GOVERNMENT OF TAMIL NADU

FOURTH NATIONAL CONFERENCE OF CHIEF SECRETARIES

STATE SPECIFIC NOTE

&

FEEDBACK NOTE

GOVERNMENT OF PUDUCHERRY

4TH NATIONAL CONFERENCE OF CHIEF SECRETARIES

Services

2. MSME & Informal Employment

Rural Non-farm

Urban

3. Opportunities in Green Economy

Renewable Energy

Circular Economy

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I. Introduction

Puducherry, a Union Territory of India, has shown steady growth in industrial activities, particularly in sectors like **pharmaceuticals, plastics, chemicals**, light engineering and **food processing**. The **Gross State Domestic Product (GSDP)** of Puducherry, driven by key sectors such as services, manufacturing, and agriculture is estimated at ₹ 48,052 crores for the year 2023-24. The GSDP grew at a Compound Annual Growth Rate (CAGR) of 5.62% between 2015-16, 2022-23. The Net State Domestic Product (NSDP) of Puducherry in 2024 was ₹ 437031.211 and NSDP per capita is ₹ 262,166.293. The per capita income of the U.T is ₹ 2,63,068 for the year 2023-24. Puducherry has the highest SPI score of 65.99 in the country, attributable to its remarkable performance across components like Personal Freedom and Choice, Shelter, and Water and Sanitation. As of March 2024, Puducherry had a total installed power generation capacity of 427.56 MW.

Puducherry, Union Territory known for its tourism and colonial heritage, is also the world's significant potential as a tier II city for manufacturing sector. It is situated on the coromandel coast of Bay of Bengal. The Union Territory comprises Puducherry, Karaikal, Mahe, Yanam region. The UT with its strategic coastal location is about 135Km away from Chennai with a minor port located between two major ports of Chennai and Thoothukudi.

However, to maximize its potential as a manufacturing hub, there is a need to create a more enabling and dynamic ecosystem. This paper outlines strategies, policies, and structural reforms that could propel Puducherry into becoming a robust manufacturing destination, leveraging its strategic location, existing infrastructure, and government initiatives.

II. Current Situation

- Puducherry is primarily known for small and medium-scale industries, which **contribute** to the territory's Gross Value Added (GVA) at approximately **30-35%**, while the services sector leads at around **60-65%**. Although Manufacturing Sector is growing, it is yet to reach its full potential, especially in comparison to larger industrial states and regions.

- The Puducherry Industrial Policy was notified during the year 2016, with an aim to promote vibrant industrial growth in the context of overall economic development of the U.T. The Policy intents to create a high tech manufacturing and service hub leading to vibrant industrial growth based on Puducherry's intrinsic strengths.

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Incentives/Subsidies for Manufacturing sector:

Capital Investment subsidy

- SC/ST/Women Entrepreneurs - 45% of Investment made on Land, Building, Plant & Machines etc. to a maximum of Rs. 75 Lakhs.
- Micro and Small Entrepreneurs – 40% of Investment made on Land, Building, Plant & Machines etc. to a maximum of Rs. 40 Lakhs.
- Medium and Large Entrepreneurs –35% of Investment made on Land, Building, Plant & Machines etc. to a maximum of Rs. 35 Lakhs.

Infrastructure Development Subsidy

- For IT/ITES - 30% for the investment made on Building to a maximum of Rs. 1 Crore.

Pollution Control Equipment Subsidy

- 25% - Maximum Rs. 5 Lakhs for installation of Pollution control Equipments.

Assistance for technology acquisition

- 50% - Maximum Rs. 10 Lakhs for acquisition of appropriate technology in the form of specific product/process.

Interest Subsidy

- 25% of interest Paid – Maximum Rs.5 Lakhs per annum for a period of 5 years for Puducherry & Karaikal Region and 7 years for Mahe & Yanam Region.

Generator Subsidy

- 50% - Maximum Rs. 5 Lakhs for the purchase of Generator.

Employment Incentive

- 20% - Wage or Salary to maximum Rs. 5 Lakhsp.a for the workers covered under Provident Fund for a period of 5 years for Puducherry & Karaikal and 7 years for Mahe&Yanam.

Subsidy for Quality Certification

- 50% - Maximum 3 Quality Certification – Rs. 2 Lakhs per Unit.

Intellectual for Protection Support

- Assistance @ 50% to maximum of Rs. 2 lakhs for domestic patent and Rs.5 lakhs for international patent.

Market Development Support Assistance

- 50% of total rent, literature and display materials maximum of Rs.5 lakhs for participation in Exhibition.

Assistance for energy and water conservation

- Reimbursement of 50% cost of energy/ water audit conducted in the unit subject to a limit of Rs. 25,000/-.

State Award

- Cash award of Rs. 2 Lakhs and citation will be given to Micro, Small and Medium Enterprises.

III. Challenges

Land Availability Constraints

- Challenge: Puducherry's small geographical size limits the availability of land for large-scale industrial projects. This also leads to higher land costs, discouraging new investment.

Infrastructure Deficiencies

- Challenge: Inadequate transport, logistics, and utilities such as water, electricity, and waste management affect manufacturing operations. Current industrial estates are underutilized or outdated, making them less attractive for investors.

Skill Mismatch

- Challenge: There is a gap between the local workforce's skills and the needs of modern industries, particularly in sectors like electronics, pharmaceuticals, and advanced manufacturing.

MSME Competitiveness

- Challenge: MSMEs in Puducherry struggle with limited access to credit, technology, and market reach, reducing their ability to grow and innovate.

Competition from Neighboring States

- Challenge: Puducherry faces competition from neighboring states like Tamil Nadu and Karnataka, which offer better infrastructure and larger industrial bases.

Environmental Regulations

- Challenge: Compliance with environmental standards can be difficult for MSMEs due to financial and technological constraints.

Dependency on Central Government Funding

- Challenge: Being a Union Territory, Puducherry relies heavily on the central government for development funding, slowing down local initiatives and investments.

IV. Possible Solutions

Land Optimization and Expansion

- Solution: Promote the optimal use of land by creating multi-level industrial complexes and revising land-use policies to prioritize industrial development. Expand industrial zones and estates to accommodate new investments.

Infrastructure Development

- Solution: Invest in upgrading transport (road, rail, and port connectivity), utilities, and logistics infrastructure. Develop Special Economic Zones (SEZs) and sector-specific clusters for industries like pharmaceuticals, textiles, IT, and electronics. Public-private partnerships (PPPs) can play a vital role in improving infrastructure.

Skill Development Programs

- Solution: Collaborate with industries and educational institutions to establish skill development centers that focus on industry-specific training. Set up vocational training institutes (ITIs) and apprenticeship programs to improve employability in the manufacturing sector.

MSME Support and Innovation

- Solution: Provide subsidized credit, improve access to technology, and establish incubators and innovation hubs to support MSMEs. Government programs should focus on technology upgradation, digital transformation, and marketing support for export-oriented MSMEs.

Green Manufacturing and Sustainability

- Solution: Offer incentives and subsidies for industries adopting sustainable and eco-friendly technologies. Develop shared green infrastructure in industrial estates to promote environmentally responsible manufacturing.

Local and Central Government Collaboration

- Solution: Puducherry's government should engage in more aggressive partnerships with central schemes such as Make in India and Startup India to attract investments. PPPs and foreign direct investment (FDI) should be leveraged to reduce dependence on central funding.

Niche Focus and Competitive Positioning

- Solution: Develop niche sectors where Puducherry has a competitive advantage, such as pharmaceuticals, agro-processing, IT, and tourism-related industries. Customized incentive packages for specific industries can make the region more attractive compared to neighboring states.

V. Priority Areas

Pharmaceuticals and Biotechnology

- **Significance**: Puducherry already has a strong presence in the **pharmaceutical sector**, with several medium and large-scale units established in the region. This sector has the potential to become a major growth driver due to the global demand for generic medicines, biopharmaceuticals, and vaccine manufacturing.
- **Enabling Ecosystem**: Establish **biotech parks** and **pharma clusters** that provide access to world-class R&D facilities, testing labs, and compliance certification services. Developing an innovation-driven environment through **public-private partnerships (PPPs)** and **FDI** would also be key.

Textiles and Apparel

- **Significance**: Puducherry has a rich tradition in **handloom textiles**, and the textiles and apparel sector provides opportunities for both employment generation and export growth. The growing demand for **organic and eco-friendly textiles** presents a niche opportunity for the region.
- **Enabling Ecosystem**: Focus on developing **textile parks** that support small and medium-scale producers with modern infrastructure, including design centers and shared resources for **dyeing, printing**, and **garment manufacturing**. Additionally, providing access to **export incentives** can help increase global market penetration.

Agro and Food Processing

- **Significance**: With agriculture being a prominent activity in Puducherry, there is great potential in the **food processing industry**, particularly in **value-added agro-products** like spices, organic products, and seafood processing.

- **Enabling Ecosystem**: The creation of **food processing zones** with cold chain facilities, processing units, and packaging centers would enable local farmers and producers to move up the value chain. Financial incentives like **subsidies** for setting up processing units and improved market access can encourage growth in this sector.

Information Technology and IT-Enabled Services (ITES)

- **Significance**: As a Tier 2 city, Puducherry offers lower operational costs compared to major metropolitan areas, making it an attractive location for IT and ITES companies. This sector can capitalize on Puducherry's educated workforce and proximity to cities like Chennai and Bengaluru.
- Enabling Ecosystem: Establish IT parks with high-speed internet connectivity, incubation centers for startups, and support from the government to promote digital infrastructure. IT training centers can be set up to equip the local population with skills in **coding, data analytics**, and **AI** to meet industry needs.

Electronics and Electrical Manufacturing

- **Significance**: The **electronics manufacturing** sector is experiencing rapid growth in India, driven by domestic demand and government initiatives like Make in India and Production Linked Incentives (PLI) for electronics. Puducherry's strategic location on the East Coast provides good connectivity for export-oriented units.
- Enabling Ecosystem: Develop electronics manufacturing clusters where companies can access state-of-the-art production facilities and R&D centers. Support policies for **semi-conductor manufacturing**, electronic components, and devices will help foster growth in this sector.

Renewable Energy and Green Technologies

- **Significance**: Given the growing emphasis on sustainability, **renewable energy** (especially solar power) and green technologies can become a priority sector. This aligns with India's commitment to reducing carbon emissions and moving toward a green economy.
- Enabling Ecosystem: Encourage investments in solar energy parks, renewable energy R&D, and green manufacturing zones with tax incentives and subsidies for companies adopting eco-friendly practices. Developing **green industrial estates** would further boost sustainable manufacturing practices.

Auto Components and Engineering

- **Significance**: The **auto components** sector can play a significant role, leveraging Puducherry's proximity to the automobile hubs in Tamil Nadu, such as Chennai, which is a major center for

auto manufacturing. The auto components industry can grow by supplying parts and services to large automobile manufacturers.

- Enabling Ecosystem: Establish engineering clusters and auto-component manufacturing parks that provide shared access to **machinery**, R&D facilities, and training centers. Government incentives for modernizing and upgrading technology in this sector would be crucial for improving competitiveness.

Tourism and Hospitality

- **Significance**: Although not directly manufacturing, **tourism** plays a crucial role in Puducherry's economy. Investments in tourism infrastructure, especially eco-tourism and cultural tourism, can create a spillover effect in related industries like handicrafts, furniture, and construction materials.

- Enabling Ecosystem: Develop integrated tourism circuits that promote Puducherry's heritage, culture, and eco-tourism offerings. Create **hospitality industry training centers** to improve the skill sets in hotel management, culinary arts, and tourism services.

VI. Way Forward – Strategy for Implementation

Create an Industrial Master Plan:

- Puducherry needs a detailed industrial development roadmap that identifies potential growth areas, sector-specific opportunities, and infrastructure needs. This plan should be aligned with both regional and national priorities such as Make in India.

Strengthen MSME Ecosystem:

- Puducherry should prioritize the growth of MSMEs by creating a dedicated MSME support framework, including access to finance, technology, market linkages, and export facilitation. Ensuring that MSMEs are connected to global supply chains is critical for long-term growth.

Promote Sustainable Growth:

- Introduce green industrial zones and eco-parks where businesses are encouraged to adopt sustainable manufacturing processes. Puducherry should position itself as a green manufacturing hub by adopting renewable energy sources for industries and enforcing waste management regulations.

Enhance Skill Development:

- Create more public-private partnerships focused on skill development, particularly in advanced manufacturing, IT, and emerging technologies. This will help build a highly skilled workforce to meet the needs of modern manufacturing industries.

Leverage Digital Technology:

- Encourage industries to adopt Industry 4.0 technologies such as automation, AI, and IoT to improve productivity. Establish digital innovation hubs that assist industries in adopting these technologies, particularly for MSMEs.

Focus on Regional Integration:

- Puducherry should aim to strengthen its integration with industrial clusters in neighboring states like Tamil Nadu, leveraging their infrastructure, markets, and supply chains. This would allow Puducherry to become part of a larger regional manufacturing hub.

Aggressive Marketing and Investor Outreach:

- Puducherry must position itself as a business-friendly location with attractive incentives for investors. This includes participating in national and international trade expos, promoting the region's ease of doing business, and offering sector-specific incentives.

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I. Introduction

Skill Development as an Enabler:

An important component of creating an enabling ecosystem is to create an effective labour force that is suitable for the manufacturing / service sectors.

Puducherry though a small Union Territory has a notably high percentage of graduates, with GER (GROSS ENROLMENT RATIO IN HIGHER EDUCATION) of **61.5** (Ref: AISHE Report-2021-22). However, despite this impressive educational attainment, the region faces a significant employment challenge (unemployment rate among youth is around **23%** which is higher than the national average of 10%) (Ref: Employment Indicators in India for youth- https://dge.gov.in/dge/sites/default/files/2024-06/Employment_Indicators_in_India_for_youth.pdf)

This disparity indicates that a substantial number of graduates are unable to secure jobs that Industries that operate in Puducherry offer, pointing to a mismatch between educational outcomes and labor market needs. Skill gap is a key conundrum that the Government needs to resolve to secure gainful employment as well as give a shot in the arm for skill based industries to set up shop in the UT.

Skill Gap Analysis:

- Key areas where graduates often fall short include technical proficiency, soft skills, and industry-specific knowledge.

Sectoral Employment Trends:

- The primary sectors driving Puducherry's economy—tourism, manufacturing, and services—are evolving rapidly. Graduates, especially in fields like humanities and social sciences, may lack the specific skills needed for these industries, leading to underemployment or unemployment.

Vocational Training Participation:

- Current enrolment in vocational training programs remains low. Industries may not require all graduates (white collar) and they require persons who have vocational skills (blue collar) like ITI, Polytechnics students. There are issues with social perception of vocational skills with everyone trying to become graduates and looking for white collar jobs. But the manufacturing/service industry (except IT/ITES) requires few graduates and a greater number of technically skilled people (blue collar jobs). The local graduates may either lack the skills needed by the industry or may not be willing to get into blue collar jobs. Often this leads to

bringing migrant workers who are willing to work. This indicates a need for increased social awareness, accessibility and change in society's mindset about vocational education.

Social Status:

- There is a prevailing societal perception that white-collar jobs are more prestigious. Many individuals associate these roles with higher education and professional success. There is an urgent need to address this misplaced societal apathy about blue collar jobs through behavior change communication. The PM Internship Scheme in this respect is a step in the right direction.

II. Current Situation

Puducherry Skill Development Mission (PSDM):

- Launched to address the skill gap and promote vocational training. PSDM offers training in various sectors, including IT, hospitality, healthcare, and manufacturing. As of 2024, over **10,000 individuals** have benefited from these training programs, with a reported **70% placement rate** among participants.

Perunthalaivar Kamarajar Financial Assistance Scheme (PKFAS):

- This scheme aims to support economically disadvantaged students pursuing higher education. PKFAS particularly targets marginalized groups, including those from low-income families and underrepresented communities. This empowerment helps promote social equity and inclusivity in higher education.

Puduvai Startup Sprint:

- To spread the idea of startups amongst both urban and rural students in Government Colleges this initiative was undertaken in collaboration with Pondicherry Technological University and Atal Incubation Mission. The outcome is yet to be evaluated. However, anecdotal evidences suggest that the campaign was well received amongst college and school students alike.

III. Challenges

There is an undue emphasis on improving skill development. While imparting Skills, no regard is paid to developing the attitude of the trainees/workers. Lack of attitude affects the Individual's progress as well as the industry. Attitude is very important not only for acquiring skills but also for utilizing/applying those skills. Most of the skill development programs do not focus on building attitude and social or soft skills. Schemes like PKFAS focus mostly on graduation which leads to expectation for white collar jobs. Societal perception regarding blue collar jobs needs to be changed.

IV. Possible Solutions

- Modules can be added to develop right attitude among the trainees from schools onwards.
- Skill Requirements (NSQF Certificate equivalence) needs to be incorporated as a prerequisite for taking up certain stream of courses in higher education and also in the Recruitment Rules for the posts in Government/Public Sector Undertakings.
- Appropriate recognition of Skill Development Programmes is needed. Many NSQF Courses are not formally recognized as many higher education courses (graduation etc) do not recognize the NSQF qualifications formally. Similarly, job roles in Government/PSUs need to recognize the NSQF levels by amending the Recruitment Rules.
- There should be better support to students pursuing ITI/Polytechnics (Quickly expand PM Internship Scheme) which may help bring more students into the vocational courses universe. Modernization of ITIs / Polytechnics, Industry relevant curriculum and Training / Internship/Apprenticeship will help improve the situation.

V. Best Practices

International Best Practices

- These highlight diverse approaches to skill development, emphasizing the importance of collaboration between government, industry, and educational institutions. Successful initiatives focus on aligning training programs with labor market needs, promoting lifelong learning, and creating pathways for disadvantaged groups. Some of the examples are:

1. Germany's Dual Education System

Overview:

Germany's dual education system combines classroom instruction with practical on-the-job training. Students split their time between vocational schools and companies, gaining hands-on experience.

Key Features:

- Strong partnerships between industries and educational institutions.
- Structured training programs tailored to labor market needs.
- High levels of apprenticeship participation, leading to low youth unemployment rates.

Outcome:

- This system has produced a highly skilled workforce and contributed to Germany's robust economy, with a strong manufacturing base.

2. Singapore's SkillsFuture Initiative

Overview:

- Launched in 2015, the Skills Future initiative promotes lifelong learning and skills upgrading among Singaporeans.

Key Features:

- Government funding for courses, with individuals receiving credits to use for skill development.
- Focus on industry-relevant skills aligned with economic needs.
- Collaboration with industries to design training programs.

Outcome:

- Skills Future has improved employability and adaptability of the workforce, leading to increased productivity and economic resilience.

3. South Korea's Human Resources Development Service

Overview:

- South Korea's Human Resources Development Service (HRD) focuses on workforce training and development to meet industry demands.

Key Features:

- Government-funded training programs that provide vocational education and skills development.
- Emphasis on technology and innovation to enhance workforce capabilities.
- Continuous feedback from industries to update training curricula.

Outcome:

- South Korea has developed a highly skilled labor force, contributing to its rapid economic development and global competitiveness

VI. Priority Areas

New Industrial Estate in Sedarapet Karasur Villages:

- The development of 750-acre new industrial estate is expected to improve the employment scenario in Puducherry.
- Doing a survey for identifying the skillsets required by the industry and bringing about required changes in the Skill development programmes will benefit both the people as well as the industry.

Integration of all Operational Industrial Estates under One Umbrella:

- In Puducherry, Industrial Estates are operated by two agencies: (1) Directorate of Industries and Commerce and (2) Puducherry Industrial Promotion and Investment Corporation (PIPDIC). This has resulted in divergence of policies and procedures that govern the Industrial Estate. To address this ambiguity, the industrial estates shall be brought under the ambit of PIPDIC which is better equipped to manage the industrial estates better

VII. Way Forward – Strategy for Implementation

- Revamp the Industrial Guidance Bureau on the lines of GUIDANCE in Tamilnadu.
- Restructuring the present cadre of officers in Industries Department with a focus towards revamping it into an agile and adaptive agency that can cater to the changing requirements of Industries in Puducherry.
- Conferring Industry Status to locally relevant service sectors like Tourism, Sports etc so as to enable the entrepreneurs to access institutional financing at competitive rates of interest.

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I. Introduction

Puducherry is the 29th most populous of the 36 states and union territories of India, and the third most densely populated union territory. The Puducherry (Region) spread in an area of 294 Sq. Km. erstwhile French establishments of Puducherry. The Union Territory with legislature extends over an area of 479 Sq. Kms. The Total population of the Union Territory is 12,44,464, with a literacy rate of 86.55, as per 2011 Census (Provisional).

The uniqueness of Pondicherry town invariably lies in skillful town planning and Franco Tamil architecture. The town is built on the model of "bastide", a fortified French coastal town of the late 18th Century.

The Puducherry Gross State Value Asses (GSDP) grew by 7.54 % and per capita income by 7.61% in 2023-24. Puducherry has the highest Social Progress Index (SPI) score of 65.99 in the country, attributable to its remarkable performance across components like Personal Freedom and Choice, Shelter, and Water and Sanitation.

It has a gross domestic product (GDP) of ₹210 billion (US$2.6 billion). The most widely spoken first language is Tamil, which is native to 88.2% of the population. There are also speakers of Telugu (5.96%), Malayalam (3.84%) and Urdu (0.69%). It has practically all opportunities and challenges of southern peninsula within one administration. Recognizing the unique Geography and Government of Puducherry desires to make technology as the backbone in the governance of union territory of Puducherry to improve service delivery and distribution of benefits.

The UT has a well-developed social, physical, and industrial infrastructure. It has a domestic airport that connects it to cities such as Bengaluru and Hyderabad. It also two ports in Puducherry and Karaikal.

Considering the manpower availability and tremendous economic activities, the service sector refinement has a pivotal role.

Recent Developments:

- The airport handled 45,441 passengers in pre-covid period.
- As of March 2023, Puducherry had 1.17 million wireless and 0.06 million wireline subscribers. Puducherry had a total tele density of 74.76%, as of March 2023.
- The Ministry of Education has announced "Swach Vidyalaya Puraskar Award" in which Union Territory of Puducherry had won 6 Awards and stood at 2nd place.
- In 2022, Puducherry witnessed arrivals of 17.6 lakh domestic and 1.5 lakhs foreign tourists.

- Number of domestic tourists in the state has increased by 40.48% in 2022 compared to previous year while the number of foreign tourist has increased by 168.54% in the same period as per ministry of tourism data.

Key Sectors:

- Puducherry is an attractive tourist destination with beaches, French architecture, churches, and temples. Domestic tourists arrived from Bengaluru, Hyderabad, Kerala, Chennai, Odisha, and West Bengal. The UT also has an occupancy capacity of 5,000 rooms in Puducherry as of 2018.
- Puducherry has begun the journey towards strengthening its startup ecosystem by showing active participation in 7 Action Points of Startup Ranking Framework 2020. The UT of Puducherry's performance in each of the Reform Area has been Ranked 6th in Incubation Support, 15th in Fostering Innovation and Entrepreneurship, 25th in Access to Market, and 33rd in Capacity to Builders.
- There are nine industrial estates in Puducherry with 9,449 registered units. In 2020-21, there are 9,181 small-scale industries, 191 medium-scale industries and 77 large-scale industries. There are also 2 sugar factories and 8 textile mills in Puducherry.
- **Technology and Tourism development:** India's tourism sector has seen a significant boost with the integration of technology, which is transforming the way tourists immersive experience. In 2023, India's travel and tourism sector contributed approximately $268 billion to the national GDP, accounting for around 6.9% of the total GDP. This growth is largely attributed to the adoption of digital tools and services that enhance the overall tourist experience.
- **Guidance on Skill development** In Puducherry, it is essential for each student at each stage of education to upgrade skill through emerging technologies. As per current policies and capacity building gaps are
    - Lack of quality in primary and secondary education
    - Small career development opportunity.
    - Difficulty in Long term generation of impact in career as technology changes fast.

As per NEP2020, starting from 6th to 12th in school education, a good education institution is one in which every student feels welcomed and cared for, where a safe and stimulating learning environment exists, where a wide range of learning experiences are offered, and where good physical infrastructure and appropriate resources conducive to learning are available to all students.

- **Skill Development as an enabler:** An important component of creating enabling ecosystem is to create the labour force which is suitable for the manufacturing / service sectors. Puducherry has a notably high percentage of graduates, with GER (GROSS ENROLMENT RATIO IN HIGHER EDUCATION) of 61.5 (Ref: AISHE Report-2021-22). However, despite this impressive educational attainment, the region faces a significant employment challenge (unemployment rate among youth is around 23% which is higher than the national average of 10%) (Ref: Employment Indicators in India for youth-

  https://dge.gov.in/dge/sites/default/files/2024-06/Employment_Indicators_in_India_for_youth.pdf.

- This disparity indicates that a substantial number of graduates are unable to secure jobs, pointing to a mismatch between educational outcomes and labor market needs.
- **Skill Gap Analysis:** Key areas where graduates often fall short include technical proficiency, soft skills, and industry-specific knowledge.
- **Sectoral Employment Trends:** The primary sectors driving Puducherry's economy—tourism, manufacturing, and services—are evolving rapidly. Graduates, especially in fields like humanities and social sciences, may lack the specific skills needed for these industries, leading to underemployment or unemployment.
- **Vocational Training Participation**: Current enrolment in vocational training programs remains low. Industries may not require all graduates (white collar) and they require persons who have vocational skills (blue collar) like ITI, Polytechnics students. There are issues with social perception of the vocational skills with everyone trying to become graduates and looking for white collar jobs. But the manufacturing / service industry (except IT/ITES) requires few graduates and a greater number of technically skilled people (blue collar jobs). The local graduates may either lack the skills needed by the industry or may not be willing to get into blue collar jobs. Often this leads to bringing migrant workers who are willing to work. This indicates a need for increased awareness and accessibility of vocational training options.

II. Current Situation

- At present, there are no comprehensive policies or programs specifically focused on faceless communication for tourists in Puducherry. This gap results in insufficient information availability about tourist destinations, facilities, and programs, limiting the ability to attract and engage tourists effectively.

  In terms of service delivery, the absence of a comprehensive digital strategy also affects the quality and consistency of services provided to tourists. Without integrated platforms, it becomes difficult for state tourism departments to track visitor feedback, understand patterns of tourist

behavior, or address complaints in real-time. This undermines the potential to improve service delivery continuously, resulting in suboptimal tourist experiences.

- **Puducherry Skill Development Mission (PSDM):** Launched to address the skill gap and promote vocational training. PSDM offers training in various sectors, including IT, hospitality, healthcare, and manufacturing. As of 2022, over 10,000 individuals have benefited from these training programs, with a reported 70% placement rate among participants.

- **Perunthalaivar Kamarajar Financial Assistance Scheme (PKFAS):** This scheme aims to support economically disadvantaged students pursuing higher education. PKFAS particularly targets marginalized groups, including those from low-income families and underrepresented communities. This empowerment helps promote social equity and inclusivity in higher education.

In terms of service delivery, the current skill development program are post academic support for individuals and no scheme or policy to provide proper guidance about the learning system and how and what it benefits to them, where to apply those skills, etc., It is essential to bring a forum of guidance on each skill development program preparing the right choice to be make each student for their carrier and what is essential.

III. Challenges

- Key challenges include the slow pace of technology adoption due to budget constraints, inadequate digital infrastructure, and lack of technical expertise within tourism departments. Many destinations also struggle with limited connectivity in rural or remote areas, which impairs the ability to provide seamless digital services.

    - The absence of comprehensive data analytics systems hinders tourism departments from gathering actionable insights on tourist preferences and trends, limiting the scope for targeted interventions.
    - The lack of readily available and easily searchable information about tourist destinations and facilities. There is also insufficient guidance on utilizing local infrastructure and events. These gaps hinder effective communication and fail to provide tourists with the necessary information to enhance their travel experience.

- There is undue emphasis on improving skill development. While imparting the Skills, no regard is paid to developing attitude of the trainees/workers.

- Most of the skill development programs do not focus on building guidance "how to utilize the skill" and "how it benefits the students"
- Lack of attitude affects the Individual's progress as well as the industry. Attitude is very important not only for acquiring skills but also for utilizing/applying those skills. Most of the skill development programs in Puducherry do not focus on building attitude and social or soft skills.
- Societal perception regarding blue collar jobs needs to be changed.

IV. Possible Solutions

Intelligent Digital board and Kiosk Advisory and Selection System (i-KAS)

- This system would offer a comprehensive application for tourists, guiding them from the selection of destinations to booking accommodations and planning itineraries. The i-KAS would operate 24x7 across various locations, providing real-time information and booking options through kiosks. It would adapt to tourists' preferences and provide actionable insights to the government for improving tourism services.

Tourist-Centric Smart Destination Platform (T-SDP):

- Puducherry can develop a centralized platform that integrates various digital services—online ticketing, accommodation booking, real-time crowd management, AI-powered travel assistants, and feedback systems. The T-SDP can be connected with state-run tourism portals, payment gateways, and local service providers, offering tourists a seamless experience. It can also enable state tourism departments to track visitor trends, manage tourist flows, and optimize destination promotion. Partnering with IT firms and telecom companies to enhance digital infrastructure, particularly in remote areas, would ensure wider access.

Virtual Reality (VR) Pre-Visit Experience:

- States could offer virtual tours of major tourist destinations on their websites and apps, allowing visitors to explore sites before physically visiting. This would encourage more tourists to plan their visits, especially in off-peak seasons, and improve their satisfaction by providing an immersive pre-experience. Collaboration with educational institutions or tech start-ups could make these VR experiences innovative and cost-effective.

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Intelligent Skill Enhancement for Employment/Career Advisory System (i-SEE):

- A system to create an application for youth wherein he/she will be guided from starting from the selection of the courses in academics, to enhance the way forward preparation of their carrier growth ie. the date of selecting their courses and before completing the course, the system will prepare the youth with their natural interest to select, prepare and enhance the required skills, which will make them "Get Set Go" model. Today lot of AI based advanced tools and techniques are developed and available for the learning. However, the gap of "Know How" missing and it is not reaching the entire Students. Once the Knowledge bridge created, it will provide the informative information's among the parents, students, and carrier search degree holders. The AI based guidance will be provided and tracking each and every one who registered under this application, the system will ensure the "ontime" growth and recommendations would be modulated using ML.

  Benefits:

  - The growth data will be analyzed through the Data Analytics and based on that, The AI will prepare a pattern to feed the right information to each student.
  - The Students will be guided from starting to till achieve the growth what they expected as an outcome.
  - Modules can be added to develop right attitude among the trainees.

- **NSQF Certificates** equivalence need to be incorporated in eligibility criteria for courses in higher education and also in the Recruitment Rules for the posts in Government/Public Sector Undertakings.

- Appropriate recognition of Skill Development Programmes is needed as many NSQF Courses are not formally recognized as many higher education courses (graduation etc) do not recognize the NSQF qualifications formally. Similarly, job roles in Government / PSUs need to recognize the NSQF levels by amending the Recruitment Rules.

- There should be sizable support to students pursuing ITI / Polytechnics which may help bringing more students into vocational skill sets. Modernization of it is / polytechnics and industry linked curriculum and training / internship/apprenticeship will help improve the situation.

V. Best Practices

Puducherry's Digital Museum Initiative:

- The Government of Puducherry has proposed to develop a Digital Museum, equipped with AR (Augmented Reality) and VR (Virtual Reality) technologies. This museum will offer immersive VR experiences of the region's prominent tourist destinations, allowing visitors to virtually explore places such as Auroville, Paradise Beach, and other cultural landmarks. Through interactive displays, tourists will not only get a virtual glimpse of these spots but will also have the opportunity to learn about their history, significance, and attractions, enhancing their knowledge and engagement with Puducherry's rich heritage.

- The Directorate of Information Technology, Puducherry under developing new emerging technology oriented "Puducherry Information & Communication Technology" unit for skill development covering Internship programs. It is aimed to figure out the gaps and fulfill the required skills essential for the youth to achieve their carrier growth. The current PICT work in progress and it will be futuristic idea and best practice can be in near future for all others.

VI. Priority Areas

- Priority in the next five years, it is crucial to assess tourist needs and prioritize the development of faceless communication systems. This involves upgrading infrastructure, implementing real-time information systems, and enhancing interactive capabilities to improve overall tourist engagement.

  - **Enhanced Digital Infrastructure:** Ensure reliable, high-speed internet in both urban and rural tourist destinations.
  - **Data Analytics for Tourist Insights:** Establish advanced data collection systems to analyze tourist behavior, preferences, and feedback.
  - **Adoption of AI/AR/VR:** Deploy AI for personalized travel planning and AR/VR for immersive destination experiences.
  - **Smart Destinations:** Focus on developing "Smart Destinations" with integrated digital services that provide real-time information and cater to tourist needs.

New Industrial Estate in Sedarapet Karasur Villages:

- The development of 750-acre new industrial estate is expected to improve the employment potential in Puducherry. Doing a survey for identifying the skillsets required by the industry and

bringing about required changes in the Skill development programmes will benefit both the people as well as the industry.

- It is proposed to assess the current needs of the employment opportunities in the industries and modify the list of skill developments which are essential to be emphasis on way forward futuristic developments and equip the trainings.

VII. Way Forward – Strategy for Implementation

To successfully integrate technology into States and UTs should:

- **Establish Public-Private Partnerships (PPP):** Partner with tech companies and start-ups to develop and manage digital solutions.
- **Capacity Building:** Organize training programs to enhance the technical skills of tourism department officials and local service providers.
- **Budgetary Allocations for Tech Innovations:** Allocate a specific portion of tourism budgets for technology adoption, focusing on sustainable and scalable solutions.
- **Legal and Policy Framework:** Develop guidelines that support digital transformation, including policies on data privacy, cybersecurity, and e-payments to ensure smooth operations.

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I. Introduction

Pondicherry economy can be characterized as an "open" economy with flows of virtually all factors of production, including natural resources, labour, capital, and technology. Puducherry GSDP grew by 7.54% and per capita income by 7.61% in 2023-24. Gross State Domestic Product Contribution is 0.62% to the National Gross Domestic Product (GDP) in 2024. The per capita income of Puducherry has increased from ₹ 2,44,469 (current price) for the year 2022-23 to ₹ 2,63,068 (current price) for the year 2023-24, showing a growth rate of 7.61%.

The UT has a strong presence in the tourism, manufacturing industries, and marine product sectors. In 2022, Puducherry witnessed arrivals of 17.6 lakhs domestic tourists and 900 foreign tourists. The income from Dubrayapet beach/ Pondy Marina is about Rs 8.20 lakhs/ month and generate direct employment to the people of Puducherry. The manufacturing industries account for 27.39% of employment in the city. A prime example is food manufacturing, which provides 6% of the city's employment, which is from the non-farm livelihoods sector.

Opportunities in Promoting Entrepreneurship Employment & Skilling – Rural Non-farm Employment (MSME-Services) :

Prevention of rural migration:

- Rural industrialization reduces dependency of rural people on agriculture, mitigates risks associated with agricultural livelihoods, prevents migration of rural population to urban areas, and creates a more balanced economic base, ultimately leading to greater stability and prosperity.

Creation of Sustainable Employment:

- Generates employment, promotes entrepreneurship, fosters technological innovation, and strengthens rural-urban linkages, thereby improving overall standards of living in rural areas.

Promotion of Entrepreneurs skills:

- Enabling rural poor to set up enterprises and supporting rural entrepreneurs/enterprises by developing their skills and supporting rural entrepreneurs by financial inputs. To identify the possibility of developing entrepreneurship amongst rural households and enhancing incomes through developing vocational and entrepreneurial skills and by creating opportunities for self-employment.

Reduce income gaps:

- As economies develop, people move from agriculture to other sectors, which can reduce the gap in income between the two sectors.

Concentration of Value Addition :

- Value addition in agriculture, horticulture and livestock has increased the opportunities for employment , financial stability mainly for small farmers and entrepreneurs.

Gender Empowerment:

- Promoting non-farm livelihoods within Rural SHGs women members is especially transformative for women in rural areas. SHGs have been instrumental in breaking gender stereotypes and empowering women to become active participants in economic activities and decision-making processes.

Environmental Sustainability :

- Non-farm activities often have a lower environmental footprint compared to intensive agricultural practices. By promoting small-scale manufacturing, handicrafts, and services, SHGs contribute to environmental sustainability by reducing pressure on natural resources and promoting eco-friendly practices

II. Current Situation

Present Scenario of Puducherry:

- Tourism sectors are major contributors to the economy of Puducherry. Apart from tourism, Puducherry art and craft villages comprise crafts of terracotta, stone, coconut, leather, papier-mâché, and shell form of products that are made and sold at the village; visitors can also get hand-on experiences in crafting; the government has several plans to expand and promote the village. The UT of Puducherry Rural Non-Farm livelihoods sector covers all non-agricultural activities household, processing, construction, mining & quarrying, transport, marketing, and other services varying in size from household enterprises to bigger group enterprises. Some of the significant industries in Pondicherry are chemicals, textiles, light engineering, metals, and food processing. Sectors like eco-tourism, footwear, and marine products are some of the areas where an investment boost is expected in Pondicherry.

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Current scheme and their progress:

Social Mobilisation and Institution Building:

- Under the National **Livelihood Mission scheme** from 2011 onwards, PSRLM mobilized 60,000 rural poor households across 3 blocks of Puducherry and provided CIF, RF, VRF, and start-up funds for uplifting their non-farm livelihood activities.

Access to Credit linkage: Pradhan Mantra MUDRA Yojana (PMMY) and Stand-up India Scheme :

- Banks in the Union Territory of Puducherry have been providing loans for starting self-employment enterprises in the non-farm sector. As of 31.3.2022, the overall disbursement under PMMY, including banks, NBFCs, and microfinance institutions, was ₹ 795.30 crore. As of 31.3.2022, 312 borrowers have been sanctioned loans under the Stand-Up India Scheme. The bank also provides credit linkage for promotion of non-farm livelihood activities to rural SHG members by forming JLGs. Also under the Puducherry **State Rural Livelihood Scheme**., from FY 2023–24, non-farm livelihood producer groups have been providing start-up funds (grants in aid) in order to strengthen their livelihoods.

MSME :

- In the UT of Puducherry **Udyam, e-Shram, NCS, and ASEEM portals** will be interlinked for credit facilitation, skilling, and recruitment with an aim to further formalize the economy and enhance entrepreneurial opportunities for all non-farm livelihood activities. The Emergency **Credit Line Guarantee Scheme (ECLGS)** will be extended up to March 2023, and its guarantee cover will be expanded by Rs. 50,000 crores to a total cover of Rs. 5 lakh crores, with the additional amount being earmarked exclusively for hospitality and related enterprises. The **Credit Guarantee Trust for Micro and Small Enterprises (CGTMSE) scheme** will be revamped with the required infusion of funds. Raising and Accelerating MSME Performance (RAMP) program with an outlay of PLP 2023-24 Rs. 6,000 crores over 5 years will be rolled out. This will help the MSME sector become more resilient, competitive, and efficient.

Skill Development:

- The Digital Ecosystem for Skilling and Livelihood (DESH-Stack) e-portal will be launched to empower citizens to skill, re-skill, or up skill through online training.

Financial Literacy:

- Financial Inclusion Financial Literacy and Credit Counselling Centres have also been established in the UT of Puducherry with the main objective of educating the people in rural

and urban areas on the various financial products and services available from the formal financial sector. NABARD conducted 75 financial literacy awareness programs for creating awareness among SHGs/JLGs, farmers, schoolchildren, etc. The Indian Bank Self Employment Training Institute (INDSETI) imparts training to the unemployed youth in various skills with a view to gaining employment.

Non Farm Livelihoods- Schemes in Rural Development Sector –UT of Puducherry:

- During FY 2021-22, PSRLM has taken up the **Aajeevika Grameen Express Yojana** (AGEY) and implemented it in a 2-block development office wherein 6 vehicles are in operation by the rural SHG members that support the rural transport services drastically. For FY 2024-25, the Ministry of Rural Development has sanctioned Rs 40.00 lakhs for the **Start-up Village Entrepreneurship Programme (SVEP)** the sub-scheme under the Deendayal Antyodaya Yojana—National Rural Livelihoods Mission (DAY-NRLM) has the objective of helping rural households, including women, to set up enterprises.

PMFME Scheme:

- Under PMFME scheme 927SHG members from the three intensive block availed Seed capital loan of Rs.3.42 Crores for strengthening their current livelihood activities.

Rural Skill building- UT of Puducherry:

- Skill-building support is provided to all the entrepreneurs supported through Community Resource Persons for Enterprise Promotion (CRP-EP). **Rural Skill Development Centres** (RSDCs) were established in Karayambuthur and Embalam villages of Puducherry UT to impart the state of the training programs for rural youth. The National Film Development Corporation (NFDC) was the training partner for the RSDCs and has trained a total of 50 persons till date in digital photography, digital videography and non-linear video editing courses.

III. Challenges

Job Insecurity:

- Many non-farm enterprises are subject to economic fluctuations, leading to potential layoffs or reduced hours during economic down turns.

Low Wages:

- Some non-farm livelihood activities, especially in certain service sectors, may offer low wages, making it difficult for workers to meet their financial needs.

Skill Mismatch:

- Rapid technological changes and evolving job requirements can lead to a mismatch between the skills workers possess and those demanded by employers.

Lack of training and capacity building:

- Inadequate conceptual ,technical training and follow up of the non- farm livelihoods activity. Constantly evolving markets require ongoing skill development and up gradation. SHGs must invest in continuous training and education for their members to remain competitive.

Access to Capital:

- Despite the success of microcredit programs associated with SHGs, accessing sufficient capital for non-farm enterprises can still be a hurdle for many members.

Workplace Stress:

- Jobs in services, manufacturing, and production sectors can be stressful due to high demands, tight deadlines, and sometimes difficult working conditions.

Gap in Forward and Backward Linkages:

- The gaps in the integration of the production linkages brought about by low market accessibility, support service weaknesses, and intervention of middlemen have constrained the development of non-farm enterprises in India.

Lack of Infrastructure:

- Apart from this, the most significant bottleneck in generating higher levels of rural non-farm activity in India is the quantity, quality, and reliability of infrastructure. Although corrective steps are now being taken, increased infrastructure remains the most important priority for the future.
- Lack of adoption of innovative technology and policy decision-making part.
- Lack of access to credit linkage facilities by the rural non-farmers.
- Interruption of advanced technology like robots, emergence of artificial intelligence techniques.
- Failure in monitoring and guidance system.

