

Effectiveness of Environmental Law Dissemination and Implementation Among Sangguniang Kabataan (SK) Members in the Municipality of Bucay, Abra

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Abstract

The Sangguniang Kabataan (SK) plays a pivotal role in local governance, particularly in solid waste management and climate change mitigation. This study assessed the effectiveness of environmental law dissemination and implementation among SK members in Bucay, Abra. Utilizing a descriptive-evaluative research design with a pretest-posttest approach, the study measured the knowledge, awareness, and participation levels of selected SK members. Data were collected through a researcher-validated 30-item multiple-choice questionnaire and a survey form. Results indicated that the municipality has established a solid legal framework with eight ordinances and one resolution. Before the intervention, SK members possessed a "Very Satisfactory" level of knowledge (72.53%). Following a focused seminar, knowledge improved to an "Outstanding" level (87.27%). While awareness of solid waste management and climate change mitigation was "Extremely High," actual participation was slightly lower, rated as "Often" or "Very Active." Statistical analysis via paired t-test confirmed a significant difference between pretest and posttest scores ($p < .05$) with a robust effect size (Hedges' g), proving the seminar's effectiveness. The study concludes that while awareness is strong, there is a need to bridge the gap between knowledge and active enforcement. Recommendations include the institutionalization of regular environmental education and the adoption of the developed policy briefs to enhance youth-led environmental stewardship.

Keywords: *Sangguniang Kabataan, solid waste management, climate change mitigation, environmental law awareness, local governance*

Introduction

In the Philippines, the Sangguniang Kabataan (SK) is essential to both solid waste management and climate change mitigation. Solid waste generation is a significant issue in the country, with Metro Manila alone producing 8,600 tons daily, straining infrastructure and causing environmental degradation. The SK is mandated to work with local government units (LGUs) to develop strategies such as the 3R methodology (Reduce, Reuse, Recycle) to mitigate these issues and reduce greenhouse gas emissions.

The effectiveness of SK members is largely dependent on their understanding and implementation of environmental laws. National mandates such as Republic Act No. 9003 (Ecological Solid Waste Management Act) and Republic Act No. 9729 (Climate Change Act) provide the legal backbone for local actions. However, challenges such as insufficient resources, lack of formal training, and limited authority often hinder the transition from awareness to effective enforcement.

Despite the role of the SK in Bucay, Abra, limited empirical data exists regarding their specific knowledge levels and the actual extent of ordinance implementation. Existing literature often focuses on general compliance rather than the impact of targeted educational interventions. This study aimed to bridge this gap by evaluating the effectiveness of a dissemination seminar and assessing the current state of environmental governance among the youth leaders of Bucay.

The study sought to identify existing local ordinances, determine the level of knowledge before and after a seminar, and assess the extent of implementation and participation regarding solid waste management and climate change mitigation.

Methodology

Research Design

The study utilized a descriptive-evaluative research design employing a pretest-posttest approach. The descriptive aspect categorized existing ordinances and current levels of awareness, while the evaluative aspect measured the impact of a seminar intervention on the respondents' knowledge.

Participants

The respondents were selected Sangguniang Kabataan (SK) members from the 21 barangays of the Municipality of Bucay, Abra. The population was chosen based on their role as frontline youth leaders in local governance.

Instruments

Data were gathered using a 30-item researcher-made multiple-choice questionnaire for the pre-test and post-test. Additionally, a Likert-scale survey questionnaire was used to measure awareness, implementation, and participation. The instruments underwent content validation by

three experts and reached excellent reliability scores (Cronbach's Alpha 0.917–0.970; KR-20 0.905).

Research Procedure

The researcher first identified existing municipal ordinances. A pre-test was administered to the SK members, followed by a seminar on solid waste management and climate change mitigation. After the seminar, the post-test and the survey questionnaire were administered.

Statistical Tool

Data were analyzed using frequency, percentage, and weighted mean for descriptive sections. A paired t-test was used to determine the significance of the difference between pre-test and post-test scores, and Hedges' g was calculated to measure the effect size of the intervention.

Results

Problem 1. What are the existing ordinances on solid waste management in the municipality of Bucay, Abra?

This table discusses the existing ordinances on Solid Waste Management in the Municipality of Bucay, Abra.

