can also be related to waste management, which is broadly overlooked. The discussion on solid waste management and seeing waste as a resource & not a problem, but it is an attitudinal change to be brought about. I work on upcycling glass waste to decor & utility with startups. How can we trigger this movement to address the UN SDGs in this segment?

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## 10 Energy

**SAMUEL JOHN**

*Director, STATLOGIC INDIA PRIVATE LIMITED*

Make Kerala an energy self-sufficient state

Make optimum use of natural energies, including converting all buildings in Kerala into energy production sources. On the large land area of the reservoirs in Kerala, floating solar panels can be installed. As the power grids are closer, energy storage will also be easier. Make reservoirs more energy efficient. In areas with large water bodies like Kuttanad, solar energy storage facilities should be provided.

Agrivoltaic technology can also be implemented in Kerala, which can make barren lands a power generation centre and make them arable. Installation of floating wind machines and wave energy generation machines on the sea land, which the Kerala government is allowed to use industrially, will be an innovative step. Kerala, which is the first state to implement a hydrogen policy in the country, can also implement hydrogen-based energy production techniques.

The Battery Electric Storage System (BESS) is a technological process that will enable accurate energy conservation and make Kerala a power-surplus state. The loss of energy supply is also one of the solutions.

The idea is to tackle climate change and the energy crisis.

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## 11 Energy

**GOLDA K.S.**

*goldaks@gmail.com*

Energy should have been a separate topic itself. Per capita energy consumption is a measure of development. This sector should consider the possibility of nuclear power production within the state. Considering the geographical conditions of the state, we should consider small modular nuclear reactors. Its is the most promising environmentally friendly energy source of today and tomorrow within the available technology.

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## 12 Drinking Water

**DR. PRIYA K L**

*Associate Professor, TKM College of Engineering.*

Microplastics have been identified as an emerging contaminant by the UNEP and have been detected in every environmental compartment, including groundwater aquifers, rivers, lakes, estuaries, ocean. Even though recalcitrant in nature, the analysis of microplastics is not being included in regular monitoring programs due to a lack of standardised methods for analysis and their regulatory concentrations. The research on microplastics is highly necessary in the current context. The research topics may include, but are not limited to, detection of microplastics in the aquatic bodies of Kerala, including water, sediments, fishes etc; fate, behaviour, and transport of microplastics in aquatic bodies; removal technologies of microplastics; and abatement of microplastic pollution in the environment.

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## 13 Water Resources

**SOORAJ M.**

*Founder and CEO, Urban Gray Engineering Solutions*

“Water resources and development of ‘wet infrastructure’ with flood and landslide resistance capabilities”

The repeated floods and landslides that Kerala has faced over the past decade have clearly revealed the structural weaknesses that exist in the planning and management of water-related infrastructure. Kerala’s wet infrastructure, which includes rainwater streams, canals, rivers, ponds, culverts, retaining walls, and urban water bodies, needs to be strengthened through integrated catchment-watershed-based planning. The design approach should take into account extreme rainfall events, interconnections in the upper and lower regions, and land use changes. Restoration of natural waterways, protection of floodways, sustainable landslide mitigation activities, and integration of nature-based solutions and engineered systems are critical to reduce flood and landslide hazards and ensure long-term water security.

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## 14 Drinking Water

**JAIS JOSE**

*jaiskattupalam93@gmail.com*

Bidding adieu to tanker culture: Filling water in tankers is only temporary; Groundwater Recharging is a permanent solution

Intervention of local bodies: Panchayats and municipalities should allocate funds in the budget for projects that recharge existing groundwater sources instead of digging new wells.

Recharging system in homes: ‘Recharge pits’ that drain rainwater into the soil should be made mandatory in all homes.

Groundwater Mapping: Groundwater mapping technology should be used to study the quantity and flow of groundwater in a scientific manner.

Economic benefit: This ‘water security’ model will help in saving the huge amount of money spent every year on water, improving the country’s economy through agriculture and so on.

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## 15 Climate Change, Disaster Management

**JAIS JOSE**

*jaiskattupalam93@gmail.com*

Kerala to have net-zero panchayats by 2050

Decentralization of power: Plans should be implemented at the panchayat level to achieve net-zero targets for India in 2070 and Kerala in 2050.

Prepare farmers for climate change through climate-resilient farming, agro-ecological farming, organic farming, and soil-biodiversity conservation.

Local water conservation: Control floods and droughts alike by expanding rainwater harvesting.

Scientific Studies and Warning System: Taking the lesson from the 2018 floods and Wayanad landslide, a proper early warning system should be installed in every panchayat. Research should not be confined to AC rooms but should be part of the panchayat plans.

Environmental Literacy: Consider climate change as a political and social issue, and educate the people at the grassroots level and make waste management a way of life.

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## 16 Climate Change, Disaster Management

**DR. JAYARAMAN C.**

*seemcj@gmail.com*

In the event of tidal flooding being recognised as a disaster (recently), prepare a master plan to deal with the distress caused by these disasters, which are likely to occur in the near future.

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## 17 Energy

**DR JAYARAMAN C**

*seemcj@gmail.com*

“Identify the energy efficiency gap in the public sector and private industries in Kerala and set up a task force to reduce at least 50% of the gap within one year.

(The energy efficiency gap is the difference between the potential/identified energy saving opportunities and what has been achieved so far.)”

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## 18 Water Resources

**GANGA KRISHNAN**

*Marian College of Architecture and Planning*

Blue-green infrastructure as a tool to achieve resilience in the watershed management of cities.

-Acts as a solution for flood management, greening the cities, and rejuvenation of water resources

-Storm water management in the city, thereby providing fresh water resources to the city

-Addressing the water shortage in urban areas of cities of Kerala, especially Thiruvananthapuram city.

- My research is on this line, and my published papers are for reference

<https://doi.org/10.1016/j.matpr.2022.09.562> - Blue Green Infrastructure: A panacea for urban environmental challenges. Case study: Thiruvananthapuram city, Kerala, India

<https://doi.org/10.1016/j.rineng.2025.106438>—Spatiotemporal dynamics and predictive modelling of land use and land cover changes for sustainable watershed management in the Karamana River Basin, India

<https://doi.org/10.1002/sd.3065> Ecological effects of land use and land cover changes on lakes in urban environments”

19/227Threats and means of prevention of super pests

Resistant pests: The Tea mosquito and armyworm have acquired the ability to survive chemical pesticides (neonicotinoids and chlorpyrifos). The enzymes GST and CAT neutralise the pesticides.

Pesticide treadmill is a dangerous situation where farmers apply more pesticides to destroy the pests, and it gives more resistance to the pests. This increases the cost of cultivation and destroys the environment.

The increase in the pesticide content (MRL) will reduce the value of Kerala tea and mangoes in the international market.

The solutions:

IPM & Molecular Monitoring: Switch to comprehensive pest control methods and set up regional labs to predict pest resistance.

Green Chemistry & GAP: Promote ‘Green Chemistry’ and implement Good Agricultural Practices (GAP) to preserve the biodiversity of the Western Ghats.

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## 19 Water Resources

**DR. ANOOP C.K**

*anoopck@vjcet.org*

- 1) Artificial Intelligence and Big Data in Hydrology
- 2) Climate change adaptation and Resilience
- 3) Urban Hydrology and Integrated Water Management
  - a) Water Energy Nexus
  - b) Urban Flood Management
- 4) Eco-hydrology and Human Water Interaction
- 5) Advanced Monitoring Technologies
  - a) Unmanned Aerial systems ( Drones )
  - b) Isotope Hydrology

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## 20 Drinking Water

**BIJU LONGHINOS**

*Professor, College of Engineering Trivandrum*

There should be a session covering drinking water sources (surface and underground), their valuation, their development, the generation of wealth from them, etc.

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## 21 Climate Change, Disaster Management

**AKHIL M.P.**

*drakhilmp@gift.res.in*

Climate change can be tackled through coordinated action at the individual, community, and policy levels. Governments should accelerate renewable energy adoption, strengthen climate-resilient infrastructure, and enforce stricter emissions standards. Expanding public transport, promoting electric mobility, and supporting sustainable agriculture can significantly reduce carbon footprints. Protecting forests, wetlands, and coastal ecosystems is vital for natural carbon sequestration. Cities should encourage green buildings and efficient waste management. At the community level, awareness programs, climate education, and local adaptation planning are essential. Individuals can contribute by conserving energy, reducing waste, choosing sustainable products, and supporting climate-conscious policies to ensure a healthier planet for future generations.

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## 22 Forest and Human-Animal Conflict

**PULAPRE BALAKRISHNAN**

*Ashoka University, Professor*

- “1. Welfare schemes/initiatives should be based on deprivation, not identity.
2. The media have documented several instances of corruption at the daily interface of citizens with the bureaucracy. This should be eliminated.
3. Legislation and governance must ensure that ecological balance is maintained so that economic development is sustainable.”

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## 23 Western Ghats

**DR RAJ KURUP**

*raj.kurup@enviroengineers.com.au*

How can Kerala shift from reactive policing to a proactive, technology-led system of ward-level environmental mapping and industrial waste valorization to eliminate the illegal degradation of our water resources?”

suggesting the following considerations:

1. Waste should be treated as a resource, and systems should be put in place to facilitate opportunities for value creation from waste streams.
2. Experiential learning activities should be introduced from the primary school level onwards. This should include environmental clubs that operate composting

units, manage overall school hygiene, and undertake environmental stewardship activities under the leadership of teachers and senior students.

3. A baseline assessment survey of environmental conditions should be conducted for each ward, using students and trained volunteers. This survey should identify the current status of the ward, including ponds, wetlands, lakes, low-lying areas, and locations where solid waste is illegally dumped. It should also identify the sources of these environmental problems, such as the type of illegal dumping (e.g. abattoir waste, rubber tyres, plastics) by individuals or businesses. In this way, pollution sources can be mapped alongside the state of environmental degradation, enabling the development of targeted strategies to improve environmental quality.

4. Where aquatic bodies (such as rivers and lakes) are used for the approved or illegal discharge of industrial effluents, dedicated study groups should be established to assess how value can be created from these waste or reject streams. In many cases, discharge to water bodies is not technically necessary, and industries can instead generate value from their waste streams.

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## 24 Energy

**SOJI SEBASTIAN**

*soji.sebastian@cnl.ca*

In general, Kerala state is known to have energy resources in the coastal areas, and in particular, mineral sand that is very rich in thorium and other elements. Towards achieving energy independence, outside of our hydroelectric footprint, we shall focus more on extracting radioactive fuel from mineral sand for thorium-based reactors. At present, the Indian Federal Government, under the auspicious advisement of the Department of Atomic Energy [DAE] and the Bhabha Atomic Research Centre [BARC], has long focused on thorium for nuclear power due to its abundance, with a three-stage plan to use uranium to breed plutonium for fast reactors, which then breed more fissile material (U-233) from thorium for future reactors towards accomplishing the much-desired zero-carbon economy in an environmentally sensitive landscape. Thus, a dedicated session to inform the policy makers towards building nuclear S&T infrastructure will be highly desired.

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## 25 Climate Change, Disaster Management

**SREEKUMAR HARIDAS**

*Post Doc Fellow, Advanced Centre for Atmospheric Radar Research, CUSAT*

1. Establish an Integrated Climate Extremes Early Warning and Impact Forecasting System for Kerala

Develop a state-level, high-resolution early warning framework using CMIP (Coupled Model Intercomparison Project) projection datasets under multiple warming scenarios. This could provide district- and taluk-level forecasts for floods, droughts, heat waves, and compound events (e.g., flood-drought sequences). Linking meteorological forecasts with impact-based thresholds (for reservoirs, slopes, agriculture, and urban drainage) will enable timely evacuation, adaptive reservoir operations, and sector-specific advisories.

2. Mainstream High-Resolution Drought Monitoring and Climate-Informed Water Governance

Institutionalise the Kerala-specific high-resolution drought severity index as an operational decision-support tool for water resource management. The drought index should be integrated with reservoir management, irrigation and tourism planning, hydropower scheduling, and drinking water allocation, particularly in high-risk districts. Climate-informed drought preparedness plans must be embedded into the 'Rebuild Kerala' initiative, shifting from crisis response to anticipatory water governance.

