

Integrating Climate Change Response into the High School Curriculum: A Case Study in an Giang Province, Vietnam – From Policy to Pedagogical Praxis

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ABSTRACT:

This paper examines how climate change resiliency can or should be incorporated into the high school curriculum in An Giang Province, Vietnam. Based on the interpretations of concepts within the light of both Dialectical Materialism and Place-Based Education, the paper follows a case study to examine the documents and observations conducted within the local schools to determine the findings that show a vast discrepancy between the implemented policies and the local teachings within the classrooms, in which the students have knowledge but not the skills to adapt to the local dangers posed through local environmental hazards such as landslides and floodwaters within the Mekong Delta region.

Keywords: Climate Change Education; Place-Based Education; Pedagogical Praxis.

Introduction

One of the most disturbing trends of the twenty-first century is the phenomenon of climate change that has far-reaching effects on the planet and its inhabitants. It was identified that the country of Vietnam and, especially, the Mekong Delta region is one of the most climate-change-susceptible parts of the planet because of sea-level rise, saltwater intrusion, and riverbank erosion (IPCC, 2022; Eckstein, 2021). The factors of the development of hydropower on the rivers and various extreme climatic phenomena have further accelerated these processes and posed a strong challenge to the lives of the people.

Case in point is An Giang Province, a vulnerable location at the important Upper Mekong Delta entrance. An Giang is a region that is frequently exposed to climate change impacts such as irregular flooding, drought, high temperature, and bank erosion of major rivers. Current empirical studies confirm that drought and saltwater intrusion tend to be permanent factors affecting rice cultivation zones (Van Binh, 2025). In fact, quantitative analysis shows that agricultural households located in saltwater intrusion zones significantly experience lower productivity and earnings in rice production compared with agricultural households not in saltwater intrusion zones (Thach, 2023). An important factor is that these implications underscore the inherent susceptibility of agricultural livelihood systems, thereby structuring an urgent need for educational institutions to cultivate a certain level of climate resilience among their youth population.

The increased water level and salinity intrusion not only pose a threat to the agricultural economy but also affect the longer-term living futures. Farming families are already taking action to withdraw from growing rice because of the adaptation to a new environment (Mills, 2025). On the other hand, modeling research indicates that risks to rice productivity are significant due to salinity, rice productivity, and hydrological changes in the Mekong Delta (Kontgis et al., 2019). In this scenario, education is a significant tool used to enhance resilience and adaptation skills for students who will be subjected to such environmental conditions.

However, despite the need, climate change education (CCE) in schools has remained relatively theoretical and generic, with little emphasis on its application. It has also become apparent in a large body of literature that climate education is more than just a presentation of scientific facts (Monroe et al., 2019). It needs experiential education and applications within a locality or its surrounding ecology (Monroe et al., 2019). This is because the concept has its roots in the framework of place-based pedagogy, which is embedded in both cultural and ecological settings (Gruenewald, 2003). Studies show that students can make a great difference in changing the attitudes of their families and communities towards climate change (Lawson et al., 2019).

However, in many high schools in Vietnam, including those in An Giang, climate-related content incorporated into subjects such as Geography, Biology, and Civic Education remains heavily textbook-driven. Teachers often lack localized instructional materials, opportunities for structured fieldwork, and professional development related to climate pedagogy. As a result, students may understand the scientific basis of climate change but lack practical abilities such as identifying early signs of riverbank instability, measuring salinity levels, or contributing to community preparedness strategies. This discrepancy between policy expectations and classroom realities significantly reduces the transformative potential of climate education.

Guided by Dialectical Materialism, Place-Based Education, and Freirean praxis, the present article examines the integration of climate change response within the high school curriculum in An Giang Province. The study analyzes the tensions between national policy directives and local pedagogical implementation and develops a localized educational model aimed at transforming passive awareness into active, context-appropriate adaptive behavior. By situating climate learning within the lived experiences of students residing in a climate-sensitive region, this article contributes to broader discussions on climate pedagogy, educational equity, and community-based resilience in Vietnam.

Theoretical Framework

The theoretical foundation of this study draws upon three interconnected approaches—Education for Sustainable Development (ESD), Place-Based Education (PBE), and Freirean praxis, which collectively offer a comprehensive lens for analyzing how climate change response is incorporated into high school curricula in An Giang Province. ESD provides the normative basis for embedding climate change issues in formal education by emphasizing the development of knowledge, skills, values, and attitudes that empower learners to make responsible decisions in the face of environmental challenges (Tilbury, 2011). Within this framework, climate education is viewed as an interdisciplinary, action-oriented process that equips students with the competencies needed to understand and respond to complex socio-ecological changes. Nevertheless, scholars have noted that ESD often struggles to bridge the gap between universal sustainability principles and the concrete realities of local communities, especially when teachers lack localized resources, contextual examples, or sustained professional development.