Table 1. Municipal Ordinances on Solid Waste Management (SWM) and Resolution on Climate Change Mitigation (CCM) in Bucay, Abra

Category	Ordinance/Resolution Number	Series	Title/Description
Solid Waste Management (SWM)	Municipal Ordinance No. 04	2015	An Ordinance to Impose Waste Segregation at Source and Strictly Implement the "No Segregation, No Collection" Policy in Bucay, Abra and Prescribing Penalties Thereof.
	Municipal Ordinance No. 05	2015	An Ordinance Prohibiting the Spilling, Dumping, and Disposal of Waste Materials Along All Bodies of Water in Bucay, Abra and Prescribing Penalties Thereof.
	Municipal Ordinance No. 06	2015	An Ordinance related to solid waste management measures in Bucay, Abra.
	Municipal Ordinance No. 07	2015	An Ordinance Prohibiting Open Dumping of Waste Materials in the Municipality of Bucay, Abra and Prescribing Penalties Thereof.

	Municipal Ordinance No. 08	2015	An Ordinance Imposing the Construction of a Materials Recovery Facility (MRF) in Every Barangay in Bucay, Abra.
	Municipal Ordinance No. 09	2015	An Ordinance Mandating the Construction of Compost Pits in Every Household, Industrial, and Commercial Establishment in Bucay, Abra and Prescribing Penalties Thereof.
	Municipal Ordinance No. 10	2015	An Ordinance Prohibiting Littering, Throwing, and Dumping of Waste in Public Places (e.g., roads, sidewalks, canals, plazas, markets, and establishments) and Prescribing Penalties Thereof.
	Municipal Ordinance No. 11	2015	An Ordinance Converting the Sanitary Landfill Located at Brgy. Pakiling into an Eco-Park and Providing Guidelines for its Implementation.
Climate Change Mitigation (CCM)	Sangguniang Bayan Resolution No. 07	2024	A Resolution Adopting and Expressing Support for the Local Climate Change Action Plan (LCCAP) CY 2024–2029 of Bucay, Abra.

The table shows that the municipality has passed eight (8) ordinances about solid waste management. All of these were passed in 2015 and deal with important issues like separating waste at the source, banning improper waste disposal, setting up Materials Recovery Facilities (MRFs), composting methods, enforcing anti-littering laws, and building sustainable waste facilities.

Republic Act No. 9003 sets out rules for how to manage solid waste in a way that is good for the environment. These local laws are based on those rules. They include separating, recycling, and setting up MRFs at the barangay level.

The incorporation of Sangguniang Bayan Resolution No. 07, series of 2024, underscores the municipality's proactive strategy to enhance climate change mitigation by endorsing the Local Climate Change Action Plan (LCCAP) for the period 2024 to 2029. This initiative aligns with national legislation such as Republic Act No. 9729, which legitimizes climate change programs, and Republic Act No. 10121, which integrates climate change adaptation techniques with disaster risk reduction measures.

Problem 2. What is the level of knowledge of the Sangguniang Kabataan (SK) members on the existing ordinances on solid waste management and climate change mitigation in the municipality of Bucay, Abra before the conduct of seminar?

This section shows the level of awareness of the Sangguniang Kabataan (SK) members on existing ordinances on solid waste management and climate change mitigation before the seminar.

Table 2 indicates that the current Ordinances on Solid Waste Management (83.00%) and Awareness on Climate Change Mitigation (83.33%) received the highest ratings, both classified as "Outstanding," reflecting a robust comprehension in both domains (Abu et al., 2023) (Lualhati et al., 2024).

Table 2. The level of knowledge of the SK on the existing ordinances on solid waste management and climate change mitigation before the seminar

	Pretest	
	Mean	DR
Existing Ordinances on Solid Waste Management	83.00	O
Existing Ordinances on Climate Change Mitigation	74.67	VS
Awareness on Solid Waste Management	69.00	VS
Awareness on Climate Change Mitigation	83.33	O
Participation on Solid Waste Management	61.00	VS
Participation on Climate Change Mitigation	76.00	VS
Implementation on Solid Waste Management	71.50	VS
Implementation of Climate Change Mitigation	67.20	VS
Overall	72.53	VS

Percentage Range	Descriptive Rating
81% – 100%	Outstanding
61% – 80%	Very Satisfactory
41% – 60%	Satisfactory
21% – 40%	Needs Improvement
0% – 20%	Poor

The findings indicate that participants possessed a commendable understanding of solid waste management and climate change mitigation, achieving mean scores of 72.53%, categorized as "Very Satisfactory." Additional factors, including awareness, participation, and implementation, were also rated as "Very Satisfactory," suggesting that while respondents have a

robust foundation, there remains potential for enhancement (Myaskur & Husna, 2025; Citraningsih & Elda, 2025). Research indicating that educational interventions significantly enhance comprehension and practices concerning waste management (Sari et al., 2016) (Citraningsih & Elda, 2025) underscores the necessity for seminars designed to augment knowledge and promote adherence to environmental regulations.