### 3. Strengthen Climate-Resilient Land Use Planning and Disaster Risk Reduction in High-Risk Zones

Adopt climate-risk-informed land use and infrastructure planning, especially in sensitive regions. This includes enforcing slope stability regulations, restricting construction in identified hazard hotspots, climate-proofing transport and power infrastructure, and restoring natural buffers such as wetlands, river floodplains, and forested catchments. Integrating projected climate extremes into local-level disaster management plans will reduce fatalities, economic losses, and long-term vulnerability under future warming scenarios.”

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## 26 Environment, Western Ghats

**ROSHNI K**

*roshni.phd@gmail.com*

Introduction of alien species

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## 27 Environment, Western Ghats

**ROSHNI K**

*roshni.phd@gmail.com*

Impact of Plastics

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## 28 Water Resources

**DR. JASMIN K. A.**

*Founder/ Chief Scientific Officer, PhyEcoSys Pvt Ltd, Cochin, Kerala*

### **Decentralised Algal Remediation: A Public Health & Climate Strategy**

- **The Problem:** Pollution from sewage, industrial, and hospital effluents leads to nutrient overload in stagnant canals and ponds. This fosters pathogen growth, resulting in outbreaks of waterborne diseases and neuroinvasive infections like meningitis.
- **The Solution:** Deploy decentralised, low-energy **microalgae-based remediation** systems to treat surface waters at the source.
- **Mechanism:** Algae absorb excess nutrients and organic matter, naturally starving pathogens and preventing microbial proliferation without the need for high-energy centralised plants.
- **Climate Co-benefits:** These nature-based systems offer carbon sequestration, ecosystem restoration, and resilience to Kerala's frequent flooding.

- **Implementation:** Scale through Local Self-Governments (LSGs) and public-private partnerships, targeting urban canals, backwaters, and ponds.

## 29 Environment, Western Ghats

**DR. JASMIN K. A.**

*Founder/ Chief Scientific Officer, PhyEcoSys Pvt Ltd, Cochin, Kerala*

### Water Hyacinth to Biochar: A Circular Bioeconomy Model

- **The Problem:** Invasive water hyacinth (*Eichhornia*) chokes Kerala's backwaters and canals, causing eutrophication, disrupting fisheries, and incurring high recurring removal costs.
- **The Resource Shift:** Treat harvested hyacinth as **biomass** rather than waste.
- **Energy Recovery:** Convert the biomass into **biochar** through thermochemical processes (pyrolysis), capturing renewable energy during production for local community use.
- **Filtration & Remediation:** Use the resulting biochar as a high-performance medium to filter heavy metals and nutrients from polluted urban waters.
- **Agricultural Value:** Once its filtration life ends, the nutrient-enriched biochar serves as a superior **soil amendment** for agriculture, sequestering carbon in the soil for centuries.
- **Implementation:** Integrate this into the state's sanitation and energy planning to create "green livelihoods" centred on wetland restoration.

## 30 Environment, Western Ghats

**DR. JASMIN K. A.**

*Founder/ Chief Scientific Officer, PhyEcoSys Pvt Ltd, Cochin, Kerala*

### "Integrated Carbon Mitigation and Pollution Reduction through Nature-Based Circular Bioeconomy Systems

**Algae as "Liquid Trees":** Deploy algae systems in dense urban and industrial zones to function as carbon sinks. They improve the Air Quality Index (AQI) by absorbing \$CO\_2\$ and remediating polluted water streams simultaneously, requiring far less land than traditional forests.

- **Multi-Stream Valorisation:** Convert all harvested aquatic and terrestrial biomass into **Biochar**. This ensures long-term carbon sequestration while providing a high-performance medium for soil restoration and water filtration.
- **Energy Recovery:** Link biochar production with thermal and biogas recovery. The generated energy can power wastewater treatment plants, biomass drying, or local community grids, creating a self-sustaining loop.
- **Kudumbashree-Led Green Enterprise:** Scale this model through women-led Self-Help Groups (SHGs). By managing algae cultivation and biochar production, these groups can turn climate action into a profitable, decentralised livelihood.
- **From Control to Regeneration:** Shift Kerala's policy from "Pollution Control" (reactive) to "Regenerative Management" (proactive), where clean air and water are byproducts of renewable energy and economic growth.

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# 31 Climate Change, Disaster Management

## VAIKUNTHAM ADVISORY (RAJIV)

rajiv@va-pl.com

### Ecological Restoration of Water Bodies in Kerala

#### Nature-Based Solutions for Climate Resilience and Revenue Generation

Kerala's water bodies are increasingly affected by sewage pollution, industrial effluents, biodiversity loss, and public health hazards. Conventional Sewage Treatment Plants (STPs) require high capital expenditure, continuous electricity, and intensive maintenance and often produce treated water unsuitable for agriculture, livestock, fisheries, or human use.

An alternative approach is in-situ nature-based restoration, which reconfigures the natural digestive capacity of water bodies to process incoming pollutants without diversion, construction, or electricity. The method involves zero structural modification, zero infrastructure, and zero power consumption and allows sewage to flow naturally while ecosystem processes restore water quality. Once revived, the system becomes self-sustaining indefinitely.

This approach has been implemented in over 70 projects across 28 cities in 13 Indian states. Documented results include sustained AQI improvement in Delhi from 600+ (Severe) to below 80 (Good) near treated water bodies for more than four years under partial treatment conditions.

#### Comprehensive Benefits

##### Public Health:

Elimination of mosquito breeding reduces vector-borne diseases such as dengue, malaria, and chikungunya. Restored water can achieve bathable standards (International Class B), reducing healthcare burdens.

##### Climate Action and Air Quality:

Restored water bodies function as blue carbon sinks, absorbing CO<sub>2</sub>, PM2.5, PM10, and toxic gases. They reduce surrounding temperatures and act as net greenhouse gas capturing assets.

##### Agriculture, Animal Husbandry, and Fisheries:

Use of restored water reduces or eliminates chemical fertilizers and pesticides, increases agricultural yield and shelf life, preserves soil health, improves livestock health with reduced vaccination and supplements, and enables natural fish breeding and chemical-free aquaculture.

##### Biodiversity and Ecosystem Restoration:

Fish, birds, bees, and butterflies return, leading to complete ecosystem revival.

##### Water Security and Climate Resilience:

Groundwater recharge improves as monsoon surplus percolates into aquifers, while summer evaporation is replenished. Water bodies become perennial, contributing to drought and flood resilience.

##### Tourism and Brand Kerala:

Clean backwaters enhance ecotourism and strengthen Kerala's global brand.

##### Financial Viability: Environmental Credit Model

The restoration process involves a moderate initial investment and the establishment of monitoring dashboards. From Year 2 onwards, revenue can be generated through:

Carbon credits from CO<sub>2</sub> sequestration

Environmental credits from biodiversity restoration and air quality improvement

Trading in voluntary and compliance carbon markets

As restored ecosystems require zero power, chemicals, or continuous maintenance, they become permanent revenue-generating assets for custodians such as Panchayats, Municipalities, and State bodies.

Recognition and Certifications

The model has received national recognition, including the Water Hero Award (Ministry of Jal Shakti), AMRUT 2.0 Technology Partner status, CII National Award for Water Management Excellence, and ESG Enabler Technology of the Year. Internationally, it has been showcased at G20 forums and global climate platforms, including COP28 and COP29. Certifications include ISO 9001, ISO 14001, ISO 45001, and ISO 20760 standards.

Monitoring and Transparency

A real-time dashboard system tracks water quality (BOD, COD, dissolved oxygen, pH), biodiversity indicators, air quality (PM<sub>2.5</sub>, PM<sub>10</sub>, AQI), and microclimate changes. Fortnightly reports are shared with custodians and government departments to ensure accountability and support carbon credit verification.

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## 32 Climate Change, Disaster Management

**GIRIJA K P**

*Independent Researcher*

Recognition of Local and Indigenous Knowledge Systems as Valid Knowledge Systems

Development initiatives should meaningfully recognise and integrate the local knowledge systems and lifelong experiential wisdom of communities, rather than imposing centralised schemes that treat people as passive recipients in need of reform. The traditional ecological and medicinal knowledge of coastal communities, Adivasi populations, and residents of tidal flood-prone regions offers valuable insights into sustainable resource management, disaster resilience, and environmental adaptation. Such community-based knowledge must be acknowledged as a critical foundation for inclusive and context-sensitive development planning.

2. Ensuring Substantive Representation of Women and Marginalised Communities

Development processes must ensure equitable and meaningful representation of women and diverse marginalized communities, enabling them to articulate their concerns based on their lived experiences and structural challenges. Mere nominal or symbolic representation is insufficient to address the depth and complexity of the issues they face. Instead, participatory frameworks should guarantee substantive inclusion in decision-making spaces, policy formulation, and implementation processes, thereby fostering social justice, accountability, democratic engagement, and constitutional guarantees.

3. Reframing Natural Resources as Commons and Integrating Climate Responsibility

Natural resources must be recognised as collective commons belonging to the people, rather than as commodities to be extracted and exploited to the point of depletion. Development paradigms should move beyond extractive models and instead promote sustainable governance rooted in ecological responsibility

and intergenerational equity. Furthermore, the realities of accelerating climate change must be explicitly acknowledged and systematically integrated into all areas of development planning, policy formulation, and implementation. Climate responsiveness should not remain peripheral but must become a foundational principle guiding economic, social, and infrastructural initiatives.

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## 33 Drinking Water

**JOE JOSEPH**

*joejoseph.albucheeri@gmail.com*

Advanced Environmental Technology shall be the basis of the submission, focusing on integrated and disintegrated facilities by establishing a zero-waste drinking hub for cities and urban areas.

Drinking water purification and utilisation of rainwater harvesting, and using greywater to conserve drinking water and save money.

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## 34 Environment, Western Ghats

**MUNDUKOTTAL JOE JOSEPH JOB JOSEPH**

*info@term-env.com*

Sustainable Infrastructure & Environmental Resilience for Kerala

### 1. Establishment of Integrated & Decentralized Zero Waste Hubs

These hubs can function in both integrated (centralized) facilities—large-scale treatment and recovery centers serving multiple wards or municipalities.

Disintegrated (Decentralized) Facilities—Ward-level or community-level micro facilities for localised waste management.

The objective is to:

Achieve near 100% waste segregation at the source.

Process biodegradable waste through composting/biogasification.

Recycle plastics and non-biodegradable waste through advanced material recovery systems.

Convert RDF into energy or industrial fuel.

Reduce landfill dependency to zero or near-zero levels.

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## 35 Environment, Western Ghats

**PRAGEESH P**

*prageesh13p@gmail.com*

A practical and sustainable alternative is needed. Startups such as STEMPACK INDIA SOLUTIONS PVT LTD, which develops mycelium-based biodegradable packaging from agricultural waste, demonstrate that eco-friendly substitutes to thermocol are feasible and scalable. Such solutions can support waste management, improve soil health through compost, and strengthen sustainable agriculture while reducing plastic pollution.

The Government of Kerala may consider promoting bio-based packaging, facilitating structured agri-waste utilisation, supporting pilot infrastructure, and adopting green procurement practices. This would help Kerala transition toward a circular economy, encourage green business growth, generate rural livelihoods, and position the state as a national leader in environmental sustainability and sustainable materials.

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## 36 Proposal for Ecological Restoration of Water Bodies in Kerala: Nature-Based Solutions for Climate Resilience and Revenue Generation

**RAJIV NAIR**

*Director, Vaikuntham Advisory Pvt. Ltd.*

Kerala's water bodies are increasingly affected by sewage pollution, industrial effluents, biodiversity loss, and public health risks. Conventional Sewage Treatment Plants (STPs) demand very high capital expenditure, continuous power supply, and significant maintenance, while often producing treated water unsuitable for agriculture, livestock, fisheries, or human use without further processing. In contrast, in-situ nature-based solutions offer a sustainable alternative by transforming polluted water bodies into "blue carbon sinks" that generate environmental credit revenue with zero power consumption and minimal operational costs.

