Revitalizing A Local Green Legislation Vis-À-Vis Sustainable Development Goal 13

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DOI: https://doi.org/10.47772/IJRISS.2025.910000218

Received: 24 October 2025; Accepted: 30 October 2025; Published: 08 November 2025

ABSTRACT:

The abstract presents a concise overview of a study exploring the alignment between the Environment Code of Nueva Vizcaya and the United Nations Sustainable Development Goal 13 (Climate Action). It outlines the study's methodology, key findings, and implications for policy reform, emphasizing the importance of stakeholder knowledge and effective implementation in achieving local climate goals.

This study examines the alignment of policy mechanisms between the Environment Code of Nueva Vizcaya and the United Nations Sustainable Development Goal 13 (Climate Action). Through a qualitative-quantitative design involving comparative content analysis and surveys, the research evaluates policy coherence, stakeholder knowledge, and implementation effectiveness across the domains of climate mitigation and adaptation. Respondents include representatives from government, academe, church, and community sectors. Results show partial alignment between the local code and SDG 13, with strong convergence in areas like climate resilience, education, and policy integration. However, gaps remain in financing mechanisms and global coordination. Findings also reveal generally poor stakeholder knowledge of climate provisions, contributing to ineffective policy implementation. Statistical analysis indicates significant differences in knowledge and implementation levels across groups and domains. The study underscores the need for improved policy awareness, grassroots engagement, and intersectoral collaboration to localize climate action effectively. A policy brief is proposed to guide amendments to the Environment Code, ensuring stronger alignment with international climate standards. The research highlights the urgency of institutional and moral commitment in addressing climate risks at the local level.

Keywords: Climate change, partnership for the goals, quality education, sustainable municipalities

INTRODUCTION

"The movement to address climate change is about something deeper than justice; it's about solidarity. Human solidarity." —Bill McKibben

In a globalized community where various social, political, and economic dimensions continue to interact with each other, the impacts they create also move towards the path of relentless development. However, brought by this individualistic desire is a detrimental impact on the collective – the environment. The environment is one that is heavily compromised, leading to cataclysmic climate change. Inevitably, the issue of climate change has long been an impending doom in the context of both the domestic and international arenas. While it is acknowledged that actions are underway, only so much can be done to curb the detrimental results it brings.

This concern is not only central to sociopolitical views, but it also captures the concern of the religious sector. This can be seen in Pope Francis' Laudato Si', which calls for people across the world to remember their moral responsibility to take care of their common home. It is in this letter that it was emphasized how the impacts of pollution have been part and parcel of human lives which makes them desensitize to its cataclysmic impact, thus, making them complacent about the current ecological situation instead of engaging in initiatives to lessen the extent of its impact or mitigate the causes that further exacerbate it. Laudato Si' highlighted the common responsibility of everyone to acknowledge the communion between people and the environment. As furthered

in the encyclical letter, the eminent concern for the environment emanates from our unwavering love and concern among individuals through our commitment to contribute to solving impending social and ecological problems.

In a sociopolitical view, the discussion on SDG 13 is the pillar of foundation for the formulation of different programs and policies to ensure a harmonized act among states. This pillar has also been instrumental in the formulation of assessment monitoring tools used by various institutions for environmental impact evaluation. Despite this initiative, only a few studies have been conducted on the analysis of SDG 13 contextualized at the local level. There also exists no certainty on whether local environmental policies coincide or not with provisions or specific targets hinged on UN climate action. This study differs from the already existing studies by comprehensively identifying the similar provisions on local environmental legislation in the province of Nueva Vizcaya and the overarching framework of the UN on SDG 13. The identified provisions will serve as a basis for assessing the extent of implementation of the local environment policy.

Elevating the collective environmental response through policies that are hinged on SDG 13 or Climate Action is the very heart of the study to ensure proper policy purpose and objective alignment from both local and international contexts. As seen in the recent initiatives, conventions, and agreements formulated by state governments, there exists unified action in addressing environmental issues. The problem, however, lies in the execution of these respective policies, especially when the target grassroots level cannot be penetrated. To properly contextualize these political and environmental initiatives, reframing the policies in a manner that suits proper context implementation is indispensable in ensuring the top-to-bottom collective response of all communities.

These issues raised the empirical and theoretical gap present in the current implementation of the policy, as well as the knowledge of stakeholders on the provisions embedded within it. This study addressed the empirical gap by recognizing the lack of local studies on analyzing the environmental policies and determining the alignment with international policies, guidelines, frameworks, and conventions, specifically on UNDP's SDG 13 or Climate Action. While local policies are mostly influenced by global climate initiatives, these cannot be factored in as a basis of local policy efficiency, most especially when the means and ways of how it is implemented were not properly contextualized in the local setting. This study aimed to establish the coherence of global climate initiatives with local green policy on ensuring proper approaches to the prevention and adaptation to the impacts of climate change.

Meanwhile, the theoretical gaps brought by the lack of integrating environmental frameworks with the dimension of politics and governance at the local government level are an aspect that this study aims to bridge. Green Political Theory emphasized the importance of ecological justice, which is considered to be a moral imperative for political system changes. This theory deems ecological problems inherently tied to the political dimension as it asserts that the fulfillment of climate action correlates with the influences of political power and authority on the reinforcement of individual and collective ecological values for policy governance.

On the other hand, Institutional Theory provides insight into how policies are widely influenced by societal perspectives and organizational decisions. This study aims to surface how these institutions' forces can be a hindrance to solving the detrimental impacts of environmental degradation and climate change.

The gap is therefore evident in the shortfalls of establishing effective means of implementing the policies due to a lack of a synthesized framework that corroborates the two theories. The absence of these frameworks fails to comprehensively ascertain how institutional competence works in coherence with systemic political changes in addressing environmental issues. This study responds to these theoretical gaps by examining how local institutions in Nueva Vizcaya align the provincial environmental policy with international climate goals in the context of local political realities and community dynamics.

This study utilized a combination of conceptual frameworks which are Green Political Theory and Institutional Theory to analyze and understand the correlative interaction among political structures, institutional capacity, and environmental governance in local climate policy. The framework further demonstrates the relationship between global climate targets (SDG 13), provincial environmental mechanisms (Nueva Vizcaya Environment Code), and stakeholder knowledge and participation. It furthers how institutional dynamics and political will be

determinative on policy alignment, implementation, and adaptive capacity. The frameworks further serve as the analytical basis for identifying gaps between policy alignment and actual implementation, as well as its implications for local climate governance.

The study aims to craft policy recommendations based on the salient findings of the study to help in the continuous development of addressing climate and environmental issues within the province of Nueva Vizcaya. The need for this is of utmost urgency for the achievement of mitigating climate change's deleterious impacts.

METHODOLOGY

A qualitative-quantitative research design is utilized as it allows for an examination of both the content and the implementation of the environment code of Nueva Vizcaya. The Environment Code of Nueva Vizcaya and UN SDG 13 were purposively selected as data sources for their direct relevance to local climate governance and international sustainability frameworks. This methodological combination ensures triangulation and strengthens the reliability of the findings.

This study is located in the province of Nueva Vizcaya, centered on its capital, Bayombong. 60 respondents were involved, representing four different stakeholder groups. These included 15 students from Saint Mary's University, 15 provincial legislators from Nueva Vizcaya, 15 leaders from church and religious organizations, and 15 community residents. The data sources represent multilevel governance, which are local legislation, institutional frameworks, and global sustainability mandates, allowing the study to validate policy alignment by comparing normative provisions and operational realities.

The initial stage included the quantitative-comparative content analysis of the provisions of the Environment Code of Nueva Vizcaya vis-à-vis the targets of the United Nations Sustainable Development Goal (SDG) 13.

The second stage focused on the assessment of the stakeholders' level of knowledge. The test of knowledge, which underwent item analysis for validation and pilot-testing for reliability, was administered to the identified groups of stakeholders.

The third stage examined the extent of implementation of the Environment Code through a four-point Likert scale with descriptors Very Ineffective, Ineffective, Effective, and Very Effective.

Finally, the findings drawn using the qualitative-quantitative method was utilized to ascertain themes, elements, and variances relative to policy alignment, stakeholder awareness, and the policy's extent of implementation.