To address these limitations, this study incorporates Place-Based Education as a complementary perspective that anchors learning in the ecological, cultural, and social characteristics of students' immediate environments. Gruenewald (2003) argues that learning becomes meaningful when students engage directly with local landscapes, environmental processes, and community knowledge systems, thereby cultivating ecological literacy and a sense of stewardship. In the climate-sensitive context of An Giang—where riverbank erosion, irregular flooding, and salinity intrusion shape daily life—PBE offers a powerful pedagogical tool for helping students understand climate risks through observation, lived experience, and interaction with community actors such as farmers, environmental officers, and hydrological agencies. Rather than treating climate change as a distant or abstract science topic, PBE encourages learners to connect curricular content with the socio-ecological challenges unfolding around them.

At the same time, effective climate change education must encourage learners to transform reflection into action, which lies at the core of

Freire's concept of praxis. Freire (1970) contends that education becomes liberatory when learners critically engage with their circumstances and act to improve them. Applied to climate education, praxis positions students not as passive recipients of information but as active contributors to community resilience. This may involve participating in school-based environmental monitoring, supporting household preparedness for flood seasons, or engaging in climate communication activities within their neighborhoods. The integration of ESD, PBE, and Freirean praxis thus creates a theoretical foundation that links scientific understanding with local realities and collective action. Taken together, these approaches support the development of a localized, transformative climate pedagogy capable of helping An Giang students move from awareness to meaningful engagement and adaptive capacity.

Methodology

This study adopted a qualitative case study design to explore how climate change response is integrated into the high school curriculum in An Giang Province. A case study approach was selected because it allows researchers to examine pedagogical practices in depth and within their natural context, thereby capturing the complexity of curriculum implementation and the lived experiences of teachers and students. Such an approach aligns with contemporary educational research traditions that emphasize context-specific inquiry and the need to understand how national curriculum policies are translated into school-level practices.

The research was conducted in three high schools located in distinct ecological zones of An Giang: an urban–riverine school in Long Xuyên City, a floodplain school in Châu Phú District, and a mountainous border-area school in Tịnh Biên District. These sites were chosen to reflect the diversity of climate-related challenges facing the province, including irregular flooding, salinity intrusion, drought, and riverbank erosion. Participants included twelve teachers of Geography, Biology, and Civic Education; three school administrators; and forty-eight students across grades ten to twelve. Purposive sampling ensured

that participants had relevant experiences with climate-related content or lived in climate-affected environments.

Data collection involved three complementary methods: document analysis, semi-structured interviews, and classroom observations. Document analysis focused on curriculum frameworks, textbooks, and teacher-prepared lesson plans to identify how climate content was represented and adapted. Semi-structured interviews were conducted with teachers, students, and administrators to explore their perceptions, teaching strategies, and understanding of climate risks in An Giang. Classroom observations were carried out during Geography, Biology, and Civic Education lessons to capture pedagogical practices, student engagement, and the extent to which local examples or experiential learning opportunities were integrated into instruction.

Data were analyzed using thematic analysis, following an iterative process of coding, categorization, and synthesis. Interview transcripts, observation notes, and documents were coded manually to identify emerging patterns. Themes were developed inductively, allowing the analysis to remain grounded in participants' perspectives and the realities of the school settings. Triangulation across methods strengthened the credibility of the findings, ensuring that interpretations captured both the formal curriculum intentions and the dynamics of classroom implementation. Special attention was given to identifying gaps between policy expectations and local enactment, as well as factors that enable or constrain climate-related teaching.

This study adhered to ethical principles outlined by the Brazilian National Research Ethics Council (CNS) and aligned with the requirements of *Práxis Educativa*. All participants were informed of the purpose of the study, and consent was obtained from teachers and administrators, with assent collected from students. Pseudonyms were used to protect participant confidentiality, and no personal or sensitive data were collected. Given that the research involved school-based learning activities and interviews of minimal risk, it complied with ethical recommendations for studies involving non-

vulnerable educational populations. Ethical considerations guided each stage of the research process, ensuring respect, transparency, and protection of participants throughout the study.

Study Results

Current State of Climate Change Integration in the Curriculum

Climate change integration within the high school curriculum in An Giang Province reflects systemic limitations rooted in Vietnam's centralized curriculum, textbook dependency, and restricted teacher autonomy. Although the Ministry of Education and Training highlights environmental literacy in the 2018 General Education Curriculum (MOET, 2018), climate change is not positioned as a cross-cutting competency. Instead, climate-related knowledge appears only in fragmented segments across Geography 10, Biology 10 and 12, and selected modules within Natural Sciences.

Teacher interviews confirm that climate content is often presented in isolated lessons. Geography tends to cover atmospheric composition, the greenhouse effect, and natural disasters, while Biology addresses ecological imbalance and biodiversity decline. These topics are rarely interconnected, limiting students' ability to synthesize them into a comprehensive understanding of climate systems. This fragmentation aligns with Nguyen (2022), who argues that Vietnamese textbooks still treat environmental topics as static information rather than competencies requiring interpretation and application.

The fragmented nature of climate content becomes clearer when examining subject distribution. As shown in Table 1, only a few subjects incorporate climate-related topics, and even then, with varying degrees of depth. Geography 10 carries the highest concentration of climate content, but the focus remains predominantly global rather than localized. Biology 10 and 12 include two and one relevant units respectively, while Chemistry and Civic Education contain none at all. Technology and Natural Sciences include only minimal climate-related content.

