

# Implementation of the concepts of sustainable nature environment education in Indonesia nature-based Early Childhood Education (ECE) learning as a supporter of achieving SDGs: Life on land

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## Abstract

This research aims to investigate implementation of the concepts of sustainable nature environment education (SNEE) in Nature-Based Early Childhood Education (ECE) Learning and see the contribution of SNEE to supporting the achievement of SDGs Life on Land in Indonesia. This research method is qualitative case study research. The research concludes that Indonesian Nature-Based ECE has effectively incorporated SNEE principles into its learning practices and contribute to supporting SDGs life on land. The SNEE framework is operationalized through three main concepts: SNEE human behavior, SNEE critical thinking, and SNEE play & learning. Firstly, SNEE human behavior is successfully integrated into Indonesian Nature-Based ECE through the application of character education and Islamic education to develop a sense of responsibility as stewards of the environment. Secondly, the implementation of SNEE critical thinking in Indonesian Nature-Based ECE involves adapting the learning environment to include nature as a fundamental component. Lastly, the SNEE play & learning concept in Indonesian Nature-Based ECE is manifested through interactive and nature-related activities. SNEE at Indonesian Nature-based ECE contributes to supporting SDGs life on land by providing superior activities such as waste management, plant and animal conservation, and understanding natural disaster mitigation.

## Keywords

Sustainable nature environment education, Early childhood education, Nature-based school, SDGs, Life on land

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## Introduction

Addressing the impact of climate change is a global imperative, requiring the concerted efforts of every country. The crisis extends its effects across diverse facets of nature and human life, necessitating proactive measures from all communities. UNICEF's Executive Director, Fore, emphasizes the importance of integrating climate resilience and environmental sustainability into services for children. Moreover, she underscores the role of schools in imparting green environmental skills to the younger generation. This aligns with the broader objectives set by the United Nations in the 2030 Sustainable Development Goals (SDGs), established in 2015. Fore's suggestion recognizes the urgent need for a holistic approach that considers climate resilience and environmental sustainability in child-focused services. The impact of climate change is felt most acutely by vulnerable populations, including children, who often bear the brunt of environmental disruptions. By incorporating climate resilience into services for children, societies can better prepare the younger generation to navigate the challenges posed by a changing climate. Schools play a pivotal role in shaping the values and skills of future generations. Fore's call to integrate green environmental skills into educational curricula aligns with the SDGs, particularly those related to environmental sustainability. Educating children about the importance of environmental conservation and sustainable practices instills a sense of responsibility and fosters a generation that is conscious of its impact on the planet. As the custodians of the future, today's youth need to be equipped with the knowledge and skills necessary to contribute to a more sustainable and resilient world. In summary, the interconnectedness of climate change, child welfare, and education underscores the urgency of comprehensive action. Fore's recommendation to merge climate resilience and environmental sustainability with services for children, especially within educational institutions, is a step towards building a generation that can effectively address the challenges of a changing climate and work towards a more sustainable future. This suggestion is also in line with the 2030 SDGs launched by the UN in 2015 (UNFCCC 2006; Unicef 2021; Vergunst and Berry 2022)

The SDGs 2030 represents a collective agreement among all United Nations Member States forged in 2015, with the shared objective of fostering peace and prosperity for present and future generations. As highlighted (Kohl et al. 2022; Stansfield J 2015), this global initiative comprises 17 SDGs, serving as an urgent call to action for nations worldwide. These goals are designed to mobilize both developed and developing countries into a collaborative partnership, emphasizing the imperative of joint efforts. Within the realm of environmental sustainability, five of the seventeen SDGs concentrate on crucial objectives: ensuring access to clean water, promoting affordable and clean energy, undertaking climate action, fostering life below water, and supporting life on land.

Education emerges as a pivotal catalyst in translating these environmental aspirations into tangible outcomes (Kang, Jun, and Park 2022; Magzamen et al. 2017; Ohlsson, Gericke, and Borg 2024; Ozburak, Batirbaygil, and Uzunoglu 2018; Spiteri 2021). By

integrating the SDGs into educational frameworks, nations can empower individuals with the knowledge (Leff 2012; Ren, Deng, and Liang 2018), skills (Evertsen and Brevik 2025; Jeet and Pant 2023; Pratiwi et al. 2023), and awareness (Curd-Christiansen 2021; Kallery 2011; Zainon et al. 2023) needed to contribute meaningfully to sustainable development. Education becomes a transformative force capable of instilling a sense of responsibility and understanding regarding the pressing environmental challenges outlined in the SDGs (Kohl et al. 2022). As nations strive to attain these environmental goals, education emerges as a linchpin, shaping informed and environmentally conscious citizens who can actively contribute to the achievement of a sustainable (Nousheen et al. 2020; Sauvé 1996) and resilient (Masten 2021; Ndugwa and Moreno 2020) global future. One of the steps to support the SDGs in the early stages is to introduce SNEE in early childhood education (ECE) institutions (Bailie 2019; NAAEE 2020; Smedsrud et al. 2023) to contribute to introducing the importance of sustainable life on land as the place where we live.

