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Unlocking the Potential of Nature-Based Solutions for Climate Mitigation: Assessing Global Pathways, Economic Viability, and Scientific Frameworks

Agita Dwi*

Department of Earth Sciences, Chrisland University

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A B S T R A C T

As the global community races to limit warming to well below 2°C in accordance with the Paris Agreement, it is increasingly evident that decarbonizing the energy sector alone will be insufficient. Nature-based solutions (NbS)—encompassing the conservation, restoration, and improved management of natural ecosystems—have emerged as a critical, yet underutilized, pillar of climate change mitigation strategies. This paper synthesizes current research to evaluate the biophysical potential, economic viability, and scientific rigor required to scale up NbS effectively. By examining global mitigation pathways, including terrestrial "green" carbon, "blue" coastal carbon, and peatland ecosystems, this review highlights that NbS can deliver upwards of 10 to 23.8 petagrams of CO2 equivalent per year. However, realizing this potential is constrained by complex economic dynamics within voluntary carbon markets, particularly issues of additionality, leakage, and permanence. Furthermore, the paper explores a two-stage scientific assessment framework designed to evaluate the "readiness" and "sufficiency" of novel mitigation activities. The findings suggest that while NbS face rising opportunity costs and competition from increasingly cheap energy-technology-based solutions (ETbS), their unique "double dividend" of delivering biodiversity conservation, water security, and rural livelihood benefits justifies sustained investment. The paper concludes that scaling NbS requires robust scientific standardization, innovative financing mechanisms beyond carbon credits, and integrated policy frameworks that align ecological boundaries with economic realities.

1. Introduction

The Intergovernmental Panel on Climate Change (IPCC) has unequivocally stated that limiting global warming to 1.5°C or well below 2°C requires not only rapid and deep reductions in greenhouse gas (GHG) emissions from fossil fuels but also large-scale carbon dioxide removal (IPCC, 2022). In this context, Nature-based Solutions (NbS)—also referred to as Natural Climate Solutions (NCS)—have gained prominence as a vital climate mitigation tool. NbS are defined as actions to protect, sustainably manage, and restore natural or modified ecosystems, thereby enhancing their ability to sequester carbon and avoid GHG emissions (Griscom et al., 2017; Seddon, 2022).

Historically, climate policy has heavily favored energy and technology-based solutions (ETbS), such as renewable energy deployment and carbon capture and storage. However, the global land-use sector—encompassing agriculture, forestry, and other land use (AFOLU)—currently accounts for approximately 22% of global GHG emissions (IPCC, 2022). Conversely, terrestrial ecosystems currently absorb the equivalent of roughly 20% of anthropogenic emissions, highlighting a massive, untapped potential for enhanced sequestration (Griscom et al., 2017). Despite this, land-based sequestration efforts historically received only a fraction of global climate finance, largely due to confusion regarding their specific mitigation potential, concerns about the permanence of natural carbon sinks, and the complexities of carbon accounting (Barbier & Burgess, 2025).

Recent advances in ecological science and carbon economics have begun to dispel this confusion, revealing that NbS can provide over one-third of the cost-effective CO2 mitigation needed through 2030 to stabilize warming to below 2°C (Griscom et al., 2017). Yet, significant barriers remain. The voluntary carbon market (VCM), the primary exchange for NbS offset credits, has been plagued by issues of "baseline gaming," carbon leakage, and the inherent impermanence of biological carbon storage (Barbier & Burgess, 2025). Furthermore, as the cost of ETbS continues to decline due to economies of scale, the economic competitiveness of NbS is threatened unless their multifaceted co-benefits are accurately valued and financed.

This research paper investigates the current state of NbS for climate mitigation by addressing three critical dimensions. First, it quantifies the biophysical mitigation potential of various NbS pathways across different biomes, with a focus on tropical forests, peatlands, and coastal blue carbon ecosystems. Second, it analyzes the economic landscape of NbS, evaluating the challenges of voluntary carbon markets, cost-effectiveness relative to ETbS, and the necessity of valuing non-carbon co-benefits. Finally, the paper explores the scientific frameworks required to assess the integrity of new NbS activities, ensuring that claimed carbon sequestration is measurable, additional, and permanent.