IV. Possible Solutions

Rural Tourism:

- Promote Eco & Agro Tourism—Adventure, Farm/Rural Stays, Home stays, Local Guides, Oral Literature/Orators in Convergence with the Department of Tourism. This will create an ecosystem for the growth of agro-entrepreneurs and eco-entrepreneurs.

Biodegradable disposable cutlery, plates, and drink ware:

- Arecanut, lotus, lily, and banana-based micro-enterprises for the production of environmentally friendly disposal products.

Use of plastic-free products:

- In convergence with DSTE, alternative use of plastic, especially paper bags, cloth bags, and jute bags, may be encouraged which was the best solutions for green Puducherry.

Use of livestock waste:

- Promotion of livestock waste enterprise units in rural areas, such as conversion of animal dung and urine into valuable products such as the vermin-composting unit and production of panchakaviya, dashakaviya, and fish amino acids, which are the enriched organic fertilizers for the agricultural land.

Elimination of water hyacinth in the pond:

- Effective utilization of this hyacinth plant, which is the nuisance to the land environment, into the handicraft products.

Food Processing:

- Products having high value and dominant price (e.g., idly batter, millets, and Moringa value-added products, pickles, bakery products, dry fish, spicy products, etc.) of a village to be prioritized for end-to-end support through the PMFME scheme run by community institutions.

Handicraft:

- Through the District Industry Centre, GI Tag for handicraft products such as products made from coconut shell, terracotta, scented candles, divine products, and mud pot incinerators. Dedicated digital market platform specific to handicraft products to promote rural artisans in global markets.

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Strategies for promoting entrepreneurship and employment in rural areas especially Medium, Small, and Micro enterprises

Skilling:

- Sector-based Skilling for generating self-employment, particularly in the agri-allied sector.

Financing:

- Bank correspondent for unbanked and under banked specific to Puducherry Community Resource Persons on Financial Literacy, non-collateral financing support of minimum Rs. 30 lakhs for financing rural **start-ups.**

Technology & Machineries Support:

- National Scheme for development of state-specific technology, tools, and machines to address emerging needs in the field. More resources for research & development.

Market Linkage:

- Buy-back subsidy to multinational companies for procurement of rural produce to generate demand and sustain rural producer groups**Use of plastic-free products**: In convergence with DSTE, alternative use of plastic, especially paper bags, cloth bags, and jute bags, may be encouraged which was the best solutions for green Puducherry.

V. Best Practices

- May also include initiatives for training and capacity-building that have been taken for effective implementation; Strategic communication campaigns undertaken to disseminate the programme; convergence; new technologies used for effective implementation.

Panchakaviya Diya Production Creating-Eco –Friendly & Carbon Free Environment

- Cattle manure is a rich source of carbon particles, which are highly toxic and pollutant to this environment. This cattle manure was effectively utilized by Mrs.Dhanasekari D/o Mr. Natarajan from Panchakaviya Vilaku JLG from Kurumbapet Panchayat of the Villianur block. She learned these innovative and creative techniques through social media and formed this Panchakaviya Vilaku JLG in November 2022. She accessed credit linkage of Rs 2.00 lakhs from PBGB and developed her business. Mrs.Dhanasekari is producing approximately 8000 pieces of Panchakaviya Diya per month, and she sells it for Rs 5/Diya in the brand name of "NEITHAL". The income from the Panchakaviya diya/month is Rs 45000/month.

This best practice adopted by Mrs.Dhanasekari, who is a resilient woman, not only takes control of her life but also lends a helping hand to promote organic and carbon-free green Puducherry by contributing productivity to the country, which promotes globalization for future generations.



Case study: Puducherry Millet Shakti–Evolution of alternative to junk Food & Food for the future

(Mrs.Valliammai W/o Murugaiyan)

Basic Details:

Women entrepreneurs like Mrs.Valliamai W/o Murugaiyan, Odavely PLF, Ariyankuppam Block bringing about a steady and silent change in the health sector with millet-based products. While organic products, food especially, are currently ruling the roost worldwide, millet Products are steadily becoming the next heath conscious substitute to this scientific world.

Mrs.Valliamai is involved in the production of traditional and rich heritage food from India merely preserving the rich culinary heritage of the state, this culinary movement has also paved the way for her financial independence. She entered into women's SHG in August 2010 and availed CIF loan of Rs 50,0000& bank credit linkage. Through the Block Development Office, Ariyankuppam, and PSRLM she underwent training at KVK and CFTRI, Thanjavur where she learned the production, processing, and packing of the varieties of millet-based value-added products.

Key achievements and impacts:

At present Mrs.Valliamai is involved in the production of 11 millet-based value-added products which she branded under the name "**NEITHAL"** and she earns Rs 20,000/month. Also, she got a platform to exhibit her products at Diwali Bazar conducted by BDO, Ariyankuppam, the Flower Show conducted By Dept. of Agriculture, and the IMPEXPO 2023" conducted by Aarupadai Veedu Medical College.The list of products are Multigrain Health Mix, Sprouted Health Mix, ABC Malt, Ragi Malt, Ragi Idly Dosa Mix, Millet Idly Dosa Mix, Red Banana Malt, Adai Dosa Flour, Millet Pongal Mix, Millet Chapati Flour, Idly Podi etc.,

Total income of Mrs. Valliammai W/o Murugaiyan:

S. No.	Name of the Activities	Income/year
1	Production of millet-based Products	2,40,000

At the time when junk foods are ruling the entire world, there is a need for interesting, appetizing, and healthy alternatives to burgers, pizzas, and the like. Millet-based products could be a good option in this respect and women entrepreneurs like Mrs.Valiaamai in rural Pondicherry are capitalizing on this need by using their business acumen to make and sell them



VI. Priority Areas

Promotion of Rural Tourism:

- Positioning a eco- friendly tourist's destination centred on spiritual, wellness and a unique heritage by **NEITHAL** branding campaign. Developing Thirunallar village, which is nestled in the serene surroundings of the Cauvery delta, boasts a rich agricultural heritage and vibrant cultural traditions.

Sustainable waste management:

- Effective use of agricultural and livestock waste products into a useful material and makes Green Puducherry.

Infrastructure Facilities:

- Better access to institutional and physical infrastructures may be expected to lower the cost of acquiring transportation and transaction costs, and may enhance the potential returns from and the probability of involvement in non-farm activity.

Adoption of Innovative Technology:

- Use of modern and innovative technology for sustainable livelihoods.

Concentration on value added products:

- Most of the agricultural and Livestock products may be effectively converted into value added products that fetches the better process**.**

Credit facilitates:

- Concentration on start-up fund ad bank linkage facilities for expansion of non-farm livelihood activities.

VII. Way Forward – Strategy for Implementation

- Efforts are needed to identify appropriate and effective institutional vehicles for the development of non-farm sector policy and interventions for creating employment opportunities. In this context, the following policy interventions can be taken by the government.

Village Enterprises Model:

- Promotion of Village Enterprises Model by converging alliances between entrepreneurs and local government officials enabling sustainable growth.

Supply Chain Integration Model:

It is also vital to improve the marketing links between the village entrepreneurs and the larger business firms located in the towns/cities. Such strategic alliances or partnerships can contribute to the sustainability of small villages and tiny enterprises in rural areas.

Addressing Structural Issues:

- Other important considerations that need to be focused on may include human resource development, financial/credit facilities, research and development and women's participation with a view to making the activities self-sustaining in the changing competitive environment.

Infrastructure development Centre:

- One Stop Facility Centre is envisaged as a business facilitation-cum-incubation centre at the Block level to provide business development services to existing small-enterprises on a growth track. It will also support new enterprises that have the potential to grow.

Adoption of new techniques:

- Use of Artificial intelligence techniques, Robots in order to reduce the service of the man power initiatives. Robots can be effectively used for recycling of the waste. Digitalization and use of crypto currency may be encouraged for better growth of local economy.

The non-farm rural sector is increasingly playing an important role in the development of rural areas of India. Specifically, as agriculture's contribution to the economy is declining, the non-farm sector will need to become more and more a major provider of employment and income to many people in rural areas. However, it should be noted that the non-farm rural sector is not a substitute for employment in agriculture but rather as a supplementary measure.

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I. Introduction

Micro, Small, and Medium Enterprises (MSMEs) play a crucial role in the economic fabric of urban areas, serving as a backbone for job creation and innovation. In many cities, these enterprises account for a significant share of employment, particularly in the informal sector, which is characterized by unregistered and unregulated jobs. Informal employment encompasses a wide range of activities, from street vending to home-based production, often lacking access to social security and formal contracts.

As cities continue to grow and evolve, addressing the skilling needs of the MSME sector and informal employment becomes essential not only for individual livelihoods but also for fostering inclusive urban development and economic resilience. By investing in skill development, we can empower individuals, strengthen MSMEs, and ultimately enhance the overall productivity and sustainability of urban economies.

II. Current Situation

Overview of MSMEs and Informal Employment

Micro, Small, and Medium Enterprises (MSMEs) form a vital part of urban economies, contributing significantly to job creation, innovation, and economic growth. Despite their importance, many MSMEs operate in the informal sector, which encompasses a wide range of unregistered businesses and workers. This informal employment often lacks job security, benefits, and formal recognition, making it difficult for workers to access training and skill development opportunities.

Current skilling scenario

- There is a significant mismatch between the skills possessed by workers in the informal sector and the needs of MSMEs.
- Informal workers often have limited access to formal skilling programs due to financial constraints, time limitations, and a lack of awareness about available resources.
- The urban landscape often features a fragmented approach to skilling, with multiple stakeholders involved—government bodies, NGOs, and private organizations.
- Rapid technological changes are altering the landscape of work. Many informal workers are not equipped with the digital skills necessary to thrive in an increasingly tech-driven environment.

Current Initiatives and Responses

- Various government initiatives aim to promote skill development among MSME workers and informal employees. Programs often focus on vocational training, entrepreneurship, and digital literacy.
- Collaboration between the public and private sectors is becoming more common to enhance training opportunities. MSMEs are increasingly partnering with educational institutions to create tailored training programs that address specific industry needs.
- The rise of online learning platforms has provided new avenues for skill development. Many informal workers are beginning to access online courses that offer flexibility and affordability, although digital literacy remains a barrier for some.
- Local NGOs and community organizations are often at the forefront of skilling initiatives, providing tailored training that aligns with the specific needs of informal workers. These programs often emphasize hands-on experience and peer learning.

III. Challenges

The landscape of Micro, Small, and Medium Enterprises (MSMEs) and informal employment in urban areas is fraught with challenges, particularly in the context of skilling. These challenges can hinder economic growth, limit individual potential, and perpetuate cycles of poverty. Here are some of the key challenges:

Skill Mismatches

- Many workers in the informal sector lack the specific skills needed by MSMEs, leading to inefficiencies and low productivity.
- Rapid technological advancements and changing market demands require continuous upskilling, but many workers are unable to keep pace.

Limited Access to Training Programs

- Many informal workers cannot afford training costs.
- A lack of awareness about available training programs and resources makes it difficult for workers to seek help.
- Training programs may be located far from urban informal employment hubs, limiting participation.

Fragmented Training Ecosystem

- The involvement of multiple entities—government agencies, NGOs, and private organizations—often leads to a disjointed approach duplication of efforts creating gaps in service delivery.

Technological Barriers

- Many informal workers lack the digital skills required to access online training or adapt to new technologies in the workplace.

Socioeconomic Factors

- The instability associated with informal employment can make it challenging for workers to commit time to training, as they may prioritize immediate income over skill development.
- Discrimination and societal norms can limit opportunities for certain groups, particularly women and marginalized communities.

IV. Possible Solutions

Addressing the challenges faced by Micro, Small, and Medium Enterprises (MSMEs) and informal employment in urban areas requires a multifaceted approach. Here are some potential solutions to enhance skilling opportunities and improve outcomes for workers and businesses alike:

Tailored Training Programs

- Design training programs that are tailored to thespecific needs of local MSMEs, focusing on skills that align with current market demands.
- Implement flexible, modular training courses that allow workers to acquire skills incrementally, accommodating their varying schedules and commitments.

Enhanced Accessibility to Training

- Utilize mobile training units to reach workers in informal sectors, providing on-site training that reduces travel barriers.

Partnerships and Collaborations

- Foster collaborations between government agencies, private enterprises, and educational institutions to create a cohesive training ecosystem that shares resources and expertise.
- Engage local NGOs that understand community needs and can facilitate targeted training programs and outreach efforts.

Digital Literacy Initiatives

- Implement comprehensive digital literacy programs to equip informal workers with the necessary skills to navigate online training platforms and modern workplace technologies.
- Promote the use of online learning resources that offer flexible, affordable, and diverse courses to workers seeking to enhance their skills.

Policy and Regulatory Support

- Advocate for policies that specifically address the needs of MSMEs and informal workers, focusing on access to training, financial support, and social protections.
- Streamline the registration processes for MSMEs to encourage formalization, which can facilitate access to training programs and financial resources.

Financial Support and Incentives

- Offer financial incentives or subsidies to MSMEs that invest in the skilling of their employees, making training more affordable.

Promoting Entrepreneurship

- Incorporate entrepreneurship skills into training programs to empower workers to start their own businesses, enhancing job creation and economic resilience.

V. Best Practices

Implementing effective skilling initiatives for Micro, Small, and Medium Enterprises (MSMEs) and informal employment requires adopting best practices that have proven successful in various contexts. Here are some noteworthy examples:

Community-Based Training Programs

- Establish skill development centers within communities that offer training in high-demand sectors. These hubs can provide localized content tailored to the specific economic activities of the area.
- Encourage peer-to-peer learning and mentorship within the community, allowing experienced workers to share skills and knowledge with newcomers.

Collaboration with Educational Institutions

- Collaborate with vocational schools and universities to develop curricula that align with industry needs, ensuring that training is relevant and practical.

- Facilitate partnerships between MSMEs and educational institutions to create internship and apprenticeship opportunities, providing hands-on experience for students and a talent pipeline for businesses.

Utilization of Technology

- Implement online training platforms that offer accessible and flexible learning opportunities. Courses can be designed to accommodate varying skill levels and learning paces.
- Develop mobile applications that provide quick access to training resources, tutorials, and industry updates, especially for workers who may not have access to computers.

Recognition of Informal Skills

- Create frameworks that allow for the assessment and certification of skills acquired informally. This helps workers gain recognition and improves their employability.
- Collaborate with industry bodies to develop certification programs that validate skills relevant to the local job market.

Flexible Training Models

- Offer short, intensive workshops that focus on specific skills, allowing workers to learn quickly without long-term commitments.
- Schedule training sessions during evenings or weekends to accommodate the work schedules of informal workers.

VI. Priority Areas

Focusing on specific priority areas can significantly enhance the effectiveness of skilling initiatives for Micro, Small, and Medium Enterprises (MSMEs) and informal employment. Here are key priority areas to consider:

Digital Skills Development

- Equip workers with basic and advanced digital skills to help them navigate online platforms, use productivity software, and adapt to technological changes in their industries.
- Provide training on e-commerce platforms and digital marketing strategies to enable MSMEs to reach broader markets and improve sales.

Sector-Specific Skills Training

- Identify and prioritize skills that are in high demand within specific local industries, such as construction, hospitality, or textiles, to ensure training aligns with market needs.

- Develop certification programs for specific trades (e.g., carpentry, plumbing, and electrical work) to enhance workers' qualifications and employability.

Soft Skills Development

- Offer training that emphasizes soft skills, including teamwork, customer service, and effective communication, which are crucial for success in both MSMEs and informal settings.
- Prepare aspiring leaders within MSMEs with skills necessary for effective team management and decision-making.

Access and Equity in Skilling Opportunities

- Ensure that skilling programs specifically address the needs of underrepresented populations, including women, youth, and marginalized communities, promoting inclusivity.
- Create accessible training programs that accommodate different schedules and learning styles, including evening classes and online modules.

Integration of Health and Safety Training

- Provide training on health and safety standards to ensure that workers are aware of best practices, which can enhance productivity and reduce workplace accidents.
- Incorporate wellness initiatives that address mental health and work-life balance, contributing to a healthier workforce.

VII. Way Forward – Strategy for Implementation

To effectively implement skilling initiatives for Micro, Small, and Medium Enterprises (MSMEs) and informal employment in urban areas, a comprehensive strategy is essential. This strategy should focus on collaboration, accessibility, and sustainability. Here's a structured approach:

Needs Assessment and Market Analysis

- Assess the specific skills needed by MSMEs and informal workers in the local economy. Use surveys, focus groups, and industry consultations to gather data.
- Monitor industry trends and technological advancements to adapt training programs proactively, ensuring they remain relevant and effective.

Program Design and Development

- Design training modules that address identified skill gaps and are adaptable to various learning styles. Incorporate both technical and soft skills into the curriculum.

- Offer a mix of in-person, online, and hybrid training options to accommodate the diverse needs of informal workers and MSME employees.

Financial Support and Incentives

- Establish grants, subsidies, or low-interest loans for MSMEs to invest in employee training. Encourage investment in skill development through tax incentives.
- Develop micro-financing schemes to help informal workers access funds for training-related expenses, such as materials or transportation.

Monitoring and Evaluation

- Define clear metrics to assess the effectiveness of training programs, including participant feedback, employment outcomes, and business growth indicators.
- Implement regular reviews and adjustments based on evaluation findings to enhance program quality and relevance.

Long-Term Sustainability

- Train local trainers and facilitators to ensure knowledge transfer and sustainability of training programs within communities.
- Create networks for program alumni to foster connections, mentorship opportunities, and continued skill development.

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I. Introduction

The robust incentive policies of Government of India and their initiative towards streamlining the procedures for getting approval for installation of RE generating plants by reducing administrative hurdles, promoting ease of business has caused rapid growth of Green economy across the nation. The UT of Puducherry has benefited out of these initiatives, by unleashing the full potential of solar installations in the region and its transition towards clean energy in the future.

Given the geographical topology and the landscape, all the regions of the UT of Puducherry have abundant potential for harnessing solar energy by providing solar power plants in the vacant lands and in the roof tops of residential as well as other buildings and thus this administration is committed to change the UT of Puducherry into a sustainable energy landscape.

The employment opportunities due to the development of renewable energy are abundant in the region. The task of developing the skilled, unskilled workforce required for installing rooftop solar energy system in the UT of Puducherry will be undertaken earnestly

II. Current Situation

- Under National Solar Mission Program of Government of India with the enabling regulatory framework, the Government of Puducherry has effectively implemented grid interactive rooftop solar power plant with Net metering provisions, across different consumers viz., Industries, Commercial establishments, Residential households etc. The total installed capacity of grid interactive solar power plant in the UT of Puducherry is around 57.0 MW.
- Presently, the PM Surya Ghar Muft Bijli Yojana (PMSMBY) is being implemented effectively in the UT of Puducherry, with the target to cover six thousand households by 2026. The targeted installed capacity is around 20 MW. Similarly, all the Government buildings in the UT of Puducherry with a total capacity of 27 MW will also be solarized. The Government of Puducherry is committed to meet 50% of the total power requirement of the UT of Puducherry by the year 2030 through renewable energy sources.

III. Challenges

- Need for dedicated personnel and a Project monitoring unit for implementation of the Roof top solar Scheme.
- Need for proactive Government policies, adaptable technology solutions, robust financing mechanisms and active community involvement.
- Limited land availability for deploying large scale solar power plants.

- Technology challenges in grid management with solar power integration, due to its variation in generation influenced by weather conditions.
- Inadequate skilled workforce in solar energy sector.
- Lack of community awareness on sustainable energy and its benefits.
- Addressing policy gaps and challenges in skilling for the renewable energy sector is crucial for ensuring a sustainable transition to a green economy. Here are some key issues:

1. Inadequate Training Infrastructure

Limited Access:

- Many State/UT's lack training facilities or programs focused on renewable energy technologies.

Absence of/Outdated Curricula:

- Existing programs often don't align with current industry needs, focusing more on traditional energy sources. Also, it is to be noted that renewable energy related subjects are not part of the curriculum in Engineering and related Under-Graduate Programmes.

2. Lack of Industry Collaboration

Disconnection between Education and Industry:

- Insufficient partnerships between educational institutions and renewable energy companies result in skill mismatches.

Absence of Industry Standards:

- Without standardized training and certification, it is challenging to ensure a consistent level of competency among workers.

3. Awareness and Accessibility

Low Awareness of Opportunities:

- Potential workers are not aware of career opportunities in the renewable energy sector or the skills required.

Geographical Disparities:

- Opportunities are concentrated in specific regions, leaving rural areas or developing regions underserved.

4. Resistance to Change

Cultural Barriers:

- Existing workforce may be hesitant to transition from traditional energy roles to renewables, necessitating retraining and up skilling.

Perceived Job Security:

- Concerns about job stability in a rapidly evolving sector deter individuals from pursuing training in renewables.

5. Technological Advancements

Rapid Change:

- The pace of technological advancement in renewable energy outstrip training efforts, making it difficult to keep curricula updated.

Emerging Technologies:

- Skills related to new technologies (e.g., energy storage, smart grids) are often lagging behind demand.

6. Measurement and Evaluation

Lack of Metrics:

- There is often no standardized way to measure the effectiveness of training programs, making it difficult to assess and improve them.

Difficulties in Tracking Employment Outcomes:

- Ensuring that training leads to job placements in the renewable sector is often not monitored.

IV. Possible Solutions

- Introducing supportive Government policies with an enabling Regulatory framework, promoting ease of business for setting up of grid interactive solar power project, curriculum in the Engineering and ITI's for skill development within the UT of Puducherry.
- Creating grass root level awareness upon importance and benefits of developing sustainable solar energy system through Government supported campaigns, workshops etc.
- Upgrading the Grid infrastructure and improving Grid management strategies viz., using advanced forecasting technologies, exploring energy storage solutions & implementing smart grid technologies, for ensuring enhanced supply of solar energy into the grid.

- Instituting a forum to address the technology challenges such as improving energy storage system with solar generation, grid management solutions and sharing of best practices in the sector through a strong institutional framework.
- The Government in partnership with private players in solar industry and Educational Institutions such as Engineering Colleges, ITIs, Polytechnics etc., may impart continuing training/ education, on job training to all the students and refresher training to all the workers in RE sector for updating their skills as per industry requirements.
- Setting up a platform for sharing expertise, information, as well as institutional mechanisms for collaboration with expert Institutes outside the state.
- Engagement with communities can build support to adopt Renewable energy technologies and hence may provide the necessary impetus to job creation.
- Creating synergy between solar power and electric vehicles by establishing solar powered EV charging stations which would enhance generation of solar energy in the region and promote job opportunities.
- Creation of a robust database on the recent developments in RE sector world-wide, policies of Government, available incentive schemes, best practises in the industry, employment opportunities, availability of trained work force, training skills required etc., for the benefits of all stakeholders. Addressing the challenges in skilling for the green energy sector requires a multi-faceted approach. Here are potential solutions to tackle these challenges effectively:

1. Strengthening Education and Training Programs

Curriculum Development:

- Collaborate with industry stakeholders to create and continuously update curricula that reflect current technologies and practices in renewable energy.

Vocational Training:

- Establish vocational training programs focused on practical skills for various renewable energy technologies (solar, wind, etc.). It is suggested that the workforce need to be trained in all renewable energy sectors such as solar, wind, bio-fuels & bio-mass, tidal, etc. instead of training persons on one sector exclusively i.e. they may not be called as Surya Mitras/Vayu Mitras rather to be called as Urja Mitras.

2. Industry Partnerships

Apprenticeships and Internships:

- Promote partnerships between educational institutions and renewable energy companies to offer apprenticeships, internships, and hands-on training opportunities. The Renewable Energy sector should also be made part of PM Internship Programme.

Industry Advisory Boards:

- Form advisory boards comprising industry experts to guide educational institutions on skill requirements and trends.

3. Government Support and Funding

Incentives for Training Providers:

- Provide grants or tax incentives for institutions that offer renewable energy training programs.

Public-Private Partnerships:

- Foster collaborations between government, industry, and educational institutions to fund and implement skilling initiatives. The trained and certified persons may be utilized immediately for the implementation of Renewable Energy sector related Flagship Schemes such as PM-Surya Ghar Muft Bijli Yojana, Green National Hydrogen Mission, National Bio-Energy Programme, Solar Park Scheme etc.

4. Raising Awareness

Outreach Campaigns:

- Launch awareness campaigns to highlight career opportunities in the green energy sector and the skills required, targeting schools, communities, and underrepresented groups.

S**uccess Stories**:

- Share success stories of individuals who have transitioned into renewable energy careers to inspire others.

5. Flexible Learning Options

Online Courses and Certifications:

- Develop online training programs and certifications that are accessible to a wider audience, allowing for flexibility in learning.

Micro-Credentials:

- Offer short, focused training modules that allow individuals to gain specific skills quickly and can be stacked toward larger qualifications.

6. Lifelong Learning Initiatives

Continuous Professional Development:

- Encourage current workers in traditional energy sectors to engage in upskilling and reskilling programs to transition into renewables.

Support for Transitioning Workers:

- Provide resources and support for workers transitioning from fossil fuels to renewable energy, including counseling and training.

7. Standardization and Certification

National Standards for Training:

- Develop and implement national standards for renewable energy training to ensure consistency and quality across programs.

Certification Programs:

- Create recognized certification programs that validate skills and knowledge in renewable energy technologies.

8. Research and Innovation

Funding for R&D:

- Invest in research and development initiatives to explore new technologies and methods in the renewable sector, creating demand for skilled professionals.

Innovation Hubs:

- Establish innovation hubs or centers of excellence where students and professionals can collaborate on renewable energy projects.

9. Monitoring and Evaluation

Impact Assessment:

- Regularly assess the effectiveness of training programs and adjust based on industry needs and employment outcomes.

Feedback Mechanisms:

- Implement feedback loops from employers and graduates to continuously improve training offerings.

10. Inclusivity and Diversity

Targeted Programs:

- Develop training programs aimed at underrepresented groups in the energy sector, including women and minorities, to build a more diverse workforce.

Scholarships and Financial Aid:

- Offer scholarships and financial assistance to individuals pursuing education in renewable energy fields.

Implementing these solutions can help bridge the skills gap in the green energy sector, ensuring a well-prepared workforce capable of driving the transition to a sustainable future. It is pertinent to mention that the skilling should not only focus on training the shop floor, but also to train people as Energy Auditors, Battery Technology Experts, Clean Technology Researchers, and Sustainability Consultants/Analysts.

V. Best Practices

- In the UT of Puducherry, Solar Technician course was introduced in the last academic session at the Women's ITI, Vambakirapalayam wherein 25 girl students were trained for a period of One year. Now they have all completed the course and they are being deployed for providing technical support for the installation and commissioning of Roof Top Solar Plants under the PM Surya Ghar Muft Bijli Yojana.

VI. Priority Areas

- Support in setting up of rooftop solar PP with net metering arrangements.
- Due to non-availability of large parcels of land, this administration prioritise development of distributed solar generation plants with installed capacities less than 10 MW.
- Planning for development of green transmission corridor in advance for evacuation of solar power from the grid interactive ground mounted solar PP setup by the captive users/ developers within the UT of Puducherry.
- To Explore allocation of waste Government land to the developers/ captive users on concessional rate of leasing for setting up grid connected solar power plant.

- Conduct of capacity building programs for various stake holders, for improving their skills required for development of RE generation

VII. Way Forward – Strategy for Implementation

- Continued focus on technologies advancement, supportive policy by Government and innovative enabling business models will drive the growth of solar energy generation in UT of Puducherry.
- Provide additional subsidy to the household consumers for setting up of grid interactive solar PP under PM Surya Ghar Muft Bijli Yojana.
- Supporting Virtual Net Metering arrangement for consumers with limited land area at service locations.
- Exclusive Training Courses will be included in the Government owned, Autonomous and Private Engineering Colleges /Technical Institutions in the UT of Puducherry in the field of Renewable Energy to promote skill development in the UT.
- Necessary amendment will be made in the Industrial Policy of the Government of Puducherry to encourage RE entrepreneurship.
- A comprehensive policy statement of Government of Puducherry will be notified to address requirement of skilled man force for development of solar energy generation in the region.

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I. Introduction

Opportunities in Green Economy: A green economy is crucial for UT of Puducherry for reasons:

- **Environmental Protection**: Puducherry is vulnerable to climate change, sea-level rise, and environmental degradation. Invasion of salinity into the ground water/ water body resulted in rusting of building structures, reduced crop/ animal diversity, imbalance in the oral and physiological hygiene resulted in alarming medical emergency; Causing health hazards due to imbalance in the ecosystems (due improper pH value) results in which, A green economy promotes sustainable practices, reducing pollution and protecting natural resources.

- **Sustainable Development & waste reduction**: A green economy ensures economic growth while **conserving resources, reducing waste, and promoting eco-friendly practices,** aligning with Puducherry's sustainable development goals. Adi-dravidar welfare, revenue, agriculture, forests, industries, rural development, urban and other departments are key players for future development.

- **Job Creation and Entrepreneurship:** A green economy can create new job opportunities in sectors like renewable energy, sustainable tourism, and eco-friendly manufacturing, promoting entrepreneurship and local economic growth.

- **Climate Change Mitigation:** Puducherry can reduce its carbon footprint by transitioning to renewable energy sources, increasing energy efficiency, and promoting sustainable land use practices.

- **Improved Public Health**: A green economy can reduce air and water pollution, improving public health and quality of life for Puducherry's citizens. Greening activities certainly bring circular economy

- **Conservation of Biodiversity**: Puducherry is home to unique ecosystems and biodiversity. A green economy can help preserve and restore natural habitats, protecting the UT's ecological heritage.

- **Tourism/ Ecotourism Development**: A green economy can promote sustainable tourism, showcasing Puducherry's natural beauty, cultural heritage, and eco-friendly practices, enhancing the tourism industry. Urban and rural sprawl may contribute global status in ecological tourism.

- **Food Security& zero waste production**: By adopting sustainable agricultural practices, Puducherry can enhance food security, reduce chemical usage, and promote organic farming towards zero waste.

- **Water Conservation & watershed management**: Green economy approach can help in quality water harvesting in Puducherry & manage water resources efficiently, minimize sewage flow into sea and promoting water conservation practices at all stages from production to consumption.

- **Global Competitiveness**: Embracing a green economy can position Puducherry as a leader in sustainable development, attracting investments, and enhancing its global reputation.

- By transitioning to a green economy, Puducherry UT can ensure a sustainable, prosperous, and environmentally conscious future

II. Current Situation

- At present, there are no comprehensive policies or programs specifically focused on faceless communication for tourists in Puducherry. This gap results in insufficient information availability about tourist destinations, facilities, and programs, limiting the ability to attract and engage tourists effectively.

- The Govt. of India has implemented various policies and programs along with local innovations for the development of UT of Puducherry, focusing on sectors like agriculture, industry, tourism, rural development, environment social welfare and industry. Some key initiatives include:

- **Agriculture:** The government supports farmers with subsidies, irrigation facilities, and crop insurance schemes. Puducherry is a significant producer of bananas, flowers, tapioca, coconut, groundnut, and sugarcane. Integrated farming system is widely followed with cash crops.

- **Tourism:** The territory's tourism industry is boosted by its beautiful beaches, French architecture, churches, and temples. The government has taken steps to improve infrastructure and services to attract more visitors. Policing for safety and security, ecofriendly tourism and basic amenities are ensured.

- **Industry**: Puducherry has nine industrial estates with numerous small, medium, and large-scale units. The government offers incentives for entrepreneurs and investors to set up industries in the territory. Commercial production of many products and process are

- **Infrastructure Development**: Recent developments include the construction of a two-lane Road Over Bridge, expansion of the airport, and upgradation of ports.

- **Social Schemes:** The government has launched various social welfare programs for schools, universities and research institutions to promote innovation and initiatives for fishermen and farmers.

- These initiatives aim to promote economic growth, improve living standards, and enhance the overall quality of life along with sustainable environment in UT of Puducherry.

III. Challenges

- Union Territory of Puducherry, a unique place where terrestrial and marine ecosystem blended well for potential production and service process to support the components of the society. Administration creates such a situation for the progressive economic activities by **absorbing the factors of the Economic, Ecological, Cultural and theological value-need** which are essentially the backbone of all the activities. Yet all the biological and non-biological factors which are responsible for coexistence and economic growth of the environment are not in harmony as per the scientific management. Following are the ways and means hindering the progress of the society. (***Arranged on descending order based on the level of threat to the society***).

- **Conservation of Resources:** UT of Puducherry has **limited Natural Resources** *(Petrological, Pedological, Hydrological and meteorological resources, primary requirement for establishment of structures and also availability of qualified human resources at different age class and age gradation meant for functional process)* where its **reliance on virgin materials** for any production process highest and straight. **Export of refined knowledge and raw / processed products are higher** than their marginal returns like forex. Over-exploitation of Conventional Resources without analyzing the carrying capacity of them like minerals, fishes, human and others.

- **Waste Management:** Puducherry generates and receives from neighboring state a significant amount of waste, including solid and liquid wastes especially plastic, food waste, and construction debris. There should be known **sink and source of the waste** for better preventive and curative actions. **Characterization of the waste and their quantification** must be known for the regulators. **Missing link are wider to deal the waste into wealth** which required to be done by the producers either domestic or industrial wastes. **Public awareness is trifling** effective use of products/ process without generating them into waste which is ultimate focus of

the circular economy. **Medical tourism brings exotic diseases to the inmates** where scientific disposal required refinement at global level.

- **Promoting Sustainable Tourism:** UT of Puducherry's economy relies heavily up on tourism where tourists' serge in from neighboring states. Along with revenue they bring **heavy pressure on natural resources and crime** which is a concern for social harmony and living quality of inmates. Excessive inflow of tourists **reduces quality of environment by means of pollution, traffic, exotic diseases** etc. **Theological, culture based and medical tourism are overshadowed** by westernized tourism concept which is supported by **drugs, alcohol and other unlawful activities**. Mushrooming of some specific specialized industries like **hotel industry led to unemployment/ under-employment, higher demand in power, production of huge waste** and crisis on land resources.
- **Support on Local Economy:** Import of exotic products and services led to loss of local SMSE. By we loss the **Indigenous** and **Traditional Knowledge** (**ITK**) along with **local medicine, ethnic products** etc. **Migration workforce in search of job lead to crime and unrest in the society.** Loss of local economy by loss of entrepreneur, loss of ITK by which loss of biodiversity.
- **Impact of Climate Change:** Puducherry is **vulnerable to climate change impacts** like sea-level rise and extreme weather events. This resulted/ induced in **lowered fish catch, invasion of saline water into the ground water, zoonotic disease outburst at times, flood and drought on seasons, low agricultural production due to salinity**, etc. Higher consumption of **electricity** due to mushrooming of hotels to satisfy the need of tourists. Greater number of consumers in synchronized with poor / lower producers and almost negligible decomposition process in the society.
- **Improvement on Public Health:** Healthy society is the outcome of individual components of the society where each household must be healthy in physical, physiological and mental aspects.

IV. Possible Solutions

- Some solutions and actionable that can be adopted by stakeholders for effective development of UT of Puducherry:

Government:

- Develop a **Comprehensive Carrying Capacity-Based Development Plan** with clear goals and objectives linking with all departments in their **Production** based (Agriculture, Forest & Wildlife, Industries, Power etc.,), **Regulation** based (Police, Forest & Wildlife, Law,

Environment etc.,) and **Service Sector** based (Police, Forest & Wildlife, Law, Environment, Transport, Cooperative, Rural Development etc.,) to get sustainable development.

- **Increased & Enhanced Green Investment** for sustainable infrastructure, traditional healthcare, and scientific education.
- **Encourage Public-Private Partnerships (PPP)** for green economic growth. Rural Micro Finance Investment from urban natural resource demanders like industries, Business persons, MNC, resources suppliers like water, and house hold consumables required to invest compulsory at least 25 % of their invest as savings in the SHG micro finance banking which may be used as seed money with lowest interest rate to ensure quality products supply.
- **Implement effective waste management and environmental conservation measures** are part of every production and consumption activities in the urban and rural area where production will be allowed as per carrying capacity of the available resources and consumption will be allowed till its zero waste.

Citizens:

- **Participate in decision-making processes** through citizen engagement initiatives such as resources assessment and conservation processes like watershed management, greening and mitigation of climate change initiatives.
- **Adopt sustainable practices and reduce waste** in every production process either commercial and subsistence. **Circular economy is primary** in all the such initiatives.
- **Support local businesses and entrepreneurs** as a part of promoting local products and services.
- **Engage in volunteer work** for community development such as preservation of exhaustible (Air & water, Mineral, Genetic resources) & non-renewable (land, biodiversity) resources and conservation of potential resources in a sustainable way for better future.
- **Stay informed and raise awareness** about developmental issues by adopting quality discussions at different levels and different subjects at repeated intervals. Promoting larger awareness programs at multiple levels to innovate productive society. Innovative work form may be established to enable informed citizens in multiple spheres of the knowledge and technologies like food, service, science, technology, theology, medicine, nature, biodiversity, ecological balance and climate change etc.,

Private Sector:

- **Invest in sustainable industries and businesses** by collaboration with government for infrastructure development & sustainable circular economic processes.

- **Support skill development and vocational training** by not protecting their knowledge under patent law & global commercial.
- **Adopt eco-friendly practices and reduce carbon footprint** through green economic processes.

NGOs and Civil Society:

- **Advocate for policy changes and development initiatives** towards knowledge sharing and skill imparting to the society by implementation of independent community development projects at rural and urban area.
- **Support environmental conservation efforts** towards greening & water conservation by alleviating the use of synthetic polymers and monomers (eg. plastics) which are highly reactive to the natural biogeochemical cycles.
- **Facilitate citizen engagement and participation in knowledge imparting process** and community awareness process.

Educational Institutions:

- Integrate sustainable development and environmental education into curricula via conducting research and promoting innovation for development solutions. Sustainability will be part of curriculum.
- Provide skill development and vocational training by means of encouraged entrepreneurship and start-ups.
- Collaborate with industry and government for developmental initiatives in order to enhance the local economy towards global standard.

Tourism Industry:

- Promote sustainable tourism practices by supporting local businesses and communities in every walk of their production and consumption process.
- Develop eco-friendly tourist infrastructure with involved and encouraged way of cultural heritage preservation and theological promotion in the land of sages.
- Provide global training for tourism industry workers with the involvement of NGO, private etc, to ensure international standard of quality hospitality and natural ecosystem.
- By working together, these stakeholders can contribute to the holistic development of Puducherry UT, making it a model for sustainable growth and prosperity

V. Best Practices

- **Establishment of Bio-shield** by greening of Road, River, Coastal and Rail side with use of horticulture & domestic degradable waste as green leaf manure (curbing illumination, noise & other pollution along with rejuvenation of water and soil ecosystem).
- **Waste to Wealth** (waste to vegetable, waste to green wall, waste to green leaf manure, waste to soil binders etc.,) (recycling of liquid and solid waste including the plastic waste into better ecologically neutral products).
- **Adopted New & Renewable Energy** (solar energy, micro wind energy & wave energy) to reduce carbon footprint at the source of production.
- **Use of Modern Tools** (Aerial Photography & Remote Sensing, Artificial Intelligence, Drone, Internet of Things etc.,) for detection of soil fertility/productivity of soil, quantification of carbon and ecological foot print by effective use in Education, Health, Finance, Rural Development, Transport, Environment, Fishery/ Animal Welfare and allied administrative sectors and in their productive & conservative process as part of activities of circular economy.

VI. Priority Areas

Current trends and needs, here are some priority areas for the development of Puducherry UT in the future:

- **Ecologically Sustainable Tourism:** Develop eco-friendly tourism infrastructure, promote cultural heritage, and support local communities.
- **New & Renewable Energy:** Invest in solar, wind, and other renewable energy sources to reduce dependence on fossil fuels.
- **Sustainable Waste Management**: Implement effective waste reduction, recycling, and management systems.
- **Education and Skill Development:** Focus on vocational training, entrepreneurship, and innovation to enhance employability.
- **Healthcare**: Upgrade healthcare infrastructure, services, and access to quality medical care.
- **Infrastructure Development**: Improve roads, transportation, and connectivity to boost economic growth.

- **Environmental Conservation**: Protect and restore natural habitats, promote sustainable agriculture, and conserve water resources.

- **Disaster Resilience**: Enhance preparedness and response to natural disasters, such as cyclones and floods.

- **Digital Governance**: Implement digital technologies for efficient governance, service delivery, and citizen engagement.

- **Inclusive Growth**: Focus on social equity, inclusivity, and empowerment of marginalized communities.

- **Entrepreneurship and Start-ups**: Encourage innovation, provide support for start-ups, and foster an entrepreneurial ecosystem.

- **Cultural Preservation**: Protect and promote Puducherry's unique cultural heritage, including its French and Indian influences.

By prioritizing these areas, Puducherry UT can achieve sustainable development, improve quality of life, and become a model for other regions

VII. Way Forward – Strategy for Implementation

To achieve convergence of schemes for a circular economy in Puducherry UT, consider the following **New Technological Solutions:**

- **Digital Platform for Waste Management:** Develop a digital platform to connect waste generators, collectors, and recyclers, ensuring efficient waste management and promoting recycling.

- **Blockchain-based Supply Chain Management:** Utilize blockchain technology to create a transparent and traceable supply chain, encouraging sustainable sourcing and responsible consumption.

- **Internet of Things (IoT) Sensors:** Deploy IoT sensors to monitor waste generation, energy consumption, and water usage, enabling data-driven decision-making.

- **Artificial Intelligence (AI) for Predictive Maintenance**: Implement AI-powered predictive maintenance for infrastructure and equipment, reducing waste and promoting resource efficiency.

- **Geographic Information System (GIS) Mapping:** Create GIS maps to identify areas for waste reduction, resource optimization, and circular economy initiatives.

- **Mobile Apps for Citizen Engagement:** Develop mobile apps to educate citizens, encourage participation, and facilitate reporting of waste management issues. Movement of waste collection vehicles, quantum of waste generation, movement of medical waste and its scientific disposal etc may be monitored.

- **Big Data Analytics for Circular Economy Insights:** Leverage big data analytics to provide insights on waste generation, resource consumption, and circular economy performance. Geological, geographical, biological and non-biological factors are to be gathered for their practical usage. All departments and their requirement and usage in the past are to be gathered for future progress.

- **Digital Marketplaces for Circular Economy Products:** Establish digital marketplaces to promote products made from recycled materials, encouraging sustainable consumption. Localized products and services will be placed in the market by better growth of local economy

- **Virtual Reality (VR) for Education and Training**: Utilize VR to educate stakeholders, including citizens, businesses, and government officials, about circular economy principles and best practices. Many scientific and technological advancements required dissemination among the public in an effective manner.