The educational pathway in SNEE is the right means to provide an understanding of the importance of preserving nature for the sake of environmental sustainability and maintaining climate stability. One of the initial foundation pathways for education is ECE. Many nature-based school concepts have been growing for a long time in various parts of the world. The following are nature-based schools in various countries, according to the Forest School Foundation (2020) and the results of the research team's interview with the head of the Jaringan Sekolah Alam Nusantara (JSAN) in October 2023.

SNEE, as a leading nature based ECE program, is experiencing a surge in demand from the public. Recognized for its innovative and impactful approach, SNEE plays a pivotal role in providing educational support for the realization of SDGs. With a primary focus on early childhood, SNEE aligns its objectives with key SDGs, including the pursuit of Life on Land. The program's popularity can be attributed to its comprehensive framework that not only imparts essential academic knowledge but also cultivates a deep-rooted connection between young learners and the natural world.

The unique learning principles embedded in SNEE, emphasizing the utilization of nature as a multifaceted educational resource (Kholik and Laeli 2020). These principles encompass employing nature not only as a source of learning material but also as an immersive learning medium and a dynamic learning environment. By integrating these principles, SNEE ensures a holistic educational experience, fostering a generation of learners who not only excel academically but also develop a profound appreciation for the environment. As society increasingly recognizes the importance of sustainable education (Martin 2020; Samuelsson 2008; Simoni and Koseni 2020; Simoni and Pograzha Koseni 2020; Wolff 2021), SNEE emerges as a pioneering model that not only meets these expectations but exceeds them, creating a lasting impact on the educational landscape.

SNEE serves as a fundamental and indispensable element in the nature based ECE curriculum, dedicating itself to portraying nature conservation within the realms of educational programs. At its core, SNEE aligns closely with the values encapsulated in the SDGs, concentrating on critical aspects of environmental preservation. These encompass a spectrum of SDGs, including clean water, affordable and clean energy, climate action, life below water, and life on land. By weaving these values into its fabric, SNEE functions as an educational beacon, guiding young minds towards fostering a profound sense of responsibility for nature, promoting sustainable resource utilization, and nurturing an innovative mindset centered around renewable energy. The strategic implementation of SNEE within the ECE domain proves particularly impactful, given its targeted approach toward children during their formative years, molding them into environmentally conscious individuals with a deep-seated commitment to sustainable practices.

Table 1. School based nature organization in the world

Canada (Forest School Foundation, 2020)	United Kingdom (Forest School Foundation, 2020)	New Zealand (Forest School Foundation, 2020)	Indonesia (Chief of JSAN, October 2023)
Educational institutions warn that Canada’s first outdoor school is opening outside Ottawa. Currently, this movement is growing rapidly, coined with the term Forest Nature Schools (FNS).	Forest schools were introduced to the UK in 1995 when a group of lecturers, child educators, and nurses from Bridgewater College in Somerset visited the Danish Forest School. UK Forest students are given access to skills in woodworking workshops, where they learn to make hammers, spatulas, and bird feeders using a variety of different tools and carving techniques.	Many environmentally based early childhood care and education services are emerging. This mini-style school education is based on the views of the Māori tribe, namely the indigenous people of New Zealand, who emphasize a strong connection with the land, mountains, rivers, and oceans.	Natural schools are said to have emerged in Indonesia with the introduction of the Lendo Novo concept in 1998, leading to the founding of the Citra Alam Ciganjur School. According to Safar (2021), Lendo Novo established the Jaringan Sekolah Alam Nusantara (JSAN) in 2011. In the same year, 57 nature-based ECE institutions joined JSAN. As of now, based on information from the official JSAN website, there are approximately 200 institutions that are members of JSAN, though not all schools have joined this association. Despite not being part of JSAN, many ECE schools in Indonesia label themselves as natural schools.

To provide a comprehensive overview of the diverse SNEE implementations in the ECE context, various studies are encapsulated in Table 1. This table serves as a valuable resource, shedding light on the varied approaches and scopes of SNEE within different educational settings. Through these comparative analyses, educators and policymakers gain insights into the multifaceted nature of SNEE programs, facilitating informed decisions for the integration and enhancement of nature-based education in early childhood settings.

