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Building Environmental Governance Knowledge through Environmental Culture in Schools: The Role of the Adiwiyata Program

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ABSTRACT

This research aims to explore the development of Environmental Governance Knowledge (EGK) through the integration of environmental culture in schools, with a focus on the Adiwiyata program. The study examines the process of building EGK and identifies both supporting and inhibiting factors in the program's implementation. A qualitative approach with a descriptive method was employed, involving data collection through in-depth interviews, observations, and document analysis, which was validated through source and method triangulation. The data were analyzed through reduction, presentation, and conclusion drawing to identify patterns and relationships. The findings reveal that EGK development is facilitated through the establishment of Adiwiyata structures, curriculum integration, routine activities like community clean-ups, and the inclusion of local cultural and religious values. Supporting factors include local government assistance, active participation from teachers and students, and external partnerships. In contrast, challenges include low environmental awareness, limited facilities, and inconsistent program sustainability. The study concludes that while the Adiwiyata program has successfully promoted ecological awareness and strengthened environmental culture, its continued success depends on ongoing collaboration, sufficient resources, and sustained behavioral change.

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INTRODUCTION

The environment plays a vital role in sustaining human life and other living organisms by providing essential natural resources, including clean air, water, fertile soil, and energy. Good environmental quality supports the fulfillment of basic needs and serves as an asset for socio-economic development, for example, through the agriculture, tourism, and renewable energy sectors

(Herlina, N., 2017). Conversely, environmental damage due to pollution and ecosystem degradation can threaten the sustainability of life and hinder economic growth. Therefore, ecological preservation requires collaboration among the government, the private sector, and the community, with a strong emphasis on instilling environmental awareness from an early age through effective environmental education (Zaputra et al., 2023).

Environmental education (EEP) is crucial in fostering environmentally friendly awareness and behavior from a young age. Through EEP, students learn about the importance of maintaining the quality of air, water, soil, and biodiversity, as well as how their daily behavior impacts the environment. This education is not only theoretical but also applied through participatory activities such as tree planting, waste management, renewable energy, and the development of school gardens or parks. Thus, environmental education serves as a foundation for developing an environmentally conscious generation capable of contributing to the sustainable management of natural resources.

Environmental governance is a strategic approach that involves various actors, including government, civil society, and the private sector, in the sustainable management of natural resources (Vita et al., 2023; Kefeli et al., 2023). This concept aims to ensure that environmental management is carried out transparently, inclusively, and accountably, thereby addressing global and local environmental challenges (Amelia, 2024). In the educational context, this concept can be implemented through the Adiwiyata program, which encourages the active participation of the entire school community in environmental management and stewardship. EGK (Environmental Governance in Schools) can be actualized through participatory learning processes, intersectoral dialogue, and the strengthening of environmentally friendly local cultures. Hapsari (2023) emphasizes the importance of co-production of knowledge, namely the joint production of knowledge between formal actors (teachers, government) and informal actors (students, local communities), to create equitable and sustainable environmental governance.

According to the latest data as of 2024, Tanah Datar Regency, West Sumatra, has approximately 19 senior high schools (SMA), comprising 15 public and four private schools. Most have A and B accreditation, but none have ISO certification. For all school levels in Tanah Datar, comprehensive data from Dapodikdasmen and the Education Office show the number of elementary, junior high, and senior high schools spread across various sub-districts. However, the exact number of schools is not explicitly detailed in available sources.

One example of successful environmental education implementation is SMA 3 Batusangkar, which, through its consistent and participatory Adiwiyata

program, successfully achieved the title of National Adiwiyata School in 2023. However, the majority of schools in Tanah Datar will not receive the Adiwiyata certificate until 2024. This is due to several key factors, including limited facilities and infrastructure to support environmental programs, a lack of resources and mentoring in implementing the Adiwiyata program, and budget priorities that are still focused on basic educational needs, such as infrastructure and teaching and learning facilities.

