



# SUSTAINABLE DEVELOPMENT: THE ROLE OF CITIZENSHIP ECOLOGY IN SOUTH KALIMANTAN FOR A GOLDEN INDONESIA 2045

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| ARTICLE INFO                                                                                                                                                                                                                   | ABSTRACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| <p><b>Article History:</b><br/> Received: 8 September 2025<br/> Revised: 10 October 2025<br/> Accepted: 25 November 2025<br/> Published: 15 May 2026</p> <hr/> <p><b>Keywords:</b><br/> Citizenship, ecology, sustainable.</p> | <p>Environmental degradation is an urgent problem that requires targeted and sustainable management. One strategy that can be implemented is citizenship ecology, which emphasises the active role of individuals and communities in preserving nature. This approach aligns with the Golden Indonesia Vision 2045, which targets food, energy and water independence, as well as the development of a creative, green and blue economy. The purpose of this study is to examine South Kalimantan regional government regulations based on citizenship ecology that support energy independence. This scientific paper uses a qualitative approach by applying the Systematic Literature Review (SLR) method. This study analysed 89 documents. Data sources consist of primary data (journal articles and regulations) and secondary data (book chapters, reference books, and archives). The results of this study indicate that South Kalimantan Province has implemented policies through energy independence, legal protection and the formation of an Adiwiyata team to socialise PBLHS, which is a school collective programme to promote an environmental friendly culture among students. Recommendations are needed to strengthen regulations and planning, monitoring, evaluation, and data transparency, funding and incentives, regional energy transition, and public participation.</p> |

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## Introduction

Environmental awareness is a crucial aspect of modern life, particularly in addressing the challenges of energy independence. Understanding the environment encourages individuals to recognise the impact of human activities on the natural world (Figueiredo *et al.*, 2023). A commitment to considering environmental impacts in every decision is the first step towards sustainability (Bürgener & Barth, 2018). Wise consumption and transportation choices reflect this awareness (Nuangchalerm *et al.*, 2024). Environmentally

friendly practices are also crucial (Firth & Smith, 2018). Disseminating environmental knowledge amplifies positive impacts broadly (Nuangchalerm *et al.*, 2022), including in economic and social aspects (Meesuk *et al.*, 2020).

Climate change has a significant impact, especially for low-income groups who often do not perceive the issue as urgent (Bourn & Soysal, 2021). Therefore, understanding and developing skills in environmental awareness are crucial to address increasingly complex

ecological challenges. This awareness influences policies, decision-making and encourages public participation in environmental protection (Santiani *et al.*, 2023). The government has a responsibility to raise public awareness, including through education about the impacts of environmentally damaging behaviours such as littering, illegal logging, overexploitation of marine resources, and excessive water and energy consumption (Janoušková *et al.*, 2020). Integrating energy independence goals into educational and social programmes is an effective strategy (Lovren & Jablanovic, 2023). Global environmental issues include air and water pollution in Turkey (Özer-Keskin & Aksakal, 2020; Recepoglu, 2021), industrial pollution in Bangladesh (Zannat *et al.*, 2021), uncontrolled urbanisation in Eastern Europe (Urbańska *et al.*, 2021), poor chemical waste management in Malaysia (Mahat *et al.*, 2020) and waste management challenges in Spain (Campo-Pais *et al.*, 2021).

These environmental issues are also occurring in Indonesia, a developing country with the fourth-largest population. Currently, it is preparing for transformation through the 2025–2045 National Long-Term Development Plan (RPJPN) under the vision of Golden Indonesia 2045 (Dewi *et al.*, 2023). This vision opens up significant opportunities for Indonesia to become a developed and globally competitive nation. However, challenges, such as social inequality, environmental degradation and the impact of globalisation, need to be addressed. This requires collaboration between individuals and policymakers (Ariza *et al.*, 2021) to achieve energy independence (Weiland *et al.*, 2021). Therefore, this study examines the local government regulations to support energy independence in South Kalimantan based on citizenship ecology.