2. Literature Review

The Evolution of Natural Climate Solutions

The conceptualization of NbS has evolved from simple afforestation programs to complex, multi-biome mitigation strategies. Griscom et al. (2017) provided a foundational synthesis by identifying and quantifying 20 discrete conservation, restoration, and improved land management actions across global forests, wetlands, grasslands, and agricultural lands. Crucially, this work applied safeguards to ensure that mitigation efforts did not compromise food security, fiber production, or biodiversity. They demonstrated that the maximum additional mitigation potential of these pathways is 23.8 petagrams of CO2 equivalent per year ($PgCO_2e\ yr^{-1}$) by 2030, with 11.3 $PgCO_2e\ yr^{-1}$ available at cost-effective levels (≤100 USD $MgCO_2e^{-1}$).

Building on this global framework, regional assessments have highlighted geographies of high opportunity. Southeast Asia, for instance, holds the highest global density of carbon stocks due to its extensive peatlands and mangrove forests (Siman et al., 2021). However, the region also exemplifies the tension between conservation and economic development, where palm oil and pulpwood expansion drive severe land-use change.

Economic Valuation and Carbon Market Dynamics

The economic evaluation of NbS is inherently complex. Unlike industrial emission reductions, NbS involve biological systems subject to natural disturbances, delayed returns, and high opportunity costs related to alternative land uses (Barbier & Burgess, 2025). The primary mechanism for financing NbS has been the VCM. Recent analyses show that NbS projects account for roughly 39% of all credits issued in VCMs since 2000, with their market value surpassing $1.33 billion in 2021 (Barbier & Burgess, 2025).

However, the credibility of NbS credits is frequently contested. West et al. (2023, as cited in Barbier & Burgess, 2025) demonstrated that many voluntary avoided-deforestation projects fail to significantly reduce deforestation compared to counterfactual baselines, leading to over-crediting. Furthermore, the economic viability of NbS is challenged by the high costs of Monitoring, Reporting, and Verification (MRV). As Miltenberger et al. (2021, as cited in Barbier & Burgess, 2025) noted, MRV costs can constitute a majority of the market value of a carbon credit, eroding incentives for project developers.

Looking forward, the cost-effectiveness of NbS relative to ETbS is shifting. While NbS are currently cheaper in many tropical regions, technological innovations are driving down the costs of ETbS. Projections suggest that between 2022 and 2050, the per-unit costs of ETbS could fall by $19 to $50 per tCO_2e, while NbS costs could rise by $7 to $68 per tCO_2e due to increasing land scarcity (Trove Research, 2023, as cited in Barbier & Burgess, 2025).

Scientific Frameworks for Assessing Mitigation Integrity

To ensure that NbS contribute meaningfully to national climate targets, such as Nationally Determined Contributions (NDCs), rigorous scientific assessment frameworks are required. Peltzer et al. (2025) developed a two-stage science assessment framework to evaluate the "readiness" and "sufficiency" of new natural carbon sequestration activities.

Stage one, *science readiness*, assesses whether there is demonstrable potential that an activity removes CO_2 from the atmosphere. This relies on four principles: the carbon gain must be *measurable*, *validated* against established techniques, *additional* to business-as-usual baselines, and *permanent* (lasting decades to centuries). Stage two, *science sufficiency*, evaluates practical implementation, requiring that the activity is *material* (significant at a national scale), *scalable*, transparent in its data, free of negative *leakage*, and ecologically *sustainable* (Peltzer et al., 2025). This framework is crucial for standardizing how novel NbS—such as blue carbon restoration or diverse pasture management—are integrated into formal GHG inventories.

3. Methodology

This paper employs a comprehensive integrative review methodology, synthesizing empirical data, economic analyses, and policy evaluations from peer-reviewed literature and technical reports. The analytical framework is structured around three interconnected dimensions of NbS:

1. **Biophysical Potential:** Quantitative data on maximum and cost-effective carbon sequestration potentials across three primary biomes (terrestrial green carbon, peatlands, and blue carbon) were extracted and compared.
2. **Economic and Market Realities:** Analysis of VCM trends, cost-benefit analyses comparing NbS to ETbS, and the financial barriers to implementation (e.g., MRV costs, land opportunity costs) were evaluated.
3. **Scientific Integrity and Assessment:** The principles required to verify carbon sequestration claims (additionality, permanence, leakage) were analyzed through the lens of standardized scientific frameworks.

Data synthesis involves cross-referencing global mitigation models (e.g., Griscom et al., 2017) with regional case studies (e.g., Siman et al., 2021) and economic critiques (e.g., Barbier & Burgess, 2025) to identify both the theoretical limits and practical constraints of NbS deployment.

