

Integrating Ecological Values, Environmental Education, and Sustainable Economic Behavior on Environmental Performance

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Abstract

Improving environmental quality requires the integration of ecological values, environmental education, and sustainable economic behavior. However, the relationships among these components have not been widely examined in an integrated manner within the context of community-based empowerment. This study aims to develop an integrative model and validate it through a study at the Environmental Education Center Seloliman. The study employs a *Sequential Exploratory Mixed Method* approach that combines a *Systematic Literature Review* of 45 scientific articles based on the PRISMA 2020 guidelines and a *Focus Group Discussion* with managers, academics, village government, and the community. Data were analyzed using *thematic coding* and thematic synthesis. The results show that ecological values serve as the foundation for shaping sustainable economic behavior, while environmental education acts as a transformation mechanism that strengthens changes in community behavior. Empirical validation shows that community-based learning encourages the adoption of environmentally friendly practices and contributes to improved environmental performance. This study produces an integrative model that can serve as a basis for developing environmental education and community empowerment policies to support sustainable development.

Keywords: Ecological Values, Environmental Education, Sustainable Economic Behavior, Environmental Performance, PPLH Seloliman.

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1. Introduction

The transformation toward sustainable development demands strong integration among ecological values, environmental education, sustainable economic behavior, and environmental performance. Increasing degradation of natural resources, climate change, environmental pollution, and loss of biodiversity indicate that the linear economic system (take-make-dispose) is no longer able to address global sustainability challenges. The report of the Intergovernmental Panel on Climate Change (IPCC, 2021) affirms that human economic activity is the main factor accelerating climate change, while the United Nations Environment Programme (UNEP, 2024) emphasizes the need for a transformation toward more sustainable production and consumption patterns. Therefore, the circular economy and bioeconomy approaches have emerged as new paradigms that prioritize resource efficiency, waste reduction, regeneration of production systems, and environmental sustainability [9] [3] [8].

The circular economy concept emphasizes not only technological innovation but also changes in the values and behavior of society in managing resources responsibly. Various studies show that the successful implementation of circular economy is strongly influenced by institutional, cultural, and behavioral aspects of society [4] [17] [16]. Thus, sustainable development cannot be supported by policy and

technological innovation alone, but also requires a transformation of values capable of driving behavioral change in both individuals and communities.

Ecological values (ecological values) are the normative foundation that shapes individual awareness of the importance of maintaining a balance between economic activity and environmental preservation. Individuals with strong ecological values tend to demonstrate more responsible behavior toward resource conservation, waste reduction, and efficient resource use. In addition, the integration of values into economic activity has been shown to enhance organizational competitiveness while strengthening environmental sustainability [13]. Nevertheless, various studies indicate that increasing ecological awareness is not always followed by real behavioral change.

This phenomenon is known as the knowledge behavior gap, namely the gap between knowledge and action in adopting environmentally friendly behavior. Environmental education is indeed able to increase people's knowledge, attitudes, and concern for the environment [7], but such an increase does not automatically produce sustainable economic behavioral change. Psychological, social, institutional, and cultural barriers remain factors that limit the implementation of environmentally friendly behavior [12] [23]. Therefore, environmental education functions not only as a medium for transferring knowledge but also as a

process of internalizing values that shape the habits and actions of society in a sustainable manner.

Sustainable economic behavior is realized through various practices, such as applying the principles of reduce, reuse, dan recycle (3R), green consumption, community-based waste management, the use of environmentally friendly products, and efficient resource utilization. Various studies show that such behavioral change contributes to improved environmental performance through emission reduction, resource-use efficiency, and improvement of ecosystem quality [27] [6]. However, the success of behavioral transformation is influenced not only by technology but also by participatory and sustainable learning processes.

In this context, community-based environmental education becomes one of the effective approaches for bridging the gap between ecological values and sustainable economic behavior. The experiential learning approach enables communities to gain direct experience through conservation practices, organic farming, 3R-based waste management, water conservation, and sustainable use of local resources. This approach has proven more effective in shaping behavioral change than purely informative learning because the community is actively involved in the learning and decision-making process.

One of the institutions applying this approach is the Environmental Education Center (PPLH) Seloliman. PPLH Seloliman has developed various community-based environmental education programs that integrate environmental conservation, waste management, organic farming, and local economic empowerment. The results of the Focus Group Discussion (FGD) involving PPLH managers, academics, village government, and the community show that community-based environmental education has successfully strengthened the community's ecological values and encouraged the adoption of sustainable economic behavior, such as 3R-based waste management, the use of organic fertilizers, resource conservation, and active participation in maintaining environmental quality. In addition, FGD participants identified that the success of program implementation is influenced by community leadership, social capital, sustained mentoring, and multi-stakeholder collaboration.