Problem 3. What is the extent of implementation of solid waste management among Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra?

The extent of implementation of Solid Waste Management among the Sangguniang Kabataan (SK) members in the Municipality of Bucay, Abra is discussed in this section.

Table 3. Extent Of Implementation of Ordinances on Solid Waste Management of the Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra

A. Waste Segregation Policy (Municipal Ordinance No. 4, Series of 2015)	Mean	DR
1. Waste segregation at source is strictly practiced by households and establishments.	4.40	HI
2. The “No Segregation, No Collection” policy is strictly enforced during waste collection.	4.28	HI
3. Proper waste categories (biodegradable, recyclable, residual, and special waste) are consistently observed.	4.28	HI
4. Composting of biodegradable waste is practiced and supported in the community.	4.18	I
B. Anti-Dumping in Rivers, Springs, and Streams (Municipal Ordinance No. 5, Series of 2015)		
5. Dumping or disposal of waste along rivers, streams, and other bodies of water is strictly prohibited and monitored.	4.42	HI
6. The construction of dump sites within one (1) kilometer of bodies of water is prevented and regulated.	4.40	HI
C. Anti-Open Burning (Municipal Ordinance No. 5, Series of 2015)		
7. Open burning of waste materials is strictly prohibited in residential and commercial areas.	4.24	HI
8. Public awareness campaigns are conducted regarding the prohibition of open burning.	4.14	I
D. Open Dumping and Waste Disposal (Municipal Ordinance No. 7, Series of 2015)		
9. Open dumping of waste is strictly prohibited and monitored in the barangay.	4.12	I
10. Violators of anti-dumping regulations are consistently penalized.	3.96	I
E. Materials Recovery Facility (MRF) (Municipal Ordinance No. 8, Series of 2015)		
11. A functional Materials Recovery Facility (MRF) exists in the	4.24	HI

barangay.

12. Waste segregation is practiced before disposal at the MRF.	4.10	I
F. Composting and Biodegradable Waste Management (Municipal Ordinance No. 9, Series of 2015)		
13. Households practice composting of biodegradable waste.	4.18	I
14. Compost pits or alternative composting methods are actively used.	4.14	I
G. Anti-Littering and Public Cleanliness (Municipal Ordinance No. 10, Series of 2015)		
15. Littering in public places is strictly regulated.	4.16	I
16. Clean-up drives are regularly conducted in the barangay.	4.24	HI
H. Eco-Park Management (Municipal Ordinance No. 11, Series of 2015)		
17. The Eco-Park is actively utilized for waste processing and recycling.	4.22	HI
18. Recyclable materials are properly processed and managed in the Eco-Park.	4.22	HI
I. Environmental Governance (Municipal Ordinance No. 2, Series of 2019)		
19. Environmental policies are consistently integrated into local programs.	4.28	HI
20. Local officials actively promote compliance with environmental ordinances.	4.14	I
Overall	4.22	HI

Scale	Verbal Interpretation
4.21-5.00	Highly Implemented (HI)
3.41-4.20	Implemented (I)
2.61-3.40	Moderately Implemented (MI)
1.81-2.60	Partially Implemented (PI)
1.00-1.80	Not Implemented (NI)

The findings indicate that the solid waste management ordinances of the Municipality of Bucay, Abra, are predominantly successfully executed, as evidenced by an overall mean of 4.22, which indicates that the ordinances are Highly Implemented.

Most of the indicators for the Municipality of Bucay, Abra have a rating of “Highly Implemented,” specifically those that pertain to the implementation of ordinances concerning the segregation of trash and the dumping of waste into aquatic bodies (WM = 4.42). These ordinances indicate that the solid waste management ordinances concerning the segregation of trash, the dumping of waste into aquatic bodies, and the establishment of Materials Recovery Facilities (MRFs) are being implemented and followed in the Municipality.

However, some of the indicators that have an overall rating of “Implemented” include those related to public awareness campaigns, the enforcement of penalties for solid waste ordinance violations, and composting practices.

The slightly reduced ratings indicate that, despite execution, consistency and community engagement may still be enhanced.

The findings demonstrate that the municipality exhibits strong compliance with solid waste management standards, hence enhancing public health and environmental conservation. Research indicates that although adherence to legislation is vital, promoting public knowledge and engagement is imperative for achieving sustainable waste management results (Souto & Lopes, 2019).