4. Findings and Analysis

4. 1. Biophysical Mitigation Potential Across Biomes

The global potential of NbS is distributed across diverse ecosystems, each with distinct carbon storage mechanisms, flux rates, and vulnerabilities. Griscom et al. (2017) established that when constrained by food, fiber, and biodiversity safeguards, NbS can provide 23.8 PgCO2e yr−1 of maximum mitigation by 2030. Cost-effective mitigation (<100 USD MgCO2e−1) accounts for 11.3 PgCO2e yr−1, contributing 37% of the mitigation needed through 2030 for a >66% chance of holding warming below 2°C.

Terrestrial Green Carbon (Forests and Agriculture) Forest pathways offer over two-thirds of cost-effective NCS mitigation. Reforestation represents the largest single natural pathway, though it carries high uncertainty regarding land availability. Avoided forest conversion is the second-largest, though implementation is hindered by land tenure complexities. Agricultural pathways, such as cropland nutrient management and trees in croplands (agroforestry), offer roughly one-fifth of total cost-effective mitigation while maintaining food production (Griscom et al., 2017).

In the ASEAN region, green carbon can reduce emissions by up to 1.35 Gt CO2 yr−1 in a cost-effective manner, representing approximately 20% of all tropical NbS potential (Siman et al., 2021). However, these opportunities are currently undercapitalized; certified green carbon projects in Southeast Asia represent only about 2% of the region's total NCS potential (Siman et al., 2021).

Peatland Carbon Peatlands are the world’s most efficient natural carbon sinks, storing carbon in waterlogged, anaerobic soils. However, drainage for agriculture (e.g., oil palm, pulpwood) alters this balance, releasing massive quantities of CO2. In Southeast Asia, peatland degradation reaches approximately 80%, contributing 3-4% of global GHG emissions (Siman et al., 2021).

Restoration of degraded peatlands and improved water table management in agricultural peatlands offer substantial mitigation. In Indonesia and Malaysia alone, improved management of industrial plantations and smallholder agriculture could yield 412 Tg CO2 eq yr−1 and 170 Tg CO2 eq yr−1, respectively (Siman et al., 2021). The primary mechanism is rewetting—raising water tables to near-surface levels to halt aerobic decomposition. However, this requires navigating trade-offs with agricultural yields, necessitating the development of wetland-adapted crops (paludiculture).

Blue Carbon Coastal ecosystems—mangroves, seagrasses, and tidal marshes—sequester carbon at substantially higher rates per hectare than most terrestrial forests and store it for millennia in waterlogged soils. Southeast Asia hosts the most extensive mangrove forests globally (5.2 Mha), yet experiences 80% of global human-caused mangrove loss, primarily due to aquaculture and oil palm conversion (Siman et al., 2021).

Protecting existing mangroves in ASEAN nations could save 887 Tg CO2e yr−1 by 2100 (Siman et al., 2021). Furthermore, over 300,000 hectares of formerly converted mangrove areas are biophysically suitable for restoration. Despite this potential, blue carbon projects face significant hurdles. Seagrasses, for instance, suffer from a lack of spatially explicit data and are often excluded from national GHG inventories because their marine status complicates terrestrial land-use accounting (Siman et al., 2021).

Table 1
Estimated Cost-Effective Mitigation Potential of Select NbS Pathways

Biome / Pathway	Region	Cost-Effective Potential	Primary Constraint
Reforestation	Global	2.7 - 17.9 PgCO2e yr−1	Land availability vs. food security
Avoided Forest Conversion	Global	1.2 - 5.6 PgCO2e yr−1	Land tenure, policy enforcement
Peatland Restoration	Indonesia	149.4 Tg CO2 eq yr−1	High restoration costs, community displacement
Avoided Mangrove Loss	ASEAN	887 Tg CO2e yr−1 (by 2100)	Aquaculture conversion, policy gaps
Nutrient Management	Global	~1.0 PgCO2e yr−1	Technological adoption, farmer education

Note. Data adapted from Griscom et al. (2017) and Siman et al. (2021).

