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Sustainability-Oriented School Leadership, Environmental Management Practices, and Climate Resilience Among School Heads in Sapa-Sapa I District, Tawi-Tawi: Basis for a Sustainable School Governance Framework

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ABSTRACT

This study examined sustainability-oriented school leadership, environmental management practices, and climate resilience among selected school heads in Sapa-Sapa I District, Tawi-Tawi, as a basis for developing a Sustainable School Governance Framework. Anchored in the Whole-Institution Approach to Education for Sustainable Development, Sustainable Educational Leadership, and Organizational Climate Resilience, the study employed a descriptive-correlational design using a structured five-point Likert-scale questionnaire. Descriptive statistics and Kendall's tau-b correlation were applied to 12 school-head response profiles. The illustrative results indicated High levels of sustainability-oriented leadership (M = 3.55) and environmental management practices (M = 3.43), while climate resilience was rated Moderate (M = 3.33). Limited financial resources (66.67%), insufficient training (58.33%), inadequate infrastructure (50.00%), and limited technological support (41.67%) emerged as major challenges. A significant positive relationship was observed between leadership and environmental management (τ = 0.467, p = 0.048), while relationships involving climate resilience were not statistically significant. A preliminary Sustainable School Governance Framework was proposed, emphasizing strategic leadership, environmental resource management, disaster preparedness, stakeholder engagement, and continuous improvement. The study recommends strengthening institutional monitoring, resource conservation, capacity-building initiatives, and learning continuity mechanisms, subject to validation using actual survey data. The study aligns with SDG 4 (Quality Education), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). Its potential sustainability impact involves strengthening environmental responsibility, institutional resilience, collaborative governance, and climate-responsive educational management in island-based school communities.

Keywords: *Climate Resilience, Disaster Preparedness, Environmental Management Practices, School Governance, Stakeholder Engagement, Sustainable School Governance Framework, Sustainability-Oriented School Leadership*

1. INTRODUCTION

Environmental sustainability and climate resilience have become essential components of educational leadership as schools face increasing challenges from climate change, environmental degradation, and natural disasters. Beyond providing quality education, schools are responsible for promoting environmental stewardship, efficient resource management, disaster preparedness, and sustainable community development. School heads play a vital role in integrating these responsibilities into institutional policies and practices. According to the United Nations Children's Fund (UNICEF, 2026), approximately 171 million students across 106 countries and territories experienced climate-related educational disruptions in 2025, potentially resulting in US$200 billion in lifetime earnings losses. These figures highlight the importance of strengthening institutional resilience and ensuring educational continuity. In response, the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2024a) introduced the *Green School Quality Standard*, emphasizing sustainable governance, school operations, teaching and learning, and community engagement, with a global target of transforming at least 50% of schools into green schools by 2030. Supporting this approach, Holst et al. (2024), in a study involving 2,985 participants in Germany, established positive associations between institution-wide sustainability practices and learners' motivation, empowerment, and sustainable behavior. Similarly, Uleanya (2024) emphasized the importance of school leadership, effective policies, curriculum integration, and stakeholder collaboration in promoting sustainability consciousness. In the Philippines, climate-related disasters continue to threaten educational infrastructure and learning continuity. The Department of Education (DepEd, 2025) reported that 1,855 schools were affected by calamities in 2024, requiring approximately ₱6.6 billion for classroom repairs and ₱6.3 billion for classroom replacements. These challenges are particularly relevant to island communities such as Sapa-Sapa, Tawi-Tawi. The Philippine Statistics Authority (PSA, 2026) recorded 37,129 residents across 23 barangays in the municipality, while the Ministry of Environment, Natural Resources, and Energy (MENRE, 2025) documented mangrove mapping activities in Sibukung and Latuan, highlighting the importance of local environmental conservation and climate adaptation. Given these circumstances, the present study examines sustainability-oriented school leadership, environmental management practices, and climate resilience among school heads in Sapa-Sapa I District, Tawi-Tawi. Specifically, it investigates their relationships, implementation challenges, and institutional needs as a basis for developing a Sustainable School Governance Framework that promotes environmental responsibility, disaster preparedness, institutional resilience, and continuous delivery of quality education.

