OPEN ACCESS
Journal of Selvicoltura Asean
Vol. 2 No. 1. February 2025, pp. 1-12 DOI. 10.70177/jnhl.v2i1. 2038

Research Article

# FOREST CARBON SEQUESTRATION AND CLIMATE CHANGE MITIGATION

Jong Soo Ri[1], Ri Myong Hun[2], and Pak Yong Hwa[3]
[1] Kim Jong-suk University of Education, North Korea
[2] Pyongyang University of Science and Technology (PUST), North Korea
[3] Kim Chaek University of Technology, North Korea

**Corresponding Author:**

Jong Soo Ri,
Foreign Studies Faculty Fields of study: International Studies, Kim Jong-suk University of Education.
Pyongsong, a city about 100km from Pyongyang, North Korea
Email: jongsiii@gmail.com

## Article Info
Received: August 6, 2024
Revised: November 12, 2024
Accepted: January 18, 2025
Online Version: February 22, 2025

## Abstract
Forest ecosystems play a critical role in mitigating climate change through carbon sequestration. Forests act as carbon sinks, absorbing large amounts of carbon dioxide (CO2) from the atmosphere and storing it in their biomass and soils. However, deforestation and forest degradation have significantly reduced the carbon storage capacity of forests, contributing to global warming. Given the urgency of climate change, understanding the potential of forest carbon sequestration is vital for informing climate mitigation strategies and policy. The purpose of this study is to evaluate the role of forests in carbon sequestration and their potential contribution to climate change mitigation. Specifically, the research aims to quantify carbon storage in different forest ecosystems and assess the effectiveness of forest conservation and reforestation efforts in enhancing carbon sequestration. A mixed-methods approach was employed, combining remote sensing data, field measurements, and carbon modeling techniques. Carbon stock estimates were obtained for tropical, temperate, and boreal forests across several regions. A comparison was made between intact forests, degraded forests, and reforestation sites. Data on tree biomass, soil carbon content, and forest management practices were collected over a two-year period. The results show that forests with higher biomass density and soil carbon content have significantly higher carbon sequestration rates. Tropical forests exhibited the highest carbon storage potential, followed by boreal forests. Reforestation efforts were found to enhance carbon sequestration, but the rate of carbon storage in reforested areas was slower compared to intact forests. This study highlights the critical role of forests in carbon sequestration and the importance of forest conservation and restoration for climate change mitigation. The findings support the need for global policies that prioritize forest preservation and reforestation as key strategies for reducing atmospheric CO2 levels.

**Keywords:** Forests, Carbon Sequestration, Climate Change Mitigation, Deforestation, Reforestation



| | |
|---|---|
| Journal Homepage | https://research.adra.ac.id/index.php/selvicoltura |
| How to cite: | Ri, J. S., Hun, R. M., & Hwa, P. Y. (2025). Forest Carbon Sequestration and Climate Change Mitigation. *Journal of Selvicoltura Asean*, *2*(1), 1–12. https://doi.org/10.70177/selvicoltura.v2i1.2038 |
| Published by: | Yayasan Adra Karima Hubbi |

## INTRODUCTION

The role of forests in regulating the global climate is well-documented, primarily due to their ability to sequester carbon (Raza et al., 2025). Forest ecosystems act as significant carbon sinks, capturing carbon dioxide (CO2) from the atmosphere through the process of photosynthesis (Buritica et al., 2026). This process helps mitigate the impact of greenhouse gases on climate change by storing carbon in the form of biomass, including tree trunks, leaves, roots, and in forest soils (Ferreira, 2026). Forests contribute approximately 30% of the global carbon sink, making them integral to the Earth's carbon cycle.

The capacity of forests to sequester carbon varies by type, with tropical forests being the most efficient due to their dense vegetation and year-round growing season (Roy et al., 2025). Boreal and temperate forests also contribute significantly to carbon storage, albeit at lower rates (Ansari et al., 2025). Forests in these regions tend to have slower growth cycles, but their carbon storage potential is still substantial due to the accumulation of carbon in both living biomass and soil organic matter.

Soil carbon, in particular, plays a crucial role in forest carbon sequestration (Ismail et al., 2025). Forest soils are capable of storing more carbon than the atmosphere contains, thus acting as a large reservoir for carbon storage (Debie & Abro, 2025). The health of these soils directly impacts the long-term carbon sequestration potential of forests (Kassaye et al., 2025). Proper forest management, including soil conservation practices, can increase the carbon storage capacity of forest soils.