Through an extensive literature review and examination of various references, a clear relationship between SDGs and SNEE in ECE institutions emerges. This recognition is pivotal as it forms the foundational basis for developing programs within the nature-based ECE curriculum. The relationships with SDGs are categorized into two aspects: SNEE Scope and Programs in the Nature-Based Curriculum of ECE. Identifying and understanding these relationships is essential for creating comprehensive and impactful educational initiatives in line with sustainability goals.

**Table 2** clearly explains the activities can emerge from preserving the natural environment in various studies. The key element in a curriculum is its alignment with the intended scope. The primary focus of SNEE is, of course, nature conservation and fostering positive human behavior towards nature. Meanwhile, the description of activities encompasses three aspects: SNEE human behavior, SNEE play and learn, and SNEE critical thinking about solving natural problems.

Firstly, focusing on SNEE human behavior (Cakan and Acer 2024; Collado, Rosa, and Corraliza 2020; Harvey et al. 2023) proves to be pivotal in immersing young children in their natural surroundings. This aspect of SNEE is designed to cultivate an early understanding and appreciation for the environment, fostering a sense of responsibility and connection to the natural world. Through specific behavioral practices, children are encouraged to adopt habits that contribute to environmental sustainability, such as proper disposal of trash, moderation in eating, and the use of reusable water bottles for refilling. Additionally, SNEE human behavior aims to instill a genuine love for plants and animals, emphasizing the importance of coexistence with the natural world.

Within the framework of SNEE human behavior, children are introduced to a set of permissible and impermissible actions with nature. This approach serves to shape an open mindset towards caring for the environment. Discouraging harmful activities like uprooting plants or disturbing maintained ecosystems, while encouraging positive actions such as weeding, forms the foundation for responsible behavior aligned with the SDGs. By incorporating these principles into early childhood education, SNEE human behavior not only contributes to individual development but also lays the groundwork for a generation that is environmentally conscious and committed to sustainable practices.

Secondly, SNEE critical thinking (Tasos 2024; Zahra Saeed 2025) is an integral component of the nature based ECE curriculum, providing young children with the tools to contemplate and understand various natural concepts derived directly from nature. This involves exploring phenomena such as celestial bodies, seasonal changes, and natural disasters, offering a comprehensive understanding of the world around them. Children are introduced to the concept of natural disaster mitigation, enlightening them on human-induced disasters like floods and landslides. Through critical thinking exercises, they are prompted to analyze the causes and consequences of activities like land deforestation, air pollution, water pollution, and land pollution.

Table 2. SNEE ECE in various research studies

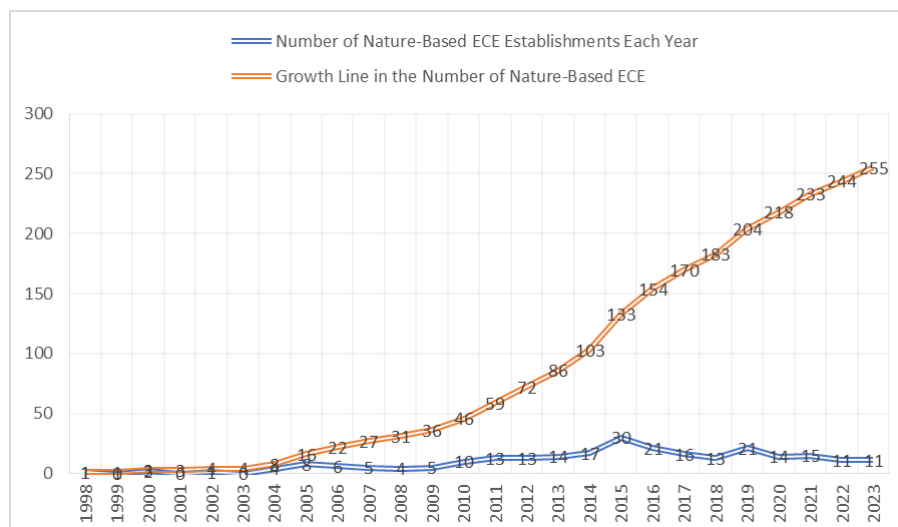
SNEE ECE (Ardoin & Bowers, 2020)	SNEE ECE (Sawitri, 2017)	SNEE ECE (Kennelly et al., 2011)	SNEE ECE (Djoehani et al. 2017)	SNEE ECE (Ozburak et al., 2018)
Scope which is important in SNEE is environmental conservation.	Scope SNEE is education about environmental awareness and sensitivity, and understanding environmental problems, having pro-environmental ideas and values.	Scope Save energy. Sustainable energy source Sustainability of living things and the environment Understanding the concept of solving natural environmental problems.	Scope Reduce waste and save goods. Reuse reusable items. Recycle Replanting in the context of nature conservation	Scope Sustainable space Save water Energy Saving Evaluation of waste management The quality of the interior and availability of natural materials
Children’s abilities are enhanced by Environmental Literacy Development: development of knowledge, behavior, skills to actively care for the environment.	Informal Learning SNEE in ECE will be more interesting delivered with informal learning. SNEE informal learning is defined as learning outdoors in the open air, classroom environments such as forests, botanical gardens, wildlife parks, gardening, playing using natural materials. This learning serves as an opportunity to make a topic entertaining, fun, and connect with nature		Caring for the environment: saving energy, water conservation, recycling waste, gardening and managing compost, food sustainability, and playing with nature.	
Time in Nature in the form of visiting natural areas, gardening, playing with natural materials.	Outdoor Activities in Natural Outdoor Settings Outdoor play & learning areas are an important component of SNEE. The aim of outdoor activities is to provide children with educational experiences outside the classroom that include direct contact with various environments. School Gardening Gardening in schools includes a complex series of activities. Gardening at school includes planting plants, processing compost, and caring for them. Play-based Learning. The game is open. Games by exchanging experiences where the teacher provides children with material that has environmental nuances or sustainability concepts.			