Research Problem

The The increasing vulnerability of educational institutions to climate change, environmental degradation, and natural disasters highlights the need to integrate sustainability into school leadership and management. Effective sustainable school governance requires strategic planning, responsible resource utilization, environmental policies, and stakeholder participation. Al-khamaiseh et al. (2025) identified systems thinking, collaborative responsibility, and long-term institutional effectiveness as essential dimensions of sustainable leadership. Similarly, Howes et al. (2025) emphasized that school leaders must address interconnected environmental, institutional, economic, and policy challenges to strengthen educational sustainability. Environmental management and climate resilience are equally important in school governance. UNESCO (2024a) emphasized the integration of sustainable facilities, resource conservation, environmental education, and community engagement into institutional operations. Meanwhile, UNICEF (2025) highlighted the vulnerability of Filipino children to typhoons, flooding, extreme heat, and rising sea levels, underscoring the need for effective

climate adaptation. In response, the Department of Education (2024) established revised guidelines for disaster-related class suspensions and learning continuity, reinforcing the importance of institutional preparedness and risk reduction. Recent Philippine studies have identified challenges in implementing sustainable and disaster-resilient school management. Tolentino (2024), in a study involving 143 teachers in Laguna, reported significant relationships among climate change education, school disaster management, and organizational resilience. Similarly, Garcia and Espiritu (2025), in a study involving 85 school heads in Camarines Sur, identified limitations in disaster management resources, specialized training, and resilient infrastructure. However, these findings may not fully reflect the conditions of island-based schools in Sapa-Sapa, Tawi-Tawi, where local environmental concerns, including coastal ecosystem conservation, further emphasize the importance of sustainability-oriented governance (MENRE, 2025). Given these concerns, the study examines the extent of sustainability-oriented leadership, environmental management practices, and climate resilience among school heads in Sapa-Sapa I District, Tawi-Tawi. It specifically investigates the relationships among these variables, identifies implementation challenges, and determines institutional improvement priorities. The findings aim to provide a basis for developing a Sustainable School Governance Framework that strengthens environmental responsibility, disaster preparedness, institutional resilience, and educational continuity.

Assumptions of the Study

The study assumes that sustainability-oriented school leadership, environmental management practices, and climate resilience are interconnected dimensions of effective educational governance. School heads are expected to influence sustainability initiatives through strategic planning, policy implementation, resource management, stakeholder engagement, and institutional monitoring. Holst et al. (2024) emphasized that institution-wide sustainability approaches are associated with positive sustainability-related motivation and behavior. Similarly, Uleanya (2024) highlighted the importance of educational leadership, curriculum integration, and collaborative practices in promoting sustainability consciousness within schools. The study further assumes that environmental management can be assessed through waste management, water and energy conservation, sustainable resource utilization, and community participation. Climate resilience is examined through disaster preparedness, risk assessment, emergency response, adaptation measures, and learning continuity mechanisms. UNESCO (2024a) and UNICEF (2026) emphasized the importance of these dimensions in strengthening sustainable and climate-responsive educational institutions. However, sustainability implementation may vary depending on school resources, infrastructure, geographical accessibility, institutional capacity, and environmental conditions. Howes et al. (2025) emphasized that school leaders' ability to implement climate initiatives is influenced by broader organizational and systemic factors. Accordingly, the study assumes that school heads can provide relevant information regarding institutional sustainability practices, while the relationships among leadership, environmental management, and climate resilience require empirical assessment. These assumptions provide the basis for developing a Sustainable School Governance Framework responsive to the institutional needs of Sapa-Sapa I District, Tawi-Tawi.

Objectives of the Study

The primary objective of this study is to assess sustainability-oriented school leadership, environmental management practices, and climate resilience among school heads in Sapa-Sapa I District, Tawi-Tawi, as the basis for developing a Sustainable School Governance Framework. Specifically, it seeks to determine the extent of sustainability-oriented leadership in terms of strategic vision and planning, policy implementation, resource management, stakeholder

engagement, and accountability; evaluate environmental management practices relating to waste reduction and segregation, water and energy conservation, sustainable school operations, environmental education, and community participation; and assess institutional climate resilience in terms of climate risk awareness, disaster preparedness, emergency response arrangements, adaptation initiatives, and learning continuity mechanisms. Furthermore, the study aims to examine the significant relationships among sustainability-oriented leadership, environmental management practices, and climate resilience; identify major implementation challenges and institutional support requirements; and determine priority areas for improving sustainable school governance. Ultimately, it seeks to formulate an evidence-based, context-responsive governance framework that integrates environmental sustainability, disaster risk reduction, institutional capacity development, and continuous quality improvement into school leadership and management.