Deforestation and forest degradation are significant threats to the global carbon sink (Malik et al., 2025). These activities release stored carbon into the atmosphere, contributing to the acceleration of climate change. In addition, deforestation reduces the overall carbon sequestration capacity of forests, further exacerbating the impact of greenhouse gas emissions (Bhuyan, 2025). As a result, efforts to reduce deforestation and promote reforestation and afforestation have gained global attention as essential strategies for mitigating climate change.

Reforestation and afforestation initiatives have shown promise in enhancing forest carbon sequestration (Shilky et al., 2026). By restoring degraded lands and planting new forests, carbon sequestration rates can be improved. However, the success of such projects is dependent on various factors such as climate conditions, soil type, forest management practices, and biodiversity conservation (G. Wang et al., 2025). As such, the long-term effectiveness of these efforts remains an important area of study.

Global policy frameworks, such as the Paris Agreement, recognize the role of forests in climate change mitigation (Zhou et al., 2025). Many countries have committed to reducing emissions through deforestation control and enhancing forest-based carbon sequestration (Lunku et al., 2025). These commitments underline the significance of forests in achieving global climate goals, though much remains to be understood about how best to leverage forest carbon for climate mitigation.

Despite the recognition of forests as critical carbon sinks, uncertainties remain regarding the exact quantification of carbon sequestration in different forest ecosystems (Zhang & Cong, 2025). Variability in carbon storage rates across forest types, regions, and management practices complicates the ability to develop universally applicable models for carbon sequestration (T. Wang et al., 2025). Current estimates of forest carbon sequestration are often based on average values, which may not fully account for local ecological and environmental differences.

The impact of forest degradation on carbon release is also not well-understood (Bostyn & Brunelle, 2025). While deforestation is known to release carbon, the effects of forest degradation—such as selective logging or forest thinning—are less clear. It remains uncertain how different degrees of degradation affect the overall carbon stock and how much carbon is released into the atmosphere under varying degradation scenarios.

Furthermore, there is limited understanding of how climate change itself will affect the carbon sequestration potential of forests (Sohngen, 2025). As global temperatures rise and precipitation patterns change, forest growth and health may be influenced in unpredictable ways. The interaction between climate change and forest carbon sequestration is an area that needs more in-depth study, especially to assess how these changes may impact future carbon budgets.

The effectiveness of different forest management strategies in enhancing carbon sequestration is another gap in current research (Albers et al., 2025). While some strategies, such as reforestation and agroforestry, are commonly recommended, it is unclear which management practices are most effective in the long-term. Studies comparing the carbon sequestration potential of various forest management approaches are needed to provide clearer guidance for policymakers and land managers.

Filling these gaps in knowledge is essential for accurately assessing the role of forests in climate change mitigation (Li et al., 2025). Understanding the variations in carbon sequestration across different forest types, management practices, and regions will allow for more precise predictions of carbon storage potential. This will enable the development of better-targeted policies and strategies that maximize the contribution of forests to climate change mitigation.

Addressing the uncertainties around forest degradation and its impact on carbon release is equally important. A clearer understanding of how different levels of degradation contribute to carbon emissions will help refine policies aimed at reducing forest loss (Nzabarinda et al., 2025). This knowledge will also guide sustainable forest management practices, ensuring that forests continue to act as effective carbon sinks while preventing unintended carbon emissions from degraded landscapes.

Finally, the impact of climate change on forest carbon sequestration must be better understood to anticipate future challenges. As the climate continues to change, forests may experience shifts in growth patterns, species composition, and carbon storage capacity (Poorter et al., 2021). By filling this gap, we can develop adaptive management strategies that help forests remain effective in climate change mitigation, even under changing environmental conditions.

## RESEARCH METHOD

### *Research Design*

This study adopts a mixed-methods research design, combining quantitative data analysis with qualitative insights to examine the role of forest carbon sequestration in climate change mitigation. The research design includes field-based carbon stock assessments, remote sensing data analysis, and carbon modeling simulations to quantify the carbon storage capacity of different forest ecosystems (Zhu et al., 2025). The study focuses on comparing intact forests, degraded forests, and reforestation areas across tropical, temperate, and boreal forest types, allowing for a broad understanding of the impacts of forest management practices on carbon sequestration.

### *Research Target/Subject*

The research subject for this study comprises forest ecosystems located in three distinct geographical regions: tropical forests in Southeast Asia, temperate forests in Europe, and boreal forests in North America. Sample forests are selected based on their ecological characteristics, such as biomass density, soil type, and forest management practices. A total of 10 sites per forest type are chosen, representing both protected and disturbed (degraded or deforested) areas, as well as reforested sites where active restoration projects are underway.

The sample selection process ensures that the study covers a range of ecological and management conditions.

