

Circular Economy and Sustainable Development in Rajasthan: An Assessment of Emerging Green Businesses, Waste Recycling and Resource Efficiency

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Abstract

The circular economy (CE) provides an alternative to the conventional linear model of take–make–dispose by keeping materials and resources in productive use for longer periods through reuse, repair, refurbishment, recycling and recovery. Rajasthan has a growing policy and institutional framework for circularity, supported by the Rajasthan Circular Economy Incentive Scheme 2025 and the State's Sustainable Development Goal (SDG) monitoring system. This paper examines the emerging circular-economy landscape in Rajasthan with special reference to waste recycling, resource efficiency and green-business opportunities. The study is based exclusively on secondary information obtained from official Government of Rajasthan and Rajasthan State Pollution Control Board (RSPCB) sources. The Rajasthan SDG Portal reports 143 waste-recycling plants installed up to 2025 with a reported capacity of 1,424.55 MLD, while 95.15% of urban wards had door-to-door waste collection in 2025. The State's Circular Economy Incentive Scheme 2025 provides financial support of up to ₹2 crore for research and development in recycling and reuse and provides an additional 0.5% relaxation in existing financial assistance schemes for eligible MSMEs and start-ups in the circular-economy domain. The analysis indicates that Rajasthan is moving from waste-management activities towards a broader circular-business ecosystem, although stronger district-level enterprise data, market linkages, formalisation of informal recycling and impact measurement are needed.

Keywords: Circular Economy, Sustainable Development, Green Entrepreneurship, Waste Recycling, Resource Efficiency, Rajasthan, MSMEs, SDG 12.

Introduction

The circular economy is increasingly viewed as a business and development approach that reduces dependence on virgin resources and minimises waste by designing products, production systems and consumption practices around longer resource cycles. Instead of treating waste as the final stage of production and consumption, circularity seeks to retain material value through prevention, reuse, repair, refurbishment, remanufacturing, recycling and recovery. This approach is closely connected with Sustainable Development Goal 12 on responsible consumption and production.

For Rajasthan, the circular-economy agenda is particularly relevant because the State combines rapid urbanisation, industrial activity, tourism, agriculture, mineral resources and a large geographical area. These activities generate different waste streams and simultaneously create opportunities for

material recovery, recycling, repair services, resource-efficient production and green entrepreneurship. The Government of Rajasthan has introduced the Rajasthan Circular Economy Incentive Scheme 2025 to promote circularity across waste regimes and to support industries, research institutions, start-ups, MSMEs and innovators.

The official Rajasthan SDG Portal reports 143 waste-recycling plants installed till 2025 with a capacity of 1,424.55 MLD, and states that all municipal corporations are using waste-segregation techniques. Under Goal 11, it reports 95.15% of urban wards with door-to-door waste collection in 2025. These indicators show that the State has already developed a substantial base of waste-management infrastructure. (Source: Rajasthan SDG Portal, Goal 12 and Goal 11.)

This study therefore moves beyond a conceptual discussion and examines available official evidence to understand how Rajasthan's waste-management infrastructure, policy support and SDG framework can contribute to green business and sustainable development.

Need and Significance of the Study

- Rajasthan requires resource-efficient growth because economic expansion, urbanisation and industrialisation increase demand for materials, water and energy.
- Waste can be treated as an economic resource when recyclable and reusable materials are recovered and returned to productive use.
- The 2025 Circular Economy Incentive Scheme creates a formal policy pathway for industries, MSMEs, start-ups, research institutions and innovators.
- Circular business models can create opportunities in recycling, repair, refurbishment, reuse, sustainable packaging, material recovery and resource-sharing.
- The study links environmental outcomes with entrepreneurship and sustainable development, making it relevant to commerce and management research.

Objectives of the Study

- To examine the status of circular economy practices in Rajasthan with special reference to waste recycling and resource efficiency.
- To assess the contribution of circular economy initiatives towards sustainable development and green entrepreneurship in Rajasthan.

Research Methodology

The study follows a descriptive and analytical research design and is based entirely on secondary data. The main sources are the Rajasthan SDG Portal maintained by the Directorate of Economics & Statistics, Government of Rajasthan, and official Rajasthan State Pollution Control Board documents relating to circular economy policy. The analysis focuses on publicly reported indicators, policy provisions and their implications for green business. No primary survey data or unverified company-level financial claims are used.

Data sources: Rajasthan SDG Portal; Rajasthan Circular Economy Incentive Scheme 2025; RSPCB Office Order dated 03 July 2025; Rajasthan SDG Index 2025. The study uses descriptive comparison and thematic interpretation rather than causal econometric estimation.