This approach reconfigures the water body's natural assimilative capacity to process incoming pollutants without structural modification or heavy infrastructure such as STPs. Sewage continues to flow naturally, and ecological processes treat contaminants, enabling the system to become self-sustaining over time. More than 70 such in-situ restoration projects have been completed across 28 cities in 13 states, with documented air quality improvements in surrounding areas, including reductions from severe AQI levels above 600 to below 80, sustained for over four years under partial treatment conditions.

The benefits are multidimensional. Public health improves through elimination of stagnant pollution and mosquito breeding, reducing dengue, malaria, and chikungunya while achieving bathable water quality (International Class B Standard). As blue carbon sinks, restored water bodies absorb CO<sub>2</sub>, PM2.5, PM10, and toxic gases, reduce ambient temperatures, and function as net greenhouse gas-capturing assets. Productive reuse of restored water supports chemical-free agriculture with improved yields and soil health, healthier livestock with reduced dependency on supplements and vaccinations, and natural, chemical-free fisheries with enhanced economic returns. Biodiversity regenerates as fish, birds, bees, and butterflies return, restoring complete ecosystems. Hydrologically, these systems enhance groundwater recharge, ensure perennial water availability, and contribute to drought mitigation and flood resilience. Clean backwaters further strengthen tourism and reinforce Kerala's global identity as "God's Own Country."

Financially, the model is viable and revenue-generating. During the initial two-year investment phase, moderate costs cover ecological interventions and real-time monitoring systems. From Year 2 onwards, carbon credits (CO<sub>2</sub> sequestration and GHG reduction) and environmental credits (biodiversity, air and water quality improvements) can be traded in voluntary and compliance markets, creating continuous income for Panchayats, Municipalities, and State agencies. With zero recurring operational costs and transparent dashboard-based monitoring for

accountability and credit verification, restored water bodies become permanent, self-sustaining climate assets capable of transforming environmental liabilities into long-term economic and ecological value for Kerala.

## 37 Integrated Market Waste Reclamation for Public Health and Employment Generation in Kerala

**DR JAYACHANDRAN V. P**

*Senior Lecturer, Applied Biology Unit, Department of Applied Sciences and Pharmacy, University of technology and Applied Sciences, Muscat- 133*

### The Sultanate of Oman

Kerala's urban and rural markets generate significant quantities of fish, poultry, vegetable, and other biodegradable wastes that are often poorly managed, leading to foul odour, vector breeding, water contamination, and public health risks. At the same time, these organic wastes represent valuable resources for producing compost, biogas, and other value-added products. This Green Jobs Initiative proposes an integrated, decentralised model for market-level waste reclamation that safeguards public health while generating sustainable local employment, particularly for youth, women, self-help groups, and cooperatives.

The initiative begins with mandatory, structured waste segregation and hygienic collection systems in major fish, poultry, vegetable, and mixed markets. Colour-coded bins for different waste streams—organic, fish/poultry, recyclables—along with time-bound daily collection using closed containers, will prevent spillage, odour, and contamination. Basic pre-processing facilities with washable floors, drainage, leachate collection, and worker hygiene infrastructure will ensure safe handling. This foundational step reduces open dumping, flies, rodents, stray animals, and groundwater contamination while creating direct employment for segregation supervisors, collection workers, and sanitation staff, potentially linked to Kudumbashree units and local cooperatives.

The second component involves establishing small- to medium-scale composting and biogas units within or adjacent to markets. Vegetable and fruit waste can be converted into organic manure through windrow, vermi-, or aerobic composting methods, while suitable mixed organic waste can be processed in anaerobic digesters to generate biogas for cooking fuel in nearby canteens or limited electricity for common areas. Digestate slurry can be marketed as liquid fertilizer. This decentralised processing reduces landfill burden, minimises leachate and pest issues, and demonstrates community-level clean waste treatment. It also generates green jobs in plant operation, maintenance, packaging, branding, and marketing, with scope for SHGs and youth groups to manage units on a revenue-sharing basis.

The third component proposes value-added utilisation of fish and poultry waste through small processing units and eco-enterprise hubs. Fish offal and non-edible portions can be converted into organic liquid fertilizers and fish-based manure, while bones may be processed into nutrient-rich soil amendments. Shared facilities with training halls and common equipment will incubate green enterprises, support skill development, and reduce capital barriers for local entrepreneurs. Market linkages with farmer collectives, organic shops, and government programmes will ensure commercial viability.

Implementation may begin with 3–5 pilot markets, integrating local self-government institutions, Kudumbashree, and existing waste programmes, supported by standard

operating procedures for hygiene and worker safety. By converting market waste into productive resources, this initiative transforms a public health liability into a decentralised green economy model that promotes environmental sustainability, formalises informal workers, and creates durable local livelihoods

## 38 Restoring Mangrove Forests along the Kerala Coast for Climate Resilience, Blue Economy Development and Livelihood Enhancement.

**DR. A.G. PANDURANGAN**

*Advisor (Envnt. & Biodiversity), Centre for Innovation in Science & Social Action (CISSA), T.C. 15/510, USRA -55, Udarasiromani Road, Vellayambalam, Thiruvananthapuram - 695010, Kerala, & Former Director, Jawaharlal Nehru Tropical Botanic Garden & Research Institute, Palode, Karimancode P.O., Thiruvananthapuram, Kerala, INDIA, Pin: 695 562*

Mangrove ecosystems are among the most productive coastal habitats, historically buffering Kerala's 590 km coastline from storms, sustaining fisheries, and maintaining ecological balance. Over the past five decades, mangrove cover has declined drastically—from about 700 sq. km to less than 70 sq. km—due to land-use change, unplanned development, pollution, aquaculture, and infrastructure expansion. This loss has heightened vulnerability to coastal erosion, storm surges, saline intrusion, biodiversity decline, and fishery depletion. Given Kerala's high exposure to sea-level rise, cyclones, extreme rainfall, and coastal erosion, mangrove restoration offers a nature-based solution that integrates climate adaptation, blue economy development, carbon sequestration, and livelihood enhancement.

The initiative aims to restore and sustainably manage mangrove ecosystems to strengthen coastal protection, enhance fish nursery habitats, improve incomes of small-scale fishers and coastal communities, conserve biodiversity, and promote mangroves as high-value blue carbon sinks. Degradation has already resulted in increased flood risks, declining fisheries, reduced incomes for fishers and shellfish collectors, biodiversity loss, and diminished carbon sequestration capacity.

The project proposes a comprehensive strategy beginning with GIS-based mapping and baseline ecological, hydrological, and socio-economic assessments to prepare site-specific restoration plans. Restoration activities will include establishing community-managed nurseries; planting native species such as *Rhizophora*, *Avicennia*, *Sonneratia*, and *Bruguiera*; assisted natural regeneration; hydrological correction; and protective measures through community watch systems. Community mobilisation is central, with formation of Mangrove Protection and Management Committees, training for fishers, women's self-help groups, and youth, and integration of traditional ecological knowledge.

Livelihood development forms a key pillar, including sustainable crab fattening, oyster and mussel farming, honey collection and value addition, mangrove-based ecotourism, skill development, and market linkages. Monitoring and research components will track biodiversity, fishery productivity, and blue carbon stocks under a measurable reporting and verification framework, in collaboration with universities and research institutions. Awareness campaigns, stakeholder consultations, and policy integration will support long-term sustainability.

Implementation will involve the Kerala Forest & Wildlife Department, State Biodiversity Boards, Fisheries Department, Local Self-Governments, universities, research institutions, NGOs, fisher associations, and community groups. Success

indicators include hectares restored, improved fish catch metrics, number of trained beneficiaries and enterprises, carbon stocks generated, and reduced flood and erosion impacts. Financing may draw from state and central climate funds, CSR support, Green Climate Fund and blue carbon mechanisms, alongside community and ecotourism revenues.

With strong institutional coordination and community stewardship, mangrove restoration can become a flagship model for climate-resilient coastal development, strengthening livelihoods, protecting biodiversity, and contributing to climate mitigation through blue carbon sequestration.

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## 39 Preparation of a Comprehensive Red Data Book of Rare, Endemic and Threatened (RET) Species of Kerala: A Strategic Tool to Prevent Biodiversity Crisis.

**DR. A.G. PANDURANGAN**

*Advisor (Env't. & Biodiversity), Centre for Innovation in Science & Social Action (CISSA), T.C. 15/510, USRA -55, Udarasiromani Road, Vellayambalam, Thiruvananthapuram - 695010, Kerala & Former Director, Jawaharlal Nehru Tropical Botanic Garden & Research Institute, Palode, Karimancode P.O., Thiruvananthapuram, Kerala, INDIA, Pin: 695 562*

Kerala, part of the Western Ghats–Sri Lanka biodiversity hotspot, harbours exceptional biological diversity with high levels of endemism across plants, animals, fungi, and microorganisms. Its ecosystems—tropical evergreen and semi-evergreen forests, shola–grasslands, wetlands, mangroves, rivers, estuaries, and marine habitats—support thousands of species. However, biodiversity is facing an accelerating crisis due to habitat loss and fragmentation, land-use change, climate change, invasive alien species, overexploitation, pollution, and infrastructure expansion. Many species are declining rapidly, yet remain poorly documented or inadequately assessed. A comprehensive, periodically updated Red Data Book (RDB) of Rare, Endemic and Threatened (RET) species is urgently required as a scientific and policy tool to systematically document species at risk, guide conservation priorities, and prevent irreversible biodiversity loss.

Currently, information on threatened species in Kerala is fragmented, outdated, or taxon-specific, with several endemic and lesser-known groups—particularly lower plants, invertebrates, freshwater, and marine species—underrepresented. The absence of a consolidated state-level Red Data Book limits effective policy action, impact assessment, and biodiversity governance at a time when extinction risks are increasing.

The proposed RDB aims to compile an authoritative inventory of RET species across major taxonomic groups, assess their conservation status using IUCN-aligned criteria, identify key threats and population trends, map critical habitats, and strengthen policy and management responses. It will cover flora (angiosperms, gymnosperms, pteridophytes, bryophytes, algae, lichens, fungi) and fauna (mammals, birds, reptiles, amphibians, fishes, and invertebrates), across all ecosystems of Kerala, including the Western Ghats, coastal belt, wetlands, islands, rivers, and marine waters.

Implementation will involve a nodal framework led by the Forest & Wildlife Department, State Biodiversity Board, and relevant science and technology institutions, with technical support from universities, research institutions such as JNTBGRI and KFRI, and taxonomic experts. Biodiversity Management Committees

and local knowledge holders will be engaged. Methodology will include literature review, field surveys, integration of People's Biodiversity Registers, application of IUCN criteria at the state level, and detailed documentation of each species, including taxonomy, distribution, population status, threats, legal protection, and conservation recommendations. A GIS-enabled digital platform will ensure periodic updates and controlled public access.

The Red Data Book will guide protected area expansion, habitat restoration, Environmental Impact Assessments, climate adaptation planning, and implementation of biodiversity and wildlife laws. Expected outcomes include identification of priority species and habitats, improved integration of biodiversity concerns into development planning, enhanced monitoring capacity, and greater public awareness. Institutionalising five-year updates, strengthening taxonomic expertise, and linking outputs to action plans and funding mechanisms will ensure long-term impact. By combining rigorous science and participatory governance, the Red Data Book will serve as a foundational instrument to safeguard Kerala's unique biological heritage for future generations.

വിഷയ മേഖല:  
സാമൂഹ്യനീതി, തുല്യത

Main Track:  
**Social Justice and Equality**

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## 1 Strengthening SC/ST Welfare through Data-Driven Governance

**DR U P ANIL KUMAR**

*Assistant Professor, Gulati Institute of Finance and Taxation*

Inclusive development stands at the heart of equitable governance and long-term social transformation. In diverse and socially stratified contexts, targeted policy interventions require a strong empirical foundation to ensure that development efforts reach those most in need. Strengthening welfare mechanisms for Scheduled Caste (SC) and Scheduled Tribe (ST) communities therefore demands a systematic, data-driven approach that enables informed decision-making and responsive public administration.