While acknowledging the limitations of covering all aspects comprehensively, SNEE critical thinking focuses on engaging children in simple yet effective exercises. These exercises aim to empower children with the ability to critically assess their surroundings and understand the implications of their actions. Moreover, the curriculum introduces strategies for mitigating natural disasters, such as tornadoes, volcanic eruptions, and earthquakes, equipping children with the knowledge and skills to respond in case of emergencies. By fostering critical thinking within the realm of environmental challenges, SNEE contributes to the broader goal of the SDGs by cultivating a generation capable of addressing and reducing the impact of natural disasters on the environment.

Thirdly, SNEE play and learn are fundamental components of nature-based curriculum activities (Baillie 2019; Falzon, Conrad, and Camilleri 2024; Mann et al. 2022; NAAEE 2020) that offer children unique opportunities to engage with the outside world in a fun and interactive manner. This approach serves as a captivating introduction to the SDGs, providing a foundation for children to understand the importance of environmental sustainability. The curriculum integrates various activities, including classes on compost and water distillation management, offering practical experiences that enhance children's understanding of ecological concepts.

Engaging in outdoor activities like gardening (Garden and Downes 2024), farming (Paffarini et al. 2024), nature walks (Maron-Puntarelli and Cecilia 2020; Trammell, Harriger, and Krumrei-Mancuso 2024), conservation projects (Ardoin, Bowers, and Gaillard 2020; Martin 2020), camping (Minoru IIDA 1978; Yilmaz et al. 2023), and cooking (Freeman and Sokoloff 1996) further enriches the learning experience. These hands-on activities (Den Hoed 2014; Sobel 2014) not only contribute to the development of practical skills but also foster a profound connection between children and the natural environment. Through SNEE play and learn initiatives, children not only acquire knowledge about sustainable practices but also cultivate a sense of responsibility and appreciation for nature. This holistic approach aligns with the broader goals of fostering environmental awareness and instilling values of sustainability and responsible behavior towards the planet.

Indonesia is experiencing rapid growth in natural schools with SNEE. According to information obtained from an interview with the chairman of JSAN on October 10, 2023, since its inception in 1998, there are currently more than 250 natural based ECE in Indonesia as depicted in Figure 1. This indicates that natural schools are an alternative educational option that has gained interest within the community. Natural schools in Indonesia are growing with various concepts of SNEE implementation. This includes understanding SNEE at Sekolah Alam Al 'Izzah Krian Sidoarjo (SAAL), Sekolah Alam Bogor (SALAM), and Sekolah Alam Aqila (SAA). The three of them have diverse understandings of SNEE in the application of their learning methods. Therefore, researchers aim to investigate implementation of the concepts of SNEE in Nature-Based Early Childhood Education Learning and see the contribution of SNEE to supporting the achievement of SDGs Life on Land in Indonesia.



**Figure 1.** Number of Nature-Based ECE Establishments Each Year and Growth Line of the Number of Nature-Based ECE

(Source: Dapodik, Ministry of Education, Culture, Research and Technology 2023 processed by the research team and JSAN)

## Method

This research is a qualitative case study. Data analysis will use the Miles Huberman model which includes four steps, namely: data collection, data display, data reduction and data analysis which are explained as follows.

### Data collection

In conducting this study, data collection focused on teacher subjects from SAAL, SALAM, and SAA institutions. The research employed a combination of methods, incorporating interviews, on-site observations at the respective institutions, and a thorough review of relevant literature from various supporting journals. The criteria for these interviews, observations, and literature studies were carefully designed, aligning with the components of SNEE, specifically targeting SNEE human behavior, SNEE critical thinking, and SNEE play & learn. The data collected through these rigorous methods provided comprehensive insights into the diverse applications and interpretations of SNEE within the context of early childhood education in the examined institutions.