- **Smart Forestry & Environmental activities:** Accurate and reliable forestry (management and administration of natural resources by technical and legal aspects) data can be obtained by means of continuous monitoring of forests using advanced technologies, which provides a major opportunity for the development of smart forestry.

- **Collaborative Robotics (Cobots) for Recycling:** Integrate cobots in recycling facilities to enhance efficiency, safety, and accuracy in sorting and processing recyclables. Marine and coral reef management is essential for sustainable blue economy where the cobots are to be used.

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Scope for convergence with other programs & schemes:

- **Innovative work forum towards scientific temper in the society:** UT of Puducherry is source of information/ knowledge where multi sourced experts are congregated in a small area. Their knowledge will be made available to all the public especially the young mind through series of talk, seminars, workshops and discussion forum on and off the days. Systematic aways of dissemination of knowledge by the experts and healthy discussion may bring better quality citizens with low/no investment.

- **Indigenous & Traditional Knowledge towards better quality life:** food safety and security, traditional local medicine, improved techniques in cyclic use of waste into products and process.

- **Novel use of domestic/ horticulture waste into Green & Greenleaf manure for urban plantation:** The domestic and agriculture / horticulture waste are to be used as manure in the urban plantation which reduces the burden of mass waste processing and expenditure to the municipality.

- **Urban Green Bio-shield** are to be created using the Horticulture and Agriculture residue converted into manures as by products in the city. Bio shield as barrier against noise, light and air pollution. Improved in the Aesthetic value of the urban area.

- **Use of local floral & fauna products towards drug de-addition:** there are plant and animal species which promote the happiness of human mind by producing Happiness Hormones like dopamine, oxytocin, serotonin etc.,

These technological solutions & convergence may help UT of Puducherry streamline circular economy initiatives, enhance stakeholder engagement and drive sustainable development in a circular passion.

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Feedback Note

Section 1: Officer Name and Details:

- Name : **Soma Sekhar Apparao Kotaru**
- Designation : I.A.S
- Batch : 2021
- Current Posting : Sub Collector (Revenue) South

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Creating enabling Ecosystem - focus on Tier 2, 3 cities – Manufacturing.

2. Policy Gaps and Challenges

- Requirement of land
- Long-pending land issues that froze usage of huge extent of land
- Huge delays in obtaining licenses
- Insufficient infrastructure
- Availability of trained human resources

3. Potential Solutions

- Implementation of Business Reforms Action Plan to the fullest
- Integration of all clearances for setting up of an industry under National Single Window System (NSWS) portal.
- Reducing Regulatory Compliances and removal of redundant laws
- Center-State/UT convergence of schemes

4. Best Practices

- Cluster based development in Tiruppur etc

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Feedback Note

Section 1: Officer Name and Details:

- Name : **M. Adharsh**
- Designation : Dy. Chief Electoral Officer
- Batch : PCS, 2015
- Current Posting :

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Creating enabling Ecosystem – focus on Tier 2.3 cities - Manufacturing

2. Policy Gaps and Challenges

- Availability of affordable land parcels in urban areas. This affects the rental housing market, burdening non-farm labour.
- Access to urban services. Repairmen, plumber, electricians, meal subscription services etc. Free availability of such services promote an urban ecosystem with good quality of life. Scope for involving local bodies, skill development departments.

3. Potential Solutions

- Freeing up land by removing government encumbrances such as land reforms, assigned lands from land titles wherever possible. Discouraging land parcels lying vacant by enforcing assessment and collection of vacant land tax by local bodies. Creation of land bank of all lands with any government departments, autonomous bodies, HRI lands. An empowered panel of officers should administer the land and ensure utilization.
- Access to urban services, local bodies (Both ULBs,& RLBs) run livelihood centers with databases with skilled/unskilled workers. This database should be expanded using skill development programmes. These database can also be de facto empanelled for small/minor contractual works by Government..

4. Best Practices

- Puducherry and Oulgaret Municipalities have common livelihood centers (CLCs) with a list of skilled professionals.

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Section 1: Officer Name and Details:

- Name : **Mohan Kumar D**
- Designation : Pondicherry Civil Services
- Batch : 2017
- Current Posting : Regional Administrator, Mahe

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Manufacturing in Tier 2 and Tier 3 Cities - Manufacturing

2. Policy Gaps and Challenges

The advent of Industrial Revolution 4.0 is changing the dynamics of manufacturing industries with the fusion of technologies ranging from the physical, digital to biological spheres. Traditionally the tier 2 and tier 3 cities are considered advantageous on the grounds of lower operational costs and availability untapped skilled and semi-skilled workers.

- "Manufacturing" is not anymore "job creation". The narrative on Manufacturing has to change from "job creation" to "competitive product production" by utilizing latest technology. Manufacturing has to be reimagined to produce higher quality products at optimal efficiency with agile manufacturing systems and practices.
- Skill development Schemes and incentives under various ministries such as Ministry of Commerce and Industries, Ministry of Information technology, Ministry of Labour and Employment, Ministry of Skill Development, Ministry of Rural Development. Ministry of Housing and Urban affairs is not co-ordinated.
- Benefits of Special Economic zones have already expired.

Administrative and Implementation Challenges:

- Lack of data and unified data. For eg: There is no dataset available regarding impact on business and investment and manufacturing practices in view of technology led job replacement/upskilling/reskilling.
- Global trade has a weakness of missing domestic supply chain and capital intensive-low wage (china model). Much literature is not available regarding the investment facilitation in tier 2 and tier 3 cities and capital intensive-low wage model for our democratic set up.
- Even though PPP has been enabling us to create road/port/other infrastructures in an efficient

way, the auditing/enforcement agencies has not been sensitized about the risk to be taken by government. Archaic approach by these agencies and the consequences leads to cautious decision making.

- Delay in land acquisition leads to delayed infrastructure project execution. Lack of Digitization survey records has been one of the major drawbacks.
- Even though various skill development schemes are run by various ministries, there is no proper co-ordination. The goals of these skilling programs are almost similar but they operate in different areas, sometimes with insufficient duration and curriculum to make them market ready. There is no data on the subsequent continuous employment of skilled persons under these schemes to see the effectiveness.

3. Potential Solutions

- Costal Economic Zone for Manufacturing with emphasis on Tier2& Tier 3 cities will have to be promoted on priority basis
- Capital intensive – technology intensive model prioritized for attracting global investments. Issues of employment generation may be resolved with introduction of Universal Basic income.
- Necessary datasets regarding investments, innovation, availability of skilled resources, employment, impact of technology needs to be created and validated to create optimum models for Tier 2 and Tier 3 cities.
- Setting up smart factories may be promoted with various incentives like production-based incentives, manufacturing practices-based incentives and technology based incentives.
- Gap in domestic supply chain needs to addressed by creating requisite digital and logistics infrastructure
- Digitalization of land records shall be completed and Land acquisition by private players in PPP model can be promoted to complete the projects on time.
- Audit dept/enforcing agencies shall be sensitized about uncertainty of outcomes and risks in decision making.
- Skill development schemes under various ministries shall be unified under one Ministry and monitoring mechanism for skilled candidates for next five year.
- Tier 2&3 cities may also be envisaged as pillars of Self Sufficient Manufacturing model considering fragile global situation.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **P.T. Rudra Goud**
- Designation : Director
- Batch : PCS-2000
- Current Posting : Director, Industries & Commerce

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Automation in Industries, a necessary evil.

2. Policy Gaps and Challenges

- There are few important factors driving automation- changed perception of job roles which makes it difficult to find manpower for certain roles, improved productivity, cost cutting & competition etc. Automation reduces labour costs and increases production efficiency, which in turn lowers the cost of goods / services.
- Automation in manufacturing and logistics will improve productivity and may potentially reduce employment opportunities in certain job roles. On the contrary, there may not be sufficient number of people willing to take certain job roles which drives for adoption of automation e.g. Farm mechanization, pesticide spraying drones. Similarly, some of the job roles may be occupationally hazardous e.g. polluting industries. In such cases, automation may help in improving occupational safety & reduce public health costs.
- When other countries start adopting automation, we can't be left behind. It may be difficult to compete when the other countries reduce the cost of production & logistics which may impact the export and import markets. The adoption of automation helps manufacturers stay competitive globally by further reducing costs and improving quality.
- Recently a video regarding automation in a port in a foreign country had gone viral in Social Media.(Ref:https://x.com/ShangguanJiewen/status/1840736962564559310?t=It33JhDY_bXVgR-r7tpNwg&s=08)
- In this kind of scenario, it is imperative that our country focuses on Automation including Robotics and Artificial Intelligence which may sooner or later impact the way manufacturing industries do production, handle logistics and the way service industries function

3. Potential Solutions

- In light of the changed scenario, there is a need to prepare a Roadmap for Industrial Automation and establish Centers of Excellence (CoEs) focused on industrial and home

Automation, Robotics, Artificial Intelligence and also train the manpower to handle automated machines, systems etc.

4. Best Practices

- In 2022, the government released a five-year plan calling for China to become a global leader in industrial automation.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **M. RAJU I.A.S.**
- Designation : Secretary to Government
- Batch : AGMU 2005
- Current Posting : Commissioner-cum-Secretary (Health)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Creating Enabling Ecosystem for Services- Focus on Tier 2, Tier 3 cities- Services - **Medical Tourism-** Potential of Promoting Medical Tourism in UT of Puducherry

2. Policy Gaps and Challenges

- No specific guidelines on Medical Tourism and role of Government in promoting Medical Tourism is available
- Medical Tourism to be given as equal importance like Spiritual Tourism, Destination Spots, etc.
- Leverages to the treating institutions
- Involving Government Sector in Medical Tourism and Economy Generation
- Role of Insurance Sectors in Developed Countries
- Availability of Stay Arrangments for medical tourists
- Transport and availability of International Airport

3. Potential Solutions

- A government portal to be developed exclusive for Medical tourism and packages of all hospitals to be declared including government and private
- Engaging Department of Health in the tourism Sector
- Promoting Medical Tourism similar to other tourism
- Arranging Stay guest houses for international Tourists for Medical Tourism alone.
- If International Airport is not feasible, road transport and ambulance systems to be in place
- Promoting air ambulances
- Special Budget to be announced for promoting the same

- Separate ward to be built for International Medical Tourist.
- Special privilege for medical tourists
- Government Institutions to be promoted and collection of charges to be permitted

4. Best Practices

- Medical Tourism is promoted in Private sector for minor surgeries and procedures especially for dental procedures and cosmetic procedures.

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Feedback Note

Section 1: Officer Name and Details:

- Name : Jayanta Kumar Ray, I.A.S
- Designation : Administrative Secretary
- Batch : AGMU:2011
- Current Posting : Secretary to Government (Information Technology)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Promoting Entrepreneurship, Employment and Skilling – Creating Enabling Ecosystem for Services.

2. **Policy Gaps and Challenges**

Entrepreneurship:

Tourism entrepreneurship faces several policy gaps and challenges. Regulatory fragmentation across regions creates confusion and compliance issues for businesses operating in multiple locations. There is insufficient support for start-ups, including limited grants and incentives tailored for the tourism sector. Entrepreneurs often struggle to access financing, hindering business growth. Inadequate infrastructure, such as poor transportation and digital connectivity, further restricts growth. Additionally, inconsistent policies at local, state, and national levels complicate operations and scalability for tourism ventures.

Skill Development:

Skill development programs frequently fail to align with industry needs, leading to a skills mismatch. Lack of integrated & holistic planning on skill development by adopting the Technology and Industry oriented programme. Since the Technology is evolving and implemented faster, the required skill development for each of them are not properly planned or guided. The admistrative plans need to be aligned with required skills for each projects in advance, so that the implementation of each technology will be readily available in market which will increase the employment at the right time.

3. Potential Solutions

Enhance Skill Development:

- Align training programs with industry needs, ensuring that courses and certifications meet the skills required for each roles for which industry institute partnership at every level is necessary.
- To utilize the local manpower resource at high end jobs, it is essential to prepare an integrated

guidance portal for public service which will focus on developing essential skills. Further, to provide proper technology guidance to each one, which provide "Right job at Right Time". This will ensure the citizens develop the required skills sets well in advance though proper guidance by Government.

Streamline Regulations:

Implement uniform policies and guidelines across regions to reduce compliance burden and create a more predictable compliance environment.

Increase Financial Support:

Develop targeted grants, subsidies, and low-interest loans specifically for tourism start-ups to foster innovation and growth.

Improve Infrastructure:

Invest in upgrading communication and digital infrastructure for connectivity and other essential infrastructure in tourist regions to support business operations (for digital nomads).

Facilitate Access to Funding:

Establish easier pathways for accessing credit and financing for tourism entrepreneurs, including government-backed loans and venture capital.

Standardize Labor Laws:

Create flexible yet protective labor regulations that accommodate the unique needs of the tourism sector, including gig and contract work arrangements. To overcome the difficulty posed in multiple registrations it is proposed for "One Registration One Register One Return (RRR)" for each establishment under labour laws**.**

4. Best Practices

- The Government is developing new emerging technology oriented "Puducherry Information & Communication Technology" (PICT) unit for skill development covering Internship programs. It is aimed to figure out the gaps and fulfill the required skills essential for the youth to achieve their carrier growth as bridge course. The current PICT work in progress and it will be futuristic idea and best practice can be in near future for all others.
- In Tourism sector Government of Puducherry has successfully implemented comprehensive guidelines for Adventure & Water Sports and Bed and Breakfast/Homestay. Under the Adventure & Water Sports guidelines, 44 boat operators were granted operational permissions, ensuring safety and standardization in this growing segment. Similarly, the guidelines for Bed and Breakfast/Homestay led to the approval of 36 operators, promoting regulated and quality

accommodations. These initiatives exemplify effective regulation and support in fostering sustainable tourism entrepreneurship, ensuring compliance with standards while enhancing the overall visitor experience.

- Registration/ License/Renewal/Approval under labour laws for Shops and Establishments etc., have been made online with minimum human interface.
- All new infrastructure projects above Rs.5 Cr are approved only after the details are uploaded in the PM Gati Shakti National Master Plan Portal ensuring integrated and holistic approach towards infrastructure development.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : YASAM LAKSHMI NARAYANA REDDY
- Designation : ADDITIONAL SECRETARY TO GOVERNMENT (LABOUR)
- Batch :
- Current Posting : LABOUR COMMISSIONER

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Promoting Entrepreneurship, Employment and Skilling – Creating Enabling Ecosystem for Services.

2. **Policy Gaps and Challenges**

- Multiple registration under different Labour Laws.
- Non-availability of skilled work force.

3. Potential Solutions

To overcome the difficulty posed in multiple registrations it is proposed for One **Registration One Register One Return (RRR) for** each establishment under labour laws**.**

Under the **Pradhan Mantri Kaushal Vikas Yojana** (**PMKVY),** skilling of workforce to cater to the service sector needs to be accelerated and year wise target to be strictly complied with. Likewise, Recognition of Prior Learning (RPL) for recognition of existing skills of all the persons in the Union Territory of Puducherry in various job roles available in the service sector should also be accelerated. To have a skill bank, with data of persons having skill sets in various job roles.

4. Best Practices

Registration/ License/Renewal/Approval under labour laws for Shops and Establishments etc., have been made online with minimum human interface.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **Dr. A.S. Sivakumar**
- Designation : Joint Secretary to Government (Transport)
- Batch : UPSC 2002 (Puducherry Civil Service)
- Current Posting : Transport Commissioner, Puducherry

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Services (Transport Service to Public)

2. Policy Gaps and Challenges

Parking:

Puducherry UT has to come up with parking policy in urban areas with the coordination Locsl Bodies& PWD. This is very important given the situation that increase in tourist visit of more tourist, especially in week ends & resulting of huge Traffic to public. Addressing the challenges of limited parking spaces in urban areas, ensuring efficient use of existing facilities, and promoting alternatives like park-and-ride will have to be taken up to ease out the vehicle being stranded everywhere in the roadsides.

ONDC (**Open Network for Digital Commerce**):

This initiative aims to facilitate digital transactions in public transport, enhancing accessibility and integration of services. At present thiis is a grey area.

PIS (Passenger Information System):

Implementing real-time information systems to keep passengers informed about schedules, delays, and routes, improving overall user experience. This technological intervention is very much felt.

AFCS (Automatic Fare Collection System):

Introducing automated systems for fare collection to streamline payments and reduce waiting times at stations. This project has to be implemented.

Road Safety:

Fostering inter-departmental coordination to implement recommendations from the Supreme Court Committee on Road Safety, focusing on measures to enhance safety for all road users.

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Feedback Note

Lack of Manpower:

Addressing the shortage of personnel in transport and traffic police, which affects enforcement and management of public transport systems, leading to inefficiencies

E V Policy:

The draft EV Policy had been prepared and submitted to the Government of approval.

Traffic Policy:

Although there is a Transport Policy to address traffic comprehensively, there is a lacunae in area specific Traffic Policy in the UT of Puducherry to deal with location specific intervention:

3. Potential Solutions

The Transport Department of Puducherry is focused on enhancing public transport infrastructure and inter-connectivity within and beyond the state. This includes issuing permits for stage carriage buses, all-India tour buses, taxis, and autos. The Government operates through entities like Puducherry Road Transport Corporation- PRTC, Tamil Nadu Road Transport- TNSTC corporations and also other state corporation buses by issuing permits and inter-state counter sign permits. Apart from these, the department issues permits to private bus operators to provide public transport services. More than 600 Stage Carriage buses and more than 1000 All India Tourist buses are under service to Puducherry Govt.

GPS Monitoring:

All public transport vehicles are equipped with GPS, allowing for real-time tracking from a central monitoring center. The data captured in the Monitoring Center will be planned to provide Passenger Information Systems (PIS) within the buses, Upcoming Smart Bus Stops & Bus Stands. Further, APP will be provided for trip planning by passengers with arrival/ departure times. In future, the facility will be expanded across various modes of travel through online National Mobility Services. As of now it is through smart cards. This card is called as NCMC- National Common Mobility Card. This will be done in PRTC with upcoming project- ITS- Intelligence Transport System funded by MoRTH**.**

Urban Mobility Improvement:

Efforts are underway to enhance Intermediary Public Transport (IPT) through online Applications facilitated by Open Network Digital Commerce ONDC platform. Under Rent a motor Bike Scheme 2 Wheelers are given with permits for personal experience of visiting tourists**.**

Fleet Expansion:

The Puducherry Road Transport Corporation (PRTC) recently introduced five shuttle buses

for tourists and added 38 new buses while refurbishing 15 older ones. Further addition of 20 more AC & Non AC diesel buses will be procured in this Financial year**.**

Pollution Reduction:

To address environmental concerns, the department plans to introduce electric buses, starting with 25 electric 9-meter buses under the Smart City Scheme and 75 more under the PM e- Bus Sewa Scheme. Apart from pollution abatement, this will improve both urban and suburban bus services**.**

Tourist Accessibility:

38 new e- rickshaws purchased under Smart City Scheme will operate in heritage areas to improve access to tourist attractions**.**

Traffic Policy:

Transport Department is coordinating with Traffic Police wing to devise suitable traffic policy very soon. This policy will address combating various road violations using electronic devices.

Manpower:

There is an acute shortage of law enforcing officials in transport and traffic cops in traffic police. Govt has notified for filling up of Asst Motor Vehicle Inspectors and initiating process for more police constables

4. Best Practices

Vehicle Monitoring Center in Puducherry

The Transport Department of Puducherry has established a pioneering Vehicle Monitoring Center equipped with GPS devices under the "Nirbhaya" Framework Scheme. This initiative focuses on enhancing the safety of women and children in public transport, particularly through the Emergency Response Portal.

Key Features:

Safety Monitoring:

Real-time tracking of public transport vehicles, including ambulances, to ensure passenger safety.

Data Utilization:

The data generated can support the development of an Intelligent Passenger Information System (IPIS), enabling efficient trip planning and seamless connections between multimodal transport systems.

Operational Efficiency:

Monitoring of government corporation buses for improved operational metrics such as:

Fuel Management:

Tracking fuel consumption to optimize costs**.**

Route Deviations:

Ensuring adherence to planned routes for reliability**.**

Speed Violations:

Promoting safe driving practices**.**

Driver Behavior:

Monitoring performance to enhance safety and service quality. This comprehensive approach not only enhances passenger safety but also aims to improve the overall efficiency of public transport in Puducherry. These initiatives reflect the department's commitment to improve public transport service and sustainability in Puducherry.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : L. Mohamed Mansoor
- Designation : Additional Secretary
- Batch : 1998
- Current Posting : Commissioner (State Tax)/Director (Port)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Creating enabling Ecosystem – focus on Tier 2.3 cities (1) Manufacturing and (2) Services.

2. **Policy Gaps and Challenges**

Public-Private Partnership for Infrastructural projects

In a small Union Territory like Puducherry, land is a big constraint since land is the basis for any infrastructure development. Major infrastructure projects such as Airports, Ports, Special Economic Zones, Convention Centers, Yacht Marinas, Cruise Terminals, etc. require huge investments and availability of lands. Under the PPP model development, Union Territory like Puducherry, at present, can leverage its lease hold right of land to a private developer to develop infrastructure projects only for a period of 19 years and the PPP model of development is mainly a Build-operate-transfer (BOT) model of development where the selected private entity, the concessionaire is allowed to invest in the land belonging to the Government (Union Territory) and is expected to commence his commercial operations from the project, repay the creditors for the loan availed and pay the Government a concession fee and certain percentage of the Gross revenue accruing from the commercial operations.

During my tenure as Director-Tourism and Director-Ports, I have observed that the limitation imposed by the 19 years lease period is the hindrance for private entrepreneurs for investing in PPP projects in the Union Territory of Puducherry. Because, any private investor who manages to secure a PPP project will definitely go for a Debt-Equity mix to source capital funds for the projects and only if the pay-back period and internal rate of return (IRR) and a markup profit margin is available for the investment, will they take up capital intensive projects. The example of Karaikal Port Pvt. Ltd. is a case in point where the concession agreement is for a period of 30 years and it is an operational port with private investment.

3. Potential Solutions

There should be a provision for extending the land lease possession where at least 30 years or more for PPP projects to enable private investor to recoup their investments and make some profits.

4. Best Practices

The existing Karaikal Port is a classic example and other infra projects such as Karaikal Airport can be done this way.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **SHIVRAJ MEENA**
- Designation : DIRECTOR
- Batch : 2015-PCS
- Current Posting : Director (Information Technology)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Services - Promoting Skill Development

2. Policy Gaps and Challenges

Lack of integrated & holistic planning on skill development by adopting the Technology and Industry oriented programme. Since the Technology is evolving and implemented faster, the required skill development for each of them are not properly planned or guided. The admistrative plans need to be aligned with required skills for each projects in advance, so that the implementation of each technology will be readily available in market which will increase the employment at the right time.3. Potential Solutions

3. Potential Solutions

To utilize the local resources at high level, it is essential to prepare an integrated guidance portal for public service which will focus on developing essential skills in parallel to the education structure and provide proper technology guidance to each one, which provide "Right job at Right Time duration". This will ensure the candidates develop the required skills sets well in advance though proper guidance by government guidance structure.

4. Best Practices

The Directorate of Information Technology, Puducherry under developing new emerging technology oriented "Puducherry Information & Communication Technology" unit for skill development covering Internship programs. It is aimed to figure out the gaps and fulfill the required skills essential for the youth to achieve their carrier growth. The current PICT work in progress and it will be futuristic idea and best practice can be in near future for all others.

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Feedback Note

Section 1: Officer Name and Details:

- Name : M. Mathew Francis
- Designation : Deputy Collector-cum-Deputy Commissioner (Excise)
- Batch : 2023
- Current Posting : Deputy Commissioner (Excise), Puducherry

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Creating enabling ecosystem for services

2. **Policy Gaps and Challenges**

- Lack of infrastructure hinders the delivery of e-government services by the government departments and agencies in providing the e-services.
- Lack of infrastructure obstructs the demand for e-government services by impeding citizens to access e-government services
- Unreliable infrastructure can degrade the performance of e-government systems, thereby, making it difficult to for users to obtain higher-level e-government services.
- Lack of and/or limited access to electronic devices for the citizens acts as a significant barrier to the implementation and utilisation of e-government services.
- Lack of government funding for e-government projects and initiatives including IT infrastructure and capacity development.
- Many e-services projects are not designed as citizen-centric or user-centric, without considering all the needs and expectations of the users of the system.

3. Potential Solutions

- Need to have a dedicated budget to fund the deployment of infrastructure and e-government projects
- Engagement of skilled and technical manpower by the government departments to drive e-government services;
- Developing user-friendly and citizen-centric e-services environment.
- Human resources capacity development in IT enabled services.

4. Best Practices

- In Government of Puducherry under the Department of Revenue and Disaster Management, many e-services are promptly provided like :
- Issue of online community certificates under e-district portal through various Taluk offices is done catering to thousands of applicants who seek admissions for higher education and employment etc.
- Issue of online permits for desilting of notified water bodies like ponds and lakes in Puducherry through single window portal.
- In the Office of the Deputy Commissioner (Excise) of all regions in the UT of Puducherry, all the services like issue of permits, renewal of licenses, etc. are done online with integration to online payment gateways.
- Though there are certain limitations in the aforesaid service delivery environments, there is always room for improvement and measures are taken to periodically update and upgrade the the systems to match the changing needs of the department and the users.

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Feedback Note

Section 1: Officer Name and Details:

- Name : **S.SIVAKUMAR**
- Designation : Under Secretary
- Batch : Pondicherry Civil Service
- Current Posting : Under Secretary (Finance), Puducherry
- Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Creating Enabling Ecosystem for services – Focus of Tier 2, Tier 3 cities - Services

2. Policy Gaps and Challenges

Developing Tier 2 and Tier 3 cities will help India to see a uniform growth and also can prevent unnecessary movement of skilled people from Tier 2, Tier 3 cities to the Tier 1 cities. To achieve this, lack of rail networks connecting the State Governments/ U.T. Governments to be addressed. The local youth are found lacking quality education on par with IITs and NITs. State/ UT governments' financial crunch may hamper the development of IT parks effectively.

3. Potential Solutions

To address the problems faced by Tier 2 and Tier 3 cities, the following can be considered:

- 100% funding from Union Government for construction and maintenance of IT parks in Tier 2 and Tier 3 cities
- Expediting the pending road and rail connectivity of Tier 2 and Tier 3 cities
- 100% funding for constructing of flyovers in Tier 2 and Tier 3 cities to ease congestion and to attract service sector companies
- 100% funding for metro rail connectivity inside Tier 2 and Tier 3 cities, connecting the proposed IT parks and other infrastructure like airport, railways station etc
- 100% funding to the local bodies of the Tier 2 and Tier 3 cities to develop the municipal roads and drains
- 100% funding to local bodies to build schemes to prevent flooding in streets and buildings during a vigorous monsoon
- 100% funding to State/UT Governments to upscale the technical /educational institutions of

Tier 2 and Tier 3 cities on par with IITs and NITs

- Ensuring a functional airport atleast within 150 kms of every Tier 2, Tier 3 cities

4. Best Practices

Development of Digital Infrastructure under Bharat Net Project can be sustained and upscaled to reach every Tier 2, Tier 3 cities and villages and the cost of Internet connecting facilities to be kept at minimum, to develop the service sector companies

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : Muralidharan
- Designation : Director
- Batch :
- Current Posting : Director (Tourism)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Services -Entrepreneurship

2. **Policy Gaps and Challenges**

Tourism entrepreneurship faces several policy gaps and challenges. Regulatory fragmentation across regions creates confusion and compliance issues for businesses operating in multiple locations. There is insufficient support for start-ups, including limited grants and incentives tailored for the tourism sector. Entrepreneurs often struggle to access financing, hindering business growth. Skill development programs frequently fail to align with industry needs, leading to a skills mismatch. Inadequate infrastructure, such as poor transportation and digital connectivity, further restricts growth. Additionally, inconsistent policies at local, state, and national levels complicate operations and scalability for tourism ventures.

3. Potential Solutions

- Streamline Regulations: Implement uniform policies and guidelines across regions to reduce compliance complexity and create a more predictable business environment.
- Increase Financial Support: Develop targeted grants, subsidies, and low-interest loans specifically for tourism start-ups to foster innovation and growth.
- Enhance Skill Development: Align training programs with industry needs, ensuring that courses and certifications meet the skills required for tourism roles.
- Improve Infrastructure: Invest in upgrading transportation, digital connectivity, and other essential infrastructure in tourist regions to support business operations.
- Facilitate Access to Funding: Establish easier pathways for accessing credit and financing for tourism entrepreneurs, including government-backed loans and venture capital.
- Standardize Labor Laws: Create flexible yet protective labor regulations that accommodate the unique needs of the tourism sector, including gig and contract work arrangements.

4. Best Practices

The Department of Tourism, Government of Puducherry has successfully implemented comprehensive guidelines for Adventure & Water Sports and Bed and Breakfast/Homestay sectors. Under the Adventure & Water Sports guidelines, 44 boat operators were granted operational permissions, ensuring safety and standardization in this growing segment. Similarly, the guidelines for Bed and Breakfast/Homestay led to the approval of 36 operators, promoting regulated and quality accommodations. These initiatives exemplify effective regulation and support in fostering sustainable tourism entrepreneurship, ensuring compliance with standards while enhancing the overall visitor experience.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **K. Veeraselvam**
- Designation : Chief Town Planner
- Batch :
- Current Posting : Town and Country Planning Department

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Creating enabling Ecosystem for services –focus on Tier 2, 3 cities - Services

2. Policy Gaps and Challenges

There is no provision in the Town and Country Planning Act and Rules, for Land Pooling scheme / Town Planning scheme. Therefore the successful implementation of the Master Plan could not be carried out in the U.T. of Puducherry

3. Potential Solutions

Necessary amendment to be brought in the Town and Country Planning Act, 1969 for Land Pooling scheme / Town Planning scheme, for which necessary proposal submitted to the Government for bringing necessary amendments.

4. Best Practices

- Entire U.T. of Puducherry was declared as the Planning Area.
- Master Plan for entire Puducherry has been notified during the year 2019.
- Master Plans for entire Karaikal, Mahe and Yanam region are being prepared and will be completed within this financial year.
- Online Building Permission system was implemented for the entire U.T. of Puducherry.
- Mixed Land Uses are proposed along the main corridors.
- Necessary lands earmarked in the Master Plans for the Industrial development

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : V. Gopi Swaminathan
- Designation : State Informatics Officer, NIC, Puducherry
- Batch :
- Current Posting :

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Pillar Creating Enabling Eco-system –focus on tier 2,3 cities – Sub Theme – Services.

2. **Policy Gaps and Challenges**

In a digital era, we are still handling the paper based beneficiary system. This paper based beneficiary system involves drudgery paper works, inordinate delay and inaccurate data available with the departments. Due to this, there is a gap between the aims and objectives of the Government with Benefits intended to reach the eligible beneficiaries. Monitoring the progress as well as tracking the status of the implementation of various schemes are other challenges.

On the other hand, due to the evolving technical trends and redefining the scope of e-governance, there is lot of area of improvements which can be done for providing the services thro' Digital methods**.** Digital infrastructure enables access to online job markets, remote work opportunities, and freelancing platforms, expanding employment options beyond geographical constraints. For many, jobs in the digital economy are only accessible through strong digital connectivity.

3. Potential Solutions

It is the improvement of infrastructure to help in promoting the services. A paperless beneficiary system will evolve like an ecosystem in identifying the requirements, physical achievements made and road ahead.

Welfare schemes can integrate advanced digital tools, such as AI and data analytics, to assess the existing skills of individuals and map them to current market needs. These systems can recommend personalized training programs that align with beneficiaries' skill gaps, ensuring that training efforts are targeted and effective.

A paper less beneficiary system is always possible by integrating the e-signed certificates and blockchained data. These are the two basic meta data to find the authenticity of the beneficiary data to identify the eligibility of a person for enrollment of schemes. If proper automation is enforced, the system can interact with the beneficiary for the enrollment of the scheme and also identify eligible beneficiaries in advance without any requirement of papers from the applicants.

4. Best Practices

- Integration of skills with qualifications, schemes beneficiary's details.
- Notification and updation of Live register of Births/Deaths from local bodies to a centralized portal to auto-include and auto-exclude.Notification of added qualifications to the skill portal. This will save lot of time and money.
- Digital certificate for skills upgradations as well as qualifications and integration with State Resident Hub.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **Ashish Madhaorao More**
- Designation : Commissioner-Cum-Secretary
- Batch : 2005
- Current Posting : Commissioner-Cum-Secretary (Finance / Revenue / Ports)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Creating Enabling Ecosystem for Services – Focus on Tier 2, Tier 3 cities - Services

2. Policy Gaps and Challenges

- To make India USD 5 trillion economy by 2025, it is very important that all States and Union Territories strive together to work hard and enhance its capabilities for creating an ecosystem which provides ample opportunities for the entrepreneurs in Tier 2 and Tier 3 cities to grow. For making this growth possible it is necessary to pay not just adequate, but abundant attention to the Services sector in these cities and towns which have these potentials to grow.
- I want to highlight here the potential of Tourism sector in the context of Puducherry. This is one of the most important Union Territories of India which has a long history right from the time of Megalithic Age to early medieval and further to colonial and modern age. One can see the excavated archaeological sites like Arikamedu, the Siddha Circuit of Temples of sages, French quarters of the colonial period and the modern times post-independence of the territory.
- As per 2011 Census, population of Puducherry is 12.47 lakhs which currently might have increased to approximately 16 lakhs. The youth population (female as well as male) is the biggest potential of this place.
- Currently, there is tourism activity in this place, but it is of a limited nature which requires much more advancement. Here, the beaches are small, but clean. This place provides many homestays and low to medium range service hotels. Every weekend there is a large crowd of youngsters / families who come to Puducherry for relaxation and to spend quality time near the promenade, beaches, some adventure activities, Aurobindo Ashram, Auroville, archaeological sites / historical places / buildings / museum / Resto-pubs and enjoy South Indian and Franco-Tamil culinary delights etc.
- This potential is required to be tapped and further enhanced by adding quality services to the public at large. Puducherry is at a distance of 160 km from Chennai and 315 km from

Bangalore. Currently, most of the tourists are coming to these metro cities and then travelling to Puducherry by road. Even though the road connectivity is there, it is very much important that it must be having air connectivity with the rest of Indian cities. Also, there is a need to have direct rail connectivity with Bangalore and Chennai with trains like Vande Bharat or Shatabdi, etc. This will help in increasing the footfall of the tourists.

- The Tourism Department and Puducherry Tourism Development Corporation (PTDC) are required to be adequately strengthened with skilled manpower, supported by budgetary requirements, adequate training and exposure visits, etc. They are required to be well-versed with all the schemes of Government of India in this sector and they should be skilled / trained enough to conceptualize the schemes from the UTs financial resources.

3. Potential Solutions

- Apart from budget tourism, it is necessary to provide conducive environment to build big 5 star hotels / resorts preferably with beach fronts which will increase the high end tourism and earn more revenue for the Union Territory. There is a need to develop infrastructure like internal roads / flyovers / exclusive public pavements / sewerage system / rain water harvesting / reliable power supply / solar rooftops etc. for all kinds of hotels / homestays.
- This will definitely increase the employment opportunities to the local youth. They need to be trained professionally to work in the tourism and hospitality sector. Such curriculum is required to be built up and they need to be tutored accordingly from the school / college levels.
- The UT administration may take help of all the schemes of Government of India like Start-up India, Stand-up India, Skill India Mission, Digital India Mission, Pradhan Mantri Kaushal Vikas Yojana, Pradhan Mantri Mudra Yojana. Pilgrimage Rejuvenation and Spiritual Augmentation Drive (PRASHAD) scheme, Swadesh Darshan 2.0, etc. Convergence and dovetailing of schemes is necessary for skill development and entrepreneurship avenues.
- Conferences / Seminars / Investment Summits are required to be organized with the help of FICCI / Industrialists Associations.

4. Best Practices

- The Government of Puducherry has taken up the matter of expansion of airport with the Ministry of Civil Aviation and Ministry of Home Affairs so that a wide body airbus can start operations which will help in increasing tourism potential.
- The Government has approved the proposal for allowing high end cruise vessels tourism in its New Port which may operate in the Bay of Bengal ports like Vishakhapatnam, Chennai, etc.
- Eden Beach in Chinna Veerampattinam near Puducherry has become the first beach in the

Union Territory to get the coveted 'Blue Flag' certification.

- Last week, a Coordination meeting has taken has been chaired by the Chief Secretary with the Railways authorities and impressed upon them for exploring the technical and financial feasibility of starting Vande Bharat / Shatabdi trains to Puducherry from Chennai / Bangalore. They have assured of working on this proposal positively.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Promoting Entrepreneurship, Employment and Skilling – Leveraging the Demographic Dividend.

2. Policy Gaps and Challenges

The demographic profile of the country is such that 54% of the population is below 25 years. This population is going to seek employment and livelihood in the coming years. The major policy concern is whether we are equipped to provide an employment and livelihood to the younger generation. Major concern is proper manpower planning as per requirements of the future and motivating and channelizing the youth towards pursuing those fields. The major concern is the students / parents inherent tendency and urge as per social compulsions to opt for courses which provide blue collared jobs. What is lacking is methods to identify the potential of the students and provide them with options and also a career trajectory which they can pursue in their life. Current skilling ecosystem is not as per industry requirements, which leaves the younger generation with less employment opportunities. Further lack of finance, proper mentorship and guidance hamper the younger generation from pursuing entrepreneurship goals.

3. Potential Solutions

Identify the aptitude and capabilities of the students should start at a very young age. Scientific aptitude test studies should be undertaken at school level to guide and motivate the students to pursue/ develop skill sets to realize their potential. Academic changes should reflect industry requirement and skill set to match the ever changing trends in the job market. Local industry should be encouraged to collaborate with schools and identify students with aptitude as per their requirements and mould them. Frequent industry shop floor visits can be encouraged. Socially useful productive work should be part of school curriculum, Upskilling the students as per the latest innovations in the technology, medical and service sector. Train students in developing multi skill sets, language skills and also in various aspects of skill on entrepreneurship is also very critical.

A major emphasis should be given to deal with the mental health of the future generation. Facing the ever changing technological eco system, social media pressures, uncertainty in the job market can affect children mental health and every school should have qualified counsellors to deal with the situation

4. Best Practices

In countries like Singapore / Japan Classroom pedagogy has been shifted to teach 21St Century competencies. Social interaction, team building, collaboration are in built in the training to ensure they have a holistic development. Emphasis is on practical skills while actually experiencing work in the workplace not only in school but also in companies. 'On the Job training' skill acquisition in Japanese enterprises is very popular. It is a systemized built in career development plan where Fresh recruit from high school is trained by seniors who will tutor him on the production process. In this tutor system they are rotated among various processes to get over all broad knowledge of the enterprise. This can be replicated in India.

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Feedback Note

Section 1: Officer Name and Details:

- Name : C. Sendhil Kumar
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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Creating Enabling Ecosystem for services

2. Policy Gaps and Challenges

The service sector in Puducherry with respect to stay places to casual tourist may be improved. There is a huge requirement of stay places in the U.T during the festival times and weekends. However, the present no. of hotels are not enough to cater the requirement and are also higher in cost for a normal traveller. It may be noted that there are several unauthorized stay places. Strangely they are listed in the internet and in many cases it goes word by mouth also. The difficulty in licensing / recognizing the stay places involves several Depts., which has lengthy procedures / rules. So most such simple houses or building remain unauthorized. For Eg.A house owner who can give a floor with furnishing may be allowed to function as stay place without much grill of authorities.

Similarly the travel for any public or tourist is also expensive with local autos. The exorbitant rates by the autos is witnessed even by any Puducherry public. There is an urgent requirement in regularizing the facilities for town and village travel. In many cases the auto is the only travel facility which is charging at an higher rates in general.

3. Potential Solutions

A policy and procedure in recognizing such simple needs to be worked out so that they are also covered under some license and related revenue is not lost to Govt., . The procedure of running to multiple offices needs to be reduced and all such recognizing or licdnsing shall be given in a fixed time frame through an online application. Involving many Dept., at various levels needs to be reduced. The service providers are not regular entrepreneur, so they shall not be made to run from poll to pillar. The nodal agency can be Tourism Dept., All other Dept., shall join and give a helping hand without any corruption or political compulsion. Further if a persons is able to get such license without much hassle he may also charge less from the tourist. This would enable more such provisions and also attract more tourists.

We need to allow app (viz.,OLA and UBER) based travel facilities in Puducherry for a better services to tourist.

4. Best Practices

The experience by north eastern state states such as Goa and Kerala may be explored to have an unambiguous licensing systems for stay places.

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Feedback Note

Section 1: Officer Name and Details:

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Rural Non-Farm Employment

2. Policy Gaps and Challenges

- Lack of favorable attitude/aspirations towards non-farm employment. Currently, lack of awareness, cultural preferences and stigma do not encourage rural population to take up jobs actively in the non-farm sector:
- Lack of non-farm economy centric government functioning
- Insufficient ecosystem to encourage non-farm economic growth
- Market and branding limitations

3. Potential Solutions

- Focus on encouraging public to take up non-farm activities through social media influencers and rewarding succesful non-farm entrepreneurs and showcasing success stories.
- Re-design the current government systems/procedures to incentivize non-farm economy and simplifying them.
- Incentivize scheme implementers to maximize reach of government schemes aimed at easing non-farm livelihoods and entrepreneurs.

4. Best Practices

- BDO scorecards in Jharkhand to identify BDOs taking active interest in scheme implementation. This incentivizes government officials to go extra mile in reaching out to intended beneficiaries.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **DR. S. Vasanthakumar**
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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Rural Non-Farm

2. Policy Gaps and Challenges

The electronic National Agriculture Market enables all stake holders to procure licenses and trade without depending on middle men. In the rural sector still many self help groups depend on the local markets in procuring items which, if avoided, could enable them to realize better returns in the value added products. Further, technology adoption in the promotion of value added products and financial inclusivity still remains a challenge:

3. Potential Solutions

Special programs aimed at orienting and skilling the self help groups and commodity interest groups in agriculture and integrate them with the e-National market network would enable them to realize better income and also create a pool of skilled traders. Financial inclusivity would help them in creating infra assets

4. Best Practices

In the existing electronic National Agriculture market at Puducherry, self help groups have been encouraged to trade in the market which has helped them in procuring products of their choice at competitive rates and in turn it has helped them in improving their marketing.