## Materials and Methods

This scientific paper uses a qualitative approach by applying the Systematic Literature Review (SLR) method. In recent years, SLR has become a widely used due to its comprehensive

approach, which could ensure the reliability of results (Chigbu *et al.*, 2023). SLR allowed the collection of relevant evidence on a given topic that met predetermined eligibility criteria and provided answers to the formulated research questions (Mengist *et al.*, 2020). This study analysed 89 documents consisting of primary data (journal articles and regulations) and secondary data (book chapters, reference books, and archives). Analysis was conducted through data reduction, presentation and conclusion (Miles *et al.*, 2019). These articles were obtained from Scopus and Web of Science using the keywords “citizenship ecology” and “ecology education”. The screening process involved two stages, title/abstract review and full-text review. Once concepts were identified, they were linked to the “Golden Indonesia 2045” vision implemented by the South Kalimantan government. Suggestions and recommendations were then provided so that the data could further contribute to achieving the Golden Indonesia 2045 vision. Further details are listed in Table 1.

## Results

The data comprised a collection of relevant scientific articles, research reports and policy documents, systematically organised based on specific inclusion and exclusion criteria. This analysis used a thematic approach to identify patterns, key issues and contributions of citizenship ecology to sustainable development, environmental education and citizen participation. Findings were presented based on key themes emerging from the analysis process. It was then critically discussed with reference to the theoretical framework and local context of South Kalimantan, before being linked to the long-term goals of Golden Indonesia 2045.

### Citizenship Ecology

Sustainability is a major global issue today (Shen *et al.*, 2020). This concept was officially introduced at the 1992 Rio de Janeiro Summit, where 178 countries agreed to cooperate in environmental protection and reduce the negative impacts of business activities

Table 1: Document classification

| Category         | Indicators                            | Amount |
|------------------|---------------------------------------|--------|
| Research methods | Quantitative                          | 29     |
|                  | Qualitative                           | 9      |
|                  | Bibliometrics                         | 8      |
|                  | Conceptual/Theoretical                | 25     |
|                  | Policy (Non-Research)                 | 13     |
|                  | Monographs (Non-Research)             | 5      |
| Document type    | Journal Articles                      | 65     |
|                  | Regulations and Laws                  | 13     |
|                  | Book Chapters                         | 4      |
|                  | Reference Books                       | 4      |
|                  | Archives                              | 3      |
| Document theme   | Education for Sustainable Development | 42     |
|                  | Environmental Literacy                | 9      |
|                  | Environmental Policy                  | 8      |
|                  | Energy and Climate                    | 16     |
|                  | Others                                | 14     |

Source: Obtained from primary and secondary data

(Grubb *et al.*, 2020). One approach used is environmental citizenship, or citizenship ecology, which emphasised individual and community responsibility in protecting the environment (Guzmán & De Velazco, 2024). In addition to nature conservation, this approach also encompassed energy independence (Fedele *et al.*, 2019) through citizen competencies (Vasiliades *et al.*, 2021), such as willingness (Sarid & Goldman, 2021) and self-confidence (Sass *et al.*, 2020), as well as environmental values (Hadjichambis *et al.*, 2020) that influenced positive attitudes within society (Tsybulsky, 2020).

Recently, the concept of citizenship ecology had received increasing attention, in line with the increasing urgency of environmental issues. This concept encompassed several important aspects. First, it was understood as individual actions in living a sustainable lifestyle, such as energy and water conservation and recycling (Huttunen & Albrecht, 2021). Second, according to green political theory, citizenship ecology involved citizen participation in environmental

decision-making (Bowman, 2020). Third, this concept was closely related to environmental justice (Kojola & Pellow, 2021). A critical and collaborative approach could foster a sense of citizenship responsibility (Činčera *et al.*, 2020). This concept is illustrated in Figure 1.