Nevertheless, studies that integrate ecological values, environmental education, sustainable economic behavior, and environmental performance into a single comprehensive conceptual model remain relatively limited. Most studies examine the relationships among variables only partially or focus on one aspect, such as the circular economy, environmental education, or pro-environmental behavior. Research that develops a conceptual model through systematic literature synthesis and validating it within the context of community-based environmental education practice also remains rare.

Based on this gap, this study develops an integrative

model that connects ecological values, environmental education, sustainable economic behavior, and environmental performance through systematic literature synthesis and empirical validation at PPLH Seloliman. This study is expected to provide a theoretical contribution in the form of developing a conceptual model that positions environmental education as a mechanism for transforming values toward sustainable economic behavior, while also offering practical implications for developing community-based environmental education policies in support of sustainable development. Research Problems How are ecological values, environmental education, sustainable economic behavior, and environmental performance related based on a synthesis of scientific literature?; How can an integrative conceptual model connecting these four constructs be developed?; How valid is the conceptual model based on the results of the Focus Group Discussion at PPLH Seloliman?; Research Objectives: To analyze the relationships among ecological values, environmental education, sustainable economic behavior, and environmental performance through systematic literature synthesis. To develop an integrative conceptual model that explains the relationships among variables in support of sustainable development. To validate the conceptual model through a Focus Group Discussion at PPLH Seloliman.

Ecological values are a primary foundation in shaping environmental awareness and a sustainability orientation in economic activity. From a modern sustainability perspective, ecological values not only reflect concern for the environment but also serve as a basis for long-term-oriented economic decision-making. The circular economy concept has emerged as a new paradigm that integrates ecological values into the economic system by emphasizing resource efficiency, waste reduction, and regeneration of production systems [1]. Furthermore, [2] affirm that the integration of the green economy, circular economy, and bioeconomy constitutes a strategic framework for achieving global sustainability. Nevertheless, the literature shows that the circular economy concept still faces implementation challenges, whether institutional, economic, or social [17]. Indeed, [3] identified more than 200 definitions of the circular economy, indicating conceptual fragmentation in this field.

In the context of the bioeconomy, the utilization of biomass- and waste-based resources becomes an important part of strengthening ecological values within production systems [2]. A recent study [18] emphasizes the importance of the safe and sustainable by design approach in enhancing the efficiency and sustainability of bioeconomy systems. In addition, [1] underline that circular economy principles must be grounded in strong sustainability, not merely economic efficiency. This is reinforced [1], who criticizes that, without fundamental value change, the circular economy risks becoming merely a technocratic solution with no significant impact on sustainability.

Sustainable Economic Behavior

Sustainable economic behavior is a real manifestation of the internalization of ecological values in the actions of individuals and communities. This behavior includes green consumption, energy efficiency, and waste management based on the 3R principles [23]. The literature shows that changes in economic behavior are influenced not only by knowledge but also by social norms, policy, and a supportive economic system [14]. In this context, sustainable business models and technological innovation play an important role in driving behavioral change [6] [10]. Nevertheless, there is a knowledge–behavior gap phenomenon, namely the gap between environmental awareness and actual behavior. Although consumers have environmental awareness, they do not always apply it in everyday consumption decisions. This is reinforced [12], who highlights that habit, convenience, and social structure are the main barriers to behavioral change.

In the policy context, the OECD [22] emphasizes that policy intervention is strongly needed to drive economic behavioral change toward sustainability. In addition, circular economy indicators are also used to measure economic behavioral change systematically [5]. In the Indonesian context, [9] shows that community-based approaches such as the waste bank are able to increase community participation in waste management. Further studies by Muljaningsih et al. [15] show that integrating the green economy concept into local policy can significantly drive changes in community economic behavior.

Environmental performance is a primary indicator in assessing the success of implementing ecological values and sustainable economic behavior. This performance reflects the capacity of an economic system to reduce negative environmental impacts through resource efficiency and waste management [27]. Within the circular economy framework, improved environmental performance is achieved through optimization of material and energy cycles, thereby reducing the exploitation of natural resources [28]. In addition, [5] developed various indicators to measure the level of circularity and environmental performance within organizations.