Electronic bidding has helped them in having a transparency in bidding and Online payment is ensuring crediting of money directly to their bank accounts. A framework needs to be evolved on pan India basis to systematically bring the all the self help groups under this fold to promote rural entrepreneurship, employment and skilling and further promote secondary agriculture.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **A. Mohamad Ismail**
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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

MSME & Informal Employment – Rural Non-farm

2. Policy Gaps and Challenges

Fisheries sector involves non-farm activity that can contribute to rural development in many ways. Fish is a vital source of food for millions of people around the world. Fisheries provide employment for people working as fishers, processors, and fish farmers. Fisheries are a source of income and livelihood for people in developing countries. Fisheries contribute to the economic well-being of rural areas. While appreciating the Pradhan Mantri Matsya Sampada Yojana, national scheme to develop the fishers, challenges faced in implementation are listed below:

- All benefits are back-ended, which means, apart from his contribution on the unit cost, the poor fisher has to invest the remaining part of 40% or 60% of the unit cost (that can be reimbursed) which ultimately has not relieved his financial stress.
- Fishers are treated as farmers but in reality, the Fishers indulging in capture fishery are disregarded in most of cases and they are still unable to get the loans and hence the benefits do not reach them
- The Fisheries sector is prevalently has more no of Male Beneficiaries, the quantum of Subsidy under the PMMSY is only 40% and hence the proportionate investment by the beneficiary is 60% which is felt as a burden by the beneficiary

3. Potential Solutions

- To ease the Fishers the subsidy portion can be released to the prospective beneficiary either whole or in parts so that the beneficiary is prevented in getting temporary short term loans from moneylenders
- The percentage of financial assistance may be increased for the General category.
- The fast-developing tourism activities in coastal areas cause socio-cultural impacts on the

fishers community. This can be reduced by actually involving fishers in coastal tourism activities

4. Best Practices

- To alert the fishermen quickly without any delay on the Cyclone/adverse weather, SMS alert is sent to fishers in the U.T of Puducherry. As such, it caution the fishermen not to venture into sea as well as to return to the shore for those who are already in the sea.
- Identification of traditional fishing crafts is a challenge as they do not have a unique identity. This Department has initiated an effort to embed RFID chip in FRP non motorized fishing crafts supplied by the Pondicherry State Fishermen Federation to the beneficiaries during the last two years.
- Data base of fishers e-EFFORT (e-Net for Fisheries and Fishermen Welfare Online Registration and Tracking System) is under preparation in technical assistance of NIC, Puducherry. The same will be put to public use shortly

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

MSME & Informal Employment – Rural Non- Farm

2. Policy Gaps and Challenges

Puducherry (UT) is a small enclave within Tamilnadu, Kerala &Andhra Pradesh. Most of the rural villages are lack of Public Transporting System . Even if it is present mostly with condemned & highly pulutting vehicles.

3. Potential Solutions

Puducherry is having 120 Primary Cooperative Milk Societies. PMCS may be involved in operating Eco- Friendly transport like Battery operated Share Autos & B\Mini Buses.

4. Best Practices

- Rural Employment opportunity.
- Doubling farmers income
- Prevent youths from moving towards town.

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Feedback Note

Section 1: Officer Name and Details:

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Rural Non-Farm Employment (MSME and Services)

2. Policy Gaps and Challenges

- A need has arisen for an elaborate study at grass root level which are the sectors that would emerge as manufacturing services and informed employment that sensitize the rural community to well-equipped to face the situations. Such study would meet the objectives.
- There should be Job security and pension benefits. High wages when compared with other sections to be ensured. There is neither traditional social protection nor state protection. So, Social safety to be ensured for casual informal workers and Health care system to be in place.
- There is difference in earning between the Scheduled Caste and other Community. The Scheduled Caste finds it difficult to operate in a larger market. People in rural areas should be encouraged to get entry in Non-farming activities more particularly young and those after completion of Education. The entry barrier for women and SCs are to be tackled. Skill Development are to be imparted to rural community in Non-Farm activities.
- RNFW is no more a residual activity of the rural community and so specific housing, health care and transportation and social security policies are urgently required. While the rural get some priority to the new sector of RNFE hardly had attracted any kind of policy intervention.
- All Safety norms to be in place.

3. Potential Solutions

New technologies can play a transformative role in expanding rural non-farm employment opportunities. Here are several emerging technological solutions:

Digital Platforms for E-commerce and Market Access

- Online Marketplaces: Platforms like Amazon, Flipkart, and Etsy allow rural artisans, small businesses, and entrepreneurs to sell products globally without needing physical storefronts.

Localized e-commerce platforms tailored to rural needs can help.

- Direct-to-Consumer Models: Apps and websites that connect rural producers directly with consumers can bypass middlemen, ensuring better margins for rural producers.
- Mobile Payment Systems: The rise of mobile money platforms like M-Pesa and UPI enables easier financial transactions, empowering small businesses to accept payments seamlessly.

Blockchain for Supply Chain Transparency

- Agricultural and Artisanal Goods: Blockchain can be used to create transparent supply chains for rural products, allowing buyers to trace the origin of products and ensuring fair trade, which can boost demand for rural artisans and food producers.
- Smart Contracts: Automated contracts using blockchain can ensure timely payments and reduce disputes between rural producers and buyers, offering a more secure working environment for rural entrepreneurs.

AgriculturaL Technology (AgTech) for Diversified Jobs

- Precision Agriculture Tools: Technologies like drones, sensors, and IoT devices can be used in precision agriculture, creating jobs for technicians, data analysts, and maintenance workers in rural areas.
- AgriTech Platforms: Platforms that provide agricultural advisory services (e.g., soil health checks, weather updates) through mobile apps create employment opportunities in agricultural extension and digital support.

Telemedicine and Health Services

- Telehealth Platforms: Telemedicine apps can enable remote consultations, creating jobs for local health facilitators who assist in the operation of such platforms. This also encourages rural clinics to digitize their services.
- Healthcare Technicians: Training rural populations to become community health workers or technicians to operate telemedicine equipment offers employment in rural health services.

Rural Business Process Outsourcing (BPO)

- Rural BPO Centers: Establishing business process outsourcing (BPO) centers in rural areas, where workers handle customer service, data processing, and IT support for global companies, can provide skilled employment. New technologies allow for low-cost setups, especially with high-speed internet and cloud computing.
- AI-assisted Operations: Use of AI tools to support call center agents or data entry operators can enhance productivity while providing training opportunities for rural workers in the tech field.

Skill Development through E-learning Platforms

- Mobile-Based Learning: Apps like Coursera, Udemy, and localized platforms can deliver skill training in regional languages, providing courses on vocational skills (e.g., carpentry, tailoring, coding) that can lead to self-employment.
- VR/AR-based Skill Training: Virtual Reality (VR) and Augmented Reality (AR) tools can be used to provide immersive vocational training experiences in areas like manufacturing, machinery repair, and crafts, allowing hands-on learning in rural areas.

Renewable Energy Jobs and Microgrids

- Solar and Wind Technicians: The rise of renewable energy technologies in rural areas, such as solar panels, wind turbines, and biogas plants, creates opportunities for installation, maintenance, and technical jobs.
- Off-Grid Energy Solutions: Microgrid and off-grid renewable energy solutions can create jobs in energy management and provide the infrastructure for other small businesses to thrive.

IoT and Smart Villages

- Smart Village Concepts: With the help of IoT sensors, rural areas can adopt smart village concepts where technology optimizes resources like water, waste management, and energy use. This leads to new jobs in monitoring, data management, and technology maintenance.
- Remote Monitoring Jobs: IoT devices used in agriculture, logistics, and energy sectors need monitoring and troubleshooting services, which can be operated remotely, creating tech-related jobs in rural areas.

3D Printing for Rural Manufacturing

- Local Manufacturing Hubs: 3D printing technology can enable rural communities to produce a wide range of goods locally, reducing dependence on urban areas for supplies and creating jobs in 3D design, production, and maintenance of printers.
- Spare Parts and Tool Fabrication: With 3D printers, rural workers can fabricate tools, parts, and agricultural equipment locally, creating jobs in the manufacturing and repair sectors.

Digital Agricultural Extension Services

- AI-Enabled Crop Management: AI-based platforms that offer crop health diagnostics, pest management advice, and real-time data analytics can create jobs for data collectors, agricultural advisors, and technicians.
- Farmer Advisory Apps: Mobile apps that offer farming advice, weather predictions, and market prices (such as KisanSuvidha in India) help farmers make better decisions and encourage

diversification into non-farm employment like processing and trading.

Drones for Non-Farm Purposes

- Logistics and Delivery Services: Drones can be used for the delivery of goods in remote rural areas, creating employment for drone pilots, repair technicians, and logistics operators.
- Surveying and Mapping: Drones used for land surveying, infrastructure monitoring, and environmental conservation can provide new types of technical jobs in rural regions.

Artificial Intelligence and Machine Learning Jobs

- Data Labeling and Annotation: AI training models require vast amounts of labeled data. Rural populations can be employed in data labeling for AI models, which can be done remotely with basic digital literacy.
- AI-Driven Predictive Analytics: Rural businesses, especially in agriculture, can benefit from predictive analytics (e.g., for crop yields, market demand), creating job opportunities for data analysts and technology consultants.
- By integrating these technological solutions, rural areas can diversify their economies beyond agriculture, create sustainable employment, and improve the overall quality of life.

4. Best Practices

Best practices in promoting rural non-farm employment (RNFE) are essential to enhancing livelihoods, reducing poverty, and fostering economic development in rural areas. Non-farm employment refers to work that is not directly related to agriculture, such as manufacturing, services, and trade. Here are key best practices for successful RNFE initiatives:

Skill Development and Training

- Vocational and Entrepreneurial Training: Providing targeted skills development, including technical, vocational, and managerial training, enables rural workers to diversify their income sources.
- Digital Literacy: Teaching digital skills can help rural workers engage in e-commerce, remote work, and use technology for business efficiency.
- Sector-Specific Skills: Focus on skills that match the demand in rural non-farm sectors such as tourism, handicrafts, agro-processing, or renewable energy.

Access to Finance

- Microfinance and Credit Facilities: Ensuring rural entrepreneurs have access to credit for starting or expanding non-farm businesses is crucial. Microfinance institutions, cooperatives,

and rural banks can provide the needed capital.

- Subsidies and Grants: Governments and NGOs can offer seed funding or subsidies for small businesses in non-farm sectors to promote growth and reduce barriers to entry.

Infrastructure Development

- Transportation and Connectivity: Improving roads, transport, and digital infrastructure (internet, mobile networks) connects rural businesses to markets and increases opportunities for rural enterprises to scale.
- Energy and Utilities: Ensuring reliable electricity and water supply is essential for the operation of non-farm industries like food processing, textiles, or small-scale manufacturing.

Market Access and Linkages

- Market Information Systems: Providing rural entrepreneurs with timely information on market prices, demand trends, and business opportunities helps them make informed decisions and compete in broader markets.
- Value Chain Development: Integrating rural producers into larger supply chains, particularly in industries like agro-processing, textiles, or craft production, can help increase rural incomes.
- E-commerce and Digital Platforms: Facilitating access to e-commerce platforms allows rural businesses to reach national and global markets.

Promoting Rural SMEs and Cooperatives

- Support for Small and Medium Enterprises (SMEs): Encouraging the growth of SMEs through incentives, mentorship programs, and business incubation can generate significant employment opportunities.
- Cooperative Models: Promoting cooperatives can help pool resources, improve bargaining power, and reduce individual risks for rural entrepreneurs engaged in non-farm activities.

Encouraging Entrepreneurship

- Entrepreneurship Education: Teaching entrepreneurship from an early age, along with providing continuous training for adults, encourages innovation and business creation in rural areas.
- Business Development Services: Offering mentorship, business planning, and networking opportunities can support the creation of sustainable rural non-farm enterprises.

Social Protection and Labor Policies

- Inclusive Policies: Designing policies that protect the rights of informal rural workers,

including those in non-farm sectors, ensures better wages, working conditions, and security.

- Social Safety Nets: Providing access to health insurance, pensions, and other social protection schemes can reduce the vulnerability of non-farm workers.

Promotion of Rural Tourism

- Eco-tourism and Cultural Tourism: Developing tourism around natural landscapes and cultural heritage offers opportunities for employment in hospitality, guide services, craft sales, and transportation.
- Tourism Infrastructure: Investments in basic tourism infrastructure such as accommodations, sanitation, and local attractions can boost rural non-farm employment.

Linkages with Agriculture

- Agro-Processing: Encouraging value addition through processing agricultural products (like dairy, fruits, and spices) can create job opportunities in rural non-farm sectors.
- Agro-Tourism: Promoting tourism linked to agricultural activities such as farm stays and organic farming tours can also generate non-farm jobs.

Gender and Youth Inclusion

- Women Empowerment Programs: Supporting women in non-farm activities, including access to training, finance, and markets, enhances overall community development.
- Youth Engagement: Fostering opportunities for young people in non-farm employment can help address rural youth unemployment and prevent migration to urban centers.

Government and Policy Support

- Enabling Policy Environment: Creating policies that reduce regulatory burdens, support enterprise development, and ensure rural development schemes are inclusive of non-farm sectors.
- Public-Private Partnerships: Collaboration between government, private sector, and non-governmental organizations (NGOs) can enhance investment in rural non-farm industries.
- By implementing these best practices, rural areas can diversify their economies beyond agriculture, create sustainable livelihoods, and improve the overall standard of living for rural populations.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Rural Non-Farm Employment

2. Policy Gaps and Challenges

Policy Gaps:

- Lack of targeted policies for rural non-farm sector development.
- Insufficient funding for rural entrepreneurship and skill development programs.
- Limited access to credit and financial services for rural entrepreneurs.
- Inadequate infrastructure (e.g., transportation, storage, and marketing facilities).
- Regulatory frameworks favoring urban-based industries.

Challenges:

- Limited job opportunities and low wages.
- Skill gaps and inadequate training programs.
- Limited access to markets and information.
- Dependence on agriculture and climate variability.
- Brain drain: youth migration to urban areas.
- Infrastructure constraints (e.g., roads, electricity, internet).
- Limited access to technology and digitalization.
- Social and cultural barriers (e.g., gender, caste).
- Environmental concerns (e.g., pollution, resource depletion).
- Inadequate data and monitoring systems

3. Potential Solutions

- Develop targeted policies and programs for rural non-farm sector growth.
- Invest in rural infrastructure development.
- Enhance access to credit, training, and technology.
- Promote rural entrepreneurship and innovation.
- Foster public-private partnerships.
- Improve market access and information dissemination.
- Address social and cultural barriers.
- Encourage sustainable practices.
- Strengthen data collection and monitoring.
- Support research and development.

4. Best Practices

Policy and Regulatory Framework

- Targeted policies for rural non-farm sector development.
- Simplified regulatory procedures for entrepreneurship.
- Tax incentives for rural businesses.

Infrastructure Development

- Invest in rural roads, storage, and marketing facilities.
- Improve access to electricity, water, and internet.
- Develop rural industrial parks and clusters.

Skill Development and Training

- Vocational training programs for rural youth.
- Entrepreneurship development programs.
- Skill upgradation for existing entrepreneurs.

Financial Inclusion

- Access to credit and microfinance.
- Mobile banking and digital payment systems.

- Crop insurance and risk management.

Market Access and Linkages

- Market research and intelligence.
- Product branding and marketing support.
- E-commerce platforms for rural products.

Innovation and Technology

- Digital literacy programs.
- Technology transfer and adoption.
- Incubation centers for rural startups.

Social Inclusion

- Women empowerment through entrepreneurship.
- Inclusive hiring practices.
- Disability-friendly workplaces.

Sustainable Practices

- Environmental impact assessments.
- Sustainable agriculture practices.
- Renewable energy adoption.

Monitoring and Evaluation

- Data collection and analysis.
- Regular impact assessments.
- Feedback mechanisms for policy improvement.

Successful Models

- Rural Business Hubs (RBHs)
- Rural Industrial Complexes (RICs)
- Community-Based Enterprises (CBEs)
- Cooperatives and Producer Organizations
- Public-Private Partnerships (PPPs)

FourthNational Chief Secretary Conference
Feedback Note

Key Stakeholders

- Government agencies
- Private sector companies
- NGOs and civil society organizations
- Community-based organizations
- Research institutions and academia

Best Countries to Learn From

- China (rural industrialization)
- India (rural entrepreneurship)
- Brazil (rural cooperatives)
- Kenya (mobile-based financial inclusion)
- Thailand (rural tourism development)

These best practices can serve as a starting point for policymakers, practitioners, and stakeholders working to promote rural non-farm employment.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Rural Non-Farm Employment

2. Policy Gaps and Challenges

- A need has arisen for an elaborate study at grass root level which are the sectors that would emerge as manufacturing services and informed employment that sensitize the rural community to well-equipped to face the situations. Such study would meet the objectives.
- There should be Job security and pension benefits. High wages when compared with other sections to be ensured. There is neither traditional social protection nor state protection. So, Social safety to be ensured for casual informal workers and Health care system to be in place.
- There is difference in earning between the Scheduled Caste and other Community. The Scheduled Caste finds it difficult to operate in a larger market. People in rural areas should be encouraged to get entry in Non-farming activities more particularly young and those after completion of Education. The entry barrier for women and SCs are to be tackled. Skill Development are to be imparted to rural community in Non-Farm activities.
- RNFW is no more a residual activity of the rural community and so specific housing, health care and transportation and social security policies are urgently required. While the rural get some priority to the new sector of RNFE hardly had attracted any kind of policy intervention.
- All Safety norms to be in place

3. Potential Solutions

New technologies can play a transformative role in expanding rural non-farm employment opportunities. Here are several emerging technological solutions:

1. Digital Platforms for E-commerce and Market Access

- ***Online Marketplaces:*** Platforms like Amazon, Flipkart, and Etsy allow rural artisans, small businesses, and entrepreneurs to sell products globally without needing physical storefronts. Localized e-commerce platforms tailored to rural needs can help.

- ***Direct-to-Consumer Models:*** Apps and websites that connect rural producers directly with consumers can bypass middlemen, ensuring better margins for rural producers.
- ***Mobile Payment Systems:*** The rise of mobile money platforms like M-Pesa and UPI enables easier financial transactions, empowering small businesses to accept payments seamlessly.

2. Blockchain for Supply Chain Transparency

- ***Agricultural and Artisanal Goods:*** Blockchain can be used to create transparent supply chains for rural products, allowing buyers to trace the origin of products and ensuring fair trade, which can boost demand for rural artisans and food producers.
- ***Smart Contracts:*** Automated contracts using blockchain can ensure timely payments and reduce disputes between rural producers and buyers, offering a more secure working environment for rural entrepreneurs.

3. AgriculturaL Technology (AgTech) for Diversified Jobs

- ***Precision Agriculture Tools:*** Technologies like drones, sensors, and IoT devices can be used in precision agriculture, creating jobs for technicians, data analysts, and maintenance workers in rural areas.
- ***AgriTech Platforms:*** Platforms that provide agricultural advisory services (e.g., soil health checks, weather updates) through mobile apps create employment opportunities in agricultural extension and digital support.

4. Telemedicine and Health Services

- ***Telehealth Platforms:*** Telemedicine apps can enable remote consultations, creating jobs for local health facilitators who assist in the operation of such platforms. This also encourages rural clinics to digitize their services.
- ***Healthcare Technicians:*** Training rural populations to become community health workers or technicians to operate telemedicine equipment offers employment in rural health services.

5. Rural Business Process Outsourcing (BPO)

- ***Rural BPO Centers:*** Establishing business process outsourcing (BPO) centers in rural areas, where workers handle customer service, data processing, and IT support for global companies, can provide skilled employment. New technologies allow for low-cost setups, especially with high-speed internet and cloud computing.
- ***AI-assisted Operations:*** Use of AI tools to support call center agents or data entry operators can enhance productivity while providing training opportunities for rural workers in the tech field.

6. Skill Development through E-learning Platforms

- ***Mobile-Based Learning:*** Apps like Coursera, Udemy, and localized platforms can deliver skill training in regional languages, providing courses on vocational skills (e.g., carpentry, tailoring, coding) that can lead to self-employment.
- ***VR/AR-based Skill Training:*** Virtual Reality (VR) and Augmented Reality (AR) tools can be used to provide immersive vocational training experiences in areas like manufacturing, machinery repair, and crafts, allowing hands-on learning in rural areas.

7. Renewable Energy Jobs and Microgrids

- ***Solar and Wind Technicians:*** The rise of renewable energy technologies in rural areas, such as solar panels, wind turbines, and biogas plants, creates opportunities for installation, maintenance, and technical jobs.
- ***Off-Grid Energy Solutions:*** Microgrid and off-grid renewable energy solutions can create jobs in energy management and provide the infrastructure for other small businesses to thrive.

8. IoT and Smart Villages

- ***Smart Village Concepts:*** With the help of IoT sensors, rural areas can adopt smart village concepts where technology optimizes resources like water, waste management, and energy use. This leads to new jobs in monitoring, data management, and technology maintenance.
- ***Remote Monitoring Jobs:*** IoT devices used in agriculture, logistics, and energy sectors need monitoring and troubleshooting services, which can be operated remotely, creating tech-related jobs in rural areas.

9. 3D Printing for Rural Manufacturing

- ***Local Manufacturing Hubs:*** 3D printing technology can enable rural communities to produce a wide range of goods locally, reducing dependence on urban areas for supplies and creating jobs in 3D design, production, and maintenance of printers.
- ***Spare Parts and Tool Fabrication:*** With 3D printers, rural workers can fabricate tools, parts, and agricultural equipment locally, creating jobs in the manufacturing and repair sectors.

10. Digital Agricultural Extension Services

- ***AI-Enabled Crop Management:*** AI-based platforms that offer crop health diagnostics, pest management advice, and real-time data analytics can create jobs for data collectors, agricultural advisors, and technicians.
- ***Farmer Advisory Apps:*** Mobile apps that offer farming advice, weather predictions, and market prices (such as KisanSuvidha in India) help farmers make better decisions and encourage diversification into non-farm employment like processing and trading.

11. Drones for Non-Farm Purposes

- ***Logistics and Delivery Services:*** Drones can be used for the delivery of goods in remote rural areas, creating employment for drone pilots, repair technicians, and logistics operators.
- ***Surveying and Mapping:*** Drones used for land surveying, infrastructure monitoring, and environmental conservation can provide new types of technical jobs in rural regions.

12. Artificial Intelligence and Machine Learning Jobs

- ***Data Labeling and Annotation:*** AI training models require vast amounts of labeled data. Rural populations can be employed in data labeling for AI models, which can be done remotely with basic digital literacy.
- ***AI-Driven Predictive Analytics:*** Rural businesses, especially in agriculture, can benefit from predictive analytics (e.g., for crop yields, market demand), creating job opportunities for data analysts and technology consultants.
- By integrating these technological solutions, rural areas can diversify their economies beyond agriculture, create sustainable employment, and improve the overall quality of life

4. Best Practices

Best practices in promoting rural non-farm employment (RNFE) are essential to enhancing livelihoods, reducing poverty, and fostering economic development in rural areas. Non-farm employment refers to work that is not directly related to agriculture, such as manufacturing, services, and trade. Here are key best practices for successful RNFE initiatives:

1. Skill Development and Training

- ***Vocational and Entrepreneurial Training:*** Providing targeted skills development, including technical, vocational, and managerial training, enables rural workers to diversify their income sources.
- ***Digital Literacy:*** Teaching digital skills can help rural workers engage in e-commerce, remote work, and use technology for business efficiency.
- ***Sector-Specific Skills:*** Focus on skills that match the demand in rural non-farm sectors such as tourism, handicrafts, agro-processing, or renewable energy.

2. Access to Finance

- ***Microfinance and Credit Facilities:*** Ensuring rural entrepreneurs have access to credit for starting or expanding non-farm businesses is crucial. Microfinance institutions, cooperatives, and rural banks can provide the needed capital.
- ***Subsidies and Grants:*** Governments and NGOs can offer seed funding or subsidies for small businesses in non-farm sectors to promote growth and reduce barriers to entry.

3. Infrastructure Development

- ***Transportation and Connectivity:*** Improving roads, transport, and digital infrastructure (internet, mobile networks) connects rural businesses to markets and increases opportunities for rural enterprises to scale.
- ***Energy and Utilities:*** Ensuring reliable electricity and water supply is essential for the operation of non-farm industries like food processing, textiles, or small-scale manufacturing.

4. Market Access and Linkages

- ***Market Information Systems:*** Providing rural entrepreneurs with timely information on market prices, demand trends, and business opportunities helps them make informed decisions and compete in broader markets.
- ***Value Chain Development:*** Integrating rural producers into larger supply chains, particularly in industries like agro-processing, textiles, or craft production, can help increase rural incomes.
- ***E-commerce and Digital Platforms:*** Facilitating access to e-commerce platforms allows rural businesses to reach national and global markets.

5. Promoting Rural SMEs and Cooperatives

- ***Support for Small and Medium Enterprises (SMEs):*** Encouraging the growth of SMEs through incentives, mentorship programs, and business incubation can generate significant employment opportunities.
- ***Cooperative Models:*** Promoting cooperatives can help pool resources, improve bargaining power, and reduce individual risks for rural entrepreneurs engaged in non-farm activities.

6. Encouraging Entrepreneurship

- ***Entrepreneurship Education:*** Teaching entrepreneurship from an early age, along with providing continuous training for adults, encourages innovation and business creation in rural areas.
- ***Business Development Services:*** Offering mentorship, business planning, and networking opportunities can support the creation of sustainable rural non-farm enterprises.

7. Social Protection and Labor Policies

- ***Inclusive Policies:*** Designing policies that protect the rights of informal rural workers, including those in non-farm sectors, ensures better wages, working conditions, and security.
- ***Social Safety Nets:*** Providing access to health insurance, pensions, and other social protection schemes can reduce the vulnerability of non-farm workers.

8. Promotion of Rural Tourism

- ***Eco-tourism and Cultural Tourism:*** Developing tourism around natural landscapes and cultural heritage offers opportunities for employment in hospitality, guide services, craft sales, and transportation.
- ***Tourism Infrastructure:*** Investments in basic tourism infrastructure such as accommodations, sanitation, and local attractions can boost rural non-farm employment.

9. Linkages with Agriculture

- ***Agro-Processing:*** Encouraging value addition through processing agricultural products (like dairy, fruits, and spices) can create job opportunities in rural non-farm sectors.
- ***Agro-Tourism:*** Promoting tourism linked to agricultural activities such as farm stays and organic farming tours can also generate non-farm jobs.

10. Gender and Youth Inclusion

- ***Women Empowerment Programs:*** Supporting women in non-farm activities, including access to training, finance, and markets, enhances overall community development.
- ***Youth Engagement:*** Fostering opportunities for young people in non-farm employment can help address rural youth unemployment and prevent migration to urban centers.

11. Government and Policy Support

- ***Enabling Policy Environment:*** Creating policies that reduce regulatory burdens, support enterprise development, and ensure rural development schemes are inclusive of non-farm sectors.
- ***Public-Private Partnerships:*** Collaboration between government, private sector, and non-governmental organizations (NGOs) can enhance investment in rural non-farm industries.
- By implementing these best practices, rural areas can diversify their economies beyond agriculture, create sustainable livelihoods, and improve the overall standard of living for rural populations.

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Rural Non-Farm

2. Policy Gaps and Challenges

- Individual level constraints – Lack of education and awareness.
- Policy level – Infrastructure related constraints, policy intervention in sustaining rural non farm sector, lack of post skill training assessments labour market, underemployment, and regulatory restrictions on small sectors.

3. Potential Solutions

- Self employment and enterprises could be encouraged across farm and off-farm value chains and supply chains.
- Non-farm activities allied to agriculture including logistics, trade, etc., could be promoted as local enterprises.
- Promoting transferable skills and combination of related skills through training programmes.
- Skill trainings to be designed predominantly for rural non-farm.
- Employment focused: Up-skilling and re-skilling based on individual preferences to work as skilled workers.
- Private sector participation particularly in augmenting finance and technology is essential to sustain non-farm opportunities. In addition, this will generate local employment.

4. Best Practices

- Scale up and sustain initiatives – Involves indentifying and scaling up best practices around value chain interventions and supply value chain development that involves non-farm livelihood potential. This has to be connected with investments and activities around resource base to sustain and boost local employment and enterprise with private sector engagement and through social entrepreneurs.

- Sustain and scale up initiative – Adopt resource centric approach and explore prospective potential non-farm livelihood options that would generate local employment and economic development through enterprise.
- Methods for sustainable management of resources can be designed along with building skills / re-skilling and integration with Government Schemes ecosystems for expanding local non-farm employment and enterprise. This will primarily be supported through public financing through convergence with Government Schemes and programmes.

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

MSME- Informal Employment Urban (AYUSH)

2. Policy Gaps and Challenges

Multiple laws and regulations given in the MSME requesting complexity and overlap, limited access to credit and finance, Inadequate infrastructure support, Insufficient technology adoption and innovationincentives limited market access, Skill development and training gaps:

- Financing: High investors rates, collateral repayment and limited credit.
- Infrastructure: Inadequate workspace, storages, logistics and transportation.
- Technology: Limited adoption of digital technologies.
- Marketing: Difficulty in accessing domestic and international market

3. Potential Solutions

- Digital marketplaces for AYUSH products.
- E-commerce platforms for online sales.
- AYUSH-specific industrial policies.
- AYUSH-specific export promotion councils.
- AYUSH-specific training programs for entrepreneurs.
- Incubation centers for AYUSH startups.
- Collaborations with pharmaceutical companies.
- Regulatory challenges and opportunities
- Market access and competition
- Innovation and R&D opportunities

4. Best Practices

- Good Manufacturing Practices (GMP) certification.
- Standardization of products and processes.
- Compliance with AYUSH Ministry guidelines and regulations.
- Investment in R&D for new product development.
- Collaboration with academia and research institutions.
- Customer engagement and feedback.
- Financial planning and budgeting.
- Employee training and development.
- Inventory management.
- Export market research and identification..

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Urban - PM Street Vendor's Atma Nirbhar Nidhi (PM SVANidhi)

2. Policy Gaps and Challenges

The PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi) scheme has faced several challenges and policy gaps, including:

Balancing legal and social needs

- The scheme needs to balance the needs of street vendors with the interests of other residents who share public spaces.

Loan applications

- Around 10–20% of loan applications are rejected or returned for reasons like insufficient documents, pending LoR applications, or the vendor not being interested in the loan.

Local government priorities

- Prioritizing public health concerns over the loan scheme, could alter the situation on the ground.
- The PM SVANidhi scheme is a micro-credit facility that provides affordable loans to street vendors. It offers collateral-free loans of ₹10,000, followed by loans of ₹20,000 and ₹50,000 with a 7% interest subsidy for prompt repayment. The scheme also promotes digital transactions among street vendors to increase their digital footprint.

3. Potential Solutions

The PM SVANidhi scheme has helped street vendors in many ways, but there are still some potential technology solutions and scope for convergence that could be considered:

Increase awareness

- Efforts could be made to reach out to more potential beneficiaries who may not be aware of the scheme.

Integrate street vendors into the formal economy

- The scheme could be expanded to include more initiatives that help street vendors integrate into the formal economy. For example, Implementation of Vending Markets

Improve access to financial services

- The scheme could be expanded to provide more financial services to street vendors. For example, introducing 4th tranche of Rs. 1,00,000/- to the Street Vendors and Convergence with entrepreneurship oriented schemes promoting and upgrading them into a more structural environment.

Provide more incentives

- The scheme could provide more incentives to encourage regular repayments other than the cashback for digital transactions.

Convergence with central welfare schemes:

- The socio-economic profiling of PM SVANidhi beneficiaries and their families is part of the SVANidhi se Samriddhi program, which aims to uplift street vendors and their families. The profiling exercise helps determine if beneficiaries are eligible for a range of central welfare schemes.
    - Pradhan Mantri Jeevan Jyoti Bima Yojana
    - PM Suraksha Bima Yojana
    - Pradhan Mantri Jan Dhan Yojana
    - Pradhan Mantri Shram Yogi Maandhan Yojana
    - One Nation One Ration Card
    - Janani Suraksha Yojana
    - Pradhan Mantri Matru Vandana Yojana (PMMVY)
    - Registration under BoCW

4. Best Practices

UT of Puducherry has conducted an award ceremony by distributing awards to the Urban Local Bodies (ULBs), lending institutions and bank branches that have contributed to the

implementation of the PM SVANIdhi scheme in Puducherry (UT). The Pondicherry Urban Development Agency in coordination with Pondicherry Municipality, Oulgaret Municipality and Indian Bank have jointly organized through Pondicherry Municipality - City Livelihood Center (PM-CLC) Conducted an event from 30th August 2024 to 01st September 2024 at Gandhi Thidal, Beach Road, Puducherry. The following events under PM SVANIdhi Mahotsav and 'PRAISE' award ceremony are:

- Food Festival of Roadside Vendors.
- Product Exhibition of Self Help Group Members
- PM SVANidhi Loan Mela
- Digital and Business Transaction Training, Art Program, etc

The program was inaugurated by the Honorable Lieutenant Governor on 30.08.2024 at 6 PM in the presence of the Hon'ble Chief Minister. Honorable Speaker, Minister and Members of Parliament. Roadside vendors, Women's Self Help Groups and general public participated in the event

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Concept Note for Sub Theme 3 – Opportunities in Green Economy, Skills and Jobs in the Renewable Energy Sector.

2. **Policy Gaps and Challenges**

Major Roadblocks to India's Renewable Energy Transition

(i) Land Acquisition Hurdles:

The scale of land required for RE projects is immense. For instance**,** a 1 GW solar plant needs about 2,000 hectares. Recent conflicts include protests in Rajasthan's Jaisalmer district against large solar parks encroaching on grazing lands. These issues highlight the complex interplay between development needs and local community rights.

(ii) E-waste and End-of-Life Management:

With the massive deployment of solar panels and batteries, e-waste management is becoming a critical issue. According to the International Renewable Energy Agency, India is projected to become the fourth-largest producer of solar panel waste by 2050.India currently lacks a comprehensive policy for solar panel recycling, though MNRE has drafted rules in 2022.The absence of large-scale recycling facilities poses environmental risks.

(iii) Climate Change Impacts on RE Infrastructure:

Ironically, climate change itself poses risks to RE infrastructure: Increased cyclone frequency in coastal areas threatens offshore wind projects. Changing precipitation patterns affect hydropower potential, as seen in the 2021 Uttarakhand floods damaging multiple hydro projects.

II. Other Challenges

(i) High Initial Cost of Installation:

There are high initial costs for the installation of renewable energy technologies, which makes investors and lenders think of renewables as high risk whereas they find fossil fuel plants more

acceptable due to their low installation costs.

(ii) Technical Challenges:

Renewable energy technologies require specific technical expertise. Solar and wind energy systems require regular maintenance and skilled technicians for installation and repair.

(iii) Institutional obstacles :

Institutes, agencies stakeholders who work under the conditions of the MNRE show poor inter-institutional coordination.

(iv) Financial and fiscal obstacles :

There are a few budgetary constraints such as fund allocation, and budgets that are not released on time to fulfill the requirement of developing the renewable sector.

(v) Technological obstacles

- Every installation of a renewable project contributes to complex risk challenges from environmental uncertainties, natural disasters, planning, equipment failure, and profit loss.
- There are not many R&D centers for renewables. Methods to reduce the subsidies and invest in R&D lagging; manufacturing facilities are just replicating the already available technologies. The country is dependent on international suppliers for equipment and technology. Spare parts are not manufactured locally and hence they are scarce.

(vi) Awareness, education, and training obstacles :

There is inadequate knowledge in renewables, and no awareness programs are available to the general public. The lack of awareness about the technologies is a significant obstacle in acquiring vast land for constructing the renewable plant. Moreover, people using agriculture lands are not prepared to give their land to construct power plants because most Indians cultivate plants.

(vii) Environmental obstacles

- A single wind turbine does not occupy much space, but many turbines are placed five to ten rotor diameters from each other, and this occupies more area, which include roads and transmission lines.
- In the field of offshore wind, the turbines and blades are bigger than onshore wind turbines, and they require a substantial amount of space. Offshore installations affect ocean activities (fishing, sand extraction, gravel extraction, oil extraction, gas extraction, aquaculture, and navigation). Furthermore, they affect fish and other marine wildlife.

- Large utility-scale solar plants require vast lands that increase the risk of land degradation and loss of habitat.

(viii) Impact on Food Security:

The conversion of agricultural land for renewable energy projects could potentially impact food security. As per experts, the push for renewable energy may lead to food insecurity in the future as India would need at least 400,000 hectares of land by 2030 to achieve its renewable targets.

3. Potential Solutions

(i) Experimentation with Ownership Models:

The renewable energy parks need not necessarily be owned by the state or private companies. Community initiatives could help generate revenues for the communities, further promoting small businesses and upskilling, improving incomes, stimulating local economies, and improving energy access.

(ii) Exhaustive Legal Regulations:

Solar and wind park development is exempted from Environmental and Social Impact Assessment, which must be revised and strengthened to limit adverse social and environmental consequences.

(iii) Monitoring Mechanisms:

It is required for establishment of land record, its accountability and transparency. In terms of impacts on small and medium landowners where private land is being used, there is no mechanism to monitor if a fair price is paid to those leasing their land.

(iv) Adequate Skilling & Training Programmes:

Large-scale renewable energy projects could have positive employment outcomes at the district level, but they lead to massive employment shifts between sectors at the national level. Adequate skilling and training programmes targeting the unskilled and poorer populations are essential.

(viii) Balancing Approach:

Balancing the need for renewable energy with the need to ensure food security requires careful planning and policy-making. Policymakers need to consider the potential impacts of renewable energy projects on agricultural practices and food security and then take actions accordingly.

II. New Technological Solutions

(i) Bladeless Wind Turbines

Bladeless technology addresses some of the critical challenges of wind turbines – they are less noisy, take up less space despite using the same amount of materials, and are significantly less harmful to wildlife, particularly birds.

(ii) Floatvoltaics

Floating solar plants, or FSPV (floating solar photovoltaic), is more recent. This involves installing solar panels onto floating platforms in water, such as lakes and reservoirs. The challenge of solar farms is that they compete with agriculture for space.

(iii) Lithium-glass batteries

Lithium-ion charges through a liquid electrolyte, which is known to be flammable, and one of the most significant risks of these kinds of batteries is fire, mainly as they degrade. Lithium-glass batteries make EVs safer and lighter while increasing their range and significantly lowering their recharge time.

(iv) AI and Big Data

The energy grid is one of the most complex infrastructures and requires quick decision-making in real-time, which big data and AI algorithms enable for utilities.

(vii) Grid Integration

Grid integration technologies primarily include transmission, distribution, and stabilization of renewable energy. Scaling up variable renewable energy generation is often far from demand centers which results in transmission and distribution losses. To overcome this, energy-efficient, grid electronic technologies such as Gallium Nitride (GaN) and Silicon Carbide (SiC) semiconductors are leveraged.

4. Best Practices

(i) Agrivoltaics, new sustainable solution at the local level :

Photovoltaic plants constructed in rural areas do not necessarily need to take away precious land from farming activities. Indeed, energy efficiency can be combined with the sustainable use of land and the protection of biodiversity.

(ii) Highway Solar Plant :

Solar PV modules will be installed on a sound-absorbing barrier on the highways. The solar plants will shelter the town from the noise coming from the highway and at the same time producing

clean energy for the area.

(iii) Floating Solar Revolution:

India can harness its vast aquatic spaces by developing large-scale floating solar projects on reservoirs, lakes, and coastal areas. This approach would preserve valuable land while reducing water evaporation and algae growth.

(iv) Community-Led Renewable Projects :

Community involvement in renewable projects enhances sustainability and local buy-in. Examples include cooperative wind farms and community solar initiatives in India. The Dharnai Solar Initiative in Bihar, led by Greenpeace India, is a prominent example where the entire village was powered by a 100-kW solar micro-grid. This project not only provided consistent energy but also fostered a sense of ownership among the villagers, leading to better maintenance and sustainability of the system.

(v) REAP (Renewable Energy Agency Puducherry) :

It had set up the State level Renewable Education Park at Lawspet, Puducherry, which has an exhibition hall, which has rooms for displaying of exhibits of interactive games and other demonstration items, which educates the use of solar, wind, geo thermal, bio gas, and biomass. It has audio visual room and a lecture hall. The working model of Ocean tidal power, wave power, Nuclear Power 5 types of wind mill, Geothermal, Biogas plant, storage of energy, future of energy scenario are displayed. In the outdoor set up, a Solar PV Power Plant of 5KWp is installed to generate solar power to run the exhibits. The Solar Powered Toy Car is a major attraction for children.

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Current Policies on Renewable Energy in the UT of Puducherry

2. Policy Gaps and Challenges

The Puducherry Solar Energy Policy – 2016, formulated by the U.T. administration, intends to create a framework that enables the development of solar energy technology. This policy was formed on the lines of Government of India's Jawaharlal Nehru National Solar Mission (JNNSM) under the Action Plan for Climate Change (NAPCC) for promoting ecologically sustainable growth while addressing India's energy security challenges.

Challenges.

- The beneficiaries who are having enough rooftop spaces are being installed with Rooftop Solar Power Plant under Net-metering/Group-net-metering mechanism. Whereas, the beneficiaries who are not having sufficient space on rooftops are not aware of virtual net-metering mechanism.
- The capital expenditure of the Roof-top Solar Power system to be borne by the beneficiary and the finance from the Banks with interest rates are seems to be higher for the consumers.
- The State subsidy in addition to the Central Financial Assistance for the installation of Solar Power Plants in residential sector are yet to be introduced.
- The timeline for obtaining the synchronization approval for solar power plants from the DISCOM is yet to be finalized and ensured.
- Monitoring mechanism towards receiving of applicants and the status of the commissioning of the system is only available for residential sector consumers and others are being followed through off-line.
- The large scale RE generators are requesting to finalize the feed-in-tariff for penetrating the Solar Power units into the grid under Gross metering with two different tariff for Day and Night Export of Solar energy.
- Green Certification for the Industries for achieving their total captive demand through Renewable

Power is yet to be introduced in the Policy measures of RE.