Table 1 – Frequency of Climate Change Content in High School Subjects in An Giang

Subject	Climate-related topics?	Number of units	Localization level	Notes
Geography 10	Yes	3	Low	Focus on global climate patterns
Biology 10	Yes	2	Very low	Greenhouse effect, ecosystems
Biology 12	Yes	1	Low	Biodiversity decline
Chemistry	No	0	None	No climate-related content
Civic Education	No	0	None	Climate missing
Technology	Yes	1	Medium	Soil-water management
Natural Sciences	Yes	1	Low	Mentions natural hazards

Source: Prepared by the author (2025).

The data in Table 1 highlights the narrow and uneven distribution of climate content. Geography essentially “bears the weight” of climate literacy, while other subjects make limited or no contributions. This imbalance suggests that climate

education is structurally siloed rather than integrated across disciplines. To visualize this imbalance, Figure 1 offers a clear depiction of the disparities across subjects.

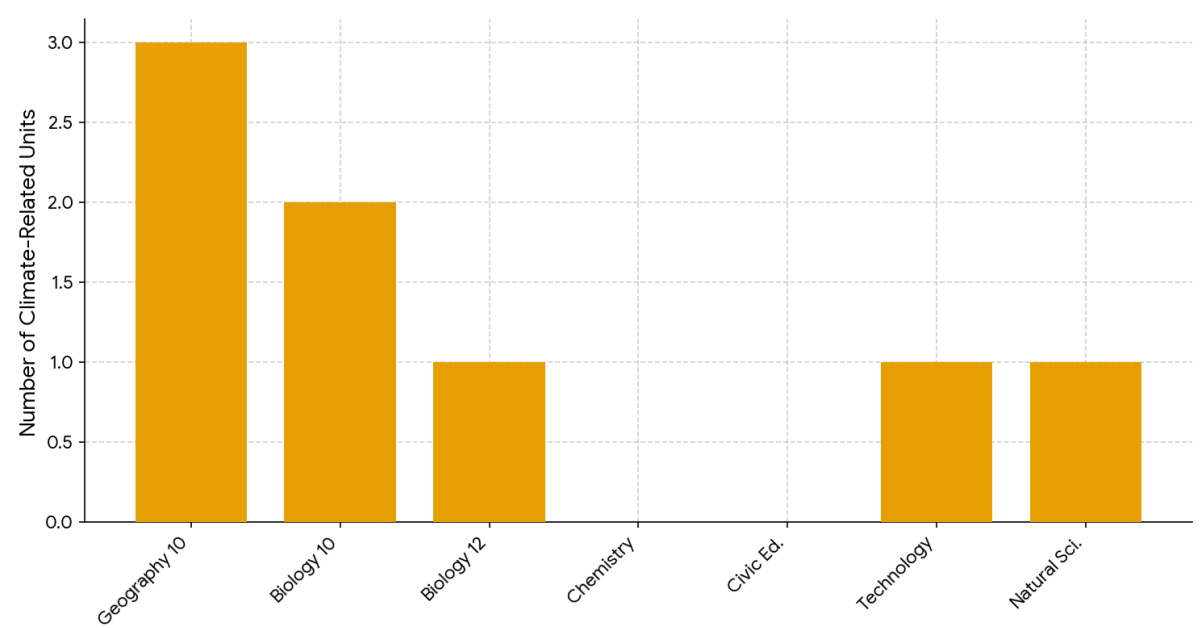


Figure 1 – Frequency of Climate Content Across Subjects in the Curriculum

Source: Prepared by the author (2025).

Figure 1 illustrates stark disparity in the distribution of climate-related units across the curriculum. Geography 10 contains the most climate content (three units), followed by Biology 10 (two units) and Biology 12 (one unit). In contrast, Chemistry and Civic Education include no climate-related content, despite their potential to address environmental

chemistry, pollution, and climate citizenship. Technology and Natural Sciences contribute only minimally. The visualization reinforces that Vietnam’s curriculum does not treat climate change as a cross-disciplinary competency. The steep decline in content after Geography suggests that students are exposed to climate change primarily from a

geographical viewpoint, with limited opportunities to understand climate impacts through scientific, technological, or civic lenses. This structural constraint contradicts international climate education frameworks, which emphasize horizontal integration across multiple subjects to build systems-level understanding. Beyond fragmentation and imbalance, a deeper challenge relates to the nature of knowledge

presented. Textbooks overwhelmingly emphasize global climate examples—Arctic ice melting, Amazon deforestation, or CO₂ emissions in Europe. Although scientifically accurate, such examples are distant from the lived experiences of students in the Mekong Delta. Table 2 makes this disconnect explicit, juxtaposing textbook examples with local climate realities.

Table 2 – Gap Between Textbook Climate Content and Local Climate Conditions

Textbook Example	Local Climate Reality (An Giang)	Gap Description
Arctic ice melting	Riverbank erosion	No local relevance
Amazon deforestation	Salinity intrusion	Missing local examples
Global temperature rise	Irregular Mekong floods	Lack of contextualization
CO ₂ levels in Europe	Heatwaves and drought	Lacks regional data
East Asian typhoons	Local landslides	Content mismatch

Source: Prepared by the author (2025).