Global studies show that the implementation of the circular economy contributes to carbon emission reduction and improved energy efficiency. In addition, economic valuation of ecosystem services is also an important approach for measuring environmental impact quantitatively [11]. Nevertheless, measuring environmental performance still faces challenges, particularly in integrating economic, social, and ecological aspects comprehensively. Therefore, a multidimensional approach is needed in evaluating environmental performance.

Environmental education is a key factor in transforming ecological values into real behavior. In the context of sustainable development, environmental education functions not only as a means of transferring

knowledge but also as a process of forming pro-environmental values and attitudes. Community-based approaches have proven effective in increasing awareness and community participation. Emphasize that the success of the circular economy depends heavily on changes in community behavior supported by education systems and policy [17]. In the local context, various studies show that community-based environmental education programs are able to drive sustainable behavioral change. Show that a community approach in environmental management is able to improve economic welfare while maintaining environmental sustainability [12].

In addition, the dimensions of leadership and spiritual values also play an important role in strengthening the internalization of ecological values [12]. This indicates that environmental education is not only cognitive but also affective and normative. Thus, environmental education serves as a primary mediator in the relationship between ecological values and sustainable economic behavior, and contributes to the overall improvement of environmental performance [20]. The literature synthesis shows that ecological values are a fundamental factor shaping individuals' orientation toward environmental preservation. However, these values do not automatically produce behavioral change. Environmental education acts as a learning mechanism that transforms values into knowledge, skills, and a commitment to act. Subsequently, this process encourages the formation of sustainable economic behavior realized through responsible consumption and production practices. Such behavioral change ultimately contributes to improved environmental performance.

The results of the Focus Group Discussion at PPLH Seloliman reinforce this conceptual relationship. FGD participants agreed that community-based environmental education programs have successfully strengthened the community's ecological values, improved sustainable economic practices such as 3R-based waste management, organic farming, and resource conservation, and encouraged improvements in environmental quality. This finding indicates that environmental education can act as a mediating variable that bridges the influence of ecological values on sustainable economic behavior, while sustainable economic behavior becomes a mechanism that contributes to improved environmental performance. Based on this literature synthesis and the FGD, the research framework is as follows Figure 1.



Figure 1. Research Framework

2. Research Method

This study employed a Sequential Exploratory Mixed Methods design by integrating a Systematic Literature Review (SLR) with a Focus Group Discussion (FGD). This research design was selected because it facilitates the development of a conceptual model through the systematic synthesis of scientific evidence, which is subsequently validated through empirical evidence obtained from environmental education practitioners and stakeholders at the Environmental Education Center (PPLH) Seloliman, Mojokerto, East Java. The research was conducted in two sequential stages. The first stage involved conducting an SLR to identify and synthesize existing knowledge regarding the relationships among ecological values, environmental education, sustainable economic behavior, and environmental performance. The findings from this stage served as the foundation for constructing an evidence-based conceptual model. The second stage consisted of conducting an FGD to evaluate the relevance, applicability, and practicality of the proposed conceptual model based on stakeholders' experiences and perspectives. By combining these two complementary methods, the study not only developed a theoretically grounded conceptual framework but also strengthened its empirical validity through participatory validation.

The study utilized both secondary and primary data sources. Secondary data were collected through a Systematic Literature Review (SLR) of peer-reviewed scientific articles that satisfied predetermined inclusion criteria. Primary data were gathered through a Focus Group Discussion (FGD) involving participants with relevant expertise and experience in environmental education and sustainability practices. The FGD was guided by a semi-structured interview protocol designed to facilitate open discussion while maintaining consistency across participants. With participants' informed consent, all discussions were audio-recorded, transcribed verbatim, and prepared for thematic analysis to ensure the accuracy and completeness of the collected data.

Data analysis was conducted in several systematic stages according to the type of data collected. The literature data obtained from the SLR were analyzed using thematic synthesis following. This process involved open coding of the selected studies, grouping similar concepts into broader themes, developing higher-order analytical themes, and constructing a conceptual model that explains the relationships among the research variables. Meanwhile, the qualitative data obtained from the FGD were analyzed using thematic analysis, beginning with data reduction, followed by coding, theme categorization, interpretation of relationships among variables, and validation of the conceptual model. The analytical process was conducted iteratively until theoretical saturation was achieved, indicating that no additional themes emerged from the discussions.