- The fully subsidized tariff for Agricultural Electricity service connection and lack of dedicated feeder for Agriculture service connection, the implementation of Solar Integrated Agricultural programs is facing difficult in execution.
- In respect of skill development on Renewable Energy sector, necessary academic curriculum for the courses to be validated in consultation with the Industries and commercial sector and the same to be certified by the Government for necessary job assurance to the candidates.
- The Green budgetary towards implementing exclusively for Renewable Energy projects at each Government Departments are to be introduced in the Policy.
- Achievement based incentive for the Government Departments in terms of Net-Zero buildings are to be introduced in the Policy.

3. Potential Solutions

New technologies may be introduced in Renewable Energy Projects

- Floating solar farms, where solar panels are installed on bodies of water such as lakes and reservoirs, are gaining momentum. A major advantage is that floating PV solar panels produce massive amounts of energy without taking up valuable land or real estate.
- Bifacial solar panels provide a unique advantage in solar energy generation by capturing sunlight from both the front and back of the module and which capture sunlight from both sides, are becoming more popular and it takes a different approach by capturing sunlight from both the front and rear sides of the panel.
- Solar windows are a developing technology that could soon allow you to convert the sunlight that comes through your windows into electricity to power your home. Now, transparent solar panels can be integrated into windows, turning buildings into vertical power plants without obstructing natural light.
- Domestic Manufacturing of Solar Photovoltaic Modulesmay be established in the U.T of Puducherry which could be Advancements for creation of Job.

New technologies may be introduced in Biogas Generation.

Anaerobic digestion

- The industry standard for biogas production, anaerobic digestion is a cheap technology that uses microbiology and consumes less energy.

Dry anaerobic digestion

- This technology is considered the next generation of biogas technology and is effective for using solid and stable organic waste.

Microorganisms

- Microorganisms can be more cost effective than hydrolytic enzymes for converting high-molecular-weight compounds into lower-mass compounds.

Biogas upgrading and purification

- Techniques for biogas upgrading and purification include water scrubbing, adsorption, cryogenic separation, membrane technology, biological upgrading, and in-situ upgrading methods.

Digestate utilization

- Bio-digestion has great potential for biogas production because the feedstock is readily available and the technology is cheap.

Circular economy

- Biogas plants can play a key role in making organic farming sustainable and profitable, and in contributing to a circular economy.

Waste management

- Biogas technology can improve waste management and reduce workload.

4. Best Practices

- Implementation of Net-Zero building initially for all Government Departments by incorporating Renewable Energy projects may be encouraged for sustainable development and creation of demand on jobs for maintaining the energy assets.
- Built Own Operate Transfer (BOOT) model projects may be followed for RE generation plants.
- Floating type Solar Power Plant may be established on Pilot basis and the same may be up-scaled for RE power generation and creation of jobs on Renewable Energy.
- Initiate necessary action for the implementation of Model Solar villages in the UT of Puducherry and the number of villages under the same programme may be up-scaled.
- Solar Tree, Standalone Solar Street lighting systems at Public places/Tourist spots may be installed and the maintenance of the systems may create jobs for the skilled candidates.
- Solar integrated equipment in fisheries sector like Solar Freezer, Solar Aquaculture, Solar Powered boatsmay be introduced so as to encourage sustainable development and creation of jobs

for the skilled candidates.

- Electric Vehicles and Charging Infrastructure to be established on major scale and transforming conventional vehicles into EV mode may increase the requirements of Renewable Energy sources and may create jobs for the skilled candidates for further maintenance and monitoring.

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Feedback Note

Section 1: Officer Name and Details:

- Name : **S.YESVANTHAIYAH**
- Designation : Registrar of Co-operative Societies
- Batch :
- Current Posting : Registrar of Co-operative Societies (Co-operation Department)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

OPPORTUNITY IN GREEN ECONOMY – Renewable Energy

2. Policy Gaps and Challenges

Puducherry (UT) is a small enclave within Tamilnadu, Kerala &Andra Pradesh. Renewable sources can be encouraged:

- Solar Power:
- Wind Power
- Bio Energy
- Small Hydro Power (SHP)

3. Potential Solutions

- Compelling each household with minimum units for solar Panel units.
- Subsidies to small industries for the establishment of Solar Panels.
- Covering all Educational institutions.
- Deployment of renewable energy product system.
- Encouraging conventional sources has impact on the future like global safety, environmental values, health and society.
- Can create the need to promote renewable energy in the Indian power sector.
- Expansion of renewable energy will improve air quality, reduce global warming emissions, create job opportunities, will have a cleaner, safer and affordable energy

4. Best Practices

- Increase solar energy Output.

- Decrease natural energy sources.
- Save Electricity
- Can create opportunities in power generation, distribution, transmission and equipment.

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Feedback Note

Section 1: Officer Name and Details:

- Name : **M.M. VINAYARAJ**
- Designation : Deputy Collector
- Batch :
- Current Posting : Puducherry District Authority, DRDM

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in Green Economy, Skills and Jobs in the Renewable Energy Sector

2. Policy Gaps and Challenges

The sources of electricity production such as coal, oil, and natural gas have contributed to one-third of global greenhouse gas emissions. It is essential to raise the standard of living by providing cleaner and more reliable electricity. Renewable energy has emerged as a best alternate for the energy produced through conventional sources.

Challenges

Major Roadblocks to India's Renewable Energy Transition

(i) ***Stranded Asset Risk and Threat to Coal Sector Workers****:* India has significant investments in coal-based power plants. India has 8 stranded coal-based thermal power plants, as of April 2023, according to Institute for Energy Economics and Financial Analysis (IEEFA).The rapid RE transition could lead to an increase in the number of stranded assets, creating economic and social challenges, particularly in coal-dependent regions. Also, the RE sector demands different skill sets, creating a mismatch with the existing workforce in conventional energy sectors like coal. Coal India Limited alone employs over 240,000 people.

(ii) ***Intermittency and Storage Challenges***: The variable nature of RE sources necessitates large-scale storage solutions. Recent study indicates that by 2030, India would need 38 GW of four-hour battery storage and 9 GW of thermal balancing power projects for the cost-efficient and reliable integration of 450 GW of renewables. The first large-scale battery storage tender (1000 MWh) by Solar Energy Corporation of India in 2021 is a step forward, but scaling up remains a challenge.

(iii) ***Urban Planning and RE Integration*****:** India's rapid urbanization presents unique challenges for RE integration. It is exemplified by lack of uniform building codes for rooftop solar across cities. Limited open spaces in dense urban areas restrict large-scale RE projects, as seen in Mumbai's

struggles with solar adoption.

II. Other Challenges

(i) ***High Initial Cost of Installation****:* There are high initial costs for the installation of renewable energy technologies, which makes investors and lenders think of renewables as high risk whereas they find fossil fuel plants more acceptable due to their low installation costs.

(ii) ***Financial and fiscal obstacles :*** There are a few budgetary constraints such as fund allocation, and budgets that are not released on time to fulfill the requirement of developing the renewable sector. The initial unit capital costs of renewable projects are very high compared to fossil fuels, and this leads to financing challenges and initial burden. There are uncertainties related to the assessment of resources, lack of technology awareness, and high-risk perceptions which lead to financial barriers for the developers. Financial institutions such as government banks or private banks do not have much understanding or expertise in renewable energy projects, and this imposes financial barriers to the projects. Delay in payment by the SERCs to the developers imposes debt burden on the small and local developers because moneylenders always work with credit enhancement mechanisms or guarantee bonds signed between moneylenders and the developers.

3. Potential Solutions

i) ***Overhaul the Wasteland Classification:*** Similar to Pavagada, if wasteland is to be leased or acquired for solar parks, solar park development corporations will have to engage with local governance units such as the Gram Sabha to initiate the project.

ii) ***Focus on Innovation*****:** Need to encourage research and experimentation with 'agrivoltaics' for sustainably developing renewable energy. Agrivoltaics pair solar with agriculture, creating energy and providing space for crops, grazing, and native habitats under and between panels. Thus, farmers can grow crops while also being 'prosumers' (producers and consumers) of energy.

(iii) ***Infrastructure Enhancement*****:** The existing energy infrastructure needs urgent reform as it is not capable of handling large amounts of renewable energy. Battery storage system helps to store the surplus energy for later use. It can help with grid instability, thereby preventing blackouts. Technological advancement has improved the longevity and battery capacity of the storage system. Battery prices have to come down to make storing of solar energy more cost-effective.

(iv) ***Support by Government & Organizations*****:** More innovative use by multilateral development banks of their balance sheets may include providing risk-taking guarantees and catalyzing more private finance for renewable projects. Investors, financiers, and developers need to respond with faster and better funded renewables development, that holds the potential to accelerate renewable growth globally. Governments need to address physical, administrative, and procedural hurdles that

will help to reduce risk and cost. There is a need for incentives and regulatory apparatus to both bring new technologies into the market affordably and encourage their deployment. Further impetus can come from implementing the envisioned domestic carbon market, and the Electricity Amendment Bill to introduce critical reforms. Develop and offer training programs for citizens with minimal education and training, who do not fit current programs, which restrict them from working in renewable areas. Include women in the renewable workforce by providing localized training.

4. Best Practices

(i) ***Highway Solar Plant*** **:** Solar PV modules will be installed on a sound-absorbing barrier on the highways. The solar plants will shelter the town from the noise coming from the highway and at the same time producing clean energy for the area. This solution allows the construction of solar PV plants without the need to occupy any new land. This system can be utilized to generate power to the domestic consumption of few villages abutting the highways.

(ii) ***Community-Led Renewable Projects*** **:** Community involvement in renewable projects enhances sustainability and local buy-in. Examples include cooperative wind farms and community solar initiatives in India. The Dharnai Solar Initiative in Bihar, led by Greenpeace India, is a prominent example where the entire village was powered by a 100-kW solar micro-grid. This project not only provided consistent energy but also fostered a sense of ownership among the villagers, leading to better maintenance and sustainability of the system.

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5. https://www.irena.org/. – International Renewable Energy Agency
6. https://enerdatics.com/blog/shaping-the-future-emerging-technologies-in-renewable-energy-projects/

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **S. Murugesan**
- Designation : Under Secretary to Govt.
- Batch : 2022
- Current Posting : Puducherry

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Pillar III – Opportunities in Green Economy – Sub Theme 5 - Renewable Energy

2. Policy Gaps and Challenges

It is indisputable that there is significant progress in this sector. However, as on date, renewable energy sector has many policy gaps as well challenges such as workforce skill gap, inconsistent net metering policies, lengthy approval processes, lack of comprehensive energy storage policy, land acquisition challenges, inadequate grid infrastructure, limited consumer awareness, delay in release of subsidy, low domestic manufacturing capacity and environmental concerns, etc.

3. Potential Solutions

To overcome the challenges faced in the renewable energy sector, we need coherent policies, better infrastructure, workforce training, new energy storage technologies such as battery storage, pumped hydro and hydrogen fuel cells, grid modernization with smart grids, release of incentives in a faster way, single-window clearance systems, public – private partnership, strengthening of domestic manufacturing of solar panel and wind turbines, for smoother fund flow convergence with other schemes on the same lines may be initiated, introduction of solar pumps for irrigation purpose may go a long way in boosting the agricultural economy

4. Best Practices

- Expansion of solar parks
- Optimization of land use especially Government unused/waste lands lying near the border of the lakes, big ponds and along the river borders
- Enhancing energy stability by normalizing wind and solar energy
- Coverage of rural areas to the most possible extent
- Creation of awareness by door-to-door campaign

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Feedback Note

Section 1: Officer Name and Details:

- Name : **T. Sudhakar**
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- Current Posting : Under Secretary (Stationery & Printing)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Renewable Energy

2. Policy Gaps and Challenges

We need to develop a comprehensive renewable energy policy for Puducherry. We need to engage right technical officials in this regard to promote renewable energy. The Department of Renewable Energy in Puducherry needs more attention. The Department needs to be more pro-active and engage common public in order to create awareness among them. Puducherry is a place where renewable energy can be promoted in abundance and there is a great scope for it. We need to harness it for the benefit of the people. We need to convince political mindset to support Renewable Energy. We need to create more awareness among the people to use the alternative source of Energy i.e., Renewable Energy.

3. Potential Solutions

We can develop solar and wind energies in Puducherry. Both have great scope in Puducherry and we need to tap it accordingly. The schemes of Government of India in this regard to be advertised among people and business communication to create more awareness.

4. Best Practices

Green Energy Corridor, International Solar Alliance, National Smart Grid Mission, Faster Adoption and Manufacturing of Electric Vehicles (FAME) are some of the best practices and schemes which need to be followed for the usage of Renewable Energy.

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Feedback Note

Section 1: Officer Name and Details:

- Name : N. Udayakumar
- Designation : Under Secretary AR Wing
- Batch :
- Current Posting : Under Secretary AR Wing

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

OPPORTUNITIES IN GREEN ECONOMY-RENEWABLE ENERGY

2. Policy Gaps and Challenges

- Lack of data on training requirements and job roles in the RE sector.
- High attrition rates among skilled workers due to contract-based work, low salaries, and limited career progression.
- Limited practical exposure and on-ground training for trainees.
- Mismatch between skilling opportunities and industry needs.
- Limited synergies between skilling institutes and the RE industry.
- Need for quality trainers with industry experience.
- Limited focus on social and gender inclusivity in skilling programs.
- Low entrepreneurship commercialization due to limited business acumen and access to finance:

3. Potential Solutions

- Conduct thorough skill gap assessments and job role analysis to inform skilling programs.
- Offer competitive salaries, benefits, and career progression opportunities to retain skilled workers.
- Ensure longer durations of on-ground training and shop floor exposure.
- Involve industry experts in developing and delivering skilling programs.
- Foster partnerships between skilling institutes and the RE industry for better alignment and job placement.
- Provide training for trainers to enhance their industry expertise.

- Implement inclusive policies and programs to promote diversity in skilling initiatives.
- Offer business training, mentorship, and access to finance for entrepreneurs

4. Best Practices

- Encourage public-private partnerships for skilling and entrepreneurship development.
- Develop Centers of Excellence for emerging RE technologies.
- Implement globally harmonized skill standards and certifications.
- Foster a culture of innovation, R&D, and continuous learning in the RE sector.
- Promote women's participation and inclusivity in the RE workforce.
- Establish incubation centers and accelerators for RE start-ups.
- Monitor progress through Key Performance Indicators (KPIs) and regular assessments.
- Encourage knowledge sharing and collaboration among stakeholders.

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Section 1: Officer Name and Details:

- Name : **Dr. K.COUMARANE**
- Designation : Dairy Development Officer
- Batch :
- Current Posting : Dairy Development Officer (Cooperation Department)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

OPPORTUNITY IN GREEN ECONOMY – Renewable Energy

2. Policy Gaps and Challenges

Puducherry (UT) is a small enclave within Tamilnadu, Kerala &Andra Pradesh. Puducherry is having 120Primary Cooperative Milk Societies . Out of which 25 Primary Cooperative Milk Societies with Bulk Milk Coolers (BMC) , consumes more electricity and increase milk cost to the milk producers.

3. Potential Solutions

- The Ecosystems can be preserved and conserved with the coordination of the following departments:
- All the BMCs will covered under Solar energy systems

4. Best Practices

- Primary Cooperative Milk Society members will get more price for the Milk.
- Electricity consumption will be will be reduced
- Keeping Quality of Milk will be increased

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Feedback Note

Section 1: Officer Name and Details:

- Name : **SIVASANKARAN**
- Designation : COMMISSIONER
- Batch :
- Current Posting : Commissioner

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Renewable Energy

2. Policy Gaps and Challenges

- Lack of awareness among the public regarding usage of Renewable Energy.
- Lack of training to the students in School level regarding usage of Renewable Energy.
- Non availability of training centers for Skill Development in the vicinity of the Sub Urban and Gram Panchayat.
- Lack of user friendly technology in handling hydrogen related technology.
- Space available for installation of solar roof top systems and cost of solar energy Harvesting Technologies.
- Low budgeting of public in promoting Renewable Energy Resources like high cost maintenance and services.

3. Potential Solutions

- Creating more awareness among the public regarding usage of Renewable Energy.
- Providing training to the students in School level regarding usage of Renewable Energy.
- Providing skill development and financial support to the youth and educated people for job creation and entrepreneurship.
- Training for skill development for the unemployed youth and conduct of vocational courses in the Industrial Training Institutes and Polytechnic.
- Conducting awareness program among the household woman for use of solar cell and solar energy for cooking and other purposes.
- Farmers may also be training to utilize the bio products of farming as an energy resource.

4. Best Practices

India's achievement in the Renewable Energy Resources is highly commendable and sustainable. Utilization of tidal, solar and wind energy resources in generation of power. Optimal utilization of fossil fuels and attitudinal change towards the environment and Eco System. Usage of e-vehicles in day to day movement of the public reduces pollution and other health related issues from the clean and green energy.

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Feedback Note

Section 1: Officer Name and Details:

- Name : **Ratnaghosh Kishor Chaure**
- Designation : Deputy Secretary (Finance) / Director (Economics and Statistics)
- Batch :
- Current Posting : Secretary (Finance) / Director (Economics and Statistics)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in Green Economy – Agri-Innovations - (Renewable Energy)

2. Policy Gaps and Challenges

The green economy presents numerous opportunities across various sectors as societies shift towards sustainability and environmentally friendly practices. Various National level policies/mission exist to achieve a Green economy in the nation. India is a mega-diverse country with a variety of ecosystems and biodiversity across different states. There arises a gap in integrating the national-level policy with the state-specific policy which results in fragmented policies, hence there is lack of a unified framework. Current subsidies and financial support are often skewed towards traditional industries, leaving renewable energy and sustainable practices underfunded. Small and medium-sized enterprises (SMEs) often struggle to access funding for green projects due to high perceived risks

3. Potential Solutions

Addressing these policy gaps and challenges is essential for the UT for successful transition to a green economy. A coordinated approach involving government, private sector, and civil society, along with robust investment in technology and capacity building, can pave the way for sustainable growth and environmental resilience. Continued dialogue and collaboration among stakeholders will be crucial in shaping effective policies for a greener future. Under National mission on sustainable agriculture Agri-innovations that offer promising solutions to enhance efficiency can be given priority

4. Best Practices

Agri-innovation to improve precision agriculture the use modern technologies such as GPS, Drone and IoT etc. to monitor various factors that affect the bring up of a produce. Vertical farming, Biotechnology, Artificial intelligence and Big data can also be brought into picture to improve the efficiency. Agri-tech innovations have the potential to transform the agricultural landscape, not only by improving efficiency and productivity but also by creating a wide range of employment opportunities. By investing in skills development and promoting collaboration among stakeholders,

we can harness the full potential of agri-tech to drive economic growth and sustainable development.

Way forward :

Conduct a labor market analysis to identify specific skill gaps and employment needs in the agri-tech sector with respect to green economy. Develop pilot training programs and workshops focusing on green economy agri-tech skills. Engage with local communities to promote agri-tech employment opportunities and initiatives

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Feedback Note

Section 1: Officer Name and Details:

- Name : **ARULRAJAN P, IFS**
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- Current Posting : Conservator of Forests cum Chief Wildlife Warden

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in Green Economy – Renewable Energy & Circular Economy

2. Policy Gaps and Challenges

Union Territory of Puducherry, a unique place where terrestrial and marine ecosystem blended well for potential production and service for effective support of the society. UT of Puducherry striving for better management of resources by adopting novel ideas in the past. With advent of Artificial Intelligence and drone technology, IoT, and allied modern technology along with rediscovering the indigenous traditional knowledge the progressive economic activities by absorbing the factors of the Economic, Ecological, Cultural and theological value-need are taken up to fill the gaps for satisfying the future need. Some of the major gaps and challenges pertinent to UT of Puducherry is as below,

Preservation of Natural Inexhaustible Resources & Conservation of exhaustible Resources:

Puducherry has best owed with **limited Exhaustible Resources** *(flora, fauna and abiotic factors are primarily used for the need of the society in subsistence and commercial activities). Which required better sustainable solutions.* Over-exploitation of Conventional Resources without understandings the carrying capacity led to disaster.

Sustainable Waste Management:

Puducherry harbors greater quantum of waste in the form of solid and liquid especially the plastic waste generated as well as received from neighboring state play major role in diminishing the quality of life and living habitat. A significant amount of waste, including plastic, food waste, and construction debris are diverted in to the living space of the society and certain challenging invisible wastes like micro plastics are dumped in to the Sea. There should be a quantification of **sink and source of the waste** for better preventive and curative actions. **Missing link are wider to deal the**

waste into wealth which required to be done by the producers either domestic or industrial wastes. **Public awareness is trifling** effective use of products/ process without generating them into waste which is ultimate focus of the green economy. **Zoonotic and exotic diseases to the inmates are imported due to un ethical tourism and poor awareness among the public/ tourists** which required scientific and technical better approaches.

Promoting Sustainable Energy:

UT of Puducherry's economy relies heavily up on tourism which directly got higher energy demand for their consumption. With low production sources like solar and wind power generation the purchase of power cost a lot to the government. Excessive inflow of tourists **reduces quality of environment by means of pollution, traffic, exotic diseases** etc. also hyper the energy demand day by day. Mushrooming of some specific specialized industries like **hotel industry led to energy demand which again led to unemployment/ under-employment, production of huge waste** and crisis on land resources. Novel innovative solutions are need of the hour.

Crisis on Indigenous Economy:

Import of exotic products and services led to loss of local economic activities especially the SMSE. Loss the **Indigenous** and **Traditional Knowledge** (**ITK**) based economic activities on **local medicine, ethnic products** etc the migration is rampant. **Migration workforce in search of job lead to crime and unrest in the society.** Loss of local economy by loss of entrepreneur, loss of ITK by which loss of biodiversity.

Impact of Climate Change:

Puducherry is **vulnerable to climate change impacts** like sea-level rise and extreme weather events. This resulted/ induced in **lowered fish catch, invasion of saline water into the ground water, zoonotic disease outburst at times, flood and drought on seasons, low agricultural production due to salinity**, etc. Higher consumption of **electricity** due to mushrooming of hotels to satisfy the need of tourists. Greater number of consumers in synchronized with poor / lower producers and almost negligible decomposition process in the society.

3. Potential Solutions

To achieve convergence of schemes better potential solutions are carved under the umbrella of green economy in Puducherry UT, by adopting following **Innovative Novel Technological Solutions:**

- Internet of Things (IoT) for Waste Reduction and Renewal of Energy: spotting the problem at the source and finding solution with the help of IoT lead to reduction in waste and enhanced energy production in solar, wind and tidal/ wave energy process.

- Artificial Intelligence (AI) & Blockchain-based Supply Chain Management: Implement AI-powered predictive maintenance for infrastructure and equipment, reducing waste and promoting resource efficiency. Predictive analysis on the natural factors like wind, water, wave, sunshine etc are the potential solutions to enhance the production ability of the resources.
- Geographic Information System (GIS) Mapping & Mobile Apps for Citizen Engagement: Create GIS maps to identify potential area of production and linkage of them for sustainable production as well as better waste reduction. The resource optimization circular economy initiatives are source of modern way of dealing the problems. Develop mobile apps to educate citizens, encourage participation, and facilitate reporting of waste management issues. Movement of waste collection vehicles, quantum of waste generation, movement of medical waste and its scientific disposal etc may be monitored.
- Big Data Analytics for Circular Economy Insights: Leverage big data analytics to provide insights on waste generation, resource consumption, and circular economy performance. Geological, geographical, biological and non-biological factors are to be gathered for their practical usage. All departments and their requirement and usage in the past are to be gathered for future progress.
- Digital Marketplaces for Circular Economy Products: Establish digital marketplaces to promote products made from recycled materials, encouraging sustainable consumption. Localized products and process/ services will be placed in the
- Virtual Reality (VR) for Education and Training: Utilize VR to educate stakeholders, including citizens, businesses, and government officials, about circular economy principles and best practices. Many scientific and technological advancements required dissemination among the public in an effective manner.
- Smart Forestry & Environmental activities: Accurate and reliable forestry (management and administration of natural resources by technical and legal aspects) data can be obtained by means of continuous monitoring of forests using advanced technologies, which provides a major opportunity for the development of smart forestry.
- Collaborative Robotics (Cobots) for Recycling: Integrate cobots in recycling facilities to enhance efficiency, safety, and accuracy in sorting and processing recyclables. Marine and coral reef management is essential for sustainable blue economy where the cobots are to be used.

Scope for convergence with other programs & schemes:

- Innovative work forum towards scientific temper in the society: UT of Puducherry is source of information/ knowledge where multi sourced experts are congregated in a small area. Their

knowledge will be made available to all the public especially the young mind through series of talk, seminars, workshops and discussion forum on and off the days. Systematic ways of dissemination of knowledge by the experts and healthy discussion may bring better quality citizens with low/no investment. ITK shall be disseminated to the global market via YouTube etc

- Indigenous & Traditional Knowledge towards better quality life: Food safety and security, traditional local medicine, improved techniques in cyclic use of waste into products and process. Use of local herbal products alternate for hair wash, body wash etc., shall be used to reduce addition of plastic (micro-plastics) in the ecosystem as well as improving local economy.
- Novel use of domestic/ horticulture waste into Green & Greenleaf manure for urban plantation: The domestic and agriculture / horticulture waste are to be used as manure in the urban plantation which reduces the burden of mass waste processing and expenditure to the municipality.
- Urban Green Bio-shield are to be created using the Horticulture and Agriculture residue converted into manures as by products in the city. Bio shield as barrier against noise, light and air pollution. Improved in the Aesthetic value of the urban area.
- Use of local floral & fauna products towards drug de-addition: there are plant and animal species which promote the happiness of human mind by producing Happiness Hormones like dopamine, oxytocin, serotonin etc.,
- These technological solutions & convergence may help UT of Puducherry streamline circular economy initiatives, enhance stakeholder engagement and drive sustainable development in a circular passion.

4. Best Practices

- Establishment of green patches by adopting 3:33:333 ration of greening in the urban sprawl lead to reduced impact of climate change on energy demand for AC, heater etc. greening activities reduces noise, light and dust pollution in the city. Road, River, Coastal and Rail side with use of horticulture & domestic degradable waste as green leaf manure (curbing illumination, noise & other pollution along with rejuvenation of water and soil ecosystem) lead to sustainable life.
- Adopted New & Renewable Energy (solar energy, micro wind energy & wave energy) to reduce carbon footprint. Ecological foot print calculation is done to create awareness among consumers to reduce the impact of human need on energy & resources.
- Adopting Modern Technologies for better future (Aerial Photography & Remote Sensing,

Artificial Intelligence, Drone, Internet of Things etc) for detection of problems in the bottom of the earth to top of the earth i.e. petrology to climatology where all the line department and civil society join with Research Institutions to adopt better doable work as done. They are used in effective use in Education, Health, Finance, Rural Development, Transport, Environment, Fishery/ Animal Welfare and allied administrative sectors and in their productive & conservative process as part of activities of green economy.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **T. Chanemougam**
- Designation : Superintending Engineer cum HoD
- Batch :
- Current Posting : Electricity Department

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Rural Non- Opportunities in Green Economy, Skills and Jobs in the Renewable Energy Sector

2. Policy Gaps and Challenges

- Large scale deployment of renewable energy in India has achieved advancement in economic development, improvement in energy security and in contributes towards mitigation of climate change. The robust Government policies and the support with opportune economic situation have pushed India to be one of the top leaders in the world's most attractive renewable energy market.
- A designed policies, programs and creation of liberal environment expected from Central / State Government for attracting foreign investments to ramp up the country in the Renewable Energy market at rapid rate. Such opportune situation in RE sector can create a large number of domestic jobs both skilled and unskilled in rural and urban area over the years to come.
- Presently, the employment opportunities due to development of RE sector witnesses great momentum in India. However, the non availability of trained workforce in commensurate with the rapid development of RE sector, leaves multiple voids in value chain. Thus, it needs to be identify and address the various obstacles faced by the RE sector in developing the required workforce.

3. Potential Solutions

The suggestions to address the challenges involved in employment opportunities in RE sector.

- The Central / State Government shall institute a robust platform to demonstrate training and educational initiatives imparted to the unskilled, skilled workers, engineers, contractors and entrepreneurs in the RE sector.
- Creation of institutional mechanism for collaboration among policy makers, industrial

innovators, associated stake holders, reasonableness for sharing of expertise, industry best practice, technology and other relevant information in the field of RE sector.

- A lack of consistent data on the potential employment impact of renewable expansion makes it particularly hard to assess the quantity of skilled, semi skilled and unskilled personnel that might be needed. Thus, a robust database on the development of RE sectors, employment opportunities, availability of trained workforce, portraying the supply demand gap of the workforce and opportunities to increase the availability of workforce by imparting training.
- The Government with partnership with industry and educational institutes may institute awareness programs, demonstrations, training, workshops, surveyassessment studies.
- Continuing training / education or Job training needs to be imparted to all workers in RE sectors through institutional mechanism, in order to update their skills.
- Include rural people in the renewable workforce by providing localised training.
- Establish connections between training institutes and renewable power companies to grantee that trained workers are placed in appropriate positions and the training programs match the requirement of the renewable sector.
- A comprehensive policy statement of the Central / State Government should be in place to address the above challenges.

4. Best Practices

The Electricity Department deputes its Engineers to various training programmes conducted in the neighboring States, so as to acquire adequate knowledge in Renewable Energy Sector and also to create trainers in the Department to conduct trainings to the other section of Engineers, workers, contractors etc

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **Dr. A. Muthamma, IAS**
- Designation : Indian Administrative Service
- Batch : 2009
- Current Posting : Secretary Power, Govt. of Puducherry

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in Green Economy - Renewable Energy

2. Policy Gaps and Challenges

Addressing policy gaps and challenges in skilling for the renewable energy sector is crucial for ensuring a sustainable transition to a green economy. Here are some key issues:

1. Inadequate Training Infrastructure

- **Limited Access**: Many State/UT's lack training facilities or programs focused on renewable energy technologies.
- **Absence of/Outdated Curricula**: Existing programs often don't align with current industry needs, focusing more on traditional energy sources. Also, it is to be noted that renewable energy related subjects are not part of the curriculum in Engineering and related Under-Graduate Programmes.

2. Lack of Industry Collaboration

- **Disconnection between Education and Industry**: Insufficient partnerships between educational institutions and renewable energy companies result in skill mismatches.
- **Absence of Industry Standards**: Without standardized training and certification, it is challenging to ensure a consistent level of competency among workers.

3. Awareness and Accessibility

- **Low Awareness of Opportunities**: Potential workers are not aware of career opportunities in the renewable energy sector or the skills required.
- **Geographical Disparities**: Opportunities are concentrated in specific regions, leaving rural areas or developing regions underserved.

4. Resistance to Change

- **Cultural Barriers**: Existing workforce may be hesitant to transition from traditional energy roles to renewables, necessitating retraining and up skilling.
- **Perceived Job Security**: Concerns about job stability in a rapidly evolving sector deter individuals from pursuing training in renewables.

5. Technological Advancements

- **Rapid Change**: The pace of technological advancement in renewable energy outstrip training efforts, making it difficult to keep curricula updated.
- **Emerging Technologies**: Skills related to new technologies (e.g., energy storage, smart grids) are often lagging behind demand.

6. Measurement and Evaluation

- **Lack of Metrics**: There is often no standardized way to measure the effectiveness of training programs, making it difficult to assess and improve them.
- **Difficulties in Tracking Employment Outcomes**: Ensuring that training leads to job placements in the renewable sector is often not monitored.

3. Potential Solutions

Addressing the challenges in skilling for the green energy sector requires a multi-faceted approach. Here are potential solutions to tackle these challenges effectively:

1. Strengthening Education and Training Programs

- **Curriculum Development**: Collaborate with industry stakeholders to create and continuously update curricula that reflect current technologies and practices in renewable energy.
- **Vocational Training**: Establish vocational training programs focused on practical skills for various renewable energy technologies (solar, wind, etc.). It is suggested that the workforce need to be trained in all renewable energy sectors such as solar, wind, bio-fuels & bio-mass, tidal, etc. instead of training persons on one sector exclusively i.e. they may not be called as Surya Mitras/Vayu Mitras rather to be called as Urja Mitras.

2. Industry Partnerships

- **Apprenticeships and Internships**: Promote partnerships between educational institutions and renewable energy companies to offer apprenticeships, internships, and hands-on training

opportunities. The Renewable Energy sector should also be made part of PM Internship Programme.

- **Industry Advisory Boards**: Form advisory boards comprising industry experts to guide educational institutions on skill requirements and trends.

3. Government Support and Funding

- **Incentives for Training Providers**: Provide grants or tax incentives for institutions that offer renewable energy training programs.
- **Public-Private Partnerships**: Foster collaborations between government, industry, and educational institutions to fund and implement skilling initiatives. The trained and certified persons may be utilized immediately for the implementation of Renewable Energy sector related Flagship Schemes such as PM-Surya Ghar Muft Bijli Yojana, Green National Hydrogen Mission, National Bio-Energy Programme, Solar Park Scheme etc.

4. Raising Awareness

- **Outreach Campaigns**: Launch awareness campaigns to highlight career opportunities in the green energy sector and the skills required, targeting schools, communities, and underrepresented groups.
- **Success Stories**: Share success stories of individuals who have transitioned into renewable energy careers to inspire others.

5. Flexible Learning Options

- **Online Courses and Certifications**: Develop online training programs and certifications that are accessible to a wider audience, allowing for flexibility in learning.
- **Micro-Credentials**: Offer short, focused training modules that allow individuals to gain specific skills quickly and can be stacked toward larger qualifications.

6. Lifelong Learning Initiatives

- **Continuous Professional Development**: Encourage current workers in traditional energy sectors to engage in upskilling and reskilling programs to transition into renewables.
- **Support for Transitioning Workers**: Provide resources and support for workers transitioning from fossil fuels to renewable energy, including counseling and training.

7. Standardization and Certification

- **National Standards for Training**: Develop and implement national standards for renewable energy training to ensure consistency and quality across programs.
- **Certification Programs**: Create recognized certification programs that validate skills and knowledge in renewable energy technologies.

8. Research and Innovation

- **Funding for R&D**: Invest in research and development initiatives to explore new technologies and methods in the renewable sector, creating demand for skilled professionals.
- **Innovation Hubs**: Establish innovation hubs or centers of excellence where students and professionals can collaborate on renewable energy projects.

9. Monitoring and Evaluation

- **Impact Assessment**: Regularly assess the effectiveness of training programs and adjust based on industry needs and employment outcomes.
- **Feedback Mechanisms**: Implement feedback loops from employers and graduates to continuously improve training offerings.

10. Inclusivity and Diversity

- **Targeted Programs**: Develop training programs aimed at underrepresented groups in the energy sector, including women and minorities, to build a more diverse workforce.
- **Scholarships and Financial Aid**: Offer scholarships and financial assistance to individuals pursuing education in renewable energy fields.

Implementing these solutions can help bridge the skills gap in the green energy sector, ensuring a well-prepared workforce capable of driving the transition to a sustainable future. It is pertinent to mention that the skilling should not only focus on training the shop floor, but also to train people as Energy Auditors, Battery Technology Experts, Clean Technology Researchers, Sustainability Consultants/Analysts.

4. Best Practices

In the UT of Puducherry, Solar Technician course was introduced in the last academic session at the Women's ITI, Vambakirapalayam wherein 25 girl students were trained for a period of One year. Now they have all completed the course and they are being deployed for providing technical support for the installation and commissioning of Roof Top Solar Plants under the PM Surya Ghar Muft Bijli Yojana.

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FourthNational Chief Secretary Conference
Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Promoting Entrepreneurship, Employment and skilling

2. Policy Gaps and Challenges

The document outlines several **policy gaps and challenges** related to skilling and entrepreneurship in the renewable energy (RE) sector in India. Here are the key challenges mentioned:

Lack of Data on Training Needs:

- There is insufficient data on the specific types and quantum of training required by the RE sector. This includes information on the skilled workforce needed by the private sector, the required job roles, and the skills required. Without this data, planning for workforce training becomes challenging.

High Attrition Rates:

- Programs like the Suryamitra Skill Development Program have experienced high attrition rates due to contract-based work, outstation postings, and lower remuneration. This has led to a significant migration of the trained workforce from RE to other sectors.

Lack of Practical Exposure:

- There is a need for courses to provide more practical, hands-on training. Many training programs lack coordination with the industry, resulting in unfulfilled on-the-job training (OJT) components.

Mismatch between Training and Industry Needs:

- The training courses often do not align with the rapidly evolving technologies in the RE sector, leading to a gap between industry requirements and the skills taught in these programs. This mismatch contributes to unemployment despite the availability of skilled workers.

Insufficient Private Sector Involvement:

- There is a lack of synergy between skilling institutes and the RE industry. The private sector is

not sufficiently incentivized to work with training institutes or provide hands-on training opportunities for students. This gap hinders the practical readiness of the workforce.

Need for Quality Trainers:

- There is a shortage of well-qualified trainers with hands-on industry experience in RE technologies, which impacts the effectiveness and credibility of the training programs.

Gender Inclusivity:

- The document highlights the need for increased gender and social inclusivity in RE sector training programs. There is insufficient focus on ensuring diverse participation and addressing social barriers that prevent women and vulnerable groups from fully participating in the workforce.

Low Entrepreneurship Commercialization:

- While India has a growing start up ecosystem, many RE start-ups struggle to scale and commercialize their innovations after receiving initial funding. This is partly due to limited business acumen among entrepreneurs, even when they are skilled in technology.
- These gaps present challenges for maximizing employment and entrepreneurial potential in India's renewable energy sector. Addressing these issues is key to improving the skilling and training ecosystem

3. Potential Solutions

Data Collection and Workforce Planning:

- Establish a comprehensive data collection system to gather information on the type and quantum of skills required by the industry. This will help in planning the workforce and developing targeted training programs.
- States should clearly define yearly deployment targets for renewable energy to plan for skill development accordingly.

Improving Job Quality to Reduce Attrition:

- Increase job stability and offer better remuneration to reduce attrition rates in programs like the Suryamitra Skill Development Program. This could involve transitioning workers from contract-based jobs to more permanent roles, as well as providing incentives for workers to remain in the sector.

Enhanced Practical Training:

- Ensure that training programs include a longer duration of on-the-job (OJT) and hands-on experience in real industry settings. This requires closer collaboration between training

institutions and the RE industry to ensure that practical training components are effectively delivered.

- Encourage shop-floor training and exposure to industry projects as part of skilling programs to improve the practical readiness of trainees.

Alignment between Industry and Training Programs:

- Develop training curricula in constant consultation with industry stakeholders to ensure the skills being taught align with industry needs. This can involve regular updates to training programs to reflect the latest technological developments in sectors like solar and wind energy.
- Foster public-private partnerships to ensure that training programs are demand-driven and future-proof, considering rapid changes in technology.

Private Sector Involvement and Incentives:

- Incentivize private sector involvement in training and skilling initiatives. This could include tax benefits, grants, or subsidies to companies that collaborate with skilling institutions or provide training and internships for young workers.
- Encourage RE companies to play a more active role in skilling initiatives by setting up training centers and participating in the development of industry-relevant training content.

Upgrading the Quality of Trainers:

- Invest in training and upskilling trainers to ensure that they have relevant industry experience and are capable of delivering high-quality training in RE technologies.
- Create programs where industry experts train trainers to maintain the relevance and quality of training content.

Promoting Gender and Social Inclusivity:

- Develop policies and programs to increase the participation of women and other vulnerable groups in the RE workforce. This could include providing financial assistance, targeted scholarships, or mentorship programs to encourage diverse participation.
- Ensure that data on workforce demographics is collected in a disaggregated manner to track inclusivity and identify areas for improvement.

Supporting Entrepreneurship and Commercialization:

- Strengthen the start-up and entrepreneurship ecosystem by providing targeted support for RE entrepreneurs, including access to finance, incubation centers, and market linkages.
- Address the "valley of death" problem, where start-ups struggle to scale after initial funding, by

providing continuous support through mentorship, business development services, and scaling programs.

- Enhance access to credit and financial resources for start-ups and small businesses in the RE sector by streamlining existing schemes and creating new financing mechanisms.

Fostering an Ecosystem Approach for Job Creation:

- Focus on building ecosystems around RE technologies that involve not just manufacturing and deployment but also allied industries and services, which can create indirect jobs. For example,supporting the ecosystem for solar water pumps or rooftop solar systems can generate demand for developers, channel partners, and service personnel.
- Map out local ecosystems for RE technologies and deploy training centers accordingly, ensuring they cater to the specific needs of the region.

Creating Centres of Excellence for Emerging Technologies:

- Establish Centres of Excellence focused on emerging RE technologies such as green hydrogen, geothermal, tidal, and floating solar power. These centers could serve as hubs for research, development, and specialized training, ensuring the workforce is prepared for the future demands of the RE sector.

Global Standardization and Future-Proofing Skills:

- Align India's skilling programs with global standards to ensure the workforce is prepared to work in international markets and adapt to new technologies.
- Introduce relevant courses in higher education institutions that focus on the future needs of the RE sector, such as Industry 4.0 technologies.
- By implementing these solutions, the RE sector can maximize employment opportunities, address the skilling gap, and support the growth of entrepreneurship, making the most of India's renewable energy potential

4. Best Practices

Public-Private Partnerships for Skilling

- Collaboration with Industry: Establish close collaboration between training institutes and RE industries. Involve the private sector in curriculum development, training delivery, and offering on-the-job training opportunities.
- Incentives for Industry Involvement: Provide incentives for private companies to partner with skilling programs. This could include tax breaks or subsidies for companies that offer apprenticeships or internships to trainees.

Data-Driven Workforce Planning

- Detailed Skills Mapping: Conduct a thorough skills mapping of various RE technologies (solar, wind, bioenergy, etc.) and identify job roles that will be in demand in the future. This ensures that skilling programs are aligned with industry needs and emerging job opportunities.
- State-Specific Workforce Plans: Develop granular, state-specific estimates of RE job potential and ensure that skilling programs are tailored to regional deployment targets and workforce requirements.

Hands-on, Practical Training

- Incorporating On-the-Job Training (OJT): Ensure that all skilling programs incorporate significant hands-on training. This can include internships, apprenticeships, or placements within RE companies where trainees can gain practical experience.
- Partnerships for Real-World Exposure: Work with RE companies to offer shop-floor training and exposure to real-world industry challenges, ensuring that trainees are job-ready upon graduation.

Focus on Continuous Upskilling and Reskilling

- Adapting to Technological Changes: Given the rapidly evolving nature of RE technologies, training programs must regularly update their curricula to keep up with technological advancements, such as in green hydrogen, floating solar, and energy storage systems.
- Long-Term Learning Pathways: Offer continuous learning opportunities for professionals to upskill and reskill. This could be through online modules, short courses, or specialized workshops on emerging technologies.