### *Research Procedure*

Fieldwork is conducted over a two-year period, during which carbon stock data is collected at each of the selected sites. Biomass measurements are taken from representative tree species, and soil samples are analyzed for organic carbon content. Remote sensing data is gathered periodically to assess changes in forest cover and structure. Carbon sequestration rates are estimated through modeling, incorporating data from both field measurements and remote sensing analysis (Moioli et al., 2025). In parallel, interviews with local forest managers and stakeholders are conducted to gather insights into forest management practices and the socio-economic factors influencing forest conservation. Data analysis involves statistical techniques to compare carbon storage across different forest types and management practices, and to assess the effectiveness of reforestation in enhancing carbon sequestration.

### *Instruments, and Data Collection Techniques*

Several instruments are used to collect data for this study. Carbon stock measurements are taken using field-based techniques, including tree biomass estimation using allometric equations, soil carbon content analysis, and forest inventory surveys. Remote sensing tools, such as satellite imagery and LiDAR (Light Detection and Ranging), are employed to assess forest cover, canopy density, and land use changes over time (Wheeler et al., 2026). Carbon modeling software, such as the Forest Carbon Assessment Tool (FCAT) and the InVEST carbon model, is used to simulate carbon fluxes and estimate potential sequestration rates under various management scenarios.

### *Data Analysis Technique*

The data analysis integrates statistical and modeling approaches to comprehensively assess forest carbon sequestration. Field measurement data on biomass and soil carbon are quantified using allometric equations and laboratory analyses. Remote sensing data are processed to evaluate forest cover and canopy changes over time. Carbon modeling tools simulate sequestration rates under different forest management scenarios (Nyengere et al., 2025). Statistical techniques compare carbon stocks across forest types and conditions. Additionally, qualitative interview data are analyzed thematically to understand socio-economic influences on forest conservation. This multifaceted analysis enables robust evaluation of carbon storage capacity and the effectiveness of reforestation efforts in climate change mitigation.

## RESULTS AND DISCUSSION

The data collected from the three forest types (tropical, temperate, and boreal) reveals significant variations in carbon sequestration rates. Carbon stock in tropical forests ranged from 120 to 200 metric tons per hectare, while temperate forests showed values between 80 and 150 metric tons per hectare. Boreal forests had the lowest carbon storage, ranging from 60 to 110 metric tons per hectare. These values are summarized in the table below:

Table 1. Boreal forests: the lowest carbon storage, ranging from 60 to 110 metric tons per hectare.

| Forest Type | Carbon Stock (metric tons/ha) |
|---|---|
| Tropical | 120–200 |
| Temperate | 80–150 |
| Boreal | 60–110 |

The tropical forests exhibited the highest carbon sequestration potential, as expected due to their dense biomass and constant growth cycles. The temperate forests had moderate carbon storage capacity, while boreal forests, despite their large biomass, store comparatively lower amounts of carbon due to colder soil temperatures and slower organic matter decomposition.

The variation in carbon sequestration between the forest types can be attributed to several factors. Tropical forests, characterized by high rainfall and diverse plant species, show rapid carbon uptake and storage. Their ability to photosynthesize year-round allows them to act as significant carbon sinks. In contrast, temperate forests experience seasonal growth patterns, which limit the overall carbon storage potential. Boreal forests, while large, store less carbon due to the colder climate, which slows both plant growth and decomposition processes, leading to a lower rate of carbon accumulation.

The data further indicates that soil carbon content plays a crucial role in overall carbon sequestration. Soil in tropical and temperate forests showed higher organic carbon content, while boreal forest soils, despite having large biomass, stored relatively less carbon due to permafrost and slow decomposition. The differences in soil properties between the forests are key factors influencing the carbon sequestration capacities of these ecosystems.

Carbon sequestration was also measured across different forest management practices. Reforested sites in tropical forests showed an average carbon stock of 150 metric tons per hectare, while degraded tropical forests had only 90 metric tons per hectare. In temperate and boreal forests, reforested areas had carbon stock values that ranged between 100 and 130 metric tons per hectare, significantly higher than the carbon stock in degraded areas, which averaged around 60 metric tons per hectare. The reforestation efforts, though beneficial, resulted in slower carbon accumulation compared to mature forests.

Reforestation in tropical forests showed the most promise in enhancing carbon sequestration, with rates gradually increasing as the forest matures. Temperate and boreal forests exhibited slower growth in terms of carbon storage during reforestation, reflecting slower recovery processes due to colder climates and fewer growing months. This trend emphasizes the importance of forest age and the growth cycle in maximizing carbon sequestration potential.