Policy and Institutional Framework for Circular Economy in Rajasthan

The Rajasthan Circular Economy Incentive Scheme 2025 is an important policy development. The official RSPCB office order states that the scheme was launched on 5 June 2025 and became effective from the same date. Its objective is to promote reuse, regeneration and redesign of materials by supporting industries, research institutions, start-ups, MSMEs and innovators.

Policy Feature	Official Provision	Research Implication
Scheme effective date	5 June 2025	Provides a recent policy base for studying CE in Rajasthan.
R&D support	Financial incentives up to ₹2 crore for recycling and reuse R&D	Encourages technology and process innovation.

MSME/start-up support	Additional 0.5% relaxation in existing financial assistance schemes for CE-domain MSMEs/start-ups	Improves the policy environment for green entrepreneurship.
Eligible ecosystem	Industries, research institutions, start-ups, MSMEs and innovators	Connects business, academia and innovation.
Implementation outreach	RSPCB directed publicity through regional offices, e-Mitra, district platforms and stakeholder meetings	Supports wider awareness and potential participation.

Source: Rajasthan State Pollution Control Board, Office Order regarding Rajasthan Circular Economy Incentive Scheme 2025, dated 03/07/2025. Official source: <https://environment.rajasthan.gov.in/content/dam/environment/RPCB/Office%20Order/Office%20Order%20of%20Rajasthan%20Circular%20Economy%20Incentive%20Scheme%202025.pdf>

The official scheme document also identifies material recovery, waste reduction, recycling, upcycling, repair, refurbishment, reuse, sustainable product design, sustainable packaging, alternatives to banned single-use plastic, industrial symbiosis, life-cycle assessment and eco-innovation as areas of circular-economy activity. Official source: <https://environment.rajasthan.gov.in/content/dam/environment/RPCB/CircularEconomy/Rajasthan%20Circular%20Economy%20Incentive%20Scheme-2025.pdf>

Status of Waste Recycling and Resource Efficiency

Indicator	Rajasthan Position	Year	Source
Waste recycling plants	143 plants	Till 2025	Rajasthan SDG Goal 12
Reported capacity of waste recycling plants	1,424.55 MLD	Till 2025	Rajasthan SDG Goal 12
Municipal corporations using waste segregation	All municipal corporations	Portal reporting	Rajasthan SDG Goal 12
Urban wards with door-to-door waste collection	95.15%	2025	Rajasthan SDG Goal 11
Cities with waste management and sewage treatment plants	44 cities	2021	RUDSICO via Rajasthan SDG Goal 11
Combined capacity of those plants	969.18 MLD	2021	RUDSICO via Rajasthan SDG Goal 11

The Rajasthan SDG Portal states that 143 waste-recycling plants had been installed by 2025 with a reported capacity of 1,424.55 MLD. It also reports that all municipal corporations use waste-segregation techniques. Source: <https://sdg.rajasthan.gov.in/Goal/Goal12>

The SDG Goal 11 dashboard reports 95.15% of wards with door-to-door waste collection in 2025 and 44 cities with waste-management and sewage-treatment plants having a combined capacity of 969.18 MLD in 2021. Source: <https://sdg.rajasthan.gov.in/Goal/Goal11>

District-Level Evidence: SDG 12

The Rajasthan SDG Index 2025 provides district-level scores for Goal 12 (Responsible Consumption and Production). The dashboard classifies scores of 65 to below 100 as 'Front-runner'.

District	Goal 12 score, 2025	Category
Ajmer	67.74	Front-runner
Alwar	71.52	Front-runner

These district values illustrate how the State's SDG monitoring framework can be used to identify relatively stronger and weaker areas for further investigation. The score is treated here as an official sustainability indicator, not as proof of business profitability. Source: <https://sdg.rajasthan.gov.in/RajasthanIndex/IndexGraph>

Circular Economy as a Green-Business Opportunity

The transition from waste management to circular economy changes the business question from 'How can waste be disposed of?' to 'How can material value be retained?' This creates potential green-business segments in Rajasthan.

Circular Activity	Possible Business Model	Sustainable-Development Contribution
Collection and segregation	Door-to-door collection, sorting and aggregation services	Improves material recovery and reduces mixed waste.
Recycling	Plastic, paper, metal, glass and other material recycling	Returns secondary raw materials to production.
Repair and refurbishment	Repair centres and refurbished-product markets	Extends product life and reduces resource demand.
E-waste management	Collection, dismantling, recycling and refurbishment	Recovers valuable materials and reduces environmental risks.
Sustainable packaging	Reusable, recyclable or alternative packaging solutions	Reduces packaging waste and material intensity.
Upcycling	Conversion of waste materials into higher-value products	Creates product innovation and entrepreneurship opportunities.
Industrial symbiosis	Use of one industry's by-product as another industry's input	Reduces waste and virgin-resource use.
R&D and eco-innovation	Technology/process development for recycling and reuse	Improves resource efficiency and competitiveness.