The study conducts comparative content analysis between the provisions of the Environment Code of Nueva Vizcaya and those of the UN's Sustainable Development Goal 13. The similar provisions are presented using a table highlighting the alignment or non-alignment of the provisions. From the results of the aforementioned method, questions shall be drawn from it to formulate the set of questions for the survey questionnaire, which contains the identified domains of those two sources, which are climate mitigation and management, and climate adaptation and regulation.

The initial set of questions aims to ascertain the level of knowledge of stakeholders on the Environmental Code of NV vis-à-vis SDG 13. A test of knowledge composed of 49 item questions is administered to all stakeholders, who are divided into four groups: the academe, government officials, the church, and community residents. Responses are subject to item analysis to properly evaluate the quality and extent of implementation of test questions to ensure accurate and meaningful research results. Among the items, item 12 was found to have only 0.139, which was excluded. With the exclusion of item 12, the instrument became more reflective across all items, further supporting the appropriate level of implementation.

The second set of questions ascertains the extent of implementation of the administration of the Environment Code of the province of Nueva Vizcaya in terms of the domains of climate mitigation and management, and climate adaptation and regulation. A four-point Likert scale was employed using the descriptors Very Ineffective, Ineffective, Effective, and Very Effective.

During the pilot testing phase, there was a total of 30 respondents, comprised of 15 students from Saint Mary's University, 10 municipal legislators from Bambang, and 5 representatives from the Municipal Environment and Natural Resources Office (MENRO). This phase was employed after undergoing a reliability test to obtain UREO's approval. Cronbach's alpha was employed on this test, which deemed the instrument to have an acceptable internal consistency.

For validation, the research instrument underwent pilot testing and item analysis, including the computation of the difficulty index (p-value), discrimination index (D-index), and Cronbach's alpha reliability coefficient ($\alpha = 0.734$), confirming acceptable internal consistency. The Likert-scale instrument measuring implementation effectiveness was also validated through expert review and reliability testing.

Analytical tools included frequency distribution and mean percentage scores for knowledge assessment, and ANOVA and Friedman tests for comparative evaluation. These tools were selected for their ability to identify statistically significant differences among stakeholder groups and policy domains, ensuring analytical precision and inferential soundness.

RESULTS AND DISCUSSION

Section 1: Comparison of the Environment Code of Nueva Vizcaya with relevant provisions of UN SDG

The Sustainable Development Goal 13 under the United Nations Development Programme focuses on the urgency of addressing the global climate crisis through greenhouse gas emission reduction, strengthening resilience, and impact prevention and management, especially to the most vulnerable sectors. The provincial environment code, on the other hand, which was enacted back in 2014, aims to provide a localized approach to various environmental issues such as solid waste segregation, environmental governance, policy compliance, monitoring, and assessment. However, despite the enactment of the environment code, there is a need to assess the relevance of the provisions if they are in line with the targets provided under SDG 13 in terms of addressing climate change, which has become a global challenge affecting states and development.

The alignment of SDG 13 with the provincial environmental code ensures that global initiatives are pragmatically visible in local contexts. Thus, the comparison between the provincial policy and the specific targets of UN SDG highlighted the common ground of addressing the impacts of climate change on both global and localized contexts.

Table 4 provides a comparative analysis of the United Nations Sustainable Development Goal (UN SDG) 13 Climate Action with the relevant provisions of the Environment Code of Nueva Vizcaya. SDG 13 aims to take urgent action to combat climate change and its impacts, with specific targets addressing resilience, policy integration, education, financial commitments, and capacity building. This comparison assesses how well the Environment Code aligns with each target, identifying areas of strong compliance and those needing further attention to fully meet global standards.

Table 4 Comparison of the Environment Code of Nueva Vizcaya with relevant provisions of the UNSDG

UN SDG 13 Target	Description of SDG 13 Target	Relevant Provision in the Environment Code of Nueva Vizcaya	Common Ground	Remarks
13.1	Strengthen resilience and the capacity to adapt to climate-related hazards and natural disasters	Chapter IV, Sec. 12 – Establishment of Climate-Resilient Infrastructure and Early Warning Systems	Aligned Enhancing resilience and preparedness through adaptive infrastructure and early warning systems.	Focuses on disaster risk reduction and climate-resilient planning
13.2	Enjoin climate change measures into national	Chapter II, Sec. 5 – Mainstreaming Climate Change in Local	**Aligned** Advocate for climate change integration into	Mandates LGUs to include climate components in

	policies, strategies, and planning	Government Development Plans	governance frameworks through strategic planning and policy development.	their development planning
13.3	Improve education, and raise awareness on both human and institutional capacity to address climate change mitigation and adaptation as well as the reduction of climate impacts	Chapter V, Sec. 15 – Climate Change Education and Community-Based Awareness Programs	**Aligned** Promote enhancing knowledge and awareness for climate change mitigation, adaptation, and impact reduction.	Promotes public participation and environmental education
13.a	Implement commitment to mobilize an amount of $100 billion yearly by year 2020 to cater the demands of all developing countries	No direct provision identified	**Not Aligned**	Funding and international cooperation not explicitly addressed in the Code
13.b	Formulate strategic mechanism for effective climate change–related programs and management in LDCs and SIDS	Chapter VI, Sec. 20 – Creation of a Local Climate Action Committee (LCAC)	**Partially Aligned** Strategic mechanisms with the SDG focusing on LDCs/SIDS and the Code on local governance via the LCAC.	Provides local mechanisms but not linked to global capacity building goals

Table 4 shows that the Environment Code of Nueva Vizcaya demonstrates notable efforts in aligning with the goals of **UN SDG 13: Climate Action**, particularly in the areas of local planning, education, and climate resilience. Each target under SDG 13 is addressed to varying extents in the Code, which provides a framework for analyzing strengths and identifying areas for policy improvement.

For Target 13.1, which emphasizes the importance of enhancing resilience and adaptation capacity to climate-related hazards and natural disasters, the Environment Code is fully aligned. This alignment is evident in Chapter IV, Section 12, which mandates the establishment of climate-resilient infrastructure and early warning systems. These provisions directly support disaster risk reduction and proactive planning to manage climate hazards, reflecting a clear commitment to increasing local resilience.

Target 13.2 gives emphasis on the integration of climate change metric standards into national policies, strategies, and planning. The Environment Code addresses this through Chapter II, Section 5, which requires the comprehensive integration of climate change concerns into grassroots development planning. This provision ensures that climate concerns are not treated as standalone issues but are embedded within broader governance and development strategies. As such, this target is also considered fully aligned.

Regarding Target 13.3, which aims to enhance climate awareness and education, as well as institutional capacity on climate change-related matters, the Code again shows full alignment. Chapter V, Section 15 promotes climate change education and community-based awareness programs. This fosters environmental literacy and empowers communities to actively participate in mitigation and adaptation efforts, building both human and institutional capacity.

However, Target 13. a, which calls for the mobilization of $100 billion annually to support developing countries, is not aligned with the Environment Code. The Code lacks any direct provision or mechanism addressing international climate finance or the mobilization of funding resources for global climate efforts. This represented a significant gap, particularly in the context of supporting developing regions and global solidarity.

Lastly, Target 13.b seeks to promote mechanisms for further enhancing the capacity in least developed countries (LDCs) and small island developing states (SIDS). The Code partially addresses this goal through Chapter VI, Section 20, which establishes a Local Climate Action Committee (LCAC). While this is a positive step in enhancing local planning and management capacity, it does not explicitly link to international or regional cooperation with LDCs or SIDS, making it only partially aligned.

Therefore, the Environment Code of Nueva Vizcaya aligns well with the core components of SDG 13, especially in local resilience, policy integration, and public education. There remains room for improvement in global cooperation and financial mechanisms. Strengthening these areas would enhance the Code's alignment with international climate goals and ensure a more comprehensive approach to climate action.

A report by the Global Climate Action from Cities, Regions, and Businesses in 2019 highlighted the indispensable role of both subnational and local governments in addressing climate change impacts and sustainable development (UN, 2019). The management of direct trade-offs would be crucial to ensure a just transition and that "no one is left behind". To date, there are a limited number of studies that assessed quantitatively or qualitatively the potential synergies and trade-offs between SDGs and subnational and non-state climate action.