Furthermore, MTsN 10 Tanah Datar has received a certificate from the Head of the Regional Office of the Ministry of Religious Affairs of West Sumatra Province, designating it as a National Adiwiyata school, a notable achievement for the entire academic community of the madrasah. This award recognizes MTsN 10's efforts and commitment to implementing sustainable environmental management principles within the school environment. At the award ceremony on January 12, 2023, the Principal of MTsN 10 Tanah Datar, Rika Maria, stated that this award was the result of the hard work and cooperation of all members of the madrasah family. This demonstrates the crucial role of collaboration between teachers, students, and parents in creating a high-quality and environmentally friendly learning environment, in line with the principles of environmental education, which emphasize experiential learning, ecological awareness, and active participation.

SMA 3 Batusangkar and MTsN 10 Tanah Datar are two educational institutions that have implemented the Adiwiyata program through various activities promoting environmental awareness. Both schools have great potential to become examples of sound environmental management, both at the local and regional levels. Through various initiatives, such as reforestation, waste management, and environmental education activities, students at these two schools are expected to develop relevant knowledge and skills.

The environment plays a vital role in sustaining human life and other living organisms by providing essential natural resources, including clean air, water, fertile soil, and energy. Good environmental quality supports the fulfillment of basic needs and serves as an asset for socio-economic development (Herlina, 2017). Therefore, environmental preservation requires collaboration between the government, the private sector, and the community, as well as environmental awareness instilled from an early age through environmental education (Zaputra et al., 2023), which emphasizes not only theoretical understanding but also implementation through participatory activities in schools. Environmental governance, involving various formal and informal actors, can be implemented through the Adiwiyata program, encouraging the co-production of knowledge among teachers, students, and local communities to create fair and sustainable environmental management (Hapsari, 2023; Amelia,

2024). Bibliographic analysis using VOSviewer reveals that environmental governance research is divided into primary clusters, including environmental culture, environmental performance, sustainability, and environmental justice, with major topics such as environmental governance and sustainability being widely explored. In contrast, aspects of environmental education and environmental awareness remain minimal, presenting a research opportunity, particularly in relation to the implementation of Adiwiyata in schools. In Tanah Datar Regency, until 2024, there are 19 high schools, most of which have been accredited A and B, but the majority have not yet obtained the Adiwiyata certificate due to limited facilities, mentoring, and budget priorities; one of the successes is SMA 3 Batusangkar which received the title of National Adiwiyata School in 2023, and MTsN 10 Tanah Datar which received a similar award, showing that collaboration between teachers, students, and parents, as well as strengthening local culture, is very important in creating a quality and environmentally friendly learning environment, in accordance with the principles of environmental education and culture-based environmental governance.

RESEARCH METHOD

This study uses a qualitative approach with a descriptive type that aims to describe the development of environmental governance knowledge (EGK) through the Adiwiyata program at SMA Negeri 3 Batusangkar and MTsN 10 Tanah Datar. Both schools were selected because they actively implement the Adiwiyata program as an effort to build a culture of environmental care. Data were collected through interviews, observations, and document studies, then validated by triangulation of sources and methods. Data analysis was carried out through the processes of reduction, presentation, and drawing conclusions to illustrate how the Adiwiyata program shapes environmental governance knowledge based on environmental culture in schools.