### Data reduction

In the data reduction phase, information gathered through interviews, observations, and literature studies conducted at SAAL, SALAM, and SAA is meticulously analyzed and condensed. This reduction process aims to distill key insights and essential findings from the extensive data collected in the field. To enhance the validity and reliability of the results, a validation process is implemented through data triangulation. This involves cross-referencing and comparing information obtained from interviews, observations, and literature studies to ensure consistency and credibility. The triangulation approach adds a layer of robustness to the research findings, strengthening the overall trustworthiness of the data analysis and interpretations.

### *Data display*

In the data display phase, the outcomes of interviews, observations, and literature studies, which have undergone thorough reduction processes, are visually presented in charts or tables. This method of presentation serves to organize and illustrate the key findings obtained from the fieldwork conducted at SAAL, SALAM, and SAA. By using visual aids such as charts or tables, the data display enhances the accessibility and clarity of the research results. This organized presentation allows for a more comprehensive understanding of the intricate information gathered during the research process, facilitating effective communication of the study's outcomes to diverse audiences.

### *Data analysis*

In drawing conclusions about the understanding of various concepts of SNEE in Indonesia's Nature-Based ECE Learning, it is evident that the examined schools, including SAAL, SALAM, and SAA, exhibit diverse and comprehensive interpretations of SNEE. The research findings shed light on the multifaceted nature of SNEE implementation, encompassing aspects such as human behavior, critical thinking, and play-based learning. These schools serve as exemplars of how early childhood education institutions can effectively integrate SNEE principles into their curricula, contributing to the achievement of SDGs, one of which is life on land. The variations in SNEE application across these schools emphasize the adaptability and versatility of this nature-based educational approach, highlighting its potential to instill environmental awareness and sustainability values in young learners.

## **Results**

### *Understanding The SNEE concept for early childhood learning in Sekolah Alam Al 'Izzah Krian Sidoarjo (SAAL)*

SAAL stands out in incorporating SNEE human behavior principles by integrating Islamic education and character education into its curriculum. In this nature-based setting, students are immersed in natural surroundings guided by Islamic teachings and moral values. The inclusion of Islamic education emphasizes the importance of fostering a deep connection with nature, aligning with principles of stewardship and respect for the environment. Through character education, SAAL instills values like responsibility and empathy towards nature, creating a unique learning environment where students not only acquire knowledge about conservation but also develop a strong moral compass. SAAL's holistic approach reflects an innovative stance on sustainable education, showcasing an understanding of the interconnectedness between nature, spirituality, and character development.

SNEE Critical Thinking at SAAL is implemented through engaging activities such as playing while learning and gardening while learning. Aligned with the nature-based curriculum, these activities provide hands-on experiences to deepen students' understanding of natural concepts. During play & learning sessions, children explore

various aspects of nature, fostering curiosity and analytical thinking. Gardening while learning serves as a practical application, prompting students to think critically about the impact of human actions on the environment. This experiential learning approach not only enhances their critical thinking skills but also emotionally connects them to the concepts of nature conservation. SAAL's integration of SNEE Critical Thinking into activities like playing and gardening exemplifies its commitment to providing a comprehensive and impactful nature-based education.

SAAL stands out in implementing SNEE through the play & learn approach, offering activities beyond traditional classrooms. Outing classes provide opportunities for students to explore the natural world firsthand, fostering a sense of connection with the environment. Outbound trekking and fun adventure promote teamwork, resilience, and environmental awareness, contributing to physical well-being and instilling a sense of adventure and curiosity. The establishment of a Greenlab provides a platform for eco-friendly experiments and projects, applying scientific principles to real-world environmental issues. MABIT, an evening program, integrates spiritual development with environmental consciousness, encouraging students to explore the intersection of faith and nature conservation. Through these diverse activities, SAAL nurtures responsible and environmentally conscious individuals, contributing to the broader goal of supporting SDGs, especially Life on Land.

### *Understanding The SNEE concept for early childhood learning in Sekolah Alam Bogor (SALAM)*

SALAM, a natural school committed to SNEE, prioritizes the cultivation of essential human behaviors. Emphasizing values such as spirit, morals, learning, advance, and meaning, SALAM goes beyond traditional academic learning, instilling enthusiasm, motivation, and a strong ethical foundation in students. By integrating these values into the curriculum, SALAM aims to produce well-rounded individuals who are academically proficient, morally grounded, and environmentally conscious.