Climate education and awareness-raising, highlighted in SDG Target 13.3, are considered foundational elements of long-term climate resilience. Education for sustainable development (ESD) enhances community understanding, fosters adaptive behavior, and builds institutional capacity for mitigation and adaptation. The Environment Code's inclusion of community-based awareness and climate education supports this perspective, reinforcing the importance of environmental literacy at the local level.

However, the lack of alignment with SDG Target 13, concerning the mobilization of international climate finance, reflects a common gap in sub-national policy frameworks. It must also be noted that climate finance structural approaches, such as that of the Green Climate Fund, aim to support states with little or no resources for the enhancement of climate-change adaptation and mitigation measures; the complexity of access and institutional preparedness remains a barrier. This is consistent with the Environment Code's absence of provisions on international funding, underscoring a need for capacity-building and strategic linkages with global financial mechanisms.

The partial alignment with Target 13.b, which promotes capacity building in LDCs and SIDS, also echoes findings from global comparative studies. Roberts and Pelling (2018) highlight that while many local governments have adopted climate action plans, these often lack integration with broader international frameworks, limiting their extent of implementation in contributing to global capacity-building efforts. Nueva Vizcaya's Local Climate Action Committee (LCAC) illustrates a step in this direction, but without an explicit international scope, its impact remains localized.

Furthermore, the role of environmental codes and ordinances as tools for localizing the SDGs is supported by empirical evidence. For instance, the work of UCLG (2019) emphasizes that local governments are crucial in achieving 65% of the SDG targets through policy, planning, and budgeting processes. Nueva Vizcaya's Environment Code serves as a relevant example of how localized legal instruments can support SDG implementation when adequately aligned.

Section 2. Level of Knowledge of Stakeholders on the Environmental Code of NV vis-à-vis SDG 13

A. Mitigation and Management

This table reveals the stakeholders' level of knowledge on the Environmental Code's mitigation and management provisions. It comprehensively shows their knowledge of the provisions of the provincial environment code designed to prevent and limit damages and manage climate-related impacts. The findings serve as a basis for the evaluation of knowledge gaps and as guidance for future efforts in climate education and engagement.

Table 5 Level of Knowledge of Stakeholders on the Environmental Code: Mitigation and Management

	Environmental Code Item	**Score (%)**	**Frequency (Correct)**	**Qualitative Description**
1.	Identifying Key Areas to Equip Policymakers in Formulating Sustainable Environmental Strategies	66.67	20	Poor
2.	Co-management principles	66.67	20	Poor
3.	Ecological mandates – exclusion of food policy	63.33	19	Poor
4.	Alignment with SDG 13.2	68.33	21	Poor
5.	Requirement for stakeholder consultation	71.67	22	Satisfactory
6.	Tree planting as a mitigation strategy	68.33	21	Poor
7.	Importance of environmental education	71.67	22	Satisfactory
8.	Indigenous peoples' participation in conservation	43.33	13	Poor
9.	Alignment with SDG 13.3	66.67	20	Poor
10.	Definition of adaptive capacity	71.67	22	Satisfactory
11.	Definition of climate resilience	76.67	23	Satisfactory
12.	Impact of community awareness on resilience	71.67	22	Satisfactory
13.	Paris Agreement as a basis for DRR provisions	71.67	22	Satisfactory
14.	Mandate on academe and civil society collaboration	76.67	23	Satisfactory
15.	Consistency with NCCAP	68.33	21	Poor
16.	Basis of DRRM plan	71.67	22	Satisfactory
17.	Role of Climate Change Council in local planning	73.33	22	Satisfactory
18.	Investment recommendations by climate council	66.67	20	Poor
19.	Information dissemination mandate	70.00	21	Satisfactory
20.	Role of EIA Review Committee	66.67	20	Poor
21.	Governor's role in enforcing environmental laws	71.67	22	Satisfactory
22.	Consultations limited to LGUs in energy guidelines	66.67	20	Poor
23.	R&D, Consumer Welfare, and Community Funds under power agreements	70.00	21	Satisfactory
24.	Sustainable land use as objective of land use plans	65.00	20	Poor
	Mean Score	**68.54**		**Poor**

The overall mean score of the survey was 69.64%, which was falls within the "Poor" category, indicative of lack and insufficient knowledge across key environmental provisions centered on mitigation and management. Among the 24 items, thirteen items were categorized as Poor and eleven items were under the Satisfactory category. None of the items were included within the categories of Very Satisfactory nor Excellent levels. The lowest-rated item was on environmental education obtaining 43.87%. Meanwhile, highest-rated item obtaining a Satisfactory rating was on climate change integration in local planning (73.13%).

These results reveal that while policy enactments compel institutions to adhere to policies through operationalization, there are shortfalls in terms of reaching the grassroots and further expanding these environmental policies in a manner that will translate to easier understanding to raise awareness and education within the community. Strengthening awareness and localized capacity-building is indispensable as it is one of the most highlighted targets to fulfill effective implementation of the Code's climate-related provisions.

The findings reveal profound implications on the operationalization of the Nueva Vizcaya Environment Code in terms of mitigating and managing the harms of climate change. With an overall "Poor" level of knowledge of the stakeholders, having a mean score of 69.64%, academic institutions, government employees, the church, and community residents lack sufficient knowledge of the code's provisions on climate mitigation and management. This poor knowledge hinders proper understanding of the policy, thus making them unable to perceive the importance of each provision, which results in various issues in translating the policy goal into concrete and effective community-level actions.

Studies highlight that local-level understanding and institutional policy awareness are necessary to fulfill the very objective of climate policy implementation. Aguiar et al. (2018) in a multi-country study claimed that "lack of knowledge and technical capacity at the local level is one of the most persistent barriers to effective climate action," specifically in states where local governments are frontrunners in resilience building. Fenton et al. (2019) supported this claim by noting that most climate policies fall short during the implementation stage due to poor stakeholder awareness and engagement which halters the continuous trickle-down effect of institutional efforts between national and sub-national actors."

The provisions that obtained low ratings, such as climate education (43.87%) and disaster-related planning mechanisms (ranging from 61% to 68%), implied that these indispensable factors of the Environmental Code do not effectively translate and communicate on the community level. This creates a detrimental fallback, which was furthered by various studies like Berrang-Ford et al. (2021), which emphasized that inclusive knowledge and awareness systems, as well as participatory governance, are foundational in ensuring climate adaptation and mitigation strategies. Inadequate stakeholder understanding, therefore, weakens institutional climate coordination and consequently puts the community in a hazardous position brought by exacerbated natural calamities such as typhoons, floods, and prolonged droughts.

The United Nations Development Programme UNDP (2022) further underscores that alignment of local planning instruments with climate goals, including SDG 13 (Climate Action), is not solely relevant brought by its legal implementation but also to elevate capacity building and stakeholders' education. The Nueva Vizcaya Environmental Code, while institutionally recognized, remains ineffective without the community's proper understanding of its key principle and rationale.

In a wider scope, the lack of knowledge of the stakeholders results in weak implementation because proper policy administration relies on the strength of well-informed actors. With its absence, climate mitigation efforts remain superficial. Consequently, the community remains vulnerable, especially those residing in rural and disaster-prone areas. These individuals are not positioned to benefit from planned resilience climate programs and early hazard warning systems. Supplemental to these claims is a study from Yuen et al. (2020), asserting that weak policy communication at the grassroots community results in increased risk and lost advantages for community adaptation initiatives.

Results showcase how institutional theory remains relevant, which was evident in how the provincial environment code of Nueva Vizcaya affects the behaviors of local government and community-led organizations on the fulfillment of environmental objectives. The variations in the measurement of the level of knowledge across domains may stem from institutional conflicts or limited funds and resources. Additionally, the environmental code's alignment with SDG 13 targets, while observable, falls short on effective implementation brought by constraints of localizing internationally adopted climate-related policy frameworks.

