



Green Leadership Transformation for Indonesia Emas 2045: Empowering School Communities for Environmental Sustainability in South Kalimantan

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Abstract. This article examines the pivotal role of green leadership in achieving Indonesia's ambitious "Indonesia Emas 2045" vision, which aims to transform the nation into a prosperous, equitable, and environmentally conscious citizen. It emphasizes the crucial involvement of school communities in South Kalimantan in promoting environmental sustainability. Faced with pressing environmental challenges such as deforestation, pollution, and climate change, the paper advocates for a transformative approach to leadership, management, and decision-making that prioritizes sustainability, environmental responsibility, and ethical practices. School communities are highlighted as catalysts for change, with the ability to shape attitudes, behaviors, and policies concerning the environment. The study presents a strategic framework for empowering these communities, including the cultivation and promotion of green leaders, the establishment of sustainable school environments, the encouragement of community engagement, and the promotion of active student participation. Concrete case studies from South Kalimantan and other regions in Indonesia showcase successful examples of green leadership in practice, such as initiatives in waste management, renewable energy adoption, urban greening, and comprehensive sustainability education. The study acknowledges challenges, such as limited resources and resistance to change, while also highlighting the opportunities offered by government support and technological advancements. The conclusion underscores that by empowering school communities and adopting green leadership, South Kalimantan and Indonesia can create a pathway to a greener and more prosperous future, ensuring a sustainable legacy for generations to come. This approach enables a harmonious combination of economic development and environmental preservation, positioning green leadership in school communities as both a necessity and an opportunity for lasting positive change in Indonesia.

Keywords: Empowering, Leadership, Sustainability

1 Introduction

South Kalimantan, a province situated at the heart of the Indonesian archipelago, is blessed with an abundance of natural resources and a remarkable diversity of ecological systems. The province's landscape is defined by extensive peatland environments, lush tropical forests rich in diverse wildlife, and complex river systems that support local communities [1] However, these precious natural assets have faced significant degradation in recent decades due to unsustainable human activities such as

large-scale deforestation, expansive mining operations, and the rapid growth of industrial-scale agricultural practices [2]. These activities have resulted in the widespread destruction of South Kalimantan's lush tropical forests, the fragmentation and degradation of its peatland environments, and the pollution of its vital river systems, all of which have had devastating impacts on the region's biodiversity and the overall well-being of local communities [3]. The role of green leadership within school communities has emerged as a critical component in addressing pressing environmental challenges, especially in the South Kalimantan context. These school communities, comprising diverse stakeholders such as students, teachers, administrators, and parents, possess the capacity to catalyze meaningful change and cultivate a culture of environmental stewardship [4]. By empowering these school communities to embrace the principles of green leadership, South Kalimantan can nurture a new generation of environmentally conscious citizens, equipped with the necessary knowledge, skills, and commitment to guide Indonesia's journey towards a sustainable future in alignment with the 'Indonesia Emas 2045' vision [5].

This study delves deeper into how school leaders in South Kalimantan can foster a transformative culture of environmental stewardship and sustainability within their school communities. The paper examines the diverse range of innovative initiatives and strategies employed by these schools to promote green leadership, empower students and teachers as active environmental advocates, and create a lasting, systemic impact on the broader community. The study aims to uncover the pivotal role of green leadership in driving environmental sustainability efforts and supporting the 'Indonesia Emas 2045' vision for a prosperous, equitable, and environmentally conscious society. The findings of this in-depth research are expected to contribute to a deeper academic understanding of the critical function that school-based green leadership can fulfill in promoting environmental sustainability, fostering community engagement, and positioning Indonesia as a global leader in the transition toward a greener, more prosperous, and equitably developed future aligned with the 'Indonesia Emas 2045' vision. By highlighting the transformative potential of green leadership in the education sector, this study provides valuable insights and guidance that can be leveraged by other schools and communities seeking to actively contribute to Indonesia's plan for a sustainable future.