In fostering critical thinking skills, SALAM takes a unique approach by intertwining SNEE with learning experiences involving nature as a learning space, medium, and teaching material. Utilizing the natural environment as a learning space, SALAM provides hands-on experiences that stimulate observation, exploration, and inquiry, enhancing students' understanding of the natural world. Lessons designed to incorporate elements from the environment make the learning process engaging and relevant, exposing students to real-world examples that prompt critical thinking. This holistic approach not only cultivates critical thinking skills but also instills an appreciation for nature and the importance of sustainable practices.

SALAM actively implements SNEE through its Play & Learn activities, contributing to SDGs, particularly Life on Land. Initiatives like the outbound program engage students in outdoor activities, fostering teamwork, leadership, and environmental awareness. Involving students in agricultural practices, SALAM's play and learn approach aims to

instill responsibility for the environment and understanding of sustainable farming practices. The night school and Salam Family Camp provide immersive environments for students to explore various facets of nature, fostering a love for the environment. These activities align with the broader goals of SNEE, supporting SDGs and contributing to a holistic approach to education at SALAM, emphasizing the significance of natural life on land.

### *Understanding The SNEE concept for early childhood learning in Sekolah Alam Aqila (SAA)*

SAA stands out for its commitment to SNEE human behavior through a multifaceted approach. The school prioritizes character-based education, integrating values such as integrity and responsibility into the curriculum, shaping students into responsible and compassionate individuals. Integrated education at SAA goes beyond traditional learning, providing a comprehensive understanding of environmental issues. Emphasizing nature-based, environmentally friendly, and child-friendly education, SAA immerses students in the natural world, promoting eco-friendly practices and tailoring the educational environment to children's needs, fostering environmentally conscious individuals.

SAA incorporates SNEE critical thinking through innovative methods, utilizing nature as a dynamic learning space. Learning outdoors allows students to connect theoretical knowledge with practical applications, fostering a deeper understanding of environmental concepts. Nature serves not only as a learning space but also as a medium and teaching material, integrating natural elements directly into the educational process. This hands-on approach encourages critical thinking about the impact of materials on the environment. Nature as a learning object at SAA involves direct interaction with the environment, stimulating curiosity and encouraging students to analyze and critically evaluate the complexities of nature, cultivating environmentally conscious individuals with analytical skills.

SAA distinguishes itself through comprehensive SNEE Play & Learn initiatives, fostering a deep connection between students and the natural world. The Outbound Trekking and Fun Adventure (OTFA) program promotes physical activity, teamwork, and resilience. Conservation and waste management activities engage students in biodiversity protection and sustainable practices, instilling environmental stewardship values. SAA extends SNEE Play & Learn into nature art and science projects, providing a holistic approach to environmental education. Through artistic expression and scientific exploration, students develop a genuine connection with nature, nurturing a lifelong commitment to environmental sustainability. SAA's multifaceted approach ensures students acquire knowledge and values, fostering a deep connection with nature and contributing to the broader goals of SNEE and SDGs, especially Life on Land.

## Discussion

### *SNEE human behaviour in Indonesian ECE*

SNEE Human Behavior is intricately woven into the fabric of ECE in Indonesia, and the collaboration between character education and Islamic education plays a pivotal role in shaping the moral and behavioral foundations of young learners. Islamic education provides a unique framework for instilling values such as spirituality, compassion, and ethical conduct. In the context of SNEE Human Behavior, Islamic teachings guide children towards understanding their connection with nature, fostering a sense of responsibility as stewards of the environment. The spiritual dimension offered by Islamic education complements the broader goals of SNEE by nurturing an appreciation for the natural world rooted in religious ethics.

Character education serves as another vital component influencing SNEE Human Behavior in Indonesian ECE. The incorporation of character education principles aligns seamlessly with the broader objectives of SNEE by emphasizing virtues that contribute to responsible environmental behavior. The shared values between character education and SNEE, such as integrity, responsibility, and empathy, provide a holistic foundation for children's ethical and moral development. Through character-based education, children are not only encouraged to respect nature but also to recognize their role in promoting sustainability and environmental well-being.

The dimensions of SNEE Human Behavior extend beyond religious and character education to encompass broader aspects such as spirit, morals, learning, advance, meaning, integrated education, nature-based education, environmentally friendly education, and child-friendly education. This holistic approach ensures that children are immersed in a comprehensive educational environment that nurtures their ethical, cognitive, and emotional development. The integration of SNEE principles with character education and Islamic education in Indonesian ECE underscores the commitment to cultivating well-rounded individuals who not only understand the significance of nature but also embody the values essential for sustainable living.

### *SNEE critical thinking in Indonesian ECE*

SNEE Critical Thinking plays a pivotal role in shaping ECE in Indonesia. The emphasis on early childhood activities being carried out in a balance of 60% in open, natural settings and 40% in the classroom highlights the commitment to providing a holistic and immersive learning experience. This balance ensures that children have ample opportunities to explore the wonders of the natural world, fostering a deep connection with the environment and promoting critical thinking skills.

