Climate Change and Poverty, Key Drivers, Impacts, Regional Trends

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Climate Change and Poverty are interlinked challenges. A recent study conducted by the National Institute of Science Education and Research (NISER), an autonomous research institute under the Department of Atomic Energy, highlights that poverty in India is increasingly shaped by climate factors rather than purely economic conditions.

Understanding Climate Change and Poverty Nexus

The NISER report, based on an analysis of 593 districts across 21 states, reveals that **poverty in India** is no longer just an economic issue but increasingly a climate-linked phenomenon. **Climate change and poverty reinforce each other, creating a self-perpetuating cycle of vulnerability and deprivation.**

- Climate shocks reduce income by affecting agriculture, livestock, fisheries, and informal sector activities, which are primary livelihood sources for the poor.
- Poor households lack financial resources, insurance, and institutional support, limiting their ability to adapt to climate variability.

- Repeated exposure to climate events leads to asset depletion, indebtedness, and long-term economic insecurity.

This creates a **“poverty trap”** where climate vulnerability and poverty continuously reinforce each other.

Key Climate Drivers of Poverty

Climate change and poverty are driven by multiple environmental factors that directly affect livelihoods and economic stability. Key climate drivers of poverty are:

- **Temperature Volatality** : Maximum temperature variation is the strongest climatic driver of poverty. A one-unit increase raises poverty probability by 31.1%
- **Rainfall Deficit** : Lower and uneven precipitation is associated with higher poverty, particularly in agriculture and water-dependent sectors. A one-unit rise in yearly average minimum precipitation increases poverty probability by 1.9%.
- **Floods**: Flood exposure is linked to higher poverty due to damage to infrastructure, displacement, and livelihood loss. A one-unit rise in flood-affected areas increases poverty probability by 1.4%.
- **Drought Conditions**: Repeated droughts result in crop failure, livestock loss, and rising indebtedness, particularly in regions heavily dependent on rain-fed agriculture.

Impact on Livelihoods and Economy

Climate change directly affects income, employment, and economic stability, especially for vulnerable populations dependent on natural resources. Climate change is a risk multiplier that disproportionately impacts the world’s poorest populations, threatening to push over 120 million more people into poverty by 2030.

- **Agricultural productivity declines** due to rising temperatures, erratic rainfall, and extreme events, leading to reduced farm incomes and increased rural poverty.
- Allied sectors such as livestock, fisheries, and forestry are adversely affected, as climate stress **reduces output, increases mortality, and disrupts traditional livelihoods.**
- Repeated climate shocks such as floods and droughts lead to **asset loss**, including crops, land quality, housing, and livestock, pushing households into long-term **economic distress.**
- **Increased rural-to-urban migration** occurs as people lose livelihood opportunities in agriculture, putting pressure on urban infrastructure and informal labour markets.
- **Income instability rises,** particularly in the informal sector, as climate variability disrupts daily wage employment and seasonal work patterns.
- **Rising indebtedness** among farmers and small producers results from repeated crop failures and income losses, often leading to a cycle of poverty and financial vulnerability.
- Broader **economic growth is affected** as climate shocks disrupt supply chains, **reduce productivity, and increase public expenditure on disaster relief and rehabilitation.**

Structural Factors Increasing Vulnerability

Climate impacts are amplified by existing socio-economic inequalities, making certain groups more vulnerable.

- **High dependence on agriculture** increases vulnerability because livelihoods are directly exposed to climate variability such as droughts and erratic rainfall.
- **Lack of economic diversification** limits alternative income sources, making it difficult for households to cope during climate shocks.
- **Marginalized communities**, especially Scheduled Tribes, face higher risks due to geographic isolation, dependence on natural resources, and limited access to services.
- **Poor infrastructure**, including irrigation, storage, and connectivity, reduces the ability to withstand and recover from climate events.
- **Limited access to education, healthcare, and financial services** weakens adaptive capacity and resilience.
- **Women** are disproportionately affected as they are more dependent on natural resources for livelihoods, face unequal access to land, credit, and technology, and bear additional burdens of water collection, caregiving, and household management during climate stress.

