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15. Climate Change Mitigation Pathways by the Global South: Prospects and Limitations

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Abstract:

Climate change presents a profound challenge with severe implications for global stability, economic development, and environmental sustainability. The Global South, encompassing regions in Latin America, Africa, Asia, and Oceania, faces a unique set of challenges and opportunities in mitigating climate change due to its economic constraints, limited infrastructure, and high dependency on climate-sensitive sectors.

Despite historically lower greenhouse gas emissions, rapid industrialization and urbanization in these regions are leading to significant increases in emissions. This paper examines the potential and limitations of climate change mitigation strategies in the Global South, highlighting the demographic and geographic diversity, economic development paths, and the critical role of international cooperation and support. Key strategies include the adoption of renewable energy, technological innovation, and South-South cooperation.

Through leveraging these approaches, the Global South can balance economic growth with sustainability, contributing significantly to global climate goals and fostering a resilient, equitable future.

Keywords:

Climate Change Mitigation, Global South, Sustainability

15.1 Introduction:

Climate change is one of the most urgent issues of our time, affecting global stability, economic growth, and environmental health. Its effects are felt everywhere, but the nations of the Global South experience the brunt of these impacts. These countries, with lower levels of industrialization and economic progress, face distinct challenges and opportunities in addressing climate change.

The Global South includes regions in Latin America, Africa, Asia, and Oceania, home to most of the world's population and some of its most at-risk communities. The diversity within these regions means that climate change impacts and solutions vary widely. However, many of these countries share vulnerabilities due to economic limitations, inadequate infrastructure, and a high dependence on sectors like agriculture and fisheries (Adger et al., 2003). The role of the Global South in tackling climate change is vital.

These nations are significant not only in terms of population but also as essential participants in global sustainability efforts. Although they have historically contributed less to global greenhouse gas emissions than the industrialized nations of the Global North, many Global South countries are now rapidly industrializing and urbanizing.

This development path could lead to significant increases in emissions if not managed carefully (IPCC, 2014). Efforts to address climate change in the Global South must balance socio-economic development, energy requirements, and environmental sustainability. These efforts are also driven by the need to alleviate poverty, improve living standards, and ensure economic growth. The challenge is to reduce emissions in a way that supports broader development goals and enhances resilience to climate impacts.

The chapter aims to explore the potential and limitations of climate change strategies in the Global South. It examines the number of these countries, their current greenhouse gas emissions, and how their economic and social contexts influence their climate policies. By understanding these factors, we can identify approaches that align climate action with sustainable development and highlight the important role of the Global South in global climate efforts.

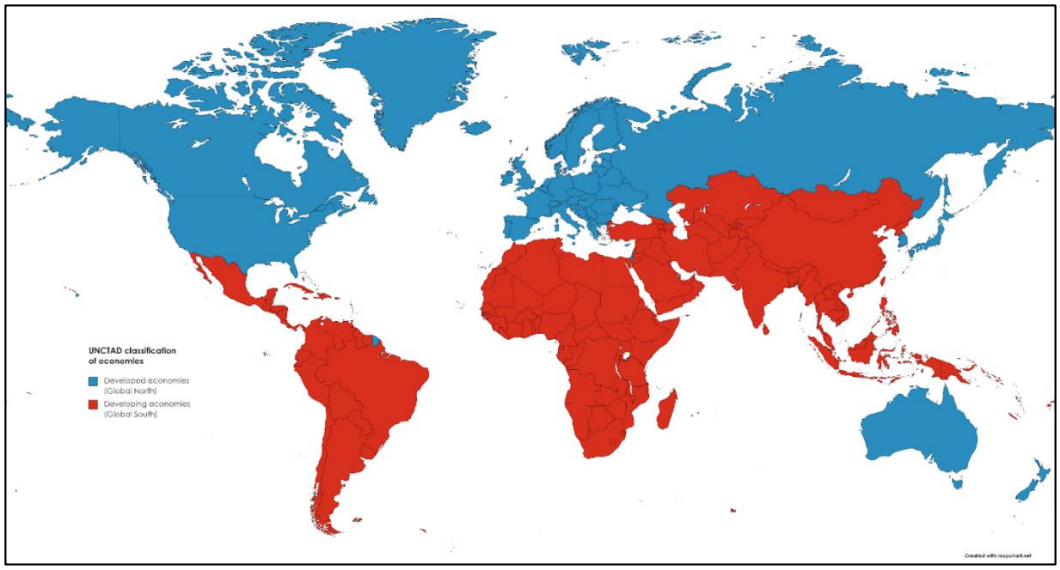

Figure 15.1: ***Economic classification of the world's countries by the UNCTAD : the Global North (i.e., developed countries) is highlighted in blue and the Global South (i.e., developing countries and least developed countries) is highlighted in red.***