Problem 4. What is the extent of implementation of climate change mitigation among among Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra?

This section shows the extent of implementation of climate change mitigation of the Sangguniang Kabataan (SK) members in the Municipality of Bucay, Abra.

The results indicate that the climate change mitigation ordinances of Bucay, Abra are being executed with notable success, as indicated by an average score of 4.24 and a status of “Highly Implemented.” These results are in alignment with Alibašić’s findings of the rise of local government initiatives in the face of deficiencies of the national government’s initiatives regarding the climate change issues that exist within the nation (Alibašić, 2018).

Most of the indicators for the implementation of Bucay, Abra’s climate change and environmental initiatives have been rated as “Highly Implemented.” The success of Bucay Abra’s LCCAP and environmental initiatives helps to highlight the need for the inclusion of climate change adaptation in local policies. Authors Warouw et al. have found that the inclusion of these adaptation strategies is essential to the success of the local initiatives regarding adaptation to the impacts of climate change (Warouw et al., 2023).

Table 4. Extent of implementation of climate change mitigation among among Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra

Indicators	Policy Basis	Mean	DR
1. The Local Climate Change Action Plan (LCCAP 2024–2029) is actively implemented in the municipality.	LCCAP	4.36	HI
2. Climate change mitigation programs (e.g., emission reduction, environmental protection activities) are regularly conducted.	RA 9729 / LCCAP	4.28	HI
3. Climate adaptation measures (e.g., flood control, risk preparedness programs) are integrated into local planning.	RA 9729 / RA 10121	4.32	HI

4. Disaster Risk Reduction and Management (DRRM) activities are consistently implemented and monitored.	RA 10121 SB Reso No. 07 s. 2024/	4.18	I
5. Climate-related programs are funded and supported through municipal budgeting.	LCCAP LCCAP /	4.16	I
6. SK members actively participate in climate change mitigation initiatives.	Youth Participation	4.16	I
7. Tree planting, environmental conservation, and sustainability programs are regularly conducted.	LCCAP SB Reso No. 07 s. 2024	4.26	HI
8. Climate policies are institutionalized through official resolutions and local legislative support.	LCCAP	4.20	I
9. Monitoring and evaluation mechanisms exist to assess the progress of climate action programs.	LCCAP	4.24	HI
10. Information dissemination and awareness campaigns on climate change are consistently conducted.	LCCAP / RA 9729	4.24	HI
Overall		4.24	HI

Scale	Verbal Interpretation
4.21-5.00	Highly Implemented (HI)
3.41-4.20	Implemented (I)
2.61-3.40	Moderately Implemented (MI)
1.81-2.60	Partially Implemented (PI)
1.00-1.80	Not Implemented (NI)

A few of the indicators for Bucay, Abra have been designated as “Implemented,” such as its DRRM initiatives, financial aid initiatives, and its Sangguniang Kabataan members. However, the degree of completion of these initiatives is not as complete as the other initiatives, indicating an opportunity for the local government to enhance its efforts (Righter & Chang, 2023).

Problem 5. What is the level of awareness on solid waste management of the Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra?

This section provides the level of awareness of the Sangguniang Kabataan (SK) members on solid waste management in the municipality of Bucay, Abra.

The overall mean of 4.45 corresponds to the translation of “Extremely Aware,” indicating that the respondents have a significant level of understanding of the solid waste management ordinances currently in place as of the present time.

Table 5. Level of awareness on solid waste management of the Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra

	Mean	DR
1. I am aware that the municipality implements waste segregation at source.	4.40	EA
2. I am aware of the “No Segregation, No Collection” policy in Bucay, Abra.	4.30	EA
3. I know that waste must be separated into biodegradable, recyclable, residual, and special waste.	4.56	EA
4. I am aware that households are required to practice waste segregation before disposal.	4.50	EA
5. I am aware that dumping waste materials along rivers, streams, and other bodies of water is prohibited.	4.68	EA
6. I know that waste disposal near bodies of water is restricted to protect the environment.	4.50	EA
7. I am aware that open burning of waste materials is prohibited in Bucay, Abra.	4.50	EA
8. I know that open burning of garbage contributes to environmental pollution and climate change.	4.60	EA
9. I am aware that open dumping of waste materials is prohibited in the municipality.	4.56	EA
10. I know that violators of waste management ordinances may face penalties or community service.	4.48	EA
11. I am aware that every barangay is required to establish a Materials Recovery Facility (MRF).	4.48	EA
12. I know that recyclable materials should be brought to the Materials Recovery Facility.	4.34	EA
13. I am aware that households and establishments are encouraged to practice composting of biodegradable waste.	4.46	EA
14. I know that compost pits are recommended for managing biodegradable waste.	4.40	EA
15. I am aware that littering and dumping waste in public places such as roads and parks are prohibited.	4.52	EA
16. I know that intentional breaking of bottles and disposal of glass materials in public areas is prohibited.	4.40	EA
17. I am aware that Bucay has an Eco-Park for waste management and recycling activities.	4.16	VA
18. I know that the Eco-Park is used for sorting, processing, and recovering recyclable materials.	4.30	EA
19. I am aware that barangay officials and the LGU enforce environmental and waste management ordinances.	4.28	EA
20. I am aware that solid waste management ordinances aim to protect public health and the environment.	4.62	EA
Overall	4.45	EA