The creation of a comprehensive socio-economic database for SC and ST communities is essential for advancing inclusive and sustainable development. Such a database facilitates evidence-based planning, allowing policymakers to design precise micro-level interventions tailored to the specific needs of these communities. By ensuring accurate targeting of welfare schemes and development programmes, it contributes to bridging socio-economic disparities, improving resource allocation efficiency, and reinforcing social justice initiatives aimed at empowering marginalised populations. Through data-driven governance, welfare

policies can move beyond broad generalisations toward measurable, accountable, and outcome-oriented development.

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## 2 Revisiting Tribal Realities in Kerala: Research, Representation and Responsibility

**DR. AZEEZ THARUVANA**

Tribal communities in Kerala constitute one of the most historically marginalised and socio-economically vulnerable sections of society. Despite multiple welfare measures and development interventions, many indigenous groups continue to experience challenges related to land alienation, educational exclusion, health disparities, cultural erosion, and livelihood insecurity. A nuanced understanding of these realities requires sustained academic engagement that connects historical perspectives with contemporary socio-economic analysis.

Scholarly work in tribal studies has sought to document both the historical trajectories and present conditions of Adivasi communities in Kerala. This engagement is reflected in publications such as *Adivasis of Wayanad: History and Present* (Kerala Language Institute); *Tribe Studies* (Chintha Publishers); and *P. K. Kalan: The Struggle Face of Tribal Life* (Chintha Publishers). Such contributions aim to foreground indigenous experiences and critically examine policy responses within a broader framework of social justice and inclusive development. Academic platforms, including seminars in regions such as Kozhikode, offer valuable opportunities to deliberate on research findings and explore policy-oriented solutions.

Strengthening the discourse on tribal issues demands continued collaboration between researchers, policymakers, and community representatives. A sustained commitment to evidence-based inquiry and participatory dialogue can contribute meaningfully to addressing structural inequalities and advancing the rights and wellbeing of Kerala's tribal communities.

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## 3 Scholarship, Struggle, and Social Commitment: Reflections from Tribal Studies in Kerala

**DR. AZEEZ THARUVANA**

*Academic Expert on tribal life and their problems/issues, focused on the history, lived realities, and struggles of Adivasi communities, particularly in regions such as Wayanad*

The tribal communities of Kerala continue to face structural disadvantages in land rights, livelihood security, education, and political representation. Addressing these challenges requires sustained scholarly attention combined with policy sensitivity and social awareness. Academic forums and seminars offer important spaces to examine these issues critically and to propose pathways for inclusive development. Continued dialogue, research dissemination, and collaborative engagement are essential for strengthening social justice initiatives and ensuring that tribal perspectives are meaningfully represented in Kerala's development discourse.

വിഷയ മേഖല: സാമൂഹ്യനീതി, തുല്യത  
ഉപശാഖ: വയോജന സംരക്ഷണം

Main Track: **Social Justice and Equality**  
Sub Track: Protection and Welfare of Senior Citizens

## 1 Preparing Kerala for an Ageing Society: Strengthening Elderly Care through Community and Local Governance

**M PARAMESWARAN**

Kerala stands at a critical demographic juncture as it undergoes rapid population ageing, a transformation that carries significant social and economic implications. Unlike developed countries, where the increase in the proportion of elderly people occurred at relatively higher levels of income supported by comprehensive social security systems, Kerala is experiencing demographic ageing at comparatively lower income levels. This structural reality has resulted in a substantial segment of the elderly population lacking adequate social and economic security, thereby making old-age care an urgent public policy priority.

The care of senior citizens therefore requires comprehensive state intervention. However, government action alone cannot ensure adequate support and dignity for the elderly; meaningful community participation is equally essential. Among the various tiers of governance, local self-governments represent the most appropriate institutional level for effectively addressing the needs of the elderly population with community involvement. Village panchayats, municipalities, and corporations function in close proximity to the people, enabling elected representatives and officials to acquire detailed knowledge of individual circumstances and local needs. This proximity positions them to design and implement more responsive development and welfare programmes. Facilitating effective old-age care is also closely linked to increasing female work participation in the state, as institutional support systems can reduce unpaid caregiving burdens within households. Achieving this objective, however, requires (1) significant changes in societal values and attitudes toward elderly care outside the home, (2) governance reforms and prioritisation at the local level, (3) increased allocation of resources to establish and maintain quality day-care centres, health services, and support facilities, and (4) the availability of trained professionals specialised in elderly care. Through coordinated institutional strengthening and community engagement, Kerala can ensure dignified ageing while advancing inclusive and sustainable development.

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## 2 Time Bank for Care: A Community-Based Response to Kerala's Ageing Challenge

**DR ZABEENA HAMEED P**

Kerala has increasingly become a society shaped by ageing, feminisation, and migration. The disintegration of joint families, high levels of female education and labour force participation, and large-scale—often permanent—migration have collectively weakened traditional informal care systems for the elderly. In many households, the situation is further complicated by a “chain” or “hanging” model of care, where one elderly person assumes responsibility for one or more other elderly members. As a result, a growing number of senior citizens require structured physical, emotional, and social support, along with reliable old-age security. Since Kerala has the highest proportion of elderly population among Indian states, and life expectancy—particularly for women—is comparatively high, the demand for external care support is both significant and likely to intensify in the coming years.

In this context, the concept of a ‘Time Bank’ for Care is proposed. Similar to depositing and withdrawing money through an automated system, individuals willing to offer voluntary geriatric care can provide services to registered elderly beneficiaries. A designated public agency could prepare and maintain a verified list of those in need through a dedicated digital portal. The hours of care rendered would be credited as “care credits,” which the volunteer may redeem in the future when personal care becomes necessary. Societal participation is central to this model. Since most individuals will eventually require support in old age, an intergenerational system of giving and receiving care—formalized through care credits—can partially restore the traditional ethos of familial reciprocity within a modern institutional framework.

This proposal emerged from academic discussions conducted during research on the elderly population in Kerala. It is presented as a preliminary framework that can be further developed and refined through policy dialogue and community engagement. Kerala's ageing challenge demands innovative and sustainable responses that extend beyond conventional state-led welfare programmes. The proposed Time Bank for Care offers a socially embedded framework that integrates public oversight with community engagement. By recognising care as both a social responsibility and a reciprocal commitment across generations, the model strengthens old-age security while reinforcing collective cohesion. With further policy refinement and institutional support, the Time Bank approach has the potential to evolve into a practical and scalable solution for ensuring dignified ageing in Kerala's changing socio-demographic context.

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## 3 Mobilising Sharia-Compliant Investment for Geriatric Care: Expanding Kerala's Silver Economy

**DR. MUNEER BABU M.**

Kerala is aging at a pace faster than the national average, with a rapidly expanding elderly population that requires structured, high-quality care services. This demographic shift has given rise to what is increasingly termed the “Silver Economy”—an economic ecosystem centred on the needs, wellbeing, and services of senior citizens. At the same time, Kerala has a large Non-Resident Indian (NRI) population,

particularly in the Gulf region, with significant savings and a strong emotional connection to the state. Harnessing this capital for socially productive investments in geriatric care presents a timely opportunity to align financial innovation with social responsibility.

The establishment of a dedicated NBFC and Chitty-based investment frameworks tailored to geriatric care can attract new investors, particularly through Sharia-compliant models such as Mudarabah (profit-sharing). A proposed Geriatric Care Investment Act with a single-window clearance mechanism for NRIs could simplify procedures and enhance investor confidence. In this model, the government may contribute land as a sovereign stake, NRIs provide capital, and professional agencies manage operations, with profits from housing and medical services shared transparently. Beyond financial returns, such investments can be positioned as a form of social security for investors and their families, creating a “social return nudge” that links profit with purpose. By combining regulatory innovation, ethical finance, and community trust, Kerala can pioneer a sustainable and inclusive model for financing its Silver Economy while strengthening long-term elderly care infrastructure.

വിഷയ മേഖല:  
സ്ത്രീപക്ഷ നവകേരളം - വെല്ലുവിളികളും സാധ്യതകളും

Main Track:  
**Nava Keralam ensuring Gender Justice :  
Challenges and Opportunities**

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## 1 Embedding Inclusion and Wellbeing in Women-Led and Marginalised Entrepreneurship

**NEHA GOPINATH**

Inclusive economic growth requires more than expanding access to credit and training; it demands a deeper recognition of the structural and social realities that shape entrepreneurial journeys. In Kerala, where gender equality and social justice form the foundation of development discourse, inclusion-oriented entrepreneurship policies must move beyond formal access measures to address the everyday organisational and relational challenges faced by women-led, migrant-led, and disabled-led enterprises. Care responsibilities, workplace wellbeing, and persistent social barriers significantly influence the sustainability and growth of such enterprises, often in ways that remain invisible within conventional policy frameworks.

Kerala's inclusion and gender-equality initiatives should therefore place greater emphasis on these lived realities. Many entrepreneurs from marginalised groups operate within highly constrained environments shaped by unpaid care work, entrenched social expectations, and limited institutional support systems. Without acknowledging and responding to these structural constraints, inclusion-focused schemes risk inadvertently reproducing inequalities rather than mitigating them. The state can respond by designing entrepreneurship and employment programmes that explicitly integrate care considerations and wellbeing support, creating tailored mentoring systems and peer-support networks, and aligning gender and social justice policies more closely with economic and employment strategies. Embedding inclusion within the broader development architecture will ensure that entrepreneurship becomes not only a pathway to income generation but also a vehicle for dignity, resilience, and equitable social transformation.

വിഷയ മേഖല: സാമൂഹ്യനീതി, തുല്യത  
ഉപശാഖ: കുടുംബശ്രീ - ഇനിയെന്ത്?

Main Track: **Social Justice and Equality**  
Sub Track: Kudumbashree, The Way Forward

## 1 Strengthening Kudumbashree through Technology-Driven Transformation

**DR. NEEMA M.**

*Associate Professor, Department of Electronics and Communication Engineering, Adishankara Institute of Engineering and Technology, Kalady*

Kudumbashree has emerged as one of Kerala's most transformative models of women-led community development and economic empowerment. As the programme evolves in a rapidly changing digital economy, there is a growing need to integrate technology more strategically into its functioning. Leveraging digital tools and innovation can significantly enhance the efficiency, market reach, and sustainability of Kudumbashree enterprises, while reinforcing women's economic independence and social empowerment.

One of the key steps forward is the development of an integrated digital platform or mobile application exclusively for Kudumbashree units. Such a platform can facilitate the online marketing of products and services, enabling women entrepreneurs to access national and international markets. Training in e-commerce operations, social media marketing, and digital payment systems will further equip members with the skills necessary to compete effectively in contemporary markets. Strengthening digital literacy and technical capacity among Kudumbashree members is equally important. Training in basic IT skills, data management, accounting software, and AI-based business analytics tools can improve operational efficiency and ensure greater financial sustainability, particularly for women in rural areas.

In addition, AI-enabled support systems can enhance monitoring, planning, and decision-making within the Kudumbashree framework. Data analytics can assist in tracking loan utilisation, enterprise performance, market demand patterns, and product demand forecasting, thereby supporting evidence-based policy formulation and programme refinement. Chatbot-based advisory systems can provide real-time guidance and grievance support to members. For agricultural and food processing units, the adoption of IoT technologies, sensor-based monitoring systems, traceability tools, packaging automation, and quality certification mechanisms can improve productivity and strengthen market credibility. Furthermore, fostering partnerships between Kudumbashree units, startups, and IT companies can

encourage innovation, facilitate technology transfer, and open pathways to higher-income entrepreneurial opportunities for women.

Integrating technology into Kudumbashree is not merely a matter of digital adoption; it is a strategic investment in inclusive growth and sustainable development. By embedding technological innovation within its institutional framework, Kudumbashree can move beyond traditional models of livelihood support and position itself as a forward-looking, resilient, and globally competitive platform for women's empowerment. Such reforms will significantly contribute to Kerala's broader goals of social development, skill enhancement, and equitable economic progress.