To ensure the trustworthiness and rigor of the research

findings, several validation strategies were implemented. Source triangulation was employed by comparing the findings from the literature synthesis with the perspectives expressed by FGD participants. Method triangulation was achieved by integrating findings from both the Systematic Literature Review and the Focus Group Discussion, thereby strengthening the credibility of the conceptual model. In addition, member checking was conducted by asking several participants to verify the researchers' interpretations of the discussion results, ensuring that the findings accurately reflected participants' views. Finally, peer debriefing was carried out through discussions among the research team to minimize researcher bias and improve the reliability of data interpretation.

Systematic Literature Review (SLR) Method with PRISMA 2020. This study adopted a Systematic Literature Review (SLR) approach following the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure that the literature identification, selection, and synthesis processes were conducted systematically, transparently, and reproducibly. The PRISMA framework was selected because it enhances the methodological quality of systematic reviews while minimizing potential selection bias. The SLR aimed to identify, evaluate, and synthesize previous research concerning the relationships among ecological values, sustainable economic behavior, environmental performance, and environmental education. Furthermore, the systematic synthesis provided the theoretical foundation for developing an evidence-based conceptual model that integrates findings from previous studies into a comprehensive research framework [24].

The literature search was conducted using four major scientific databases, namely Scopus, Web of Science (WoS), ScienceDirect, and Google Scholar, with the latter serving as a complementary source. The search employed combinations of the keywords ecological values, sustainable economic behavior, environmental performance, circular economy, and environmental education. To ensure the quality and relevance of the selected studies, several inclusion criteria were established, including: (1) articles published between 2015 and 2025, (2) articles indexed in Scopus or published in reputable journals, (3) studies directly relevant to the research variables, and (4) articles written in English. Conversely, non-scientific publications, studies with unclear methodological procedures, and articles unrelated to the research focus were excluded from the review.

The literature selection process followed the four stages recommended by the PRISMA 2020 guidelines. During the identification stage, a total of 120 articles were retrieved from the selected scientific databases using predetermined search keywords. The purpose of this stage was to achieve comprehensive literature coverage while minimizing initial selection bias. In the screening stage, duplicate records were removed, and

article titles and abstracts were evaluated for relevance, resulting in 95 articles meeting the preliminary selection criteria. Subsequently, the eligibility stage involved an in-depth full-text assessment of 55 articles, during which methodological quality, variable relevance, and theoretical contribution were critically evaluated. Finally, in the included stage, 45 articles satisfied all inclusion criteria and were retained for the final synthesis. These selected studies were analyzed through content analysis and thematic coding to identify recurring patterns and relationships among ecological values, sustainable economic behavior, environmental education, and environmental performance.

The literature included in the review was analyzed using two complementary analytical approaches. Content analysis was employed to identify the principal concepts, research variables, and relationships reported in previous studies, thereby providing a comprehensive understanding of the conceptual structure within the literature. Subsequently, thematic coding was applied to classify the findings into four principal themes: ecological values, sustainable economic behavior, environmental performance, and environmental education. This thematic organization facilitated the identification of consistent relationship patterns and supported the development of an integrated conceptual framework.

The validity and reliability of the systematic review were maintained through several quality assurance procedures. First, only literature from reputable scientific databases and peer-reviewed journals was included to ensure academic credibility. Second, the literature selection process followed the transparent and standardized PRISMA 2020 protocol, allowing the review to be replicated by future researchers. Third, conceptual triangulation was conducted by comparing theoretical perspectives across multiple studies to ensure consistency and strengthen the robustness of the conceptual model. These procedures enhanced the overall trustworthiness of the literature synthesis and supported the study's contribution to theory development and evidence-based decision-making.

The PRISMA 2020 diagram presented illustrates the systematic process of identifying, screening, assessing, and selecting the literature included in this review. Initially, 120 articles were identified from multiple scientific databases using predetermined search terms. Following the removal of duplicate records and preliminary screening based on titles and abstracts, 95 articles were considered relevant to the research objectives. A full-text assessment was subsequently conducted on 55 articles, evaluating methodological rigor, variable relevance, and theoretical contribution. Ultimately, 45 articles fulfilled all inclusion criteria and were incorporated into the final synthesis. These studies were analyzed using content analysis and thematic coding to identify recurring relationships among ecological values, sustainable economic behavior, environmental education, and environmental

performance. Overall, the PRISMA diagram not only provides a transparent visualization of the literature selection process but also demonstrates the methodological rigor, reproducibility, and validity of the systematic review, ensuring that the conceptual model developed in this study is grounded in high-quality scientific evidence consistent with international standards [25] [26].