Citizenship ecology could be realised if the following indicators were achieved: (a) Addressing existing environmental problems; (b) preventing the emergence of new environmental problems; (c) realising sustainability; (d) building harmonious relationships with nature; (e) respecting rights and obligations towards the environment; (f) identifying the roots of environmental problems; (g) encouraging critical, active involvement and community participation; and, (h) supporting environmental justice. To achieve these indicators, collective action, individual and group action, and participation in the public sphere are required. These actions could be realised only if citizens had the knowledge, values, attitudes, skills, competencies and behaviours that supported them to become agents of environmental change.

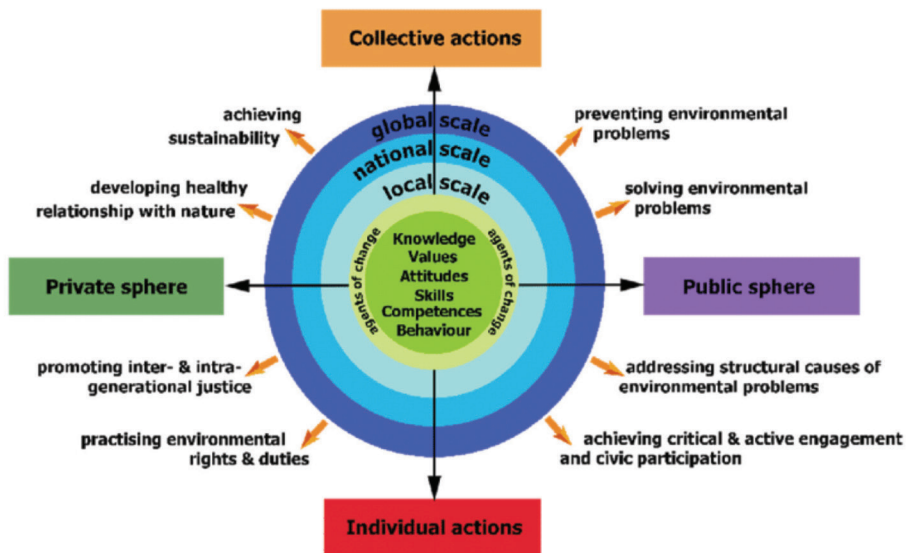


Figure 1: Education concepts for environmental citizenship  
Source: Adaptation from Hadjichambis *et al.* (2020)

### Ecological Education

The increasing threat of environmental degradation required immediate action. Mitigation efforts could be achieved by increasing public understanding of the environment (Yang *et al.*, 2021). This understanding encompasses a combination of knowledge, skills, competencies and behavioural responses to environmental issues (Liang *et al.*, 2018), including awareness of regulations and the socio-economic impacts of environmental degradation (Huang & Hsin, 2023). Furthermore, environmental understanding encompassed insights into natural systems and how to maintain them (Kharchenko *et al.*, 2020). This education aimed to provide knowledge, skills and motivation to support sustainability (Wardani *et al.*, 2018) and encourage active behaviour in conservation (Shamuganathan & Karpudewan, 2015). This understanding reflected the ability to maintain or improve the environment (Aikowe & Mazancova, 2023).

Strong environmental awareness would help individuals to develop the knowledge, values, ethics, character and skills needed to prevent environmental damage and promote

the preservation and improvement of natural conditions (Putra *et al.*, 2021). There were four main elements of environmental awareness: Knowledge, competence, disposition and environmental-friendly behaviour (Sudarmin *et al.*, 2024). These elements must be applied in addressing environmental issues to ensure appropriate decisions and actions (Szczytko *et al.*, 2019). This understanding was also related to how environmental systems worked and how humans could play a role in maintaining them (Koçak *et al.*, 2023). The greater a community's understanding, the better prepared they would be to face environmental challenges and promote energy independence (Sasa *et al.*, 2022). One effort to increase this awareness was through ecological education at all levels (Mutlu *et al.*, 2021). This education should begin at an early age, even in preschool, and gradually progress through theory and practice (Simsar & Doğan, 2019). Young people play a crucial role as actors and leaders in environmental issues (Wood & Kallio, 2019; Kallio *et al.*, 2020; Georgiou *et al.*, 2021) and with the support of technology, they could accelerate the spread of ecological citizenship values (Caren *et al.*, 2020).