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## 2 2.Integrating E-Waste Management into Kudumbashree for Sustainable Livelihoods

**MANISH T I**

*Professor and Head, in Department of Computer Science and Engineering, SCMS School of Engineering and Technology, Kerala*

With the rapid expansion of digital technologies and electronic consumption, the management of electronic waste (e-waste) has become an urgent environmental and developmental concern. Community-based institutions such as Kudumbashree are well-positioned to contribute to sustainable waste management practices while creating new livelihood opportunities for women. Integrating e-waste collection and processing into Kudumbashree's activities can align environmental responsibility with economic empowerment.

By adopting structured e-waste collection, providing technical training in safe segregation, and focusing initially on urban-connected units, Kudumbashree can develop an innovative and sustainable livelihood model. Efficient utilisation and reuse of e-waste components not only enhance income generation but also contribute to environmental sustainability. Such initiatives can strengthen Kudumbashree's role as a catalyst for inclusive growth, green entrepreneurship, and responsible community-based development in Kerala.

വിഷയ മേഖല: സാമൂഹ്യനീതി, തുല്യത  
ഉപശാഖ: ദാരിദ്ര്യം

Main Track: **Social Justice and Equality**  
Sub Track: Poverty

## 1 Immersive Wellness Approach: A Pathway to Sustainable Leadership and Social Wellbeing

**DR. RAM KUMAR MISHRA**

In the contemporary governance landscape, the quality of leadership increasingly determines the quality of social outcomes. Rapid socio-political change, heightened public expectations, and complex institutional responsibilities require leaders who are not only administratively capable but also emotionally resilient and ethically grounded. The concept of an immersive wellness approach seeks to respond to this need by integrating psychological balance, reflective awareness, and value-based decision-making into leadership practice.

The paper entitled “*Immersive Wellness Approach: Enabling the Sixth Sense in Sustainable Leaders*” outlines a holistic framework that integrates psychological balance, ethical awareness, and leadership sensitivity to foster sustainable and responsible governance. In a rapidly changing socio-political environment, cultivating deeper awareness and emotional resilience among leaders and institutions is essential for long-term societal wellbeing. The adoption of an immersive wellness approach has the potential to promote peace and prosperity, significantly reduce anxiety and stress, and contribute to more constructive political discourse and improved public welfare in Kerala. It is therefore recommended that the principles articulated in the paper be widely disseminated among government staff, police personnel, medical practitioners, educational institutions, and civil society organisations. Such coordinated institutional engagement can embed wellness-oriented leadership practices across sectors.

Institutionalising wellness as a foundational principle of leadership can transform governance from a reactive administrative mechanism into a reflective and sustainable system of public service. By promoting psychological resilience, ethical clarity, and social responsibility, the immersive wellness approach offers a pathway toward more humane and future-oriented leadership. Its systematic adoption can contribute to strengthened democratic dialogue, improved institutional effectiveness, and enhanced collective wellbeing, ultimately advancing social harmony and sustainable development.

വിഷയ മേഖല: സാമൂഹ്യനീതി, തുല്യത  
ഉപശാഖ: ഭിന്നശേഷി

Main Track: **Social Justice and Equality**  
Sub Track: Empowerment of the Differently-Abled

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## 1 Towards Disability-Friendly Public Transport in Kerala

**DR. SREEPRIYA S.P.**

*Independent researcher*

Accessibility in public infrastructure is a fundamental component of inclusive development. One of the pressing concerns affecting persons with disabilities in Kerala is the limited accessibility of the state's public transport system. Despite progress in various social sectors, public transportation has not yet become fully disability-friendly.

For persons with visual impairments, identifying bus numbers and destinations remains a challenge due to the absence of accessible audio announcements and clearly designed visual indicators. Similarly, individuals with physical disabilities often depend on others to board or alight from buses because of the lack of ramps, low-floor buses, and supportive boarding mechanisms. Such barriers restrict mobility, reduce independence, and limit equal participation in social and economic life.

Transforming Kerala's public transport system into a disability-friendly network is essential for realizing the vision of an inclusive "New Kerala." Introducing low-floor buses, audio-visual announcement systems, tactile guidance paths, and staff sensitization programmes can significantly enhance accessibility. Ensuring universal access in public transportation is not merely a welfare measure—it is a commitment to dignity, equality, and social justice for all citizens.

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## 2 Welfare Schemes Should Be Based on Deprivation, Not Identity

**PULAPRE BALAKRISHNAN**

*Ashoka University, Professor*

Welfare policy should be guided by the principle of reducing deprivation, not merely recognising identity. The primary objective of social welfare is to support individuals and households who lack adequate income, access to education,

healthcare, housing, and employment opportunities. Therefore, measurable socio-economic indicators must form the basis for identifying beneficiaries.

While identity-based measures have played an important role in addressing historical discrimination, exclusive reliance on identity categories may overlook significant economic inequalities within communities. Not every individual belonging to a recognised group is equally deprived, and many vulnerable persons may fall outside such classifications.

A deprivation-based framework ensures fairness, transparency, and effective targeting. By focusing on actual need rather than fixed identity markers, welfare schemes can better fulfil their purpose of reducing poverty and promoting social justice.

## 1 Sustainability as Culture: Kerala's Model for the Development Cycle

**VINU GEORGE**

*Manipal Health Enterprises Pvt.Ltd*

Kerala has historically demonstrated remarkable progress in social development, education, public health, and human security-often outperforming many developed regions on key human development indicators. As a native Keralite with international experience, this paper argues that the next phase of Kerala's development lies not merely in adopting sustainability as a policy objective, but in embedding sustainability as a cultural norm.

While sustainability and ESG (Environmental, Social, and Governance) principles are widely discussed, Kerala already possesses an inherently sustainable social fabric. The opportunity now is to consciously integrate sustainability into everyday culture across governance, industry, education, and civic life, to accelerate development outcomes and reclaim recognition as a developed state.

This paper proposes a scientific and structured approach to converting sustainability into culture, aligning with the state's ESG policy framework. It explores how Kerala can become instrumental in identifying ESG-aligned projects, scientifically driving their implementation, and attracting capital investments that support long-term environmental stewardship, social equity, and economic resilience. It also addresses key challenges, such as climate change, which can be effectively tackled through collective action in the future.

### **Key Discussion Themes:**

- From Practice to Culture
- Moving sustainability from isolated actions and projects into shared cultural values and behavioural norms.
- Kerala's Developmental Advantage
- How Kerala's achievements in education, social security, and governance provide a strong foundation for ESG-led growth.
- ESG as a Development Accelerator

- The role of ESG frameworks in aligning industries, institutions, and government bodies toward measurable development outcomes.
- Scientific Identification and Execution of ESG Projects
- Methods for identifying high-impact ESG initiatives and implementing them through data-driven, technology-enabled approaches.
- Capital Attraction and Global Positioning
- How culturally embedded sustainability can attract long-term capital investment and elevate Kerala's global standing.
- Role of Institutions and Governance
- Contributions of industries, educational institutions, and public bodies in institutionalising sustainability as culture."

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## 2 Strategic Roadmap to Transform into a Global Knowledge and Creative Powerhouse

**ARUNDEV K.**

- Establish a Kerala Global Investment Promotion Program to attract international media, technology, and tourism investments.
- Create a Youth Entrepreneurship Development Fund to support startups and self-employment initiatives.
- Develop a Knowledge Economy Corridor in Kerala connecting universities, research centres, and industries.
- Launch a Green Creative Industry Initiative promoting sustainable film production and eco-friendly media infrastructure.
- Introduce a Single-Window Digital Permission System for film production, events, and creative projects in Kerala.

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## 3 Prioritised Recommendations on the Cultural–Historical Significance of the Periyar–Bharathapuzha Region

**LT. DR. PRASAD J C.**

**Priority 1:** Recognising the Periyar–Bharathapuzha Belt as Kerala's Core Cultural–Trade Corridor (Muziris Region)

The region between the Periyar River and Bharathapuzha River represents one of the most historically dense, culturally continuous, and economically significant regions of Kerala, corresponding broadly to the Muziris civilisation zone. This belt was the heartland of the Chera Kingdom, a global trade hub linking Kerala with the Roman, Arab, Jewish, and later Chinese worlds.

Archaeological and numismatic evidence—gold and silver coins discovered in and around Kunnamkulam, Guruvayur, and Thrissur—clearly establish sustained international trade networks. This region also formed the most populated part of medieval Malabar, driven by fertile riverine plains, ports, and temple-centred settlements. Recognising this belt as a single integrated cultural–heritage landscape is crucial for Kerala's historical narrative and cultural policy.

**Priority 2: Migration, Conflict, and Cultural Diffusion during Chera–Chola–Pandya Conflicts**

Historical evidence suggests that repeated wars involving the Chola and Pandya dynasties led to major population movements from this central Malabar belt towards southern Kerala, contributing to cultural diffusion, administrative practices, and temple traditions across regions.

Places like Talapilly (Thalappilly) served as key administrative and military zones of the Cheras. Local traditions such as “Rana Khalam” (war grounds) and historical assemblies like Kadavallur Anyonyam reflect early democratic, military, and scholarly institutions that deserve structured documentation and academic validation.

The Congress should recommend systematic historical mapping of migration routes, war zones, and administrative centres to better understand Kerala’s social evolution.

**Priority 3: Multireligious Heritage and Early Globalisation of Faith**

This region uniquely demonstrates the peaceful coexistence of multiple faith traditions from the earliest periods:

- Chiramanangad is traditionally associated with the burial sites of Chera kings, reflecting royal ritual practices.
- Kottal Guha and related sites point to early religious and ritual activity.
- Arthat (Old St. Thomas Church) stands as one of the earliest Christian centres in Kerala.
- Cheraman Juma Masjid, Kodungallur, the first mosque in India, anchors Kerala’s early Islamic history.
- The Guruvayur and Thrissur temple traditions show strong historical and philosophical links with Buddha Pallis, indicating the Buddhist presence that shaped later Hindu institutions.

This makes the Periyar–Bharathapuzha region a living laboratory of early globalisation, religious dialogue, and cultural synthesis, which should be central to Kerala’s heritage-based development agenda.

**Concluding Recommendation**

The Congress may consider proposing:

- A Periyar–Bharathapuzha Cultural Heritage Corridor Project
- Integrated archaeological, historical, and cultural tourism initiatives
- Inclusion of this region as a core narrative zone in Kerala’s development and education policies

Such recognition will strengthen Kerala’s global cultural identity while ensuring historically informed, inclusive development.

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## 4 Strategy for Open Knowledge and Cultural Documentation

**DR. GIREESH KUMAR T.K.**

### 1. Kerala as a Pioneer in Open Knowledge and Open Science

Kerala may be positioned as a national and international model for Open Knowledge and Open Science by strengthening policies that promote open data, open research, and open educational resources. Building on the state's strong public education system and digital infrastructure, coordinated efforts among government departments, universities, and research institutions can further ensure transparency, public access to knowledge, and citizen participation in scientific and social research.

### 2. Kerala's Contributions to the Open Access Initiative

Kerala can further consolidate its contributions to the Open Access movement by encouraging publicly funded research to be published in open-access platforms and by strengthening institutional repositories in universities and research institutions. Support for open-access journals, capacity-building for researchers and librarians, and alignment with global Open Access policies will help democratize knowledge, enhance research visibility, and promote equitable access to scholarly information.

### 3. Documentation of the Intangible Cultural Heritage of Kerala

A comprehensive, open-access digital framework may be developed for the systematic documentation of Kerala's intangible cultural heritage, including traditional performing arts, rituals, oral traditions, indigenous knowledge systems, and community practices. Such documentation, created in collaboration with local communities, scholars, and cultural institutions, will support cultural preservation, intergenerational knowledge transfer, academic research, and global cultural exchange, while ensuring ethical and inclusive representation.