3. Result and Discussion

The results of the systematic literature review analysis through the thematic coding approach produced four main themes that represent the conceptual structure of this study, namely ecological values, sustainable economic behavior, environmental performance, and environmental education. The distribution of themes shows that the literature has developed not only sectorally but also in an integrated manner in explaining sustainability dynamics. The theme of ecological values is the most dominant theme, with a total of 15 studies. The subthemes that emerged are related mainly to the circular economy and bioeconomy, which emphasize the importance of resource efficiency, waste reduction, and regeneration of production systems. The dominance of this theme shows that current global literature focuses on transforming the economic paradigm from a linear system toward a more sustainable one. Studies within this theme affirm that ecological values become the normative foundation for driving changes in the economic system and environmental policy.

The second theme is sustainable economic behavior, consisting of 12 studies. The main subthemes include green consumption (green consumption) and 3R practices (reduce, reuse, recycle). This finding shows that changes in the behavior of individuals and communities become a key element in implementing the concept of sustainability. Nevertheless, the literature also indicates that behavioral change does not occur automatically even when environmental awareness increases, thereby affirming the existence of a gap between knowledge and practice (knowledge-behavior gap). This shows that psychological, social, and institutional factors play an important role in influencing sustainable economic behavior.

Next, the theme of environmental performance was identified in 8 studies. The dominant subthemes include emission reduction, resource-use efficiency, and improvement of environmental quality. Although the number of studies on this theme is relatively fewer than on the other themes, its role is very important as an outcome indicator of the implementation of ecological values and sustainable behavior. The literature shows that improved environmental performance is the cumulative result of changes in production systems and more sustainable consumption behavior.

The fourth theme is environmental education, with 10 studies emphasizing a community-based approach (community-based environmental education). This

subtheme focuses on transforming values into real behavior through contextual and participatory learning processes. This finding shows that environmental education acts as a connecting mechanism between ecological values and sustainable economic behavior. The community-based approach is deemed effective in encouraging the internalization of values and sustainable behavioral change.

Overall, the results of the thematic coding show interrelated relationships among the four main themes (Table 1). Ecological values act as the normative foundation, sustainable economic behavior as the manifestation of action, environmental education as the transformation mechanism, and environmental performance as the final outcome of the process. This pattern indicates that sustainability cannot be achieved partially, but rather through the systemic integration of values, behavior, and environmental outcomes. Next Results of Literature Thematic Coding on Table 1.

Table 1. Results of Literature Thematic Coding

Main Theme	Subtheme	Number of Studies	Example Focus
Ecological Values	Circular economy, bioeconomy	15	Resource efficiency
Sustainable Behavior	Green consumption, 3R	12	Behavioral change
Environmental Performance	Emissions, efficiency	8	Environmental impact
Environmental Education	Community-based	10	Behavioral transformation

The literature matrix presented in Table 2 provides a comprehensive overview of research developments related to the integration of ecological values, sustainable economic behavior, and environmental performance. Analysis of the 45 studies shows diversity in research focus, yet all point to one common thread, namely the transformation of the economic system toward sustainability. On the side of ecological values, the study by [7] affirms that the circular economy is a new paradigm in sustainable development that replaces the linear economic model. This approach emphasizes system regeneration and resource efficiency as the primary foundation of sustainability. Nevertheless, the study by [9] provides a critical perspective by showing various barriers to circular economy implementation, including institutional and cultural challenges and a lack of definitional uniformity. This indicates that although ecological values have developed conceptually, their implementation still faces various obstacles.

On the aspect of sustainable economic behavior, research by [9] shows that integrating Industry 4.0 with the circular economy is able to drive innovation in more efficient and sustainable production and consumption behavior. Meanwhile, the study by [13] highlights the role of the waste bank as an effective community-based instrument in driving changes in community behavior toward more environmentally friendly economic practices. This finding shows that behavioral change is influenced not only by technology

but also by social and institutional approaches. In the dimension of environmental performance, the report from the United Nations Environment [8] emphasizes the importance of using indicators in evaluating the success of circular economy implementation. These indicators include resource efficiency, emission reduction, and overall environmental impact. This shows that environmental performance functions as a primary measurement tool in assessing the effectiveness of integrating values and behavior in the context of sustainability.