Ecological education played a crucial role in developing individuals who cared about the environment (Kiraz & Salman, 2021) and were able to find solutions to environmental problems (Berber, 2021). This process aimed to help individuals understand various concepts related to their living environment (Topal *et al.*, 2020), including the relationship between natural elements and habitats. This education also fosters awareness of the importance of preventing environmental damage and a sense of responsibility for environmental issues (Kalayci, 2020). In many countries, ecological education is an essential part of lifelong learning (Ablak & Yeşiltaş, 2020). This education could shape attitudes, values and skills that encourage concrete action (Pullu & Pullu, 2021), resulting in high-income countries with few environmental problems, whereas low-income countries required better policies (Santiani *et al.*, 2023). Consequently, many countries have implemented innovations, as listed in Table 2.

Table 2 shows that most pro-environmental innovations were driven by government policies. Governments could play a crucial role in addressing environmental issues by providing strategic direction, regulatory frameworks and incentives to mitigate the risk of adopting new technologies. Through a combination of emission standards, green tax instruments and subsidies, sustainable procurement, incubation

funding and pilot projects, governments could accelerate the diffusion of innovations from the research stage to the market. Governments could also promote transparency through mandatory environmental performance reporting. By establishing measurable targets, key performance indicators, and evidence-based monitoring and evaluation mechanisms, policies could be continuously adjusted to be effective, inclusive and equitable, so that emerging innovations actually result in emission reductions, improved waste management and sustainable ecosystem restoration. Another way to develop ecological education is through the role of environmental organisations. Institutions need to be more active in raising individual awareness of environmental issues (Itasanmi & Tosin, 2019) as shown in Table 3.

Based on Tables 2 and 3, it was clear that the formulation of environmental policies must involve both the government and environmental organisations. Governments could provide the regulatory framework, funding and enforcement, while environmental organisations contributed their technical expertise, field data and advocacy networks. Together, they could design evidence-based policies, encourage public participation and ensure monitoring, evaluation and policy adjustment mechanisms. Collaboration across levels (national and regional) and actors (academia, business and communities) would

Table 2: Environmental innovations undertaken by several countries

| Country   | Innovation                                                                                                                                                                           | Source                         |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Australia | The University of Wollongong in New South Wales, has developed the “Illawarra Flame House”, an energy-efficient and solar-powered house.                                             | Cole and Baghi (2024)          |
| Spain     | The Spanish government regulates beverage companies to create environmental-friendly products.                                                                                       | Carchano <i>et al.</i> (2024)  |
| Japan     | Japan’s waste management practices are sustainability focused — investing in new technologies, increasing efforts to reduce and recycle waste and promoting environmental awareness. | Moshkal <i>et al.</i> (2024)   |
| Sweden    | The Swedish government uses by-products from paper mills to produce biofuel.                                                                                                         | Lipiäinen <i>et al.</i> (2022) |
| France    | The French government has set a carbon neutral target by 2050 with updated energy strategies.                                                                                        | Khan <i>et al.</i> (2022)      |