2 Theoretical Framework

2.1 Green Leadership and Environmental Sustainability

Beyond the school walls, effective green leaders recognize the importance of forging strong partnerships with local, regional, and global stakeholders to amplify the impact of their sustainability efforts [6]. By collaborating with community organizations, government agencies, and international networks, school leaders can access valuable resources, expertise, and funding to support the implementation of innovative, high-impact environmental initiatives within their schools and surrounding communities. This enables them to expand the reach and impact of their green initiatives, fostering

broader community engagement and driving transformative change at the local, regional, and even global levels [7].

Within the context of school communities, green leadership manifests through a multifaceted approach that empowers students, teachers, and administrators to become active participants in environmental conservation efforts [8]. School leaders who embrace green leadership principles actively cultivate a culture of environmental awareness by incorporating sustainability-focused curricula, providing resources and training to enable teachers to integrate environmental education into their teaching, and empowering the entire school community to engage in a wide range of eco-friendly initiatives [9]. These initiatives may include, but are not limited to, the implementation of waste management systems, the promotion of energy efficiency and renewable energy usage, the conservation of water resources, the creation of campus-wide recycling programs, and the establishment of school-community partnerships to address local environmental challenges [10], [11]. By fostering a collaborative and engaged school community, green leadership has the potential to drive transformative change and inspire a new generation of environmentally conscious individuals, who will be instrumental in shaping a sustainable future for Indonesia.

2.2 The Imperative of Green Leadership in Indonesia's 'Indonesia Emas 2045' Vision

To effectively solve these environmental challenges and contribute to the realization of the 'Indonesia Emas 2045' vision, the role of school-based green leadership is pivotal. School communities, with their vast reach and influence, are well-positioned to serve as powerful agents of change, empowering students, teachers, and the broader community to become active participants in the pursuit of environmental sustainability [12]. Green leadership within school communities is essential for cultivating a new generation of environmentally conscious citizens who can drive the transformative changes needed to achieve the 'Indonesia Emas 2045' vision [13]. By embedding sustainability principles into the core functions of educational institutions, school leaders can inspire and equip students to address complex ecological challenges, while also fostering a shared sense of responsibility for protecting Indonesia's natural resources and biodiversity. This holistic, community-based approach to green leadership is vital for realizing the government's ambitious goals for a sustainable and prosperous future [14].

Thus, green leadership is essential for achieving Indonesia's 'Indonesia Emas 2045' vision. By empowering school communities to drive environmental transformation, Indonesia can cultivate a new generation of eco-conscious citizens who will enact the changes needed to realize the country's sustainable and prosperous future [15]. Through adopting green leadership practices, school leaders can foster a shared responsibility for protecting Indonesia's natural resources, build collaborative partnerships, and inspire collective action toward environmental sustainability [16]. This holistic, community-based approach to green leadership is crucial for accomplishing the

ambitious goals of the 'Indonesia Emas 2045' vision, as it enables integrating environmental considerations across all sectors and levels of society. With green leaders leading the way, Indonesia can evolve into a thriving, equitable, and environmentally conscious nation, setting an example for sustainable development [15].

2.3 The Role of Green Leadership in Promoting Sustainability in School Communities

Through green leadership, school principals and administrators can cultivate a shared vision for environmental sustainability within their school communities. By fostering this collective engagement and sense of ownership, school communities can serve as hubs of environmental transformation, inspiring and empowering individuals to take tangible actions that contribute to the realization of the 'Indonesia Emas 2045' vision. Through this holistic approach to green leadership, school-based initiatives can catalyze broader societal change, equipping the next generation with the tools and mindset necessary to tackle complex environmental challenges and build a more sustainable future for Indonesia [17]. School communities, as centers of learning and civic engagement, occupy a unique and powerful platform to catalyze the transformation toward environmental sustainability [15]. This holistic approach to green leadership integrates environmental education, sustainable practices, and community engagement, enabling schools to nurture environmental awareness, knowledge, and a sense of personal and collective responsibility [18].

