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The Balakat Tree Project: A Case Study on Higher Education Institutions' Role in Climate Change Mitigation and Environmental Sustainability

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ABSTRACT

This study examines the Balakat Tree Project, a sustainability initiative by Mabalacat City College (MCC), highlighting the critical role of Higher Education Institutions (HEIs) in climate change mitigation and environmental sustainability. The project focuses on restoring and protecting the culturally and ecologically significant Balakat tree, a species vital for local biodiversity and cultural heritage. Through a mixed-methods approach combining a scoping review and case study analysis, this research demonstrates the transformative potential of HEIs in mitigating climate change and advancing sustainability efforts. The study emphasizes the importance of academic stewardship, community engagement, and conservation efforts in promoting environmental conservation and biodiversity preservation. The Balakat Tree Project is a prime example of HEIs' leadership in sustainability initiatives, leveraging their resources to drive environmental responsibility and foster a culture of sustainability.

INTRODUCTION

Climate change and environmental degradation are urgent global challenges, demanding prompt action for sustainability. This necessitates a collaborative and multifaceted approach involving all stakeholders within the community. Higher Education Institutions (HEIs) are pivotal in leveraging their resources to drive sustainability initiatives beyond their campuses and local communities, thereby contributing to the creation of more sustainable societies and alleviating pressures on the environment and global climate (Leal Filho *et al.*, 2023). Over time, HEIs have undergone significant shifts in their perception of environmental issues. Their perspectives on sustainability have evolved, leading to the adoption of practical strategies to foster sustainability on their campuses (Washington-Ottombre *et al.*, 2018). HEIs play a significant role in education for sustainable development, facilitating the development of new skills, tools, and concepts to address unsustainable practices and promote pro-sustainability efforts (Molthan-Hill *et al.*, 2019; Leal Filho *et al.*, 2023).

Gough and Scott (2008) describe a university as an open and dynamic system capable of planning actions and coordinating internal components while maintaining fluid and permeable boundaries through interactions with various external agencies and groups. Consequently, HEIs are uniquely positioned to take the lead in addressing these pressing environmental challenges. A prime example of this leadership is the Balakat Tree Project, which Mabalacat City College (MCC) started. Through academic stewardship and environmental responsibility, MCC demonstrates the transformative potential of HEIs in mitigating climate change and advancing sustainability efforts.

The MCC-initiated Balakat Tree Project exemplifies a

multifaceted approach to cultural and environmental preservation. This project focuses on restoring and protecting the Balakat tree, a species of significant cultural importance in Mabalacat City. Beyond its cultural value, the tree plays a vital role in maintaining biodiversity and ecosystem health, making its preservation crucial for local environmental resilience (Mijatović *et al.*, 2013).

Examining the project's inception, implementation strategies, and outcomes, this study aims to explain how HEIs can effectively contribute to climate change mitigation and environmental sustainability. The researchers have analyzed the project's impact on the local community, academic curriculum development, and institutional sustainability practices. This research aspires to inform future sustainability initiatives within HEIs and beyond by extracting valuable insights from the project. This study seeks to contribute to the discourse on HEIs' role in climate change mitigation and environmental sustainability. Highlighting the transformative potential of academic stewardship and community engagement, exemplified by the Balakat Tree Project, researchers aim to inspire and empower other institutions to embrace sustainability as a core tenet of their mission and philosophy.

Framework

This study follows Leal Filho *et al.* (2023) framework, titled "Ways a Focus on Climate Change Can Impact the Higher Education Agenda," which emphasizes climate change communication and education. The framework illustrates how focusing on climate change can influence the higher education agenda. It outlines five key modalities: teaching and learning, research, campus operations, community engagement, and policy engagement. Universities can integrate climate change topics into curricula, conduct

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research to inform solutions, implement sustainable practices on campuses, engage with communities to raise awareness and build capacity, and contribute expertise to policy development. By emphasizing these areas, universities can play a pivotal role in addressing

climate change, equipping students and society with the knowledge and tools needed to mitigate and adapt to the challenges posed by climate change. This research stream explores how to communicate climate science effectively to the public and policymakers.