Quality Assurance in Training Programs

- Qualified Trainers with Industry Expertise: Employ trainers who have significant hands-on industry experience. Training institutions should create certification programs for trainers, and trainers should be regularly assessed and updated on the latest RE technology.
- Train-the-Trainer Programs: Implement programs where experienced professionals from the industry train the trainers, ensuring that the trainers stay updated on the latest technology and practices.

Gender and Social Inclusivity

- Targeted Programs for Women and Vulnerable Groups: Design skilling programs that actively promote gender inclusivity and support the participation of women and other marginalized groups in the RE workforce.
- Safe and Supportive Work Environments: Ensure that training centers and RE companies provide

safe, healthy, and supportive environments for all employees, with an emphasis on inclusivity and diversity.

Supporting Entrepreneurship and Innovation

- Access to Finance for Start-ups: Create a more accessible ecosystem for start-ups by ensuring easier access to finance, mentorship, and business development services. This includes providing support through grants, venture capital, and other financial mechanisms.
- Incubation Centers and Business Development: Set up incubation centers focused on RE innovations. These centers can provide business support, market linkages, and help start-ups commercialize their technologies.
- Bridging the 'Valley of Death': Provide continuous support beyond the initial funding stages to help start-ups scale up and commercialize their innovations.

Global Standardization and Certification

- Align Training to Global Standards: Ensure that skilling programs are harmonized with international standards. This will help Indian workers become employable not only domestically but also in global markets.
- International Certifications: Provide certification courses that align with global benchmarks, ensuring that trainees have qualifications that are recognized internationally.

Ecosystem Approach to Job Creation

- Building an Ecosystem of Allied Services: Jobs in the RE sector should not only focus on direct employment but also consider allied services (e.g., installation, maintenance, financing, and distribution). By promoting these services, more job opportunities can be created in both urban and rural areas.

Developing Local Markets:

- Strengthen local ecosystems by building demand centers in both rural and urban areas, leveraging government schemes like Pradhan MantriKisanUrja Suraksha evamUtthanMahabhiyan (PM-KUSUM) to create employment opportunities through decentralized renewable energy systems.

Focus on Emerging Technologies

- Training for Future Technologies: Develop skilling programs focused on emerging RE technologies like green hydrogen, geothermal, tidal, and floating solar. This will prepare the workforce for future job roles as these technologies become more mainstream.
- Centers of Excellence: Establish specialized Centers of Excellence dedicated to cutting-edge technologies, where research and practical training can take place simultaneously.

Monitoring and Evaluation

- Key Performance Indicators (KPIs): Implement a system of KPIs to monitor the progress of training programs, employment generation, and entrepreneurial activities in the RE sector. These indicators can track job creation, trainee performance, and the impact of policies.
- Feedback Loops for Continuous Improvement: Use feedback from the industry, trainees, and other stakeholders to continuously improve the training programs and ensure they are in line with both current and future needs of the RE sector.

Strengthening Institutional Capacity

- Upgrading Training Infrastructure: Strengthen the existing skilling institutions by providing them with updated equipment, training resources, and digital infrastructure to deliver effective learning experiences.
- Collaboration with Higher Education Institutions: Encourage collaboration between skilling centers and higher education institutions to ensure that graduates are industry-ready and possess both theoretical knowledge and practical skills.
- By adopting these best practices, India can strengthen its renewable energy sector's workforce, enhance employment opportunities, and ensure sustainable entrepreneurial growth in the green economy

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Promoting Entrepreneurship, Employment and skilling

2. Policy Gaps and Challenges

- No subject on solar and renewable energy sector in Engineering Colleges.
- No. of trainees are very less
- Regular upgradation of New Technology
- Lack of involvement of private sector.

3. Potential Solutions

- Introduction of renewable energy subjects in Engineering colleges and I.T.I
- Trainees to be increased in Government and Private Sector.
- Private sector to be given some incentives like Tax benefits etc. to increase their participation.
- Involve woman work force through regular courses and motivation programs.

4. Best Practices

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Promoting Entrepreneurship, Employment and skilling

2. Policy Gaps and Challenges

Electricity Department, Puducherry shall develop a training cell with complete list of skills to be imparted to the new bees in the field. It shall invite fresh vendors and entrepreneurs and a comprehensive training be given to them from grassroots level to the finished product.

To overcome the phenomenon of the "valley of death" by young and new entrepreneurs a system can be created so that they do not fall short of the basic required number of projects in any year in order to continue their survival. This can be achieved as the potential of rooftop solar in Puducherry is on the raise.

A state wide joint conference can be held with all those new and budding entrepreneurs, existing stalwarts in the field, the discoms and the consumers to widely apprise about the various opportunities available.

3. Potential Solutions

To speak about the issues to be resolved in order to face the myriad challenges in achieving the employment opportunities this discom would render necessary assistance and also evolve specific work groups to carry out and monitor the progress in the field.

Periodical on ground training can also be arranged. A coordination meeting can be held with the industries and households to address the bottlenecks and clear the apprehensions vis a vis consumer and the vendor.

The initiatives of Government under "Make in India" in promoting setting up of new medium and small scale industries in the field of renewable energy may be widely published. Special concessions available for manufacturing roof top solar panels may be posted to help improve the job opportunities.

A specialised camp can also be arranged with the women entrepreneurs and self help groups

4. Best Practices

It is indeed a great feat by India in achieving more than 200 GW of non Fossil power generation as of July 2024.

The concept note rightly aims to achieve the same by giving parallel opportunities in employment, entrepreneurship and skilling in the renewable energy sector.

As a discom, Electricity Department, Puducherry can form a dedicated team under one Executive Engineer as the leader and supporting engineers to focus on the development of entrepreneurship, creating employment and skilling.

With these basic initiatives and promotion on the part of Government, days are not far as rightly pointed out by the Honorable Prime Minister of India during the "Global renewable energy summit" held at Ahmadabad between 6th and 8th of September 2024 that India would definitely achieve 500 GW of non Fossil power generation by 2030 as against the present capacity of 200 GW.

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in Green Economy-Circular Economy

2. Policy Gaps and Challenges

- The recycling industry are highly informal
- The data related to circular economy are currently available with different agencies. These are highly complex and it has to be monitor comprehensively especially that related to environmental impacts (greenhouse gas emissions, energy and raw material consumption, waste management and reduction, sustainable development, etc.)
- There is a lack of differentiation between circularity and recycling. The policies around waste management in India broadly focus on end-of-life waste management.
- The recycling industries are not yet ready for reorganized their production processes and the investment in the circular economy will give return only after some long year.
- The recycling technology is also not yet perfected and it is observed that not all waste can be recycled, not all materials can be salvaged, and recycling channels are not completely environmentally friendly.
- Prices of recycled are not competitive. Resource markets do not give competitive prices for recycled waste, fragmented resource markets, lack of economies of scale

3. Potential Solutions

- Use of IoT devices in the product or its packaging to gather data continuously throughout its lifecycle. These IoT sensors collect real-time information during manufacturing, usage, and eventual disposal. Such data is precious as it helps optimize processes, predict maintenance requirements, and enable material recovery during recycling.
- Digital platforms play a role in facilitating the exchange of materials among businesses. These

platforms allow companies to sell or donate surplus materials, promoting an approach to resource utilization. By creating a marketplace for transactions, these platforms effectively reduce waste.

- AI-powered machines equipped with IoT sensors to identify and sort the types of materials present in the waste stream. Automating sorting operations enhances recycling efficiency, leading to quality recycled materials.

4. Best Practices

- Extended Producer Responsibility (EPR) is an important practice designed to facilitate the creation of a circular economy. EPR is a regulatory framework that makes manufacturers and producers responsible for the post-consumer waste generated by their products. The EPR framework encourages producers to adopt sustainable product design practices, increase the use of recycled materials, and support waste management and recycling initiatives
- Swachh Bharat Mission (SBM) is another critical policy intervention when it comes to aspects of waste segregation and recycling. This mission has promoted waste segregation, recycling, and composting, and aims to make India a "zero-waste" country. A reduction in waste generation is central to the goal of a circular economy.
- In the Atal Innovation Mission has encouraged the development of circular business models and encourage the entrepreneurs to adopt sustainable technologies in their business model.
- 2% tax benefit on their income tax to the manufacturers who recycle or reuse more than 60% of new product sales
- In the UT of Puducherry, in the Karaikal District, the source segregation of solid waste has been started in 2017 and the Resource Recovery Park created became a success story. The Plastic recycle, small bio-gas based power generation and manufacturing of compost from biodegradable waste helped to manage the waste. Public has also started to segregate the waste and started to reduce the consumption of plastics.
- The resale of Liquor bottles and reuse of building materials are being done through informal sectors. This can be formalized..

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

CIRCULAR ECONOMY

2. Policy Gaps and Challenges

NIMBY (Not In My Back Yard) syndrome among the people at large is the single-most important obstacle to the creation of a Circular Economy where all waste is treated as a resource and to be recycled back into the economy. There has to be large-scale behavioral change among the public to take responsibility for the waste generated by each household and for willful participation in the recycling and processing of the waste for circulation in the economy. Since segregation at source is the essential first step in recycling of waste, public awareness of the different categories of waste and the willingness of each and every household to segregate wastes effectively is the critical factor in building a circular economy.

In Puducherry, there has been a constant stream of public and political opposition to the levy of user charges for solid waste collection, called simply and not without a hint of contempt as "garbage tax". This is an indication of the challenge we face in erecting a circular economy, because 'garbage' is looked at as something not worthy of charging the people for. In such a context, educating the public and garnering their willful cooperation for a circular economy present a tough challenge.

There is no doubt that a proper legal and policy framework suited to the local conditions and realities in respect of the different categories of waste such as municipal solid waste, wastewater, plastic waste, e-waste, used tyres, used oil, construction and demolition waste, hazardous waste is sine qua non for embarking on the journey towards a circular economy.

Alongside such a legal and policy framework, capacity building of the local bodies and public institutions coupled with allocation of sufficient resources in terms of finances, manpower and technology constitute the basic building blocks of a circular economy. The rules and policies need to be tailored in such a manner as to incentivize and encourage the formal, informal and non-profit sectors to participate significantly in the creation of a circular economy. However, the entire edifice of

legal and policy framework and the institutional infrastructure can succeed only on the back of an informed and responsible citizenry who take responsibility for their own consumption and the waste generated in the process.

3. Potential Solutions

Enforcing far better compliance of norms such as 'polluter pays', extended producer responsibility (EPR), and compliance by the bulk waste generators.

Increase public investments by the Central and State Governments in the components of circular economy, as (a) many facets of waste processing and recycling are at times not lucrative enough for the private players to enter, (b) local bodies are largely crippled in terms of finances and capacity, (c) tax incentives and subsidies are crucial to encourage MSMEs and private entrepreneurs to involve effectively, (d) informal sector which currently performs bulk of the waste processing and recycling cry for more attention and protection in terms of a modicum of a social security for the workers, (e) funding R&D for newer and better technologies, etc.

Convergence with schemes such as MGNREGS, NLM, PMKVY, etc. for localized waste management and recycling, enhancing the role of self-help groups, more and better skilling for youths to avail of the increasing opportunities of a circular economy, etc.

4. Best Practices

None worth mentioning in respect of the theme of 'Circular Economy' from my six years of public service in Puducherry.

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FourthNational Chief Secretary Conference
Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. Policy Gaps and Challenges

Circular economy model prioritizes the continuous use of materials, transforming waste into valuable resources. As Puducherry gains importance as prominent Tourist Destination but with limited resource base, the importance of Circular Economy can hardly be emphasized as same not only provides opportunities to deal with waste thereby adding thrust to tourism potential but also provides ample opportunities for reutilization of resources. Circular Economy in Tourism driven political unit also offers potential for large scale employment generation provided same is backed by vision, policy, execution and finance.

- Challenges in implementing Circular Economy model in Puducherry:
- Policy Challenges
- Absence of Waste Management Policy for UTP which caters specifically to unique geographic, economic , topographic and cultural aspects effecting waste generation.
- Absence of Tourism Policy which highlights importance of waste management and eco-friendly Tourism.
- Pick and choose policy with regards to Policy/Rules framed by GoI with regards to waste management.
- Administrative Challenges
- Crumbling administrative set up of Urban Local Bodies which are marred by absence of staff, finance and administrative leadership.
- Lack of political will to strengthen ULBs which are the core agencies through which Circular Economy can put in place.
- Densely populated UT with highly active and sensitive demography prevents setting up of

necessary waste collection, segregation and recycling plants.

- With most of producers and packaging industries located outside the UT, implementation and enforcement of ERP becomes a challenge.
- Different cultural influences in 4 different regions of UT demands separate strategy for waste management. Proper appreciation of concerns and solutions for issues of outlying regions with regards to waste management remain missing.
- Integration of Local Administration Department with Labour and Higher Education in terms of Skilling for Circular Economy is never thought of.

3. Potential Solutions

- Strengthenimg of Local Administration Dept by providing adequate manpower, skill leadership and adequate financing.
- Properly designed and well executed Resource Recovery Park is required in both Puducherry and Karaikal Regions.
- National Urban Livelihood Mission has to be re-worked and oriented towards achieving the objectives of Circular Economy by emphasizing on Skill Training, Entrepreneurahip in sectors of Waste Recycling, Waste Re-Use and also Seed Funding for SHGs for setting up Start Ups in the same sector.
- Whatever value is generated out of waste, it always demands pumping of more funds to sustain the model. Hence, ERP and CSR funding should be utilised for setting up one corpus to meet SWM needs of ULBs over and above budgetary support.

4. Best Practices

Waste Management Practices in Mahe Municipality can be replicated for sustainable SWM practices contributing to idea of Circular Economy. The main highlights of the model are :

- Waste segregation at source. In house treatment of wet waste by using household practices like pipe composting, bio gas plants and manure preparation for kitchen gardens.
- Door to door collection of dry waste from households. Further segregation leading to sale of valuable waste components to designated agencies this generating value for ULB. Inert waste left behind to be sent to incineration plants.
- Active involvement of SHGs in entire waste management cycle. Twin pit sewage disposal system at each household level.
- Strict collection of User Charges

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

OPPORTUNITY IN GREEN ECONOMY – Circular Economy

2. Policy Gaps and Challenges

Puducherry (UT) is a small enclave within Tamilnadu, Kerala &Andra Pradesh. Puducherry more than 50% urbanization, with forest area covering 13 Sq. KM, accounting to 2.65 % geographical area:

3. Potential Solutions

Puducherry is having more Primary Co-operative Milk Societies.

- Primary Milk Cooperative Society Members in association with Forest & Wildlife, Revenue Department, Tourism Department can identify place & create at least 2 MIYAWAKI Forests in their respective areas.
- Lots of scope for development of Akio Miyawaki Forest in all vacant areas of the Government premises.
- It will be very eco-friendly.
- Creation of Roof Top Miyawaki Forest in urban areas.
- Leads to greater biodiversity.
- Miyawaki forests when maintained prevents calamities.

4. Best Practices

- All PACS and Dairy Co-operatives are encouraged for a green economy through Akio Miyawaki Forest development.
- PACS and Dairies may be encouraged to prepare the soil, like Dig pits add composts, manure, and fertilizers to enrich the soil.

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FourthNational Chief Secretary Conference
Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Sub-theme 3 – Opportunities in Green Economy – Circular Economy

2. Policy Gaps and Challenges

The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended. In practice, it implies reducing waste to a minimum. The circular economy is based on three principles, driven by design: Eliminate waste and pollution. Circulate products and materials (at their highest value) Regenerate nature.

One of the main barriers to implementing circular economy solutions is the perceived high upfront costs. Transitioning from a linear to a circular system often requires investments in new infrastructure, technology, and processes. However, these costs can be offset by long-term savings and benefits.

The main 5 challenges in implementing the Circular economy is :

- Lack of efficient recycling technologies.
- Fear of losing recurrent customers.
- No proper implementation of localized operations.
- No proper understanding of emerging business modes.
- High Investment costs.

3. Potential Solutions

Implementing modular design principles allows products to be easily disassembled and reassembled, promoting repair, upgrades, and component replacement rather than discarding entire products. Designing products with standardized, interchangeable parts makes it simpler for customers or technicians to extend the lifespan of products. For example, modular smartphones with replaceable screens, batteries, and cameras encourage users to upgrade individual components instead of buying entirely new phones.

4. Best Practices

- Adoption of product-service system (PSS).
- Increasing of recyclability of product.
- Use of biodegradable raw materials.
- Dematerialization of product.
- Production of durable-repairable goods

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Feedback Note

Section 1: Officer Name and Details:

- Name : **P. Ragini**
- Designation : Director, Social Welfare Department, Puducherry
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- Current Posting : Director, Social Welfare Department, Puducherry

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. Policy Gaps and Challenges

- Lack of awareness on the concept of "Circular Economy"
- While there is a general awareness on the concept of re-cycling of products, the concept of "Circular Economy", encompassing the other salient features, of repair and reuse, refurbish and re-use, recover and reuse etc., still remain in the realms of ignorance.
- Lack of policies that involve Corporates / Industries and Trading bodies in being active partners in promoting the concept of "Circular Economy"
- Lack of policies that ensure voluntary participation of citizens in these endeavours
- Lack of policy drafted for convergence of all stakeholders by the line departments of PWD and Local Administration Department.
- The concept of "Circular Economy" need not be limited to products of monetary value, but could be enlarged to include Household waste
- The U.T. faces the ingress of Sea water and depletion of ground water. Imperative, it is for employing the concept of re-use, re-cycle, re-purify water to face this challenge

3. Potential Solutions

- The potential solution lies in active participation of corporates/industries/trading bodies and common citizens.
- Realistic policy to be drafted by the line departments in consultation with the Corporates / Industries / Trading Bodies and other active NGOs for setting a new paradigm where they get involved in the concept of not just recycle, but re-use, repair, refurbish etc.
- PWD to draw out a re-defined policy on re-use, re-cycle, re-purify of waste water.
- LAD to similarly work policy for reduce and re-use of household waste

4. Best Practices

- In Government of Puducherry, an initiative was undertaken to de-silt water bodies with the caption of "Water Rich Puducherry".
- The initiative extended to involvement of Private Industries as well as NGOs in the efforts to de-silt identified water bodies.
- This initiative has to be sustained and taken forward by putting in place the right systems

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

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- Designation : Under Secretary To Government (Labour)
- Batch : 2020
- Current Posting : Deputy Labour Commissioner

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Promoting Entrepreneurship, Employment & Skilling- Opportunities in Green Economy-Circular Economy

2. Policy Gaps and Challenges

The Circular Economy basically focus on the extension of the useful life of the products and materials we use so that Waste, Pollution are reduced. The Natural wealth and raw materials are preserved for the Future.

As far as Puducherry is considered, in my opinion, the following are the Challenges among others:

- Buying Behaviour
- Lack of Awareness

Generally, all are purchasing one time use items. This applies to even Government Buying which is against the philosophy of 3R- Reduce, Reuse, Recycle.

Take the case of a simple Pen. What is being used by almost all are of ONE TIME use. Not only the General Public but also the Government buy such pens. Just use and throw. The plastic, metal etc. of the waste go to Trash and are not reused or recycled. The use of Fountain Pens is already History.

Imagine the population and number of Government Offices in the Country. The Waste produced will be of a great magnitude. Do we have any policy to stop this menace?" No" will be my answer

Take the case of Batteries. Each and every household has a clock, remotes for TV and AC. Where do they go after their life?. Just thrown out. That is it. For the house hold it may not be an issue, a trivial one. But we will know the significance if we take into account the number of house holds in the country as a whole. A little crack in the pot will drain the water completely with time.

There is the Battery Waste Management Rules 2022. It applies to the Producers, Dealers, Consumer and to the entities involved in Collection, Segregation, Transportation, Refurbishment and Recycling Waste Batteries. But is it happening on the Ground?.

Is there Extended Producer Responsibility Obligation? It is there but on paper. Are the batteries segregated at the time of disposal by the Consumers?. Doubtful and No. People are not aware of the damages it can cause. Ground and Surface water can be contaminated and it can enter our food chain through fruits and vegetables. Cattles can be affected. The toxic nature of the heavy metals used in the battery can cause havoc.

3. Potential Solutions

- Educating students and Adults.
- Segregation of Waste at source.- Each and every house hold must be made responsible, Resident associations, SHGs can be roped in.
- Educating Rag Pickers and incentivizing them in such a way that they get a decent income which can bring in “win- win” for all.

4. Best Practices

- Puducherry is having a waste yard at Kurumbapet Village. Legacy waste is being disposed by proper segregation, reuse and recycle resulting in Circular Economy.
- Western Countries do produce Electricity from the waste. As we face shortage and purchase electricity, we can explore this avenue as huge quantity of waste is generated every day in Puducherry.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **SURESHRAJ**
- Designation : PCS
- Batch : 2021
- Current Posting : Commissioner, Oulgaret Municipality

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. Policy Gaps and Challenges

In the past our economy has been linear which has resulted in increased economic benefits and prosperity, but on the other hand, it has also led to the overuse of resources by promoting a 'use – and-throw' approach.

To address this issue, we need to focus on resource efficiency by adopting a circular economy. The circular economy is defined as an alternate to the linear 'take-make-waste' approach. It seeks to design out waste, regenerate natural ecosystems and keep materials and products in use for as long as possible. To this end, resources are not consumed and discarded, destroying their value. Rather their value is retained by reusing repairing and re-cycling. The circular economy entails new business models, strategies and innovations focusing on the optimization of process and products.

Oulgaret Municipality generates about 170 tonnes of Municipal Solid Wastes dailies. These wastes are entirely transported to Kurumbapet Resource Recovery Park where the day to day processing of wastes takes place. As there are no lands for intermediate processing stations is available this centralized arrangement which include compost and bio-methanation plants is adopted. This arrangement is capital and land intensive which has limited scope for community based participation, social entrepreneurship, livelihood generation and innovations. This system does not provide access to the recyclable material for the local rag pickers. The livelihoods of such rag pickers in the informal seeker is adversely affected.

However a circular economy aligns with the concept of decentralized waste management.

3. Potential Solutions

As the policy of having a centralized RRP does not support a full-fledged circular economy, Oulgaret Municipality decided to target the BWG insisting them to comply with the Solid Waste Management Rules of 2016. Either they shall process their waste on their own or hand over the waste to any private agency. This has to some extent is a decentralized approach aiding the circular

economy. Here also most of the BWGs are reluctant as they are mostly unaware of the technology and the impact of RRR principles on circular economy.

4. Best Practices

Oulgaret Municipality has a population of 3.00 lakhs. By issuing public notice as specified in its Solid Waste Management bye-laws and a field survey, Oulgaret Municipality has identified 94 BWG in its limit. Oulgaret Municipality has specified the duties & responsibilities of Bulk Wastes Generators in Chapter 7 of it's Bye-laws (http://oulmun.in/admin/whatsnew/20221114134616167500900 1.pdf). The salient features of the specification promoting circular economy are :

- Oulgaret Municipality shall enforce in-situ processing of Bulk Horticulture and Garden wastes in parks, gardens and similar appropriate places, as far as possible.
- Oulgaret Municipality shall facilitate construction, operation and maintenance of solid waste processing facilities and associated infrastructure on its own or through any Agency for optimum utilization of various components of Solid Waste by adopting suitable technology including the guidelines issued by the Ministry of Of Housing and Urban Affairs from time to time and standards prescribed by the Ministry of Environment and Forests so that the dependency of waste disposal on the Sanity Landfills can be minimized to the maximum extent possible.
- The Agency/service providers and /or Empanelled Vendors as applicable shall be allowed to dispose of or sell the Recyclable Non biodegradable Wastes to the Waste Traders or authorized recycling units which recycle waste in accordance with the provisions of these bye-laws and shall be entitled to retain the amounts realized from these sales.

Progress on the implementation of Bulk Waste Generators

- The Oulgaret Municipality has published the Byelaws for Bulk Wastes Generator vide Gazette No: 35-PART-II Dated 10-08-2022. (Oulgaret Municipality Solid Waste Management (OM-SWM) Bye-laws, 2021) and Press release issued through daily newspaper on 29-10-2022 to declare the Bulk waste generators.
- Notices issued to Individuals towards categorization of Bulk Waste Generators on 19-01-2023 onwards.
- So far 94 nos. of Bulk Wastes Generator are identified in Oulgaret Municipality Jurisdiction.
- 4 nos of Service providers empaneled and work order issued on 09-02-2023 by this Municipality towards providing services to identified Bulk Waste Generators and issued press release on 24-02-2023.
- In continuation this Municipality has conducted Awareness -cum- Orientation program

exclusively for BWG's on 31-03-2023 and follow up meeting conducted on 10-06-2023 & 04-07-2023 (Residential Apartments), 14-07-2023 (Hotels, Educational Institutions, Companies & Industrial Estates) 19-10-2023

- (Residential Apartments, and Hospitals) 15-11-2023 (Thattanchavady Industrial Estate and PIPDIC Industrial Estate Mettupalayam). 01.02.2024 has been fixed as deadline for implementation of the provisions within the insitu for the segregation and disposal of wastes. Further, it was informed to the Bulk Waste Generator that Oulgaret Municipal team would be inspect the premises after 25-01-2024 to verify the action taken to segregate at source failure to comply not to collect waste in a mixed manner and imposing fine upto Rs.2,500/- first offence and Rs.5,000/- for subsequent offence as per the Municipal Solid Waste Management Bye Laws would be strictly implemented from February 2024.
- Following which sensitization and handholding meet held in certain apartments

1. Sri Aishwaryam Apartment, Sri Ragavendra Nagar
2. Guna Jeno Apartments, Ajeez Nagar
3. Srinivas Towers, Ajeez Nagar
4. Letitia Apartment , Thanthai Periyar Nagar.
5. Rose Apartment, Venkata Nagar
6. Anugraha Apartment, Pakkamudaiyanpet
7. SriNivas Towers, Oulgaret
8. Alpha Kamban Estate

7. With regard to Major Institutions

IGMC&RI, PIMS, JIPMER, Pondicherry University, St.Joseph of Cluny Higher Secondary School, Hotel Accord and other Institutions have set up infrastructure for composting of green wastes within their campus. Segregation is also being practiced progressively. After February 2024 waste will not be collected in a mixed manner.

8. Segregation and Processing

With the help of Recity-NGO, a compost bin provided to the Letitia Apartment, at Thanthai Periyar Nagar for insitu composting and they have started to segregate and dispose the wastes. In general due to space constraints apartment colonies have requested to practice segregation of waste in a timebound manner , latest by December, and requested to collect the segregated wastes by Municipality as per SWM bye laws user charges from Next Financial year. Necessary follow up action is being taken to implement the segregation and disposal of wastes by all remaining Bulk Waste Generators.

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FourthNational Chief Secretary Conference
Feedback Note

Reference:

http://oulmun.in/images/act-and-rules/Solid%20waste%20management%20rules%202016.pdf (SOLID WASTE MANAGEMENT RULES 2016)

http://oulmun.in/admin/whatsnew/20221114134616167500900 1.pdf (Solid Waste Management bye-laws)

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Feedback Note

Section 1: Officer Name and Details:

- Name : **Dr. G. Latha Mangeshkkar**
- Designation : Director
- Batch :
- Current Posting : Dept. of Animal Husbandry & Animal Welfare

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. Policy Gaps and Challenges

Current Policy Challenges:

- Fragmented regulatory approach towards waste streams, such as solid, e-waste, bio-medical waste and plastic waste, leading to inefficient coordination.
- Insufficient integration of the informal workforce into the formal waste management system, which affects worker safety and hampers large-scale formalization.
- Limited infrastructure and technology in Tier-2 and Tier-3 cities for waste segregation, processing, and recycling.
- Lack of comprehensive awareness and outreach programs, especially in rural areas, where the knowledge about waste segregation and circular economy practices is limited.

Administrative and Implementation Challenges:

- Inadequate financial and technical capacity of Urban Local Bodies (ULBs) to manage waste streams efficiently.
- Absence of real-time tracking mechanisms for Extended Producer Responsibility (EPR) compliance, leading to challenges in monitoring producers' obligations.
- Difficulty in scaling up successful circular economy initiatives at the local level due to lack of adequate infrastructure, finance, and trained human resources.
- Need for standardized and structured skilling programs that include marginalized sectors, particularly in rural and informal settings

3. Potential Solutions

New Technology Solutions:

- Use of AI and machine learning-based waste segregation and material recovery technologies in municipal waste systems to improve efficiency.
- Encourage the adoption of decentralized biowaste treatment units in smaller towns and rural areas to reduce dependence on centralized landfill systems.
- Development of digital platforms for real-time tracking and reporting of EPR compliance by producers, recyclers, and regulators.

Scope for Convergence with Other Schemes/Programs:

- Link Startup India and Atmanirbhar Bharat schemes with circular economy initiatives to foster entrepreneurship in waste management, recycling, and upcycling industries.
- Collaborate with Swachh Bharat Mission (SBM-Urban and SBM-Gramin) to improve waste segregation at source, create employment opportunities, and generate awareness about circular economy principles.
- Integrate circular economy initiatives with MSME schemes to create recycling clusters, promoting small-scale industries focused on waste processing and material recovery

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- Integrate circular economy initiatives with MSME schemes to create recycling clusters, promoting small-scale industries focused on waste processing and material recovery

4. Best Practices

Indore's Zero Waste Model:

- An exemplary model of 100% waste segregation and processing that is scalable for other municipalities across the country. The city's integrated waste management system can serve as a best practice for ULBs to replicate, with a strong focus on community engagement and accountability.

Kerala's Kudumbashree Initiative:

- Empowering women's self-help groups for waste collection, segregation, and composting. This initiative promotes women's employment and self-reliance while ensuring community-based waste management. It serves as a replicable model for empowering marginalized groups while integrating sustainable waste management practices.

Tamil Nadu's Recycling Zones:

- The state has established dedicated recycling zones and industrial parks with incentives for entrepreneurs to set up waste recycling and processing units. This initiative has encouraged local economic growth and sustainable waste management practices, presenting a scalable model for other states to adopt.

Maharashtra's Plastic Ban and E-Waste Management:

- Maharashtra's plastic ban has led to increased recycling capacity and waste-to-wealth initiatives, particularly focusing on hazardous waste streams like e-waste, creating employment and reducing environmental hazards.

Delhi's EPR Tracking Mechanism:

- Delhi has pioneered a digital tracking system for monitoring EPR obligations in the plastic and e-waste sectors, enhancing transparency and compliance. This system can be expanded to other states to ensure effective EPR implementation nationwide

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Feedback Note

Section 1: Officer Name and Details:

- Name : **Dr. N. Ramesh**
- Designation : Senior Environmental Engineer
- Batch :
- Current Posting : Member Secretary, Puducherry Pollution Control Committee

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. Policy Gaps and Challenges

Comprehensive policy on circular economy yet to be evolved Standard Operation Procedure (SOP) have been evolved only for few selected waste streams. Since it is resent emerging field required administrative set up to be put in place. Source and demand need to be inventorised.

3. Potential Solutions

Misused resources are pollutants. Waste of one industry can be resource for another industry. Such type of resource recovery need invention of affordable technology. .

4. Best Practices

Implementation of sector wise circular economy concept would pave way for replicablity in the similar industrial sector. It is easier to scale it and monitor the success rate.

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Feedback Note

Section 1: Officer Name and Details:

- Name : **Devaanandan. S**
- Designation : Assistant Environmental Engineer
- Batch :
- Current Posting : Puducherry Pollution Control Committee

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. Policy Gaps and Challenges

- Market barrier for recycled resources.
- Lack of incentives or positive taxation environment for these circular strategies lead to unequal competition between the recycled and new product. (Primary and secondary raw materials).
- Ineffective waste collection, segregation and channelization to the authorised person.
- Lack of manpower.
- Lack of schemes subsidy schemes for circular entrepreneurs.

3. Potential Solutions

- Policy interventions are required in using secondary raw materials. (re-use construction waste as aggregates, steel slags in road making, maximizing treated water reuse, waste to energy etc.,).
- Ecolabelling of product using secondary raw materials to give importance among the public.
- Provision of special incentive schemes for entrepreneurs in Circular Economy.
- Creation of platforms for waste exchange programme and mobile app facilitate the easy disposal and ensures material reaches circular program.
- Usage of digital technologies may help the transition towards a more sustainable and circular economy.
- Skilling of informal sectors towards refurbishing, recycling of waste and toward circular initiatives.
- Promotion of Industrial symbiosis for circular economy.

4. Best Practices

- Utilization of Hazardous waste as secondary raw materials resource in Industry.

- Utilization of organic waste to generate Bio-gas.

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Feedback Note

Section 1: Officer Name and Details:

- Name : **K. Kalamegam**
- Designation : Environmental Engineer
- Batch :
- Current Posting : Dept. of Science, Technology and Environment, Puducherry

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in Green Economy - Circular Economy

2. Policy Gaps and Challenges

Enforcement and Monitoring:

- Despite existing waste management rules and Extended Producer Responsibility (EPR) policies, their enforcement and monitoring mechanisms often lack adequate staffing and infrastructure. This hinders their effectiveness.

Lack of Incentives:

- Circular business models might not be competitive without incentives to encourage businesses and consumers to adopt them. Well-designed policies are required to establish these incentives.

Resource Recovery and Recycling Facilities:

- The absence of resource recovery and recycling facilities in rural areas poses a significant challenge. This limits the ability to process and reuse waste materials locally.

Skill Development:

- Targeted training programs are necessary to upskill workers in waste management and circular practices, especially in the informal sector. This will enhance their capacity to contribute to a circular economy

3. Potential Solutions

- Developing integrated circular economy framework for U.T. of Puducherry that includes cross-sectoral guidelines for waste reduction and recycling and enhancing resource efficiency.
- Introducing tax benefits and subsidies for businesses adopting recycling, refurbishing, and material recovery practices.
- Encourage private-sector investment in circular economy initiatives through public-private

partnerships (PPP).

- Launching training initiatives to build technical expertise in circular waste management for workers in both formal and informal sectors.
- Investing in decentralized material recovery facilities spread across the Union Territory with advanced machinery is crucial for efficient waste processing and promoting a circular economy.
- Facilitating industrial partnerships where waste from one industry can be used as a resource for another.

4. Best Practices

- The successful reuse of treated wastewater from STPs by bulk drug and chlor-alkali industries in Puducherry demonstrates a valuable circular economy practice. This helps conserve water resources and reduces the demand for freshwater.
- The collaborative efforts between Puducherry Pollution Control Committee and NGOs to train women self-help groups in making handicrafts and products from water hyacinth is another example of circular economy action in Puducherry. This initiative not only promotes sustainable livelihoods but also addresses the environmental issue of invasive water hyacinth.

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Feedback Note

Section 1: Officer Name and Details:

- Name : J. ILANGO
- Designation : Junior Laboratory Assistant
- Batch : AGMU: 2017
- Current Posting : District Collector, Puducherry

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. **Policy Gaps and Challenges**

- There are no policy to promote circular supply chain, since it requires collaboration with multiple stakeholders and industries.
- High initial investment required for implementing a recycling facilities. Hence credit system for circular economy projects are limited.
- The enforcement and monitoring of EPR regulations require adequate staffing to promote awareness among entrepreneurs.
- There is a shortage of skilled manpower in circular economy practices and recycling technologies. Hence a skill training programme converting the informal sector to entrepreneurs need to be promoted.
- Certain waste like E-waste and Construction and Demolition waste are challenging due to complexity of materials and recycling techniques.

3. Potential Solutions

- Schemes such as SBM Urban and Grameen may provide funding for entrepreneurs to establish facilities for circular economy initiatives from both central and State government agency on credit basis.
- GSDP and other skill programmes course may be shifted towards Circular initiatives through promoting informal sector to entrepreneurs.
- Promotion of Decentralized waste management in wards through Public Private Partnership to achieve zero waste and circular initiatives.
- Facilitation of Credit linked loans to entrepreneurs through Pradhan Mantri Rojgar Protsahan Yojana, Aatmanirbhar Bharat Rojgar Yojana and Pradhan Mantri Kaushal Vikas Yojana for

establishing the facilities.

- State level circular economy cell may be created through line departments to benefit the circular entrepreneurs.

4. Best Practices

Encouraging Zero Liquid Discharge treatment systems to ensure reuse of treated water for boilers and cooling towers in pharmaceutical industries.

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FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **Selvanayaki .J**
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- Batch :
- Current Posting :

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. Policy Gaps and Challenges

To promote the adaptation of Circular Economy in the areas identified like Solid Waste Management, Plastic Waste Management, E-Waste Management and Battery waste management, the Government of India has issued rules and implemented by CPCB and SPCBs / PCCs. The State/ U.T. Governments have to make policies for implementation of the above Rules and assist Government of India.

- Infrastructure for recycling / processing
- Access of latest technologies & equipment for ULBs to efficiently manage waste stream
- Inadequate collection, sorting, and segregation of waste.
- Scaling up of start-up ecosystem
- Sector specific skilling across various institutions accessible to marginalised groups
- Access to concessional finance
- Implementation of EPR
- Unsafe and unsanitary conditions for the informal workforce

Administrative and implementing challenges:

- Government of India Programmes like Startup India and advanced vocational Training Scheme in lacking in this U.T. Educational and still development programmes like schemes for upgradation of it is, National Urban Livelihood Mission Entrepreneurship Skill development programme, Assistance to Training Institutions National Apprentice Promotion Schemes are lacking. EPR has been introduced by the MoEF&CC, but due to lack of awareness, entrepreneurs are not come forward to register in EPR Portal.

3. Potential Solutions

If the Circular Economy is in place, the entrepreneurs can give;

- Extensive job opportunities in recycling/refurbishment/processing sector
- Opportunities for business in various stages like collection, sorting, transport, product designers, material experts
- Various process for recycling / processing.

Union Territory Government should mutually identify ways to convergence of existing schemes and initiatives promoting entrepreneurship in identified waste sectors, closely linking with allocated funds for skill development. Re-skilling and up skilling of the existing manpower Bridge courses for skilling of informal sector.

Supportive policy for circular economy by providing: -

- Incentives for setting up of waste recycling, refurbishing and processing facilities
- Incentives power and water tariffs, and land for entrepreneurs
- Single window clearance system for waste management facilities
- Registration of recyclers and producers under EPR
- Focus on product life extension through repair, reuse, and refurbish
- Integration of formal and informal sectors

Fair wages, health and safety, and insurance for workforce in recycling sector

- Awareness generation of on-going schemes and initiatives
- Urban Local Bodies (ULBs) may focus on adequate waste collection and processing for effective waste management practices through outreach programs
- States can initiate campaigns and initiatives to educate stakeholders about
- Skill development opportunities in the circular economy
- Engaging local communities to raise awareness of circular economy

4. Best Practices

- Utilization and treated sewage.
- Bio-mining of Legacy Waste completed
- Exclusive shops viz. “Solai” for alternate products and selling with subsided rates.
- Cloth bag vending machine installed near ozhavar santhai.

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Feedback Note

Section 1: Officer Name and Details:

- Name : **Dr. K.COUMARANE**
- Designation : Dairy Development Officer
- Batch :
- Current Posting : Dairy Development Officer (Cooperation Department)

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

OPPORTUNITY IN GREEN ECONOMY – Circular Economy

2. Policy Gaps and Challenges

Puducherry (UT) is a small enclave within Tamilnadu, Kerala & Andra Pradesh. Puducherry is having 5 Ecosystems

- Marine Ecosystem
- Mangrove ecosystem
- Wetland Ecosystem
- River Ecosystem
- Red Sand Ecosystem

which has to be protected and Conserved for future generation. These Ecosystems have high Educational awareness and Tourism values.

3. Potential Solutions

The Ecosystems can be preserved and conserved with the coordination of the following departments

- Cooperation Department – Primary Milk Cooperative Society Members in association with
- Forest & Wildlife
- Revenue Department
- Tourism Department

4. Best Practices

Primary Cooperative members may be involved in

- Eco- Tourism Management
- Educational Study purpose.
- Creation of Regular awareness by conducting competitions
- Celebrations of the events.
- Regular monitoring of the ecosystem with a specified team.

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Feedback Note

Section 1: Officer Name and Details:

- Name : **N. Prabhu**
- Designation : Junior Engineer
- Batch :
- Current Posting : Puducherry

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy of Solid Waste Management, Plastic Waste Management

2. Policy Gaps and Challenges

Case 1: This feedback note is based on startup recycling industry M/s. Mass Eco Products, located V.Manavely – Odiampet Road, Villianur Commune, Puducherry. The unit is manufacturing Bricks, tiles from plastic waste of Municipal solid waste. Problems faced by the unit are:

- Lack of Mentorship in available for the startup industries like finance options, continuous availability of raw material, marketing channels with regular products.
- The unit is not able to source plastic waste from Material recovery facility (MRF) of Pondicherry Municipality since all wet waste are mixed, thereby sourcing raw material at lower cost option is not available to them.
- Their Product cost compared to normal tile / brick manufacturer is high making difficult to market and sale.
- Unless tax concession and special benefits are provided they cannot successfully provide at low cost.
- As a start up company due to finance problem they are not able to get loans from SIDBI for improving the machineries or scaling up the machineries. Their main problem is fund resource for operating business, no loans are given to them. Making failure model for circular economy in making value added products like this.
- They are not aware of schemes like SBM – Urban, SBM – Gramin
- Since they are not able to operate due to finance source

Case 2: The same challenges for setting up of agarbathi unit / dhoop sticks from flower waste generated from temples exists.

3. Potential Solutions

- Priority of space allocation of industrial sheds in industrial estates/ area is better for them in terms of helping in paying rental charges in private industrial shed.
- Prototype machine development is pending due to their fund source which can be sorted by MSME Technology Centre for developing prototype machines for their product quality improvement.
- Mentoring through District Industries Centre/ Department of Industries & Commerce.
- Stalls for selling products by Govt by special melas for promoting their products required.
- Funding option for operating this business should be provided to make their business sustainable which circular economy will not be realized.
- Govt through policy change should sign an MOU or provide raw material from Material recovery facility (MRF) of Pondicherry Municipality to help these entrepreneurs.

4. Best Practices

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Feedback Note

Section 1: Officer Name and Details:

- Name : **S. SHAKTHYVEL**
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- Batch : 2015
- Current Posting : Director , Local Administration Department

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in Green Economy-Circular Economy

2. Policy Gaps and Challenges

Regulatory Gaps:

While India has introduced various regulations for waste management (such as for Plastic, Electronics, C&D Waste etc), enforcement at the regional level may be inconsistent. Puducherry needs more region-specific policies to align with its unique challenges, particularly regarding coastal waste and industrial waste / byproducts from small-scale & large scale industries.