2.4 Current State of Indonesian Education in Promoting Environmental Sustainability

Despite the Indonesian government's long-term vision emphasizing sustainability, the current curriculum framework does not prescribe specific environmental education content, allowing for flexibility in integrating environmental themes based on local contexts and resources [19]. Nevertheless, the government's commitment to sustainability, as reflected in the "Indonesia Emas 2045" vision, provides a strong foundation for the further integration of environmental education within the Merdeka Belajar curriculum framework, presenting a valuable opportunity for schools to more prominently incorporate environmental education and empower students to become environmental stewards [20].

2.5 Green Leadership's Roles for Environmental Sustainability and 'Indonesia Emas 2045' Vision

Synergies Between Green Leadership Transformation and Indonesia Emas 2045 Vision

This visionary plan's emphasis on environmental sustainability, economic development, and social equity resonates deeply with the holistic approach advocated by green leadership, which recognizes the interconnectedness of these critical elements

in addressing environmental challenges [21]. The "Indonesia Emas 2045" vision and the green leadership transformation share a fundamental commitment to fostering a future that is not only economically vibrant but also environmentally responsible and socially equitable [15]. This synergy underscores the pivotal role that the green leadership transformation can play in realizing the government's bold and far-reaching aspirations for the nation.

Empowering School Communities as Agents of Change for Indonesia Emas 2045 Vision

School communities, comprised of students, teachers, administrators, and parents, represent a critical segment of society. They possess the significant potential to influence attitudes, behaviors, and policies regarding the environment [22]. Besides being places of learning, schools are also vital hubs of social and civic engagement, providing an ideal platform for cultivating environmental leadership skills, inspiring sustainable practices, and catalyzing community-wide action towards a greener future [23]. The green leadership transformation in education can play a pivotal role in realizing Indonesia's "Emas 2045" vision by equipping school communities with the necessary knowledge, skills, and values to become active agents of change [24]. By robustly integrating environmental education across the curriculum, schools can nurture environmentally literate and engaged students who are equipped to address complex environmental challenges.

Cultivating a Holistic and Multifaceted Approach to Sustainability in Education

To effectively empower school communities as agents of change for the "Indonesia Emas 2045" vision, a comprehensive and multifaceted approach to sustainability education is essential [13]. This approach should encompass three interconnected pillars: comprehensive environmental education, the implementation of sustainable practices within the school, and the deliberate cultivation of environmental leadership and stewardship among students, teachers, and the broader community [25]. By integrating these three pillars, schools can become powerful engines of change, equipping the next generation with the knowledge, skills, and values necessary to drive sustainable development and contribute to the realization of Indonesia's ambitious vision for 2045. This holistic approach recognizes the interconnectedness of environmental, economic, and social progress, and empowers school communities to lead by example, inspiring their local communities and aligning their efforts with the government's bold vision for a greener, more prosperous, and equitable future [26].

3 Method

This research employed a qualitative approach, using case studies to explore the nuanced landscape of green leadership within Indonesian schools, particularly in South Kalimantan. The study prioritized in-depth investigation and understanding of perspectives, initiatives, and practical experiences related to green leadership, rather than relying on numerical data. The research combined document analysis and case study compilation. The document analysis examined existing research articles, reports,

and policy documents related to green leadership in education, sustainable environment, and the Indonesian context. Additionally, the study focused on "concrete case studies" - detailed accounts of green leadership initiatives in various Indonesian schools, especially in South Kalimantan. These case studies were drawn from previously published research, reports by NGOs or governmental bodies, information on newspaper and school's websites, as well as direct observations and interviews with important school's stakeholders conducted by the author.