Source: Obtained from primary and secondary data

Table 3: International institutions that promote environmental conservation

| Organisation Name                                                       | Explanation                                                                                                                                                                                                                                                                                 | Source                      |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| World Wide Fund for Nature                                              | WWF is the largest independent international organisation focused on environmental conservation, research and sustainability, supported by millions of people in more than 100 countries.                                                                                                   | Chairunnisa (2018)          |
| United Nations Environment Programme                                    | UNEP was founded in 1972 in Nairobi, Kenya, to support global environmental policy and sustainable development.                                                                                                                                                                             | Insani (2023)               |
| Intergovernmental Panel on Climate Change                               | The IPCC was established to assess the impacts of climate change caused by human activities. The IPCC has 195 member countries.                                                                                                                                                             | Paglia and Parker (2021)    |
| Global Environment Facility                                             | GEF is a grant-making organisation that funds environmental projects on climate, biodiversity, ozone, forests and sustainable cities.                                                                                                                                                       | Thieme <i>et al.</i> (2022) |
| <i>United Nations Educational, Scientific and Cultural Organization</i> | UNESCO is a global governmental organization based in Paris, France. Its goals are peace, poverty reduction, sustainable development, and intercultural dialogue through the implementation of programs in education, natural and social sciences, culture, communication, and information. | Bridgewater, (2016)         |

Source: Obtained from primary and secondary data

strengthen transparency, accountability and implementation effectiveness through clear role allocations. This collaborative governance was expected to enable everything from pollution control and ecosystem restoration, to adaptation of the circular economy and climate change mitigation.

## Discussion

Over the past 300 years, poor environmental management and pollution had led to the extinction of many species (Kraft, 2021). Hence, to prevent ecosystem damage, preserving natural habitats and protecting endangered species is crucial (Roscoe *et al.*, 2019). Environmental sustainability had been identified as a priority in implementing the Golden Indonesia 2045 Programme, therefore, appropriate policies could only be formulated optimally if substantial contradictions were resolved with adequate capacity (Bali & Ramesh, 2019). This capacity encompassed the entire policy cycle and involved various stakeholders (Mardiyanta & Wijaya, 2023).

## Golden Indonesia 2045

Indonesia aspires to achieve a per capita income level equivalent to that of developed countries through three main pillars: Economic, social and governance transformation, with the spirit of “A Sovereign, Advanced and Sustainable Archipelago”. To realise this, regulations had been issued in governing the National Long-Term Development Plan 2025–2045 (Law The Republic Indonesia Number 59 of 2024 Concerning the National Long-Term Development Plan for 2025–2045, n.d.). This law divided development planning into two parts, namely national and regional. National plans formulated included the National RPJP, National RPJM, RKP, Renstra-KL and Renja-K. Meanwhile, regional development plans included the Regional RPJP, Regional RPJM and Regional RKP. The 2025–2045 National RPJP was prepared by taking the principles of energy independence into consideration and adopting the United Nations Sustainable Development Goals as explained in Law Number 59 of 2024. The vision of Golden Indonesia 2045 was the

realisation of a “Unitary State of the Republic of Indonesia that is united, sovereign, advanced and sustainable”, in accordance with the ideals stated in the country’s Preamble of the 1945 Constitution, namely independent, united, sovereign, just and prosperous. Provisions of laws and regulations in the environmental sector to strengthen the vision of Golden Indonesia 2045 are listed in Table 4.

The Indonesian government had implemented several regulations related to environmental policy. This demonstrated the country’s commitment to environmental issues as reflected in the establishment of environmental quality standards, licensing instruments such as AMDAL/UKL-UPL-SPPL and the green economy as a model for sustainable development. The government had also adopted economic instruments, such as the economic value of carbon, renewable

energy incentives, and waste reduction/management schemes, to encourage behavioural change among businesses and the public. The integration of Strategic Environmental Assessments (KLHS) into development planning and consistency with national targets (emission reduction, waste reduction, ecosystem rehabilitation) demonstrated the mainstreaming of environmental issues in public policy. On the implementation side, transparency and accountability were endured through monitoring, evaluation and performance reporting mechanisms, including programme assessments for environmental compliance. However, regulatory effectiveness would depend heavily on cross-sectoral and cross-level coordination, local government capacity, adequate funding and public participation. Collaborations with businesses, investors and civil society was key to ensuring inclusive and equitable impacts.