Scale	Verbal Interpretation
4.21-5.00	Extremely Aware (EA)
3.41-4.20	Very Aware (VA)
2.61-3.40	Moderately Aware (MA)
1.81-2.60	Slightly Aware (SA)
1.00-1.80	Not Aware (NA)

All of the indicators measured except for the one that was classified as “Very Aware” received the translation of “Extremely Aware,” indicating that the respondents have a comprehensive understanding of the various critical solid waste management policies.

The highest mean of 4.68 indicates that the respondents are very aware of the environmental protection measures regarding the prohibition of garbage disposal in aquatic environments. However, there is a little reduced awareness regarding the Eco-Park (4.16). There are still challenges in the community as certain individuals do not consider solid waste management to be of relevance to themselves, hence the need for educational initiatives regarding this topic (Bernadas & Peralta, 2024) (Tajuddin et al., 2021). Nevertheless, the results of this study demonstrate the essential importance of awareness regarding solid waste management as it directly relates to the development of good waste management and environmental stewardship practices in the community.

Problem 6. What is the level of awareness on climate change mitigation of the Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra?

This section discusses the level of awareness of the Sangguniang Kabataan (SK) members on climate change mitigation in the municipality of Bucay, Abra.

Table 6. Level of awareness on climate change mitigation of the Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra

	Mean	DR
1. I am aware that the Municipality of Bucay has a Local Climate Change Action Plan (LCCAP).	4.34	EA
2. I am aware that the Sangguniang Bayan adopted the Municipal Climate Change Action Plan through SB Resolution No. 07, Series of 2024.	4.30	EA
3. I am aware that the LCCAP contains programs that aim to reduce the impacts of climate change in the municipality.	4.38	EA
4. I know that the municipal government implements programs to address climate change mitigation and adaptation.	4.28	EA
5. I am aware that disaster risk reduction programs are integrated into climate change action plans in Bucay, Abra.	4.22	EA
6. I know that environmental protection programs such as tree planting and environmental conservation are part of climate change mitigation efforts.	4.44	EA
7. I am aware that SK members and youth organizations are	4.38	EA

encouraged to participate in climate change mitigation programs.

8. I am aware that climate change awareness campaigns and environmental education activities are conducted in the municipality. 4.28 EA

9. I know that the local government provides support and resources for climate change mitigation initiatives. 4.30 EA

10. I am aware that local environmental policies aim to reduce climate change risks and promote sustainable development in Bucay, Abra. 4.36 EA

Overall 4.33 EA

Scale	Verbal Interpretation
4.21-5.00	Extremely Aware (EA)
3.41-4.20	Very Aware (VA)
2.61-3.40	Moderately Aware (MA)
1.81-2.60	Slightly Aware (SA)
1.00-1.80	Not Aware (NA)

The level of “Extremely Aware” that the respondents displayed with a mean of 4.33 is in alignment with other research findings that investigate the role of local governance in mitigating the effects of climate change. For instance, Zorn et al. note the involvement that municipalities must have in climate change policy, as they require awareness to be effectively implemented (Zorn et al., 2024).

All of the indicators received the rating of “Extremely Aware,” indicating that the participants were aware of the local governance plans specific to the municipality, including the LCCAP, the inclusion of disaster risk reduction plans, and environmental initiatives. This indicates that the respondents possess a comprehensive understanding of the local government's adaptation and mitigation efforts.

Environmental protection initiatives related to climate change mitigation exhibited the highest level of awareness (WM = 4.44), whilst the integration of disaster risk reduction shown slightly lower awareness (WM = 4.22), albeit remaining within the same interpretative framework.

