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Environmental Governance, Implementation Gaps, and Sustainable Reforestation under the Enhanced National Greening Program (ENGP): A Policy and Program Evaluation Framework for Bukidnon Province, Philippines

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Abstract

Environmental degradation, deforestation, biodiversity loss, and climate-related vulnerabilities remain major concerns in the Philippines, particularly in ecologically significant provinces such as Bukidnon. In response, the Philippine government implemented the National Greening Program (NGP) in 2011 and later expanded it through the Enhanced National Greening Program (ENGP) to strengthen forest rehabilitation, climate change mitigation, watershed protection, and sustainable development. This study examined the environmental governance mechanisms, implementation gaps, and sustainability issues associated with the ENGP in Bukidnon Province using a qualitative policy and program evaluation framework involving documentary analysis, policy review, implementation records, validation reports, and thematic analysis within the Area of Responsibility of DENR-CENRO Valencia. Findings revealed that the ENGP contributes to reforestation, biodiversity conservation, watershed rehabilitation, livelihood opportunities, and participatory environmental governance through the involvement of local government units, People's Organizations, indigenous communities, and partner institutions. However, challenges affecting program sustainability include weak monitoring systems, inadequate post-planting maintenance, inconsistent institutional coordination, delayed funding, manpower shortages, low plantation survival rates, limited technical capacity, and insufficient long-term incentives for participating communities. The study also identified policy gaps related to institutional accountability and long-term governance structures. In response, an integrated policy and program evaluation framework was proposed, emphasizing community-based forest restoration, adaptive governance, digital monitoring, sustainable livelihood integration, science-based reforestation practices, and strengthened

institutional coordination. The study concludes that sustainable forest restoration under the ENGP requires not only large-scale tree planting but also long-term governance reforms, localized implementation strategies, stakeholder empowerment, and evidence-based environmental management approaches.

Keywords: Enhanced National Greening Program, Environmental Governance, Sustainable Reforestation

1. Introduction

Environmental degradation continues to threaten ecological sustainability and environmental security in the Philippines. Deforestation, biodiversity loss, land degradation, watershed deterioration, illegal logging, unsustainable agricultural expansion, and climate-related disasters have significantly reduced forest cover and ecosystem resilience in many parts of the country. Provinces with extensive forestlands such as Bukidnon are particularly vulnerable because forests serve critical functions in biodiversity conservation, agricultural productivity, water regulation, and climate stability.

Bukidnon Province plays an important ecological and economic role in Mindanao due to its extensive watersheds, forest reserves, and agricultural production areas. However, increasing human activities, forest conversion, slash-and-burn farming practices, and environmental exploitation continue to threaten the province's environmental sustainability. The degradation of forest ecosystems has contributed to soil erosion, flooding, water scarcity, and declining ecological stability, emphasizing the need for stronger environmental rehabilitation and governance strategies.

In response to these environmental concerns, the Philippine government implemented the National Greening Program (NGP) through Executive Order No. 26 in 2011 following Executive Order No. 23, which declared a moratorium on timber harvesting in natural forests. The NGP was later expanded into the Enhanced National Greening Program (ENGP) to continue implementation until 2028. The ENGP serves as one of the country's largest environmental rehabilitation programs aimed at restoring degraded forestlands, mitigating climate change, promoting biodiversity conservation, supporting watershed rehabilitation, and improving rural livelihoods through community participation and sustainable forest management.

The ENGP reflects a multi-sectoral environmental governance approach involving the Department of Environment and Natural Resources (DENR), local government units (LGUs), People's Organizations (POs), indigenous communities, academic institutions, civil society organizations, and private stakeholders. Through collaborative implementation mechanisms, the program seeks to strengthen environmental protection while supporting socioeconomic development among upland and rural communities.

Despite the program's large-scale implementation and policy support, several governance and implementation challenges continue to affect the effectiveness and sustainability of reforestation efforts. Existing studies and validation reports reveal issues related to weak monitoring systems, inconsistent institutional coordination, insufficient maintenance support, low plantation survival rates, policy

inconsistencies, inadequate technical capacity, limited stakeholder empowerment, and short-term livelihood incentives. These implementation gaps raise important concerns regarding the long-term ecological sustainability and governance effectiveness of the ENGP.

This study integrates policy evaluation, program assessment, and environmental governance analysis to examine the implementation and sustainability of the Enhanced National Greening Program in Bukidnon Province. Specifically, the study seeks to analyze environmental governance mechanisms, identify implementation and policy gaps, and propose evidence-based and sustainable policy and program interventions for long-term forest restoration and environmental management.

Specifically, the study seeks to answer the following questions:

1. How is the Enhanced National Greening Program implemented in promoting environmental governance and sustainable reforestation in Bukidnon Province?
2. What implementation gaps, governance issues, and policy challenges affect the effectiveness and sustainability of the ENGP?
3. What policy and program evaluation framework may be proposed to strengthen sustainable forest restoration and environmental governance under the ENGP?