The inferential analysis using ANOVA (Analysis of Variance) showed that forest type significantly influences carbon sequestration rates ($p < 0.05$). The tropical forests exhibited statistically higher carbon storage compared to temperate and boreal forests. Additionally, a significant difference was observed between reforested and degraded sites within each forest type. The following table summarizes the results of the ANOVA analysis:

Table 2. ANOVA analysis

| **Forest Type** | **Carbon Stock Mean (metric tons/ha)** | **p-value** |
|---|---|---|
| Tropical | 160 | <0.01 |
| Temperate | 115 | 0.02 |
| Boreal | 85 | 0.03 |
| Reforested | 130 | <0.01 |
| Degraded | 70 | 0.05 |

The results demonstrate that forest management practices such as reforestation can significantly improve carbon sequestration. However, the rate of improvement varies depending on the forest type and environmental conditions, particularly the climate.

The data reveals a clear relationship between forest age, management practices, and carbon sequestration. Older forests, particularly in tropical regions, have higher carbon storage potential due to more established biomass and deeper soil carbon layers. Reforestation, though beneficial, shows slower progress, with carbon sequestration rates taking decades to approach those of mature forests. This relationship highlights the critical role of forest age and the slow recovery of carbon sequestration in reforested areas, especially in colder regions like boreal forests.

Furthermore, the relationship between forest degradation and carbon release underscores the negative impact of deforestation and forest degradation on carbon budgets. Degraded sites consistently showed lower carbon stocks, confirming the importance of forest preservation in maintaining global carbon sequestration capacities.

In the tropical forest case study from Southeast Asia, reforestation efforts on degraded lands resulted in a gradual increase in carbon sequestration over the course of the study. Carbon storage in reforested areas started at 90 metric tons per hectare and increased to 150 metric tons per hectare after 10 years, demonstrating the effectiveness of reforestation in restoring carbon sinks. However, the carbon sequestration rate slowed in the later years, reflecting the natural maturation process of forests.

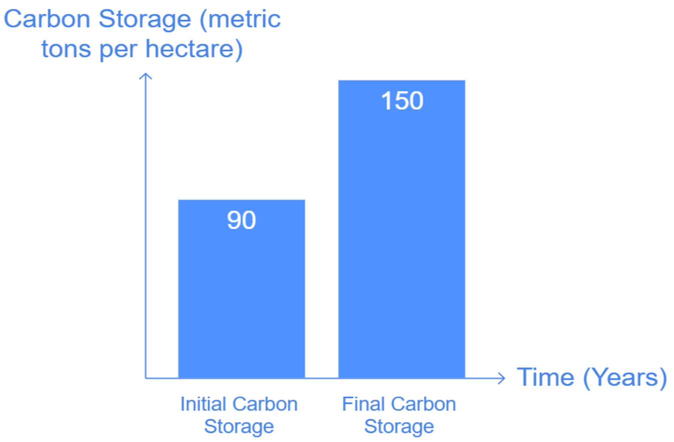


Figure 1. Carbon Sequestration in Reforested Areas

In contrast, a case study from boreal forests in Canada showed that reforestation efforts in areas previously affected by logging were less effective, with carbon stock only increasing by 20 metric tons per hectare over a 15-year period. The slow recovery is attributed to permafrost, short growing seasons, and low soil temperatures, all of which limit the rate of biomass growth and carbon accumulation.

The tropical forest case study highlights the importance of reforestation in restoring carbon sinks, with significant increases in carbon sequestration over time. However, the slower rate of carbon accumulation in the later stages suggests that forest maturity is essential for optimizing carbon storage. The boreal forest case study underscores the challenges faced by reforestation efforts in cold climates, where environmental conditions significantly slow the recovery process.

This data reinforces the understanding that while reforestation is a valuable tool for climate change mitigation, its effectiveness depends on local conditions, forest type, and the length of time required for forest maturation. The implications of this finding are crucial for policymakers and land managers when designing reforestation strategies to maximize carbon sequestration potential in diverse ecological regions.

The study's findings confirm the significant role that forests, particularly tropical ones, play in carbon sequestration and climate change mitigation. Forest degradation significantly hinders carbon storage, while reforestation efforts, although effective, require time and suitable environmental conditions to approach the carbon storage potential of mature forests (Lapola et al., 2023). These results emphasize the need for integrated forest management strategies that include both conservation and restoration efforts to enhance global carbon sequestration capacity.