By triangulating data from policy documents, academic literature, and real-world case studies, this research approach provided a rich, context-specific understanding of the implementation of green school practices, the roles and responsibilities of school leaders, and the broader environmental and educational implications in Indonesian schools. The data were analyzed using a thematic analysis approach, involving a systematic review to identify recurring themes, patterns, and key concepts related to green leadership perspectives, successful initiatives, challenges faced, and the overall impact on school communities. The analysis aimed to synthesize the findings into a cohesive narrative, supported by evidence from the analyzed data, to answer the research questions surrounding green leadership in Indonesian schools.

4 Results and Discussion

4.1 Transformative Green Leadership for Environmental Education and Environmental

Green Leadership Transformation: Case Studies from Indonesia

SMP Negeri 1 Kragan, Rembang: 3R Waste Management and On-Site Composter

Guided by the school's green leadership team, led by the principal, the school has established an on-site composting facility to transform organic waste into nutrient-rich soil amendments. In addition to the composting program, the school has also adopted a 3R approach to waste management. This not only reduces the amount of waste sent to landfills but also engages students in hands-on learning about sustainable waste management practices. The school has also designed and created a vibrant school garden, filled with a diverse array of native plants and trees. Furthermore, the school has actively participated in environmental sustainability campaigns, collaborating with local authorities and community organizations to raise awareness and promote environmentally responsible behaviors beyond the school's boundaries.

SMP Negeri 24 Jakarta: Sustainable Lifestyle and Environmental Education Campaigns

The school has actively empowered students to become agents of change, involving them in decision-making through the student council and environmental clubs. These student-led groups play a crucial role in developing and implementing green programs, such as waste management, water conservation, and energy-saving initiatives. This

student-centric approach fosters environmental stewardship and sustainability commitment among the student body. To further demonstrate its dedication to sustainability, the school has also transformed its physical environment. The campus now features a vibrant garden filled with a diverse array of native plants, creating a serene and ecologically-rich setting for learning and exploration.

SMA Negeri 3 Semarang: River Eco-Enzim Program and Specta-Ecolife Activities

SMA Negeri 3 Semarang, a high school in Central Java, has taken a unique approach to environmental sustainability by focusing on the restoration and conservation of local rivers. Under the leadership of the principal and with the active involvement of the school community, the school has implemented the "River Eco-Enzim" program. This program aims to revive the ecological health of the Lawang Sewo River that runs close to the school grounds. The program even has a motto, "Lestarikan Bumiku," that underscores the school's commitment to environmental stewardship and serves as a guiding principle for its sustainability initiatives. This motto highlights the importance of preserving and caring for our Earth, which is central to the various sustainability efforts undertaken by the school community. In addition to the River Eco-Enzim program, SMA Negeri 3 Semarang has also implemented the "Specta-Ecolife" initiative, which focuses on the development of eco-friendly products and the promotion of sustainable lifestyles among students. The program encompasses a range of hands-on activities, such as the creation of vibrant vertical gardens that showcase the potential of urban agriculture.

Sekolah Citra Alam Ciganjur, Jakarta Selatan: Embracing Sustainability as a Way of Life and Connection Between Learners and Environment

One of the standout features of Sekolah Citra Alam Ciganjur is its emphasis on outdoor learning and immersive experiences in nature. It has a commitment that learning is to understand wisely about the connection between learners and environment. The campus is meticulously designed to blend with the surrounding natural landscape, featuring lush gardens, a thriving organic farm, and well-maintained composting facilities. Furthermore, the school has implemented environmental sustainability activities such as the "Selamatkan Bumi" program, the "Jelajah Hijau" program, and "Gerakan Pencinta Alam" Program, as well as green environment workshops for both teachers and students.