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## 5 Interdisciplinary Frameworks for Contemporary Performance

**DR. METHIL DEVIKA**

*Post-Doc Fellow, The Kerala State Higher Education Council*

- Performing Arts from the Aesthetic to the Functional Spaces
- Inclusive Studies in Performing Arts
- Extending Boundaries in Arts Practice
- Practice-led Research in Dance

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## 6 Proposal for Urgent Archaeological Intervention of The Mekkalady Palaeolithic Site

**JEE FRANCIS THERATTIL**

Immediate Commencement of Excavation at Mukkadai Thodu, Mekkalady

### 1. Historical Significance

The banks of the Mukkadai Thodu at Mekkalady, situated near its crucial confluence with the Periyar River, represent one of Kerala's most significant prehistoric

landscapes. Surface recoveries have already yielded a wealth of Palaeolithic cultural material. These artefacts are of such high calibre that they currently serve as cornerstone exhibits in Kerala's leading museums, offering a rare glimpse into the life of early hominids in the region.

## 2. Current Status & Opportunity

While a formal excavation was previously sanctioned by the authorities, the project remains in a state of stasis. We currently have a critical window of opportunity:

- Landowner Cooperation: The present owner of the site is fully supportive and has expressed a clear intent to cooperate with the archaeological department.
- Scientific Readiness: The preliminary surface findings have already established the site's high potential for stratified deposits.

## 3. The Urgency: A Call to Action

History is a non-renewable resource. The site is currently facing an imminent threat from rapid urbanisation and planned construction. Once the soil is disturbed and foundations are laid, the stratigraphic integrity of this Palaeolithic site will be lost forever. By securing this site now, we ensure that a vital chapter of Kerala's ancient heritage is preserved for the global scientific community rather than being lost to modern development.

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# 7 Historical Foundations for Future Growth: A Policy Framework

**DR. P. JINIMON**

## 1. Integrating History into Development Planning

Kerala's development agenda should systematically incorporate historical scholarship in policy formulation, particularly in areas such as land relations, social justice, migration, environmental change, and public health. Historically informed analysis enables a deeper understanding of structural continuities and limits policy approaches that rely only on short-term data.

## 2. Kerala Historical Knowledge Archive

It is recommended to establish a publicly accessible Kerala Historical Knowledge Archive that integrates archival records, oral histories, vernacular print materials, and local institutional documents. Such an archive would support research, democratise access to sources, and strengthen studies on marginalised communities, labour, ecology, and social movements.

## 3. Renewal of History Education and Research

University-level history education should be renewed through interdisciplinary research, critical historiography, and public history initiatives. This will cultivate historically informed citizenship and ensure that Kerala's social experiences are analysed within broader regional and global contexts.

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## 8 Cultural Education and Economic Resilience

**ANANTHAKRISHNAN V.K.**

- Cultural Education in Schools (Structured + Certified)
- District-Level Cultural Talent Pipeline + Youth Fellowships
- Cultural Economy: Support Artists as Micro-Entrepreneurs

## 1 Community Sports Hubs — but with a mandatory annual “activation plan” (not just infrastructure)

**SHABEEB MUSTHAFA**

**Recommendation 1:** Launch Community Sports Hubs across Kerala (school grounds/municipal land), with standardised facilities + a funded yearly activity rollout plan so hubs are “always on” and not underused.

What to do (activation-focused rollout):

- Every hub must submit a 12-month activation calendar: weekly open-play hours, girls-only slots, school leagues, weekend tournaments, holiday camps, and monthly community events.
- Fund operations through a blended model: public support + CSR + modest booking revenue; ring-fence budget for coaches/organisers and maintenance.
- Build local capacity: train youth as operators/coaches/organisers and pay them per activity delivered (direct employability link).
- Use a simple booking + participation log system to track utilisation and outcomes (even a lightweight phone-number-based ID is enough).
- Tourism link (small but powerful):

Quarterly “Hub Showcases” can be clustered into district-level mini-events that feed into the main Football Festival season.

**Success metrics:**

- Utilisation hours, number of programmes delivered/month, girls’ participation %, employment days generated, reduction in idle facility time.”

**Recommendation 2:** Establish an annual “Football Festival” as Malappuram’s signature cultural-tourism event

Malappuram should be positioned as a sports-culture-tourism destination by recognising and supporting an annual Football Festival as an official calendar event—built around football, local culture, food, music, community stories, and youth participation.

Why this matters: The district has no widely-recognised, official, flagship cultural festival at scale—yet it has one of India’s deepest football cultures. A well-structured

Football Festival can become a repeatable tourism product, creating seasonal footfall, local pride, and real jobs.

**What to do (action plan):**

- Create a 7–14 day festival window with multiple touchpoints: tournaments, fan zones, cultural evenings, street activations, school/community leagues, heritage & food experiences.
- Add a sports tourism layer: invite international academies/football schools for youth tournaments + training camps + exchange matches (fixed annual dates help planning).
- Package it as a Malabar experience (football + culture + nature + cuisine), linking to homestays, local transport, and curated trails.
- Set up a Festival Operating Committee with clear roles + a one-window permissions process for venues, crowd management, vendors, and sponsors.

**Partnership model:**

- Work jointly with the Government of Kerala Department of Tourism + Industries/Employability arms + Local Self Government bodies, with a clean sponsorship framework.

**Success metrics (simple KPIs):**

- Footfall, outstation visitors, room nights, local vendor revenue, number of paid gigs created, youth participation, media reach, and repeat attendance.

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## 2 Integrating Total Physical Fitness and Lifestyle Literacy in Primary Education

**ENHANCING MIND AND BODY SOLUTIONS PVT LTD.**

*A Registered Edtech and B2c Company in Thiruvananthapuram, Kerala*

Introducing the new generations in their primary classes to total physical fitness, through fun-filled activities utilising the existing PT periods and regular class teachers, would pave the way for a healthy lifestyle adaptation for the immediate youth power of the state. Catch them young in the right sense.

Also, utilising the same mechanism to induce the basics of good lifestyle adaptation would make them more responsible citizens, too.

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## 3 Comprehensive and Sustainable Sports Infrastructure Development

**SOORAJ M**

*Founder and CEO, Urban Gray Engineering Solutions*

The development of sports infrastructure in Kerala should not be limited to isolated stadiums and special projects alone; instead, a comprehensive and community-centred approach should be adopted by integrating them with schools, colleges, residential areas, and public spaces. Sustainability standards such as water efficiency, rainwater harvesting, reuse of treated wastewater, and energy efficiency must be included in the planning and design of sports facilities. Consensual and locally distributed sports facilities strengthen public health, youth participation, and social harmony, along with sporting excellence. Integrating urban development and local

self-government planning with sports development will ensure long-term social and operational benefits.

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## 4 Establishing an Open, Interoperable Digital Network for the Sports Ecosystem Based on Shared Protocols

**ADRIKA NARAYANAN**

*Director, SportsByATech*

A key recommendation could be the establishment of an open, interoperable digital network for the sports ecosystem, similar to ONDC in its guiding principles and architecture. Rather than functioning as a single centralised platform, such a network would operate through shared standards and protocols that enable athletes, event organisers, academies, federations, and service providers to interact seamlessly across multiple applications. This model would help eliminate fragmentation, encourage innovation, and create a more competitive and inclusive digital environment for sports-related services. By facilitating the secure exchange of verified data on events, performance metrics, certifications, and opportunities, the network could improve transparency, expand access for participants at all levels, and provide a stronger foundation for data-driven decision-making and policy development, while also enabling future integration with adjacent sectors such as mobility, hospitality, healthcare, and e-commerce.

വിഷയ മേഖല: പ്രവാസം, ടൂറിസം  
ഉപശാഖ: ടൂറിസം

Main Track: **Migration, Tourism**  
Sub Track: Tourism

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## 1 Strategic Framework for Coastal Infrastructure, Blue Economy, and Integrated Tourism Development

**PROF. SURESH RANGARAJAN**

*Dean School of Global Studies, Central University of Kerala, sureshrajan1994@yahoo.co.in*

1. Kerala, as a coastal state, has significant potential for travel, transportation, and tourism through sea routes. We can support the coastal community and enhance infrastructure in these areas. A clean coastal environment not only boosts tourism but also promotes the health of the local community.
2. Improving backwater connectivity from Thiruvananthapuram to Kasargod for tourism and transportation purposes.
3. The Tourism Department can initiate Spiritual Tourism and Ayurveda Tourism.
4. Coastal tourism will be enhanced by developing quality accommodation facilities along the coast.

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## 2 Roadmap for developing Geographical Indications (GI) in Kerala

**ANSON C.J.**

*777anson@gmail.com*

### 1. Introduction

Kerala is a land rich in handlooms, handicrafts, agricultural products, and traditional knowledge. The Geographical Indications (GI) system provides legal protection and market value to these heritage assets. However, without comprehensive development policies alongside GI registration, the GI communities cannot achieve long-term benefits.

The objective of this policy document is to present a government-level roadmap that integrates GI protection, market development, artisan/farmer welfare, tourism, and sustainability.

## **2. Policy Objectives**

- Ensure the quality and authenticity of GI products.
- Increase the income and social security of artisan and farming communities.
- Promote regional development with the integration of GI and tourism.
- Prevent the misuse of GI and the sale of counterfeit products.
- Encourage youth participation in the GI sector.

## **3. Post-Registration Development Strategy**

- Mandate a Post-GI Development Plan for every GI product.
- Establish a 5–10 year development roadmap.
- Clearly define targets for marketing, tourism, exports, and job creation.

## **4. GI Management Authority**

- Form a Local GI Management Committee for each GI.

Structure:

Representatives of artisans/farmers.

Local Self-Government Institutions (LSGIs).

Academic, legal, and technical experts.

- Responsibilities:

GI quality control.

Prevention of misuse.

Ensuring fair distribution of profits.

## **5. Quality and Certification**

- Develop a Quality Manual for every GI product.
- Implement a periodic inspection system.
- Introduce “GI Certified Manufacturer” tagging.

## **6. GI + Tourism Development**

- Create Craft Tourism Circuits based on GI locations.
- Implement the GI Village Experience model.
- Establish GI Craft Museums & Live Studios.
- Integrate with the Responsible Tourism policy.

## **7. Youth Participation and Startups**

- Launch GI + Startup Incubation Programs.
- Offer fellowships for design and branding.
- Collaborate with educational institutions.

## **8. Digital GI System**

- Implement QR Code / Blockchain-based GI traceability.
- Maintain a Digital GI Register.
- Enhance consumer confidence through transparency.

## **9. Government Procurement and Market Support**

- Give priority to GI products in government procurement.
- Establish GI Certified Retail Outlets.
- Launch Export Readiness Programs.

## **10. Legal Protection and Enforcement**

- Form a Legal Support Cell to handle GI infringements.
- Ensure swift legal action against violations.
- Provide artisan-friendly legal assistance.

#### **11. Environmental Sustainability**

- Align GI initiatives with Sustainable Development Goals (SDGs).
- Promote eco-friendly manufacturing methods.
- Implement Green GI Branding.

#### **12. Impact Assessment and Monitoring**

- Conduct regular GI Impact Assessment Studies.
- Evaluate changes in income, employment, and social status.
- Pursue evidence-based policy reforms.

#### **13. Institutional Coordination**

- Department of Industries.
- Department of Tourism.
- Department of Agriculture.
- Kerala State Biodiversity Board.
- Universities and Research Centres.

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## **3 Strategies for Resilient and Sustainable Tourism Growth**

**AKHIL M P**

*Assistant Professor, Gulati Institute of Finance and Taxation*

Tourism can be strengthened by promoting sustainable, community-based experiences while improving basic infrastructure such as roads, sanitation, and digital connectivity. Diversifying tourism products—heritage, eco-tourism, wellness, and local cuisine—can attract wider audiences and reduce seasonality. Skill development for local youth, quality standards for homestays, and multilingual guides will enhance visitor satisfaction. Strong digital marketing, integrated booking platforms, and data-driven promotion can expand global reach. Protecting natural and cultural assets is essential to ensure long-term growth. Finally, encouraging responsible tourism practices and public-private partnerships can generate employment, boost local economies, and create a resilient tourism ecosystem.