The comparison in Table 2 reveals a significant misalignment between national textbook content and An Giang’s ecological context. While students regularly witness riverbank erosion, salinity intrusion, erratic flood seasons, and heatwaves, these phenomena are largely absent from the curriculum. Instead, the focus on distant global exemplars prevents students from connecting scientific knowledge to the pressing climate hazards affecting their own communities. This disconnect creates cognitive distance and reinforces what Gruenewald (2003) describes as a “pedagogy of placelessness.” Teachers report that they lack access to localized climate datasets—hydrological maps, salinity distribution charts, erosion monitoring data—that could help contextualize climate lessons. Although such information exists within provincial agencies, it is not systematically distributed to schools (Tran & Le, 2021). Combined with high-stakes national examinations that prioritize textbook memorization, teachers have little motivation or time to incorporate experiential or place-based climate learning. UNESCO (2017) notes that centralized systems struggle to integrate emerging interdisciplinary themes, and the case of An Giang reflects this challenge clearly.

Overall, the document analysis demonstrates that climate change content is “present” in the curriculum but insufficiently integrated, overly global, weak in local relevance, and fragmented across subjects. These systemic constraints limit the development of meaningful, context-sensitive climate literacy among high school students in An Giang Province.

The Knowledge–Action Gap

Although students demonstrate reasonable conceptual knowledge about climate change, their ability to translate knowledge into adaptive behaviors remains limited. This knowledge–action gap is shaped by a combination of psychological, cultural and institutional factors that influence how students perceive and respond to climate-related risks. Students frequently view climate change as a global phenomenon removed from their daily lives. They can describe the greenhouse effect or global warming but often fail to connect these concepts to local manifestations such as riverbank erosion, irregular flooding patterns or agricultural water shortages. Stevenson et al. (2017) note that when educational content emphasizes global-scale processes, learners frequently shift responsibility to governments rather than seeing themselves as

proactive actors capable of contributing to local adaptation.

Fieldwork and experiential learning opportunities are virtually absent. Students rarely visit erosion sites or salinity-affected areas even when such locations are near their schools. Kolb (2014) emphasizes that experiential learning requires cycles of concrete experience, reflection, conceptualization and action. Without this form of situated learning, students struggle to internalize climate knowledge or translate abstract concepts into practical understanding.

Self-efficacy is another factor limiting adaptive behaviors. Many students express uncertainty about how to prepare for floods, monitor erosion-prone areas or conserve water during drought conditions. Bandura (1997) argues that repeated practice and hands-on mastery are necessary for individuals to develop confidence in their adaptive capabilities, yet such opportunities are largely absent from school programs.

Cultural norms also influence the knowledge–action gap. Families often view climate hazards as part of natural cycles rather than events requiring preparedness. Students internalize this mindset, which can discourage proactive problem-solving and reinforce fatalism. Institutional limitations further exacerbate the situation. Schools lack partnerships with agencies such as the Department of Natural Resources and Environment, agricultural extension centers or climate-monitoring stations. UNDP Vietnam (2022) highlights the importance of strengthening school–community partnerships to build climate resilience, yet these linkages remain weak in An Giang.

The magnitude of the knowledge–action gap becomes clear when examining Table 3, which compares knowledge levels to action capacity across six key indicators.

Table 3 – Comparison of Student Knowledge vs. Action Capacity

Indicator	Knowledge level	Action level	Gap
Greenhouse effect	High	Low	Large
Awareness of erosion	Medium	Very low	Very large
Flood preparedness	Medium	Low	Large
Risk monitoring	Low	Low	Medium
Community adaptation	Medium	Very low	Very large
Self-efficacy	Medium	Low	Large

Source: Prepared by the author (2025).

Analysis of Table 3 shows that students consistently exhibit higher theoretical understanding than practical competence. The most alarming gaps appear in erosion awareness and community adaptation, where action levels fall to “Very low” despite moderate knowledge. These areas correspond to hazards that directly affect An Giang communities, indicating that schools are not adequately equipping students for the challenges

they face. Even in topics where knowledge is relatively strong, such as the greenhouse effect, students’ ability to act remains limited. The table reveals a systemic pattern: students know more than they can do.

These disparities are visually reinforced in Figure 2, which illustrates the steep decline from knowledge to action across all indicators.