Table 4: Indonesian state regulations regarding the environment

| Description                                                                                                                                                                                                                                                                            | Source                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| The government promotes the green economy as a model of sustainable development through Law Number 16 of 2016 and Presidential Regulation 98/2021.                                                                                                                                     | Law The Republic Indonesia Number 16 of 2016 and Presidential Regulation The Republic Indonesia Number 98 of 2021  |
| The government requires business plans that have an environmental impact to fulfil the Amdal/UKL-UPL-SPPL licensing requirements.                                                                                                                                                      | Government Regulation The Republic Indonesia Number 22 of 2021                                                     |
| The government has determined that motor vehicles need to be controlled through emission quality standards, motor vehicle taxes and supporting policies to reduce air pollution. Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number 8 of 2023. | Regulation The Minister Environment and Forestry Republic Indonesia Number 8 of 2023                               |
| The government establishes national policies and strategies in waste management, such as waste reduction and waste handling.                                                                                                                                                           | Government Regulation The Republic Indonesia Number 81 of 2012                                                     |
| The government has established regulations regarding Strategic Environmental Assessment (KLHS) to ensure that sustainable development principles are integrated into regional planning.                                                                                                | Law The Republic Indonesia Number 32 of 2009                                                                       |
| The government has developed a PBLHS curriculum as a collective action for schools that is conscious, voluntary, networked and environmental-friendly. Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.52/Menlhk/Setjen/Kum.1/9/2019.     | Regulation The Minister Environment and Forestry of The Republic Indonesia Number P.52/Menlhk/Setjen /Kum.1/9/2019 |

Source: Obtained from primary and secondary data

### ***Citizenship Ecology in South Kalimantan***

South Kalimantan is a province on the island of Borneo with Banjarmasin as the capital. It comprises 11 regencies and two cities. The province had implemented several regional regulations supporting the Golden Indonesia 2045 environmental programme, as shown in Table 5.

Based on the environmental regulations already implemented in Table 5, South Kalimantan Province is ready to support the Golden Indonesia 2045 Programme. Concrete evidence of this readiness included regulations on urban spatial planning, coastal land management, natural area protection and implementation of the Adiwiyata programme in schools. With measurable targets, adequate funding and cross-actor collaborations, this series of policies could strengthen regional competitiveness while maintaining environmental quality towards 2045. Coupled with strengthened governance, environmental data transparency and consistent law enforcement, these policies would accelerate the region's green economy transition, and improve climate resilience and the quality of life among the people of South Kalimantan. Even though it was good in environmental management, the South Kalimantan Provincial

Government still required recommendations as listed in Table 6, for example.

Based on the recommendations in Table 6, the following steps could be taken to strengthen environmental policies: First, align Regional Regulations with AMDAL, KLHS, and RPJMD/RKPD instruments to link environmental targets with regional government agencies. Second, establish an environmental ecology coordination unit under the Regional Secretary through a Governor's Decree. Third, establish regional emission standards and mandatory pollution load reduction plans per sector. Fourth, establish a baseline environmental quality index for sectoral emissions, water/air quality, land cover and waste generation. Fifth, develop a "South Kalimantan Green Dashboard" to expedite the licensing process. Sixth, allocate funds from natural resource revenues for new and renewable energy. Seventh, encourage cooperation between the government and business entities for green-labeled businesses. Eighth, facilitate Energy Service Companies through solar panel rentals for public buildings to reduce capital expenditures. Ninth, expand digital waste banks and use waste-derived fuel to reduce waste ending up in landfills. Tenth,

Table 5: Regional regulations of South Kalimantan concerning the environment

| <b>Description</b>                                                                                                                                                           | <b>Source</b>                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| This regulation regulates the spatial planning for the South Kalimantan region for 2023–2042 to build a national-global economic centre based on synergy and sustainability. | Regional Regulation South Kalimantan Province Number 6 of 2023     |
| This regulation regulates WP-3-K zoning to integrate land-sea space, maintain resource sustainability and reduce conflicts of interest.                                      | Regional Regulation of South Kalimantan Province Number 13 of 2018 |
| This regulation regulates South Kalimantan's responsibility in managing environmental-friendly waste optimally according to its objectives.                                  | Regional Regulation South Kalimantan Province Number 8 of 2018     |
| A regulation for sustainable management of natural resources to ensure legal certainty in South Kalimantan.                                                                  | Regional Regulation South Kalimantan Province Number 8 of 2022     |
| This regulation regulates the Adiwiyata Programme to form environmentally conscious school communities through good governance in South Kalimantan.                          | Governor Regulation South Kalimantan Number 037 of 2012            |