Awareness and Behaviour Change:

Circular economy principles like reuse, recycling, and resource efficiency are not widely adopted by the industry. Thus, lack of awareness, combined with the high costs associated with shifting from a linear to a circular model, often discourages businesses and citizens from making this transition, due to the unavailability of alternatives. Circular economy models require a shift in consumer behavior, emphasizing reuse, repair, and recycling over consumption and disposal. However, ingrained consumption habits, perspectives of development, aspiration and the "use and throw culture" make it challenging to achieve widespread behavioral change. Without public buy-in, efforts to implement circular practices, such as reducing waste or extending product life cycles face significant roadblocks.

Waste Management Infrastructure:

While there are national policies for various types of waste streams (plastic, electronic, and hazardous waste etc) the local infrastructure is often insufficient to effectively collect, sort, and process waste materials into reusable resources. Integrating the informal sector and improving recycling rates, particularly for materials like low value plastics, electronics, C&D waste remains a major challenge.

Data and Measurement Challenges:

Accurately measuring the impact of circular economy initiatives is difficult due to a lack of reliable data on resource flows, waste generation, and recycling rates. Without standardized metrics, it becomes challenging to set goals, track progress, or evaluate the effectiveness of CE projects. This lack of data can also inhibit evidence-based policymaking and hinder businesses from identifying opportunities for resource efficiency.

Interdepartmental Coordination and Planning:

Circular economy policies often span multiple sectors—waste management, manufacturing, energy, and agriculture—each governed by different regulations. This fragmented approach makes it difficult to align the goals of circular projects projects across government departments, stakeholders and agencies, leading to bureaucratic delays and inconsistencies in policy implementation.

3. Potential Solutions

Developing a Circular Economy Roadmap

A comprehensive circular economy roadmap, with clear policy guidelines, regulations, and performance targets in the context of Puducherry Development Plan is vital. This roadmap should focus on creating value from waste materials, encouraging eco-design in industries, and fostering innovation in waste processing technologies. The roadmap would outline the specific steps Puducherry can take to foster Circular Economy related practices in areas such as plastic waste, e-waste, and organic waste management. Collaboration with environmental experts, urban planners, academic institutions and related stakeholders to develop a long-term policy framework focused on sustainable waste management, setting ambitious recycling which would be adding value by integrating unorganized sectors into the circular economy and waste reduction targets is essential.

Integrating Informal Waste Workers

Puducherry has a large informal sector of waste pickers who play a critical role in recycling. Integrating these workers into formal waste management systems through convergence with centrally sponsored schemes, providing training to them and their associated family members, formal employment, and social benefits, can enhance the efficiency of recycling while improving their livelihoods, providing alternate livelihood options.

Digital Tools for Monitoring and strengthening SWM Value Chain

Deploying digital technologies like QR Code based systems, mobile apps for tracking waste generation, collection, and recycling can make waste management tracking more efficient. Data-driven solutions can help optimize collection routes, monitor waste segregation, and provide real-time

insights to improve decision-making. By implementing data driven solutions, Puducherry can take significant strides toward creating a more sustainable waste management system and promoting a circular economy, reducing its environmental footprint while generating economic benefits.

Promoting Public-Private Partnerships (PPPs)

Public-private partnerships can play a vital role in improving infrastructure for recycling and waste management. The government can collaborate with private firms, startups in sustainable technologies EPR companies and related stakeholders to develop and operate localized recycling solutions for specific types of waste such as coconut shells, organic waste, electronics etc. These partnerships can also help scale up technology investments in recycling, sorting, and remanufacturing processes, which are cost intensive for Urban Local Bodies.

Capacity Building and Awareness Campaigns

Building impactful public awareness about the benefits of the circular economy and educating people on waste segregation are essential steps. Community programs, workshops, and campaigns are to be organised to encourage residents and businesses to adopt practices like reducing, reusing, and recycling waste. Schools and universities can also integrate circular economy concepts into their curricula to foster a culture of sustainability. The concept of waste segregation and management shall be made part of school curriculum.

Incentivizing Recycling and Reuse:

The Government of Puducherry could implement incentive programs to encourage recycling and reuse. For example, offering financial incentives or discounts on utilities for households and businesses that practice proper waste segregation and recycling could significantly boost participation rates. Introducing deposit-return systems for plastic bottles and containers could encourage citizens to return items for recycling. Implementing user fees based collection models where citizens pay based on the amount of non-recyclable waste they generate, while incentivizing the recycling of other materials may be useful in promoting circularity.

4. Best Practices

- The Resource Recovery Park (RRP) functioning at Kurumbapet waste yard churns out a huge quantity of garbage turning it into value added products towards ensuring zero waste targets. The another Material recovery facility (MRF) operating in Dubraypet ensures fairly sourcing material for further processing from formal as well as informal sources thereby ensuring an ethical supply chain. This RRP & MRF ensures collection of waste in a segregated manner and emphasizes on educating citizens to follow segregation of dry waste at source. All the concerned stakeholders were directed to build efficiency in waste management services.

- The waste collected from the city and channeled into the Sanitation Park for processing ensures not only diversion of municipal solid waste but also its processing which reduces the likelihood of this waste entering back into the environment. Reduced plastics and other non-biodegradable waste in the city would mean less water-logging or clogging in drainage systems, thereby sustaining the city during floods. Furthermore, processing of ocean-bound plastic also safeguards the marine environment and protects groundwater from contamination.
- With an intent to make Pondicherry sustainable, Local Administration Department enabled holistic solutions to go beyond efficient waste collection services, and further focus on appropriate circularity for all waste materials collected at the MRF. This state-of-the art infrastructure ensures that this material that would otherwise make its way to the landfills is recovered and brought back into the system, transitioning their current waste management system from linear to circular.
- Through this innovative MRF approach, Local Administration Department ensures that the segregated waste is sorted into different material types, baled to ensure optimal logistics, and sent to appropriate end-of-life solutions through various partnerships established and by leveraging technology. This innovation ensures sustainable livelihoods to the community in the neighbourhood.

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FourthNational Chief Secretary Conference
Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in Green Economy - Circular Economy

2. Policy Gaps and Challenges

Gaps in Enforcement and Monitoring

Puducherry needs comprehensive circular economy policies focusing on 12 thematic areas promoting entrepreneurship, skill development and effective waste management in the region. Despite existing waste management rules and Extended Producer Responsibility (EPR) policies, their enforcement and monitoring mechanisms often lack adequate staffing and infrastructure. This hinders their effectiveness in waste collection, segregation and processing.

Lack of local infrastructure

It is need of time to integrate the informal sector into the circular economy and provide necessary infrastructure to bring circular model of waste management rather than linear.

Lack of Incentives

Circular business models might not be competitive without incentives to encourage businesses and consumers to adopt them. Well-designed policies are required to establish these incentives to promote circular entrepreneurs. As often the capital cost of setting up of recycling facility is quite high. Lack of incentives or positive taxation environment for these circular strategies lead to unequal competition between the recycled and new product.

Resource Recovery and Recycling Facilities

The absence of resource recovery and recycling facilities in rural areas poses a significant challenge. This limits the ability to process and reuse waste materials locally. Market barriers for recycled resources.

Data, Measurement and Monitoring Challenges

There is a need to measure the circular economy initiatives to understand its effectiveness, for replicability and to monitor. There is a lack of reliable data on resource flows from the waste generator to recycler.

Skill Development

Targeted training programs are necessary to upskill workers in waste management and circular practices, especially in the informal sector. This will enhance their capacity to contribute to a circular economy.

Interdepartmental Coordination and Planning

Circular economy is a cross sectoral concept involving various governmental agencies. Hence, it makes it difficult to transform the linear model into circular model as it requires interdepartmental coordination, monitoring and implementation.

3. Potential Solutions

- Developing integrated circular economy framework for U.T. of Puducherry that includes cross-sectoral guidelines for waste reduction and recycling and enhancing resource efficiency.
- Policy interventions are required in using secondary raw materials. (re-use construction waste as aggregates, steel slags in road making, maximizing treated water reuse, waste to energy etc.,).
- Provision of special incentive schemes for entrepreneurs in Circular Economy. Introducing tax benefits and subsidies for businesses adopting recycling, refurbishing, and material recovery practices.
- Encourage private-sector investment in circular economy initiatives through public-private partnerships (PPP).
- Launching training initiatives to build technical expertise in circular waste management for workers in both formal and informal sectors. Integrating the informal workers into formal waste management systems through centrally sponsored schemes, providing training to them and their associated family members, formal employment and social benefits.
- Investing in decentralized material recovery facilities spread across the Union Territory with advanced machinery is crucial for efficient waste processing and promoting a circular economy.
- Promotion of Industrial symbiosis concept for industries. Facilitating industrial partnerships

where waste from one industry can be used as a resource for another.

- Creation of platforms for waste exchange programme and mobile app facilitate the easy disposal, accountability and ensures material reaches circular program. Usage of digital technologies such as Internet of things and machine learning may help the transition towards a more sustainable waste management and achieving circular economy.

4. Best Practices

- The successful reuse of treated wastewater from STPs by bulk drug and chlor-alkali industries in Puducherry demonstrates a valuable circular economy practice. This helps conserve water resources and reduces the demand for freshwater.
- The collaborative efforts between Puducherry Pollution Control Committee and NGOs to train women self-help groups in making handicrafts and products from water hyacinth is another example of circular economy action in Puducherry. This initiative not only promotes sustainable livelihoods but also addresses the environmental issue of invasive water hyacinth.
- Industries in Puducherry play significant role in promoting a circular economy by effectively managing and reprocessing hazardous waste. A prime example is the reprocessing of waste sodium dichromate solution from the pharmaceutical industry. This solution is converted into basic chromium sulfate in the reprocessing industries and supplied as tanning agent for the leather industry. Similarly, spent hydrochloric acid (HCl) generated from galvanizing industries is reprocessed to produce ferric chloride, a coagulant used in wastewater treatment. These practices not only reduce the environmental impact of hazardous waste but also create opportunities for value recovery and resource conservation. By implementing such circular economy strategies, Puducherry contributes to a more sustainable and resilient industrial landscape.

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in the Green and Circular Economy in Puducherry

2. Policy Gaps and Challenges

Puducherry has limited land and water resources, with rapid urbanization leading to increased demand for infrastructure and services makes it vulnerable on resource depletion. Hence, circular economy can help ensure that Green and Circular Economy development is sustainable and minimizes environmental impact by focusing on community engagement, technology integration, and sustainable practices, Puducherry have lot of scope to set an example for other regions in India, by contributing significantly to environmental resilience and sustainability. Puducherry's limited industrial base can make it dependent on imports for certain products and materials. Hence encouraging local manufacturing and supporting small and medium-sized enterprises with local processed raw material from waste can promote circular economy practices by meeting the supply chain locally.

Current Policy Challenges

The Rapid urbanization is putting immense pressure on infrastructure. To balance the economic Growth and Environmental Protection, Building new infrastructure often involves environmental trade-offs. In this regard India faces challenges in securing adequate funding for Financing Green initiatives projects. Hence involving Private sector in green initiatives is essential in terms of advanced green technologies and Promoting domestic innovation. To address this the current Policy Coordination and Implementation in India is very Fragmented across different government departments say that various policy on each sector and department. Hence on larger perception to ensure effective implementation of green policies towards the circular economy is a challenge. Further, the existing regulations do not enforce strict compliance on identification of tracking from generation to process to output which are the hindrances to send to manufacturing industries is. Also, the insufficient financial incentives for local bodies to adopt sustainable practices to promote circular economy is bigger challenge.

Administrative Challenges

Local administration faces resource constraints in even in regular monitoring and management of water, sanitation, and waste effectively. In case of start up for new innovation the decision-making processes towards circular economy are Slow which hinder the implementation of innovative solutions. Besides that there is inadequate Training for Local staff in sustainable practices and technology integration still accelerate the lacking on development towards circular economy.

Consumer Behavior challenge

There may be resistance to adopting new practices and technologies that deviate from traditional linear models to circular model since there is misconceptions about the quality or cost of products. Consumers often prefer new products over used or refurbished items. Further, products made from Circular economy may not be readily available in all markets or may have limited options which dispirits the consumers to go for immediate buying of available products in market. Also, the strong brand loyalty can make it difficult for consumers to switch to circular economy products as consumers may view the products as status symbols. Consumers may have concerns about the potential risks associated with the circular economy products. Increasing the availability of products surplus made from circular economy rather than linear economy product, forces the people to buy the same.

3. Potential Solutions

Comprehensive Policy Framework and Regulatory Framework

Develop a comprehensive policy framework requires Holistic approach that encompasses all aspects of the circular economy, including waste generation to resource allocation model by setting clear and measurable objectives to track waste from origin to raw material. This involves Stakeholder engagement including government agencies, businesses, NGOs, manufacturing industries and consumers, in the policy development process by ensuring the end product based on consumer based product design. Incorporating circular design principles into product design can enhance in the policy leads to recyclability by extending product lifespans. The product lifecycle management practices shall be made mandatory for all the feasible industries by linking with the issue of license.

The current enforceable regulations such as extended producer responsibility (EPR) Schemes impose additional costs on producers, which may be passed on to consumers in the form of higher prices. This may be addressed by tax breaks, subsidies and incentives to the producers. This requires harmonization between different levels of government (national, state, and local) to avoid regulatory burdens and promote a level playing field to promote sustainable circular economy.

International Cooperation:

India further to Collaborate with international organizations to negotiate trade agreements,

circular economy practices and promote the exchange of knowledge and technology at grass root level is vital to bring success on circular economy in all the sectors. Collaborating with international research institutions to set up R&D in every district encourages local entrepreneurs/ startups based on local resource availability will retain momentum in circular economy on longer terms. Further this will accelerate the mutual knowledge sharing, research findings and intellectual properties.

Supply Chain Collaboration & Technological intervention:

Enhancing the traceability and transparency in global supply chains can help identify opportunities for waste management and waste as raw material for efficient resource allocation. Working with suppliers who are committed to circular economy principles can create more sustainable and resilient supply chains to reduce waste and promote sustainability. Utilizing IoT and data analytics to track product lifecycles from generation to waste to material will optimize the logistics on transporting the raw material to the manufacturing sector.

4. Best Practices

The Resource Recovery Park (RRP) functioning at Kurumbapet waste yard churns out a huge quantity of garbage turning it into value added products towards ensuring zero waste targets. The another Material recovery facility (MRF) operating in Dubraypet ensures fairly sourcing material for further processing from formal as well as informal sources thereby ensuring an ethical supply chain. This RRP & MRF ensures collection of waste in a segregated manner and emphasizes on educating citizens to follow segregation of dry waste at source. All the concerned stakeholders were directed to build efficiency in waste management services.

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Fourth National Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic:

CIRCULAR ECONOMY

The current disruptive changes in macro and micro environment call for action to strategize development and spur economic growth ,tackling climate change ,building future programs for waste management and resource preservation. A circular economy is an economic system aimed at eliminating waste , continual use of resources through principles like recycling, reuse, remanufacturing, and regeneration. It contrasts with the traditional linear economy (make, use, dispose) and is seen as essential for sustainability, resource efficiency, and climate change mitigation.

1. The circular economy encourages a transition from linear 'take-make-waste' to multi-life cycle circular value chains in business models, integrating the design-thinking approach for more effective and judicious use of resources.

2. While increased push and focus of government policy being given to advanced computer based manufacturing under Made in India program where huge incentives and subsidies are being given to semi conducters chips manufacturing to keep pace with the requirements of artificial intelligence needs of future. The government of India emphasis on increasing the role of manufacturing sector ,to be part of the global products value chain in the global manufacturing supply chain has stressed the importance of circular economy like never before.

3. The changing consumption patterns will generate more employment and increase per capita income, the effects of such higher production on the environment must also be efficiently managed and mitigated. With India having only 2% of the world's landmass and 4% of freshwater resources, a linear economy model of 'Take-Make-Dispose' would constrain India's manufacturing sector and, consequently, the overall economy. Therefore, it is essential to recognize and revolutionize the material

flow in the manufacturing process and shift towards a circular economy, which provides multipronged economic and ecological benefits.

4. The implementation of a circular economy in India would require an enabling ecosystem that encourages the identification and adoption of new business models. Presently, 377 million people living in urban cities, produce approximately 55 million tonnes of Municipal Solid Waste (MSW) (like organic waste, recyclables like paper, plastic, wood, glass, etc.) per year, with these numbers expected to skyrocket to 125 million MT per year by 2031. Moreover, only 75-80% of the MSW gets collected; out of which only 22-28% is processed, and the rest is dumped in dump yards. MSW generation is projected to increase to 165 million tons by 2031, and further rise to 436 million tons by 2050. . • To drive the nation towards a sustainable circular economy, the government of India has been actively formulating policies and various incentivizing projects such as Plastic Waste Management Rules, e-Waste Management Rules, Construction and Demolition Waste

5. India's rapidly evolving market and high potential for development can provide a competitive advantage over mature economies. The aspirational long-term vision of a circular economy is based on the current strengths of the Indian market and the integration of diverse stakeholders that has the potential to pave the way for fast-tracked sustainable, and resilient prosperity. Circular economy advancements will not only improve urban and agricultural economies' resilience, but will also provide benefits such as climate mitigation, food, and water security, increased biodiversity, job creation, and empowerment of underprivileged communities

6. Despite the immense relevance of the circular economy, the industry currently has a varied awareness of the concept, which poses a significant challenge concerning its widespread adoption in India. It is estimated that by 2050, India would reap yearly benefits of US$ 624 billion (Rs 40 lakh crore) reducing the negative externalities. The transition to a circular economy could result in an additional US$ 4.5 trillion in global economic output by 2030.

Government Policies Supporting India’s Sustainable Circular Economy

To drive the nation towards a sustainable circular economy, the government of India has been actively formulating policies and various incentivizing projects such as Plastic Waste Management Rules, and Metals Recycling Policy. These rules have been formed to achieve sustainable economic growth.

- NITI Aayog also organized an international conference on ‘Sustainable Growth through National Recycling’; prepared a strategy paper, along with the EU delegation to India, on ‘Resource Efficiency’, and four more on resource efficiency in the sectors of steel (with the Ministry of Steel), aluminium (with the Ministry of Mines), construction and demolition (with the Ministry of Housing and Urban Affairs) and e-waste (with the Ministry of Electronics and Information Technology) MoEFCC.

- To expedite the transition of the country from a linear to a circular economy, 11 committees have been formed—to be led by the concerned line ministries and comprising officials from MoEFCC and NITI Aayog, domain experts, academics and industry representatives—for 11 focus areas.
- 11 committees have been formed by the government which comprise representatives from NITI Aayog and the Ministry of Environment, Forest, and Climate Change (MoEFCC), SMEs and industry representatives.
- The National Solar Mission has been formulated which aims to increase the use of solar energy in India.
- The National Electric Mobility Mission Plan has been formed which aims to have at least 30% of all vehicles in India be electric by 2030.
- The National Action Plan on climate change working on formulating a comprehensive strategy for addressing climate change in India.
- The Pradhan Mantri Fasal Bima Yojana,
- The Securities and Exchange Board of India (SEBI) has introduced new guidelines for companies to disclose their environmental, social, and governance (ESG) performance.

2. Policy Gaps and Challenges (Current policy challenges, administrative and implementing challenges with respect to the topic selected)

Current challenges :

Circular economy is an essentially contested concept. Circular economy is a cluster concept consisting of several sub-concepts. All societal sectors are interested in CE ,are having many inter-sectoral and inter-organizational interests and preferences ,Knowledge on sustainability impacts is continuously evolving. Relatively little critical research is available on CE, There exists a Progressive competition with Various actors, organizations and sectors keep coming up with their respective definitions and applications of CE

1.Difficulty and cost of collecting used products,

2.the lack of a supply chain infrastructure to reverse product flows

3. limited public participation;

4. recovery value may be less than the cost;

5. extremely heavy products are difficult to transport and recycle

6..lack of existence of a secondary market.

Challenges and Limitations:

1. Infrastructure

2. Regulatory Framework

3. Public Awareness

4. Economic Viability

5. Scalability

India has an extended producers' responsibility policy but is mainly limited to plastic waste management. To make the model impactful, policymakers must extend its scope and encompass a broader range of materials and products.

1. The first step should be to identify products that offer substantial environmental benefits (for example, reducing energy needs compared to the linear model) that can be refurbished or recycled without incurring significant additional costs.

2. The regulator can make it compulsory for the manufacturers of the identified products to enter into a contractual agreement with the user, in which the products must be returned to the manufacturer in case they are not refurbished and reused.

3. The government can offer tax benefits and incentives if certain thresholds are crossed. For example, if the manufacturers recycle or refuse more than 60 percent of new product sales, they can assume 2 percent of tax benefits in their income tax.

4. Besides, the government must support building infrastructure to collect used products from end consumers for refurbishing or recycling. Regulators can make it compulsory to disassemble products where high-value products can be reused (e.g., electronic items in batteries). 5. The government can establish a green arbitration panel specialising in environmental conflicts to resolve disputes. The use of mediation and arbitration before any legal action to maintain partnership ethos and sustainability focus.

6. The manufacturer gains a reputation as a sustainable corporation, and they disclose better recycling rates compared to their peers. The consumer reduces operational costs through efficient and well-maintained products.

7. Transitioning to a circular economy necessitates a comprehensive and systematic implementation of a roadmap. The net-zero future is such a significant necessity that it will affect every

aspect of our daily lives. As a result, start-ups will have a plethora of opportunities, ranging from plant-based proteins and carbon emission trackers to electric vehicles and new battery technologies, involving waste management in the design phase to assist in closing the loop and contributing to a more sustainable planet.

8. While increased focus and emphasis of Government on manufacturing,the changing consumption patterns will generate more employment and increase per capita income, To avoid the harmful effects of such higher production on the environment, it must also be efficiently managed and to mitigate the harmful effects of increased environment in an efficient, effective and sustainable ways. The adverse impact of a linear economy, where products are manufactured, consumed, and discarded, is evident in the environment and health of humans and animals in India. If we continue with a linear economic model, the problem will only worsen due to a rising material demand in a growing economy and product demand due to a large consumer base.

Circular economy (CE) can alleviate these challenges by reducing discarded products in multiple ways, including prolonging the life of products through proper maintenance and repair, changing product ownership in the secondary market, refurbishing, and recycling. Although there are several benefits of a CE, there are challenges to adopting it on a large scale.

Policy Gaps:

a. Lack of Unified Legislation Disjointed regulations: Many countries have scattered, piecemeal policies on waste management, recycling, and sustainability, but lack an integrated, overarching circular economy framework. Sector-specific policies: Existing policies often target specific sectors (e.g., plastic or electronic waste), missing opportunities for a holistic approach that could encourage systemic circular practices across industries.

b. Inconsistent Definitions and Standards Unclear definitions: There is no universally accepted definition of what constitutes a circular economy, leading to different interpretations and inconsistent approaches. Lack of standardization: The absence of uniform standards for measuring circular economy outcomes makes it difficult to track progress and compare results across regions or industries. This hinders investment and policy development.

c. Focus on Recycling over Prevention Recycling-focused policies: Many circular economy policies emphasize recycling, often neglecting more transformative solutions such as product design for longevity, reuse, and repair. Recycling alone is insufficient to close the loop effectively.

d. Incentives are available for Linear Models Subsidies for extractive industries: Fossil fuels, mining, and other resource extraction industries often receive more government support than circular

economy initiatives, distorting markets and disincentivizing sustainable business models e.Linear tax systems Current taxation systems tend to favor the linear economy (e.g., labor-intensive services such as repair are heavily taxed, whereas raw material extraction is not).

Administrative and Governance Challenges

1. Interdepartmental coordination: Siloed government departments hinder integrated policy implementation.

2. Bureaucratic barriers: Complex permitting processes and regulatory uncertainty discourage innovation.

3. Lack of data sharing: Insufficient data exchange between stakeholders impedes decision-making.

4. Inadequate funding: Insufficient budget allocation for circular economy initiatives.

5. Policy inconsistencies: Conflicting policies across different levels of government.

a. Fragmentation Across Agencies Coordination issues: Circular economy policies often fall under the jurisdiction of multiple ministries or departments (e.g., environment, industry, trade, urban development). This fragmentation can lead to a lack of coherence and difficulties in implementation. Overlapping regulations: Different layers of government (national, regional, and local) may have competing regulations, creating confusion and inefficiencies in execution

b. Limited Local Government Capacity Resource constraints: Many local governments lack the financial and human resources to effectively implement circular economy policies. This includes insufficient staff training, inadequate infrastructure, and a lack of technology access. Knowledge gaps: Smaller municipalities may struggle to understand and apply circular economy concepts, which can lead to poor policy implementation at the local level.

c. Monitoring and Evaluation Gaps Inadequate data collection: Monitoring the success of circular economy initiatives is difficult due to the lack of comprehensive data on resource flows, material use, and waste management. Measuring impact: There are no universally agreed-upon metrics to measure circular economy outcomes (e.g., resource efficiency, lifecycle assessments), which complicates the evaluation of policy effectiveness.

Implementation Challenges

1. Infrastructure limitations: Inadequate waste management and recycling infrastructure.

2. Technological barriers: High costs and limited availability of circular economy technologies.

3. Consumer behavior: Changing consumer habits and preferences is challenging.

4. Supply chain complexities: Difficulty in implementing circular economy practices throughout supply chains.

5. Scalability: Difficulty scaling circular economy solutions.

a. Barriers to Private Sector Engagement High initial costs: Implementing circular economy business models often requires substantial upfront investments in new technologies, infrastructure, and processes. SMEs, in particular, face barriers to entry. Lack of financing: There is insufficient access to funding mechanisms that support circular business models, such as venture capital, green bonds, or government grants.Business models not yet viable: Circular practices such as remanufacturing or take-back schemes may not be profitable without government support, discouraging companies from adopting them.

b. Public Awareness and Consumer Behavior Low consumer awareness: Circular economy concepts like product-as-a-service, extended producer responsibility (EPR), or collaborative consumption are not widely understood by the general public. Resistance to change: Consumers and businesses are often resistant to adopting circular models, especially if they perceive them as more expensive or less convenient than linear alternatives. c. Global Supply Chain Complexity International trade regulations: Global supply chains complicate the enforcement of circular economy policies, especially when products are manufactured in countries with different environmental regulations.

Product design challenges:

Products designed for a global market may not be optimized for circularity, particularly if they are difficult to disassemble, repair, or recycle. Global cooperation is required for the redesign of products to be circular.

4. Other Specific Challenges

a. Technological and Innovation Constraints capacity to implement circular economy principles due to financial and technological constraints. This exacerbates the global north-south divide in environmental policy impacts. Limited technological advancements: Some industries face a lack of innovation in materials and technology that enable circular processes, such as the development of biodegradable materials or more efficient recycling systems. Data-sharing platforms: In a circular economy, efficient resource use requires transparent, open data-sharing platforms that facilitate collaboration across supply chains, which are often lacking.

b. Global Inequalities Unequal access to circular economy benefits: Developing countries may not have the same Waste colonialism: The export of waste from wealthier countries to less developed ones undermines circular economy goals and perpetuates environmental injustice.While the transition to a

circular economy is crucial for long-term sustainability, several policy gaps and challenges need to be addressed. Governments, private sectors, and civil society must collaborate to develop clearer, more unified policies that incentivize circular practices, build capacity at local levels, and overcome administrative hurdles. Only with coordinated effort can we close the loop on resources and foster a truly sustainable economy.

Circular Economy: Potential Solutions The transition to a circular economy (CE) requires innovative approaches, new technologies, and strategic convergence with existing policies and programs to overcome challenges in implementation. The goal is to shift from the traditional linear economy (make-use-dispose) to a more sustainable system where resources are kept in use for as long as possible, and waste is minimized. 3. Potential Solutions (Can potentially highlight new technology solutions, scope for convergence with other schemes/ programmes etc.)

Potential Solutions:

1. Develop comprehensive circular economy policies
2. Establish standardized metrics and monitoring systems
3. Implement extended producer responsibility
4. Offer economic incentives (tax breaks, subsidies)
5. Invest in education, training, and infrastructure
6. Foster interdepartmental coordination and data sharing
7. Encourage public-private partnerships
8. Support research and development

Key Stakeholders: 1. Governments 2. Businesses 3. Consumers 4. Civil society organizations 5.

Research institutions Recommendations:

1. Conduct thorough policy assessments and gap analyses.
2. Develop circular economy roadmaps and action plans.
3. Establish public-private partnerships to drive innovation.
4. Invest in education and training programs.
5. Monitor progress and adjust policies accordingly.

Addressing these policy gaps and challenges is crucial for transitioning to a circular economy, mitigating climate change, and ensuring sustainable development.

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Fourth National Chief Secretary Conference
Feedback Note

Circular Economy: Potential Solutions

A. Technological Innovations and Solutions:

1. Digital Platforms: Product-as-a-Service (PaaS), sharing economy platforms, and online marketplaces.

2. Internet of Things (IoT): Smart sensors for waste management, energy efficiency, and resource tracking.

3. Artificial Intelligence (AI): Predictive maintenance, quality control, and waste reduction.

4. Blockchain: Transparent supply chain management, product tracking, and authentication.

5. Biotechnology: Biodegradable materials, waste-to-resource conversion, and bio-based packaging.

6. 3D Printing: Reduced material waste, customized production, and product design optimization.

7. Advanced Recycling Technologies: Chemical recycling, waste-to-energy conversion, and closed-loop recycling.

a. Advanced Recycling Technologies Chemical recycling: Unlike traditional mechanical recycling, chemical recycling breaks down plastic waste into its basic chemical components, allowing for the production of new materials of the same quality as virgin plastic. This technology can address challenges related to plastic waste, especially non recyclable plastics. AI and robotics in recycling: Artificial intelligence (AI) and robotics can improve the efficiency of sorting waste materials, making it easier to separate recyclables from non-recyclables. This can reduce contamination and improve the quality of recycled materials. Biodegradable materials: The development of biodegradable and compostable materials from natural resources (e.g., plant-based plastics) can reduce the environmental impact of packaging and single-use products.

b. Product Design and Innovation Design for disassembly: Products should be designed with modularity and easy disassembly in mind, allowing for repair, reuse, or recycling of individual components. This is particularly crucial for electronics and consumer goods. Additive manufacturing (3D printing): 3D printing allows for the on-demand production of products and parts, reducing waste in manufacturing processes. It also enables customization, repair, and the production of spare parts, extending product lifespans. Internet of Things (IoT) and Digital Twins: IoT sensors and digital twins (virtual replicas of physical products) can help track the condition of products throughout their lifecycle, enabling predictive maintenance and efficient resource management. This technology can improve the circularity of high-value assets, such as industrial machinery or vehicles.

c. Blockchain for Supply Chain Transparency Circular supply chains: Blockchain technology can provide transparent and traceable supply chains, ensuring that materials are sourced ethically and recycled or reused responsibly. It can track product lifecycles, ensuring circular practices like remanufacturing, repair, and material recovery. Extended Producer Responsibility (EPR) tracking: Blockchain can enhance EPR programs by allowing producers to track their products beyond the point of sale and ensure they are reclaimed, reused, or recycled at the end of their life.

B. Policy and Regulatory Solutions:

1. Extended Producer Responsibility (EPR) legislation.
2. Product design standards and regulations.
3. Waste management and recycling targets.
4. Tax incentives for circular economy businesses.
5. Green public procurement policies.
6. Circular economy-focused research funding.
7. Standardization and certification programsns

a. Convergence with Existing Policies and Schemes /Programmes:

1. Integration with Sustainable Development Goals (SDGs).
2. Alignment with climate change mitigation strategies (Paris Agreement).
3. Synergies with renewable energy systems (solar, wind, hydro).
4. Collaboration with sharing economy and collaborative consumption initiatives.
5. Leveraging circular economy principles in urban planning and smart city development.
6. Incorporating circular economy concepts in education and workforce development programs.
7. Partnerships with industry-led initiatives (e.g., Ellen MacArthur Foundation). Integration with climate policies:

Circular economy policies can be integrated with national climate change strategies, as they contribute to reducing emissions through more efficient resource use and waste reduction. For instance, circular economy actions can be part of countries' Nationally Determined Contributions (NDCs) under the Paris Agreement. Synergies with Sustainable Development Goals (SDGs):

Circular economy practices align with multiple SDGs, such as SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action). Governments can promote circular economy initiatives as part of their SDG strategies, creating shared objectives across policy areas. Green public procurement: Governments can lead by example by adopting green procurement policies, where public entities prioritize purchasing products designed for circularity (e.g., recycled content, repairability, or remanufactured goods). This creates demand for circular products and services.

b. Circular Taxation and Economic Incentives Tax reforms favoring circular models: Governments can restructure taxation systems to support circular activities by lowering taxes on repair services, remanufactured products, and secondary raw materials, while increasing taxes on virgin resource extraction or waste disposal (e.g., landfill taxes). Subsidies for circular businesses: Direct financial support or subsidies can encourage businesses to invest in circular innovations, such as creating take-back schemes, repairing products, or developing products as services. Carbon pricing: Integrating carbon pricing into circular economy policies can help capture the environmental costs of wasteful production and incentivize more resource-efficient practices.

c. Private Sector and Business Solutions

a. Circular Business Models Product-as-a-Service (PaaS): Companies can shift from selling products to providing services. For example, instead of selling equipment, companies could rent or lease products, maintaining ownership and responsibility for repairs, upgrades, and recycling. This encourages durability and resource efficiency. Sharing economy platforms: Platforms like ride-sharing, equipment sharing, or peer-to-peer marketplaces can reduce the demand for new products by maximizing the use of existing resources. This approach is highly effective in sectors like transportation, tools, and real estate. Reverse logistics: Companies can develop reverse logistics systems where consumers can return products at the end of their life for repair, refurbishment, or recycling. This is particularly important in electronics, textiles, and packaging industries.

b. Collaboration and Industry Coalitions Circular supply chain partnerships: Businesses across different sectors can collaborate to create circular supply chains. For instance, waste materials from one industry can be used as inputs for another. Collaboration between manufacturers, suppliers, and recyclers can improve material recovery and reuse. Sector-specific coalitions: Industry-specific coalitions can create guidelines and best practices for implementing circular economy principles, ensuring that companies across the sector adopt consistent and effective approaches.

D. Capacity Building and Education

a. Public Awareness Campaigns Consumer education: Governments and civil society organizations can launch educational campaigns to raise awareness of circular economy principles, such as the benefits

of buying durable, repairable, and recycled products. This can shift consumer behavior towards more sustainable consumption patterns. Labeling and certification: Clear labeling schemes can help consumers identify circular products, such as those made from recycled materials or designed for easy repair and disassembly. Certification programs can further build trust in circular products.

B . Workforce Training Reskilling for circular jobs: As circular business models grow, workers will need to develop new skills in areas such as product repair, remanufacturing, and recycling technologies. Governments and educational institutions can develop training programs to prepare the workforce for these roles. Support for SMEs: Small and medium-sized enterprises (SMEs) often face barriers to adopting circular practices due to limited resources. Governments and industry associations can offer technical support, training, and financial assistance to help SMEs integrate circular economy principles.

E. Social and Behavioral Solutions:

1. Education and awareness campaigns.
2. Consumer engagement and feedback mechanisms.
3. Collaborative consumption and sharing initiatives.
4. Community-based waste management programs.
5. Social norms and behavioral change interventions.
6. Circular economy-focused community development projects.
7. Incentives for sustainable consumer behavior.

F. Cross-Sectoral Collaboration and International Cooperation

a. Global Partnerships for Circularity International cooperation on standards: Countries can collaborate to establish international standards for circular products and materials, ensuring consistency in practices such as recycling, product labeling, and resource recovery across borders. This is especially important for global supply chains. Technology transfer and knowledge sharing: Developed countries can support developing nations in adopting circular economy principles by providing access to technologies, funding, and expertise. This can help address global inequalities in resource use and waste management.

b. Convergence with Development Programs Linking with development finance: Circular economy projects can be integrated into international development programs, especially in areas like waste management, urban planning, and sustainable agriculture. Development banks and international organizations can support circular economy initiatives in emerging markets through funding and technical assistance. Circular cities programs: Urban areas are critical for the circular economy due to the concentration of resources and waste. Municipalities can adopt circular economy strategies in city

planning, housing, transportation, and waste management. Programs like the EU's Circular Cities and Regions Initiative (CCRI) provide blueprints for urban circularity.

G. Creation of Metrics

1. Waste Reduction: Tracking reduction in waste generation.
2. Recycling Rates: Measuring recycling efficiency.
3. Carbon Footprint: Monitoring greenhouse gas emissions.
4. Water Conservation: Tracking water savings.
5. Economic Benefits: Assessing job creation and cost savings.

Key Sectors for Circular Economy Implementation:

1. Textiles
2. Electronics
3. Food and Beverage
4. Construction
5. Automotive

Enabling Factors:

1. Policy Support
2. Technology Innovation
3. Stakeholder Engagement
4. Education and Awareness 5. Financial Incentives

H. Implementation Roadmap:

1. Short-term (0-3 years): Policy development, technology deployment, and pilot projects.
2. Medium-term (4-7 years): Scaling up successful initiatives, developing new technologies.
3. Long-term (8-15 years): Mainstreaming circular economy practices, achieving significant impact.

Potential Impact of implementing the above suggested solutions

1. Reduced greenhouse gas emissions (up to 50%).
2. Increased resource efficiency (up to 30%).

3. Job creation (up to 1 million).

4. Waste reduction (up to 80%).

5. Economic benefits (up to 1.5 trillion USD). By implementing these solutions, we can transition towards a circular economy, mitigate climate change, and ensure sustainable development.

Circular Economy The transition to a circular economy presents a significant opportunity to address environmental challenges while creating new economic opportunities. By leveraging technological innovation, aligning policies with existing frameworks, fostering collaboration across sectors, and building public and business capacities, we can accelerate the shift towards a more sustainable, resource-efficient, and resilient economy.

Circular Economy: Best Practices

A circular economy (CE) aims to create a regenerative economic model by designing out waste, keeping products and materials in use, and regenerating natural systems. Around the world, many regions, districts, and sectors have already implemented innovative and effective circular economy practices that are sustainable, replicable, scalable, and monitorable. These best practices demonstrate how circular economy principles can be applied across different levels—local, regional, national—and in various industries. 4. Best Practices (Highlights the practices, which are sustainable, replicable, scalable, monitorable etc. Can also highlights the block/district/ State level practices)

BEST PRACTICES International Sustainable Practices in Circular Economy

1. Dutch Circular Economy: Netherlands' national circular economy strategy.

2. Sweden's Waste-to-Energy: Converting waste into heat and electricity.

3. Japan's Extended Producer Responsibility: Manufacturers responsible for product waste.

4. Germany's Closed-Loop Recycling: Recycling rates exceeding 65%.

5. Finland's Biogas Production: Converting organic waste into energy.

Replicable and Scalable Practices :

1. Product-as-a-Service: Companies offering product rentals and sharing.

2. Sharing Economy Platforms: Online platforms for sharing resources.

3. Closed-Loop Production: Designing products for recyclability and reuse.

4. Biodegradable Packaging: Alternatives to plastic packaging.

5. Community-Led Waste Management: Engaging local communities in waste management.

a. Germany's Extended Producer Responsibility (EPR) Germany's Packaging Act: Germany is a pioneer in implementing the Extended Producer Responsibility (EPR) model. Under this system, manufacturers are legally required to take back, recycle, or reuse packaging waste. It has resulted in one of the highest recycling rates in the world, with over 65% of municipal waste being recycled. Replicability: EPR policies can be adapted to various industries, including electronics, automotive, and textiles. Countries like Japan, France, and South Korea have adopted similar schemes for electronics waste (e-waste).

b. Denmark Industrial Symbiosis Kalundborg Symbiosis, Denmark: This project brings together companies from different industries that exchange by-products, energy, and waste. The by-products of one company become the raw materials for another. For example, surplus heat from a power plant is used to heat nearby homes, while waste from a pharmaceutical company is used as a fertilizer. Scalability: Industrial symbiosis can be scaled to industrial parks, clusters, and even across regions. The Kalundborg model has inspired many similar projects across Europe, proving the concept is scalable and can significantly reduce waste and carbon footprints.

c. San Francisco, USA Zero Waste Initiatives San Francisco, USA: San Francisco has set an ambitious goal of achieving zero waste to landfill by 2030. The city has implemented robust waste separation systems, composting programs, and strict recycling policies. Businesses and residents are required to compost and recycle, and the city provides extensive education to encourage compliance. Replicability and Scalability: Zero waste initiatives can be implemented in other cities and districts. Municipalities worldwide can replicate such programs by adopting comprehensive waste management systems and educating citizens on their role in waste reduction.

d. The Netherlands' Circular Procurement The Netherlands' Circular Procurement Program: The Dutch government is a leader in integrating circular economy principles into public procurement policies. Public agencies prioritize purchasing goods and services designed for reuse, repair, and recycling. For example, they procure furniture that can be disassembled and remanufactured. Replicability: Circular procurement practices are easily replicable in both public and private sectors worldwide, influencing supply chains and encouraging businesses to adopt circular practices in product design. Scalability: This can be scaled across various sectors, such as construction, IT equipment, and textiles, to create a demand-driven push toward circularity.

e. Global Repair Café Network: Repair Cafés are community hubs where people can bring broken items (e.g., electronics, clothing, bicycles) to be repaired for free by volunteers. This extends the lifecycle of products, reduces waste, and fosters a culture of repair rather than disposal. Replicability: Repair Cafés can be easily replicated at the local or district level in communities, educational institutions, and workplaces. They encourage skill-sharing and raise awareness about sustainability. Scalability: The

concept is scalable through partnerships with local governments, businesses, and educational institutions, making it possible to establish repair centers as part of circular hubs in cities and towns globally.

f. Freiburg, Germany Circular Construction Practices Freiburg, Germany - Circular Construction in Green Buildings: Freiburg, known as the "Green City," is a leader in using circular economy principles in urban development. The city's buildings are designed for disassembly, meaning they can be easily deconstructed and their materials reused. Furthermore, buildings are made from recycled or locally sourced materials. Replicability and Scalability: Circular construction practices are replicable in both urban and rural areas, promoting the use of sustainable materials and design for disassembly. These practices can also scale to large infrastructure projects, particularly in new city developments or green building initiatives.