In the context of SNEE Critical Thinking, various educational methods are employed during these activities, including playing while learning, gardening while learning, and farming while learning. These approaches integrate playful and hands-on experiences into the educational framework, allowing children to learn through exploration and experimentation. Playing while learning stimulates creativity and problem-solving, while

gardening and farming activities instill an understanding of ecological processes and sustainable practices. This multi-faceted approach ensures that early childhood education is not confined to traditional classroom boundaries but extends into the outdoors, enriching children's perspectives and nurturing their critical thinking abilities.

Furthermore, the implementation of SNEE Critical Thinking extends to learning through nature as a learning space, nature as a medium and teaching material, and nature as a learning object. Nature becomes an extended classroom where children actively engage with the environment as both a source of inspiration and a repository of knowledge. This integrated approach promotes critical thinking about ecological concepts, natural phenomena, and the intricate relationships within ecosystems. By incorporating nature into the learning process, Indonesian ECE institutions are fostering a generation of young minds equipped with critical thinking skills and a deep appreciation for the complexities of the natural world.

### *SNEE play & learn in Indonesian ECE*

The implementation of SNEE Play & Learn in Indonesian ECE encompasses a rich array of natural activities designed to provide a holistic learning experience for young learners. Outing classes serve as an effective means to break away from the traditional classroom setup, allowing children to explore and engage with their surroundings. These excursions promote experiential learning, helping children develop a deeper connection with nature and fostering a sense of curiosity.

Outbound trekking and fun adventure (OTFA) represent dynamic elements within the SNEE Play & Learn framework, encouraging children to participate in activities that challenge them physically and mentally. These adventures contribute not only to physical development but also instill important life skills such as teamwork, resilience, and problem-solving. By engaging in outdoor adventures, children gain a firsthand appreciation for the environment, promoting an understanding of nature's wonders.

Moreover, gardening, farming, camping, conservation, nature art, science projects, and waste management activities are integral components of SNEE Play & Learn. Gardening and farming initiatives expose children to the fundamental aspects of plant life cycles, fostering an early appreciation for agriculture and sustainable practices. Camping experiences provide opportunities for children to connect with nature on a deeper level, while conservation efforts instill a sense of responsibility for preserving the environment. Nature art and science projects stimulate creativity and curiosity, allowing children to express themselves while exploring natural phenomena. Additionally, waste management activities promote environmental awareness, teaching children the importance of responsible waste disposal and contributing to a sustainable future. Through these varied activities, Indonesian PAUD institutions aim to cultivate well-rounded individuals who appreciate the natural world and understand their role in preserving it.

*SNEE framework contributes to supporting SDGs life on land*

The incorporation of SNEE human behavior elements in Indonesian education contributes meaningfully to SDGs, particularly Life on Land. The integration of Islamic principles, character education, and diverse educational approaches establishes a foundation for active participation in the preservation and sustainable management of land resources. Similarly, by infusing critical thinking into SNEE practices through play-based learning, gardening activities, and nature engagement, students develop the cognitive skills essential for addressing SDGs challenges, notably contributing to the goal of Life on Land. Moreover, SNEE Play & Learn initiatives, spanning outing classes, outbound trekking, garden lab, camp, conservation, waste management, and nature art and science projects, empower participants to actively contribute to SDGs, fostering a comprehensive understanding of land ecosystems, promoting environmental stewardship, and motivating individuals to take meaningful actions for the sustainable management of land resources.

**Table 3.** Connecting SNEE framework contributes to supporting SDGs life on land

SNEE Framework	Value	Description
SNEE Human Behavior	Islamic Education	Integrating Islamic principles to instill a sense of responsibility for environmental stewardship. Promoting the concept of ‘Khalifah fil Ard’ (stewardship on Earth) to emphasize the importance of caring for the land.
	Character Education	Spirit Fostering a deep connection to nature by nurturing a spiritual understanding of the environment. Encouraging individuals to view themselves as stewards of the land in accordance with their character and spiritual values. Morals: Emphasizing ethical conduct in interactions with the environment. Cultivating moral values that prioritize the well-being of the land and its ecosystems. Learning: Developing a love for learning about the intricacies of ecosystems and sustainable land management. Encouraging continuous learning and adaptation to promote sustainable practices. Advance: Cultivating an advanced mindset that seeks innovative solutions to land-related challenges. Encouraging individuals to use their skills and knowledge to contribute to sustainable land development. Meaning: Connecting environmental conservation with personal meaning and purpose. Emphasizing the significance of individuals’ actions in creating a meaningful impact on the health of the land.
Character-Based Education		Infusing character development with a focus on values that support sustainable land practices. Building virtues such as responsibility, integrity, and respect for nature.