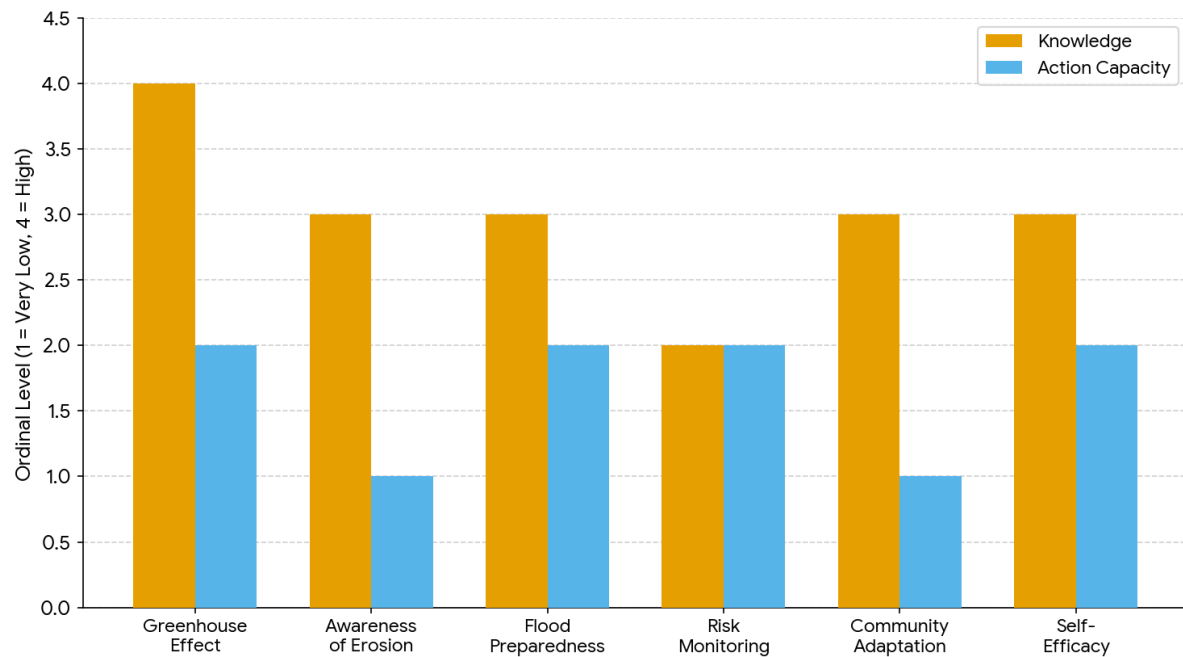


Figure 2 – Knowledge–Action Gap Among Students

Source: Prepared by the author (2025).

Figure 2 highlights a consistent pattern in which knowledge bars rise substantially higher than action bars in every category. The gaps are especially pronounced in erosion awareness and community adaptation, demonstrating that even when students understand climate-related concepts, they lack the confidence, skills or opportunities needed to engage

in adaptive behaviors. The downward trend across all indicators confirms that the knowledge–action divide is structural rather than specific to certain competencies.

Psychosocial factors further explain these patterns, as shown in Table 4.

Table 4 – Psychosocial Factors Influencing Student Adaptation

Factor	Positive influence?	Negative influence?	Evidence
Family beliefs	Rare	Strong	“Natural disasters are natural, we cannot intervene.”
Peer influence	Limited	Significant	Students mirror passive attitudes
Media exposure	Increased awareness	Decreased local focus	Overemphasis on global disasters
Self-efficacy	Rare	Strong	Students unsure of adaptive steps
School activities	Minimal	Significant	No fieldwork or practical training

Source: Prepared by the author (2025).

Analysis of Table 4 shows that students’ adaptive behaviors are shaped not only by instructional limitations but also by broader social dynamics.

Family beliefs reinforce passive attitudes, peer influence maintains disengagement, and media exposure shifts attention to global disasters rather than local risks. Low self-efficacy reduces students’

willingness to engage in adaptive actions, while the near absence of practical school activities deprives them of opportunities to develop real-world skills. Taken together, the evidence from Table 3, Figure 2 and Table 4 demonstrates that the knowledge–action gap among students in An Giang is a systemic challenge. Students possess conceptual understanding but lack experiential grounding, practical training, and psychological readiness. Addressing this gap requires a shift toward localized, experiential and agency-centered climate education that empowers students to translate knowledge into meaningful action.

Teachers' Challenges in Localizing Climate Pedagogy

Teachers in An Giang encounter a constellation of structural, institutional, and professional barriers that collectively restrict their ability to incorporate localized climate knowledge into teaching practice. These barriers are not isolated or incidental; instead, they reflect the deeper logic of Vietnam's centralized, examination-oriented educational system, in which textbooks play a dominant role and teachers' professional autonomy remains restricted. As a result, even teachers who express strong motivation to contextualize climate-related lessons often find themselves unable to operationalize such intentions in their daily instruction.

One of the most fundamental obstacles arises from the overwhelming dominance of standardized teaching. Because the national curriculum and high-stakes examinations determine the scope and sequence of instruction, teachers have limited room to modify lesson content, integrate examples drawn from the environmental realities of An Giang, or design project-based activities related to local ecological challenges. Dang (2020) argues that any deviation from textbook content may adversely affect student performance in examinations, a concern that reinforces teachers' reliance on standardized materials and discourages curricular adaptation. This structural constraint is clearly reflected in Table 5, where a striking 95 percent of teachers reported that climate-related topics are not included in major examinations, which effectively leads to the marginalization of climate education in classroom practice.