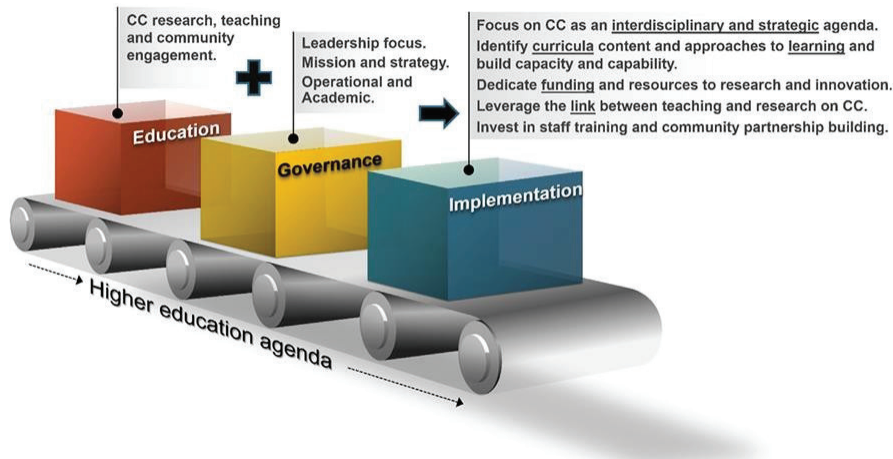


Figure 1: Ways a focus on climate change can impact the higher education agenda
 Source: Leal Filbo, W., Aina, Y. A., Dinis, M. A. P., Purcell, W., & Nagy, G. J. (2023)

This study’s conceptual framework proposes and presents a paradigm of three pillars promoting successful environmental stewardship by Higher Education Institutions (HEIs). The first pillar, which focuses on the role of Higher Education Institutions (HEIs) in promoting environmental responsibility, highlights the strategies of sustainability practices, resource conservation, and environmental education. HEIs achieve this by actively engaging with the local community via research, education, and outreach efforts. Engaging with the local community through research, education, and outreach efforts promotes the sharing of information and enables communities to tackle environmental issues. The second pillar, “Community Engagement & Collaboration,” underscores the importance of establishing alliances with nearby communities through initiatives such as

joint projects, community forums, and collaborative events. This collaborative approach involves identifying community needs, fostering joint problem-solving, and empowering community members to take ownership of environmental initiatives. The last pillar, named ‘Environmental Impact,’ emphasizes the goal of achieving positive environmental outcomes such as reducing carbon footprint, promoting sustainable practices, and enhancing ecosystem resilience... This pillar focuses on addressing various environmental challenges, including mitigating the impacts of climate change, conserving biodiversity, and restoring the environment. Through these core principles, HEIs can become influential champions of environmental conservation, facilitating collaborative and impactful environmental initiatives in their communities.

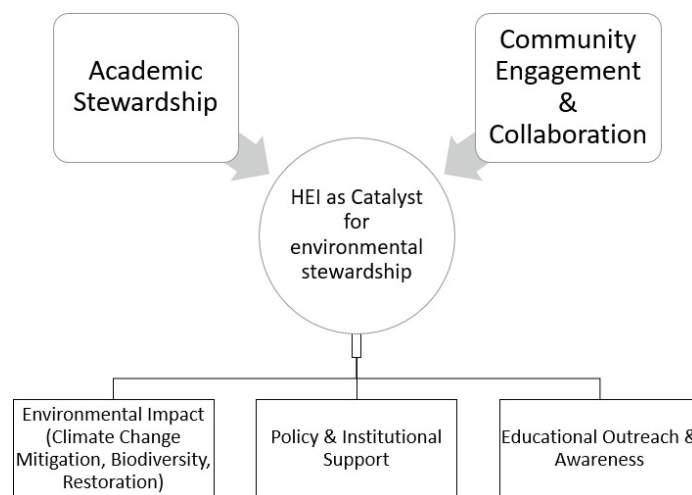


Figure 2: HEI (Higher Education Institutions) as Catalyst for environmental stewardship