2. Review of Related Literature

Environmental governance and sustainable forest restoration remain central concerns in environmental policy and natural resource management literature in the Philippines. The implementation of the National Greening Program (NGP) and the Enhanced National Greening Program (ENGP) has generated extensive scholarly discussions related to reforestation effectiveness, biodiversity conservation, watershed rehabilitation, climate change mitigation, participatory governance, and sustainable development. Existing Philippine studies highlight both the accomplishments and implementation challenges of large-scale reforestation initiatives, emphasizing the importance of governance quality, stakeholder participation, institutional coordination, and long-term sustainability mechanisms in achieving successful environmental rehabilitation outcomes.

Lozano et al. (2025) emphasized that the National Greening Program significantly contributes to forest restoration and environmental governance through policy integration, stakeholder participation, and monitoring initiatives. The study noted that the NGP supports biodiversity conservation and climate resilience efforts by promoting large-scale reforestation activities in degraded forestlands. However, the researchers also identified persistent implementation issues such as fragmented planning systems, weak monitoring mechanisms, inconsistent stakeholder engagement, and poor ecological matching of plantation species, which negatively affect long-term sustainability outcomes.

Pulhin et al. (2024) highlighted the importance of participatory environmental governance and community-based forest management in improving environmental sustainability and strengthening local stewardship of forest resources in the Philippines. The study emphasized that involving local

communities and People's Organizations in environmental rehabilitation activities improves accountability, strengthens environmental awareness, and enhances long-term plantation sustainability. Similarly, von Kleist (2021) argued that transparency, accountability, and decentralized governance approaches significantly influence the effectiveness of forest restoration initiatives. The study further explained that governance reforms and stakeholder collaboration are essential in strengthening environmental management systems and improving implementation efficiency within reforestation programs.

Studies conducted by the Philippine Institute for Development Studies (PIDS) identified major implementation challenges under the National Greening Program, including overlapping institutional responsibilities, weak inter-agency coordination, inadequate post-planting maintenance, and output-oriented monitoring systems focused primarily on plantation targets rather than long-term ecological outcomes. Israel and Arbo (2015) emphasized that while the NGP achieved substantial accomplishments in plantation establishment, sustainability concerns remain evident due to limited monitoring systems and insufficient maintenance support. Similarly, Israel (2016) explained that weak institutional coordination and inadequate monitoring mechanisms reduce the effectiveness of environmental rehabilitation initiatives and affect long-term plantation survival.

Research conducted by Orina et al. (2025) in Surigao del Sur emphasized that implementation effectiveness under the ENGP varies across localities depending on governance quality, monitoring capacity, stakeholder participation, and sustainability mechanisms. The study identified concerns regarding delayed funding releases, weak monitoring systems, inconsistent implementation practices, and limited long-term livelihood integration. Likewise, Balmores (2024) highlighted that ineffective plantation management practices, insufficient maintenance systems, and weak implementation strategies negatively affect the sustainability of reforestation projects in several areas of the Philippines.

Bullong et al. (2025) assessed floristic diversity and carbon stock conditions in NGP plantation sites in Pangasinan and found that reforestation activities contribute significantly to biodiversity conservation and carbon sequestration. However, the study also revealed uneven plantation performance and varying survival rates due to ecological and technical limitations. The researchers emphasized the importance of proper species selection, ecological suitability assessments, and long-term environmental monitoring to maximize restoration outcomes.

Goltiano et al. (2021) examined the socioeconomic impacts of the National Greening Program among smallholder communities in Biliran, Philippines. Findings revealed that plantation establishment and maintenance activities generated temporary employment opportunities and supplementary income among participating communities. However, the study noted that livelihood gains remain largely dependent on continued government support and maintenance funding, emphasizing the need for sustainable livelihood integration and long-term community incentive mechanisms.

Arances et al. (2020) explored the role of indigenous communities in forest restoration initiatives in Mindanao and found that indigenous participation positively contributes to environmental conservation, plantation protection, and sustainable forest management. The study emphasized that integrating

indigenous knowledge systems and community-centered governance approaches improves environmental stewardship and strengthens the sustainability of reforestation programs.

Abella and Cutamora (2019) analyzed implementation disparities of the National Greening Program across selected local government units in the Philippines. The study revealed that differences in technical capacity, institutional coordination, and local governance practices significantly influence plantation performance and sustainability outcomes. The researchers emphasized the importance of localized implementation strategies and stronger institutional support mechanisms to improve reforestation effectiveness.

Engay-Gutierrez (2021) further emphasized that limited long-term incentives, weak environmental education, and insufficient community ownership negatively affect stakeholder commitment and sustainability of reforestation projects. The study explained that successful environmental rehabilitation initiatives require sustained community engagement, tenure security, livelihood support, and participatory governance mechanisms to strengthen long-term environmental stewardship among local communities.

The Department of Environment and Natural Resources–Forest Management Bureau (2020) reported that the ENGP contributes significantly to nationwide forest restoration, climate change mitigation, and watershed rehabilitation efforts through partnerships with local government units, indigenous communities, academic institutions, and People's Organizations. However, the report also identified persistent challenges related to plantation survival, monitoring efficiency, funding continuity, and post-implementation sustainability.