Circular Economy Monitorable Practices

1. Japan's Monitorable Practices a. Waste Audits and Monitoring Systems Japan's Circular Economy Monitoring System: Japan has developed a comprehensive monitoring system for its circular economy initiatives. By conducting regular waste audits and tracking material flows, the country measures the success of its recycling and waste reduction programs. Japan also monitors resource productivity and the use of recycled materials across industries. Replicability: Countries and local governments can implement similar monitoring systems to track the progress of their circular economy policies. Waste audits are also useful tools for businesses looking to reduce their waste footprint. Monitorability: These systems provide measurable outcomes, such as the percentage of materials recycled, reuse rates, and reductions in resource use, which help policymakers assess progress.

2. Ellen MacArthur Foundation's Circular Economy Indicators Ellen MacArthur Foundation's Circularity Indicators: The Ellen MacArthur Foundation has developed a set of indicators that help businesses and governments measure how circular their products and services are. These indicators track material flows, product lifecycles, and resource efficiency, enabling organizations to identify circular economy opportunities. Replicability: Governments and businesses worldwide can use these indicators to assess their circular economy performance. These metrics are versatile and adaptable to different industries and contexts. Monitorability: Circularity indicators provide clear, actionable data on resource use and waste reduction, making it easier to monitor progress and refine circular economy strategies.

3. Amsterdam's Circular Economy Action Plan (Netherlands) Amsterdam's 2020-2025 Circular Strategy: Amsterdam has adopted an ambitious circular economy action plan focused on three key areas: construction, organic waste streams, and consumer goods. The city aims to halve the use of raw materials

by 2030 and transition to a fully circular economy by 2050. Strategies include circular construction, shared mobility schemes, and organic waste recycling.

Replicability and Scalability: The model is replicable for other cities worldwide, particularly in urban areas with similar resource challenges. Amsterdam's focus on specific sectors like construction and consumer goods makes it scalable in other urban contexts. Cross-Sectoral Best Practices d. Sweden's Circular Fashion Initiatives Sweden's Circular Fashion Innovation: Brands like H&M and Filippa K in Sweden are integrating circular economy principles into fashion by offering clothing rental, resale of second-hand goods, and take-back programs for recycling old clothes. These initiatives reduce textile waste and promote sustainable consumption patterns.

Replicability: Circular fashion initiatives are replicable across the global textile industry. These practices can be adopted by brands and retailers of all sizes, particularly through collaboration with recycling companies and second-hand marketplaces.

Scalability: The circular fashion model can scale through partnerships with global retailers and the growing demand for sustainable fashion, making it applicable in both developed and developing markets District/State-Level Best Practices of India Circular economy best practices highlight the importance of sustainable, replicable, scalable, and monitorable solutions. From local initiatives like repair cafés to large-scale policies such as industrial symbiosis and zero waste cities, these practices demonstrate how circular economy principles can be effectively implemented across sectors and regions

National Best Practices (India):

1. Kerala's Waste Management: Source segregation, composting, and recycling.
2. Tamil Nadu's Plastic-Free Initiative: Banning single-use plastics.
3. Maharashtra's Recycling Program: Door-to-door collection and recycling.
4. Gujarat's Industrial Symbiosis: Sharing resources between industries.
5. Pune's Smart City Initiative: Integrating circular economy principles.

Block/District Level Best Practices:

1. Alappuzha (Kerala): Zero-waste village, with 100% segregation and composting.
2. Sikkim's Organic Mission: State-wide organic farming and waste management.
3. Tirupur (Tamil Nadu): Textile industry adopting circular economy practices.
4. Warangal (Telangana): Integrated solid waste management system.

5. Mysuru (Karnataka): Successful implementation of waste segregation and recycling.

a. Gujarat, India – Circular Economy in Industrial Estates Gujarat Industrial Development Corporation (GIDC) Circular Initiative: Gujarat has implemented circular economy principles in several industrial estates, focusing on waste minimization, resource recovery, and energy efficiency. The estates operate with zero liquid discharge (ZLD) systems, where wastewater is recycled and reused, and waste is converted into energy. Replicability: This model can be replicated in other industrial clusters across India and globally, where industrial symbiosis and resource sharing can significantly reduce waste and increase efficiency. Scalability: The practices implemented in Gujarat's industrial estates can be scaled across other manufacturing and industrial sectors, particularly in regions where industries are concentrated. Puducherry, a Union Territory (UT) of India, is taking steps toward incorporating circular economy (CE) principles to promote sustainable development, resource efficiency, and waste minimization.

b. Sikkim, India - Organic and Waste-Free State Sikkim's Zero Waste and Organic Farming Initiative: Sikkim is the first state in India to become fully organic, banning the use of chemical pesticides and fertilizers. The state has also implemented strict waste management policies, encouraging composting, recycling, and minimizing waste generation. Sikkim has a high level of community involvement in waste reduction programs, which ensures widespread participation. Replicability: Sikkim's model can be replicated in other regions aiming to integrate organic agriculture with circular waste management practices, particularly in agrarian economies. Scalability: With proper government support and community engagement, Sikkim's model can scale to other states, contributing to sustainable agriculture and reduced waste. By adopting these models, governments, businesses, and communities can contribute to a more resource-efficient, sustainable future.

Circular Economy initiatives in the Union Territory of Puducherry region faces unique challenges, such as limited land area, population density, and dependency on tourism, but these challenges also create opportunities for circular initiatives that can enhance economic resilience and environmental sustainability. Here's a look at the circular economy efforts in Puducherry, along with opportunities for scaling.

1. Current Circular Economy Initiatives in Puducherry

a. Solid Waste Management Door-to-Door Waste Collection and Segregation: Puducherry has introduced door-to-door waste collection services, encouraging households to segregate waste at the source (wet, dry, and hazardous waste). This segregation is critical for recycling, composting, and reducing waste sent to landfills. Composting Units: The government of Puducherry promotes the use of composting units, especially in rural areas and community centers. Organic waste is converted into compost, which is used in agriculture and horticulture. Swachh Bharat Mission (Clean India Mission: As

part of this national initiative, Puducherry has been working on reducing waste generation and promoting cleanliness in public spaces through campaigns and infrastructure development, such as public waste bins, sanitation drives, and awareness programs.

b. Plastic Ban and Recycling Initiatives Ban on Single-Use Plastics: In line with India's national goals, Puducherry has imposed a ban on single-use plastics, such as plastic bags, straws, and cutlery. The administration has been actively promoting alternatives, like cloth bags and biodegradable materials. Plastic Recycling Programs: The UT has initiated plastic recycling programs through partnerships with local recyclers. Plastic waste is collected and processed for reuse in various industries, such as construction (road building) and manufacturing (plastic-based products).

c. Water Resource Management Rainwater Harvesting: Puducherry faces periodic water scarcity, and rainwater harvesting is being encouraged as a sustainable solution. Residential and commercial buildings are required to install rainwater harvesting systems to capture and reuse water, reducing dependence on external sources. Wastewater Recycling: The Puducherry administration has explored wastewater recycling technologies in some areas. Treated wastewater is used for irrigation, landscaping, and industrial purposes, reducing freshwater consumption and promoting water circularity.

d. Tourism and Sustainable Development Eco-Tourism Initiatives: Given Puducherry's reliance on tourism, the UT is promoting sustainable tourism practices. Eco-friendly resorts, plastic-free beaches, and heritage conservation efforts are part of the circular approach to reduce the environmental impact of tourism.

Zero-Waste Events: Some festivals and public events in Puducherry have adopted zero-waste strategies, focusing on minimizing waste through reusable materials, compostable foodware, and strict waste segregation.

2. Potential Opportunities for Expanding the Circular Economy in Puducherry

a. Circular Economy in Agriculture Organic Farming: Puducherry can promote organic farming practices by incentivizing the use of natural fertilizers, such as compost from municipal organic waste. The region's small-scale farmers could benefit from sustainable agriculture methods that enhance soil health and reduce the need for chemical inputs. Agri-Waste Utilization: Agricultural waste, such as paddy straw, can be used for bioenergy production, composting, or as raw material for biodegradable packaging, contributing to a zero-waste agricultural model.

b. Circular Construction and Infrastructure Recycling Construction Waste: Puducherry can implement circular construction practices by promoting the recycling of construction and demolition (C&D) waste. Materials like concrete, wood, and metal can be reused in new construction projects or

infrastructure development. Green Building Designs: By adopting green building standards and encouraging the use of locally sourced, recycled, or renewable materials, Puducherry can reduce resource consumption and waste generation in the construction sector.

c. Circularity in the Fisheries Sector Fish Waste Valorization: Puducherry has a strong fisheries sector, and circular economy principles can be applied to utilize fish waste for bio-products like fish meal, fish oil, or fertilizers. This would reduce waste while creating additional revenue streams for local communities. Sustainable Aquaculture: Encouraging sustainable aquaculture practices, such as integrated multi trophic aquaculture (IMTA), where waste from one species is used to feed another, can enhance productivity while reducing the environmental impact of aquaculture.

d. Energy Circularity Waste-to-Energy Projects: Puducherry can explore waste-to-energy technologies, especially for non recyclable waste. By converting waste into biogas, electricity, or heat, the UT can reduce landfill waste while generating energy for local needs. Solar and Renewable Energy: Solar power is a key opportunity in Puducherry due to its geographic location. Solar panels on rooftops, public buildings, and industrial areas can generate clean energy, reducing reliance on non-renewable sources.

e. Circular Economy in Tourism Sustainable Hotel Practices: The hospitality sector in Puducherry can adopt circular practices by minimizing energy and water use, eliminating single-use plastics, and focusing on sustainable procurement (e.g., local, eco-friendly products). Waste-Free Beaches: Given the appeal of Puducherry's coastal areas, circular practices can include zero-waste beach initiatives that focus on beach clean-ups, waste segregation, and recycling facilities for tourists.

f. Public-Private Partnerships (PPP) Collaboration for Circular Solutions: The government can collaborate with private companies and non governmental organizations (NGOs) to promote circular practices in sectors like waste management, recycling, and renewable energy. This approach could provide technical expertise, financial support, and scalability. Start-up Ecosystem for Circular Innovations: Puducherry can foster a start-up ecosystem focused on circular innovations, such as recycling technologies, upcycling businesses, and sustainable product design.

Challenges in Implementing Circular Economy in Puducherry

a. Limited Infrastructure for Recycling and Waste Management Puducherry needs to invest in advanced recycling facilities and improve waste segregation systems to maximize material recovery. Without adequate infrastructure, achieving circularity in waste management is challenging.

b. Lack of Awareness and Behavioral Change While initiatives like plastic bans have been implemented, public awareness and behavior change regarding circular practices (e.g., waste segregation, resource conservation) need to be strengthened through education campaigns.

c. Resource and Land Constraints Given Puducherry's small geographical size, land available for waste processing and industrial symbiosis is limited. This makes it necessary to optimize space usage and focus on high-efficiency circular solutions.

4. Way Forward for Puducherry's Circular Economy Transition

a. Policy Interventions Extended Producer Responsibility (EPR): Introducing EPR policies, especially for e-waste, plastics, and packaging, can encourage manufacturers to design products for recyclability and take responsibility for post-consumer waste. Green Public Procurement: The government can adopt circular economy principles in procurement by prioritizing products that are recyclable, repairable, and sustainably sourced.

b. Capacity Building and Education Skill Development for Circular Jobs: Training programs can be introduced to develop skills in areas like recycling technologies, waste management, and sustainable tourism. Public Engagement and Awareness: Consistent public campaigns focusing on waste reduction, resource conservation, and the benefits of a circular economy are necessary to engage residents and businesses in this transition.

c. Collaboration with Neighboring States Puducherry can collaborate with neighboring states like Tamil Nadu to develop regional circular economy strategies. Cross-border partnerships in waste management, recycling, and resource-sharing can enhance the impact of circular initiatives. Conclusion Puducherry has the potential to become a leader in circular economy practices by leveraging its existing sustainability efforts and addressing infrastructure and awareness gaps. With targeted interventions in waste management, water conservation, energy production, and tourism, the Union Territory can create a sustainable, resilient economy that reduces waste and enhances resource efficiency, benefiting both the environment and local communities. Here are some useful references for understanding the circular economy, its principles, and best practices:

Key Initiatives: - Effective Waste Management: The government is focusing on effective waste management to achieve a circular economy [4]. - Green Public Procurement: The department is working on an action plan for green public procurement to further goals on the circular economy and clean energy [5]. - District Environment Plan: A district environment plan has been developed for Puducherry, which includes recycling facilities and waste management [6]. Capacity Building: To support the transition to a circular economy, capacity-building programs are being implemented. For instance, a presentation on "Capacity Building Needs and Knowledge Management" highlighted the importance of effective waste management in achieving a circular economy. Sustainable Development Goals (SDGs):

Puducherry's circular economy efforts are also aligned with the United Nations' Sustainable Development Goals (SDGs), particularly Goal 12, which focuses on responsible consumption and

production. Overall, Puducherry is taking proactive steps towards adopting a circular economy model, and these initiatives are expected to have a positive impact on the environment and the c the goal of CE is on promoting the inception of a manufacturing paradigm to mitigate the impact of environmental problems and in the extension the realization of a sustainable society, i.e. it covers the impact of climate change, resource scarcity, depletion of biodiversity etc. and the economic problems of unsustainable development, e.g. rising resource prices etc. It contributes to sustainable development initiatives

References: 1. Books and Reports "Cradle to Cradle: Remaking the Way We Make Things" by William McDonough and Michael Braungart This seminal book introduces the concept of designing products with a focus on continuous cycles of use, where waste becomes a resource. "Waste to Wealth: The Circular Economy Advantage" by Peter Lacy and Jakob Rutqvist This book explains how businesses can benefit from adopting circular economy models and presents case studies of successful implementations. Ellen MacArthur Foundation Reports The Ellen MacArthur Foundation is one of the leading organizations promoting the circular economy globally. Their reports such as "Towards a Circular Economy" (Parts I, II, and III) and "Circularity Indicators" provide in-depth analyses of circular economy models, case studies, and impact assessment methods. Link: ellenmacarthurfoundation.org "The Circular Economy Handbook" by Peter Lacy, Jessica Long, and Wesley Spindler This book offers a comprehensive guide for businesses and policymakers looking to transition towards circular economy practices. 2. Research Papers and Academic Journals "Circular Economy: A Review of Definitions, Processes and Impacts" by T. Kirchherr, D. Reike, and M. Hekkert (2017) This paper reviews different definitions and conceptualizations of the circular economy, analyzing the challenges and limitations in implementing the model globally. "The Role of Digital Technologies in Supporting the Circular Economy Transition in Companies" by Ana Laura Daou, et al. (2021) This research looks at the role of digital technologies such as IoT, blockchain, and AI in fostering the circular economy. Journal of Industrial Ecology This journal publishes research on industrial ecology, which is closely related to the circular economy, focusing on material flow, life cycle assessments, and systems thinking. 3. Government Reports and Policy Frameworks "A New Circular Economy Action Plan for a Cleaner and More Competitive Europe" (European Commission, 2020) This policy document outlines the European Union's strategic vision for transitioning to a circular economy by reducing waste, promoting recycling, and creating green jobs. Link: ec.europa.eu "India's Resource Efficiency and Circular Economy Strategy" (NITI Aayog, India) This report provides an overview of India's approach to integrating resource efficiency and circularity into various sectors, including agriculture, water management, and waste. Link: niti.gov.in 4. Websites and Online Resources Ellen MacArthur Foundation A comprehensive platform with resources, case studies, and tools for understanding the circular economy. Website: ellenmacarthurfoundation.org Circle Economy A Dutch social enterprise that provides insights and tools to help organizations transition to circular business models. Website: circle-economy.com Circular Economy Club (CEC) A global

community working towards the adoption and implementation of circular economy strategies. The CEC provides webinars, global events, and best practice sharing. Website: circulareconomyclub.com 5. Case Studies "The Circular Economy in Practice" (World Economic Forum, 2019) This report outlines successful circular economy case studies across industries like automotive, electronics, and food. Link: weforum.org "The Circularity Gap Report" (Circle Economy, 2021) The report provides an annual overview of the global state of circularity, highlighting sectors where circular economy principles are being applied and the gaps that still exist. Link: circularity-gap.world These references should provide a broad understanding of circular economy principles, as well as insights into policies, technologies, and real-world applications. Circular Economy: Policy Gaps and Challenges Instructions for filing feedback note: 1. References : ● In-text citing as well as the listing of all the references used for compiling the data and information. ● Hyperlinks can be added in the document 2. Documentation style: ○ Microsoft Word - Paper Size A4 with one inch margin from all four sides ○ Font: Times New Roman ○ Font Size: Title 14 pt; Section Heading - 12 pt; Body Text 11 Pt ; ○ Line Spacing : 1.25 ○ Use additional spacing for section heading with spacing (After) - 6 pt

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National Institution for Transforming India

FourthNational Chief Secretary Conference
Feedback Note

Section 1: Officer Name and Details:

- Name : **Dr Sharat Chauhan, IAS**
- Designation : Indian Administrative Service
- Batch : 1994
- Current Posting : Chief Secretary, Puducherry

Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Opportunities in Green Economy – Circular Economy

2. Policy Gaps and Challenges

Union Territory of Puducherry, located on the eastern Coromandel coast, is a place where terrestrial and marine ecosystems blend together providing opportunities for potential production and service processes to support reuse of the components required for modern living of the society. While the administration is attempting multi-sector collaboration for climate-resilient and progressive economic activities, yet there are gaps in such coordination, especially between public and private sector agencies and the people. The implementation of the Air (Prevention and Control of Pollution) Act, enacted in 1981 and amended in 1987 - to provide for the prevention, control and abatement of air pollution in India, The Water (Prevention and Control of Pollution) Act, enacted in 1974 - to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, as well as Solid Waste Management Rules, 2016 have helped but (with increasing interventions by the Courts and Green Tribunal) are seen to be the responsibility of Central and State Governments alone. There are good examples of public and private initiatives (govts, companies and NGOs) to recycle and reuse products, but the responsibility of a clean and green environment seems to be largely contracted out to the government by society. A 'whole of society' approach is needed where local communities are the principal stakeholders in managing and balancing biological and non-biological waste. The harmonious coexistence of environmental and economic growth imperatives also requires scientifically validated inputs provided by the academia. Toward the collective responsibility of clean air and water and reducing / reusing waste, the legal framework may need to be reformulated for reflecting indigenous economic, ecological, cultural and theological values. Addressing the following gaps would accelerate progress on the circular economy front.

Conservation of Resources:

UT of Puducherry has limited Natural Resources *(Petrological, Pedological, Hydrological and Meteorological).* It would therefore benefit from conscious choices with respect to its carrying /

cyclical exploitation capacity and encourage reuse of essential resources to the extent possible rather than reliance on source materials.

Waste Management: Besides generating waste, Puducherry receives a significant amount of waste from neighbouring regions, including solid and liquid waste especially plastic, food waste, and construction debris. While the characterization and quantification of waste generated internally is known to the UT regulator, there is a felt need for sharing of such data among bordering regions of neighbouring States for more effective planning. There is also need for model 'waste to wealth' project technologies, documents and empaneled agencies for States / UTs to choose from.

Public awareness: IEC and behaviour change campaigns need to be linked with incentives / disincentives at the ground level for greater ownership of communities in effective usage and processing of life products without generating waste as the focus of circular economy.

Promoting Sustainable Tourism: UT of Puducherry's economy relies heavily on tourism, which directly / indirectly contributes about 25% to the GSDP. The travel and tour industry's participation in adopting ways and means to promote sustainable tourism needs better coordination on the part of stakeholders.

Supporting Local Economy: Import of products and services lead to higher overall impact on environment and economy both, including loss of opportunities for local MSMEs as well as loss of the Indigenous and Traditional Knowledge (ITK). along with local medicine, ethnic products etc. Migration workforce in search of job lead to crime and unrest in the society. Loss of local economy by loss of entrepreneur, loss of ITK by which loss of biodiversity.

Impacts of Climate Change: Puducherry is vulnerable to climate change impacts like sea-level rise and extreme weather events. Climate resilient and adaptive policies are needed to counter probable effects such as lowered fish catch, invasion of saline water into ground water, unseasonal flood and drought situations, public health emergencies, low agricultural production, higher consumption of electricity, etc

Overreaching Judicial Interventions: Regulatory functions and / or Oversight mechanisms need informed and considered management by the government rather than through judicial diktats or interventions for needed time to time course corrections and avoiding unplanned budgetary outlay mandates. Prime example is the unscientific and unsustainable restrictions on age of vehicles rather than emission norms, notwithstanding MV Act provisions, which would lead to significant waste generation rather than optimum use of resources.

3. Potential Solutions

Potential Technological Solutions:

- Digital Platform for Waste Management: A common nation-wide digital platform to connect original manufacturers, trade and commercial establishments – including small shop / kirana store owners, local communities / households, and waste generators / collectors / recyclers, for efficient waste management and promoting targeted recycling.
- Blockchain-based Supply Chain Management: Blockchain technology could be utilized to create a transparent and traceable supply chain, encouraging sustainable sourcing and responsible consumption.
- A source and sink GIS map of solid and liquid waste for better preventive and curative actions. The National Master Plan portal of PM Gati-Shakti could have GIS based mapping to identify areas of waste processing, reduction, resource optimization, and circular economy initiatives. The m**issing links could be connected at a wider level for creating 'waste to wealth' opportunities for benefit of waste** producers and users – industrial, commercial, or domestic – with regulatory oversight.
- Internet of Things (IoT) Sensors: Deploying IoT sensors to monitor waste generation, energy consumption, water supply & usage, and sewage generation & treatment, enabling data-driven decision-making.
- Artificial Intelligence (AI) for Predictive Maintenance: Implement AI-powered predictive maintenance for infrastructure and equipment, reducing waste and promoting resource efficiency.
- 'Return to Sender' Initiative: Mobile Apps for citizen engagement could be developed to link them to the unified circular economy Digital Platform. The App will help in educating citizens, encouraging participation, and facilitating returning of dry solid waste – for eg: product packaging - to stores / shops for linked incentives. Similarly, the wet solid waste could be sent to common composting or small biogas producing units for local energy consumption. The movement of waste collection vehicles, quantum of waste generation, movement of medical waste and its scientific disposal etc could be monitored through the App.
- Big Data Analytics for Circular Economy Insights: Leverage big data analytics to provide insights on waste generation, resource consumption, and circular economy performance. Information on geological, geographical, biological and non-biological factors could be gathered and analyzed for practical usage. The requirement of public and private sector establishments and industries could be assessed and guided for accelerated progress.

- Digital Marketplaces for Circular Economy Products: Establish digital marketplaces to promote products made from recycled materials, and encourage sustainable consumption. This could be helpful in supporting local economy by preferential display of local products and services, including those based on indigenous and traditional knowledge.
- Smart Forestry & Plantation activities: Accurate and reliable forestry management as well as utilization of natural resources through up-to-date Work-plans and encouraging private plantations. There needs to be a reorientation toward promoting use of recyclable and indigenous wood through helping communities and entrepreneurs with scientific, technical and legal aspects.

Scope for convergence with other programs & schemes:

- Use of treated sewage water in agriculture / industry / public gardens: The treated sewage water could be supplied for industrial / agricultural and horticultural usage with incentives (reduced charges) or through mandating a certain proportion through provision in the Rules under the Water (Prevention and Control of Pollution) Act, 1974.
- Solid Waste Management: The 'return to sender' initiative, especially in relation to plastic packaging of fast-moving consumer goods and processed food items, could be linked with the GSTIN to provide pre-determined incentives to consumers, retailers and manufacturers to reduce solid waste collection and storage at land-fill sites. Since the supply chain of such goods is well established down to the remotest parts, the return collection chain should not be an insurmountable problem.
- Knowledge Dissemination: Big data analytics could be used through 'Digital India', 'Start-Up India' and 'Make in India' missions for generating and sharing information/ knowledge for model 'waste to wealth' project technologies, documents and empaneled agencies for States / UTs governments and the private sector to choose from. The Departments of Science & Technology, Bio-Technology and Council of Scientific & Industrial Research could use their Research & Development budgets to support academic institutions to create indigenous technological solutions in this regard.
- Indigenous & Traditional Knowledge towards better quality of life: The schemes of Ministry of Agriculture through Krishi Vigyan Kendras, Ministry of AYUSH and Ministry of Food Processing (PMFMPE) could be converged to encourage increased usage of locally produced crops, fruits and vegetables in food processing. Similarly, traditionally grown local herbs and medicinal plants could be used to encourage manufacturing of AYUSH medicines and consumer goods to reduce pharmacological waste.
- MSME and Skill India: The various schemes related to skill development programmes, market development assistance, technology support, credit flow, and public procurement

policies could be used to encourage individuals and cooperatives to establish units towards cyclic use of waste into usable products. Utilizing the 'Raising and Accelerating MSME Performance' (RAMP) scheme aimed at enhancing the performance of MSMEs by promoting technology upgradation, innovation, digitization, market access, credit, greening initiatives, etc with active participation of the State / UT Governments would also help in promoting green economy enterprises. The start-up ecosystem could be given incentives and assistance to utilize green economy opportunities and boost local economy.

- Water Supply Management: The saturation of 'Har Ghar Nal – Nal se Jal' program under the Jal Jeevan Mission has significantly improved the water supply situation in Puducherry. The effort now is towards rejuvenation and strengthening of water and sewage network, including piloting 24*7 tap-water supply. Local initiatives towards optimum and more efficient usage of water, with resultant reduction in grey/black water discharge would be tried at village level with community ownership and management of water supply / source protection through cooperatives.
- Sustainable Tourism: The 'Swachchata Green Leaf" rating of tourism establishments would go a long way in making home-stays, guest houses and hotels recycle products, become eco-friendly and contribute to green economy, through segregation of solid waste, sustainable forward linkages and 3R (reduce, reuse and recharge) of waste water management.
- National Urban and Rural Livelihood Missions: Involvement of SHGs in processing domestic / horticulture waste into Green & Greenleaf manure for urban, forest and agricultural plantations would reduce the burden of mass waste processing and expenditure incurred by the urban local bodies, forest department and help increase the income of SHGs / farmers. Similarly, conversion of horticulture / agriculture crop residues into Green Bio-shields for use around urban infrastructure would help as barriers against noise and air pollution.
- Technology agnostic norms and standards implementation: Incentives and policies should be oriented towards prescribing outcome norms and standards to be followed in particular sectors rather than preferential leaning toward technological solutions and / or imposing time limitations on life-cycle of products. For instance, the automotive sector faces artificially imposed end of vehicle registration periods contrary to the MV Act provisions, which is placing unnecessary economic burden on people as well as increasing solid waste burden (scrapping) and resultant public expenditure. The emission norms related to air quality standards need to be prescribed, which could be met by manufacturers and users irrespective of technology or age, including through annual fitness tests as is done elsewhere. Big data analytics could be easily used to implement norms-based policy environment.

4. Best Practices

- UT of Puducherry is attempting to double its green (tree) cover under State scheme & the Mangrove Initiative for Shoreline Habitat & Tangible Income scheme of MoEFCC, GoI to be able to utilize degradable Greenleaf manure and leaf residue. The green cover will act as bio-shield on Roads, River-banks, Coastal areas and Rail-tracks. App. 40,000 Palm tree seeds and 12,000 coastal tree saplings have been planted in the last three months to prevent sea salinity and act as wind breaks all along the coastline. Besides this, on the occasion of van mahotsav, forest department distributed 30,000 seedling & saplings among people for plantation and around 6,000 tree saplings were planted earlier in the year aimed at a carbon-neutral and green general election 2024. Under the 'Ek Ped Maa ke Naam' initiative nearly 6,000 plant saplings have been distributed with a target of 1,00,000 out of total 2,00,000 saplings plantation during the upcoming retreating monsoon season, including mangrove tree species along the coastline.

- Waste to Wealth: The decentralized model of Mahe Municipality is one best practice with respect to segregation and economically viable reuse of solid waste generated in the region. As a result, there is no dump or landfill site and no transportation of waste to dump sites in Mahe Municipal region. People understand and practice segregation of waste into degradable and non-degradable and have been enabled to treat and dispose the bio-degradable waste on their own. The kitchen waste is traditionally disposed of in the homestead premises itself through i) garbage pits, (where waste pits are dug in the backyard and daily waste is simply put into the pit), ii) use of pipe composts (where two pipes are used for putting in the waste and with proper seeding converted into compost), and iii) bio-gas plants.
- Pipe composting: The PVC or cement pipe is kept vertically with bottom part of the pipe, about 1 foot, under the ground with a lid for collecting bio-degradable waste. Neem cake powder is periodically applied to check growth and control smell. For a small family of 4 members, one such pipe is sufficient to hold bio-degradable waste for two months. When it is full, a second pipe is used. The pipes are alternately used and emptied by manure collection.

Apply

- Bio-Gas Plants: Several households and commercial establishments (restaurants) and government institutions like schools have installed bio gas plants in their backyards to convert the organic domestic waste to bio-gas to meet the domestic energy requirements based on anaerobic process. Some vegetable waste is also sold as feed to nearby pig farms.
- There is a calendar informing people of the date of non-degradable waste collection in each ward. The commercial establishments deposit their segregated waste at designated locations,

from where the Municipality collects the wastes while for households the non-degradable waste is collected from the doorsteps. Such waste is then taken to the segregation centre (Material Recovery Facility) of the Municipality and further segregated as plastics, bottles, papers, inert etc. for being sent to identified processing / recycling units.

- Water Supply and Energy Management: The 'Pillayar Koil Pond' has been brought back from the bring and rejuvenated to improve the availability of surface water and enhance ground water recharge under the AMRUT 2.0 scheme of Govt of India. The rain water run-off from rainwater harvesting structures in nearby localities now acts as the source of surface water and catch pits have been constructed across the area to convey the rain water. Further, the grey water discharge into the pond has been cut-off by intercepting drains to take it to the sewage network. The initiative was recognized as one of the best initiatives in the Centre for Science & Environment's compendium on best programs of water body rejuvenation – 'Back from the Brink'.
- The harnessing of solar power under the 'PM Surya Ghar Muft Bijli Yojana' will convert individual houses into net producers rather than consumers of energy. Out of over 900 applications received, over 400 Roof-Top Solar Systems have been installed and nearly 330 commissioned. The government has targeted saturation of all government buildings by 2025 with app 6 MW aggregate capacity installed out of assessed 27 MW so far.

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FourthNational Chief Secretary Conference
Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. Policy Gaps and Challenges

- Limited infrastructure for recycling and processing key waste streams and lack of dedicated recycling zones.
- Poor enforcement and awareness of Extended Producer Responsibility (EPR) regulations, with inadequate monitoring systems.
- Low public and business awareness about circular economy practices and limited engagement of informal sector workers.
- Difficulty for startups and small businesses in accessing finance and investment for waste management projects.
- Insufficient skilling and reskilling efforts for jobs in waste management, with limited collaboration on national programs.
- Gaps in technology access and digital solutions, hindering effective waste tracking and management processes.

3. Potential Solutions

Potential New Technology Solutions:

- **Plastic Recycling**: Mechanical and chemical recycling technologies can help manage plastic waste and reduce landfill use.
- **E-waste Processing and Battery Recycling**: Advanced machinery for dismantling and recycling electronic waste and partnership with re-processors while technologies to recover lithium, cobalt, and other metals from batteries are vital as electric mobility increases.
- **Waste Tracking Systems**: Digital platforms for tracking waste generation, collection, and

recycling can streamline the waste management process in Puducherry. These can be used to promote transparency, efficiency, and better coordination among stakeholders.

- **Mobile Applications**: Apps for informal sector workers can improve access to recyclers and reporting tools.

Scope for convergence with other schemes/ programmes:

- **Startup India:** Encourage innovative startups focused on recycling, refurbishing, and waste processing through the Startup India initiative.
- **PMKVY:** Implement skill development programs in waste collection, sorting, recycling, and refurbishing through the Pradhan Mantri Kaushal Vikas Yojana.

Waste Management Programs

- **Swachh Bharat Mission (SBM):** SBM can be better used to enhance waste collection, segregation, and processing infrastructure, while mentoring waste management startups.
- **GOBAR-Dhan Initiative:** Adopt bio-waste-to-wealth models to create a circular bio-economy from organic waste. A food waste-based biogas plant was implemented in Puducherry & Karaikal region totalling under GOBAR-Dhan scheme at a capacity of 50 m3.

Green Skill Development Program (GSDP)

- Collaborate with national agencies to offer certified training in e-waste, solid waste, and biomedical waste management.

Extended Producer Responsibility (EPR)

- Integrate EPR regulations to promote waste accountability in sectors like plastic, e-waste, and battery waste, encouraging circular models.

Infrastructure Development

- Establish waste recycling zones or MSME clusters, fostering innovation and entrepreneurship in waste management.

National Policy Support

- Align skilling initiatives with the National Policy on Skill Development and Entrepreneurship (NPSDE) and leverage Public-Private Partnerships (PPP) for waste management infrastructure.

4. Best Practices

- One of the novel methods that Puducherry could adopt is the floating farming using Water Hyacinth Beds. Water Hyacinth, an invasive species that is being an uncontrollable menace to all the surface water bodies in Puducherry, can be effectively managed and augmented for sustainable farming practices. This method is widely being practiced in Bangladesh. In Bangladesh, the circular economy concept has been creatively applied to the use of water hyacinth, which otherwise clogs waterways and negatively impacts aquatic ecosystems.
- Water hyacinth is repurposed for floating farming by piling the plant into thick mats or beds on water bodies. These beds are reinforced with organic materials like rice straw, forming stable platforms for crop cultivation. A layer of nutrient-rich soil or compost is spread on top, where seeds for vegetables such as tomatoes, spinach, cucumbers, gourds, egg plants and more prominently spinach and other greens are sown. This method provides a sustainable solution for farming in waterlogged or flood-prone areas, utilizing water hyacinth's buoyancy and nutrient-retention capabilities to grow crops. It also addresses environmental challenges by managing water hyacinth overgrowth, which can choke waterways and harm biodiversity. The piles of dredged water hyacinth is heaped to form these beds, which offers double advantage that the water bodies is clean of the hyacinth and the hyacinth that is collected and made into these farming beds which offers effective floating grounds for farming. This innovation improves food security and provides a resilient farming practice against seasonal flooding.
- Appreciating the large scale adopting of this practice in Bangladesh, the United Nations recommended other countries to adopt this sustainable farming practice.
- The circular economy offered by effectively augmenting Water Hyacinth extends further, in that, the leaves, stems and roots of the plant collected are dried and are used in making value added handicrafts products.
- This offers skill development of the communities involved, especially the participation of the women folks, in both floating farming, in making handicraft products.
- Also, the potential of Green Credits could be explored by adopting this practice of augmenting Water Hyacinth.
- This circular economy model would not only help in managing ecological threat of Water Hyacinth but also creates economic opportunities and promotes sustainable development in Puducherry with the Local Administration Department, Public Works Department, Directorate of Rural Development / District Rural Development Agency, Agriculture Department, , KVK, Tank Users Association and other civil societies as stakeholders.

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Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy

2. Policy Gaps and Challenges

Circular economy policies face various gaps and challenges. A significant challenge! Lack of clear definitions and standards can hinder the adoption and scalability of circular economy practices. Insufficient regulations and laws can hinder the transition to a circular economy. A common challenge! Limited policy coherence across government departments can hinder effective circular economy implementation. Public awareness and education can hinder circular economy adoption.

Public Awareness Strategies:

- Social Media Campaigns: Utilize platforms like Twitter, Instagram, Facebook, and LinkedIn to share engaging content.
- Documentaries and Videos: Produce or promote films showcasing circular economy success stories.
- Community Events: Organize workshops, webinars, and conferences.
- The Difficulty in implementing Extended Producer Responsibility (EPR).

Difficulties:

- Lack of clear regulations and standards.
- Insufficient infrastructure for waste management.
- Limited producer awareness and education.
- Higher costs associated with EPR implementation.
- Difficulty in measuring and tracking producer responsibility.

Solutions:

- Regulatory Frameworks:
- Develop and enforce EPR laws and regulations.
- Establish clear guidelines and standards.
- Provide incentives for compliance.

Producer Engagement:

- Educate producers on EPR benefits and requirements.
- Encourage voluntary EPR adoption.

Infrastructure Development:

- Invest in waste management infrastructure.
- Develop take-back programs and collection systems.
- Enhance recycling and composting facilities.

Cost Management:

- Implement cost-sharing mechanisms.
- Develop economic incentives for EPR adoption.
- Encourage product design changes reducing waste.

3. Potential Solutions

The circular economy! An innovative approach to reduce waste, promote sustainability, and foster economic growth. Some potential solutions to transition towards a circular economy:

Circular economy convergence with other schemes:

Convergence Opportunities:

- Sustainable Development Goals (SDGs)
- Renewable Energy Initiatives
- Water Conservation and Management
- Waste Management and Recycling
- Eco-Tourism and Sustainable Tourism
- Agriculture and Rural Development

- Urban Planning and Development
- Education and Skill Development

Government Schemes:

- Swachh Bharat Abhiyan (India)
- Smart Cities Mission (India)
- Atal Mission for Rejuvenation and Urban Transformation (AMRUT)
- National Solar Mission (India)
- Green Infrastructure Fund (EU)

Production and Design:

- Product-as-a-Service: Offer product leasing or sharing services.
- Design for Disassembly: Create products easy to repair, reuse, and recycle.
- Biodegradable Materials: Use compostable materials.
- Circular Supply Chains: Implement closed-loop production.

Waste Management:

- Zero-Waste-to-Landfill: Implement recycling, composting, and energy recovery.
- Advanced Recycling Technologies: Chemical recycling, upcycling.
- Sharing Economy Platforms: Encourage sharing, reuse.

Technology and Innovation:

- Digital Platforms: Facilitate sharing, reuse.
- IoT and Sensors: Monitor product usage, optimize performance.
- 3D Printing: Reduce material waste.
- Biotechnology: Develop biodegradable materials.

4. Best Practices

Waste management is a pressing challenge in cities and towns worldwide. Many regions need proper waste collection and disposal systems, and existing systems often operate inefficiently. The Internet of Things (IoT) offers a revolutionary solution. IOT – Based Waste Management systems can significantly streamline waste management processes for municipalities and organizations.

- This explores common waste management challenges and how IoT can address them. **Common Challenges in Waste Management Systems** Managing waste for an entire city or town involves logistics, managing extensive tools, equipment, and personnel, and complying with local and national environmental regulations. Here are some key challenges:
- **Proper Waste Segregation:** Separating waste effectively is crucial. Different waste types require unique handling. Food waste can be composted, while plastic needs recycling or incineration. Materials like glass and toxic chemicals require special care. However, segregation remains a significant challenge. While source separation is mandated in many municipalities, significant manual effort is still required after collection. Electronic devices with plastic casings require battery removal, and some cloth, paper, or plastic items might be recyclable while others are degraded. The manual separation process is time-consuming and labor-intensive.
- **On-Time Waste Collection:** Many cities have strict waste collection schedules. Residents place bagged or binned garbage for pickup by collection trucks. Waste is then transported from collection points to a central waste management facility. This approach has limitations. Collection schedules often need to account for waste quantity variations. Collection teams might waste resources checking empty bins or encounter overflowing bins on other days.
- **Proper Waste Disposal:** Once collected and separated, waste needs safe disposal with minimal environmental impact. However, most disposal methods are energy-intensive and require significant resource investment for maintenance. Equipment breakdown can lead to waste management crises or toxic chemical leaks.
- **Raising Waste Pollution Awareness:** Effective waste management goes beyond collection and disposal. All stakeholders should strive to reduce waste and be mindful of what they discard. Even cities with robust systems struggle with this aspect.

Sustainable Practices:

- Waste reduction and recycling programs.
- Organic farming and composting initiatives.
- Renewable energy projects (solar, wind, biogas).
- Sustainable transportation systems (electric vehicles, cycling infrastructure).

Block Level:

- Panchayat-led waste management initiatives (e.g., Kerala's Thrissur district).
- Community-based organic farming programs (e.g., Andhra Pradesh's Anantapur district).

- Village-level renewable energy projects (e.g., Maharashtra's Dhule district).

District Level:

- District-level waste management plans (e.g., Tamil Nadu's Coimbatore district).
- Sustainable agriculture initiatives (e.g., Punjab's Ludhiana district).
- Green infrastructure development (e.g., Karnataka's Bengaluru Urban district).

State Level:

- State-wide waste management policies (e.g., Maharashtra's Waste Management Policy).
- Renewable energy targets and incentives (e.g., Karnataka's Renewable Energy Policy).
- Sustainable transportation initiatives (e.g., Delhi's Electric Vehicle Policy).

Key Benefits of IoT in Waste Management

Implementation of IOT solution for waste management offers numerous benefits, including:

- **Optimized waste collection routes:** IoT-powered smart bins equipped with fill-level sensors provide real-time data on waste levels, enabling waste collection vehicles to prioritize routes based on bin fullness. This optimization reduces fuel consumption, labor costs, and greenhouse gas emissions.
- **Increased efficiency:** IoT devices can monitor waste levels, detect overflowing bins, and trigger alerts for timely collection, preventing waste spillage and improving overall cleanliness.
- **Improved recycling rates:** Smart bins with waste categorization capabilities can facilitate efficient sorting and recycling, promoting circular economy principles and reducing landfill waste.
- **Data-driven decision making:** IoT-generated data offers valuable insights into waste generation patterns, enabling waste management organizations to optimize resource allocation, identify hotspots, and implement targeted waste reduction strategies.
- **Cost reduction:** By streamlining operations, reducing fuel consumption, and optimizing resource utilization, IOT solutions contribute to significant cost savings for waste management organizations.

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FourthNational Chief Secretary Conference
Feedback Note

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Section 2: Feedback for Fourth National Chief Secretaries' Conference

1. Name of the topic

Circular Economy – Waste Management

2. Policy Gaps and Challenges

Non availability of fine provision for the mixed waste disposal and incentive for source segregation are impound scientific and sustainable waste management

3. Potential Solutions

Mixing of various waste viz. plastic waste, e-waste and bio-medical waste in municipal solid waste and ultimately reaching to the disposal site leads to environment and health hazards. Setting up of collection centers for the above mentioned waste will promotes entrepreneurship and employment opportunity. Extended Producer Responsibility (EPR) Rules mandate all the brand owners of consumable products and electrical and electronic products manufacturer to buy back their product wastes. It is their obligation to provide financial assistance for the waste being collected

4. Best Practices

Waste collection centers can be established in all the parts of the country both urban and rural areas. The collected waste can be channelized to the plastic recycling units, e-waste dismantling centers and Common Bio-medical Waste Treatment Facility