



04-27-2024

Forests with rich tree diversity adapt better to changing climate



By [Rodielon Putol](#)
Earth.com staff writer

Climate change, often seen as a formidable adversary, poses a significant threat to humanity and the natural environment, particularly impacting the diversity of our vital forests.



A recent collaborative study involving researchers from multiple international institutions, including [Kyoto University](#), has shed light on a hopeful scenario.

They discovered that forests characterized by high trait diversity are not only better equipped to cope with climate change, they may actually flourish under such conditions.

Diversity's role in forest health

Led by Han YH Chen from [Lakehead University](#), the research team delved into the significance of tree functional trait diversity. This crucial aspect of biodiversity enhances the ability of forests to adapt to environmental stressors.

Their findings stem from an extensive analysis of 57 years of inventory data collected from dryland biomes across Canada, spanning from 1958 to 2015.

“In the face of environmental stress, these diverse trees have been shown to maintain higher productivity levels, in contrast to monoculture forests,” Chen explains.



Climate change and future forest management

The study meticulously accounted for variables such as vegetation recovery from natural disturbances, local climate variations, and soil drainage characteristics.

This robust statistical approach not only highlights the resilience of [diverse forests](#) but also paves the way for future explorations into the long-term dynamics of terrestrial ecosystems and biodiversity.

“Our robust statistical approach to the large-scale data may lead to future opportunities for further exploring the long-term dynamics of terrestrial ecosystems and biodiversity,” said Masumi Hisano, the first author of the study and affiliated with [Hiroshima University](#).

Natural forest diversity impact

The concept of nature-based solutions is gaining momentum within climate policy circles as a means to mitigate [ecosystem](#) vulnerabilities.



“Due to limited evidence from multi-decade long-term observation, synthesizing several direct observations is essential for generalizing dynamic ecological patterns,” Hisano noted.

Cultivating hope through ecological diversity

The study illuminates the intricate relationships among forest diversity, how ecosystems operate, and the impacts of [climate change](#). It highlights how various species within a forest interact and support each other, enhancing the whole ecosystem’s ability to withstand climatic shifts.

These findings offer promising strategies for strengthening forest resilience, emphasizing the importance of maintaining a wide range of species.

By encouraging diversity, forests are better prepared to face environmental changes, potentially leading to healthier and more robust ecosystems.

As the severity of climate challenges increases, the role of diverse forests becomes increasingly critical.



In summary, preserving diverse forest ecosystems is pivotal for maintaining biodiversity, ensuring ecosystem services, and supporting overall planetary health.

Additional benefits of rich forest diversity

Forest diversity offers numerous benefits beyond enhancing resilience to climate change. Here are some key advantages:

- **Increased productivity:** Diverse forests often exhibit higher productivity than monocultures because different species utilize resources such as light, water, and nutrients in varying ways, reducing competition and increasing overall efficiency.
- **Disease and pest resistance:** A diverse forest is less susceptible to pests and diseases. With a variety of species, it's less likely that all will be affected by the same threats, preventing widespread devastation.
- **Improved soil health:** Different trees contribute differently to soil structure and nutrient content. This variety helps in



range of wildlife. This is crucial for maintaining ecological balances and supporting species survival.

- Cultural and recreational value: Diverse forests attract more tourists and nature enthusiasts, providing recreational, educational, and aesthetic benefits. They are also vital to many cultures that rely on various forest species for traditional practices and medicines.
- Carbon sequestration: Forests with a high diversity of tree species have been shown to store more carbon than less diverse forests, playing a critical role in mitigating global warming.
- Water cycle regulation: Forests influence local and regional water cycles. Diverse forests are more effective at regulating water flow and purification, contributing to cleaner rivers and streams and more consistent rainfall patterns.
- Resilience to fire: Diversity can reduce the vulnerability of forests to fires by including species that are less flammable or that can help to regulate the forest microclimate.

These benefits highlight the importance of preserving and promoting forest diversity as part of

ADVANCES.

Like what you read? [Subscribe to our newsletter](#) for engaging articles, exclusive content, and the latest updates.

Check us out on [EarthSnap](#), a free app brought to you by [Eric Ralls](#) and Earth.com.