MATERIALS AND METHODS

The research utilizes a mixed-methods approach, combining a scoping review and a case study analysis to investigate the research question comprehensively. The scoping review systematically maps existing literature on the role of Higher Education Institutions (HEIs) in climate change mitigation and environmental sustainability. This review establishes a foundation in the current knowledge base, identifies trends and patterns within the field, and provides context for the subsequent case study analysis under the direction of the Tricco *et al.* (2016) framework.

The research then employs a case study analysis of the Balakat Tree Project at Mabalacat City College. This analysis uses multiple data collection methods to better understand the project's complexities and impact on climate change mitigation (Flyvbjerg, 2011). These methods include document analysis of relevant project materials, semi-structured interviews with key stakeholders, field observations of project activities, and data analysis from all collected sources.

The mixed-methods approach leverages the strengths of both methodologies. However, it requires careful management of resources. To ensure research rigor and address potential bias, the study implements transparent and systematic procedures for literature selection and interpretation within the scoping review. Additionally, findings are cautiously generalized beyond the case study context, and meticulous attention is paid to data integration during analysis to ensure coherence and consistency. By acknowledging and mitigating these potential challenges, the research strives to provide a robust and well-rounded analysis of academic stewardship and its contribution to climate change mitigation efforts.

RESULTS AND DISCUSSION

The Balakat Tree Project

The Balakat Tree Project at Mabalacat City College represents a comprehensive and proactive approach to environmental conservation and biodiversity preservation, focusing on the Balakat tree (*Ziziphus talanai*). This project is significant for the local ecosystem and addressing climate change challenges. The Balakat tree, a vital component of the region's biodiversity, faces threats from urban development, such as housing construction, road expansions, and new industrial zones, leading to habitat destruction and population decline. Mabalacat City College is demonstrating proactive conservation efforts to preserve this indigenous species and its ecosystem. The project aims to create a conducive environment for the propagation and conservation of Balakat trees by establishing the MCC Greenhouse, Balakat Sanctuary, and Hiking Trail on the Mabalacat City College campus. These initiatives implement sustainable practices such as rainwater harvesting, organic farming, and waste recycling, contributing to environmental conservation and climate change resilience.

Preserving indigenous trees like the Balakat is crucial for

carbon sequestration, helping mitigate climate change by absorbing carbon dioxide from the atmosphere. Efforts to conserve biodiversity, such as those in the Balakat Tree Project, help restore and strengthen ecosystems by promoting species diversity, enhancing soil fertility, and improving water quality, which are essential in addressing the impacts of climate change. By connecting the Balakat Tree Project to broader environmental issues like climate change, Mabalacat City College promotes sustainable development practices with far-reaching environmental and community benefits.

The Balakat Tree as a Symbol of Cultural Heritage and Environmental Stewardship

The Balakat tree, from which the city of Mabalacat derives its name, holds immense cultural significance for the local community. It represents the city's 300 years of history, culture, and heritage (Donesa, 2013). This deep-rooted connection underscores the importance of preserving this culturally significant species (Sousa *et al.*, 2024).

The Balakat Tree Project's focus on conservation and propagation reflects a broader commitment to safeguarding the city's cultural heritage and environmental sustainability. Because continuous use of forest trees poses a threat to the future of our forest estate and biodiversity (Niambe *et al.*, 2024). By recognizing the Balakat tree as a symbol of the community's past and present, the project aims to prevent its loss due to rapid urbanization and development (Scott *et al.*, 2016). The Balakat tree's ecological role in maintaining biodiversity and environmental health further emphasizes the need for its preservation (Vinceti *et al.*, 2013).

