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# PharmaBio World

INSIGHT INTO THE PHARMACEUTICAL AND BIOTECH INDUSTRIES


## Sustainability & ESG in Pharma Industry

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# Building a Sustainable Pharma Future

In the evolving healthcare landscape, India's pharmaceutical industry stands tall as a beacon of innovation, affordability, and scale. Rightly referred to as the "pharmacy of the world," the sector contributes more than 20% of the global supply of generic medicines, and 60% of vaccines, to over 150 countries. The COVID-19 pandemic reinforced India's leadership, as pharma companies ensured uninterrupted access to essential medicines. However, this defining moment also prompted scrutiny of the industry's environmental impact, from excessive water use to waste discharge and emissions.

**Sudarshan Jain, Secretary General, Indian Pharmaceutical Alliance (IPA),** emphasizes that India's pharmaceutical industry is increasingly embracing sustainability as a core operational principle, with a strong focus on ESG performance.

India's pharmaceutical production has grown rapidly, expanding at roughly 8% annually over the past decade, more than twice the global average.

As the world confronts the environmental costs of this rapid growth, India's pharma sector faces an opportunity to broaden its leadership beyond quality, cost, and access. The new frontier of global leadership lies in environmental sustainability.

It is no longer sufficient to focus solely on healing people; we share a fundamental responsibility to heal and protect the planet as well. The question posed by Jonas Salk, the developer of the first successful polio vaccine, remains as urgent as ever: "Are we being good ancestors?" With this, Salk challenged us not only to cure diseases but to consider the impact of our actions on future generations.

### The Strategic Shift Toward Sustainability

This perspective by Salk now finds tangible expression in the industry's strategic shift towards environmental sustainability, which has emerged as a critical business imperative—no longer merely a regulatory checkbox but a core tenet of corporate responsibility, strategic positioning, and long-term competitiveness. Sustainability is rapidly evolving into the currency of trust in an increasingly conscientious global healthcare market. Across international markets, Environmental, Social, and Governance (ESG) criteria are becoming essential determinants of investment decisions, partnerships, and corporate reputation.

Indian pharmaceutical companies are proactively embracing this shift, aligning their operations with India's net-zero goals for 2070, the United Nations Sustainable Development Goals (UNSDGs), and the Business Responsibility and Sustainability Reporting (BRSR) mandates issued by SEBI. Testament to this progress, the Dow Jones Sustainability Index now ranks seven Indian pharmaceutical companies among the world's top eleven, affirming their growing global stature in sustainability performance.

While these achievements signify meaningful progress and reflect the sector's readiness to evolve with the times, much more remains to be done. India's leadership in the global pharmaceutical industry must now be defined by its capacity to innovate sustainably, adopt greener production practices, and build resilient supply chains that minimize environmental impact throughout the entire value chain.

### From Molecule to Market: Aligning the Value Chain with Sustainability

Sustainability in pharmaceuticals demands a holistic approach. It is not the responsibility of any single department or phase but a continuous mandate

spanning the entire value chain. From research and development to manufacturing, logistics, and equitable distribution, each stage offers unique opportunities to drive sustainability.

**a. Greening R&D:** Starting with Innovation

The journey of every molecule begins in the laboratory. Indian pharmaceutical companies are increasingly embracing green chemistry principles, striving for less hazardous and more resource-efficient formulations. Cleaner synthesis processes for Active Pharmaceutical Ingredients (APIs) and eco-friendly excipients are gaining momentum. However, challenges remain in underfunded R&D ecosystems, regulatory frameworks that inadequately incentivize sustainable investments, and technical hurdles requiring novel synthetic pathways, solvents, and reaction conditions. These substantial obstacles can be overcome through government-backed incentives, public-private partnerships, and innovation clusters focused on green pharmaceutical technologies. Collaborative platforms and increased investment in research infrastructure will be essential to catalyse systemic change and accelerate progress toward sustainability.

**b. Cleaner Manufacturing:** Scaling Responsibly

Post-R&D, the focus shifts to cleaner manufacturing, where the Indian pharma sector has made notable strides. Initiatives such as the Production Linked Incentive (PLI) scheme and the development of dedicated pharma clusters encourage the adoption of global best practices. Several companies have integrated Zero Liquid Discharge (ZLD) systems, automated pollution control technologies, and renewable energy solutions into their operations. Yet, significant challenges persist - effluent discharge from bulk drug production, emissions from aging facilities, and inconsistent waste management practices continue to impact environmental outcomes. Industry-wide adoption of cleaner technologies, supported by robust regulatory frameworks and voluntary self-regulation, will be critical to reducing the sector's environmental footprint.

**c. Greener Supply Chains:** Logistics for a Low-Carbon Future

India's pharmaceutical supply chain, encompassing manufacturing hubs, cold storage, transportation, and last-mile delivery, is among the most complex worldwide. While operational efficiency and scale have improved, environmental concerns have mounted due to energy-intensive cold chains, excessive plastic packaging, and emissions from long-distance transport. Building a sustainable supply chain is not only an environmental imperative but also enhances resilience against disruptions and improves cost-effectiveness. Key enablers for this transformation include decentralized manufacturing hubs, adoption of electric or hybrid transport fleets, biodegradable packaging solutions, and digital tools for optimized route logistics.