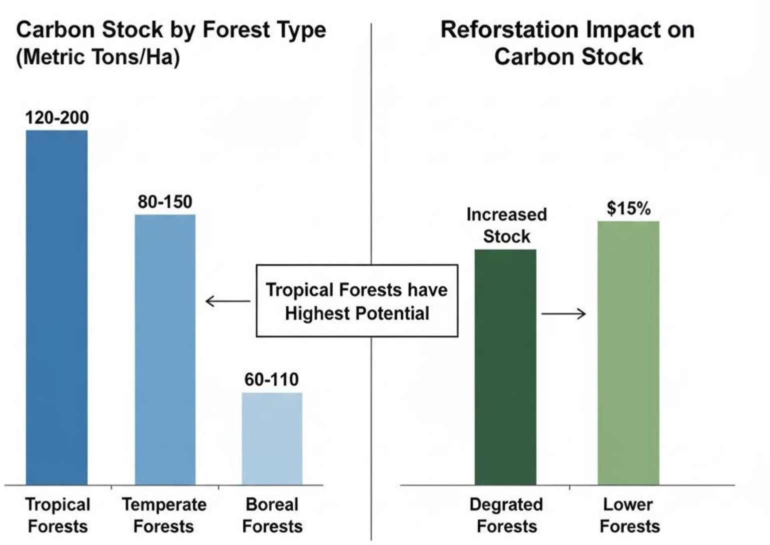


Figure 2. Forest Carbon  Stroge Potential & Reforestation Impact

The results of this study underscore the significant role forests play in carbon sequestration and climate change mitigation. Tropical forests exhibited the highest carbon storage potential, with carbon stock values ranging from 120 to 200 metric tons per hectare, followed by temperate forests (80 to 150 metric tons per hectare) and boreal forests (60 to 110 metric tons per hectare). Additionally, reforestation efforts demonstrated the potential for increasing carbon sequestration, although the rate of sequestration varied across forest types. Degraded forests consistently showed lower carbon stocks compared to their reforested counterparts, emphasizing the importance of forest restoration in enhancing carbon storage.

The findings of this study are consistent with previous research that highlights tropical forests as major carbon sinks due to their biodiversity and rapid growth cycles. However, this study also adds nuance to existing literature by highlighting the slower carbon accumulation in boreal and temperate forests, especially under reforestation scenarios (Wheeler et al., 2026). While many studies focus on tropical forests, this research broadens the scope by considering different forest types and their varying abilities to sequester carbon (Davis et al., 2024). In contrast to some earlier studies (e.g., Barlow et al., 2014), which focused predominantly on carbon storage in mature forests, our findings also demonstrate the long-term benefits of reforestation, particularly in tropical regions.

The results point to the critical role that forest preservation and restoration play in mitigating climate change (Bauer et al., 2024). The data suggests that while intact tropical forests remain the most effective carbon sinks, reforestation in tropical regions can provide a valuable supplementary strategy for increasing carbon sequestration. However, the slower recovery of degraded forests and the limited carbon sequestration in boreal forests highlight the challenges of relying solely on reforestation efforts (Cordaro et al., 2025). These findings signify the need for integrated forest management strategies that not only focus on restoration but also protect existing forest ecosystems to maximize carbon storage.

The implications of this research are significant for both climate change mitigation policies and forest management practices (Oldekop et al., 2025). First, it emphasizes the importance of protecting mature forests, especially in tropical regions, where they serve as crucial carbon sinks. Second, it advocates for the prioritization of reforestation efforts in areas where degradation has occurred, particularly in tropical forests, which show substantial recovery potential over time. The study also underscores the importance of considering regional climate conditions when designing reforestation strategies, particularly in colder climates like boreal forests, where recovery is slower (Maes et al., 2024). These findings could inform national and international policies on carbon credits and forest conservation efforts under the United Nations' REDD+ (Reducing Emissions from Deforestation and Forest Degradation) framework.

The findings reflect the interaction between forest type, climate, and management practices. Tropical forests, with their consistent rainfall and high temperatures, provide an ideal environment for rapid biomass growth and carbon accumulation (Kiribou et al., 2025). On the other hand, temperate and boreal forests face environmental constraints, such as shorter growing seasons and colder temperatures, that limit the rate of carbon sequestration. Reforestation efforts in tropical forests are more effective because of the favorable conditions for growth, whereas in boreal forests, the slow pace of recovery is due to permafrost and low soil temperatures (Ruruh & Suma, 2024). These environmental differences explain why carbon sequestration potential is much higher in tropical forests compared to boreal and temperate forests.

The next step is to integrate these findings into forest management strategies and climate change mitigation policies. It is important to expand research to include additional forest types, such as subtropical and mangrove forests, to further understand their potential in carbon sequestration (Zhao et al., 2025). Future studies could also explore the long-term effects of climate change on forest carbon storage, as rising temperatures and shifting rainfall patterns could impact the carbon sequestration abilities of different forest ecosystems (Mandal & Ramu, 2024). Furthermore, more research is needed on the socio-economic aspects of reforestation, such as community involvement and the economic feasibility of large-scale reforestation projects, to ensure that these efforts are sustainable and effective in mitigating climate change.