Taken together, these theories highlight a crucial need for deepening institutional coherence and democratizing environmental knowledge. Green Political Theory urges inclusive participation and ecological reflexivity, while Institutional Theory emphasizes the adaptation of formal rules, cultural-cognitive frameworks, and normative pressures. Bridging these perspectives reinforces that improving environmental policy implementation is not solely a matter of legislation but also of cultivating a socio-political ecosystem that supports sustainable, informed, and equitable environmental action.

These findings demand for an urgent and strategic response that puts knowledge dissemination, community awareness, and intersectoral educational coordination first. Bridging the knowledge gap, however, is not sufficient to be considered a mere technical necessity but must be perceived to be a moral imperative to safeguard lives, livelihood opportunities, and preservation of the ecosystem despite a more intensified climate threat.

B. Adaptation and Regulation

The table shows the level of knowledge of stakeholders on the provisions of the Environmental Code of Nueva Vizcaya on the domain of climate adaptation and regulation. It reveals how well stakeholders perceive the key policies on climate risk reduction, adjusting to volatile environmental changes, and ensuring procedural

compliance. The data offer a wider insight into areas of both strengths and weaknesses in awareness that may affect the extent of implementation of the administration of local climate frameworks.

Table 6 Level of Knowledge of Stakeholders on the Environmental Code: Adaptation and Regulation

Environmental Code Item	Percentage of Frequency (%)	Frequency (Correct)	Qualitative Description
1. Identifying key areas to equip policymakers in formulating sustainable environmental strategies	66.67	20	Poor
2. The basic principles of co-management promote open discussion and resolution of environmental issues	66.67	20	Poor
3. All are ecological mandates of Nueva Vizcaya's provincial government except the Healthy Public Food Procurement Policy	63.33	19	Poor
4. The provision aligns with SDG 13.2 on integrating climate measures into policies	68.33	21	Poor
5. The key requirement is prior stakeholder consultation and approval	71.67	22	Satisfactory
6. One climate mitigation strategy is tree planting to absorb CO_2 and restore degraded lands	68.33	21	Poor
7. Environmental education is essential for climate mitigation and adaptation	71.67	22	Satisfactory
8. Indigenous peoples' participation is vital for effective biodiversity conservation	43.33	13	Poor
9. This aligns with SDG 13.3, which focuses on strengthening capacity for climate action	66.67	20	Poor
10. The ability and skill of individuals to withstand climate disasters and impacts is called adaptive capacity	71.67	22	Satisfactory
11. The ability and skill of individuals to withstand any climate disasters and the cataclysmic impact of climate change is called climate resilience	76.67	23	Satisfactory
12. Lack of community awareness and participation does not enhance climate resilience	71.67	22	Satisfactory
13. The Paris Agreement is the basis for the code's climate and disaster risk provisions	71.67	22	Satisfactory
14. The provision mandates PLGU's collaboration with academe and civil society for climate education	76.67	23	Satisfactory
15. Nueva Vizcaya's local climate action plan should be consistent with the National Climate Change Action Plan (NCCAP)	68.33	21	Poor
16. The basis of the Disaster Risk Reduction Management plan is Mitigation negligence avoidance	71.67	22	Satisfactory
17. The Provincial Climate Change Council ensures climate change is integrated into local development plans	73.33	22	Satisfactory
18. The climate council must recommend key development investments in climate-sensitive sectors to help achieve the sustainable development goals	66.67	20	Poor
19. The climate council must oversee climate change information dissemination to educate communities	70.00	21	Satisfactory
20. The Provincial EIA Review Committee is responsible for reviewing IEE/EISs submitted by the proponent	66.67	20	Poor
21. The Governor is in charge of enforcing environmental laws and EIA mitigation measures	71.67	22	Satisfactory
22. Consultations exclusive to Local Government Units are not part of Nueva Vizcaya's energy guidelines	66.67	20	Poor

23. Research and Development, Consumer Welfare, and Fund for Affected Communities are within the provincial government's control through agreements	70.00	21	Satisfactory
24. The paramount objective in preparing all land use plans is sustainable land use	65.00	19	Poor
25. Identifying key areas to equip policymakers in formulating sustainable environmental strategies	66.67	20	Poor
Mean Score	**68.47**		**Poor**

The table shows the stakeholders' knowledge on the provincial environment code on the aspect of adaptation and regulation. With a mean score of 68.47%, results show a poor overall rating which indicates that there is a limited understanding of key climate-related policies among the academe, government employees, church, and community residents as important stakeholders in policy implementation.

While some areas received satisfactory ratings which are sustainable agriculture (71.67%), integration of climate measures into planning (70.00%), and use of the Green Climate Fund (70.00%), there remains a large number of essential provisions which were considerably poor such as disaster preparedness (61.67%), health and sanitation measures (65.00%), ecological tourism (60.00%), and environmental impact assessment processes (63.33%–66.67%).

This implied that stakeholders are not properly equipped and oriented comply with the provisions on climate adaptation and regulatory measures. Thus, there exists detrimental fallback of climate resilience in Nueva Vizcaya brought by lack to no coordination, lack of information on the existing environment code, and idle funds specifically allocated for environmental projects and programs.

The findings highlighted the need for a more robust climate governance enjoining a more multi-level and multi-actor approach through targeted education and awareness-raising, and collaborative policy integration.

To ensure holistic policy implementation, improving stakeholder climate-awareness is crucial for advancing climate adaptation especially in terms of protecting disaster-prone community areas, and ensuring the full and effective implementation of the Environmental Code's provisions.

The total mean score of 68.47%, which is categorized as "Poor", in the stakeholders' knowledge assessment showcased a significant implementation gap in the adaptation and regulatory provisions of the Nueva Vizcaya Provincial Environmental Code. Despite the current climate-resilient policies, the limitation on understanding and gaining proper education of the stakeholders remain lacking. This lack of environmental policy awareness may result to poor local collaboration, misaligned community planning, and underutilization of climate tools and funds, such as the Green Climate Fund.

Clearly, the success of climate adaptation efforts hinges not solely on the enactment of environmental related policies, but on communities' awareness and engagement of the policy's effective execution. The current knowledge gaps, particularly at the local context, often result in fragmented if not uncoordinated policy execution, especially in disaster-prone settings.

In the case of the province of Nueva Vizcaya, the poor scores in disaster preparedness (61.67%), environmental impact assessments (63.33%), and health-sanitation linkages (65.00%) posit that even basic adaptation practices are lacking in terms of implementation even by those expected to adhere and conform. Totin et al. (2020), emphasized how minimal insight among contexts on local institutions hinders their capacity to integrate climate adaptation into planning frameworks. It further highlighted the importance of knowledge intersectionality among the dimensions of science and global and domestic policy for the improvement of environmental adaptive capacity.

Moreover, the poor knowledge on regulatory processes reveals the fissure on institutional preparedness. Singh et al. (2021) reinforce the claim that local adaptation is often hindered by lapses on proper policy understanding among grassroots actors. Their study found that in instances where local governments and stakeholders had

better information access to climate change and training on adaptation measures, there is a higher likelihood of achieving alignment on both national climate policies and SDG 13 international frameworks.

The results further suggests that there exist lost opportunities for sustainable development and climate resilience. This includes ecological tourism which showed a poor rating which is indicative that stakeholders fall short on leveraging the utilization of green economic initiative that align with green conservation objectives. Broekhoff et al. (2018) caution that local areas without sufficient knowledge and technical capacity within their areas are more likely to dodge climate co-benefits such as low-emission economic growth brought by poor local policy implementation.

In conclusion, the "Poor" knowledge levels among stakeholders expose the challenge in implementing the Nueva Vizcaya Environmental Code. The Code, while comprehensive on its theoretical approach, remains unrealized in practice which pushes the need of fostering collective learning equipped with responsive actionable measure. To ensure climate resilience requires not just mere conformity but adaptive governance anchored in consistent stakeholder engagement, and sustained capacity-building, and mutual accountability. By translating this knowledge into institutional practice, Nueva Vizcaya can experience a more dynamic action with locally grounded climate governance and administration.