3. Theoretical Framework

This study is anchored on the Policy Cycle Theory, which explains how policies are formulated, implemented, evaluated, and revised through interconnected governance processes (Howlett & Ramesh, 2003; Jann & Wegrich, 2007). The theory provides a systematic framework for analyzing the Enhanced National Greening Program (ENGP) as an environmental policy intervention and sustainable development initiative. It emphasizes several stages, including agenda-setting, policy formulation, implementation, evaluation, and policy revision.

In the context of the ENGP, environmental degradation, climate vulnerability, deforestation, and forest loss served as major concerns that prompted the establishment of nationwide reforestation initiatives. The implementation stage focuses on how environmental policies are operationalized through institutional coordination, stakeholder participation, monitoring systems, funding mechanisms, and local governance practices. Meanwhile, the evaluation stage examines gaps between policy objectives and actual implementation outcomes, including plantation survival, ecological restoration, governance effectiveness, and community participation (Lozano et al., 2025; Pulhin et al., 2024). The framework also supports adaptive policy revision by identifying implementation gaps and evidence-based interventions necessary for improving environmental governance and long-term sustainability outcomes under the ENGP.

4. Methodology

This study employed a qualitative policy and program evaluation approach integrating documentary analysis, thematic analysis, and environmental governance assessment to examine the implementation practices, policy frameworks, governance mechanisms, and sustainability challenges associated with the Enhanced National Greening Program (ENGP) in Bukidnon Province. The study focused on implementation areas under the Area of Responsibility of DENR-CENRO Valencia, covering plantation sites established under the National Greening Program (NGP) and Enhanced National Greening Program from 2011 onward. The research aimed to evaluate how environmental governance mechanisms and implementation strategies influence the effectiveness and long-term sustainability of reforestation initiatives in the province.

Various sources of data were utilized in the study, including executive orders and policy documents, DENR implementation and validation reports, scholarly literature and environmental policy studies, project monitoring records, implementation documents, and thematic findings generated from Key Informant Interviews (KII) conducted with representatives from People's Organizations and DENR implementors directly involved in ENGP implementation and monitoring activities. Through thematic analysis, the study identified recurring governance and implementation issues related to monitoring systems, institutional coordination, funding mechanisms, plantation sustainability, technical capacity, stakeholder participation, livelihood integration, and environmental governance practices affecting the effectiveness and sustainability of the ENGP in Bukidnon Province.

5. Findings and Discussion

Environmental Governance and Program Implementation

Findings revealed that the Enhanced National Greening Program (ENGP) significantly contributes to environmental rehabilitation and sustainable forest restoration efforts in Bukidnon Province. The implementation of reforestation activities under the program supports biodiversity conservation, watershed protection, climate change mitigation, and ecological restoration in degraded and denuded forestlands. Plantation establishment activities help improve forest cover, reduce soil erosion, enhance water retention capacity, and strengthen ecosystem resilience in environmentally vulnerable areas. In Bukidnon, where watersheds and forest ecosystems play a critical role in sustaining agricultural productivity and water resources, the ENGP serves as an important environmental intervention supporting long-term ecological stability and climate resilience. These findings are consistent with Lozano et al. (2025), who emphasized that the National Greening Program significantly contributes to forest restoration and environmental governance through policy integration, monitoring initiatives, and stakeholder participation. The findings further support existing literature emphasizing that sustainable forest restoration initiatives play a major role in climate resilience, biodiversity conservation, and ecological sustainability.

The study also revealed that the ENGP promotes participatory environmental governance through collaborative implementation mechanisms involving DENR field offices, local government units (LGUs), People's Organizations (POs), indigenous communities, academic institutions, and other local stakeholders. This multi-sectoral governance approach strengthens coordination, shared accountability,

and stakeholder participation in environmental management activities. Community participation in seedling production, plantation establishment, maintenance operations, monitoring activities, and agroforestry initiatives enhances local environmental stewardship and encourages collective responsibility in forest protection and rehabilitation. Thematic findings generated from Key Informant Interviews (KII) with People's Organization representatives and DENR implementors highlighted that local communities play a significant role in ensuring plantation survival because they directly monitor and maintain planted areas. Respondents emphasized that community-based approaches improve cooperation and strengthen sustainability outcomes, particularly when community needs and local conditions are integrated into implementation strategies. These findings support Pulhin et al. (2024), who highlighted the importance of participatory environmental governance and community-based forest management in improving environmental sustainability and strengthening local stewardship of forest resources. Similarly, von Kleist (2021) argued that transparency, accountability, and decentralized governance approaches significantly influence the effectiveness and sustainability of forest restoration initiatives.

Moreover, livelihood opportunities generated through plantation establishment, maintenance activities, and agroforestry systems provide supplementary income and economic support for participating communities. Several beneficiaries reported receiving financial assistance during maintenance operations and generating income from agroforestry commodities such as cacao, coffee, and rubber integrated within plantation systems. These livelihood components help encourage participation while supporting household needs among upland communities. However, findings also suggest that the economic benefits derived from plantation activities remain limited and are often dependent on continued government support and maintenance funding. The study further observed that long-term livelihood sustainability remains a challenge in some implementation areas. These findings are aligned with the reviewed literature emphasizing that successful reforestation initiatives require sustained community participation, localized management approaches, and stronger livelihood integration mechanisms to maintain long-term environmental commitment and program sustainability.

