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Institutionalising Co-Benefits in India and South Asia: Integrating Climate, Pollution Control, Development, and Equity

Key Messages

1. India and South Asia face overlapping crises of climate change, air pollution, energy insecurity, and inequality that require integrated policy responses.
2. Co-benefits approaches reframe climate policy as a development strategy delivering health gains, economic productivity, and job creation.
3. Institutional reform is required to embed co-benefits into finance ministries, planning commissions, and subnational governance systems.
4. India's Panchamrit commitments create alignment opportunities, but implementation gaps persist across states and sectors.
5. Subnational governments are central to realizing measurable co-benefits.
6. Air pollution mitigation produces immediate, politically salient benefits that often exceed mitigation costs.
7. The energy–water–food nexus represents a high-impact intervention domain for systemic transformation.
8. Just transition principles must be embedded to protect workers and marginalized communities.
9. Regional cooperation in South Asia is indispensable due to shared airsheds, river basins, and energy systems.
10. The next decade is decisive in determining whether South Asia locks into high-carbon pathways or pioneers inclusive green growth.

Contents

1. Introduction: Converging Pressures and Growing Opportunities in South Asia

South Asia is undergoing rapid economic expansion while facing escalating climate and environmental stress. The region contains some of the most climate-vulnerable populations globally (IPCC, 2022). Rapid urbanization, industrialization, and infrastructure expansion are increasing emissions and pollution burdens. Air pollution contributes to millions of premature deaths annually (Health Effects Institute, 2020; Institute for Health Metrics and Evaluation, 2019). Meanwhile, extreme heat, glacial melt, and flooding threaten agricultural productivity and infrastructure stability.

These pressures necessitate integrated policy approaches capable of addressing climate mitigation, pollution control, and social equity simultaneously. The co-benefits framework offers a structured approach to tackling these related challenges. The concept of co-benefits emerged from research demonstrating that greenhouse gas mitigation also reduces local air pollutants (Shindell et al., 2012). Subsequent work demonstrated that health gains alone could offset climate mitigation costs in several regions (Markandya et al., 2018).

Over time, the framework expanded to include employment generation, biodiversity protection, energy security, water resilience, and poverty alleviation. Sustainability science increasingly emphasizes systems integration across sectors (Liu et al., 2015). In emerging economies, co-benefits approaches strengthen domestic political support for climate action by aligning global commitments with local development priorities.

The co-benefits framework offers a practical pathway to reconcile these objectives. Rather than treating climate action as a constraint on development, co-benefits approaches demonstrate how mitigation and development policies can simultaneously advance public health, economic productivity, job creation, energy security, environmental quality, and social justice.

This paper argues that co-benefits must evolve from analytical framing to institutionalised governance. It outlines four strategic rationales—economic, policymaking, sustainability science, and social justice—and presents a roadmap to strengthen research–policy integration and embed co-benefits into planning, finance, and regional cooperation.

2. The Evolution of Co-Benefits Thinking

The concept of co-benefits emerged from early efforts to demonstrate that climate mitigation could produce immediate local gains, particularly through reductions in air pollution. Early research highlighted how lowering fossil fuel combustion could reduce particulate matter, thereby improving public health and generating economic savings.

Over time, the framework expanded beyond the climate–air pollution nexus. It now encompasses energy security, biodiversity conservation, water management, employment

generation, resilience building, and social equity. More recently, there has been a shift toward integrating co-benefits directly into policy design and project appraisal. Rather than treating co-benefits as secondary advantages, policymakers increasingly view them as central criteria in evaluating development strategies.

For South Asia, this evolution is particularly relevant. Development priorities remain urgent, and integrated approaches allow governments to advance multiple objectives without sacrificing economic ambition.

3. Four Strategic Rationales for Institutionalising Co-Benefits

The growing importance of co-benefits in India and South Asia can be understood through four complementary rationales.

3.1 The Economic Rationale: Climate Action as Development Strategy

First, co-benefits strengthen the economic case for climate action. When health improvements, productivity gains, energy security enhancements, and avoided environmental damages are considered, the net economic impact of mitigation policies can be strongly positive. Renewable energy expansion reduces dependence on imported fuels and enhances energy sovereignty. Energy efficiency lowers operating costs for industries and households. Clean transport systems reduce congestion and health expenditures. Framing climate policy as a driver of modernization and competitiveness—rather than as a cost—can unlock domestic political support and attract international climate finance aligned with development goals.

3.2 The Policymaking Rationale: Breaking Sectoral Silos

Second, co-benefits help overcome institutional fragmentation. Ministries and departments often operate in isolation, leading to missed synergies and inefficient spending. An integrated co-benefits framework encourages cross-ministerial collaboration. Transport electrification can be aligned with renewable energy policy; urban planning can incorporate climate resilience and public health objectives; industrial policy can integrate decarbonization pathways. Co-design processes involving stakeholders, private sector actors, researchers, and communities strengthen implementation feasibility.