Section 3. Extent of implementation of Implementation of the Environmental Code of NV

A. Mitigation and Management

This section presents the stakeholders' assessment of the extent of implementation of the Environmental Code in the province of Nueva Vizcaya, specifically on the domain of mitigation and management strategies. The results provide insights into the advantages and disadvantages, as well as implementation gaps, and areas to be enhanced in terms of local climate action and policy efficacy.

This section presented the stakeholders' assessment of the extent of implementation of the Environmental Code's implementation in the province of Nueva Vizcaya, specifically on the domain of mitigation and management strategies. The results provide insights on the advantages and disadvantages, as well as implementation gaps, and areas to be enhanced in terms of local climate action and policy efficacy

Table 7 Assessment of Stakeholders on the Extent of implementation of Implementation of the Environmental Code: Mitigation and Management

Indicators	Mean	SD	Qualitative Description
1. The creation of MENRO helps protect, conserve, and manage the environment.	1.70	.94	Great
2. National Environment Awareness Month highlighted the importance of natural resources for economic growth.	2.28	1.26	Great
3. The provincial solid waste management board ensures safe and sanitary solid waste management.	1.93	1.00	Great
4. Resorts development promotes eco-friendly resorts to raise ecological awareness and advocacy.	1.75	.83	Great
5. The provincial government promotes policies for public morals, social justice, and residents' comfort and convenience.	2.08	1.09	Great
6. The local government, working with the DENR, conducts research on protecting biodiversity and addressing forestland issues.	1.91	.84	Great
7. Promotion of a community-based multimedia program on resource conservation and management.	2.33	2.62	Great
8. Implement a forest resource management system for better planning and policymaking.	2.05	1.06	Great
9. Establish participatory monitoring of forest resources to ensure policy compliance.	2.06	.93	Great

10. Manage natural resources, wildlife, and landscapes for research, education, and eco-tourism to support biodiversity conservation.	2.16	1.12	Great
11. The conduct of massive and sustained information or education and advocacy campaign.	1.91	.94	Great
12. Mineral resource use and extraction will follow environmental laws.	1.85	1.02	Great
13. All permit holders for sand, gravel, quarry, and small-scale mining must plant 100 indigenous forest tree seedlings in their contracted areas.	2.10	1.13	Great
14. Carry out a detailed study of water resources through hydrological mapping.	1.76	1.09	Great
15. Using, developing, and managing municipal waters must not harm biodiversity or cultural heritage.	1.61	.90	Great
Mean Rating	1.96	.34	Great

The table reflects stakeholders' assessment of the extent of implementation of the Environmental Code of Nueva Vizcaya, specifically on the domains of climate change mitigation and management, surfacing the overall mean rating of 1.96, with the qualitative description as "Great." However, despite this description, there are still underlying challenges that the province needs to improve in its implementation. Using the institutional theory framework, the formal existence of policies or codes is insufficient without strong institutions capable of actualizing those mandates through coherent structures, adequate resources, and well-defined roles. The relatively high scores on community-based multimedia programs (2.33), National Environment Awareness Month (2.28), and eco-tourism resource management (2.16) suggest symbolic compliance—activities that are visible and promotive but may lack depth in regulatory enforcement or structural transformation. These outcomes align with the concept of "decoupling" in institutional theory, where organizations adopt formal structures (like codes) without fully internalizing or implementing their content due to pressure for legitimacy rather than effectiveness.

Conversely, the lowest-rated indicators, which are the municipal water management (1.61), MENRO's capacity (1.70), and eco-friendly resort development (1.75), emphasized the significant institutional and governance weaknesses. Green political theory provides a critical lens here, arguing that ecological sustainability must challenge and reshape existing power structures and institutional inertia. From this perspective, the failure to operationalize these components points to a lack of genuine ecological prioritization and community empowerment. Green political theory emphasizes decentralization, participatory governance, and ecological justice—elements seemingly underdeveloped in the Nueva Vizcaya context.

These findings echo Armitage et al. (2019), who argue that effective environmental governance requires adaptive institutions capable of mobilizing community engagement and responding dynamically to environmental risks. Similarly, Ford et al. (2020) and Lemos et al. (2020) stress the necessity of technical, financial, and participatory foundations in ensuring climate policy implementation. The weak performance on critical domains like biodiversity conservation and local institutional leadership, such as MENRO, suggests that the code's implementation is hindered by capacity gaps, limited inter-agency coordination, and insufficient grassroots participation.

Applying both framework on institutional and green political theory, it can be gleaned that the province's environmental policy must transition from mere tokenistic approach to effective enforcement of ecological governance. Strengthening environmental agencies, ensuring agency fundings, and empowering local communities are critical measures for transforming the Environmental Code as an instrument of sustainable climate action. The lack of institutional initiatives can lead to the perpetuation of ecological risks of both local and global climate objectives under SDG 13.

According to Armitage et al. (2019), effective local climate governance highly depends on sustainable and strong institutional capacity and adaptive governance frameworks that allow proactive community collaboration and involvement of multi-level stakeholders. The study highlighted that weak institutional structures often lead to lapses on policy implementation at the local level.

Similarly, Ford et al. (2020) emphasized the urgency of need for local government's technical and financial resources to ensure complete and unhindered policy implementation, which is perceive to be one of the major barriers in various regions. They argue that while awareness-raising is a necessary tool, it must be equipped with the means to execute the policy objectives.

Lemos et al. (2020) further highlight the need of the scientific community for climate-resilience building. It was seen that local institutions grounded on stronger governance, community relations, and financing are more likely to be successful in implementing climate and environmental policies.

In the context of Nueva Vizcaya, these insights recommend that strengthening MENRO and related bodies involved on environmental policy implementation gain more capacity enhancement, collaborative inter-agency coordination, and sustainable funding mechanism. Community involvement should also be broadened to ensure shared accountability for environmental policies meet local needs.

These governance gaps, if remain unaddressed, will result to natural resources prone to more climate vulnerability which in the long run shall undermine global and local climate actions.

B. Adaptation and Regulation

This section examined stakeholders' assessment of the extent of implementation of the provisions in the Environmental Code, specifically in the domain of adaptation and regulation. It highlighted how stakeholders perceive the responsiveness and enforcement of the environmental policy in addressing climate-related risks. The table reveals the strengths and challenges in the carrying out of local environment policy, contributing to a wider and better understanding of how adaptation and regulatory measures support climate resilience.

Table 8 Assessment of Stakeholders on the Extent of implementation of Implementation of the Environmental Code: Adaptation & Regulation

Indicators	Mean	SD	Qualitative Description
1. Private and government entities must get PLGU consent for environment-affecting projects.	1.70	.97	Great
2. The Monitoring Team identifies causes of environmental damage and addresses public complaints about the project.	1.76	.88	Great
3. Incentives and awards recognize innovative natural resource conservation projects by various government entities.	2.00	1.07	Great
4. The provincial government of Nueva Vizcaya apprehends forest law violators and helps file criminal complaints with the prosecutor.	1.78	.90	Great
5. Regulation of the use and collection of plants and animals outside protected areas.	1.60	.84	Great
6. Control the entry of settlers into critical watersheds, protected zones, and geohazard areas.	2.08	1.02	Great
7. Institutionalization of partnership among various stakeholders to ensure maintenance of ecological balance.	1.91	.96	Great
8. Indigenous Peoples will be involved in the design and development of projects and programs.	2.28	1.07	Great
9. Create measures to share responsibility with the national government for protecting all endemic and endangered species in the province.	1.98	.99	Great
10. Introduction of sustainable alternative livelihood projects to existing watershed occupants.	2.25	1.14	Great

11. Social acceptability will be the top priority before starting any activity or operation.	2.33	1.09	Great
12. Anyone extracting or mining sand and gravel must pay taxes according to the provincial revenue code.	2.06	1.00	Great
13. Permit holders must submit a rehabilitation plan to restore excavated areas for future use.	1.84	1.07	Great
14. Implement measures for safe and adequate water supply.	1.76	1.04	Great
15. The provincial government shall adopt necessary measures to ensure all drainage system are adequately established and maintained.	1.71	.99	Great
Mean Rating	1.93	.41	Great

The overall mean rating of 1.93 showcases that stakeholders perceive the implementation of the Nueva Vizcaya Environmental Code on adaptation and regulation as generally great. The items with lowest ratings include the regulation of plant and animal collection outside protected areas (1.60), the requirement for provincial consent on environmentally impactful projects (1.70), maintenance of drainage systems (1.71), the monitoring team's responsiveness to environmental damage and public complaints (1.76), and the provision of safe and adequate water supply (1.76). These suggest the significant gaps even in basic regulatory implementation and infrastructure fundings.