Green School Bali: A Global Beacon of Sustainability Education and Living Sustainability Lifestyle

Green School Bali have also implemented environmental sustainability curriculum such as green literacies program, eco-entrepreneurship courses, and outdoor environmental science labs that provide students with hands-on learning experiences in renewable energy, sustainable agriculture, and ecological conservation. Furthermore, Green School Bali has implemented Living Sustainability Lifestyle, where the school and its community engage in a wide range of sustainable practices in their daily lives, including adopting a zero-waste approach, utilizing renewable energy sources, and embracing organic farming methods. Furthermore, Green School Bali has

established a comprehensive waste management infrastructure, including a dedicated waste management center, composting station, and aquaponic center, to effectively manage, recycle, and reuse the waste materials generated within the school.

Green Leadership Transformation in Action: Case Studies from South Kalimantan

SMP Negeri 1 Banjarmasin: Pioneering Waste Management and Recycling

The school has implemented a comprehensive waste segregation program, educating students about the importance of proper waste disposal and recycling. Additionally, the school has established a composting facility where organic waste is transformed into valuable fertilizer for the school garden. This collective effort demonstrates the power of green leadership in mobilizing the school and the surrounding community towards more sustainable practices.

SMP Negeri 1 Banjarbaru: Greening the School and Fostering Environmental Stewardship

The school's campus features a well-maintained school garden and trees around the school yards, serving as a living laboratory for students to explore biodiversity, ecosystem dynamics, and the importance of urban green spaces. Furthermore, the school has integrated environmental topics into its curriculum, empowering students to develop a deeper understanding of environmental issues and their role as environmental stewards. SMPN 1 Banjarbaru's principal, a passionate advocate for sustainability, has played a pivotal role in driving these initiatives.

SMA Negeri 1 Banjarmasin: Environmental Sustainability Curricular Integration and Child-Friendly School Program

The school has seamlessly integrated environmental education across various subjects, ensuring that students develop a comprehensive understanding of environmental issues, resource conservation, and sustainable practices. Beyond the classroom, the school has established a vibrant environmental club, that has a program called "Sekolahku Bersih, Hijau, dan Asri" where students take the lead in organizing and executing a range of environmental initiatives. SMA Negeri 1 Banjarmasin has implemented child-friendly school design principles, incorporating green spaces, shaded walkways, and natural ventilation to enhance the learning environment and demonstrate the school's dedication to environmental stewardship.

SMK Negeri 4 Banjarmasin: Cultivating Green Skills, Environmental Entrepreneurship, and Environmental Awareness

The school's mission to "Enhance Environmental Awareness" reflects this commitment. The school has strategically integrated environmental education and green skills development across its vocational programs, enabling students to gain practical knowledge and hands-on experience in sustainable practices. SMK Negeri 4 Banjarmasin has committed to becoming a leading "Green School" in the region, with

a multifaceted approach that includes curriculum integration, student-led initiatives, and community engagement.

SMA Negeri 4 Banjarbaru: Integrating Environmental Sustainability through Curriculum and School Culture

The school's Green School program has been recognized at the national level, as it was awarded the prestigious Adiwiyata award, which honors schools that demonstrate exemplary environmental management and education. Accordingly, the school's vision and mission emphasize a strong commitment to environmental sustainability, with the aim of creating an environmentally conscious school community that can contribute to the preservation of the environment. SMA Negeri 4 Banjarbaru has implemented energy-efficient lights, robust waste management systems, and campus-wide green spaces to minimize its environmental footprint and serve as a living laboratory for sustainable practices.

MTS Negeri 4 Tabalong: Developing an Environmentally Conscious School Curriculum and Green School Culture

The school's unwavering commitment to environmental protection and stewardship is profoundly reflected in its mission statement, which places a strong emphasis on the critical importance of developing students' comprehensive environmental awareness and instilling within them a profound sense of responsibility for the preservation and stewardship of the region's precious natural resources. Beyond the classroom, MTS Negeri 4 Tabalong has also cultivated a vibrant green school culture, where environmental stewardship is embedded into the daily routines and practices of the school community.

