

ESG Performance in India's Dairy Sector: A Comparative Analysis of Amul and Mother Dairy

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Abstract

This study provides an in-depth examination of Environmental, Social, and Governance (ESG) performance in India's dairy sector, focusing on two leading brands—Amul and Mother Dairy. Using Amul's 2023–2024 Sustainability Report, Mother Dairy's publicly available disclosures, and secondary literature from academic, industry, and policy sources, the research situates these companies within India's cooperative dairy movement, national ESG policy frameworks, and global sustainability benchmarks. Amul's cooperative model facilitates large-scale social empowerment, equitable profit distribution, and a diversified environmental agenda spanning renewable energy, water conservation, and waste reduction. Mother Dairy, while narrower in environmental scope, demonstrates targeted impact, particularly in plastic waste management, and has pioneered AI-driven governance frameworks.

The paper traces the historical development of India's dairy sector, evaluates relevant regulatory instruments, and benchmarks Amul and Mother Dairy against global dairy leaders such as Fonterra, Arla Foods, and Danone. Key findings highlight Amul's breadth of ESG initiatives and Mother Dairy's depth in select governance and environmental areas. Challenges—including climate vulnerability, water scarcity, and methane emissions—are discussed alongside opportunities for sector-wide collaboration. Recommendations call for a blended strategy that integrates Amul's systemic reach with Mother Dairy's targeted innovations to enhance resilience, competitiveness, and alignment with the United Nations Sustainable Development Goals (UN SDGs).

1. Introduction

The Indian dairy sector is a global powerhouse, accounting for over 23% of the world's milk production (FAO, 2023). Beyond its economic significance, dairy is a cultural and nutritional mainstay for millions, providing livelihoods to over 80 million rural households, many of whom are smallholder farmers. In the last decade, Environmental, Social, and Governance (ESG) factors have become central to assessing organisational resilience, ethical responsibility, and long-term value creation. Globally, investors and consumers alike are scrutinising companies for their carbon footprints, labour practices, diversity in leadership, and transparency in operations.

In this shifting landscape, Amul and Mother Dairy emerge as the most influential players in India's dairy industry. Amul—operating under the Gujarat Cooperative Milk Marketing Federation

(GCMMF)—is the world’s largest producer of milk and dairy products by volume, and its identity is deeply rooted in India’s cooperative movement. Mother Dairy, a subsidiary of the National Dairy Development Board (NDDB), began as a vehicle to supply safe milk to Delhi and has since evolved into a diversified food brand with pan-India presence.

Despite similarities in origin, their ESG approaches differ considerably. Amul’s farmer-owned cooperative model prioritises equitable value distribution and community empowerment, while Mother Dairy’s centralised management facilitates agility in technological adoption and targeted sustainability interventions. This research aims to:

1. Trace the historical evolution of India’s cooperative dairy movement.
2. Analyse national ESG-related policies impacting the dairy sector.
3. Compare the environmental, social, and governance performance of Amul and Mother Dairy.
4. Benchmark both against global dairy ESG leaders.
5. Identify challenges, opportunities, and pathways for future sustainability.

A qualitative content analysis method is used, combining primary sources (sustainability reports, policy documents) with secondary academic and industry literature. The analysis is framed by the UN Sustainable Development Goals (SDGs), particularly Goals 2, 6, 12, and 13, which are most relevant to dairy sustainability.

2. Historical Context of India’s Dairy Sector & Cooperative Movement

India’s dairy industry owes much of its present strength to the cooperative movement that began in the mid-20th century. The origins can be traced to 1946 with the establishment of the Kaira District Cooperative Milk Producers’ Union—later branded as Amul—in the town of Anand, Gujarat. At the time, dairy farmers were heavily dependent on local milk contractors, who often exploited them through low procurement prices and delayed payments. Inspired by nationalist ideals and the need for rural economic self-reliance, the cooperative was formed under the leadership of Tribhuvandas Patel, with technical and strategic guidance from Dr. Verghese Kurien.

The cooperative model was built on three principles:



1. Farmer ownership and control over production and marketing.
2. Elimination of middlemen to ensure fair and timely payments.
3. Investment in processing infrastructure to increase milk shelf-life and market reach.