SNEE Framework Contributes To Supporting SDGs: Life on Land in Nature-Base ECE in Indonesia

SNEE Framework	Value	Description
	Integrated Education:	Incorporating SNEE principles seamlessly into various subjects to promote an understanding of the interconnectedness of life on land. Encouraging students to integrate environmental awareness into their academic pursuits.
	Nature-Based Education:	Utilizing nature as a primary context for learning about sustainable land management. Encouraging a profound appreciation for nature through hands-on experiences and outdoor education.
	Environmentally Friendly Education:	Promoting environmentally friendly practices within educational institutions. Encouraging individuals to adopt eco-friendly behaviors that contribute to the preservation of life on land.
SNEE Critical Thinking	Playing While Learning:	Encouraging interactive and play-based activities that stimulate critical thinking. Integrating educational games and exercises that promote problem-solving and decision-making skills related to land sustainability. Connecting play with real-world scenarios to enhance understanding of environmental issues.
	Gardening While Learning:	Implementing hands-on gardening activities to engage students in practical experiences. Encouraging critical thinking through observing, analyzing, and making decisions about plant growth, soil health, and ecological balance. Integrating gardening as a platform to explore the importance of sustainable land use practices.
	Learning Through Nature as a Learning Space:	Utilizing natural environments as classrooms to encourage observation and exploration. Facilitating critical thinking by analyzing natural patterns, ecosystems, and the interdependence of living organisms. Promoting a deeper understanding of the impact of human activities on land through direct experiences in nature.
	Nature as a Medium and Teaching Material:	Incorporating nature as a medium for conveying concepts and fostering creativity. Using natural elements as teaching materials to illustrate environmental principles. Encouraging students to critically evaluate the ecological significance of various natural elements.
	Nature as a Learning Object:	Treating nature itself as a subject of study, promoting inquiry and investigation. Encouraging students to ask questions, make hypotheses, and conduct research on land-related topics. Developing critical thinking skills by analyzing the complexities of ecosystems and the impact of human activities on the environment.
SNEE Play & Learn	Outing Classes	Conducting educational excursions to natural environments to connect students with the land. Integrating interactive learning experiences that emphasize the importance of preserving biodiversity and ecosystems. Fostering an understanding of sustainable land practices through firsthand observation and exploration.
	Outbound Trekking and	Organizing trekking and adventure activities that immerse participants in natural settings.

SNEE Framework	Value	Description
Fun Adventure (OTFA):		Promoting teamwork, leadership skills, and environmental awareness during outbound experiences. Connecting the joy of outdoor adventure with lessons on responsible land use and conservation.
Garden Lab		Establishing a hands-on learning space focused on gardening, plant cultivation, and sustainable agriculture. Engaging students in activities that highlight the significance of soil health, biodiversity, and eco-friendly gardening practices. Instilling a sense of responsibility for nurturing and preserving the land.
Camp		Hosting educational camps that immerse participants in nature and environmental learning. Facilitating workshops and discussions on sustainable land management practices. Providing a platform for participants to appreciate and connect with the natural world.
Conservation		Implementing programs and activities aimed at conserving natural habitats and protecting endangered species.  Raising awareness about the importance of preserving ecosystems for the well-being of flora and fauna. Encouraging active participation in conservation efforts within local communities.
Waste Management		Conducting workshops and initiatives to educate participants about proper waste disposal and recycling. Emphasizing the impact of waste on land ecosystems and promoting responsible waste management practices. Engaging in hands-on projects to reduce, reuse, and recycle materials in creative ways.
Nature Art and Science Projects		Integrating artistic and scientific exploration to deepen understanding of the natural world. Encouraging creativity through nature-inspired art projects. Conducting science experiments that demonstrate the interconnectedness of ecosystems and the impact of human activities on land.

## Conclusion

The study concludes that Indonesian Nature-Based Early Childhood Education (ECE) has successfully integrated Sustainable Nature-Based Early Education (SNEE) principles into learning practices through three main concepts: SNEE human behavior, SNEE critical thinking, and SNEE play & learning. SNEE human behavior is reflected in the integration of character education and Islamic values, which help children develop moral awareness, environmental responsibility, and a sense of stewardship toward nature. SNEE critical thinking is implemented by positioning nature as an essential part of the learning environment through outdoor activities, natural materials, and nature-based teaching resources. Meanwhile, SNEE play & learning is practiced through interactive, play-based, and nature-related activities that foster curiosity, creativity, and children's emotional connection with the environment. Overall, SNEE in Indonesian Nature-Based ECE contributes to the achievement of the Sustainable Development Goals (SDGs),

particularly Life on Land, by nurturing environmental awareness and responsibility from an early age.

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