Overall, the literature matrix shows a consistent pattern of relationships among the three main variables. Ecological values act as the conceptual basis, sustainable economic behavior as the form of implementation, and environmental performance as the measurable outcome. In addition, the studies in the matrix also affirm the importance of a multidisciplinary approach that integrates technological, social, and policy aspects in achieving sustainability. Thus, the literature matrix serves not only as a summary of prior research but also as a basis for building an integrative conceptual model that connects values, behavior, and environmental performance systematically. Next Literature Matrix (Summary of 45 Studies) on Table 2.

Table 2. Literature Matrix (Summary of 45 Studies)

Author	Year	Focus	Variable	Finding
Geissdoerfer et al.	2017	Circular economy	Value	New paradigm
Kirchherr et al.	2019	Critique of CE	Value	Barriers
Dolci et al.	2024	Industry 4.0	Behavior	Innovation
Muljaningsih et al.	2023	Waste bank	Behavior	Social change
UNEP	2024	Indicators	Performance	Environmental evaluation

Results of the Focus Group Discussion (FGD) at PPLH Seloliman. The Focus Group Discussion (FGD) was held at PPLH Seloliman, involving PPLH managers, the surrounding community, academics, village government, and participants of the environmental education program. The FGD aimed to validate the research model connecting ecological values, environmental education, sustainable economic behavior, and environmental performance. All participants were asked to respond to six main themes formulated in the research grid. The discussion showed that all participants had a relatively strong understanding of the importance of protecting the environment. The main reason put forward was that the environment is a source of life, so its preservation determines the survival of both humans and other living beings. Most participants wrote that protecting the environment is important for maintaining air quality, water availability, public health, and the sustainability of ecosystems.

Besides ecological reasons, moral and social dimensions also emerged. Participants viewed protecting the environment as a form of responsibility toward future generations. Some participants associated environmental preservation with the value of mutual cooperation (gotong royong) that has long

developed in village communities. The discussion also identified changes in community perception in recent years. Environmental awareness was assessed as increasing compared with before. The community has begun to understand that pollution, waste, and resource exploitation will directly affect their lives. Nevertheless, participants acknowledged that some members of the community still require mentoring so that such awareness can turn into real behavior. In general, the FGD validated that ecological values are the primary foundation that shapes the community's willingness to participate in various environmental preservation programs.

Participants identified various forms of environmental education that PPLH Seloliman has conducted so far. The most frequently mentioned programs include training in organic farming, making organic fertilizer, waste management, reforestation, water conservation, plant nursery, organic waste processing, and education about biodiversity. The learning method considered most effective is field-practice-based learning (learning by doing). Participants judged that the combination of discussion, hands-on practice, demonstration, and field mentoring is far easier to understand than purely theoretical learning.

Most participants also appreciated PPLH's approach of integrating training with real field activities so that participants could directly observe the benefits obtained. This approach was deemed able to increase learning motivation while strengthening the community's commitment to applying environmentally friendly practices. Nevertheless, some participants proposed that training activities be conducted more regularly, expanded in scope, and accompanied by sustained mentoring so that behavioral change can be maintained over the long term.

The discussion showed that most participants had begun applying various sustainable economic practices. These practices include applying the Reduce, Reuse, Recycle (3R) principles, using organic waste as compost, reducing the use of synthetic chemicals, and increasing the use of organic fertilizer in farming activities. Participants also noted changes in consumption patterns after joining PPLH programs. The community has become more selective in using environmentally friendly materials, reducing resource waste, and paying more attention to the environmental impact of everyday economic activities.

In the agricultural sector, some participants stated that the use of organic fertilizer is deemed able to improve soil quality while reducing dependence on chemical fertilizers. In addition to providing ecological benefits, this change also has the potential to improve production-cost efficiency in the long term. The main motivation driving such behavioral change stems from increased knowledge of environmental impacts, direct experience during training, and the existence of successful practices applied by other communities. The majority of participants assessed that the various programs conducted by PPLH have had a positive

impact on environmental conditions. The most frequently mentioned changes include increased environmental cleanliness, increased vegetation cover, increased reforestation activities, and reduced indiscriminate waste disposal.

Participants also noted that the use of organic fertilizer has begun to improve soil quality and support the sustainability of local farming systems. In addition, several water conservation activities were deemed to have begun providing benefits for water availability during the dry season. Nevertheless, participants cautioned that such success still requires a sustained mentoring process because changes in community behavior take a relatively long time. Limitations of human resources, funding, and program continuity remain the main challenges.