4. 2. Economic Viability and Carbon Market Dynamics

While the biophysical potential of NbS is vast, its realization is fundamentally constrained by economics. The VCM is the primary vehicle for NbS finance. Between 2016 and 2021, the value of NbS carbon credit transactions surged from $67 million to $1.33 billion, accounting for over two-thirds of the total VCM market value by 2022 (Barbier & Burgess, 2025). However, recent market cooling—evidenced by a drop in issued credit volumes from 166.9 million tCO2e in 2021 to 122.2 million tCO2e in 2023—highlights underlying structural vulnerabilities.

The Challenges of Additionality, Leakage, and Permanence The credibility of NbS credits hinges on three contested concepts. *Additionality* requires that carbon savings would not have occurred in the absence of the project. Establishing accurate baselines is notoriously difficult; analyses of REDD+ (Reducing Emissions from Deforestation and Forest Degradation) projects show that ex ante baselines are frequently inflated to generate more credits, a practice known as "baseline gaming" (Barbier & Burgess, 2025). *Leakage* occurs when protecting one area simply shifts deforestation to another. Market leakage is particularly hard to quantify but can offset up to 50% of a project's claimed savings (Barbier & Burgess, 2025). *Permanence* refers to the longevity of carbon storage. Unlike geological carbon storage, biological carbon is susceptible to fire, disease, and climate-induced disturbances. Because NbS offer only temporary storage, the Social Cost of Carbon (SCC) applied to NbS must be adjusted downward to reflect this risk, which unfortunately results in NbS credits attracting discouragingly low prices compared to more permanent technological removals (Barbier & Burgess, 2025).

Cost Trajectories: NbS vs. ETbS A critical long-term economic concern is the relative cost-effectiveness of NbS compared to ETbS. Currently, many NbS pathways are highly cost-effective, ranging from $1 to $70 per tCO2e, whereas many ETbS are two to six times more expensive (Barbier & Burgess, 2025). However, this dynamic is shifting. ETbS benefit from economies of scale and rapid technological learning curves; the costs of solar panels, electric vehicles, and direct air capture are projected to fall significantly by 2050. Conversely, NbS do not benefit from the same scale effects. As population and development pressures increase, the opportunity costs of land will rise, driving up the costs of NbS (Barbier & Burgess, 2025).

If the cost of ETbS falls below that of NbS, the rationale for financing NbS purely for carbon mitigation weakens. This necessitates a paradigm shift in how NbS are valued and financed.

The "Double Dividend" and Alternative Financing The survival of NbS finance depends on recognizing their "double dividend"—the delivery of critical co-benefits alongside carbon sequestration. Molina et al. (2024, as cited in Barbier & Burgess, 2025) found that co-benefits associated with carbon sequestration, such as flood protection and water quality improvement, are often 2 to 3.4 times greater than the original intended public good benefits of the investment.

Relying solely on carbon markets is insufficient to cover the high costs of MRV, certification, and land opportunity costs. Innovative financing mechanisms are required. For example, Costa Rica and Colombia have successfully implemented small carbon levies on fossil fuel imports, using the proceeds to fund NbS and payment for ecosystem services (PES) programs targeted at disadvantaged communities (Barbier et al., 2020, as cited in Barbier & Burgess, 2025). Furthermore, repurposing the $276 billion in globally harmful agricultural subsidies toward sustainable land management could simultaneously reduce GHG emissions and fund NbS expansion (OECD, 2022, as cited in Barbier & Burgess, 2025). The insurance industry is also emerging as a novel funding source; insurers are beginning to invest in coral reef and mangrove restoration to reduce coastal flood risks, finding that the premium reductions from enhanced natural buffers can cover a significant portion of restoration costs (Barbier & Burgess, 2025).

4. 3. Scientific Frameworks for Assessing NbS Integrity

As demand for high-integrity NbS grows, standardized scientific frameworks are essential to distinguish credible sequestration from greenwashing. Peltzer et al. (2025) propose a rigorous two-stage assessment framework designed to evaluate whether a proposed mitigation activity is scientifically robust enough for inclusion in national GHG inventories or VCMs.

Stage One: Science Readiness Science readiness assesses the fundamental biophysical plausibility of a proposed activity. It requires satisfying four normative criteria:

1. *Measurable:* The activity must result in a quantifiable change in a carbon pool (e.g., aboveground biomass, soil organic carbon) that can be detected above baseline variability.
2. *Validated:* Measurement techniques must be cross-checked against well-tested, established protocols. If innovative methods (e.g., drone-mounted lidar) are used, they must be validated against ground truth data.
3. *Additional:* The carbon sequestered must be strictly attributable to the new human intervention, beyond business-as-usual trajectories. This requires robust counterfactual modeling.
4. *Permanent:* The carbon must remain stored for a climate-relevant timescale (typically 50 to 100 years). Proponents must demonstrate a high probability (e.g., 90%) that the carbon will persist, accounting for future disturbance risks like climate change and fire.