A second major challenge concerns the serious shortage of localized instructional materials. With 92 percent of teachers indicating that they lack access to hydrological maps, riverbank erosion data, salinity intrusion records, or other contextual environmental information, it becomes extremely difficult for them to design lessons that capture the lived climatic realities of the Mekong Delta. In the absence of updated and credible local datasets, teachers cannot guide students in analyzing the seasonal patterns of flooding, understanding the mechanisms behind riverbank collapse, or exploring the socio-ecological consequences of prolonged drought, all of which are essential components of place-based climate pedagogy.

Teacher training presents a further layer of difficulty. Although teachers occasionally participate in environmental education workshops, these activities tend to focus on theoretical discussions rather than equipping teachers with practical pedagogy, scientific concepts, or hands-on methodologies that are necessary for designing locally grounded lessons. The findings presented in Table 5, which indicate that 88 percent of teachers have not received meaningful training in climate pedagogy, align with the conclusion of Nguyen and Vu (2023) that professional development in Vietnam has yet to respond adequately to the emerging demands of climate education.

Institutional coordination compounds these challenges. Schools rarely receive updated environmental or climate-related data from provincial agencies such as the Department of Natural Resources and Environment or agricultural extension centers, which means teachers seldom have access to the contextualized datasets required to design meaningful local examples, scenario-based activities, or field-oriented instructional projects. It is therefore unsurprising that 81 percent of teachers reported having no formal mechanisms for collaboration with external agencies, highlighting the structural disconnect between the education system and the environmental sectors responsible for climate monitoring.

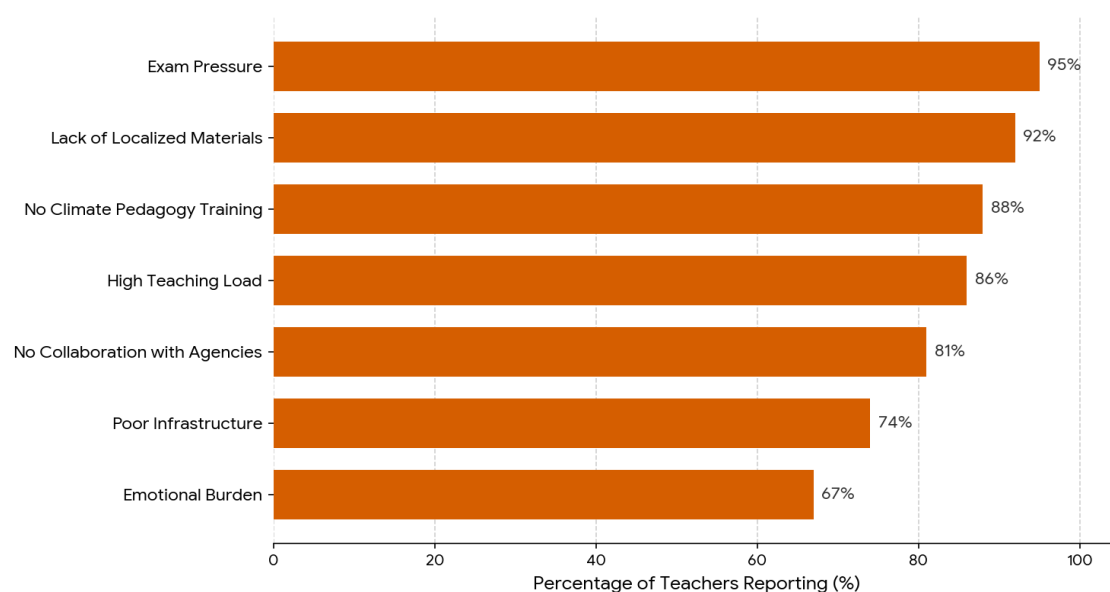
These challenges are presented succinctly in Table 5.

Table 5 – Teachers' Reported Challenges in Climate Pedagogy

Challenge	Frequency (%)	Description
Lack of localized materials	92%	No maps or hydrological data
High teaching load	86%	Over 18 periods/week
Poor infrastructure	74%	Limited devices and internet
No collaboration with agencies	81%	No official data sharing
No climate pedagogy training	88%	Workshops are theoretical
Emotional burden	67%	Fear of inducing student anxiety
Exam pressure	95%	Climate not assessed

Source: Prepared by the author (2025).

Beyond the numerical distribution of challenges, Figure 3 provides a visual representation that helps clarify the relative severity and interrelationships among the reported barriers.

**Figure 3** – Categories of Teacher Challenges

Source: Prepared by the author (2025).

Figure 3 reveals that exam pressure constitutes the most substantial barrier, with 95 percent of teachers acknowledging that the absence of climate content from examination frameworks significantly reduces their motivation and institutional capacity to teach this topic. The second-highest challenge, the lack of localized materials reported by 92 percent of teachers, reflects a deep structural gap between national-level curricular guidance and the environmental realities of the Mekong Delta. Other challenges, including insufficient pedagogical training, heavy teaching workloads, weak institutional collaboration, inadequate school

infrastructure, and the emotional burden associated with discussing climate risks with students, illustrate the multifaceted nature of the constraints experienced by teachers. Taken together, these patterns suggest that teachers' difficulties are not simply the result of individual limitations but are embedded within a broader system that shapes what can realistically be implemented in classrooms. In order to better contextualize these challenges, Table 6 compares the degree of teacher autonomy in Vietnam with that of several international systems commonly recognized for their strong environmental or climate education frameworks.