Overall, the findings show that respondents have a high level of awareness regarding efforts to mitigate climate change, which is crucial for encouraging involvement and bolstering local climate action. Bere-Semerédi and Bere-Semerédi further emphasize that citizen perception and support are vital for the success of local climate action plans (Bere-Semerédi & Bere-Semerédi, 2019). Lastly, Lira da Silva and Mérida discuss the challenges and opportunities municipalities face in climate governance, reinforcing the critical role of local entities in fostering awareness and action (Silva & Mérida, 2024).

Problem 7. What is the level of participation on solid waste management of the Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra?

This section shows the level of participation of the Sangguniang Kabataan (SK) members on solid waste management in the Municipality of Bucay, Abra

The data illustrates that the majority of the respondents are involved in the enforcement and implementation of ordinances regarding solid waste management. The mean scores of each of these categories indicate that the majority of the indicators fall under the category of “Often.” However, the indicators regarding enforcement and implementation of ordinances regarding trash segregation and garbage disposal fell into the “Always” category altogether.

Table 7. Level of participation on solid waste management of the Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra

A. Enforcement and Monitoring	Mean	DR
1. I actively support the enforcement of the ordinance prohibiting dumping of waste in rivers and other bodies of water.	4.08	O
2. I report cases of illegal dumping or improper waste disposal in the barangay.	3.92	O
3. I assist barangay officials in monitoring areas prone to open dumping.	3.82	O
4. I support the implementation of penalties for violators (fines, community service, cancellation of permits).	4.10	O
5. I discourage the construction or use of illegal dumpsites near water bodies.	4.08	O
Composite Mean	4.00	O
B. Waste Segregation and Proper Disposal		
6. I consistently practice and promote proper waste segregation at source.	4.28	A
7. I encourage households and youth to follow proper garbage disposal rules.	4.34	A
8. I participate in organizing waste collection or waste management activities in the barangay.	3.96	O
9. I promote the reduction of non-biodegradable waste in community activities.	4.10	O
10. I serve as a role model in following solid waste management ordinances.	4.10	O
Composite Mean	4.16	O
C. Environmental Programs and Community Engagement		
11. I actively participate in clean-up drives along rivers, streams, and public areas.	3.86	O
12. I help conduct information or awareness campaigns about municipal solid waste ordinances.	3.94	O

13. I coordinate with LGU officials, barangay officials, or PNP regarding waste management concerns.	3.86	O
14. I support SK programs and resolutions aligned with municipal environmental ordinances.	4.08	O
15. I initiate or propose youth-led activities that support the implementation of solid waste management ordinances.	4.04	O
Composite Mean	3.96	O
Overall	4.04	O

Scale	Verbal Interpretation
4.21-5.00	Always
3.41-4.20	Often
2.61-3.40	Sometimes
1.81-2.60	Rarely
1.00-1.80	Never

In contrast, their involvement in reporting infractions and cleanup initiatives was significantly diminished. This pattern corresponds with extensive research highlighting the significance of community engagement in efficient waste management systems, as evidenced by various studies in regions such as Quezon and Bintuni, where knowledge and attitudes markedly affect participation levels ("Involvement of Stakeholders, 2023) (Nafurbenan et al., 2022). Moreover, the necessity for improved community engagement is underscored by findings from Somba Opu and Manokwari, indicating that despite established systems, active public participation is essential for enhancing waste management results and environmental quality (Yahya et al., 2022) (Maleke et al., 2024). The present health budget of the Local Government Unit, which endorses clean and green projects, may also facilitate elevated levels of involvement and execution. This integration enhances community engagement as environmental management is intrinsically connected to public health.

Problem 8. What is the level of participation on climate change mitigation of the Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra?

This section shows the level of participation of the Sangguniang Kabataan (SK) members in the climate change mitigation actions of the Municipality of Bucay, Abra.

The results reveal a significant level of respondent participation in climate change mitigation, as revealed by a grand mean of 3.97, which is described as "Very Active."

The results reveal that most of the indicators are described as "Very Active," showing significant participation in environmental protection, disaster risk reduction, and youth-led activities. The highest level of participation is recorded for supporting environmental sustainability, such as reducing the use of plastics (WM = 4.22), showing significant respondent commitment to environmental sustainability.