Stage Two: Science Sufficiency If an activity passes the readiness stage, it is evaluated for its practical implementability at scale. This stage requires:

1. *Material:* The effect size must be significant enough to matter for national carbon accounting.
2. *Scalable:* The measurement and monitoring systems must be robust enough to quantify impacts across broad spatial scales.
3. *Leakage-free:* The project must account for and mitigate any unintended increase in carbon losses outside the project boundary.
4. *Transparent:* Data, assumptions, and analyses must be publicly accessible for independent peer review.
5. *Sustainable:* The activity must not harm biodiversity or ecosystem services, and ideally, should generate co-benefits.

Table 2: Two-Stage Science Assessment Framework for NbS

Stage	Principle	Definition	Key Evaluation Question
Readiness	Measurable	Quantifiable change in carbon pools.	Can we detect the signal above the noise?
	Validated	Cross-checked against established methods.	Are the measurement tools accurate?
	Additional	Beyond business-as-usual baselines.	Would this carbon have been stored anyway?
	Permanent	Long-term storage (decades to centuries).	What is the risk of reversal?
Sufficiency	Material	Significant effect size at scale.	Does this matter for national targets?
	Scalable	Applicable across broad spatial areas.	Can this be monitored regionally/nationally?
	Leakage	No negative spillover effects.	Does protecting this land cause deforestation elsewhere?
	Transparent	Open data and methodologies.	Can third parties verify the results?
	Sustainable	No harm to biodiversity/ecosystems.	Does this activity deliver co-benefits?

Note. Adapted from Peltzer et al. (2025).

The application of this framework is best illustrated through contrasting case studies. For example, *peatland restoration* scores highly on readiness because the causal link between raising water tables and reducing CO_2 emissions is well-established, measurable, and additional. However, it faces sufficiency challenges due to the high cost of large-scale monitoring. Conversely, *browsing animal management* (e.g., culling invasive deer to allow forest regrowth) struggles with readiness; while vegetation recovery is measurable, attributing specific carbon gains to the removal of specific animals is extraordinarily complex, and the long-term permanence of the carbon sink is not guaranteed without continuous, costly management (Peltzer et al., 2025).

5. Discussion: Overcoming Barriers to Scale

The synthesis of biophysical potential, economic realities, and scientific frameworks reveals a central paradox in the NbS discourse: the solutions with the highest theoretical mitigation potential often face the steepest economic and governance barriers. To unlock the 37% cost-effective mitigation potential identified by Griscom et al. (2017), the global community must address several systemic challenges.

First, the integrity crisis in voluntary carbon markets must be resolved. The prevalence of baseline gaming and leakage undermines buyer confidence and suppresses carbon prices. Implementing standardized, science-based assessment frameworks—like the two-stage readiness and sufficiency model proposed by Peltzer et al. (2025)—is essential. Furthermore, the adoption of advanced MRV technologies, such as satellite remote sensing and eddy covariance flux towers, can reduce verification costs and improve accuracy. However, as Novick et al. (2022, as cited in Peltzer et al., 2025) noted, these technologies remain prohibitively expensive for high-resolution, project-level monitoring. Public-sector investment in open-source MRV infrastructure is therefore critical.

Second, the economic framing of NbS must evolve. If NbS are judged solely on the metric of cost per ton of CO_2 removed, they will eventually lose the race against rapidly declining ETbS costs. The value proposition of NbS lies in their multifunctionality. A reforestation project that sequesters carbon, filters drinking water, provides habitat for endangered species, and offers flood protection is worth far more than the sum of its carbon credits. Policymakers must develop blended finance models that allow projects to stack revenues from carbon markets, biodiversity credits, water funds, and public agricultural subsidies. The redirection of the $276 billion in harmful agricultural subsidies identified by the OECD represents a massive, untapped source of NbS finance.