3.3 The Sustainability Science Rationale: Systems Thinking

Third, sustainability science underscores the interconnected nature of environmental and social systems. Policies implemented in one sector often have cascading effects in others.

For example, urban design influences transport emissions, heat exposure, and social equity. Energy transitions affect water resources and employment patterns. Agricultural practices shape emissions, food security, and biodiversity.

Integrated assessment models and interdisciplinary research provide tools to analyze these interactions and guide long-term planning.

3.4 The Social Justice Rationale: Equity and Political Durability

Fourth, co-benefits approaches incorporate distributional analysis. Environmental and climate risks disproportionately affect low-income and marginalized communities. Policies that generate visible local improvements—such as cleaner air, better public transport, and job creation—are more likely to gain political support. Embedding just transition principles ensures that workers and communities affected by structural shifts are protected and empowered.

4. India's Climate Commitments and Policy Landscape: Co-Benefits as a Lever for Integrated Policymaking in South Asia

4.1 National Climate and Air Pollution Policies

India's updated Nationally Determined Contribution (NDC) under the Paris Agreement commits to achieving 500 GW of non-fossil electricity capacity by 2030, reducing emissions intensity of GDP by 45 percent from 2005 levels, and reaching net-zero emissions by 2070. These commitments signal a structural transformation of the energy system, reinforced through policies such as the National Solar Mission, Production-Linked Incentive (PLI) schemes for clean technologies, and expanded renewable auctions. Renewable energy capacity—particularly solar and wind—has grown rapidly, making India one of the world's largest renewable energy markets (IRENA, 2023). However, coal continues to account for the majority of electricity generation, and new coal investments remain under development. Financial distress among distribution companies (DISCOMs), institutional fragmentation across energy, environment, and finance ministries, and legacy infrastructure constraints complicate the transition. Embedding co-benefits metrics—especially health, employment, and fiscal savings—into national infrastructure appraisal frameworks (e.g., cost–benefit analysis and public investment guidelines) would strengthen inter-ministerial coordination and improve capital allocation decisions (Markandya et al., 2018; World Bank, 2021).

Air pollution governance at the national level has increasingly intersected with climate policy. The National Clean Air Programme (NCAP), launched in 2019, targets reductions in particulate matter (PM2.5 and PM10) concentrations across major cities. Although framed primarily as an air quality initiative, its implementation overlaps significantly with climate mitigation measures in energy, transport, and waste sectors. Air pollution is estimated to reduce life expectancy across the Indo-Gangetic Plain by several years, while also lowering labor productivity and increasing health expenditures (Health Effects Institute, 2020). Studies demonstrate that the monetized health co-benefits of decarbonization in India can exceed the costs of mitigation policies (Markandya et al., 2018). Recognizing these co-benefits can shift national policy from siloed environmental regulation toward integrated public health, energy security, and macroeconomic strategy. Institutionalising co-benefit accounting in India's national climate budgeting processes could also enhance fiscal credibility and political durability of mitigation commitments.

4.2 Subnational Climate and Air Pollution Policies

India's federal structure places states and municipalities at the frontline of climate and air pollution implementation. State Action Plans on Climate Change (SAPCCs), first developed following the National Action Plan on Climate Change, were initially conceptual planning documents. However, many lacked measurable targets, financing strategies, and monitoring mechanisms. A new generation of state climate strategies is emerging that links renewable procurement mandates, electric mobility policies, and adaptation planning with measurable outcomes. Embedding co-benefits into these state-level strategies can catalyze cross-sectoral integration—for example, linking public health departments with urban planning and transport authorities to quantify avoided mortality from cleaner transport systems (Knowlton et al., 2014). Budget-linked climate planning—where climate and air quality metrics are tied directly to state expenditure frameworks—would strengthen accountability and accelerate policy coherence.

Municipal governments play a particularly critical role in operationalizing co-benefits. Heat Action Plans (HAPs), pioneered in cities such as Ahmedabad, have demonstrated measurable reductions in heat-related mortality through early warning systems and urban design interventions (Knowlton et al., 2014). Urban heat mitigation strategies—cool roofs, urban greening, reflective materials—simultaneously reduce electricity demand for cooling, ease grid stress, and improve public health. Similarly, electric bus deployment in cities such as Delhi and Mumbai reduces tailpipe emissions, lowers long-term health expenditures, and supports domestic manufacturing. When municipal climate plans integrate transport electrification with renewable procurement and air quality monitoring, the resulting co-benefits multiply across public health, fiscal savings, and energy security domains. Strengthening data systems and enabling fiscal transfers linked to measurable environmental and health outcomes would allow subnational governments to better capture these benefits.