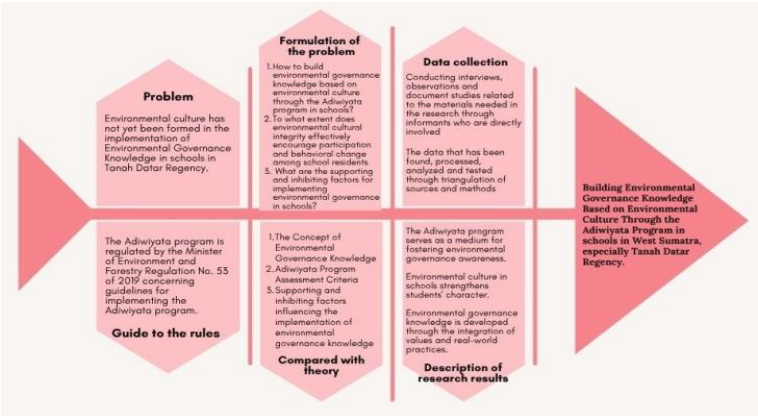

Figure 1. Fishbone diagram of research flow

This research begins with the main problem, namely the lack of environmental culture in the implementation of EGK, and is then formulated into three research questions. Data collection was conducted through observation, interviews, and document studies, then analyzed using source and method triangulation. The theoretical foundation used includes the concept of EGK, the Adiwiyata Program criteria, and supporting and inhibiting factors in its implementation. The results of this study are expected to explain how the Adiwiyata Program shapes a culture of environmental awareness, changes in student character, and the integration of values and real-world practices, ultimately building EGK in schools, particularly in Tanah Datar Regency.

RESULT AND DISCUSSION

Result

Information obtained from several informants as the primary sources of this research will be analyzed through a coding process to obtain research discussion themes or memos. The next analysis technique is coding. The first stage is open coding, which involves grouping data into basic concepts related to the phenomenon to be studied.

Tabel 1. Open Coding

Informant	Transcript	Draft Label/ Highlight
I1, I8	"Environmental management in schools is a way for all school residents, including the principal, teachers, staff, and students to maintain, care for, and be responsible for the school environment so that it remains clean, green, and comfortable... Environmental management is very important today.	Understanding and Views (Draft 1)
I3	"...disposing of trash properly according to its type, sorting trash in desk drawers, creating a duty schedule, and practicing energy and water conservation."	Environmental culture (Draft 2)
I5	"When there are community service activities, not all teachers participate; only those assigned to participate."	Lack of cooperation (Draft 2)
I2, I4	"Yes, there are several programs, such as community service, green school, where each student is required to bring one tree... Another program is "S3pala," which means "1 piece of trash, ten rewards."	Program (Draft 2)
16,18	"The challenge is that habits from home are carried over to school. The biggest obstacle lies in the individual's mindset."	The Biggest Problem (Draft 3)
I3	"...what we experience is a lack of cooperation between teachers and students in the surrounding community. People allow their livestock to enter the school grounds. Another problem is a lack of cooperation between teachers and students."	Lack of public concern (Draft 3)

After labeling the transcripts with initial codes (drafts), the next stage is axial coding. At this stage, the categories obtained from the open coding results are linked and regrouped into subcategories, allowing researchers to see the condensation of the data in the interview transcriptions. The results of the axial coding process, based on the previous coding, are as follows:

Tabel 2. Open Coding

Drafts	Sub-Categories
Draft 1	Environmental knowledge for environmental protection
Draft 2	Utilization of environmental knowledge
Draft 3	Problem solving
Draft 4	Application of environmental knowledge to address environmental issues

The third stage is selective coding, which is the process of combining and unifying organized data from various categories and themes to generate a deeper understanding and discover new meanings of the phenomena being studied. Several categories derived from the previous coding results were then used as sub-chapters in this study, as follows:

Tabel 3. Selective Coding

Subcategory	Category
Subcategory 1	Category #Understanding
Subcategory 2	Category #Implementation
Subcategory 3	Category #Challenges
Subcategory 4	Category #Solutions

After all coding stages are completed, the final results of the Selective Coding process are obtained, which is then followed by a discussion of the main topics through the preparation of memos. At this stage, the analyzed data is visualized to provide a clearer picture of the research results. The mind map flow of the memos is as follows:

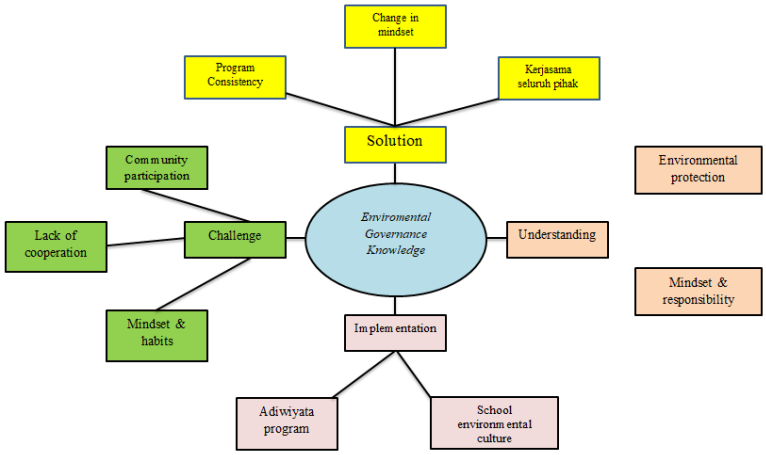

Figure 1. Selective Memos Results

Based on the results of selective memos, it can be seen that the development of EGK through the Adiwiyata Program proceeds through an interconnected process of implementation, challenges, and solutions. Program implementation is seen through the strengthening of school environmental culture and the application of Adiwiyata values, while the main challenges arise from the lack of community participation and habits and mindsets that are not fully concerned with the environment. However, solutions are achieved through cooperation from all parties, consistent program implementation, and a shift in mindset towards responsibility and understanding of environmental protection. These three elements interact with each other and play a crucial role in shaping sustainable, culture-based environmental governance in schools.

Building Environmental Governance Knowledge through the Adiwiyata Program

Research results show that EGK development at SMA Negeri 3 Batusangkar and MTsN 10 Tanah Datar was carried out through the establishment of Adiwiyata institutions, curriculum integration, greening practices, and support from the Environmental Agency. Teachers and students actively participated in cleaning activities, inter-class competitions, and religious value-based programs. This demonstrates that environmental governance knowledge is not only built through classroom theory, but also through real-world practice and the internalization of cultural and spiritual values that develop within the school environment.

In environmental governance theory (Lemos & Agrawal, 2006), effective environmental management requires collaboration between the government, the community, and educational institutions. This is evident in the school's collaboration with the Environmental Agency (DLH), committees, and the surrounding community through participatory Adiwiyata teams and local value-based activities such as Salju Sempona and S3pala. However, the knowledge gained is still predominantly practical and lacks conceptual depth. Therefore, program strengthening needs to be directed at improving understanding of environmental governance principles to instill a culture of environmental care sustainably.

Integrating Environmental Culture in the Adiwiyata Program.

Research results show that environmental culture at SMA Negeri 3 Batusangkar and MTsN 10 Tanah Datar is integrated through routine practices, school rules, reforestation activities, mutual cooperation, and the reinforcement of local religious and cultural values. This integration encourages active participation among the school community and fosters environmentally

conscious behavior, despite challenges such as program sustainability, negative student habits carried over from home, and limited facilities. This demonstrates that a strong environmental culture requires structural support and consistent practice to foster sustainable ecological behavior.

The integration of environmental culture into the Adiwiyata program aligns with environmental governance theory, which emphasizes multi-stakeholder participation and social learning. Through activities such as school duty, cleanliness competitions, and the signature Salju Sempona and S3pala programs, religious and cultural values are utilized to foster ecological awareness spiritually. However, consistent environmental behavior still depends on limited momentum and facilities. Therefore, ongoing support from families, the community, and the government is needed to ensure that a culture of environmental awareness becomes the collective identity of the school community.