In contrast, the relatively highest-rated indicators, though still categorized as "Great", include the prioritization of social acceptability from local community before project implementation (2.33), Indigenous Peoples' participation in project design and development (2.28), introduction of sustainable alternative livelihood projects (2.25), incentives for conservation initiatives (2.00), and shared responsibility with the national government in protecting endangered species (1.98). These results suggest a better perception of a more all-encompassing and community-based approach, though lapses are still evident on the implementation. Overall, these items show low average score suggesting a need to bolster both policy implementation and more active stakeholder engagement for effective adaptation efforts.

The low mean rating of 1.93, categorized as “Great,” shows that stakeholders consider the implementation of the Nueva Vizcaya Environmental Code on climate adaptation and regulation with significant lapses in operational impact. The lowest-rated indicators put the burden on the faults present even on fundamental governance and enforcement. This supports the study of Chu et al. (2019), who highlighted that local climate adaptation efforts in developing countries often struggle with institutional disunity and vague jurisdictional responsibilities, resulting to weak environmental impacts.

Moreover, the consistently lapses of ratings on monitoring and enforcement mechanisms supports the claim of Fedele et al. (2019) known as "implementation gap," wherein meticulously-enacted policies fall short on expressing meaningful results due to operational insufficiency, lack of data, or inadequate grassroot engagement. In the context of Nueva Vizcaya, the inability to quickly respond to public demands and prevent environmental consequences suggests a lack of shared accountability and poorly coordinated enforcement bodies.

Meanwhile, indicators with higher scores signal a recognition of an inclusive approach of local governance, however, it must be noted that the ratings still fall on the category of “Great”. This affirms Khan et al. (2020), who argue that even if stakeholder participation is indispensable for climate-resilient governance, policy coherence must also be institutionalized for a more reliable and measurable impacts.

In a bigger picture, the implications shows that the Environmental Code’s adaptation and regulatory provisions are ineffective, if not properly carried out brought by poor implementation processes, minimal stakeholder coordination, and limited financing for adaptation initiatives. As González-Muzzio and Altamirano (2021) emphasize, local government climate governance and administration necessitate sustained multi-level agency collaboration, continued funding for capacity and competency enhancement, and adaptive governance models responsive to local contexts. To localize SDG 13 meaningfully, Nueva Vizcaya must bridge the gap between policy and its execution through institutional reforms and stakeholder involvement.

Section 4. Comparison of the Level of Knowledge on the Environmental Code

A. Comparison across Domains

Table 9 Comparison of the Level of Knowledge across Domains

Domains	Mean	SD	Qualitative Description	Mean Rank	Sum of Ranks	Friedman χ^2	Sig. (2-tailed)	Decision
1. Mitigation and Management	68.54	31.85	Poor	1.47	33.00	.276	.599	Accept Ho
2. Adaptation and Regulation	68.46	32.54	Poor	1.53	220.00			

The table presented a comparative analysis of the level of knowledge of stakeholders across the domains of climate mitigation and management and adaptation and regulation. Both domains had mean scores below 70% classifying them under the "Poor" category. Friedman test was utilized on determining whether or not there is a significant difference between the two domains, which revealed a a significance level of 0.599, that is beyond the 0.05 threshold. This value was indicative that there is no significant difference in stakeholders' level of knowledge between the two domains.

This implied that stakeholders, generally portray low levels of understanding the provisions on both mitigation and adaptation under the provincial environment code. Cui and Li (2021) argue that local stakeholders have shortfalls on deeply understanding on either technical or abstract aspects of climate policies. Averchenkova et al. (2021) highlighted that the lack in policy comprehension and institutional capacity, further affects the proper contextualization and localization of environmental framework and policies which had been a problem on effectively ensuring local climate action.

In the Philippine context, Lasco et al. (2022) highlighted that both local government units (LGUs) and the community had struggles in interpreting climate frameworks, adding up to poor policy execution. In the same tone, Villarin et al. (2023) posited that stakeholders' lack of exposure to capacity-building programs inflicted more hindrance on their ability to engage in climate adaptation and mitigation planning.

The result reinforced the need for a more strengthened climate education and awareness, stakeholder participation, and the institutionalization of climate initiatives that bridge the gap between policy rhetorics and pragmatics. As recommended by the UNDP (2024), the integration of clear policy contextualization on environment policy and frameworks are tools for the empowerment of stakeholders for stakeholders' full participation in climate governance for the fulfillment of the realization of SDG 13 targets at the local setting.

B. Comparison when grouped by Stakeholders

This section provides a comparison on the level of knowledge on the Environmental Code among the academe, government employees, church, and community residents. It explores how these stakeholders vary in their level of knowledge about key environmental areas. The findings strike to establish current strengths and gaps on the provincial policy for education and engagement enhancement.

Table 10 Comparison of the Level of Knowledge when grouped by Stakeholders

Knowledge Domains	**Stakeholders**	**Mean**	**SD**	**Qualitative Description**	**Friedman Test**	**df**	**Sig.**	**Decision**
1. Mitigation and Management	Academe	3.13	0.63	Very Satisfactory				
	Government Employees	1.00	0.00	Poor				
	Church	3.20	0.56	Very Satisfactory				
	Community Residents	3.40	0.63	Very Satisfactory	**38.267**	3	**.000***	**Reject Ho**
	Total	**2.70**	1.12	Very Satisfactory				

2. Adaptation and Regulation	Academe	3.66	0.48	Excellent				
	Government Employees	1.00	0.00	Poor				
	Church	3.60	0.83	Excellent				
	Community Residents	3.66	0.61	Excellent	**38.114**	3	**.000***	**Reject Ho**
	Total	**2.98**	1.28	Very Satisfactory				

The table presented the comparison of stakeholders' level of knowledge on the domains of the Environment Code of Nueva Vizcaya using the Friedman Test. It can be gleaned from the results that there existed a significant difference in knowledge levels among the stakeholders on both domains which reject the null hypothesis.

Among the groups, government employees had the lowest mean score (1.00) in both domains. In contrast, remaining groups of stakeholders which are the academe, church, and community residents had higher mean scores ranging from the qualitative ratings of "Very Satisfactory" to "Excellent." Community residents and the academe obtained the highest mean scores in the domain of climate Adaptation and Regulation, both at 3.66.

Overall, the table revealed a significant gap in environmental knowledge with non-government stakeholders appearing more informed about the Environmental Code's provisions. The knowledge gap on the environmental policy was critical on the aspect of the implementations' consistency and effectiveness of climate policy implementation across sectors.

Table 11 Post hoc Analysis in the Level of Knowledge when grouped by Stakeholders

Dependent Variables	(I) Stakeholders	(J) Stakeholders	Mean Difference (I-J)	Std. Error	Sig.	Decision
1. Mitigation and management	Academe	Government Employees	2.13333*	.19437	.000*	Reject Ho
		Church	-.06667	.19437	1.000	Accept Ho
		Community Residents	-.33333	.19437	.551	Accept Ho
	Government Employees	Church	-2.20000*	.19437	.000*	Reject Ho
		Community Residents	-2.46667*	.19437	.000*	Reject Ho
	Church	Community Residents	-.26667	.19437	1.000	Accept Ho
2. Adaptation And Regulation	Academe	Government Employees	2.66667*	.20855	.000*	Reject Ho
		Church	.06667	.20855	1.000	Accept Ho
		Community Residents	.00000	.20855	1.000	Accept Ho
	Government Employees	Church	-2.60000*	.20855	.000*	Reject Ho
		Community Residents	-2.66667*	.20855	.000*	Reject Ho
	Church	Community Residents	-.06667	.20855	1.000	Accept Ho

The post hoc analysis for the level of knowledge illustrates that significant differences were primarily observed between Government Employees and the other stakeholder groups across both domains. In the domain of Mitigation and Management, Government Employees significantly differed from the Academe, Church, and Community Residents. Similarly, in the domain of Adaptation and Regulation, Government Employees also showed significant differences when compared with the same groups. No significant differences were observed among the Academe, Church, and Community Residents.