15.2 Quantum of Greenhouse Emissions of the Global South:

Despite their large populations, the Global South has historically contributed less to greenhouse gas emissions compared to the Global North due to lower industrial activity and energy consumption. However, rapid industrialization and urbanization in these regions are now leading to significant increases in emissions. According to the Global Carbon Project (2022), the Global South now accounts for around 60% of annual global CO2 emissions, reflecting growing economic activity and energy needs. China and India are major emitters within the Global South. China, the world's most populous country and second-largest economy, accounts for nearly 30% of global emissions (IEA, 2022), largely due to extensive coal use, rapid industrialization, and large-scale urban development. India's emissions are also significant and rising rapidly as the country seeks to improve living standards and expand its industrial base.

Other countries, such as Brazil and Indonesia, contribute to emissions through deforestation and land-use changes. The Amazon rainforest in Brazil and the peatlands in Indonesia are vital carbon sinks, but ongoing deforestation and land conversion for agriculture are causing significant carbon releases. Per capita emissions in the Global South remain much lower than in the Global North, highlighting disparities in consumption and energy use. The per capita emissions in countries like the United States and Australia are significantly higher than in China and India. Rising emissions in the Global South reflect economic trends and developmental goals. As these nations strive to lift populations out of poverty and achieve economic growth, energy demand is expected to increase. Balancing this growth with sustainable development is a critical challenge. Substantial support is needed in terms of technology transfer, financial resources, and capacity building. International cooperation and climate finance mechanisms, such as the Green Climate Fund, are crucial in helping these countries transition to low-carbon pathways while achieving development goals. Innovative energy solutions, such as renewable energy, improved efficiency, and sustainable land management, will be essential in mitigating emissions from these rapidly growing economies.

Table 15.1: T*he contributions and key factors influencing greenhouse gas emissions in major countries and regions within the Global South, with references to authentic sources*

Country/Region	Emission Contribution (%)	Key Factors	Source
Global South	60% of global CO2 emission	Growing economic activity and energy needs	Global Carbon Project (2022)
China	Nearly 30% of global emissions	Extensive coal use, rapid industrialization, urban development	IEA (2022)
India	Significant and rising	Industrial expansion, improved living standards	IEA (2022)

Country/Region	Emission Contribution (%)	Key Factors	Source
Brazil Not specified	Not specified	Deforestation, land-use changes	Global Carbon Project (2022)
Indonesia	Not specified	Deforestation, land-use changes	Global Carbon Project (2022)
Global North (e.g., USA Australia)	Higher per capita emissions	High consumption and energy use	IEA (2022)

15.3 Developmental Context: Industrialization and Climate Impact:

The Global South faces the dual challenge of addressing development needs while mitigating climate change. Many regions in these countries lack the infrastructure and resources necessary for robust economic growth (United Nations, 2020). Consequently, per capita emissions in the Global South are much lower than in the Global North, with Sub-Saharan Africa averaging 0.8 metric tons of CO2 per capita compared to 15.5 metric tons in North America (World Bank, 2021).

As these nations pursue industrialization, their emissions are likely to rise significantly. If the Global South follows the carbon-intensive development paths previously used by the Global North, it would exacerbate the global climate crisis (Parikh et al., 2020). This underscores the need for sustainable development practices that decouple economic growth from carbon emissions. Rapid urbanization also contributes to this challenge. Cities in the Global South are expanding rapidly, often without adequate planning or infrastructure. This growth increases energy consumption, emissions from transportation and industry, and strain on natural resources. For example, cities in India and Nigeria are among the fastest-growing urban centers, with significant implications for energy use and emissions. Agriculture is another critical sector where development and climate impact intersect. Climate change affects agricultural productivity, water availability, and food security, posing risks to livelihoods and economic stability. Efforts to improve agricultural productivity must incorporate climate resilience to ensure sustainable development.