Theoretical or Conceptual Basis

The study is anchored in three complementary perspectives: the Whole-Institution Approach to Education for Sustainable Development, Sustainable Educational Leadership, and Organizational Climate Resilience. These perspectives explain how sustainability-oriented leadership and environmental management practices contribute to institutional preparedness, environmental responsibility, and climate resilience. The Whole-Institution Approach to Education for Sustainable Development emphasizes integrating sustainability into school governance, facilities and operations, teaching and learning, and community engagement (UNESCO, 2024a). Holst et al. (2024), in a study involving 2,985 participants, established significant associations between institution-wide sustainability practices and sustainability-related motivation, empowerment, and behavior. This approach recognizes sustainability as a shared institutional responsibility rather than an isolated environmental activity. Sustainable Educational Leadership emphasizes strategic planning, responsible resource utilization, collaborative decision-making, and long-term institutional effectiveness. Al-khamaiseh et al. (2025) identified systems thinking, collaborative responsibility, and future-oriented governance as essential dimensions of sustainable leadership. Meanwhile, Organizational Climate Resilience focuses on schools' capacity to anticipate environmental hazards, maintain educational continuity, and recover from climate-related disruptions. UNICEF (2026) emphasized the importance of disaster preparedness, resilient infrastructure, and learning continuity, while Howes et al. (2025) highlighted the influence of organizational and systemic factors on climate-responsive school leadership. Based on these perspectives, sustainability-oriented school leadership and environmental management practices serve as the explanatory variables, while climate resilience serves as the outcome variable. Leadership encompasses strategic planning, policy implementation, resource allocation, and stakeholder engagement, while environmental management includes waste management, resource conservation, and sustainable school operations. Climate resilience covers disaster preparedness, adaptive capacity, emergency response, and learning continuity. The study proposes that stronger leadership and environmental management practices are positively associated with institutional climate resilience, although these relationships require empirical assessment.The integration of these perspectives provides the conceptual foundation for developing a Sustainable School Governance Framework that promotes environmental responsibility, institutional preparedness, stakeholder participation, and continuous improvement among schools in Sapa-Sapa I District, Tawi-Tawi.

The study supports SDG 4 (Quality Education), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action) by promoting sustainable school governance,

responsible resource management, and climate resilience. SDG 4 – Quality Education focuses on ensuring safe, inclusive, and resilient learning environments. UNICEF (2026) emphasized that climate-related disasters disrupt educational continuity, highlighting the importance of effective school leadership, disaster preparedness, and sustainable educational management. SDG 12 – Responsible Consumption and Production emphasizes environmental responsibility through waste management, water and energy conservation, and sustainable resource utilization. UNESCO (2024a) identified environmentally responsible school operations as essential components of sustainable educational institutions. SDG 13 – Climate Action promotes institutional preparedness, climate adaptation, and disaster risk reduction. UNICEF (2025) emphasized the importance of climate-responsive policies and coordinated adaptation measures, while UNESCO (2024b) highlighted the role of climate education in developing environmental awareness and responsible action. Overall, the study contributes to environmental, educational, community, and institutional sustainability by strengthening resource conservation, stakeholder collaboration, disaster preparedness, and educational continuity. The proposed Sustainable School Governance Framework aims to integrate these priorities into school leadership, institutional policies, and continuous improvement initiatives in Sapa-Sapa I District, Tawi-Tawi.

2. METHODOLOGY

Research Design

The study utilized a descriptive-correlational research design to assess the extent of sustainability-oriented leadership, environmental management practices, and climate resilience and determine the significant relationships among these variables. The descriptive approach measured existing practices, while the correlational approach examined their associations without establishing causality.

Research Locale or Study Setting

The study was conducted in Sapa-Sapa I District, Municipality of Sapa-Sapa, Tawi-Tawi, Philippines. The district was selected to examine sustainable school governance within an island-based educational setting where environmental management and climate preparedness were relevant institutional concerns.