Participants stated that ecological values act as the basis for forming community awareness to participate in environmental education. Environmental education subsequently produces increased knowledge and skills that drive changes in community economic behavior toward more sustainable practices. Such behavioral change then produces improved environmental performance through reduced pollution, increased reforestation, better waste management, and more efficient use of natural resources. In addition to the relationships among the main variables, participants proposed several additional factors deemed to influence the success of the model, including community leadership, continuity of mentoring, government support, multi-stakeholder collaboration, community social capital, availability of facilities and infrastructure, funding support.

Thus, FGD participants viewed the research model as consistent with the empirical conditions in the field, although these contextual factors need to be taken into account. Overall, the results of the Focus Group Discussion show a consensus that ecological values are a fundamental factor in shaping the success of environmental education. Environmental education conducted through participatory approaches and hands-on practice has proven able to improve the community's sustainable economic behavior. Such behavioral change subsequently contributes to improved environmental performance through reduced pollution, improved ecosystem quality, and more sustainable use of natural resources.

This discussion aims to interpret the results of the literature synthesis and empirical validation in order to explain the relationships among ecological values, environmental education, sustainable economic behavior, and environmental performance in support of community-based sustainable development. Unlike prior research that generally examines relationships among variables partially, this study integrates the four constructs into a conceptual model developed through a Systematic Literature Review (SLR) and validated through a Focus Group Discussion (FGD) at the Environmental Education Center (PPLH) Seloliman.

The discussion is organized around the three research objectives. First, analyzing the conceptual relationships among ecological values, environmental education, sustainable economic behavior, and environmental performance based on the synthesis of 45 scientific articles. Second, developing an integrative conceptual model that explains the mechanism of transforming ecological values into sustainable economic behavior through environmental education. Third, validating this model through the FGD results with stakeholders at PPLH Seloliman. Each finding is interpreted by relating it to the literature review, prior research, and the context of community-based environmental education implementation, thereby producing a more comprehensive understanding of the factors supporting improved environmental performance. The discussion for each objective is elaborated in the following subsections.

The Relationship Among Ecological Values, Environmental Education, Sustainable Economic Behavior, and Environmental Performance Based on Literature Synthesis. The first objective of the study is to identify the relationships among ecological values, environmental education, sustainable economic behavior, and environmental performance based on literature synthesis. Analysis of 45 scientific articles produced four main themes that form a sequential causal relationship, namely ecological values as the foundation of change, environmental education as the transformation mechanism, sustainable economic behavior as the implementation of values, and environmental performance as the outcome of sustainable development. These results reinforce the literature review, which explains that ecological values are a belief system that shapes individuals' orientation toward the relationship between humans and the environment. As explained in the literature review, ecological values serve as the moral basis for decisions related to the use of natural resources. The literature synthesis shows that individuals with high ecological values tend to have concern for environmental conservation, resource efficiency, and waste reduction. This finding is consistent of sustainable development.

These results reinforce the literature review, which explains that ecological values is a belief system that shapes individuals' orientation toward the relationship between humans and the environment. As explained in the literature review, ecological values serve as the moral basis for decisions related to the use of natural resources. The literature synthesis shows that individuals with high ecological values tend to have concern for environmental conservation, resource efficiency, and waste reduction. This finding is consistent with [9], who state that the successful implementation of the circular economy is determined not only by technological innovation but also by changes in the community's value system.

Nevertheless, the synthesis results also show that ecological values are not yet able to drive behavioral change automatically. Most articles identify a

knowledge behavior gap, namely the gap between increased environmental awareness and the implementation of environmentally friendly behavior. This finding reinforces the literature-review discussion that behavioral change is influenced by psychological, social, cultural, and institutional factors [18]. Thus, ecological values are an important prerequisite but are not yet sufficient to produce sustainable economic behavior.

The literature synthesis further shows that environmental education acts as a mechanism that transforms values into real action. As elaborated in the literature review, environmental education not only increases knowledge but also builds learning experience, skills, and community commitment through the experiential learning approach and community-based learning. The research results show that most articles position environmental education as a factor that strengthens the relationship between ecological values and sustainable economic behavior. In other words, environmental education functions as a process of internalizing values so that the community not only understands the importance of protecting the environment but is also able to apply it in daily life.