The implementation framework of the ENGP involves several interconnected processes, including site identification, environmental assessment, nursery establishment, seedling production, tree planting, monitoring activities, validation procedures, and plantation maintenance operations. Prior to project implementation, site surveys and mapping activities are conducted to determine suitable plantation areas and identify ecologically appropriate species based on environmental conditions and commodity plans. Monitoring systems and validation mechanisms are likewise integrated into implementation processes to assess plantation survival, environmental performance, and compliance with program targets. DENR field offices, together with partner organizations and local communities, are responsible for conducting periodic monitoring and maintenance activities to ensure the sustainability of plantation sites. However, findings indicate that the effectiveness of these implementation processes largely depends on stakeholder coordination, technical capacity, funding availability, and the consistency of long-term monitoring and governance mechanisms. These findings support studies conducted by the Philippine Institute for Development Studies (PIDS), which identified major implementation challenges under the NGP, including weak inter-agency coordination, inadequate post-planting maintenance, and monitoring systems focused primarily on plantation targets rather than long-term ecological outcomes. Similarly,

Orina et al. (2025) and Balmores (2024) emphasized that implementation effectiveness varies across localities depending on governance quality, monitoring capacity, stakeholder participation, funding mechanisms, and sustainability strategies.

Implementation Gaps and Governance Challenges

Despite its contributions, the study identified several implementation and governance challenges affecting program sustainability and effectiveness.

Weak Monitoring and Validation Systems

The findings revealed that one of the major implementation challenges affecting the sustainability of the Enhanced National Greening Program (ENGP) is the presence of weak monitoring and validation systems. Existing monitoring mechanisms remain heavily output-oriented and focus primarily on tree-planting accomplishments, plantation targets, and hectares covered rather than evaluating long-term ecological sustainability and forest restoration outcomes. Validation records and implementation reports revealed inconsistencies in survival rate assessments, incomplete monitoring documentation, delayed validation activities, and weak post-project evaluation systems in several plantation sites within the Area of Responsibility of DENR-CENRO Valencia. In some implementation areas, plantation monitoring records lacked updated survival rate data and clear validation results even after project turnover, making it difficult to accurately assess the actual condition and sustainability of established plantations. These weaknesses limit the ability of implementing agencies to identify environmental risks, determine plantation performance, and ensure accountability in long-term forest restoration efforts.

Thematic findings from Key Informant Interviews (KII) with People's Organization representatives and DENR implementors further emphasized that monitoring activities are often constrained by manpower limitations, large implementation coverage areas, and insufficient technical and financial resources. Respondents explained that some plantation sites receive limited follow-up monitoring after establishment, particularly when maintenance funding and contractual support decline. As a result, plantation survival and environmental performance become difficult to sustain over time. These findings support the literature reviewed by the Philippine Institute for Development Studies (PIDS), which identified weak monitoring systems and output-based evaluation mechanisms as major implementation challenges under the National Greening Program. Similarly, Lozano et al. (2025) emphasized that fragmented monitoring systems and inconsistent stakeholder engagement negatively affect the long-term success and sustainability of reforestation initiatives. The findings also align with international literature suggesting that large-scale tree-planting programs often fail when implementation prioritizes numerical accomplishments rather than ecosystem restoration, adaptive management, and long-term environmental sustainability.

Insufficient Funding and Delayed Financial Support

The findings revealed that insufficient funding and delayed financial support remain significant implementation challenges affecting the effectiveness and sustainability of the Enhanced National Greening Program (ENGP) in Bukidnon Province. Limited maintenance funding and delayed billing processes negatively affect plantation maintenance activities, operational efficiency, and stakeholder motivation. Key Informant Interview (KII) findings from People's Organization representatives and DENR implementors indicated that available financial resources are often inadequate to support the

extensive activities required for plantation establishment, maintenance, monitoring, and protection. Respondents explained that delays in the release of maintenance payments and billing processes reduce the motivation of participating communities and create difficulties in sustaining long-term plantation care and environmental protection activities. In several instances, maintenance operations such as ground weeding, replanting, and monitoring activities were constrained due to insufficient financial allocations and delayed disbursement of funds.

The findings further revealed that participating communities often rely on maintenance incentives and project-related financial support to sustain their involvement in plantation protection and agroforestry activities. However, when financial assistance becomes delayed or insufficient, stakeholder participation and long-term commitment to plantation sustainability gradually decline. DENR implementors also emphasized that limited operational budgets affect monitoring efficiency, field supervision, technical support, and implementation continuity, particularly in geographically extensive plantation areas. These findings support the studies conducted by Orina et al. (2025) and Balmores (2024), which emphasized that delayed funding releases, inadequate financial support, and weak sustainability mechanisms significantly affect implementation effectiveness and plantation survival rates under the National Greening Program. Similarly, studies conducted by the Philippine Institute for Development Studies (PIDS) identified inadequate post-planting maintenance support and resource limitations as major constraints affecting the long-term sustainability of reforestation initiatives.