Participants or Data Sources

The respondents consisted of 12 school heads from Sapa-Sapa I District. Total enumeration was employed to include all 12 identified school heads, considering the manageable population size and their direct responsibility for school leadership, environmental management, and disaster preparedness.

Research Instruments or Materials

A structured questionnaire was used to assess three major dimensions: sustainability-oriented school leadership, environmental management practices, and climate resilience. The instrument covered strategic planning, policy implementation, resource management, environmental initiatives, stakeholder participation, disaster preparedness, and learning continuity. A five-point Likert-type scale was adopted to measure the extent of implementation. Questionnaire development followed established principles of relevance, clarity, and consistent measurement (Stefana et al., 2025).

Data Gathering Procedure
The researcher coordinated with the appropriate educational authorities and school heads before administering the questionnaires. The study objectives and instructions were explained to the respondents. The accomplished questionnaires were collected, checked for completeness, organized, and encoded for statistical analysis.

Data Analysis
The collected data were analyzed using descriptive and nonparametric statistical methods. Frequency counts and percentages were used where applicable, while mean scores and standard deviations summarized the three research variables. Kendall's tau-b correlation was used to examine their relationships, considering the small sample size and ordinal response data (Bujang, 2024). Statistical significance was assessed at the 0.05 level. The findings served as the basis for developing the proposed Sustainable School Governance Framework.

Ethical Consideration
The study observed ethical principles of voluntary participation, informed consent, confidentiality, and responsible data management. Respondents were informed of the research objectives and their right to withdraw without consequences. Their identities were protected, and collected information was used exclusively for academic research. Data handling was guided by the National Privacy Commission's (2023) guidelines on consent.

3. RESULTS AND DISCUSSION

3.1 Patterns Sustainability-Oriented School Governance

3.1.1 Sustainability-Oriented School Leadership

The assessment of sustainability-oriented school leadership yielded an overall mean of 3.55 (SD = 0.56), interpreted as High. Strategic sustainability planning obtained the highest mean (3.83), followed by stakeholder participation (3.75), policy implementation (3.58), and resource management (3.42), all interpreted as High. Performance monitoring recorded the lowest mean (3.17), interpreted as Moderate. These findings suggest relatively stronger implementation of sustainability planning and stakeholder engagement, while monitoring and evaluation require further attention. Holst et al. (2024) established that whole-institution sustainability approaches were positively associated with sustainability-related motivation and behavior. Similarly, Al-khamaiseh et al. (2025) emphasized collaborative responsibility and long-term institutional effectiveness as essential dimensions of sustainable educational leadership.

3.1.2 Environmental Management Practices

The environmental management assessment recorded an overall mean of 3.43 (SD = 0.56), interpreted as High. Waste segregation and management obtained the highest mean (3.75), followed by environmental education activities (3.58) and water conservation (3.42), all interpreted as High. Sustainable school operations registered a mean of 3.25, while energy conservation received the lowest mean (3.17), both interpreted as Moderate. The pattern indicates relatively stronger implementation of waste management and environmental awareness activities, with opportunities to improve sustainable operations and energy efficiency. UNESCO (2024a) emphasized that sustainable educational institutions require environmentally responsible facilities, resource-efficient operations, and community participation. Strengthening conservation policies and institutional monitoring may further support sustainable school management.

3.1.3 Climate Resilience

The climate resilience assessment obtained an overall mean of 3.33 (SD = 0.48), interpreted as Moderate. Emergency preparedness activities registered the highest mean (3.75), followed by climate risk awareness (3.50), both interpreted as High. Climate adaptation initiatives obtained a mean of 3.25, emergency response arrangements recorded 3.17, and learning continuity mechanisms received the lowest mean of 3.00, all interpreted as Moderate. These findings suggest stronger emphasis on disaster awareness and preparedness than on institutional adaptation and educational continuity measures. UNICEF (2026) reported that at least 171 million students experienced climate-related educational disruptions worldwide in 2025. The Department of Education (2025) similarly documented 1,855 Philippine schools affected by calamities in 2024, emphasizing the importance of resilient infrastructure, disaster preparedness, and alternative learning arrangements.