Amul's success in the 1950s and 1960s demonstrated that smallholder dairy farmers, when organised collectively, could compete with private and state-run enterprises. This model became the blueprint for Operation Flood (1970–1996), a national dairy development programme executed by the National Dairy Development Board (NDDB). Operation Flood created a nationwide milk grid, linking producers to consumers through a network of cooperatives. It transformed India from a milk-deficient country to the largest milk producer globally, achieving self-sufficiency and stabilising dairy prices.

Mother Dairy was established in 1974 as part of this transformation, initially to supply pasteurised milk to Delhi under hygienic conditions. While it began with a cooperative mandate, over time, it developed a centralised management structure that allowed for faster decision-making and diversification into vegetables, edible oils, and frozen products.

By the early 21st century, the cooperative model had become a key instrument for socio-economic development in rural India. It not only improved farmer incomes but also fostered community infrastructure, women's participation, and rural skill development. This heritage remains central to Amul's identity and influences its ESG strategies today.

3. Policy and Regulatory Landscape for ESG in the Dairy Sector

India's ESG regulatory environment has evolved significantly over the past decade, influenced by global climate commitments, national development priorities, and growing investor expectations.

3.1 Corporate and ESG Reporting Requirements

While Amul and Mother Dairy are not listed entities, many ESG reporting norms still influence their operations indirectly. The Companies Act (2013) mandates Corporate Social Responsibility (CSR) spending for qualifying companies, directing funds towards social and environmental projects. The Securities and Exchange Board of India (SEBI) introduced the Business Responsibility and Sustainability Report (BRSR) in 2021, making it mandatory for the top 1,000

listed entities. Though voluntary for unlisted entities, BRSR frameworks serve as a best-practice benchmark that Amul and Mother Dairy have partially adopted in their sustainability disclosures.

3.2 Environmental Regulations

Key legislations shaping the environmental performance of dairy companies include:

- Environment Protection Act (1986) – the umbrella legislation governing emissions, effluents, and hazardous waste.
- Plastic Waste Management Rules (2016, amended 2022) – impose Extended Producer Responsibility (EPR) obligations on packaging materials.
- Water (Prevention and Control of Pollution) Act (1974) – regulates effluent discharge into water bodies.
- Energy Conservation Act (2001) – encourages energy efficiency measures in industrial facilities.

For the dairy sector, compliance often involves wastewater treatment, solid waste management, and a gradual shift to renewable energy sources.

3.3 Social and Labour Regulations

Labour codes, workplace safety laws, and the Food Safety and Standards Authority of India (FSSAI) regulations influence social and governance performance. FSSAI mandates traceability and hygiene standards across the dairy supply chain, while national programmes such as the Rashtriya Gokul Mission and National Programme for Dairy Development encourage breed improvement, farmer training, and infrastructure investment.

3.4 International Commitments

India is a signatory to the Paris Agreement and committed to reducing emission intensity by 45% by 2030 (relative to 2005 levels). Dairy sector stakeholders are expected to contribute to climate targets through methane mitigation, energy efficiency, and sustainable feed practices. The UN Sustainable Development Goals (SDGs)—particularly Goals 2, 6, 7, 12, and 13—form an implicit framework for evaluating Amul and Mother Dairy’s ESG initiatives.

4. Environmental Analysis

4.1 Amul's Environmental Performance

Amul's environmental strategy is anchored in renewable energy adoption, carbon emission reduction, water conservation, and sustainable packaging. Its 2023–2024 Sustainability Report notes a 4% reduction in carbon emissions, equivalent to approximately 31,200 tons annually. This achievement stems from measures such as:

- Installation of solar rooftop PV systems and solar boilers.
- Utilisation of biogas from cattle dung, reducing dependency on fossil fuels.
- Deployment of wind energy infrastructure in select plants.

Amul has planted over 37.7 million trees between 2017 and 2023, contributing to carbon sequestration and biodiversity enhancement. Its Vision 2030 roadmap includes installing biomass briquette-fired boilers (with energy efficiency of ~64%) and scaling wind–solar hybrid power generation systems.

On packaging, Amul has replaced 280 million plastic straws with compostable alternatives and collaborates with suppliers to develop recyclable materials. Water stewardship initiatives include:

- 25% reduction in specific water consumption.
- Recycling 20% of total water usage.
- Rainwater harvesting projects at multiple sites.

4.2 Mother Dairy's Environmental Performance

Mother Dairy's environmental initiatives are more targeted. The company has committed to becoming Plastic Waste Neutral and has recycled 8,164 metric tons of post-consumer plastic since 2018–2019. Sustainable packaging innovations have cut 125 metric tons of plastic annually.