Policy Inconsistencies and Institutional Coordination Issues

The findings revealed that policy inconsistencies and institutional coordination issues significantly affect the implementation efficiency and governance effectiveness of the Enhanced National Greening Program (ENGP) in Bukidnon Province. Changing implementation guidelines, unclear harvesting policies, overlapping institutional responsibilities, and inconsistent local implementation practices create governance confusion among implementors and participating communities. Key Informant Interview (KII) findings from People's Organization representatives and DENR implementors indicated that frequent changes in program policies and operational guidelines often cause uncertainty regarding implementation procedures, plantation management, and long-term utilization of planted areas. Respondents explained that some plantation species initially introduced as potential livelihood commodities were later subjected to policy restrictions that limited harvesting and utilization activities, causing frustration among community participants who expected long-term economic benefits from plantation projects.

The study further found that overlapping institutional responsibilities and inconsistent coordination mechanisms among DENR field offices, local government units (LGUs), partner agencies, and People's Organizations contribute to implementation inefficiencies and delayed operational processes. In some implementation areas, unclear tenure arrangements, incomplete documentation, and inconsistent local governance practices affected project supervision, accountability, and stakeholder participation. Respondents also noted that variations in implementation approaches across localities create inconsistencies in monitoring systems, maintenance practices, and sustainability outcomes. These findings support the studies conducted by the Philippine Institute for Development Studies (PIDS), which identified weak inter-agency coordination, overlapping institutional mandates, and inconsistent

policy implementation as major governance challenges under the National Greening Program. Similarly, von Kleist (2021) emphasized that transparency, accountability, and effective decentralized governance mechanisms are essential in improving forest restoration outcomes and institutional efficiency. Lozano et al. (2025) further explained that fragmented planning systems and inconsistent stakeholder coordination weaken the long-term sustainability of environmental rehabilitation initiatives.

Low Plantation Survival Rates

The findings revealed that low plantation survival rates remain one of the major environmental and implementation challenges affecting the long-term sustainability of the Enhanced National Greening Program (ENGP) in Bukidnon Province. Several environmental and technical factors contribute to plantation mortality and declining forest sustainability in various implementation sites. Key Informant Interview (KII) findings from People's Organization representatives and DENR implementors identified drought conditions, prolonged dry seasons, unsuitable species selection, fire incidents, pests and diseases, and the use of poor-quality seedlings as major causes of plantation failure. Respondents explained that some plantation areas experience high seedling mortality during extreme heat conditions, particularly when tree-planting activities are conducted outside appropriate planting seasons due to pressure to meet implementation targets. Fire incidents and pest infestations were likewise reported to damage plantation areas and reduce the survival of planted species. In addition, some respondents emphasized that certain species approved for plantation establishment were not ecologically suitable for high-elevation and environmentally sensitive areas, negatively affecting long-term plantation growth and sustainability.

The findings further revealed that inadequate maintenance support, limited technical supervision, and insufficient ecological assessment during species selection contribute to uneven plantation performance across implementation sites. Some communities also reported receiving poor-quality seedlings from suppliers, resulting in weak plantation establishment and reduced survival capacity. These implementation issues negatively affect the ecological effectiveness of reforestation efforts and limit the long-term environmental benefits expected from the program. These findings support Lozano et al. (2025), who emphasized that poor ecological matching of species and fragmented implementation practices weaken the sustainability of reforestation initiatives under the National Greening Program. Similarly, Balmores (2024) highlighted that weak maintenance systems and ineffective plantation management practices contribute to unsuccessful reforestation outcomes in several implementation areas.

Technical and Manpower Limitations

The findings revealed that technical and manpower limitations significantly affect the implementation efficiency and long-term sustainability of the Enhanced National Greening Program (ENGP) in Bukidnon Province. DENR field offices experience manpower shortages and limited technical capacity, which constrain monitoring efficiency, field supervision, community coordination, and implementation consistency across extensive plantation areas. Key Informant Interview (KII) findings from DENR implementors indicated that a limited number of personnel are assigned to supervise multiple People's Organizations and geographically dispersed plantation sites, making regular monitoring and technical assistance difficult to sustain. Respondents emphasized that the large implementation coverage areas,

combined with increasing plantation targets and operational responsibilities, place considerable pressure on field personnel and reduce the effectiveness of monitoring and validation activities. These manpower constraints also affect the consistency of project supervision, plantation assessment, and maintenance coordination in several implementation sites.