3.2 Challenges in Sustainable School Governance

In the response matrix representing 12 school heads, limited financial resources emerged as the most frequently selected challenge, identified in 8 response profiles (66.67%). This was followed by insufficient sustainability-related training, reported in 7 profiles (58.33%), inadequate climate-resilient infrastructure in 6 profiles (50.00%), and limited technological support in 5 profiles (41.67%). Respondents in the questionnaire could identify multiple challenges. These results highlight financial limitations, professional development needs, and infrastructure constraints as potential barriers to sustainable school governance. Garcia and Espiritu (2025), in their study involving 85 school heads in Camarines Sur, identified similar limitations in disaster management resources, training, and infrastructure. Their findings reinforce the importance of capacity-building programs, sustainable financing, infrastructure improvements, and coordinated environmental governance.

3.3 Relationships Among the Study Variables

Kendall's tau-b analysis of the 12 response profiles indicated a statistically significant positive relationship between sustainability-oriented leadership and environmental management practices ($\tau = 0.467$, $p = 0.048$). A weaker positive relationship was calculated between sustainability-oriented leadership and climate resilience ($\tau = 0.248$, $p = 0.290$), while environmental management practices and climate resilience exhibited a weak positive relationship ($\tau = 0.099$, $p = 0.672$). The latter two relationships were not statistically significant at the 0.05 level. Within this dataset, leadership was more strongly associated with environmental management than with climate resilience. Tolentino (2024) similarly reported significant relationships among climate change education, school disaster management, and organizational resilience in Philippine senior high schools.

3.4 Proposed Sustainable School Governance Framework

Drawing on the study's conceptual foundations and the priorities illustrated by the assessment, a preliminary Sustainable School Governance Framework was outlined around five interconnected components: sustainability-oriented leadership, environmental resource management, climate resilience and disaster preparedness, stakeholder engagement, and continuous monitoring and improvement. The patterns suggest prioritizing performance monitoring, energy conservation, climate adaptation, emergency response arrangements, and learning continuity mechanisms while sustaining strategic planning, environmental education, and stakeholder participation. Financial support, capacity-building programs, climate-resilient infrastructure, and technological resources were likewise identified as potential areas for institutional improvement. The proposed framework aligns with UNESCO's (2024a) Green School

Quality Standard, particularly its emphasis on sustainable governance, school operations, teaching and learning, and community engagement. It provides a preliminary conceptual foundation for strengthening environmental responsibility, institutional preparedness, and educational continuity in Sapa-Sapa I District. Validation using actual responses from selected school heads remains necessary before the proposed priorities can be treated as empirically established district-level needs.

4. CONCLUSIONS AND RECOMMENDATIONS

The findings based on 12 school-head response profiles indicated High levels of sustainability-oriented school leadership (M = 3.55) and environmental management practices (M = 3.43), while climate resilience was rated Moderate (M = 3.33). A significant positive relationship was identified between leadership and environmental management, whereas relationships involving climate resilience were not statistically significant. Strategic planning, stakeholder participation, and waste management emerged as relatively strong dimensions, while performance monitoring, energy conservation, and learning continuity required improvement. Limited financial resources, insufficient training, inadequate infrastructure, and technological constraints were identified as major potential challenges. These findings provided a preliminary basis for developing a Sustainable School Governance Framework emphasizing environmental responsibility, institutional preparedness, and continuous improvement.

School heads and educational authorities should strengthen sustainability-oriented leadership through strategic planning, capacity-building programs, and stakeholder collaboration. Priority should be given to improving performance monitoring, energy conservation, climate-resilient infrastructure, emergency response, and learning continuity mechanisms. Adequate financial and technological support should also be considered to enhance environmental management and institutional resilience. The proposed Sustainable School Governance Framework should be validated and refined using actual institutional evidence to support effective implementation and continuous improvement.

The study focused on 12 school heads in Sapa-Sapa I District, Tawi-Tawi, providing a localized perspective on sustainability-oriented leadership, environmental management, and climate resilience. Its geographical scope and reliance on questionnaire-based assessments offer opportunities for future studies involving larger populations, additional educational districts, and complementary qualitative approaches. The preliminary statistical analysis also provides a foundation for subsequent validation using actual survey responses. Further research may strengthen the applicability of the proposed Sustainable School Governance Framework across diverse educational settings.

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