15.4 Positioning: Development Needs at the Periphery:

The Global South faces the challenge of balancing development with sustainability. Economic growth and poverty alleviation must be integrated with climate policies. This requires innovative, low-carbon development models, as noted by Sachs (2015).

- **Green Growth Strategies:** Investing in renewable energy, enhancing energy efficiency, and adopting sustainable agricultural practices are key. For example, India's National Solar Mission aims to boost solar power capacity to 100 GW by 2022, reducing reliance on fossil fuels (Ministry of New and Renewable Energy, 2022).

- **Sustainable Urban Development:** Cities can adopt smart growth principles, emphasizing compact, transit-oriented development, green infrastructure, and energy-efficient buildings. These strategies help reduce urban sprawl, lower emissions, and improve urban living conditions.
- **Inclusive Economic Policies:** Focusing on sectors that generate employment and income, such as sustainable agriculture, eco-tourism, and green manufacturing, can lift large segments of the population from poverty. The Green Belt Movement in Kenya, for instance, combines environmental conservation with poverty alleviation through tree planting and sustainable land management (Maathai, 2004).
- **International Cooperation:** Developed countries must provide financial resources, technology transfer, and capacity-building support. Mechanisms like the Green Climate Fund are crucial for helping developing nations implement sustainable development strategies.
- **Climate Resilience and Adaptation:** Policies should integrate measures to prepare for climate impacts like extreme weather, sea-level rise, and changes in precipitation. Building resilient infrastructure, protecting natural ecosystems, and enhancing disaster preparedness are essential for mitigating climate effects while pursuing development goals.

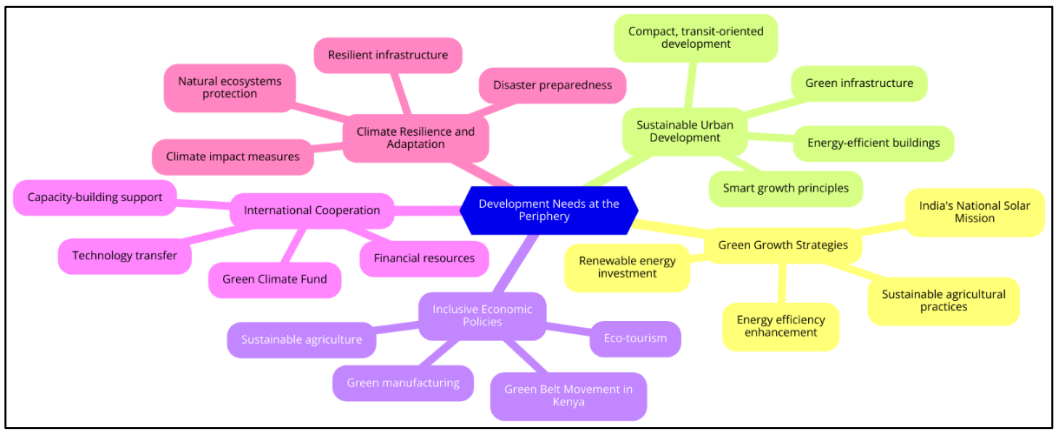

Figure 15.2: ***various strategies for balancing development and sustainability in the Global South, including green growth, sustainable urban development, inclusive economic policies, international cooperation, and climate resilience***

15.5 Sources of Development: Renewable Energy and Biofuels:

Renewable energy sources such as solar, wind, and biofuels offer viable pathways for sustainable development in the Global South. These energy sources are particularly appealing because they can provide the dual benefits of reducing greenhouse gas emissions and enhancing energy security. The adoption of renewable energy technologies in the Global South has been growing, although at different rates due to varying levels of investment, policy support, and technological capabilities (REN21, 2021). For instance, Brazil has emerged as a global leader in biofuels, particularly ethanol produced from sugarcane. This biofuel has become a significant component of Brazil's transportation fuel, reducing the country's reliance on fossil fuels and lowering its carbon emissions

(Goldemberg, 2007). The success of Brazil's biofuel industry has been attributed to a combination of supportive government policies, technological innovation, and the country's favourable climatic conditions for sugarcane cultivation. Other countries in the Global South are also making strides in renewable energy. India has invested heavily in solar power, with initiatives like the National Solar Mission aiming to increase the country's solar power capacity to 100 GW by 2022 (Ministry of New and Renewable Energy, 2022). Similarly, South Africa has developed a substantial wind power sector, leveraging its windy coastal regions to generate clean electricity. Despite these advancements, challenges remain. Many countries in the Global South face barriers such as limited access to finance, inadequate infrastructure, and a lack of technical expertise. Overcoming these obstacles requires not only domestic efforts but also international support and cooperation.