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## **4 Blending high-tech 3D visualisation with the deep cultural roots of Kerala’s calendar and cuisine**

**MANISH T.I.**

Tourists will be provided with a 3-dimensional virtual web portal that showcases images and videos of various tourist destinations throughout Kerala, aimed at attracting more national and international visitors.

The website will offer guidance in the form of pathways for exploring different districts in Kerala. Based on the season and specific dates chosen by the tourist, it will highlight various festivals associated with each region.

A comprehensive database of festivals and rituals will be compiled, with both the Malayalam and Gregorian calendars mapped to each other to assist national and international tourists. Additionally, the diverse culinary offerings from different regions of Kerala will be documented and listed on the portal.

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## 5 Boosting State GDP through Pilgrimage Corridors, Cultural Hubs, and Private Facilitation

**UNNIKRISHNAN N**

*Professor & Head (Rtd), Department of Civil Engineering, College of Engineering Trivandrum*

### **1. There is an increased impetus on pilgrimage tourism these days.**

Many of our religious institutions have the potential to attract pilgrims from all over the country and even abroad. The corridor from Chengannur to Pampa can be developed with several intermediate destinations of accommodation and local tourism. This can be augmented if the rail corridor planned from Chengannur to Pampa materialises. Several local temples will receive focus, and this will increase the state's GDP. The recently concluded Magha Makam at Thirunavaya is an important pointer. The meeting was overwhelmingly received by the local people due to the potential it offers. The state can be just a facilitator, while the inflow will automatically improve the trade opportunities and thus the overall GDP. As happened in Prayagraj, every household in the area can turn into a home stay during the period. The Government will have to improve the connectivity by widening the narrow lanes and widening the roads that provide the last-mile connectivity. It is to be recalled how KSRTC has used the opportunity wisely even this time.

### **2. Health tourism**

Ayurveda (in its authentic form) can be the USP. Lost treatment methods like Rasayana treatment and Kayakalpa may be revived and marketed if possible. Revival of the rich tradition of Kerala in the field shall be a great boon.

### **3. Cultural tourism**

There are 64 art villages in Kerala, as I read somewhere (for example, Pallassana for percussion instruments). Every such village can be a spot where tourists can come, stay, join the classes and get educated. The Government may have to support the local people to create basic needs for a homestay. A small number to start with to see the response, and then scale up. Institutions like Margi, Sadanam, etc. can also be supported to improve their infrastructure and organise regular events. The Kalaris of martial arts existing can be revived and marketed for tourists from abroad. Many traditions or paramparas exist or paramparas existing in Kerala. However, due to the embedded secrecy, it is difficult to identify the genuine schools or gurus. Celebrated destinations like Varkkala Gurukulam, Chenkottukonam, Amritapuri, etc. can be projected as destinations. However, the usual pattern is that the gurus identify and reach the deserving seekers, and it does not happen the other way.

Infrastructure like way-side charging stations combined with facilities for toilets, refreshments, etc., with large parking spaces can be taken up by the local bodies without much investment, but by just facilitating the private entrepreneurship.

Ring roads and bypass roads can become popular destinations in their own right. For instance, the Adoor By-Pass has transformed into a well-known food hub. Similarly, the proposed Trivandrum ring road could feature various attractions,

moving beyond typical bypass service roads. These could include food streets, cultural theatres, shops for electronics and textiles, and art villages or streets.

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## 6 Positioning Kerala as a Global Model for Sustainable, Responsible, and Experience-Driven Tourism

**MIHAMMAD ASIF K**

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Kerala has long been recognised as a pioneer in responsible and sustainable tourism in India. The tourism sector in Kerala today stands not merely as a revenue-generating industry but as a powerful instrument of inclusive growth, employment generation, and cultural preservation. The successful revival of tourism in the post-pandemic period, the renewed global branding of “God’s Own Country,” and the emphasis on responsible tourism models clearly reflect the government’s commitment to sustainable development. Building on these achievements, it is recommended that Kerala now move towards positioning itself as a global model for sustainable, experience-driven, and community-centred tourism.

A key policy intervention could be the promotion of low-impact, high-value tourism, focusing on eco-tourism, wellness tourism, heritage tourism, and experiential rural tourism. Instead of mass tourism that strains local ecosystems, Kerala can lead the way by encouraging tourism models that respect carrying capacity, protect biodiversity, and enhance visitor engagement. The state’s rich natural assets—backwaters, hill ranges, forests, beaches, and biodiversity hotspots—must be conserved through strict sustainability guidelines and scientific destination management plans.

The Responsible Tourism Mission, which has already brought international acclaim to Kerala, can be further strengthened by deeper integration with local self-governments, women’s collectives, cooperatives, and MSMEs. By ensuring that tourism-generated income flows directly to local communities, Kerala can reinforce its development model where people remain at the centre of economic activity.

Infrastructure development remains crucial. Investment in green mobility, waste management systems, water conservation, and digital tourism infrastructure will enhance visitor experience while maintaining environmental balance. Incentivising eco-certified resorts, homestays, and tourism enterprises through financial and regulatory support will encourage responsible private participation in the sector.

Another promising area is wellness and medical tourism, where Kerala enjoys a natural advantage due to its traditional systems like Ayurveda, skilled healthcare professionals, and serene environments. With appropriate quality standards, global marketing, and regulatory oversight, this segment can significantly enhance Kerala’s tourism revenues while reinforcing its brand identity.

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## 7 Inclusive Tourism: Differently-Abled Friendly Tourist Destinations

**ALOAK MENON**

*Founder CEO, Spizaar Pvt Ltd*

Many people with disabilities face major barriers when trying to visit public places and tourist destinations. Lack of ramps, step-free pathways, accessible toilets,

dedicated parking, and assistance services often makes travel extremely difficult. As a result, many people remain socially excluded and unable to participate in tourism and community life.

This proposal suggests a phased initiative to make selected public spaces and tourist destinations differently-abled-friendly, starting with pilot locations such as Kozhikode Beach, SM Street, and major places of worship. Basic but impactful improvements like ramps, wheelchair-accessible pathways, accessible restrooms, clear signage, and designated parking can significantly improve access. During peak seasons and events, trained volunteers or support staff can be deployed to assist visitors who require help.

Transport is another key barrier. In partnership with KSRTC, a small fleet of modified or low-floor buses can be introduced on selected routes to connect towns with identified accessible tourist spots. This would enable persons with disabilities, elderly citizens, and families with mobility challenges to travel more confidently.

The pilot can be branded as a set of “Differently-Abled Friendly Tourist Zones,” creating visibility and demonstrating the government’s commitment to inclusive infrastructure. Over time, this model can be expanded across districts and integrated into future tourism development standards. In the long run, this initiative can strengthen the Kerala Tourism brand by adding a strong identity as a destination that actively promotes differently-abled-friendly tourism, ensuring travel and public spaces are accessible to all.

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## 8 Enhancing Medical and Wellness Tourism in Kerala

**SIVAPRASAD P.V.**

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**MCS Medical Tourism – [www.mcsmvt.com](http://www.mcsmvt.com)**

### **Introduction**

Kerala, with its rich cultural heritage, natural beauty, and advanced healthcare infrastructure, has immense potential to become a leading destination for Medical and Wellness Tourism. However, to fully realise this potential, strategic interventions are required to address existing challenges in the sector. This proposal outlines the current challenges faced by the Medical Value Travel (MVT) sector in Kerala and provides recommendations to overcome these obstacles with the support of the Government of Kerala.

### **Current Challenges**

#### **1. Lack of Regulation and Quality Control**

Absence of proper regulation leads to an unorganised sector with inconsistent service quality.

Limited government interventions to promote accredited organisations and service providers.

#### **2. Absence of a Nodal Body**

Promotion and development of MVT involve multiple ministries and organisations, causing fragmentation.

No dedicated nodal body to spearhead initiatives, resulting in missed opportunities.

**3. Limited Government Support in Promotion**

The Indian government has not actively promoted Kerala as a medical value travel destination.

Lack of effective campaigns and supportive schemes.

**4. Lack of Awareness of Accreditation**

India has a robust accreditation system through NABH, but awareness abroad is limited.

International patients value JCI accreditation more, affecting Kerala's appeal.

**5. Disorganised MVT Facilitators**

Facilitators are not well-organised, leading to inconsistent service quality.

Existing NABH accreditation is not effective in addressing this issue.

**6. Inconsistent Pricing**

Lack of transparency and consistency in pricing.

Some facilitators exploit patients, undermining trust.

**7. Perception of Poor Hygiene Standards**

Widespread perception of poor hygiene negatively impacts Kerala's appeal.

**8. Insurance Coverage Limitations**

Lack of portability of medical insurance and non-coverage of traditional medicine under international policies.

**Proposed Solutions**

**1. Establish a Regulatory Framework**

Collaborate with the central government to create a regulatory framework.

Implement monitoring systems to ensure compliance and quality.

**2. Create a Nodal Body for MVT**

Establish a dedicated body to coordinate activities across ministries and organisations.

Spearhead initiatives and ensure effective strategy implementation.

**3. Launch a Statewide Promotion Campaign**

Promote Kerala as a premier MVT destination.

Highlight advanced healthcare, traditional wellness therapies, and natural beauty.

**4. Enhance NABH Accreditation Awareness**

Increase awareness among international patients and stakeholders.

Collaborate with industry partners to promote NABH as a mark of quality.

**5. Organise MVT Facilitators**

Develop an accreditation system for facilitators.

Introduce training and capacity-building programs.

**6. Standardise Pricing Across Hospitals**

Implement a transparent pricing model across hospitals.

Build trust among international patients and prevent exploitation.

**7. Improve Hygiene Standards**

Invest in sanitation and hygiene improvements, especially in tourist areas.

Launch public awareness campaigns to showcase Kerala as clean and safe.

## 8. Advocate for Insurance Reforms

Push for inclusion of traditional medicine under international insurance policies.

Enable patients to access a wider range of healthcare services in Kerala.

### Conclusion

With strategic interventions and strong government support, Kerala can overcome current challenges in the MVT sector. By addressing these issues, the state has the potential to emerge as a leading destination for medical and wellness tourism, enhancing its global reputation.

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## 9 Establishment of an annual “Football Festival” as Malappuram’s signature cultural-tourism event

**SHABEEB MUSTHAFA**

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**Recommendation:** Malappuram should be positioned as a sports-culture-tourism destination by recognising and supporting an annual Football Festival as an official calendar event—built around football, local culture, food, music, community stories, and youth participation.

**Why this matters:** The district has no widely-recognised, official, flagship cultural festival at scale—yet it has one of India’s deepest football cultures. A well-structured Football Festival can become a repeatable tourism product, creating seasonal football, local pride, and real jobs.

**What to do (action plan):** Create a 7–14 day festival window with multiple touchpoints: tournaments, fan zones, cultural evenings, street activations, school/community leagues, heritage & food experiences.

**Add a sports tourism layer:** invite international academies/football schools for youth tournaments + training camps + exchange matches (fixed annual dates help planning).

**Package it as a Malabar experience** (football + culture + nature + cuisine), linking to homestays, local transport, and curated trails.

**Set up a Festival Operating Committee** with clear roles + a one-window permissions process for venues, crowd management, vendors, and sponsors.

**Partnership model:** Work jointly with the Government of Kerala Department of Tourism + Industries/Employability arms + Local Self Government bodies, with a clean sponsorship framework.

**Success metrics (simple KPIs):**

Footfall, outstation visitors, room nights, local vendor revenue, number of paid gigs created, youth participation, media reach, and repeat attendance.

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## 10 Redefining Tourism: Prioritising People, Policy, and Planet

**VINOD BALAN**

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Kerala's tourism growth should move beyond numbers and focus on sustainability, social awareness, and community inclusion.

Tourism policies must prioritise local community participation, support small operators, create employment for local youth and women, and strengthen local supply chains. Responsible tourism awareness—for tourists and operators alike—should be institutionalised to protect culture, ecology, and destinations.

