

NOTIFICATION NO: 599/2026

NOTIFICATION DATE: 12.05.2026

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TOPIC OF RESEARCH: THE ROLE OF GREEN PATENTS WITH REFERENCE TO ENVIRONMENTALLY SOUND TECHNOLOGIES: A CRITICAL STUDY

FINDINGS

The present research examines the evolving relationship between patent rights and environmentally sound technologies (ESTs) in the context of climate change and sustainable development. It highlights that while patent systems are designed to incentivise innovation, their interaction with environmental objectives creates both opportunities and challenges, particularly in the context of equitable access and global climate governance.

A key finding of the study is that patent rights function as a double-edged mechanism. On one hand, they provide legal protection, financial incentives, and market exclusivity, which encourage research and development in green technologies. This is especially evident in developed countries, where strong intellectual property regimes, robust innovation ecosystems, and institutional support structures contribute to higher levels of patenting in environmental technologies.

On the other hand, the study identifies that patent protection can act as a barrier to the diffusion of ESTs, particularly in developing and least developed countries. High licensing costs, procedural complexities, and restrictive patent regimes often limit access to essential technologies, thereby widening the technological gap between developed and developing nations. This creates a tension between innovation incentives and the urgent need for widespread climate solutions.

The research further reveals that existing international legal frameworks, including climate agreements and intellectual property regimes, acknowledge the importance of technology transfer but lack effective enforcement mechanisms. Provisions under international instruments often remain voluntary or weakly implemented, resulting in limited practical impact on the ground. This gap between legal commitments and actual outcomes is a recurring issue in global climate governance.

Another important finding is the significant disparity across countries. Developed nations demonstrate strong alignment between patent systems and environmental innovation, while emerging economies show gradual progress despite institutional and policy limitations. Least developed countries, however,

remain highly vulnerable to climate change while possessing minimal innovation capacity and limited access to patented technologies, highlighting structural inequalities in the global system.

The empirical component of the study reinforces these observations. The questionnaire-based analysis indicates that patents are widely perceived as essential for promoting innovation, but at the same time, they are viewed as costly, complex, and restrictive in terms of access. Respondents expressed strong support for alternative mechanisms such as compulsory licensing, open innovation models, and collaborative frameworks to enhance accessibility and equity.

The cross-country data analysis further reveals an inverted U-shaped relationship between patent strength and innovation, where moderate levels of protection stimulate innovation, but excessively rigid regimes may hinder further development, particularly in the context of ESTs where collaboration and affordability are crucial.

The study also highlights the growing importance of technology transfer mechanisms, demonstrating that innovation alone is insufficient unless supported by effective systems for dissemination and adaptation. Financial constraints, weak institutional capacity, and lack of technical expertise continue to limit the successful transfer of technologies to vulnerable regions.

In conclusion, the research establishes that while patent systems play a crucial role in promoting sustainable innovation, their current structure does not adequately address issues of access, equity, and climate justice. A balanced approach is required, one that integrates intellectual property protection with flexible legal mechanisms, institutional support, and international cooperation, to ensure that environmentally sound technologies contribute effectively to global sustainability goals.