SMA Negeri 1 Tanjung: Zero Plastic Waste and Vision for Environmental Preservation

The school's commitment to green initiatives is exemplified through its "Zero Plastic Waste" campaign, which has garnered national recognition and inspired other educational institutions to follow suit. The school's "Zero Plastic Waste" campaign, for instance, has mobilized the entire school community to eliminate the use of single-use plastics on campus. The school has established a thriving school garden, where students learn about sustainable agriculture, composting, and the importance of biodiversity. Additionally, the school collaborates with ADARO and PAMA Coal Mining companies to organize a range of green school initiatives.

MAN 2 Banjarmasin: Integrating Environmental Sustainability into School Management and Operations

MAN 2 Banjarmasin, a prominent Islamic high school in the capital city of South Kalimantan, has taken a holistic approach to integrating environmental sustainability into its school management and operations. Recognizing the urgent need to address environmental challenges, the school has embedded sustainable practices into every aspect of its operations, from curriculum development to infrastructure management. Beyond the classroom, MAN 2 Banjarmasin has taken significant and far-reaching steps to align its school infrastructure and operational practices with sustainability

principles. The school has made substantial investments in energy-efficient lighting, water-saving technologies, and renewable energy sources, such as solar panels, to substantially reduce its environmental footprint and carbon emissions.

4.2 Innovative Strategies of Green Leadership Transformation in Education for Environmental Sustainability in South Kalimantan

- a) Cultivating Green Leaders through Teachers Training and Students Empowerment
- b) Creating Sustainable Learning Environments through Green Schools Framework and Environmental Education Curriculum Integration
- c) Fostering Community Engagement and Partnerships for Environmental Stewardship through Local Collaborations and Partnerships
- d) Incentivizing and Supporting Green Initiatives through Funding, Awards and Recognition
- e) Building a Legacy of Green Leadership and Environmental Stewardship

4.3 Green Leadership Transformation Roles for Indonesia Emas 2045 and Environmental Sustainability in South Kalimantan

- a) Visionary School Leaders for Environmental Sustainability
- b) Mobilizing Resources and Fostering Partnerships for Green Initiatives
- c) Transformative Educators: Embedding Sustainability Across Curricula, Adopting Innovative Pedagogy, and Becoming Mentors and Role Models for Environmental Sustainability
- d) Empowered Students: Leading Green Initiatives, Fostering Collaborative Networks, and Driving Sustainable Change
- e) Engaged Communities: Support School Sustainability initiatives, Promote Local Knowledge and Practices, and Advocate for Environmental Protection

4.4 Transformative Green Leadership for Environmental Sustainability in Indonesian and South Kalimantan Schools

The research findings underscore the critical role of visionary school leadership in driving the remarkable green transformation observed across Indonesia. Principals and administrators who have wholeheartedly embraced a bold, forward-thinking approach to environmental sustainability have demonstrated an unparalleled ability to catalyze systemic change within their institutions [27]. By fostering a deep-rooted culture of sustainability that permeates every facet of school life, these transformative leaders have been able to overcome the inertia of institutional bureaucracy and induce a profound shift in mindsets and behaviors [28].

The research findings reveal that the remarkable green transformation observed in schools across Indonesia, particularly in South Kalimantan, is not limited to the region. Rather, multiple schools throughout the country have demonstrated innovative approaches to promoting environmental sustainability [27]. For instance, SMAN 1