Third, governance and land tenure issues are paramount, particularly in the Global South where NbS potential is highest. As seen in Southeast Asia's peatlands, NbS interventions can conflict with national economic strategies prioritizing agricultural expansion (Siman et al., 2021). Furthermore, NbS projects that fail to secure equitable benefit-sharing with Indigenous peoples and local communities risk social backlash and long-term failure. Secure land tenure is a prerequisite for successful carbon forestry; without it, smallholders cannot participate, and powerful elites may capture the benefits (Barbier & Burgess, 2025). National policies must align economic incentives—such as PES schemes and carbon taxes—with landscape-level planning that respects customary land rights.

Finally, the scientific community must continue to constrain uncertainty. The 95% confidence intervals for maximum mitigation potential in pathways like reforestation are vast (e.g., 2.7 to 17.9 $PgCO_2e\ yr^{-1}$), reflecting deep uncertainties in land availability and sequestration rates (Griscom et al., 2017). Furthermore, the impacts of climate change itself on terrestrial carbon sinks—through increased drought, fire, and pest outbreaks—threaten the permanence of NbS.Unchecked climate change could reverse terrestrial carbon sinks by midcentury, eroding the long-term climate benefits of NCS (Griscom et al., 2017). This underscores the urgency of deploying NbS in tandem with, not as a substitute for, aggressive fossil fuel emissions reductions.

6. Conclusion

Nature-based solutions represent an indispensable component of the global strategy to mitigate climate change. With the potential to deliver over one-third of cost-effective CO_2 mitigation needed by 2030, NbS offer a powerful, readily available set of tools to bridge the gap between current emissions trajectories and the goals of the Paris Agreement. Beyond carbon, they provide a "double dividend" of critical ecosystem services, from biodiversity conservation to water security and climate adaptation.

However, the realization of this potential is not guaranteed. The deployment of NbS is constrained by complex economic dynamics, including the high opportunity costs of land, the financial burden of MRV, and the structural flaws of voluntary carbon markets that plague the credibility of offsets. Furthermore, as energy-technology-based solutions become cheaper, the economic competitiveness of NbS purely for carbon mitigation will decline.

To overcome these barriers, a paradigm shift is required. The integrity of NbS must be ensured through the adoption of rigorous, standardized scientific frameworks that mandate additionality, permanence, and transparency. Financing mechanisms must evolve beyond singular carbon markets to embrace blended models that value the full spectrum of ecosystem co-benefits. Crucially, the implementation of NbS must be grounded in equitable governance, ensuring that the burdens and benefits of climate action are shared justly among local communities. Only through such integrated, scientifically robust, and economically innovative approaches can the world unlock the full potential of nature to stabilize the global climate.

References

Barbier, E. B., & Burgess, J. C. (2025). Economics of nature-based solutions for mitigating climate change. *Review of Environmental Economics and Policy, 19*(2), 156–174. https://doi.org/10.1086/735742

Griscom, B. W., Adams, J., Ellis, P. W., Houghton, R. A., Lomax, G., Miteva, D. A., Schlesinger, W. H., Shoch, D., Siikamäki, J. V., Smith, P., Woodbury, P., Zganjar, C., Blackman, A., Campari, J., Conant, R. T., Delgado, C., Elias, P., Gopalakrishna, T., Hamsik, M. R., … Fargione, J. (2017). Natural climate solutions. *Proceedings of the National Academy of Sciences, 114*(44), 11645–11650. https://doi.org/10.1073/pnas.1710465114

Intergovernmental Panel on Climate Change (IPCC). (2022). *Climate change 2022: Mitigation of climate change. Contribution of Working Group III to the*

Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. https://doi.org/10.1017/9781009157926

Peltzer, D. A., Mudge, P., Greenhalgh, S., & Carswell, F. (2025). *Science framework for assessing new mitigation activities for natural carbon sequestration* (Contract Report: 2526-0025). Manaaki Whenua – Landcare Research.

Seddon, N. (2022). Harnessing the potential of nature-based solutions for mitigating and adapting to climate change. *Science, 376*(6600), 1410–1416. https://doi.org/10.1126/science.abn9668

Siman, K., Friess, D. A., Huxham, M., McGowan, S., Drewer, J., Koh, L. P., Zeng, Y., Lechner, A. M., Lee, J. S. H., Evans, C. D., Evers, S., Jovani-Sancho, A. J., Varkkey, H., Anshari, G., Jaya, A., Chong, K. Y., Page, S., Mishra, S., & Sjögersten, S. (2021). *Nature-based solutions for climate mitigation: Challenges and opportunities for the ASEAN region*. British High Commission and the COP26 Universities Network.