Heritage trees, aside from their successful propagation and sustained growth due to local acclimatization, engage institutions, partners, and volunteers more effectively.

They are more motivated to care for these trees, especially during crucial stages of development since the trees represent their heritage. The project's efforts to protect the Balakat tree extend beyond cultural preservation, contributing to the overall environmental resilience of the Mabalacat City community. By positioning the Balakat tree as a symbol of both cultural heritage and environmental stewardship, the project fosters a holistic understanding of the interconnectedness between human communities and the natural world (Cave & Negussie, 2017). This approach aligns with sustainability principles, challenging the traditional dichotomy between culture and nature and promoting an integrated and harmonious relationship between the two.

The Role of Higher Education Institutions in Climate Change Mitigation and Sustainability

The Balakat Tree Project exemplifies the pivotal role that higher education institutions (HEIs) can play in addressing environmental challenges and promoting climate change mitigation. Mabalacat City College has demonstrated a proactive approach by integrating environmental awareness and action into its institutional framework

through academic programs, community partnerships, and sustainability initiatives (Bilodeau *et al.*, 2014).

By engaging students, faculty, and local stakeholders in the Balakat Tree Project, the college contributes to environmental conservation and cultivates a culture of environmental responsibility and civic engagement. This approach aligns with the growing recognition of the critical role that HEIs can play in addressing global environmental issues and fostering sustainable practices. The college's commitment to the Balakat Tree Project reflects a broader institutional ethos of academic stewardship and environmental responsibility. By leveraging its resources, expertise, and community connections, Mabalacat City College has positioned itself as a leader in driving climate change mitigation and sustainability efforts within the local context. Furthermore, the project's integration of academic programs, research, and community engagement demonstrates the potential for HEIs to adopt a holistic and interdisciplinary approach to environmental challenges (Yarime *et al.*, 2012). By bridging the gap between theory and practice, the Balakat Tree Project serves as a model for how academic institutions can translate their intellectual resources into tangible, community-based solutions (Noble *et al.*, 2023). The project's success is attributed to its emphasis on community engagement and collaborative partnerships. The project's efforts to forge partnerships with local organizations, indigenous communities, and government agencies in preserving and propagating the Balakat tree highlight the importance of cross-sectoral collaboration (Pence, 2011). These collaborative relationships leverage diverse perspectives, resources, and expertise to address environmental conservation challenges.

The involvement of local stakeholders enhances the project's relevance and effectiveness, promoting a sense of ownership and investment within the community. The project's engagement with government agencies, such as the Department of Environment and Natural Resources (DENR), demonstrates the importance of aligning conservation goals with broader policy and regulatory frameworks (Chapin III *et al.*, 2011). This multi-pronged approach, combining community engagement, educational initiatives, and policy advocacy, is crucial for the long-term survival of the Balakat tree (Cordner *et al.*, 2019).

CONCLUSION

Heritage trees are particularly effective for climate change mitigation because their cultural significance motivates local communities, agencies, and institutions to maintain and sustain them throughout their growth. The Balakat Tree Project at Mabalacat City College demonstrates how conserving and propagating a culturally significant species can also serve as a powerful tool for biodiversity preservation and climate change mitigation. This initiative underscores MCC's vital role as a catalyst for environmental stewardship. By integrating environmental sustainability into its academic programs, institutional policies, community outreach, awareness campaigns, and

sustainability practices, MCC exemplifies a comprehensive approach to sustainability. Moreover, the multi-sectoral approach adopted by MCC has significantly enhanced the project's effectiveness. MCC ensures a comprehensive and inclusive strategy by providing a platform for the active participation of local government units, indigenous communities, government agencies, and other stakeholders. This collaborative model fosters greater community involvement and maximizes the project's overall impact, making it a successful example of how higher education institutions can drive meaningful environmental change.

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