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Environmental Literacy and Sustainable Living Practices among Adolescents in Bihar's High Schools: A Review Study

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Abstract

Environmental literacy plays a vital role in shaping sustainable behaviours among adolescents, who represent a critical group for long-term environmental stewardship. This review study synthesises existing research on environmental awareness, attitudes, and sustainable living practices among high school students in Bihar, India. The analysis focuses on educational influences, school-based initiatives, and socio-economic factors that affect students' engagement with environmental issues. Findings from reviewed studies indicate that while students possess basic knowledge of environmental concepts, the consistent adoption of sustainable practices remains limited. Experiential learning, teacher involvement, and community-oriented programs were found to significantly enhance both awareness and responsible behaviour. However, disparities related to school resources and socio-economic conditions continue to influence outcomes. The review highlights the need for curriculum integration, practical learning approaches, and collaborative community efforts to strengthen environmental education at the secondary school level. These insights offer valuable implications for educators, policymakers, and institutions seeking to promote sustainable development through education.

Keywords: Environmental literacy, Sustainable practices, Adolescents, Secondary education, Environmental education, Sustainable development, Bihar

Introduction

Environmental concerns have moved from being peripheral issues to central developmental challenges in recent decades. Escalating problems such as climate variability, declining biodiversity, and increasing resource stress have reinforced the urgency of embedding sustainability within education systems. In this context, schools are not merely sites of knowledge transmission; they function as formative spaces where environmental values and behavioural orientations begin to take shape.

Environmental literacy extends beyond factual familiarity with ecological concepts. It involves the capacity to interpret environmental issues critically, evaluate their local and

global implications, and make informed choices in everyday life. For adolescents, this stage is particularly significant, as habits and attitudes developed during secondary schooling often persist into adulthood. However, possessing knowledge about environmental degradation does not automatically translate into environmentally responsible conduct.

Sustainable living practices represent the behavioural expression of environmental understanding. Actions such as reducing household waste, conserving water, limiting energy consumption, and participating in community initiatives require not only awareness but also motivation, opportunity, and institutional encouragement. Therefore, examining environmental literacy without analysing behavioural outcomes provides only a partial picture. A deeper inquiry into how awareness is shaped, reinforced, or constrained within school and socio-economic contexts becomes essential.

This review seeks to synthesise existing scholarship and policy discourse to understand how environmental literacy among high school students in Bihar is conceptualised, practised, and limited. By focusing on both enabling conditions and structural barriers, the study aims to contribute to ongoing debates on sustainability education in developing educational settings.

Research Gap

Although environmental literacy has received increasing scholarly attention in recent decades, existing studies largely focus on either conceptual awareness or isolated behavioural indicators. Much of the literature remains fragmented, examining knowledge levels, attitudes, or institutional programmes independently rather than analysing their interconnections within specific socio-regional contexts.

In the Indian setting, several empirical studies assess environmental awareness among school students; however, fewer investigations systematically synthesise findings to evaluate the persistent awareness–action divide. Moreover, limited scholarship critically examines how state-level policy initiatives, infrastructural disparities, and socio-economic realities collectively influence behavioural outcomes in secondary education.

In the context of Bihar, research remains particularly sparse and dispersed. While programme reports and small-scale empirical studies exist, there is a lack of integrative review-based analysis that consolidates evidence across policy documents, institutional initiatives, and behavioural studies. The absence of such synthesis restricts a comprehensive understanding of how environmental literacy translates into sustainable living practices among adolescents.

Therefore, the present review addresses this gap by systematically examining existing literature to identify patterns, inconsistencies, and structural constraints influencing sustainability education at the high school level in Bihar.

Objectives

- To evaluate the current level of environmental awareness among high school students in Bihar.
- To examine the gap between theoretical knowledge and practical sustainable living.
- To identify educational and socio-economic factors influencing environmental engagement.

Literature Review

Environmental literacy has been widely recognised as a foundational element in promoting sustainable behaviour. However, several studies highlight the persistence of a knowledge–action gap in environmental education. Research conducted among adolescents in Bihar revealed that although a large majority of students were able to define and explain concepts such as global warming and climate change, a much smaller proportion reported practising waste segregation or other eco-friendly behaviours at home (Sinha & Kumar, 2021). Similar observations have been reported internationally, where environmental knowledge does not always translate into consistent pro-environmental actions (Kollmuss & Agyeman, 2002). This gap suggests that cognitive awareness alone is insufficient to ensure behavioural change, emphasising the need for interventions that strengthen attitudes, values, and decision-making skills.