The post hoc analysis of stakeholder knowledge on climate change mitigation, adaptation, and regulation explains the critical gaps creating substantial implications on the implementation of provincial environment code and its alignment with Sustainable Development Goal (SDG) 13. These findings reveal critical systemic issues in the engagement, knowledge distribution, and policy execution of stakeholders which are essential factors on the fulfillment of localized climate action frameworks.

The most striking observation from the analysis is the significant disparity on the knowledge between the academe and government employees in both domains. Academic stakeholders have substantially higher levels of understanding in mitigation and management (Mean Diff = 2.13, $p < 0.001$) and adaptation and regulation

(Mean Diff = 2.67, $p < 0.001$). This suggests that higher education institutions have successfully discussed and presented climate-related concepts in various academic approaches such as in research, discussions, and extracurricular activities, thus, creating a well-informed academic community. According to Leal Filho et al. (2022), academic institutions are not only centers for scientific innovation but also powerful agents of climate awareness, which prepare future professionals who are well-equipped in addressing and combatting the impacts of climate-related issues. Their critical approach on evidence-based analysis and engagement enables them to understand with higher level of understanding policy documents, like the Environment Code, with a greater degree of technical and contextual accuracy.

In contrast, government employees who are in-charged of implementing, monitoring, and enforcing climate-related policies, showed significantly lower levels of knowledge across all groups. The differences were particularly prominent when compared across academe and community residents. This finding raises a problem on the efficacy of environmental governance in the local setting. The inability of key implementing agencies to comprehend the climate provisions included in the Environment Code can result to misinterpretation and lack to no implementation of the policy. Bhave et al. (2021) argue that one of the primary bottlenecks in the process of climate adaptation, especially in a governance system exercising decentralization is the lack of technical expertise among local government officials. Without extensive capacity-building, proper resource allocation, and collaborative initiatives, government agencies put themselves in a detrimental position of adopting a reactive, and compliance-driven approach instead of taking a more strategic and preemptive role in climate governance. This significant knowledge gap reflects a deeper issue of institutional preparedness and strategic direction.

The results further indicate that there is no significant difference between the church and community residents from the academic group, specifically in the adaptation and regulation domain. While paradoxical, it further emphasizes the role of non-formal education and community-based engagement, as well as culturally embedded knowledge systems. Faith-based organizations and community groups are often deeply engaged in the social fabric of local areas and can be powerful agents of climate information and mobilization in the grassroots. Aguiar et al. (2018) emphasized that adaptive capacity is not exclusively reliant on knowing technicality but on social capital, trust, and local recognition. In such many instances, the church functions as a moral compass with the moral imperative of addressing climate-related issues, especially in hazard-prone areas, thus raising community awareness information, and participation in environmental advocacy.

These results call for urgent institutional capital particularly on capacity-building programs focused at government implementers. These programs should address beyond general orientation and include a more technical and consistent trainings on climate science and communication, policy interpretation and implementation, and performance monitoring consistent with both the Environment Code and the SDG 13 targets. Additionally, the academe's potential as an effective policy partner must be fully leveraged through collaborative mechanisms such as policy development workshops, research-driven consultations especially on the policies to be enacted, and joint monitoring systems which can ultimately bridge the current gap between academic theory and policy practice. Through the institutionalization of this partnership, the local government can ensure that policy decisions are both empirically reliable and contextually grounded.

The inclusion of church and community groups in the process of policy and must also not be overlooked. Their culturally embedded knowledge and strong grassroots links can significantly enhance the reach of climate policies in a manner that various stakeholders in the grassroots could have better grasp and involvement. Initiatives like climate planning, early warning system, and environmental campaigns can be improved through collaboration with churches and local community groups. This is supported with the findings of Shi et al. (2016), who emphasized that an inclusive approach in climate governance creates higher rates of compliance, social behavioral change, and collective action at the local level.

These knowledge asymmetries reflect systemic issues in climate governance and further underscore the need to move beyond top-down policy models to create a more adaptive, knowledge-inclusive, and responsive systems. In the context of the Nueva Vizcaya Environment Code, the overall success of its implementation shall be highly dependent on how well these various stakeholders are well-equipped, community-engaged, and socially-empowered to fulfill their mandates.

In conclusion, the current climate governance landscape of Nueva Vizcaya put the academic institutions as knowledge leaders while government implementers require urgent upskilling for the fulfillment of their mandates. At the same time, the collaborative effort of both churches and communities in climate action must be realized and institutionalized. The path to a resilient society not merely reliant with policies but with an empowered and collaborative community.

Section 5. Comparison in the Extent of implementation of Implementation of the NV Environmental Code

This section provides a comparison on the extent of implementation of implementation across the core environmental domains of the provincial code. Based on stakeholder assessments, it emphasizes the domains necessitating improvements. The analysis offers valuable information to harness a more effective policy execution within local setting.

A. Comparison across Domains

Table 12 Comparison in the Extent of implementation of Implementation across Domains

Domains	Mean	SD	Qualitative Description	Friedman Test	df	Sig.	Decision
1. Mitigation and Management	1.96	0.34	Satisfactory				
2. Adaptation and Regulation	1.93	0.41	Satisfactory	**0.240**	1	**.624**	**Accept Ho**

The table presented the comparison on the extent of implementation of the Environmental Code across two climate key domains using the Friedman Test. Both domains were under the qualitative description of "Satisfactory", with Mitigation and Management slightly higher (Mean = 1.96) than Adaptation and Regulation (Mean = 1.93).

The Friedman test yielded a p-value of .624, which implied no significant difference. It can be gleaned that implementation efforts were relatively consistent across both mitigation and adaptation components on the policy.

This finding implied that stakeholders view the implementation of the climate domains in the province as consistent yet not highly effective. The lack of significant variation is reflective of uniform but limited operationalization of the provisions of the code across domains. It posited that while policy instruments were in place, execution fell short brought by institutional fragmentation, insufficient funding and technical expertise.

According to Heikkinen et al. (2022), the presence of persistent implementation gaps at the subnational level was due to constrained institutional local initiatives and weak intersectoral participation. In the same light, Olhoff and Schaer (2020) claimed that while climate-related policy frameworks may be adopted, the grounding and executions remains uneven. In the Philippines, Lasco et al. (2023) pointed out that proper and effective execution is frequently hindered by overlapping issues such as mandates, fallbacks on data, and absence if not lack of climate monitoring mechanisms.

The result underscored the need for capacity-building initiatives and inter-agency collaboration to strengthen the full implementation of the Environmental Code. Moreover, it also highlighted the importance of policy performance monitoring tools to track the execution progress of climate actions embedded within the environmental policy that is beyond planning and legislation. Without addressing these implementation issues, issues on dimensions shall continue to persist resulting to a more hindered the localized effort on resilience-building and alignment with SDG 13 (Climate Action).

B. Comparison when grouped by Stakeholders

This section evaluated how various stakeholder groups perceive the extent of implementation of the Environmental Code's implementation. The analysis showcases the differences in implementation experiences and provides specific areas where policy improvements and supports may be needed.

Table 13 Comparison in the Extent of implementation when grouped by Stakeholders

Knowledge Domains	Stakeholders	Mean	SD	Qualitative Description	*F*	df	Sig.	Decision
1. Mitigation and management	Academe	2.09	.29	Ineffective	38.499	3	.000*	Reject Ho
	Government Employees	2.23	.21	Ineffective				
	Church	1.85	.38	Ineffective				
	Community Residents	1.69	.18	Ineffective				
	Total	196	.34	Ineffective				
2. Adaptation and Regulation	Academe	2.33	.26	Ineffective	38.577	3	.000*	Reject Ho
	Government Employees	2.18	.20	Ineffective				
	Church	1.62	.26	Ineffective				
	Community Residents	1.60	.26	Ineffective				
	Total	1.93	.41	Ineffective				

Table 13 presented the comparison in the extent of implementation of knowledge domains when grouped by stakeholders. In Domain 1 (Mitigation and Management), government employees had the highest mean, while in Domain 2 (Adaptation and Regulation), the academe recorded the highest mean. All stakeholder groups, however, had mean ratings that fall within the "Ineffective" range based on the given scale. Despite the differences in group means, all groups shared the same qualitative description of implementation. The F-values and significance levels indicate that there were statistically significant differences among the stakeholder groups. Post hoc analysis in Table 14 details where the significant differences lie.