Factors Affecting Environmental Governance in the Adiwiyata Program
Supporting factors

Support from the Regional Government and Environmental Agencies

Support from the Environment Agency (DLH) is a key factor in the development of EGK in schools through policies, guidance, outreach, and the provision of facilities such as composters, plant seeds, and waste banks. The involvement of the local government strengthens institutions and resources, ensuring a systematic and sustainable Adiwiyata program. This support reflects effective collaboration between schools and the government in fostering a culture of environmental awareness that consistently meets local needs.

Formation of School Teams and Institutions

The formation of school teams and institutions is a key factor in the success of the Adiwiyata program at SMA Negeri 3 Batusangkar and MTsN 10 Tanah Datar. The Adiwiyata team ensures clear division of tasks, effective coordination, and the implementation of sustainable environmental activities. This institution also serves as a forum for collaboration with external parties such as the DLH and the community, ensuring the program is not merely ceremonial. A strong and systematic structure forms the basis for the formation of a focused and sustainable environmental culture-based EGK.

Teacher and Student Participation

The active participation of teachers and students is a key factor in the success of the Adiwiyata program at SMA Negeri 3 Batusangkar and MTsN 10 Tanah Datar. Teachers act as role models and motivators, while students

demonstrate collective awareness through routine activities such as mutual cooperation and reforestation. The synergy between the two fosters environmental values as a shared culture, making the Adiwiyata program a real, sustainable, and deeply rooted program within the school environment.

Innovative School-Specific Programs

Innovative school-specific programs support the success of Adiwiyata by adapting environmental education to students' cultural and religious values. This local initiative makes environmental education more contextual and meaningful, fostering awareness based on intrinsic motivation. The integration of ecological values into the curriculum and non-formal activities strengthens a culture of environmental awareness and demonstrates that local creativity can be key to building culturally and spiritually based EGK.

Routine Activities and Competitions

Routine activities and competitions are effective strategies for instilling a culture of environmental stewardship in schools. Routines such as mutual cooperation, cleaning duties, and tree planting foster positive habits, while inter-class cleanliness competitions foster motivation and collective responsibility. Teachers' role models reinforce learning through hands-on practice, making these activities crucial for building a sustainable school culture-based EGK.

Partnerships with External Parties

Partnerships with external parties are a crucial factor in strengthening the Adiwiyata program. Collaborations with the Environment Agency (DLH), community health centers (Puskesmas), agricultural groups, and sub-district governments provide resources, knowledge, and support that expand the program's impact. This collaboration makes schools part of the broader environmental movement, emphasizing that environmental stewardship is a shared responsibility, while ensuring the program's tangible and sustainable sustainability.

Inhibiting Factors

Low Mindset and Awareness of School Communities

The main obstacle to the Adiwiyata program is the low awareness and mindset of school communities regarding the importance of environmental protection. Many view it as merely a formality, resulting in underutilization of facilities and regulations. This problem requires consistent practice and the involvement of the entire school community so that environmental awareness truly becomes part of the school culture.

Unsustainable Program

Another obstacle is the unsustainability of environmental activities, as many programs are only conducted during competitions or assessments. The lack of a monitoring system makes activities ceremonial and does not form long-term habits. Consistent planning and evaluation are needed for the Adiwiyata program to be truly sustainable and foster a culture of environmental awareness on an ongoing basis.

Complex Adiwiyata Administrative Requirements

The complexity of administrative requirements presents an obstacle for schools, especially when attempting to advance to the provincial or national level. Many schools actively carry out environmental activities, but are hampered by the lack of complete documentation. Administrative complexity often shifts the focus from building an environmental culture to merely fulfilling formalities.

Student Habits Still Carried Over from Home

Another obstacle is students' lack of environmental awareness due to not being accustomed to it at home. The lack of synchronization between family and school culture slows down the development of environmentally conscious character. Parental support and involvement are needed to ensure the Adiwiyata values are consistently instilled at home and at school.

Limited Facilities and Infrastructure

The lack of facilities such as waste processing facilities, greening equipment, and waste bank space is a major obstacle to the Adiwiyata program. Without adequate supporting facilities, environmental activities are difficult to implement effectively and sustainably. Support from the government and partners is needed to ensure the continued development of environmentally conscious practices in schools.