The growing role of digital learning environments has also attracted scholarly attention. Studies from secondary schools in Bihar indicate that students with access to digital educational tools demonstrate higher environmental literacy scores compared to those relying solely on traditional teaching methods (Mishra, 2022). Digital media, including interactive modules and audiovisual content, may enhance engagement and conceptual understanding. Broader educational research supports this view, suggesting that experiential and technology-supported learning can improve environmental awareness and critical thinking (Ardoin, Bowers, & Gaillard, 2020).

Institutional mechanisms such as Eco-Clubs have been identified as effective platforms for fostering environmental engagement among students. Reports from the National Green Corps (NGC) programme indicate that schools with active Eco-Clubs observe improved student attitudes toward biodiversity conservation and ecosystem protection (National Green Corps,

2020). Participation in activities such as plantation drives, waste management campaigns, and awareness rallies helps translate theoretical knowledge into practical action. Such participatory approaches align with findings that experiential learning significantly contributes to pro-environmental behaviour (Stevenson et al., 2013).

Gender-based differences in environmental attitudes have also been documented in rural settings. Some regional studies suggest that female students tend to display stronger concern for water conservation and sustainable household practices, possibly due to their closer involvement in domestic resource management (Chawla, 2020). Research further indicates that emotional connection with nature and constructive hope can influence sustainable behavioural choices (Chawla, 2020).

Overall, the literature suggests that environmental literacy is multidimensional, encompassing awareness, knowledge, attitudes, and behavioural skills. While awareness levels among students are relatively high, the translation of knowledge into action depends on contextual factors such as digital exposure, institutional support, participatory learning opportunities, and socio-cultural influences. Bridging the knowledge–action gap, therefore, requires integrated educational strategies that combine cognitive learning with practical engagement and value formation.

Table 1: Summary of Review Findings on Environmental Literacy and Sustainable Practices

Parameter	Current Status	Review Observations
Basic Awareness	High (~75%)	Students demonstrate strong ability to identify environmental issues such as pollution, deforestation, biodiversity loss, and climate change. Conceptual understanding is generally satisfactory.
Sustainable Practices	Low (~35%)	Practical adoption of activities such as composting, rainwater harvesting, waste segregation, and energy conservation remains limited. A clear gap exists between knowledge and action.
Teacher Involvement	Inconsistent	Programme success often depends on individual teacher motivation rather than structured training or institutional mandates. Regular integration into the curriculum is lacking.

Parameter	Current Status	Review Observations
Institutional Support	Moderate	Although supportive policy frameworks exist, implementation at the school level is constrained by limited funding, infrastructure gaps, and weak monitoring mechanisms.

Table 1 indicates a noticeable imbalance between environmental awareness and actual sustainable behaviour among students. With respect to basic awareness, most studies report relatively high levels of understanding of environmental issues. A significant proportion of students are able to correctly identify key concerns such as pollution, deforestation, biodiversity loss, and climate change. This suggests that environmental concepts are being effectively introduced at the theoretical level through school curricula and awareness initiatives.

However, when examining sustainable practices, the findings reveal considerably lower levels of practical adoption. Only a limited proportion of students consistently engage in activities such as composting, waste segregation, water conservation, or energy-saving measures at home. This contrast highlights the persistent knowledge–action gap frequently discussed in environmental education research. Although students demonstrate conceptual understanding, consistent behavioural transformation remains limited.

Teacher involvement emerges as another important factor influencing environmental outcomes. The review suggests that the success of environmental programmes often depends on the initiative and motivation of individual teachers rather than structured institutional mechanisms. In schools where teachers actively incorporate environmental themes into classroom instruction and extracurricular activities, student engagement tends to be stronger. In contrast, irregular or minimal teacher participation reduces programme effectiveness.

Institutional support appears to be moderate. While policy frameworks and government initiatives promote environmental awareness and conservation activities, implementation at the school level may be constrained by limited funding, inadequate infrastructure, and a lack of systematic monitoring. As a result, policy intentions are not always fully reflected in consistent institutional practice.

Overall, the literature indicates that strengthening environmental literacy requires more than awareness generation. Emphasis must be placed on experiential learning, teacher capacity

building, and sustained institutional support to ensure that environmental knowledge translates into meaningful and long-term sustainable living practices.