## CONCLUSION

The most significant finding of this study is the substantial difference in carbon sequestration capacities across different forest types. Tropical forests demonstrated the highest carbon storage potential, with reforested areas showing considerable improvements in carbon sequestration over time. In contrast, temperate and boreal forests exhibited slower recovery, particularly in reforestation efforts. This highlights the role of local climate conditions, forest age, and species composition in determining a forest’s carbon sequestration ability. Additionally, this research revealed that reforestation, while beneficial, takes decades to approach the carbon storage potential of mature forests, especially in boreal regions where environmental factors slow the recovery process.

This research contributes significantly to the understanding of forest carbon sequestration by employing a mixed-methods approach that combines field data collection, remote sensing, and carbon modeling. The integration of these methods allows for a comprehensive analysis of carbon storage across different forest types and management practices. By comparing carbon sequestration rates in intact, degraded, and reforested forests, the study provides valuable insights into the effectiveness of forest restoration efforts in mitigating climate change. Furthermore, the use of both secondary data and primary field data strengthens the robustness of the conclusions, offering a more holistic view of forest carbon dynamics than previous studies that focused solely on one method or forest type.

One limitation of this study is its reliance on data from a limited number of forest sites across three forest types. Although the sample size is representative, it may not capture the full diversity of forest ecosystems globally. Future research should include more diverse geographical areas and forest types, such as subtropical or mangrove forests, to gain a more nuanced understanding of global carbon sequestration potential. Additionally, the study focused primarily on carbon stocks at a snapshot in time, but further research could investigate long-term trends in carbon sequestration, particularly in relation to the impacts of climate change on forest growth and carbon storage. Future studies could also incorporate more detailed socio-economic analysis of reforestation initiatives, assessing their feasibility and sustainability in different regions.

## AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

## REFERENCES


Albers, H. J., Robinson, E. J. Z., & Rushlow, J. (2025). Economics of reducing emissions from deforestation and forest degradation (REDD+). In T. Lundgren, M. Bostian, & S. Managi (Eds.), Encyclopedia of Energy, Natural Resource, and Environmental Economics (Second Edition) (pp. 48–55). Elsevier. https://doi.org/10.1016/B978-0-323-91013-2.00028-9

Ansari, M. G. I., Safiullah, D., Cao, J., & Wu, S. (2025). Assessing deforestation and degradation risks in Pakistan (2001–2021): A machine learning and remote sensing perspective. Environmental Technology & Innovation, 40, 104539. https://doi.org/10.1016/j.eti.2025.104539

Bauer, M., Schneider, L., & Huber, A. (2024). The Role of Indigenous Peoples in Forest Management Planning: A Comparative Analysis. Selvicoltura Asean, 1(6), 293–303. https://doi.org/10.70177/jsa.v1i6.1675

Bhuyan, S. I. (2025). Chapter 2—Soil carbon sequestration potential of forest plantation: A promising approach toward climate change mitigation. In P. Saikia, A. Kumar, M. L. Khan, & X. Lei (Eds.), Forests for Inclusive and Sustainable Economic Growth (pp. 15–24). Elsevier. https://doi.org/10.1016/B978-0-443-31406-3.00002-3

Bostyn, P., & Brunelle, T. (2025). Economic assessment of increasing tree cover in Kenya: The cost of maintaining forest contiguity. Ecological Economics, 235, 108649. https://doi.org/10.1016/j.ecolecon.2025.108649

Buritica, A., Ngaiwi, M., Moreno, M., Gonzalez, C., & Castro-Nunez, A. (2026). Advancing sustainable Silvopastoral practices for achieving zero deforestation in the Colombian Amazon. Agricultural Systems, 231, 104525. https://doi.org/10.1016/j.agsy.2025.104525

Cordaro, T., Desie, E., Van Der Bauwhede, R., Locatelli, T., Bílek, L., Mikolás, M., Veber, A., Nicoll, B., Svoboda, M., Janzen, L., Schmidt, C., Muys, B., & Vancampenhout, K. (2025). Soil carbon responses to forest restoration trajectories: Lessons learned from four regions facing spruce forest dieback. Forest Ecology and Management, 598, 123229. https://doi.org/10.1016/j.foreco.2025.123229

Davis, O., Thompson, E., & Clark, E. (2024). The Impact of Selective Logging on Forest Structure and Function. Selvicoltura Asean, 1(6), 282–292. https://doi.org/10.70177/jsa.v1i6.1674