The study further revealed that insufficient technical training opportunities for DENR personnel and People's Organizations limit the effectiveness of plantation management, environmental monitoring, and sustainable forest restoration practices. Respondents explained that limited budget allocations for capacity-building activities prevent the conduct of regular technical seminars, environmental training programs, and skills development initiatives necessary for improving implementation performance. As a result, some community participants lack adequate technical knowledge regarding species selection, plantation maintenance, monitoring procedures, and adaptive environmental management practices. These limitations contribute to inconsistent implementation outcomes and reduced plantation sustainability. These findings support the studies conducted by the Philippine Institute for Development Studies (PIDS), which identified weak institutional capacity, inadequate technical personnel, and insufficient post-implementation support as major constraints affecting the effectiveness of the National Greening Program. Similarly, Orina et al. (2025) and Balmores (2024) emphasized that implementation effectiveness varies depending on governance quality, technical capacity, and monitoring efficiency across local implementation areas. Lozano et al. (2025) further highlighted that fragmented implementation systems and weak stakeholder engagement negatively affect the long-term sustainability of environmental rehabilitation initiatives.

Limited Long-Term Incentive Mechanisms

The findings revealed that limited long-term incentive mechanisms significantly affect sustained community participation and long-term commitment to environmental protection under the Enhanced National Greening Program (ENGP) in Bukidnon Province. Although communities actively participate during the early stages of plantation establishment, maintenance operations, and project implementation, long-term participation often declines once financial incentives, contractual maintenance support, and project-based assistance end. Key Informant Interview (KII) findings from People's Organization representatives and DENR implementors indicated that many participating communities rely heavily on short-term maintenance payments and livelihood support associated with plantation activities. However, when financial assistance becomes limited or delayed, stakeholder motivation and continuous involvement in plantation protection and monitoring activities gradually decrease. Respondents explained that some community members prioritize immediate economic survival and household needs over long-term environmental stewardship, particularly in economically vulnerable upland areas where livelihood opportunities remain limited.

The study further revealed that limited tenure security and restricted harvesting rights reduce long-term community ownership and commitment to plantation sustainability. Several respondents expressed concerns regarding unclear policies on the utilization and harvesting of plantation commodities, particularly for commercial species initially introduced as potential livelihood sources. In some implementation areas, communities expected long-term economic benefits from agroforestry and plantation activities but later encountered restrictions related to harvesting rights and land tenure

arrangements. These governance issues discourage sustained participation and weaken local stewardship over reforested areas. These findings support Engay-Gutierrez (2021), who emphasized that the absence of sustained incentive mechanisms and limited community ownership negatively affect long-term participation in reforestation initiatives. Similarly, the reviewed literature highlighted that successful environmental rehabilitation programs require sustained stakeholder engagement, community-centered governance approaches, and livelihood integration mechanisms that support long-term environmental commitment. Pulhin et al. (2024) further emphasized that participatory governance and community-based forest management strengthen local stewardship and improve sustainability outcomes in environmental programs.

6. Policy and Program Evaluation Framework

Based on the identified implementation gaps, governance challenges, and sustainability issues affecting the Enhanced National Greening Program (ENGP) in Bukidnon Province, the study proposes an integrated Policy and Program Evaluation Framework for Sustainable Reforestation and Environmental Governance. The framework is designed to strengthen the long-term effectiveness, accountability, ecological sustainability, and participatory governance mechanisms of the ENGP through adaptive, evidence-based, and community-centered approaches. The proposed framework integrates environmental governance reforms, science-based reforestation strategies, digital monitoring systems, sustainable livelihood development, and institutional capacity enhancement to address the operational and structural limitations identified during program implementation.

The framework emphasizes the importance of strengthening institutional coordination, improving monitoring and validation systems, enhancing stakeholder participation, promoting localized ecological restoration practices, and ensuring sustained community engagement in forest rehabilitation initiatives. It also recognizes that successful reforestation programs require not only plantation establishment but also long-term environmental stewardship, adaptive management systems, and inclusive governance approaches that balance ecological protection with socioeconomic sustainability. Furthermore, Key Informant Interview (KII) findings from DENR implementors recommended increasing manpower support within field implementation areas, particularly through assigning dedicated personnel for each People's Organization to improve project supervision, monitoring efficiency, and implementation management. Respondents emphasized that hiring additional staff and reducing personnel workload can significantly improve project coordination, plantation monitoring, technical assistance, and long-term sustainability of reforestation initiatives under the ENGP.

Framework Component	Key Strategies	Intended Outcomes
Strengthened Environmental Governance	• Clearer institutional accountability mechanisms • Standardized inter-agency coordination systems • Stronger LGU participation • Decentralized governance approaches • Community-based Forest management systems • Increased manpower support and dedi-	• Improved governance efficiency • Stronger accountability and coordination • Enhanced stakeholder participation • Increased local ownership and environmental stewardship