This change is then realized in the form of sustainable economic behavior, such as applying the reduce, reuse, and recycle (3R) principles, green consumption, organic farming, energy-use efficiency, and community-based waste management. This finding is consistent with the literature review, which states that sustainable economic behavior is a real implementation of ecological values that have been internalized through environmental education [19]. In addition to improving resource efficiency, such behavior also contributes to strengthening the local economy through more responsible production and consumption practices.

This relationship ultimately leads to improved environmental performance. The literature synthesis shows that changes in community behavior produce various success indicators, such as reduced waste, increased resource-use efficiency, biodiversity conservation, and improved environmental quality. This finding supports the literature review, which explains that environmental performance is the result of interaction among values, education, and community behavior [21] [22]. Thus, the first research objective successfully shows that the relationships among variables are systemic and mutually reinforcing in support of sustainable development.

The Environmental-Education-Based Ecological Value Transformation Model (MTNE). The second objective of the study is to develop an integrative conceptual model that explains the relationships among ecological values, environmental education, sustainable economic behavior, and environmental performance. Based on the literature synthesis, it was found that most prior research still examines relationships among variables partially. Some studies focus on the influence of ecological values on pro-environmental behavior,

while others emphasize environmental education or the implementation of the circular economy on environmental performance. Few studies integrate all of these constructs into a single, complete conceptual model.

Based on these findings, this study develops a model that positions environmental education as a mediating variable. This model is built on the theoretical argument in the literature review that ecological values shape individual orientation, but behavioral change requires a systematic learning process. Environmental education functions to internalize values into knowledge, experience, and skills, while sustainable economic behavior is the real implementation of that process. Subsequently, sustainable economic behavior contributes to improved environmental performance through resource efficiency, waste reduction, and environmental conservation. Compared with previous research, this model offers a more comprehensive conceptual contribution because it explains the mechanism of transforming values into behavior. Thus, the novelty of this study lies not only in combining the four main constructs but also in explaining the role of environmental education as a mechanism that bridges the relationship between ecological values and sustainable economic behavior. This is shown in Figure 2 below.



Figure 2. The Environmental-Education-Based Ecological Value Transformation Model (MTNE)

Validation of the MTNE through the Focus Group Discussion at PPLH Seloliman. The third objective of the study is to validate the conceptual model through a Focus Group Discussion (FGD) at PPLH Seloliman. The FGD results show that the relationships among variables obtained from the literature synthesis are consistent with the community-based environmental education practice implemented by PPLH Seloliman. As explained in the literature review, community-based environmental education is more effective in shaping behavior because it uses an experiential learning approach. The FGD findings confirm that participants not only gained knowledge about the environment but also experienced behavioral change through hands-on practice, such as 3R-based waste management, the use of organic fertilizer, water conservation, reforestation, and utilization of household waste. These results reinforce the theory that participatory learning is more able to internalize ecological values than a purely informative approach.

FGD participants also emphasized that behavioral change is influenced by the continuity of mentoring, community support, and local leadership. This finding expands the literature review, which previously emphasized the educational aspect, by showing that the effectiveness of environmental education is also influenced by social capital and multi-stakeholder collaboration. Thus, the implementation of environmental education is not only a process of transferring knowledge but also a social process that builds collective habits. Empirically, the FGD results show that the developed conceptual model has a high degree of consistency with practice at PPLH Seloliman. Ecological values become the basis for forming community awareness, environmental education strengthens the process of internalizing values, sustainable economic behavior is realized through various environmentally friendly practices, and the entire process contributes to improved environmental performance. Therefore, the resulting integrative model has not only a strong theoretical foundation but also empirical support from community-based environmental education practice.

4. Conclusion

Ecological values are the foundation for forming environmental awareness, while environmental education acts as a value-internalization mechanism that drives the formation of sustainable economic behavior. Such behavioral change subsequently contributes to improved environmental performance through conservation practices, resource efficiency, waste management, and community participation. This finding not only reinforces existing theory but also produces an integrative model that gains empirical support from community-based environmental education practice at PPLH Seloliman. Environmental education programs need to be expanded through more regular and continuous training. Post-training mentoring also needs to be strengthened so that the community is able to sustain the behavioral changes that have formed. Collaboration among PPLH Seloliman, universities, local government, farmer groups, MSMEs, and the community is deemed necessary to be expanded so that environmental innovations can be implemented more widely. Increased support is needed for organic farming, community-based waste management, water resource conservation, village reforestation, and the development of a green economy capable of providing economic benefits while maintaining environmental sustainability.

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