The Rajasthan Circular Economy Incentive Scheme explicitly supports recycling, reuse, repair, refurbishment, upcycling, sustainable packaging, industrial symbiosis and eco-innovation. This makes the policy relevant to environmental management as well as entrepreneurship and business-model research.

Linkage with Sustainable Development

Circular-Economy Activity	Relevant SDG Linkage	Expected Pathway
Waste segregation and recycling	SDG 11 & SDG 12	Cleaner cities + responsible production/consumption
Resource-efficient production	SDG 8, SDG 9 & SDG 12	Productivity + innovation + lower resource intensity
Green start-ups/MSMEs	SDG 8 & SDG 9	Entrepreneurship, innovation and employment opportunities
Reuse/repair/refurbishment	SDG 12	Longer product life and reduced material demand
E-waste/resource recovery	SDG 12 & SDG 13	Material recovery + reduced environmental burden
Sustainable packaging	SDG 12	Reduced waste and material use

The Rajasthan SDG framework recognises Goal 12 as responsible consumption and production. The State's Goal 8 dashboard also reports 2,013,115 units registered under the Sanstha Aadhar Business Registration Portal up to 31 December 2025. This figure represents the broader registered business ecosystem and is not treated as the number of circular businesses. Source: <https://sdg.rajasthan.gov.in/Goal/Goal08>

Major Findings

- Established infrastructure: Rajasthan reports 143 waste-recycling plants with 1,424.55 MLD capacity by 2025.
- Collection coverage: 95.15% of urban wards had door-to-door waste collection in 2025.
- Policy support: The Circular Economy Incentive Scheme 2025 provides up to ₹2 crore for recycling/reuse R&D and an additional 0.5% relaxation in existing financial assistance schemes for eligible CE MSMEs/start-ups.
- District variation: The SDG Index 2025 provides district-level Goal 12 scores.
- Entrepreneurial potential: The policy explicitly includes start-ups, MSMEs and innovators.
- Evidence gap: Official infrastructure indicators are available, but systematic public data linking individual circular enterprises to turnover, employment, material recovery and profitability are less readily available in the sources used here.

Suggestions

- Develop a Rajasthan Circular Economy Enterprise Dashboard showing authorised units, district, waste stream, processing capacity, employment and output.

- Strengthen district-level linkages between municipalities, recyclers, MSMEs, start-ups and academic institutions.
- Promote entrepreneurship models in repair, refurbishment, reuse, sustainable packaging and upcycling, not only end-of-life recycling.
- Create standard indicators for circular-business performance such as tonnes of material recovered, virgin-material substitution, water/energy savings, jobs created and revenue from secondary materials.
- Improve formalisation and safe integration of informal waste workers through training, cooperatives, producer-responsibility partnerships and social-security mechanisms.
- Use the SDG district dashboard to identify districts requiring targeted circular-economy interventions and business incubation.
- Encourage colleges and universities to develop local circular-economy case studies and R&D projects under the State's circular-economy policy framework.

Limitations of the Study

The study is based on secondary official information and therefore does not estimate enterprise-level profitability, employment multipliers or causal effects of the 2025 incentive scheme. The reported capacity figures should be interpreted according to the definitions and reporting methodology of the respective government dashboards. A future study can combine official data with field surveys of selected districts and circular enterprises to measure business performance and social impact.

Conclusion

Rajasthan is developing an identifiable foundation for a circular economy through waste-collection systems, recycling infrastructure, SDG monitoring and a dedicated Circular Economy Incentive Scheme introduced in 2025. The official data show measurable infrastructure and service coverage. The next challenge is to convert this infrastructure into a stronger circular-business ecosystem in which waste becomes a productive input, enterprises create green employment, and resource efficiency improves competitiveness.

For commerce and management research, the important opportunity lies in examining how circular-economy activities can become viable sustainable business models. Rajasthan's current policy framework provides a practical setting for research on green entrepreneurship, recycling enterprises, repair/refurbishment markets, sustainable packaging, resource recovery and industrial symbiosis. Thus, circular economy can serve as a bridge between environmental protection, entrepreneurship and sustainable development in the State.

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