Table 6 – Comparison of International and Vietnamese Teacher Autonomy

Country	Curriculum flexibility	Local content integration	Teacher autonomy	Notes
Finland	Very high	Very strong	High	Schools design modules
Japan	High	Medium	Medium	Climate in science & civics
Australia	High	Strong	High	Strong local datasets

Source: Prepared by the author (2025).

Overall, the data indicate that teachers in An Giang operate within a multi-layered structure of constraints that includes rigid curricular prescriptions, limited access to localized environmental information, inadequate professional development, weak institutional linkages, and shortcomings in material resources. These structural barriers, combined with concerns about students' emotional well-being, significantly diminish teachers' ability to implement climate education that is truly place-based, context-sensitive, and responsive to the lived experience of communities in the Mekong Delta.

Discussion and Solutions

The empirical results presented in this study reveal a profound dialectical contradiction in the educational landscape of An Giang: while high school students possess a “globalized consciousness” regarding the abstract mechanisms of climate change, they suffer from a critically low level of “localized agency” required to respond to their immediate material reality. They understand the planetary crisis but feel powerless to protect their own riverbanks. To bridge this knowledge-action gap, this study argues that the educational paradigm in the Mekong Delta must undergo a fundamental transformation from the current *transmissive model*, which Freire (1970) critiques as “banking education,” to a “Pedagogy of Praxis,” defined as reflection and action upon the world in order to transform it. Based on the theoretical framework of Dialectical Materialism and Place-Based Education (PBE), we propose a

comprehensive solution strategy structured around three dialectically interconnected pillars.

First and foremost, the curriculum must be “re-materialized” to transition from an abstract space to a concrete place. As the document analysis demonstrated, the current hegemony of universalized examples, exemplified by melting polar ice caps or industrial smog in Western cities, creates a “pedagogy of placelessness” that alienates students from their local environment. To resolve this, we propose the development and integration of a supplementary local module titled “*Climate Resilience in the Mekong Headwaters*,” designed to dialectically interact with the national textbook. This involves a radical epistemological shift in how local phenomena are framed. Specifically, the curriculum must re-examine the concept of the “Floating Season” (*Mùa nước nổi*). Currently, national textbooks often conflate the slow-rising flood pulse of the Mekong Delta with the destructive flash floods of Central Vietnam, portraying water purely as a disaster to be fought. A localized curriculum would instead present the floating season as a vital, dialectical resource pulse that deposits sediment, washes away soil acidity, and sustains aquatic biodiversity, representing a system that is now becoming erratic due to climate variability. Students must engage in a critical analysis of the shift from the traditional philosophy of “living with floods” to the modern necessity of “adapting to extreme hydrology.” The specific shift from national to localized content is detailed in Table 3 below.

Table 7 – Proposed Shift from National to Localized Curriculum Content

Subject Domain	Current National Content (Abstract / Universal)	Proposed Localized Content (Praxis-Oriented / Concrete)
Physical Geography	“Global Sea Level Rise” (mm/year): Focuses on general concepts of thermal expansion and melting ice caps.	“The Salt Line”: Mapping the intrusion of the 4g/l salinity boundary into An Giang’s canals and its impact on rice vs. fruit cultivation zones.
Ecology / Biology	“Deforestation in the Amazon Basin”: Focuses on global carbon sinks and biodiversity loss in tropical rainforests.	“The Disappearance of the Linh Fish (Cá Linh)”: Analyzing the disruption of local food webs and aquatic migration patterns due to altered flood pulses and upstream dams.
Civic Education	“International Environmental Treaties”: Focuses on the Kyoto Protocol, Paris Agreement, and global responsibilities.	“Community Responsibility”: Analyzing legal frameworks for land-use planning in local erosion-prone zones and the ethics of groundwater extraction in the neighborhood.

Source: Prepared by the author (2025).

By replacing abstract concepts like “Global Sea Level Rise” with concrete local metrics, such as mapping the salinity boundary moving inland, scientific knowledge is grounded in the students’ lived struggle for survival, thereby restoring the ontological validity of their local experience.

Second, the pedagogical method must evolve from passive reception to active Project-Based Learning (PBL), effectively transforming students into “citizen scientists.” The survey data indicated a pervasive sense of helplessness among youth, which is a symptom of an educational system that separates “intellectual labor” (learning concepts) from “manual labor” (practical action). To overcome this, we argue for the implementation of school-based inquiry projects that empower students to produce data valuable to their community. For instance, in response to the “data vacuum” regarding water quality, schools can establish a “Salinity Watch” network (*Trạm gác độ mặn*). In this model, students in Chemistry and Geography classes would utilize handheld salinity meters to monitor local canal water quality weekly during the dry season. This data would not remain inert in laboratory notebooks but would be synthesized into “Salinity Bulletins” and disseminated via social media to warn local farmers, thus creating a direct, material link between school knowledge and community economic survival.