Simplified regulations, destination diversification beyond overcrowded hotspots, and technology-driven governance will ensure balanced growth. Strong public-private collaboration is essential to make tourism inclusive, resilient, and future-ready.

Kerala has the potential to become India's leading model for community-driven and responsible tourism.

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## 11 Strategic Integration of the Urban-Rural Continuum and Sustainable Tourism Development in Kerala

**ANNIE JOHN**

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Kerala enjoys a vast number of resources as unique selling points. Tourism in Kerala has to be tapped to its maximum potential. The climate in Kerala draws people from cold regions, and Kerala, with its varied tourism products, can bring in tourists throughout the year from different nations. The resources, hills, mountains, rivers, beaches, natural landscapes, heritage, traditional products, pilgrimage tourism and many more provide experiential tourism to the tourists. Tourists come to feel and experience a place, and Kerala has many such products.

The major concerns in tourism are, to discuss a few, whether tourists are able to travel the entire length of Kerala with easy availability of transport, online bookings with varied options, accommodation at locations, and relevant services in a professional manner. In that case, with respect to development in Kerala, there is a need to consider the urban-rural continuum. Regional connectivity can be enhanced through the improvement of roads linking the rural areas. As land availability in urban areas is limited, the rural areas can be incorporated into the development through better connectivity. The regional development will reduce pressure in the urban areas, and gradually, the region will become more urban.

The tourism industry has to plan considering Kerala as one big city and each of the tourism products as a product that requires branding and marketing, eventually drawing in people. Their experience should spread through word of mouth. Tourism products cannot reach people if left to themselves in isolated locations. There have to be good forward and backward linkages working with these tourism locations, and the local people can play a major role here. It would improve the local economy and improve host population participation. Hence, every product in Kerala that can be tapped for its tourism potential should be identified and promoted. This also

calls for better environmental management if the natural landscape and resources have to be retained with their serene beauty.

This brings us to our hills, mountains, Western Ghats, forests, rivers, water bodies, estuaries, beaches, heritage, which need to be protected and tourism experience enhanced through ease of accessibility, better services for tourists in terms of accommodation, foreign exchange, communication, food, etc., which will help boost the local economy.

Urban development in the state, tourism promotion with more branding and marketing, and ease of transportation will bring a sea change in Kerala. I earnestly look forward to these changes that will definitely bring more tourists to the State, hence improving the landscape in Kerala, both environmentally and economically

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## 12 Integrating Responsible Tourism Education into Curricula for Sustainable Growth

**HARSHA PUTHUSSERRY**

*Founder and MD of Iraaloom, Iraaloom*

To ensure the long-term sustainability of Responsible Tourism, it is essential to integrate Responsible Tourism Education into school and college curricula. Incorporating awareness about environmental conservation, local culture, heritage, traditional crafts, and culinary traditions into education will help foster a sense of responsibility among the younger generation toward tourism. Practical learning initiatives, such as heritage walks, cultural mapping, tourism activities, and the documentation of local art forms involving students, should be encouraged.

Furthermore, Kerala's cultural tourism and related activities—including arts festivals, village tourism, craft experience centres, food tourism, and festival tourism—must be promoted in an organised manner. Developing these tourism activities with the participation of the expatriate community will help create job opportunities, increase the income of local communities, and establish Kerala as a global model for Responsible Tourism.

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## 13 Value Addition to Kerala Tourism through Experience-Based and Culturally Integrated Tourism Models

**AHAMED SHAMIL**

In today's global tourism sector, travellers do not journey merely to see buildings or visit tourist spots; they travel in search of experiences. Regions such as the Masai Mara, Saudi Arabia, and Japan have enhanced their value and attraction by designing tourism as experiences seamlessly integrated with their culture.

A building or a park alone no longer excites the traveller. The true brand value of a destination today is determined by its culture, lifestyle, customs, food, and ritualistic experiences. Kerala is a region with a powerful cultural identity as the land of Ayurveda. To further leverage this:

- Premium Curated Tourism Packages featuring rare cultural art forms like *Theyyam* can be developed. Such packages can be implemented through the

private sector; this ensures the government does not have to bear the financial burden directly.

- Activity-Based Tourism should be promoted in regions like Alappuzha by including fishing experiences and activities related to aquatic life. The government can encourage this by mandating that existing tour guides and travel agencies provide “brand-aligned experiences.”
- Curated programs aimed at international vloggers and documentary creators should be formulated to strengthen Kerala’s experiential tourism brand on an international level.

This type of culture-experience-based tourism model will not only increase Kerala’s tourism value but also create a more responsible, sustainable, and premium tourism ecosystem.

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## 14 Possibility of Experience tourism

**ARAVIND SEKHAR S**

Experience tourism will be the best, given Kerala’s future tourism development. -Travellers tend to prefer offbeat or less crowded areas rather than extremely touristy places. - Its hard to understand that tourism is not always development. But tourism can also be done with whatever limited resources we already have. - If an offbeat village in Kerala is only accessible by walk or trek, then be it. We can make that an experience tourism rather than developing a road to the location.

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## 15 Preserving Heritage and Empowering Locals for Sustainable Tourism

**DR.MEENU MOHAN**

*Assistant Professor, Gulati Institute of Finance and Taxation*

Responsible tourism empowers locals to protect their heritage while profiting from it. By prioritising community-led tours, eco-friendly practices, and cultural preservation, residents ensure that tourism enriches the neighbourhood without depleting resources. Authenticity attracts visitors, so keeping traditions alive is both a cultural win and a sustainable business strategy.

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## 16 Integration of Food Heritage into Cultural Tourism Policy

**DR. DEEPA G.**

Kerala’s cultural tourism initiatives should formally integrate regional food traditions as heritage assets. Culinary circuits highlighting Malabar, Travancore, and Central Kerala food practices can be developed in collaboration with local communities. This would promote sustainable tourism, generate rural employment, and ensure that traditional food producers especially women’s collectives and small-scale farmers benefit economically.

## Promotion of Sustainable and Indigenous Food Systems

Public policy should encourage the revival of indigenous crops such as traditional rice varieties, tubers, and millet-based food systems that historically shaped Kerala's diet. Linking food heritage with climate-resilient agriculture will strengthen food security while preserving cultural identity. Academic institutions can collaborate with local bodies to research and promote sustainable dietary models rooted in Kerala's ecological history.

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# 17 Enhancing Medical and Wellness Tourism in Kerala

**SIVAPRASAD P V**

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Kerala possesses strong potential to emerge as a premier destination for Medical and Wellness Tourism (Medical Value Travel – MVT), given its advanced healthcare infrastructure, traditional systems of medicine, skilled professionals, and global tourism appeal. However, structural gaps currently limit sectoral growth. A comprehensive policy framework, led by the Ministry of Tourism in coordination with the Health and Industries Departments, is required to unlock this potential.

First, a robust regulatory framework must be established in collaboration with the Central Government to standardise quality benchmarks for hospitals, wellness centres, and MVT facilitators. Monitoring and compliance mechanisms should discourage unaccredited operators and promote certified institutions. A dedicated nodal body for MVT should be constituted to coordinate inter-departmental efforts, integrate airlines, hospitals, hotels, and facilitators, and ensure stakeholder representation in policymaking.

Second, Kerala should launch a unified global promotion campaign positioning the State as a high-quality, affordable, and safe medical and wellness destination. This campaign must highlight NABH-accredited institutions, advanced clinical capabilities, Ayurveda and traditional therapies, and Kerala's natural and cultural advantages. International awareness of NABH accreditation should be strengthened through diplomatic channels, trade missions, and partnerships with global healthcare networks to enhance credibility vis-à-vis JCI-accredited facilities.

Third, MVT facilitators must be organised and regulated through strengthened accreditation norms, mandatory registration, and structured training programmes to ensure professionalism and consistent patient experience. A transparent and standardised pricing framework across hospitals should be developed to reduce wide cost variations, prevent exploitation, and build trust among international patients.

Fourth, hygiene and sanitation standards in tourism corridors must be upgraded and visibly enforced to counter negative perceptions regarding cleanliness. Public campaigns should reinforce Kerala's positioning as a safe and hygienic destination.

Finally, the State should advocate for insurance portability and work with national authorities and international insurers to expand coverage for treatments in Kerala, including traditional systems of medicine where clinically validated.

Through coordinated regulation, branding, quality assurance, pricing transparency, hygiene improvements, and insurance reforms, Kerala can establish itself as a globally competitive hub for medical and wellness tourism, generating employment, foreign exchange, and enhanced global recognition for the State.

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## 18 Kerala Visual Heritage & Digital Archive Mission

### **B. JAYACHANDRAN**

*Former Sr. Picture Editor, Malayala Manorama and Editor, "Visual History of Kerala Project", I&PRD, Govt. of Kerala*

1. Establish a "Kerala Visual Heritage & Digital Archive Mission" (Priority 1) Create a state-supported, professionally managed digital archive to systematically collect, digitize and preserve photographs, films, private collections, oral histories and documentary records related to Kerala's social, political and cultural evolution. This would safeguard fragile visual history and make it globally accessible for research, education and tourism.
2. Heritage-Based Cultural Tourism Development (Priority 2) Integrate visual history documentation with tourism circuits—especially Travancore, Malabar and Cochin heritage regions—through curated exhibitions, photo museums, digital storytelling kiosks and documentary screenings. This can strengthen Kerala's knowledge tourism and cultural economy.
3. Centre for Documentary & Visual Studies (Priority 3) Establish a Centre dedicated to documentary filmmaking, visual anthropology and archival research to train young professionals in preserving Kerala's contemporary transformations for future generations. Kerala's development narrative must not only move forward but also consciously preserve and interpret its historic journey.

വിഷയ മേഖല: പ്രവാസം, ടൂറിസം  
ഉപശാഖ: കുടിയേറ്റം

Main Track: **Migration, Tourism**  
Sub Track: Migration

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## 1 Leveraging Musharakah-Based NBFCs and Behavioural Nudges for NRI Investment

**DR MUNEEER BABU M.**

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Establishment of a new NBFC (Non-Banking Financial Company) and Chitty frameworks that attract new investors (Sharia-Compliant Investment)

Investment Model: Use a Musharakah (Joint Venture) model. A group of NRIs pools funds to build an eco-resort. The government provides legal protection and infrastructure (roads/water). The “return” is a share of the resort’s operational profit.

The “Nudge” Strategy for Government

To ensure these resources are pooled, the government should use Behavioural Nudges:

- Trust Nudge: Use State-Backed Guarantees on the principal amount for Sharia-compliant funds to lower the perceived risk.
- Naming Nudge: Labelling these as “Ethical Development Funds” or “Pravasi Prosperity Bonds” to appeal to both religious and secular ethical investors.
- Default Enrollment: When NRIs register with NORKA (Non-Resident Keralites Affairs), provide an “Opt-In” for a micro-investment scheme for hometown development projects.”

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## 2 Regulating Guest Labour: Safety Measures and Sensitisation

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We are open to guest workers unconditionally. The criminal activities done by them in the recent past are alarming. With many households in Kerala occupied by the elderly, the threat to their life and property from guest workers is a serious matter of concern. There should be some mechanisms to have a control over the anti-

social activities done by guest workers and campaigns to sensitise them to become responsible citizens.

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### 3 Launching Retirement & Investment Linked Schemes for Expatriates

**HARSHA PUTHUSSERRY**

*Founder and MD of Iraaloom, Iraaloom*

The expatriate community plays a crucial role in the socio-economic growth of Kerala. However, structural guidelines and policy support remain inadequate regarding the long-term financial security of expats, their post-retirement life, and investment opportunities back home. At the same time, Kerala's cultural diversity and responsible tourism are sectors that offer immense potential for expat investments and job creation.

Therefore, it is recommended to launch Retirement & Investment Linked Schemes specifically targeting expatriates. Secure and transparent platforms should be established for expats to invest in sectors such as sustainable tourism, homestays, heritage tourism, cultural tourism, and eco-tourism in Kerala. These schemes must ensure a single-window service for matters including land use, licenses, tax benefits, pension support, and social security. Through this, retired expatriates can achieve a stable life and a steady source of income in their homeland.







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