Theoretical Framework

The present review is conceptually grounded in Behavioural Change Theory, particularly frameworks that emphasise the interaction between knowledge, attitudes, and contextual enablers in shaping behaviour.

Environmental literacy aligns with cognitive components of behavioural theory, where awareness and understanding form the foundational layer of change. However, behavioural adoption depends not only on knowledge but also on perceived behavioural control, social norms, and institutional reinforcement. The Theory of Planned Behaviour suggests that intention to act environmentally is influenced by attitudes, subjective norms, and perceived feasibility.

In school settings, this implies that environmental knowledge must be supported by enabling environments, teacher modelling, and accessible infrastructure to facilitate behavioural translation. Experiential learning further reinforces behavioural internalisation by linking abstract concepts with lived experience.

Thus, the awareness–action gap observed in reviewed studies can be interpreted through behavioural theory as a consequence of weak reinforcement mechanisms, limited institutional modelling, and socio-economic constraints. Integrating behavioural insights within environmental education policy may therefore strengthen sustainable practice adoption among adolescents.

Methodology

This study adopted a **systematic review design** to critically examine existing literature on environmental literacy, sustainable living practices, institutional initiatives, and implementation barriers in school education, with specific reference to Bihar. The review approach was chosen to synthesise empirical findings, policy frameworks, and theoretical perspectives to identify recurring patterns and research gaps.

Data Sources

The study relied exclusively on **secondary sources of data**. Relevant literature was collected from:

- Peer-reviewed journal articles on environmental literacy and Education for Sustainable Development (ESD)

- Government policy documents (e.g., Eco-Club/NGC guidelines, Mission LiFE framework, state-level environmental programmes)
- Curriculum frameworks and educational policy reports
- International agency publications (e.g., UNESCO, UNICEF)
- Reports on school infrastructure, WASH facilities, and socio-economic indicators

Databases such as Google Scholar, ERIC, ResearchGate, and official government portals were used to retrieve scholarly and policy documents.

Results and Discussion

The reviewed literature consistently indicates that awareness of environmental issues among adolescents is not negligible. Many students demonstrate familiarity with terms such as climate change, pollution control, and biodiversity conservation. This suggests that environmental themes have successfully entered classroom discourse and curricular frameworks.

Yet awareness appears to operate largely at a cognitive level. When behavioural indicators are examined, a noticeable decline becomes evident. Participation in consistent waste segregation, water-saving practices, or energy conservation is reported by a comparatively smaller proportion of students. This divergence between knowledge and practice cannot be attributed solely to indifference. Rather, it reflects a more complex interaction between institutional reinforcement, domestic environment, and access to enabling resources.

In several reviewed cases, sustainable practices were more visible where schools actively organised experiential activities such as plantation drives, eco-audits, or project-based assignments. In the absence of such reinforcement, environmental understanding tended to remain abstract. This pattern suggests that environmental literacy is sustained not through information alone, but through repeated, contextually grounded engagement.

Thus, the awareness–action gap observed across studies should not be interpreted simply as student reluctance. Instead, it signals structural and pedagogical limitations that restrict the transformation of knowledge into routine behaviour.

Factors Influencing Sustainable Behaviour

The adoption of sustainable behaviour among students is influenced by multiple interconnected factors that extend beyond theoretical knowledge. Evidence from the reviewed literature highlights the importance of experiential exposure, teacher engagement, and technological support in shaping environmentally responsible practices.

Experiential Learning: Hands-on and activity-based learning approaches significantly enhance the internalisation of sustainable habits. Students who participate in practical initiatives such as composting projects, plantation drives, waste audits, or water conservation activities demonstrate better retention of environmental values compared to those exposed solely to textbook-based instruction. Experiential learning not only strengthens understanding but also builds behavioural confidence and long-term commitment to sustainable practices.

Teacher Influence: Teachers play a pivotal role in translating environmental concepts into action. Well-trained and motivated teachers act as facilitators who guide students through inquiry-based and action-oriented projects. Their encouragement, demonstration of eco-friendly behaviours, and integration of sustainability themes into daily teaching contribute substantially to student engagement. In contrast, limited training or inconsistent involvement may weaken programme effectiveness.

Digital Learning: The integration of digital tools and interactive media has shown a positive influence on environmental awareness levels. Studies indicate that exposure to digital platforms, multimedia content, and online environmental campaigns enhances conceptual clarity and engagement among students. Technology-supported learning environments can therefore complement traditional teaching methods and broaden access to updated environmental information.