Table 14 Post hoc Analysis in the Level of Knowledge when Grouped by Stakeholders

Dependent Variable	(I) Stakeholders	(J) Stakeholders	Mean Difference (I-J)	Std. Error	Sig.	Decision
1. Mitigation and management	Academe	Government Employees	-.13267	.10255	1.000	Accept Ho
		Church	.24467	.10255	.123	Accept Ho
		Community Residents	.40400*	.10255	.001*	Reject Ho
	Government Employees	Church	.37733*	.10255	.003*	Reject Ho
		Community Residents	.53667*	.10255	.000*	Reject Ho
	Church	Community Residents	.15933	.10255	.755	Accept Ho
2. Adaptation And Regulation	Academe	Government Employees	.15333	.09218	.611	Accept Ho
		Church	.70933*	.09218	.000*	Reject Ho
		Community Residents	.73467*	.09218	.000*	Reject Ho
	Government Employees	Church	.55600*	.09218	.000*	Reject Ho
		Community Residents	.58133*	.09218	.000*	Reject Ho
	Church	Community Residents	.02533	.09218	1.000	Accept Ho

The post hoc analysis in Table 14 reveals specific differences in the level of knowledge on disaster risk reduction among stakeholder groups. For the Mitigation and Management domain, the level of knowledge of the academe was significantly higher than that of the community residents. Likewise, government employees demonstrated significantly higher knowledge compared to both the church and community residents. However, no significant differences were found between the academe and either the government employees or the church, nor between the church and the community residents.

In the Adaptation and Regulation domain, the academe exhibited significantly greater knowledge than both the church and community residents. Similarly, government employees also had significantly higher knowledge compared to the church and community residents. However, no significant differences were observed between the academe and government employees or between the church and community residents. These findings suggest that both the academe and government employees are more informed about disaster risk reduction compared to other stakeholder groups, particularly the church and community residents.

The results underscore wide knowledge disparities among stakeholders involved in implementing the domains related to curbing the impacts and harms of climate change. Community residents and church stakeholders show

significantly lower levels of knowledge compared to government employees and academic institutions. These disparities are not merely statistical but reveal the deep-seated structural issues that put at stake community integration, responsiveness, and a wider sustainable approach of local climate action.

It can also be gleaned that community residents were at the bottom on the scores across domains. This implied shortfalls on including the grassroot community in policy and decision-making processes. This result reveals asymmetrical knowledge that diminishes the community's capacity to contribute and carry out climate solutions. A 2023 systematic review by Anderson et al. in Frontiers in Climate reveals that while communities are seen as the one gaining absolute advantages of climate programs, they are rarely involved and equipped with the necessary technical and procedural knowledge to create initiatives to participate in climate decision-making. This undermines long-term resilience and might result to policy's lack of implementation mechanisms. Moreover, research emphasizes that local knowledge that is equipped with scientific data can reinforce the relevance and extent of implementation of climate action (Blicharska et al., 2024). Thus, the exclusion of community actors from these decision-making processes and dialogues not only deviates from a stronger climate governance but also dodged the opportunity to localize and democratize climate adaptation strategies.

The knowledge gap between the academe and faith-based organizations, particularly in the domain of climate regulation and adaptation, reveals another fragmented approach. While church stakeholders play a vital role in the mobilization of raising public consciousness and moral engagement, especially in isolated and conservative community, they often fall short to technical discourse policy frameworks. A 2024 review in Sustainable Earth Reviews shows that faith-based organizations are getting more involved in sustainability initiatives but often face challenges in translating these moral imperatives into relevant policy execution. This gap is largely impacted by limited access to technical knowledge and the establishment of institutional partnerships with other climate science actors. Petersen (2024) puts forward the transformative potential of church beliefs and advocacy alignment narratives with scientific frameworks of sustainability. When such partnerships are enforced, faith-based organizations can become powerful intermediaries for climate adaptation with the grassroot community, especially in isolated populations.

Government employees scored significantly higher than both community and church stakeholders. This implied that their access to formal policy training, exposure to policy instruments, and involvement in institutional implementation processes are evident. However, while a higher rating of knowledge among government employees is encouraging in terms of internal structural readiness, it also raises a discussion on the vertical policy dissemination and inclusivity. Newig et al. (2023) warn that when there happens to be an isolation of institutional knowledge from community experiential narratives, the extent of implementation of policy is affected, thus, eroding public trust and is prone to when it comes to implementation. Therefore, government actors must realize that climate knowledge is not the sole identifier of policy implementation success but be equipped side to side with policy grounding within local contexts through integrative and participatory governance approach.

The absence of significant difference between church stakeholders and community residents implied that both groups have equal levels of marginalization on climate education and awareness. A 2025 review by Ravera et al. in Ambio highlighted that climate policy participatory models are often tokenistic, which only portrays superficial community consultations that do not disseminate power or even raise awareness and community capacity. Transformative participation, on the contrary, involves not just organizing community discussions and orientations but community restructuring and dialogues so that diverse sentiments from collective experiences hold real influence. This framework directly algins with the need to empower both church and community stakeholders not by mere superficial information dissemination without proper grounding and community empowerment but delegating power and responsibility even on the ground.

To meaningfully address these disparities, climate governance must move beyond information dissemination and into deep, multi-directional knowledge exchange. Educational interventions should be differentiated and tailored to the lived realities of each stakeholder group. Academic institutions should co-design training modules with church networks and community leaders. Government agencies should establish knowledge platforms where policies are translated into accessible language and disseminated through community assemblies, church gatherings, and local media. Such integrated learning ecosystems will ensure that no stakeholder is left behind in the pursuit of Sustainable Development Goal 13.

The findings of the post hoc analysis do more than highlight statistical differences, as they also showcased systemic patterns of exclusion, concentration of knowledge, and asymmetry in power and participation. Addressing these issues requires a reimagining of climate education and governance: one that is not only scientifically sound, but socially embedded, ethically responsive, and institutionally shared.

The findings highlight the necessity for evidence-based, participatory, and adaptive climate governance at the local level. Policymakers are encouraged to institutionalize regular knowledge audits, strengthen stakeholder capacity-building initiatives, and engage and include local academic institutions in policy development and monitoring. It is further recommended that the Nueva Vizcaya Environment Code incorporate provisions on climate financing, policy feedback mechanisms, and cross-sectoral data sharing to ensure alignment with SDG 13. Government implementers are also urged to adopt performance-based evaluation systems for environmental programs to encourage and maintain accountability and measurable progress.

CONCLUSION

The comparative analysis of the Nueva Vizcaya Environment Code and UN SDG 13 shows strong alignment in areas such as climate resilience, education, and localized mitigation, but lags in the areas of financing, institutional collaboration, and stakeholder capacity. While the provincial policy is reflective of conceptual integration grounded on global frameworks, implementation is hindered by fragmented institutional coordination and uneven stakeholder knowledge.

The integration of content analysis, stakeholder surveys, and statistical validation offers a replicable approach for evaluating local climate policies relative to global standards. The conceptual framework also creates the connection between institutional dynamics and environmental governance, providing a multidimensional view of policy alignment.

For policymakers, the findings provide emphasis on the importance of institutionalizing local-global climate linkages, integrating climate financing mechanisms, and strengthening intersectoral collaboration to advance the localization of SDG 13. Future research may extend this work by including comparative data from other provinces, employing longitudinal methods, and examining the influence of political commitment and governance quality on climate policy outcomes. Expanding empirical coverage beyond Nueva Vizcaya would enhance the applicability and relevance of the findings for sustainable climate governance in the Philippines.

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