Source: Obtained from primary and secondary data

Table 6: Suggestions for strengthening citizenship ecology in South Kalimantan

| Suggestion                                   | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strengthening regulations and planning       | <ul style="list-style-type: none"> <li>- Harmonisation of Regional Regulations with AMDAL, KLHS, and RPJMD/RKPD instruments so that environmental targets are tied to regional apparatus organisation (OPD) programmes.</li> <li>- Formation of an environmental ecology coordination unit under the Regional Secretary (members: DLH, ESDM, Education Office, PU, Transportation, Kominfo, Bappeda) with a Governor's Decree.</li> <li>- Establishing regional emission standards (ambient/chimney/vehicle) and mandatory pollution load reduction plans per sector (energy, industry, transportation, waste).</li> </ul> |
| Monitoring, evaluation and data transparency | <ul style="list-style-type: none"> <li>- Establishing baselines for environmental quality index (IKLH), sectoral emissions, water/air quality, land cover, and waste generation.</li> <li>- Developing a "Green Dashboard South Kalimantan" (open data) to accelerate the Online Single Submission Risk Based Approach (OSS-RBA) licensing process, AMDAL reports, public complaints and restoration maps.</li> </ul>                                                                                                                                                                                                      |
| Funding and incentives                       | <ul style="list-style-type: none"> <li>- Earmarking of funds from natural resource revenues (DBH) for New and Renewable Energy (EBT), post-mining reclamation, rehabilitation of River Basin Areas (DAS), and strengthening the Adiwiyata programe through corporate social responsibility (CSR) initiatives.</li> <li>- Encouraging Government and Business Entity Cooperation (KPBU) and retribution incentives for green-labelled businesses.</li> </ul>                                                                                                                                                                |
| Regional energy transition                   | <ul style="list-style-type: none"> <li>- Facilitating Energy Service Companies (ESCOs) through solar panel rental for public buildings to reduce capital expenditure (CAPEX).</li> <li>- Expanding digital waste banks and use Refuse Derived Fuel (RDF) to reduce waste going to landfill.</li> </ul>                                                                                                                                                                                                                                                                                                                     |
| Public participation                         | <ul style="list-style-type: none"> <li>- Submitting environmental proposals through the Development Planning Deliberation (Musrenbang) which involves indigenous communities.</li> <li>- Implementing modern community-based green procurement.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                 |

Source: Obtained from primary and secondary data

implement modern, community-based green procurement processes.

## Conclusions

Environmental degradation is an urgent issue that must be addressed immediately. An effective solution is through planned and targeted environmental management. One strategic approach is citizenship ecology, which emphasises the importance of individual and community competencies in preserving nature. Based on the available literature, this study is the first comprehensive synthesis to explicitly link South Kalimantan's environmental regulations

to the Golden Indonesia 2045 agenda. Its novelty also lies in the mapping of policies and indicators that link AMDAL (Environmental Impact Assessment), KLHS (SEA), emission standards, waste management and PBLHS/Adiwiyata (Natural Environment and Forestry Development) with measurable performance indicators (water quality, GHG emissions, land rehabilitation and climate resilience). Thus, this study not only maps policy directions but also provides an implementation and monitoring framework that can be replicated as a 2025–2045 baseline at the subnational level. Recommendations include strengthening regulations and planning; ensuring monitoring,

evaluation and data transparency; providing development funding and incentives; implementing regional energy transition; and encouraging public participation.

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### Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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