While carbon reduction is not as broad as Amul's, Mother Dairy has achieved a 900 metric ton reduction in emissions, primarily through energy-efficient equipment upgrades and process

optimisation. The company's renewable energy adoption is limited but growing, with pilot solar installations in certain facilities.

4.3 Comparative Environmental Evaluation

Amul's environmental portfolio is broad and systemic, addressing climate change, water scarcity, and waste management simultaneously. Mother Dairy's portfolio is narrow but deep, excelling in plastic waste management but less diversified in renewable energy or afforestation. Both companies align with SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action), but Amul's scale gives it a stronger multi-dimensional profile.

5. Social Analysis

5.1 Amul's Social Impact

Amul's cooperative model integrates 3.6 million farmer-producers, returning approximately 80% of revenues directly to farmers. This ensures economic empowerment and aligns with SDGs 1 and 2. Social initiatives include:

- Mahila Pashupalan Talim Karyakram – training women in advanced dairy farming techniques.
- Entrepreneurship Development Programs (EDPs) for rural youth.
- Comprehensive healthcare, insurance, and maternity benefits for employees.
- Educational support through the Anandalaya School.

Amul also runs community health camps, afforestation drives, and vocational training programmes, expanding its impact beyond the dairy value chain.

5.2 Mother Dairy's Social Impact

Mother Dairy supports local farmers through assured procurement and quality control training. It has introduced vegan and organic product lines, catering to changing consumer health preferences. The company invests in consumer awareness campaigns on food safety and nutrition. While it lacks Amul's deep cooperative integration, it engages in community projects such as school nutrition programmes and disaster relief.

5.3 Comparative Social Evaluation

Amul's social impact is structurally embedded in its cooperative model, giving it broader rural reach and deeper farmer empowerment. Mother Dairy's social contributions are more market-facing, focused on product health benefits and urban consumer engagement.

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6. Governance Analysis

6.1 Amul's Governance Model

Amul's governance is anchored in the federated cooperative structure of the Gujarat Cooperative Milk Marketing Federation (GCMMF), which allows farmer-members to participate directly in decision-making. Each village cooperative elects representatives to the district unions, which in turn send delegates to the state-level federation. This three-tiered governance system ensures democratic participation, transparency in operations, and accountability to primary stakeholders—the farmers.

Key governance features include:

- Stakeholder representation in administrative committees.
- Materiality matrix to prioritise ESG issues based on their significance to stakeholders and to the organisation.
- Food safety systems with rigorous traceability, allergen management, and product recall protocols.

Globally, Amul has been recognised for brand strength, ranked as the world's strongest food brand by Brand Finance in 2024. However, the World Benchmarking Alliance's Nature Benchmark 2023 gave Amul a low score (2.0/100) in biodiversity and social inclusion, indicating gaps in non-core governance metrics.

6.2 Mother Dairy's Governance Model

Mother Dairy, while rooted in cooperative origins, operates as a wholly owned subsidiary of NDDB with a more centralised corporate governance structure. This facilitates faster strategic pivots, especially in technology adoption. A notable initiative is its development of an AI governance framework to ensure:

- Ethical use of artificial intelligence in supply chain optimisation.
- Enhanced regulatory compliance.
- Data-driven operational efficiency and predictive maintenance.

Unlike Amul's participatory model, Mother Dairy's governance is managerially driven, with indirect farmer representation through NDDB's broader cooperative network.

6.3 Comparative Governance Evaluation

Amul's governance excels in stakeholder democracy and cooperative accountability, while Mother Dairy's model prioritises agility and innovation. The ideal governance model for India's dairy future may combine Amul's grassroots legitimacy with Mother Dairy's technological foresight.

7. Global Dairy ESG Benchmarks

7.1 Fonterra (New Zealand)

Fonterra, a farmer-owned New Zealand cooperative, offers a relevant parallel to Amul. It operates with a sustainable value-chain approach, focusing on carbon reduction, regenerative farming, and global market integration. Notably, Fonterra has committed to achieving net zero emissions by 2050 and has integrated on-farm emissions tracking.

7.2 Arla Foods (Europe)

Arla Foods, a European cooperative, is a leader in science-based climate targets and farmer engagement. It has introduced Climate Checks for member farms, measuring and reducing emissions per kilogram of milk.