Table 8. the level of participation on climate change mitigation of the Sangguniang Kabataan (SK) members in the municipality of Bucay, Abra

A. Environmental Protection and Mitigation Programs	Mean	DR
1. I actively participate in tree planting and reforestation activities conducted by the LGU or barangay.	4.08	VA
2. I support municipal programs that aim to reduce carbon emissions and environmental pollution.	4.10	VA
3. I promote energy conservation practices (e.g., turning off unused lights, reducing electricity consumption) in the community.	4.04	VA
4. I participate in activities that promote the protection of rivers, forests, and other natural resources.	4.12	VA
5. I support initiatives that reduce plastic use and encourage environmentally friendly alternatives.	4.22	EA
Composite Mean	4.11	VA
B. Disaster Risk Reduction and Climate Adaptation Support		
6. I participate in climate-related disaster preparedness and risk reduction activities.	3.92	VA
7. I help disseminate information about climate change mitigation programs in the barangay.	4.02	VA
8. I assist in organizing youth-led activities that support municipal climate action ordinances.	3.86	VA
9. I coordinate with barangay or municipal officials regarding climate-related initiatives.	3.64	VA
10. I support the enforcement of local policies aimed at protecting the environment from climate-related impacts.	4.00	VA
Composite Mean	3.89	VA
C. Youth Leadership and Advocacy		
11. I initiate or propose SK programs that contribute to climate change mitigation.	3.82	VA
12. I participate in environmental seminars, trainings, or workshops related to climate change.	3.78	VA
13. I encourage fellow youth to actively engage in climate mitigation activities.	4.04	VA
14. I consistently practice environmentally responsible behaviors in daily life.	3.98	VA
15. I make climate change mitigation a priority in SK planning and budgeting discussions.	3.88	VA
Composite Mean	3.90	VA
Overall	3.97	VA

Scale	Verbal Interpretation
4.21-5.00	Extremely Active (EA)
3.41-4.20	Very Active (VA)
2.61-3.40	Moderately Active (MA)
1.81-2.60	Slightly Active (SA)
1.00-1.80	Not Active (NA)

However, it is also revealed that respondents are showing a relatively lower level of participation in activities such as coordination with officials, proposing programs, and attending trainings, showing areas for improvement in terms of increasing youth leadership and participation in climate change governance. The literature underscores that although young are increasingly acknowledged as essential agents of change, obstacles such as constrained resources and political disenfranchisement continue to hinder their full potential (Ogunsola, 2023) ("An Analysis of Climate Change, 2025). Effective community engagement is essential for cultivating a unified mandate for climate action, indicating that focused strategies to empower youth may result in more significant contributions to environmental sustainability and disaster risk reduction (Goel & Yadav, 2024) ("An Analysis of Climate Change, 2025).

Problem 9. What is the level of knowledge of the Sangguniang Kabataan (SK) members on the existing ordinances on solid waste management and climate change mitigation in the municipality of Bucay, Abra after the conduct of seminar?

This section shows the level of knowledge of the Sangguniang Kabataan (SK) members on existing ordinances on solid waste management and climate change mitigation following the performance of the seminar.

The results of the training initiative in Bima indicated that the participants achieved an exceptional level of understanding of the current regulations on solid waste management and climate change mitigation following the seminar. The average score of the pre-and post-tests demonstrates that the level of understanding increased from 40% to 85%, which is an outstanding level of understanding (Missouri et al., 2023).

Table 9. Level of knowledge of the SK on the existing ordinances on solid waste management and climate change mitigation after the seminar

	Mean	DR
Existing Ordinances on Solid Waste Management	94.00	O
Existing Ordinances on Climate Change Mitigation	92.67	O
Awareness on Solid Waste Management	83.00	O
Awareness on Climate Change Mitigation	97.33	O
Participation on Solid Waste Management	75.50	VS
Participation on Climate Change Mitigation	84.00	O
Implementation on Solid Waste Management	90.00	O
Implementation of Climate Change Mitigation	85.20	O
Overall	87.27	O

Percentage Range	Descriptive Rating
81% – 100%	Outstanding
61% – 80%	Very Satisfactory
41% – 60%	Satisfactory
21% – 40%	Needs Improvement
0% – 20%	Poor

All variables, except for SK members' involvement in climate change mitigation efforts (75.50%), which was assessed as “Very Satisfactory”, received an Outstanding rating. This signifies that respondents markedly enhanced their comprehension in most domains, especially in awareness, execution, and existing ordinances, where scores exceeded 90%.

Awareness on Climate Change Mitigation (97.33%) and Existing Ordinances on Climate Change Mitigation (94.00%) received the highest ratings, indicating a solid understanding of climate-related policies following the seminar.

Problem 10. Is there a significant difference between the knowledge of the Sangguniang Kabataan (SK) members before and after the conduct of seminar existing ordinances on solid waste management and climate change mitigation in the municipality of Bucay, Abra?