15.6 Innovating Alternate Fuels: Cost-Effectiveness:

Innovation in alternative fuels and renewable energy technologies is crucial for the Global South. These nations require cost-effective solutions that can be scaled up to meet the energy needs of their large and growing populations. Investments in research and development (R&D), as well as international cooperation, are essential for advancing these technologies and making them more affordable. The cost of renewable energy has been decreasing, making it increasingly competitive with fossil fuels. According to the International Renewable Energy Agency (IRENA), the cost of electricity from solar photovoltaics (PV) and onshore wind has fallen dramatically over the past decade, making these technologies some of the cheapest sources of new power generation (IRENA, 2020). This cost reduction presents a significant opportunity for the Global South to adopt renewable energy on a larger scale. For example, in Kenya, the development of large-scale geothermal and wind power projects has helped to diversify the country's energy mix and reduce electricity costs. The Lake Turkana Wind Power project, the largest wind farm in Africa, provides significant amounts of clean energy, contributing to the country's goal of achieving universal access to electricity (Kenya Power, 2021).

15.7 Technology Transfer:

Effective technology transfer from developed to developing countries is vital for enabling the Global South to leapfrog to cleaner technologies. Technology transfer involves not just the physical transfer of hardware but also the dissemination of knowledge, skills, and practices necessary to operate and maintain these technologies.

International frameworks such as the United Nations Framework Convention on Climate Change (UNFCCC) have emphasized the importance of technology transfer in achieving global climate goals. The UNFCCC's Technology Mechanism, which includes the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN), aims to enhance climate technology development and transfer to developing countries (UNFCCC, 2015). For instance, through technology transfer programs, countries like Morocco have developed their solar power capabilities. The Noor Solar Complex in Morocco, one of the largest concentrated solar powers (CSP) plants in the world, was developed with significant international support and technology transfer. This project not only provides clean energy but also serves as a model for other countries in the region.

15.8 South-South Cooperation:

South-South cooperation offers a framework for countries in the Global South to share resources, knowledge, and technologies. This cooperation can enhance their collective capacity to address climate change while pursuing sustainable development. Initiatives such as the BRICS partnership (Brazil, Russia, India, China, and South Africa) and the India-Brazil-South Africa (IBSA) Dialogue Forum illustrate the potential of South-South cooperation in driving climate action and sustainable development (Chaturvedi, 2016).

South-South cooperation allows countries to share successful strategies and technologies tailored to similar socio-economic and environmental conditions. For example, India's expertise in solar energy can be shared with African countries through platforms like the International Solar Alliance, which aims to promote solar energy and provide a collective response to energy needs and climate change challenges.

Furthermore, South-South cooperation can facilitate joint research and development initiatives, leveraging the collective scientific and technical expertise of participating countries.

Collaborative projects in areas such as renewable energy, sustainable agriculture, and climate resilience can drive innovation and foster the adoption of sustainable practices across the Global South.

15.9 Conclusion:

The Global South faces a complex challenge in balancing development needs with environmental sustainability. Economic constraints, infrastructural deficits, and high climate vulnerability complicate climate change mitigation efforts. Despite these hurdles, the region's innovative strategies show promise. Renewable energy adoption, led by Brazil's biofuels and India's solar initiatives, reduces emissions while promoting energy security and economic growth.

Technological innovation, backed by investments in research and development, is crucial for making renewable energy solutions cost-effective and scalable. Additionally, South-South cooperation, exemplified by the BRICS partnership and the International Solar Alliance, enhances resource sharing, knowledge exchange, and joint ventures in sustainable development.

These collaborative efforts enable the Global South to address common challenges effectively. By focusing on renewable energy, fostering technological advancements, and strengthening cooperation, the Global South can significantly contribute to a sustainable future and a resilient global climate framework.

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