4.3 Sectoral Integration: Energy, Transport, and Waste

In the energy sector, the co-benefits framework highlights the multiple dividends of renewable expansion beyond carbon mitigation. Large-scale solar and wind deployment reduces local air pollutants from coal combustion, thereby lowering respiratory and cardiovascular disease burdens (Markandya et al., 2018). Renewable energy also reduces water consumption relative to thermal power plants—an important consideration in water-stressed regions of India and Pakistan. Moreover, decentralized solar applications, such as solar irrigation pumps, reduce diesel use, enhance farmer incomes, and stabilize rural electricity demand. Agriculture accounts for substantial groundwater extraction and electricity subsidies; thus, integrating solar irrigation with groundwater governance reforms can produce "triple wins": improved food security, reduced fiscal burdens, and emissions mitigation (FAO, 2022). Embedding co-benefit metrics into agricultural and energy subsidy reform can reframe politically sensitive transitions as rural development strategies.

Transport represents one of the fastest-growing sources of emissions and urban air pollution in India and across South Asia. Electrification of two- and three-wheelers, buses, and urban fleets offers immediate air quality improvements, particularly in densely populated cities. Reduced PM2.5 exposure enhances workforce productivity and reduces public health expenditures (Health Effects Institute, 2020). Electric mobility policies—combined with renewable electricity integration—can also generate employment in battery manufacturing, charging infrastructure deployment, and vehicle assembly (ILO, 2018). However, integrated planning is essential. Without grid decarbonization, electrification risks shifting emissions upstream. Thus, co-benefits materialize most strongly when energy and transport policies are synchronized, supported by investments in grid modernization and storage technologies.

The waste sector presents additional opportunities for integrated co-benefits. Poorly managed solid waste contributes to methane emissions, open burning, and severe urban air pollution. Methane capture from landfills, composting systems, and circular economy strategies can reduce greenhouse gas emissions while improving sanitation and urban livability. Informal waste workers play a critical role in recycling systems across Indian and South Asian cities. Formalizing and integrating these workers into municipal waste management systems can enhance recycling rates, reduce environmental contamination, and improve livelihoods. Methane mitigation in waste and agriculture also aligns with global efforts to reduce short-lived climate pollutants, delivering near-term climate and health gains (UNEP, 2021). Integrated waste governance—linking climate, health, and labor policy—illustrates how co-benefits can transform a traditionally neglected sector into a pillar of sustainable development.

4.4 Just Transitions and Social Equity

A co-benefits approach must also address distributional impacts and political economy constraints. Coal-dependent regions—such as Jharkhand, Chhattisgarh, and parts of eastern India—face risks of economic disruption as decarbonization accelerates. Economic diversification strategies, worker retraining programs, and social protection mechanisms are essential to maintain political support for transition policies. International evidence suggests that proactive labor market policies can reduce social resistance and improve transition outcomes (ILO, 2018). Embedding equity indicators—such as employment generation, income distribution, and community participation—into climate planning strengthens legitimacy and long-term stability. Fiscal transfers to coal-dependent states tied to renewable manufacturing and clean energy deployment could support structural transformation while preserving regional development goals.

Gender and social equity dimensions are equally central. Energy poverty and indoor air pollution disproportionately affect women and low-income households. Access to clean cooking technologies reduces respiratory disease and unpaid labor burdens (UN Women, 2020). Electrification and decentralized renewable systems can enhance energy access in marginalized communities while supporting local entrepreneurship. Incorporating gender-sensitive metrics into energy and transport policy design ensures that mitigation strategies

do not exacerbate inequality. A just transition framework—integrating labor rights, gender equity, and regional development—transforms co-benefits from a technocratic accounting exercise into a socially grounded governance paradigm.

4.5 Regional Integration in South Asia

Environmental systems transcend national borders across South Asia. Shared river basins (e.g., the Ganges-Brahmaputra-Meghna system) and transboundary airsheds link India with Bangladesh, Nepal, Pakistan, and Bhutan. Coordinated governance mechanisms are therefore critical. Regional electricity trade has significant potential to enhance grid stability and facilitate renewable integration, particularly through hydropower cooperation between India, Nepal, and Bhutan (World Bank, 2021). Cross-border solar and hydropower integration can reduce reliance on fossil fuels while strengthening collective energy security.

Regional platforms could harmonize emissions inventories, air quality monitoring systems, and climate data reporting, enabling more coherent responses to shared environmental risks. Joint air pollution mitigation strategies across the Indo-Gangetic Plain could yield substantial public health benefits. By framing regional cooperation in terms of shared co-benefits—health improvements, energy reliability, fiscal savings—South Asian countries can move beyond zero-sum energy geopolitics toward collaborative sustainability transitions.

5. Conclusion

Embedding co-benefits into India's climate and air pollution policy architecture provides a pathway toward more integrated policymaking across governance scales. At the national level, incorporating health and economic co-benefits into fiscal and infrastructure appraisal systems can strengthen policy coherence. At the subnational level, linking climate targets with budgetary processes and measurable public health outcomes enhances accountability. Sectorally, integrated strategies across energy, transport, agriculture, and waste generate compounding economic and social gains. Finally, ensuring just transitions and regional cooperation safeguards political durability and equity.

In India and across South Asia, co-benefits are not peripheral advantages—they are central instruments for aligning climate mitigation with development priorities. Institutionalising co-benefit metrics can transform fragmented environmental governance into a coordinated strategy for sustainable growth, public health protection, and social inclusion.

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