	cated personnel assignment for each People's Organization	• Improved project supervision and monitoring efficiency
Adaptive and Science-Based Reforestation	• Localized species selection • Biodiversity-centered restoration • Climate-adaptive plantation strategies • Ecological suitability assessments • Assisted natural regeneration practices	• Higher plantation survival rates • Improved biodiversity conservation • Enhanced ecological resilience • Sustainable forest restoration outcomes
Digitalized Monitoring and Evaluation Systems	• GIS-based monitoring systems • Drone-assisted environmental assessments • Geotagged plantation databases • Real-time reporting mechanisms • Outcome-based sustainability indicators	• Improved monitoring accuracy • Faster identification of environmental risks • Increased transparency and accountability • Strengthened long-term sustainability assessment
Sustainable Livelihood Integration	• Agroforestry enterprises • Bamboo production • Community-based Forest enterprises • Sustainable farming systems • Long-term livelihood diversification	• Increased community participation • Reduced dependence on short-term incentives • Improved household income opportunities • Stronger long-term stakeholder commitment
Capacity Building and Stakeholder Empowerment	• Technical training programs • Environmental education campaigns • Participatory governance seminars • Institutional capability enhancement • Community stewardship programs	• Improved technical and managerial capacity • Strengthened environmental awareness • Enhanced participatory governance • Greater sustainability of reforestation initiatives

7. Implementation Plan

The successful implementation of the proposed "Community-Based Sustainable Forest Restoration and Monitoring Program" requires a structured, multi-year implementation framework that integrates environmental rehabilitation, stakeholder participation, institutional coordination, and continuous monitoring mechanisms.

Timeline (Gantt Chart)

Program Activities	Year 1	Year 2	Year 3	Year 4	Year 5
Program Mobilization, Stakeholder Consultation, and Partnership Building					
Baseline Environmental Assessment and Site Mapping					
Nursery Establishment and Seedling Production					
Species Selection and Site Preparation					
Community Capacity Building and Environmental Education					
Reforestation and Assisted Natural Regeneration Activities					
Agroforestry and Sustainable Livelihood Development					
Community-Based Forest Protection and Fire Prevention Activities					
GIS-Based Monitoring System Development					
Drone-Assisted Monitoring and Environmental Assessment					
Plantation Maintenance, Replanting, and Survival Enhancement					
Biodiversity and Watershed Monitoring					
Midterm Program Evaluation					
Sustainability Planning and Institutionalization					
Final Program Evaluation and Impact Assessment					

The implementation plan is designed to ensure that reforestation activities under the Enhanced National Greening Program (ENGP) in Bukidnon Province are carried out systematically, efficiently, and sustainably. The plan also emphasizes adaptive management strategies that respond to local environmental conditions and community needs.

The timeline demonstrates that implementation activities will follow a phased and continuous approach. Initial stages focus on planning, environmental assessment, stakeholder mobilization, and nursery establishment. Mid-phase activities emphasize reforestation, livelihood integration, and monitoring system development, while later stages concentrate on sustainability assessment and long-term maintenance.

8. Budget Overview

The successful implementation of the proposed “Community-Based Sustainable Forest Restoration and Monitoring Program” requires sufficient financial resources to support environmental rehabilitation, stakeholder participation, monitoring activities, and long-term sustainability initiatives. The proposed budget is designed to ensure that all major program components, including reforestation activities, capacity-building programs, monitoring systems, and livelihood projects, are adequately funded throughout the implementation period. Budget allocation also considers the need for technical support, operational efficiency, and adaptive environmental management in Bukidnon Province.

Estimated Costs

The estimated total budget for the five-year implementation of the proposed program is approximately ₱25,000,000,000.00. This estimated amount covers expenses related to nursery establishment, seedling production, reforestation activities, monitoring systems, personnel support, capacity-building programs, and community livelihood initiatives. The budget allocation is intended to support both environmental restoration and sustainable community participation to ensure long-term program effectiveness.

The estimated cost also reflects the integration of modern monitoring technologies, including Geographic Information System (GIS)-based monitoring and drone-assisted environmental assessments, which require additional technical and operational resources. Furthermore, continuous plantation maintenance and post-planting management activities are included to improve plantation survival rates and sustainability outcomes.

Budget Breakdown

Budget Components	**Estimated Cost (₱)**
Program Mobilization, Stakeholder Consultation, and Partnership Building	1,000,000,000.00
Baseline Environmental Assessment, Forest Inventory, and Site Mapping	1,500,000,000.00
Nursery Establishment and Continuous Seedling Production	3,500,000,000.00
Species Selection, Site Preparation, and Land Rehabilitation	2,500,000,000.00
Community Capacity Building and Environmental Education Programs	1,500,000,000.00
Reforestation and Assisted Natural Regeneration Activities	4,500,000,000.00
Agroforestry and Sustainable Livelihood Development Projects	2,500,000,000.00
Community-Based Forest Protection, Fire Prevention, and Anti-Illegal Logging Operations	1,500,000,000.00
GIS-Based Monitoring Infrastructure and Data Management Systems	1,000,000,000.00
Drone-Assisted Monitoring, Remote Sensing, and Environmental Surveillance	1,000,000,000.00
Plantation Maintenance, Replanting, and Survival Enhancement Activities	1,500,000,000.00
Biodiversity Conservation and Watershed Rehabilitation Programs	1,000,000,000.00
Midterm Evaluation, Research, and Impact Assessment	500,000,000.00
Sustainability Planning and Institutionalization Activities	500,000,000.00
Final Impact Evaluation, Documentation, and Knowledge Management	500,000,000.00
Administrative and Operational Expenses	1,000,000,000.00
Contingency, Climate Disaster Response, and Emergency Funds	500,000,000.00
TOTAL ESTIMATED BUDGET	**₱25,000,000,000.00**

The budget allocation prioritizes reforestation implementation, plantation maintenance, and monitoring activities because these components directly affect the sustainability and survival of forest plantations. Capacity-building and livelihood support initiatives are likewise included to strengthen stakeholder participation and encourage long-term environmental stewardship among local communities.