Regional Patterns in India

The impact of climate-induced poverty varies across regions due to differences in economic structure, level of development, and exposure to climate risks. In contrast to agriculture-dependent regions, the study found that districts with a higher share of the tertiary sector such as services, trade, and information technology tend to have lower poverty rates.

- The report highlights that higher poverty levels were observed in eastern states (Chhattisgarh, Odisha, Jharkhand, Bihar, and West Bengal), where the share of the tertiary sector is relatively low.
- By contrast, districts in southern states such as Kerala, Karnataka, Tamil Nadu, and parts of western states like Gujarat and Maharashtra, which have a higher share of the tertiary sector, showed lower poverty rates.

This divergence reflects broader structural economic patterns, where regions with more diversified and service-oriented economies tend to be more resilient to poverty. Stronger infrastructure, higher human capital, and policy support for skill development in southern and western states reinforce this trend.

Government Initiatives

India has undertaken several policy measures to address the dual challenge of climate change and poverty through adaptation, mitigation, and livelihood support strategies.

- **The National Action Plan on Climate Change (NAPCC)** provides a broad framework for climate adaptation and sustainable development through missions on **solar energy**, water conservation, and sustainable agriculture.
- **State Action Plans on Climate Change (SAPCCs)** focus on region-specific vulnerabilities, enabling states to design localized strategies for climate resilience and poverty reduction.
- Programs like **MGNREGA** act as a social safety net by providing wage employment during periods of climate stress such as droughts and floods, thereby supporting rural livelihoods.
- Promotion of **climate-resilient agriculture**, including drought-resistant crops, micro-irrigation, and soil conservation techniques, helps reduce the impact of climate variability on farmers.

- **Crop insurance schemes** such as **Pradhan Mantri Fasal Bima Yojana** (PMFBY) protect farmers against losses due to extreme weather events.
- **Disaster management frameworks and early warning systems** have been strengthened to reduce the economic and human costs of floods, cyclones, and droughts.
- **Financial inclusion initiatives, rural infrastructure development, and skill development programs** aim to diversify income sources and reduce dependence on climate-sensitive sectors.
- India's commitment to the United Nations **Sustainable Development Goals**, particularly **SDG 1 (No Poverty) and SDG 13 (Climate Action),** reflects an integrated approach to tackling climate-induced poverty.

Key Challenges

Despite efforts, climate change and poverty remain persistent due to several structural and policy constraints.

- Lack of localized and district-level policy implementation reduces effectiveness.
- Continued dependence on agriculture increases vulnerability.
- Regional inequalities lead to uneven resilience across states.
- Inadequate infrastructure and institutional capacity hinder adaptation.
- Limited awareness and access to technology restrict adoption of climate-resilient practices.

Way Forward

Addressing climate change and poverty requires a comprehensive and integrated strategy.

- **Encourage economic diversification** by expanding non-farm employment opportunities in rural areas. The NISER report highlights that districts with a higher share of the tertiary sector — such as services, trade, and information technology — tend to have lower poverty rates. A one-unit increase in the tertiary sector's share in gross state domestic product decreases the probability of poverty by 1.9 per cent. This shows that economic diversification acts as a buffer against climate shocks.
- India must **move beyond one-size-fits-all approaches and adopt region-specific strategies** to tackle climate-induced poverty.
- The study recommends promoting **climate-resilient agriculture** through drought-resistant crops and efficient irrigation systems, expanding non-farm employment opportunities to reduce dependence on agriculture, and strengthening disaster management systems to minimise the impact of floods and extreme weather events.
- Strengthen **disaster preparedness and early warning systems** to minimize losses.
- Improve infrastructure, healthcare, education, and financial inclusion to enhance adaptive capacity.
- Focus on **inclusive developmen**t targeting vulnerable groups such as tribal communities and small farmers.
- **Integrate climate policy with poverty alleviation strategies** to ensure coordinated and sustainable outcomes.