Semarang in Central Java has implemented a comprehensive urban farming program that not only provides sustainable food for the school's cafeteria but also serves as an outdoor learning lab for students to explore sustainable agricultural practices. Similarly, SMPN 1 Kragan Rembang in East Java has invested in renewable energy infrastructure, including solar panels and wind turbines, to power their campus and reduce their carbon footprint [29]. In the capital city of Jakarta, SMPN 24 has pioneered a holistic environmental education curriculum that integrates traditional ecological knowledge, hands-on sustainability projects, and community engagement initiatives to instill a deep sense of environmental stewardship among its students and school community [30]. Further, Sekolah Citra Alam in Ciganjur, on the outskirts of Jakarta, has adopted a whole-school approach to sustainability, embedding green practices into every aspect of school life, from waste management to biodiversity conservation [31]. Additionally, the well-known Green School in Bali has set a global benchmark for sustainable campus design and experiential environmental learning, inspiring schools around the world to emulate its transformative model [27]. These diverse examples across Indonesia demonstrate the profound impact that visionary school leaders and administrators can have in driving lasting, systemic change towards environmental sustainability within their respective communities.

The schools in South Kalimantan have demonstrated a remarkable commitment to green leadership and environmental sustainability. At SMA Negeri 1 Tanjung, the school has implemented a comprehensive urban farming program that provides sustainable food for the cafeteria and serves as an outdoor learning lab for students [66]. SMAN 4 Banjarbaru, on the other hand, has invested in renewable energy infrastructure, including solar panels and wind turbines, to power their campus and reduce their carbon footprint [32]. Furthermore, at MAN 2 Banjarmasin, the school has pioneered a holistic environmental education curriculum that seamlessly integrates traditional ecological knowledge, hands-on sustainability projects, and community engagement initiatives [33]. Similarly, SMPN 1 Banjarmasin and SMAN 1 Banjarmasin have adopted a whole-school approach to sustainability, embedding green practices into every aspect of school life, from waste management to biodiversity conservation [34]. This holistic integration of sustainability principles has empowered these institutions to become sustainability leaders within their communities. Additionally, SMKN 4 Banjarmasin and SMPN 1 Banjarbaru have taken a more collaborative approach, actively engaging with local authorities and participating in community-based environmental initiatives [33]. Lastly, MTsN 4 Tabalong has focused on nurturing a profound sense of environmental stewardship and place-based responsibility among their students, faculty, and wider community stakeholders [35]. This approach has empowered a new generation of green leaders who are poised to drive lasting, systemic change toward environmental sustainability in South Kalimantan and beyond.

4.5 Strategies of Green Leadership Transformation in for Environmental Sustainability

Recognizing the importance of community engagement, these leaders have fostered partnerships and collaborations to leverage resources and amplify their influence on policymakers. This collaborative approach has enabled them to secure the funding and support needed to incentivize and sustain green initiatives across their campuses. Importantly, these leaders have also instilled a profound sense of environmental stewardship and place-based responsibility among their school communities [36].

For instance, SMAN 1 Semarang in Central Java has implemented a comprehensive urban farming program that not only provides sustainable food for the school's cafeteria but also serves as an outdoor learning lab for students to explore sustainable agricultural practices [37]. Similarly, SMPN 1 Kragan Rembang in East Java has invested in renewable energy infrastructure, including solar panels and wind turbines, to power their campus and reduce their carbon footprint [33]. In the capital city of Jakarta, SMPN 24 has pioneered a holistic environmental education curriculum that integrates traditional ecological knowledge, hands-on sustainability projects, and community engagement initiatives to instill a deep sense of environmental stewardship among its students and faculty [38]. Furthermore, in West Java, SMAN 4 Bandung has taken a comprehensive approach to sustainability, weaving green practices into every facet of school life, from waste management to biodiversity conservation [39]. This holistic integration of sustainability principles has empowered the institution to become a sustainability leader within its community, inspiring other schools to emulate its example. Additionally, Sekolah Citra Alam Ciganjur in Jakarta and the well-known Green School in Bali have set global benchmarks for sustainable campus design and experiential environmental learning, inspiring schools around the world to emulate their transformative models [17].