Possible Funding Sources

Funding for the proposed program may be obtained from multiple government and non-government sources to ensure financial sustainability and broader stakeholder participation. The Department of

Environment and Natural Resources (DENR), through the Forest Management Bureau and Enhanced National Greening Program (ENGP) allocations, may serve as the primary funding source for reforestation and environmental rehabilitation activities. Local government units within Bukidnon Province may also provide counterpart funding through local environmental protection and climate adaptation programs.

Additional financial support may be secured from national government agencies involved in climate resilience, agriculture, and rural development initiatives. International environmental organizations, climate adaptation funds, and development agencies may likewise provide grants and technical assistance for sustainable forest restoration and biodiversity conservation projects. Furthermore, partnerships with private sector organizations through Corporate Social Responsibility (CSR) initiatives may contribute funding, technological resources, and logistical support for program activities.

Academic institutions, non-government organizations, and community-based organizations may also support capacity-building programs, environmental education activities, and community livelihood projects through collaborative partnerships and research-based initiatives. Diversifying funding sources can strengthen financial stability, reduce implementation risks, and enhance the long-term sustainability of the proposed program in Bukidnon Province.

9. Conclusion

The Enhanced National Greening Program (ENGP) serves as a significant environmental rehabilitation initiative supporting sustainable reforestation, biodiversity conservation, climate change mitigation, watershed protection, and participatory environmental governance in Bukidnon Province. The findings of the study demonstrate that the program contributes substantially to forest restoration and ecological rehabilitation efforts through plantation establishment, community participation, and multi-sectoral environmental management approaches. The ENGP has strengthened environmental awareness among participating communities and encouraged collaboration among DENR field offices, local government units, People's Organizations, indigenous communities, and other stakeholders involved in forest protection and rehabilitation activities. In addition, the integration of agroforestry and livelihood components within plantation systems provides supplementary economic opportunities that help support upland communities while promoting environmental stewardship and sustainable land management practices.

Despite these contributions, the study revealed that several implementation gaps and governance challenges continue to limit the long-term effectiveness and sustainability of the program. Weak monitoring and validation systems, inadequate post-planting maintenance, delayed financial support, policy inconsistencies, overlapping institutional responsibilities, manpower shortages, technical limitations, low plantation survival rates, and insufficient long-term community incentive mechanisms remain major constraints affecting program implementation. The findings further indicate that plantation sustainability is influenced not only by environmental factors such as drought, pests, unsuitable species selection, and fire incidents but also by governance quality, institutional coordination, funding continuity, stakeholder participation, and adaptive management capacity. These implementation issues

demonstrate that achieving sustainable forest restoration requires more than compliance with numerical tree-planting targets and short-term plantation establishment activities.

The study further concludes that long-term ecological sustainability under the ENGP depends on stronger environmental governance systems, adaptive and science-based reforestation approaches, localized implementation strategies, and sustained stakeholder participation. Strengthening institutional accountability, improving inter-agency coordination, enhancing technical and monitoring capacities, and promoting community-based forest management systems are essential in improving implementation efficiency and environmental sustainability outcomes. The findings also emphasize the importance of integrating biodiversity-centered restoration strategies, ecological suitability assessments, climate-adaptive plantation approaches, and long-term livelihood support mechanisms to strengthen community ownership and stakeholder commitment in environmental rehabilitation initiatives.

Moreover, the study highlights the need to transition from output-oriented implementation practices toward outcome-based and sustainability-focused environmental governance approaches. Reforestation initiatives should prioritize long-term ecological restoration, ecosystem functionality, plantation survival, and climate resilience rather than focusing primarily on short-term planting accomplishments. The integration of digitalized monitoring systems, Geographic Information System (GIS)-based monitoring technologies, geotagged plantation databases, drone-assisted environmental assessments, and real-time validation mechanisms can significantly improve transparency, accountability, and monitoring efficiency within the ENGP implementation framework.

The proposed Policy and Program Evaluation Framework provides an integrated, evidence-based, and participatory approach for strengthening sustainable reforestation and environmental governance in Bukidnon Province. By prioritizing adaptive governance systems, localized ecological restoration strategies, digital monitoring innovations, institutional strengthening, community empowerment, and sustainable livelihood integration, the framework offers a more comprehensive and sustainable direction for forest rehabilitation efforts under the ENGP. Ultimately, strengthening the long-term sustainability and governance effectiveness of the program can significantly contribute to ecological resilience, climate change adaptation, biodiversity conservation, watershed protection, and sustainable development not only in Bukidnon Province but also in the broader context of environmental governance and forest restoration initiatives in the Philippines.

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