This section shows the study of the significant difference between the pretest and posttest details to establish the effectiveness of the seminar on the knowledge of the SK.

Table 10. Comparison of the Knowledge of the Sangguniang Kabataan Before and After the Conduct of a Seminar on Existing Ordinances on Solid Waste Management and Climate Change Mitigation in the Municipality of Bucay Abra

	Pretest	Posttest	Effect Sizes (Hedges' g)	T- Value	T-Prob Value
Existing Ordinances on Solid Waste Management	83.00	94.00	19.82	3.96	0.000
Existing Ordinances on Climate Change Mitigation	74.67	92.67	37.91	3.38	0.001
Awareness on Solid Waste Management	69.00	83.00	38.82	2.57	0.013
Awareness on Climate Change Mitigation	83.33	97.33	29.65	3.36	0.001
Participation on Solid Waste Management	61.00	75.50	35.30	2.93	0.005
Participation on Climate Change Mitigation	76.00	84.00	39.90	1.43	0.159
Implementation on Solid	71.50	90.00	32.91	4.01	0.000

Waste Management					
Implementation of	67.20	85.20	42.95	2.99	0.004
Climate Change					
Mitigation					
Overall	72.53	87.27	21.15	4.96	0.000

The results show that all indicators increased from the pretest to posttest, which means that the seminar succeeded. There were statistically significant differences with large effect sizes in respondents' knowledge of existing ordinances about solid waste management ($t=3.96$, $p=0.000$) and climate change mitigation 3.38, $p=0.001$). This means that their knowledge had improved a lot. An online educational initiative in Bunipah exhibited a 10.7% enhancement in knowledge, as evidenced by pre-test and post-test scores increasing from 84 to 93 (Hasanah et al., n.d)

Awareness regarding solid waste management ($t=2.57$, $p=0.013$) and climate change mitigation ($t=3.36$, $p=0.001$) exhibited significant differences with substantial effects, indicating that the intervention successfully increased awareness. Participation in solid waste management ($t=2.93$, $p=0.005$) demonstrated a significant difference with a substantial effect, whereas participation in climate change mitigation ($t=1.43$, $p=0.159$) was not significant, despite a considerable effect size, suggesting improvement that lacks statistical strength. The implementation of solid waste management ($t=2.99$, $p=0.004$) demonstrate significant differences with substantial effect sizes, indicating enhanced improved application of environmental practices.

The results ($t=4.96$, $p=0.000$) show a very significant difference with a big effect, which shows that the intervention or the seminar worked to improve knowledge, awareness, participation, and implementation of environmental laws. Additionally, research conducted with high school students in Maura Enim demonstrated a notable enhancement in knowledge, rising from 23.53 to 32.67 following practical training in organic waste management. (Framita et al., 2025). These results collectively highlight the success of educational interventions in promoting environmental awareness and practices as demonstrated by statistically significant enhancements in the knowledge and implementation of waste management strategies among various populations. (Kesuma et al.,2025; Fernandez et.,2018)

Discussion

The findings reveal that the Municipality of Bucay has a robust legal framework for environmental protection, but the "Very Satisfactory" pre-test scores suggested that there was still room for professional development among SK members. The jump to "Outstanding" post-test scores proves that targeted seminars are highly effective in clarifying the specifics of local ordinances.

The "Highly Implemented" rating for waste segregation and anti-dumping policies indicates that the LGU has successfully established a culture of compliance. However, the gap between "Extremely Aware" (4.45) and "Often Participated" (4.04) suggests that while SK

members know what should be done, they face hurdles in active leadership or resource mobilization. This aligns with global findings that youth participation is often hindered by limited budgets or perceived lack of authority in legislative discussions.

The significant effect size (Hedges' $g = 21.15$) underscores that education is the primary catalyst for improving environmental governance. By empowering the SK with technical knowledge, they shift from being mere followers of rules to active enforcers.

Conclusion

The study concludes that the Municipality of Bucay possesses a strong legal foundation for environmental governance, and the Sangguniang Kabataan members are highly aware of these mandates. The educational seminar was a highly effective intervention, significantly increasing the SK members' knowledge and application of environmental laws.

However, a noticeable gap remains between awareness and participation. To move from compliance to proactive leadership, the LGU must empower the SK with more leadership opportunities and consistent funding. The developed brochures and policy briefs serve as vital tools for sustaining this knowledge and should be integrated into the municipality's standard legislative and educational workflows.

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