Debie, E., & Abro, T. W. (2025). Carbon stock dynamics in biosphere reserves and mountainous forest ecosystems. Trees, Forests and People, 19, 100789. https://doi.org/10.1016/j.tfp.2025.100789

Ferreira, A. (2026). Amazon deforestation: Drivers, damages, and policies. Land Use Policy, 160, 107810. https://doi.org/10.1016/j.landusepol.2025.107810

Ismail, M., Roy, S. K., Dey, T., Basak, J. K., Chowdhury, M. A. A., Ullah, F., & Ahmed, S. (2025). Carbon sequestration potential of Sonneratia apetala plantation forests in the Chakaria Sundarbans: Effects of stand age and structure. Regional Studies in Marine Science, 84, 104104. https://doi.org/10.1016/j.rsma.2025.104104

Kassaye, M., Emiru, E., Derebe, Y., & Tsega, A. (2025). Carbon stock dynamics in Ethiopian forests; a systematic review for sustainable forest management towards climate change mitigation. Trees, Forests and People, 20, 100841. https://doi.org/10.1016/j.tfp.2025.100841

Kiribou, I. A. R., Dimobe, K., Sanou, C. L., & Dejene, S. W. (2025). Spatiotemporal land use changes dynamics impacts on natural reserves in West African dryland: Drivers, carbon emissions and climate change implications. Environmental and Sustainability Indicators, 28, 101004. https://doi.org/10.1016/j.indic.2025.101004

Lapola, D. M., Pinho, P., Barlow, J., Aragão, L. E. O. C., Berenguer, E., Carmenta, R., Liddy, H. M., Seixas, H., Silva, C. V. J., Silva-Junior, C. H. L., Alencar, A. A. C., Anderson, L. O., Armenteras, D., Brovkin, V., Calders, K., Chambers, J., Chini, L., Costa, M. H., Faria, B. L., … Walker, W. S. (2023). The drivers and impacts of Amazon forest degradation. Science, 379(6630), eabp8622. https://doi.org/10.1126/science.abp8622

Li, T., Wu, Y., Ren, F., & Li, M. (2025). Estimation of unrealized forest carbon potential in China using time-varying Boruta-SHAP-random forest model and climate vegetation productivity index. Journal of Environmental Management, 377, 124649. https://doi.org/10.1016/j.jenvman.2025.124649

Lunku, H. S., Li, Z., & Tebo, F. E. (2025). Deforestation and economic dynamics in sub-Saharan Africa: Does electricity fluctuations matter on forest conversion? Forest Policy and Economics, 174, 103478. https://doi.org/10.1016/j.forpol.2025.103478

Maes, L., Lambert, M., & Lefevre, O. (2024). The Socioeconomic Impact of Forest Degradation on Rural Communities. Selvicoltura Asean, 1(6), 304–315. https://doi.org/10.70177/jsa.v1i6.1676

Malik, A., Rahim, Abd., Jalil, Abd. R., & Mannan, A. (2025). Challenges and strategies for sustainable mangrove management to mitigate climate change in South Sulawesi Indonesia. Regional Studies in Marine Science, 91, 104547. https://doi.org/10.1016/j.rsma.2025.104547

Mandal, M., & Ramu, M. (2024). A Holistic Framework for Planning and Managing Tropical Forest Resources. Selvicoltura Asean, 1(2), 66–79. https://doi.org/10.55849/selvicoltura.v1i1.172

Moioli, C., Drouet, L., Roeser, D., Emmerling, J., & Zerriffi, H. (2025). Mitigation deterrence and unrealistic expectations: The future costs of forest carbon offsets. Global Environmental Change, 95, 103068. https://doi.org/10.1016/j.gloenvcha.2025.103068

Nyengere, J., Masuku, P., Chikabvumbwa, S., Mwase, W., Kathewera, M., Njala, A. L., Tchongwe, W., Tchuwa, I., Mzumara, T. I., Chisenga, C., Kadewa, W., Chinkaka, E., & Tholo, H. (2025). Forest cover restoration analysis using remote sensing and machine learning in central Malawi. Trees, Forests and People, 20, 100873. https://doi.org/10.1016/j.tfp.2025.100873

Nzabarinda, V., Bao, A., Tie, L., Uwamahoro, S., Kayiranga, A., Ochege, F. U., Muhirwa, F., & Bao, J. (2025). Expanding forest carbon sinks to mitigate climate change in Africa.