**d. Equitable Access:** The Social Sustainability Dimension

At the heart of India's pharmaceutical leadership lies its unwavering commitment to affordability and access. Programs spearheaded by the National Pharmaceutical Pricing Authority (NPPA) and the Standing Committee on Affordable Medicines and Health Products (SCAMHP) have brought essential medicines within the reach of millions. Environmental sustainability must never come at the cost of social equity. The transition toward greener processes and materials should not compromise drug affordability or accessibility. Innovation must be inclusive, ensuring sustainable healthcare remains synonymous with equitable healthcare.

**e: Driving Change:** Pharma Industry Embracing Sustainable Practices

India's pharmaceutical industry is increasingly embracing sustainability as a core operational principle, with a strong focus on ESG performance. Companies are implementing forward-looking strategies to reduce carbon emissions, boost energy efficiency, and adopt responsible water and waste management practices.

One of the most impactful transformations has been the widespread adoption of Zero Liquid Discharge (ZLD) systems. These advanced technologies treat, recycle, and reuse wastewater within manufacturing facilities, significantly minimizing ecological footprints. The treated water is repurposed for non-potable applications such as cooling towers and cleaning operations, thereby improving overall resource efficiency.

In pursuit of clean energy, pharmaceutical firms are turning to renewable sources like solar power. Rooftop solar installations, biomass utilization, and renewable energy procurement have become common initiatives

contributing to long-term decarbonization goals. Energy efficiency efforts extend beyond power generation—LED lighting, motion sensors, and smart timers are being installed to optimize electricity use. Additionally, Heating, Ventilation, and Air Conditioning (HVAC) systems are being upgraded with variable-speed blowers, programmable thermostats, and automated controls to maintain indoor air quality while reducing energy consumption. The adoption of smart metering further enhances operational efficiency by enabling precise energy monitoring and management.

Moreover, companies are investing in employee training and awareness programs to foster responsible behavior and effective greenhouse gas (GHG) management. Aligning with global transparency standards, many Indian pharmaceutical companies publish dedicated ESG or Sustainability Reports that detail key achievements, ongoing initiatives, and future targets. This commitment to openness reinforces accountability and strengthens the industry-wide pledge toward a greener future.

**Bridging Gaps:** Navigating the Challenges

The path to sustainability is not without obstacles. Legacy infrastructure, capital constraints, and fragmented regulatory compliance remain significant roadblocks. Moreover, while leading firms have made substantial progress, smaller companies often lack the resources to follow suit.

Overcoming these challenges requires a multi-dimensional strategy. This includes strategically mainstreaming ESG principles by embedding sustainability into core business models with clearly defined metrics, targets, and accountability mechanisms. Innovation must focus on circularity—redesigning product life cycles to prioritize reusability, recyclability, and minimal environmental impact. Additionally, building collaborative ecosystems that involve government, academia, startups, and multinational corporations is critical to scaling sustainable innovations across the entire value chain.

A particularly complex challenge is addressing 'Scope 3' emissions - indirect greenhouse gas (GHG) emissions occurring throughout a company's value chain. Industry leaders are adopting an integrated "dual mission" approach that simultaneously optimizes costs and reduces Scope 3 emissions. To achieve this, pharmaceutical companies can focus on three key **levers:** decarbonizing the raw material value chain, improving process and energy efficiency, and promoting recycling and circularity.

Decarbonizing the raw material value chain requires a detailed analysis of both the cost and carbon footprint of products and components, enabling more informed procurement decisions and adoption of lower-impact alternatives. Enhancing process and energy efficiency through measures such as transitioning to renewable energy sources and implementing robust energy management systems can reduce emissions by 30–40% while cutting energy costs by up to 20%. Embracing recycling and circularity by redesigning packaging to reduce material use, eliminating single-use plastics, and simplifying packaging processes can also substantially lower the industry's overall environmental impact

### A Future-Ready Vision for Indian Pharma

India has already redefined global healthcare leadership through its scale, efficiency, and commitment to access. Now, it stands poised to redefine leadership once more by setting new benchmarks in environmental sustainability. Pharma companies must prioritize adopting green technologies in legacy and new facilities, invest in bio-based APIs and green chemistry platforms, conserve energy and water across all operations, and ensure transparent ESG reporting with meaningful stakeholder engagement.

India's pharmaceutical sector is at a crossroads of immense opportunity and responsibility. The decisions made today will shape not only the future of healthcare but also the future of the planet. Environmental sustainability is no longer optional—it is essential to secure health for both people and the planet. The Indian pharmaceutical industry has the scale, capability, and vision to lead this transformation boldly, holistically, and irreversibly. ■

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