Aligning with the inspiring examples set by pioneering schools across Indonesia, the educational institutions in South Kalimantan, such as SMPN 1 Banjarmasin, SMAN 1 Banjarmasin, SMKN 4 Banjarmasin, SMPN 1 Banjarbaru, and MTsN 4 Tabalong, have demonstrated a deep and multifaceted commitment to driving green leadership transformation and empowering their local communities for environmental sustainability [40]. These visionary schools have implemented comprehensive strategies that go beyond mere surface-level changes, embracing a holistic approach to sustainability that permeates every aspect of school life. From renewable energy infrastructure and urban farming initiatives to the integration of traditional ecological knowledge and hands-on sustainability projects, these institutions have transformed themselves into vibrant hubs of green innovation, serving as catalysts for broader, systemic change in the region [41].

4.6 Green Leadership Transformation Roles for Indonesia Emas 2045 and Environmental Sustainability

The research findings reveal how school leaders in South Kalimantan have played a pivotal role in driving lasting change toward environmental sustainability as part of Indonesia's vision for "Indonesia Emas 2045". Visionary school leadership drives comprehensive sustainability initiatives, from renewable energy to holistic environmental education, serving as models and catalysts for broader transformation [13]. Institutions that have successfully embedded sustainability throughout their operations, pedagogy, and culture demonstrate the profound transformative power of green leadership [42]. These pioneering schools, such as SMAN 1 Semarang, SMPN 1 Kragan Rembang, SMPN 24 Jakarta, and SMAN 4 Bandung, have not only transformed themselves into beacons of green innovation but have also emerged as powerful catalysts, inspiring and empowering other educational communities across Indonesia to follow their lead and embrace sustainable practices [39]. Similarly, Sekolah Citra Alam Ciganjur in Jakarta and the well-known Green School in Bali have set global benchmarks for sustainable campus design and experiential environmental learning, inspiring schools around the world to emulate their transformative models and adopt innovative, eco-friendly practices [43]. These pioneering institutions have demonstrated the profound potential of green leadership in education, showcasing how schools can become vibrant hubs of sustainability and environmental stewardship that catalyze broader, systemic change.

The critical and multifaceted role of schools in South Kalimantan, including SMPN 1 Banjarmasin, SMAN 1 Banjarmasin, SMKN 4 Banjarmasin, SMPN 1 Banjarbaru, and MTsN 4 Tabalong, in driving environmental sustainability has become increasingly evident and indispensable as the nation strives to achieve its ambitious "Indonesia Emas 2045" vision [33]. These institutions have demonstrated that a comprehensive, holistic approach to sustainability, one that permeates every aspect of school life, is essential for fostering lasting, systemic change and cultivating a new generation of environmentally conscious and responsible citizens. The research findings underscore the importance of a comprehensive approach that encompasses government support, community engagement, technological advancements, and a deep commitment to green leadership. By cultivating green leaders, creating sustainable school environments, fostering active student participation, and promoting community involvement, school communities can play a pivotal role in shaping a greener and more prosperous future.

5 Conclusion

The imperative of a green leadership transformation within the context of Indonesia's ambitious vision, "Indonesia Emas 2045," is undeniable. This transformation, rooted in a paradigm shift towards sustainable and ethical decision-making, is crucial for navigating the complex interplay between economic development and environmental preservation. School communities, as vibrant microcosms of society, hold immense potential to spearhead this transformation. By empowering students, teachers,

administrators, and parents to embrace sustainability, we can foster a ripple effect that extends far beyond the classroom, shaping a generation of environmentally conscious and responsible citizens. The case studies highlighted in this paper underscore the tangible impact of green leadership in action. These initiatives showcase the potential of school communities to not only reduce their environmental footprint but also inspire and empower others to follow suit. It is evident that a multifaceted approach, encompassing government support, community engagement, technological advancements, and unwavering commitment to green leadership, is essential to overcome the challenges on the path to sustainability. By cultivating green leaders, creating sustainable school environments, fostering active student participation, and promoting community engagement, we can ensure that school communities in South Kalimantan and across Indonesia play a pivotal role in shaping a greener and more prosperous future for the nation.

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