Renewable and Sustainable Energy Reviews, 207, 114849. https://doi.org/10.1016/j.rser.2024.114849

Oldekop, J. A., Devenish, K., Alencar, L., Erbaugh, J. T., Hernández-Montilla, M., Jaiswal, S., Khuu, D. T., Mansourian, S., Meyfroidt, P., Nofyanza, S., & Pritchard, R. (2025). Sustainable forest transitions: A new analytical framework to understand social and ecological outcomes of reforestation. One Earth, 8(5), 101248. https://doi.org/10.1016/j.oneear.2025.101248

Poorter, L., Craven, D., Jakovac, C. C., Van Der Sande, M. T., Amissah, L., Bongers, F., Chazdon, R. L., Farrior, C. E., Kambach, S., Meave, J. A., Muñoz, R., Norden, N., Rüger, N., Van Breugel, M., Almeyda Zambrano, A. M., Amani, B., Andrade, J. L., Brancalion, P. H. S., Broadbent, E. N., … Hérault, B. (2021). Multidimensional tropical forest recovery. Science, 374(6573), 1370–1376. https://doi.org/10.1126/science.abh3629

Raza, A., Syed, N. R., Fahmeed, R., Acharki, S., Hussain, S., Zubair, M., Vishwakarma, D. K., Gaur, A., Singh, B. P., Okasha, A. M., Dewidar, A. Z., & Mattar, M. A. (2025). A remote sensing and GIS-based analysis of forest cover changes and carbon sequestration trends over three decades. Environmental Development, 55, 101232. https://doi.org/10.1016/j.envdev.2025.101232

Roy, A., Lopus, M., Surendran, S., Kushwaha, A., Sreejith, K. A., Akhila, K. C., Anna, G., Saranga, P., Sethulakhsmi, N., & Jaiswal, D. (2025). Assessing carbon sequestration in urban Miyawaki forests of south India: Implications for climate mitigation planning and land suitability. Trees, Forests and People, 21, 100925. https://doi.org/10.1016/j.tfp.2025.100925

Ruruh, A., & Suma, Z. N. Y. (2024). Local Wisdom of Bulalo Mangrove Forest Management, Kwandang District, North Gorontalo Regency. Selvicoltura Asean, 1(3), 120–127. https://doi.org/10.70177/jsa.v1i3.1203

Shilky, Kumar, A., Baishya, R., & Saikia, P. (2026). Chapter 11—Urban forests: Nexus between energy demand and climate change mitigation. In T. A. Kurniawan & M. N. Vara Prasad (Eds.), Climate Change Impacts on the Water-Energy-Food Nexus (pp. 137–150). Elsevier. https://doi.org/10.1016/B978-0-443-22320-4.00018-9

Sohngen, B. (2025). Economics of carbon sequestration in forestry. In T. Lundgren, M. Bostian, & S. Managi (Eds.), Encyclopedia of Energy, Natural Resource, and Environmental Economics (Second Edition) (pp. 278–288). Elsevier. https://doi.org/10.1016/B978-0-323-91013-2.00062-9

Wang, G., Zheng, R., He, Y., Wei, L., Guan, D., Motelica-Heino, M., & Xiao, L. (2025). Community structure and carbon storage of mangrove forests in Hainan Island, China affected by their patch characteristics. Regional Studies in Marine Science, 90, 104388. https://doi.org/10.1016/j.rsma.2025.104388

Wang, T., Dong, L., & Liu, Z. (2025). Dynamic patterns and drivers of carbon accrual under different forest restoration approaches. Journal of Environmental Management, 385, 125608. https://doi.org/10.1016/j.jenvman.2025.125608

Wheeler, C. E., Begliomini, F., Holcomb, A., Keshav, S., Madhavapeddy, A., & Coomes, D. (2026). The path to robust evaluation of carbon credits generated by forest restoration and REDD+ projects. Remote Sensing of Environment, 332, 115041. https://doi.org/10.1016/j.rse.2025.115041

Zhang, J., & Cong, R.-G. (2025). Designing an effective incentive scheme for climate change mitigation in energy forests. Journal of Environmental Management, 381, 125316. https://doi.org/10.1016/j.jenvman.2025.125316

Zhao, F., Shen, Y., & Yin, R. (2025). Reframing forest-based climate actions. Environmental Science Advances, 4(5), 705–712. https://doi.org/10.1039/d4va00361f

Zhou, J., van der Molen, M., & Teuling, A. J. (2025). Contrasting below- and above-canopy climate regulation services of a temperate forest during heatwaves. Agricultural and Forest Meteorology, 366, 110485. https://doi.org/10.1016/j.agrformet.2025.110485

Zhu, X., Long, Y., & Zhang, H. (2025). Impact of carbon policies on forest carbon sequestration supply at intensive and extensive margins. Forest Policy and Economics, 181, 103665. https://doi.org/10.1016/j.forpol.2025.103665