Discussion

The findings from this study indicate that the implementation of the Adiwiyata program at SMA 3 Batusangkar and MTSN 10 Tanah Datar has positively influenced students' environmental knowledge and awareness, aligning with prior research emphasizing the role of school-based environmental programs in fostering ecological literacy (Tilbury, 1995; Filho et al., 2018). Similar to these studies, our results show that embedding environmental governance within school culture encourages sustainable behavior. However, a notable difference lies in the depth of cultural integration: while previous research often

focused on general environmental practices, our study highlights how local environmental values and traditions uniquely shape students' engagement with sustainability initiatives. This suggests that cultural contextualization can enhance the effectiveness of environmental education (Samsul, 2025).

Moreover, the study reveals that the presence of structured environmental governance within schools such as committees, monitoring systems, and clear environmental policies correlates strongly with students' active participation. This aligns with the findings of Stevenson (2007), who emphasized the importance of institutional structures in supporting environmental behavior. The "so-what" implication is that functional governance structures within schools do not merely provide rules but actively cultivate a sense of responsibility and accountability among students. Conversely, any lack or dysfunction in these structures may limit the potential impact of environmental programs, highlighting the critical role of institutional suppor.

Analyzing the underlying mechanisms, it appears that integrating local environmental culture into the Adiwiyata program strengthens the internalization of pro-environmental behavior. Students not only follow sustainable practices because of school rules but also because they perceive these practices as aligned with local norms and values. This "why" aspect linking cultural relevance to behavioral adoption—illustrates the structural relationship between cultural context and environmental governance outcomes. In other words, local traditions function as an underlying structure that enhances program effectiveness, showing that sustainability efforts are more successful when they resonate with existing cultural frameworks.

Furthermore, the findings have broader implications for policy and practice. Schools that seek to implement environmental programs can benefit from tailoring strategies to the local cultural context rather than adopting standardized approaches. By doing so, programs like Adiwiyata can move beyond superficial compliance to genuinely foster long-term environmental stewardship. This approach also suggests that environmental governance in schools functions optimally when cultural identity and institutional support reinforce each other, creating a synergistic effect that maximizes student engagement.

Finally, this study underscores the importance of continuous monitoring and evaluation. While initial implementation shows positive outcomes, sustaining these gains requires ongoing support, adaptation to evolving local environmental challenges, and active engagement from all stakeholders students, teachers, and the wider community. By connecting findings to both global environmental education literature and local cultural practices, this research highlights a model of environmental governance that is both

contextually relevant and theoretically grounded, offering practical guidance for other schools seeking to enhance their sustainability programs (Diana & Sain, 2025).

CONCLUSION

Efforts to build environmental governance knowledge (EGK) based on environmental culture through the Adiwiyata program have proven effective in fostering student awareness and responsibility toward environmental conservation. By integrating environmental values into school policies, curriculum, and participatory activities, the program has facilitated positive behavioral changes among students, such as reforestation, waste management, and promoting eco-friendly practices. The success of the program can be attributed to the strong commitment from school leaders, teacher support, and collaboration with the Environmental Agency. However, challenges such as limited funding, inadequate infrastructure, and uneven participation remain, which hinder the full realization of the program's potential.

To ensure the sustainability and wider impact of the Adiwiyata program, it is essential to strengthen cross-stakeholder collaboration, with increased involvement from local governments and the Environmental Agency, particularly in terms of funding and technical support. Additionally, schools must integrate environmental cultural values across all subjects and extracurricular activities to foster a lasting ecological mindset. A more structured monitoring and evaluation system is needed to assess the program's effectiveness and identify areas for improvement. Future research should explore the implementation of environmental culture-based EGK at other educational levels or regions to provide a broader understanding of its impact across Indonesia.

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