Overall, sustainable behaviour is shaped by a combination of experiential opportunities, teacher leadership, and supportive learning environments. Strengthening these factors can help bridge the gap between environmental awareness and consistent pro-environmental action.

Current Initiatives in Bihar

Bihar has undertaken several institutional and community-based initiatives aimed at strengthening environmental awareness and promoting sustainable behaviour among students. These programmes reflect the state's commitment to integrating environmental education with practical conservation efforts.

Eco-Clubs under the National Green Corps (NGC): A substantial number of schools across the state participate in the National Green Corps (NGC) programme. Through Eco-Clubs, students engage in activities such as nature observation, biodiversity documentation, cleanliness drives, plantation campaigns, and environmental awareness rallies. These platforms provide experiential learning opportunities that encourage students to translate environmental knowledge into action. The Eco-Club model emphasises student participation,

peer learning, and community involvement, thereby fostering a sense of environmental responsibility at an early age.

State-Level Environmental Programmes: State-supported initiatives such as Paryavaran Mitra and Mission LiFE (Lifestyle for Environment) align school activities with broader sustainability goals. These programmes promote responsible consumption, resource conservation, and climate-conscious lifestyles. By linking local school-based efforts with national and global sustainability frameworks, such initiatives help contextualise environmental issues within everyday life and community practices.

Local-Level Innovations and Success Stories: At the local level, several schools have adopted innovative practices that serve as demonstrative models. Activities such as Miyawaki-style plantation drives, solar energy demonstrations, waste management projects, and water conservation campaigns showcase practical approaches to sustainability. These initiatives not only enhance student learning but also strengthen school-community partnerships and create a visible environmental impact.

Overall, the initiatives implemented in Bihar demonstrate a growing emphasis on experiential engagement and policy alignment. However, the long-term effectiveness of these programmes depends on sustained funding, teacher training, monitoring mechanisms, and continuous community participation.

Barriers to Implementation

Resource Disparity: Lack of basic infrastructure (such as clean drinking water and functional toilets) in many rural schools makes it difficult to effectively practice and model sustainability principles.

Curriculum Rigidity: A strong emphasis on classroom-based instruction often limits opportunities for observation, experiential learning, and field-based exploration.

Socio-Economic Pressures: Poverty and limited community awareness can restrict students' ability to practice sustainable behaviours at home.

Conclusion

The review underscores that environmental education in Bihar has made visible progress in embedding sustainability within academic discourse. Students are increasingly exposed to environmental terminology and conceptual frameworks through curricular reforms and co-curricular programmes. However, the persistence of an awareness–action divide indicates that conceptual familiarity has not yet matured into consistent behavioural commitment.

Environmental literacy, as reflected in the literature, remains uneven in its practical expression. Behavioural engagement appears to depend heavily on institutional culture, teacher initiative, and infrastructural conditions. Where these supports are limited, sustainability education risks remaining symbolic rather than transformative.

Therefore, the challenge before educational institutions is not merely to expand environmental content but to reconfigure pedagogical and institutional practices in ways that normalise sustainable behaviour. Without such integration, environmental education may continue to produce informed students who remain constrained in their capacity to act.

Policy Recommendations

Strengthening sustainability education requires a shift from fragmented initiatives to systemic integration. Experiential learning should not remain occasional or event-based; it must become a structured and recurring component of the academic calendar. Embedding practical environmental projects within assessment frameworks may help institutionalise behavioural engagement rather than leaving it dependent on voluntary participation.

Teacher preparation is equally central. Professional development efforts should move beyond awareness workshops and instead equip educators with interdisciplinary strategies for linking environmental issues to everyday classroom discussions. When sustainability becomes embedded across subjects rather than confined to environmental studies alone, students are more likely to perceive it as a lived concern rather than a discrete topic.

Infrastructure development must also align with educational objectives. Schools that lack basic sanitation, water management systems, or green spaces face inherent contradictions in modelling sustainable behaviour. Addressing these infrastructural gaps is not merely a welfare concern but an educational necessity.

Finally, stronger alignment between policy formulation and school-level implementation is required. Monitoring mechanisms, transparent evaluation criteria, and sustained funding streams are essential to prevent environmental initiatives from remaining short-term or symbolic exercises.

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