7.3 Danone (France)



Danone’s “One Planet. One Health” strategy blends environmental sustainability with nutrition and social responsibility. It is not a cooperative but offers a corporate model integrating ESG into brand identity.

7.4 Lessons for Amul and Mother Dairy

- From Fonterra: Embed farm-level GHG tracking and transparent reporting.
 - From Arla: Link farmer incentives directly to sustainability performance.
 - From Danone: Integrate ESG into brand storytelling to build consumer loyalty.
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8. Challenges and Opportunities

8.1 Sector-Wide Challenges

- Climate change impacts on fodder yield, water availability, and livestock health.
- Methane emissions from cattle, a potent greenhouse gas.
- Water scarcity in several milk-producing states.
- Fragmented supply chains, especially in non-cooperative procurement systems.

8.2 Opportunities for Amul

- Scale up biodiversity protection and regenerative agricultural practices.
- Implement farm-level emissions tracking akin to Arla’s Climate Checks.
- Use digital traceability to strengthen consumer trust.

8.3 Opportunities for Mother Dairy

- Broaden environmental agenda beyond plastic waste neutrality.



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- Leverage AI governance to drive energy optimisation and predictive supply chain planning.
 - Explore hybrid cooperative-corporate models to increase farmer profit-sharing.
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9. Future Scenarios & Strategic Pathways

Short-Term (1–3 Years)

- Joint industry initiatives on waste reduction and low-carbon processing technologies.
- Public-private partnerships for sustainable cold-chain infrastructure.

Medium-Term (4–7 Years)

- Scaling renewable energy adoption to cover majority plant operations.
- Sector-wide adoption of methane reduction feed additives.

Long-Term (8–15 Years)

- Transition to net-zero dairy production systems.
 - Establish India as a global exporter of sustainably certified dairy products.
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10. Conclusion

Amul and Mother Dairy reflect two distinct but complementary ESG pathways within India's dairy sector. Amul's cooperative model delivers breadth of impact, spanning farmer empowerment, large-scale afforestation, renewable energy adoption, and social infrastructure investment. Mother Dairy offers depth in focus areas, excelling in plastic waste management and governance innovation via AI integration.

The comparative analysis suggests that blending Amul's systemic reach with Mother Dairy's targeted innovation could establish a new gold standard for sustainable dairy operations in India. Both must strengthen biodiversity metrics, expand renewable energy portfolios, and embed inclusive governance principles to align with global best practices.

For India's dairy sector to remain globally competitive, ESG integration must shift from compliance to core strategic priority. This transformation will not only meet regulatory and consumer demands but also secure the resilience of rural livelihoods and the planet's ecological balance.

References

1. Amul. (2024). *Amul Sustainability Report 2023–24*. Anand Milk Union Limited.
2. Brand Finance. (2024). *Food and Drink 2024 Report*. Brand Finance.
3. Food and Agriculture Organization of the United Nations. (2023). *FAO Dairy Market Review*.
4. Mother Dairy. (2023). *Sustainability and CSR Initiatives Report*. Mother Dairy Fruit & Vegetable Pvt. Ltd.
5. World Benchmarking Alliance. (2023). *Nature Benchmark 2023 Report*.
6. United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*.
7. KPMG. (2023). *ESG Trends in the Indian Food and Beverage Sector*.
8. The Economic Times. (2024, March 15). *India's dairy sector faces sustainability test*.
9. Ministry of Environment, Forest and Climate Change, Government of India. (2023). *State of Environment Report*.
10. International Dairy Federation. (2022). *Dairy Sustainability Outlook*.
11. Arla Foods. (2023). *Climate Check Programme Overview*.



12. Fonterra Co-operative Group. (2023). *Sustainability Report*.
13. Danone. (2023). *One Planet. One Health Progress Report*.
14. Government of India. (2022). *Plastic Waste Management Rules*.
15. Securities and Exchange Board of India. (2021). *Business Responsibility and Sustainability Reporting Framework*.
16. National Dairy Development Board. (2022). *National Programme for Dairy Development Guidelines*.
17. Rashtriya Gokul Mission. (2021). *Scheme Guidelines*.
18. Energy Efficiency Bureau of India. (2023). *Industrial Energy Efficiency Practices*.
19. FAO & UNEP. (2021). *Methane and the Dairy Sector: Global Opportunities*.
20. IPCC. (2023). *Climate Change 2023: Mitigation of Climate Change*.