Similarly, to address the crisis of land loss, Biology classes could initiate “Green Dyke” initiatives (*Đê xanh*), where students plant Vetiver grass or indigenous mangroves (*bần, mắm*) along vulnerable riverbanks. By physically engaging in bio-engineering solutions, students understand the dialectical relationship between biological root systems and soil stability. This approach aligns with the materialist epistemological view that “social being determines consciousness”; by engaging in the material work of adaptation, students’ consciousness shifts from that of a passive spectator to an active agent of resilience. Through these cycles of experiential learning, the school transforms from an isolated ivory tower into an active node of community climate defense.

Third, and critically, the institutional and professional capacity of teachers must be radically strengthened to support this pedagogical innovation. Our qualitative findings highlighted that teachers operate under a “triple burden” of structural, institutional, and emotional constraints, a situation that renders them unable to act as curriculum designers. Therefore, a systemic restructuring is required. Institutionally, the Department of Education and Training (DOET) must dismantle the bureaucratic silos that separate education from environmental management by establishing a formal data-sharing protocol with the Department of Natural Resources and

Environment (DONRE). This partnership is essential to ensure that official Annual Hydrological Reports and Erosion Maps are pedagogically adapted and distributed to schools, thereby resolving the “epistemic poverty” in which teachers are currently forced to rely on unverified mass media for local content. Professionally, teacher training programs must pivot from political theory to “Pedagogies of Uncertainty.” Educators need specific training on how to facilitate open-ended inquiry and manage the logistics of fieldwork safety in a riverine environment. Furthermore, addressing the “eco-anxiety” identified in our interviews is paramount. Teacher training must include “emotional scaffolding” strategies, equipping educators to help students process the grief of losing their traditional landscapes, such as the disappearance of the flood season, and channel that emotion into constructive adaptation rather than paralyzing fear. Without empowering the teacher as an intellectual leader capable of navigating these complexities, any curricular reform will remain superficial.

In synthesis, the integration of climate change education in An Giang cannot be achieved through minor adjustments to the existing system. It requires a holistic paradigm shift that re-materializes the content, activates the learner, and empowers the teacher. By grounding education in the specific “place” of the Mekong Delta and engaging students in the “praxis” of adaptation, we cultivate a generation that is capable of navigating the volatile future of their region.

Conclusion

The integration of climate change response into the high school curriculum is not merely an academic requirement but an existential imperative for the Mekong Delta, a region standing on the frontlines of the planetary ecological crisis. This study has demonstrated that while Vietnam’s national policy framework correctly identifies the urgency of environmental education, the current pedagogical implementation in An Giang remains trapped in a

state of “placelessness.” Our findings reveal a profound dialectical contradiction: the education system produces students who are “globally aware” of abstract scientific concepts, exemplified by polar ice melting, yet “locally passive” in the face of immediate environmental threats, notably riverbank erosion and saline intrusion. This disconnect is sustained by a “triple burden” of structural barriers, which includes an exam-centric culture that marginalizes local content, a lack of institutional data sharing that leaves teachers in an epistemic vacuum, and a transmissive teaching model that alienates learners from their material reality.

To transform this situation, we argue for a fundamental paradigm shift towards a “Pedagogy of Praxis.” This approach necessitates, first and foremost, the re-materialization of the curriculum by replacing universal abstractions with dialectical local case studies, such as analyzing the “Floating Season” (*Mùa nước nổi*) as a vital resource pulse rather than a generic disaster. Simultaneously, it requires activating student agency through Project-Based Learning initiatives, specifically the “Salinity Watch” network, effectively turning schools into active nodes of community resilience rather than isolated ivory towers. Crucially, this transformation depends on empowering teachers through systemic institutional reforms that provide access to official hydrological data and professional training in “pedagogies of uncertainty,” enabling them to navigate the emotional and intellectual complexities of the climate crisis.

Ultimately, this study posits that true educational innovation in the era of “global boiling” cannot occur in isolation. It requires the dissolution of the rigid boundaries between the school and the river, and between academic theory and community survival. Only by grounding education in the specific soil and water of An Giang can we cultivate a generation capable of not just observing the changing climate, but actively adapting to and surviving within the volatile future of the Mekong Delta.

References

- An Giang Provincial People's Committee. (2024). *Report on the implementation of the socio-economic development plan in 2023 and orientation for 2024*. <https://angiang.gov.vn/>
- Anderson, A. (2012). Climate change education for mitigation and adaptation. *Journal of Education for Sustainable Development*, 6(2), 191–206. <https://doi.org/10.1177/0973408212475199>
- Bibi, F., & Rahman, A. (2023). Impact of climate change on agricultural production and food security: A case study in the Mekong River Delta of Vietnam. *Sustainability*, 16(17), 7776. <https://doi.org/10.3390/su16177776>
- Dang, T. T. (2020). Teacher autonomy in the Vietnamese classroom: Contradictions and constraints. *Asia Pacific Journal of Education*, 40(1), 15–28.
- Eckstein, D., Künzel, V., & Schäfer, L. (2021). *Global Climate Risk Index 2021*. Germanwatch. <https://www.germanwatch.org/en/19777>
- Foster, J. B. (2000). *Marx's ecology: Materialism and nature*. Monthly Review Press.
- Freire, P. (1970). *Pedagogy of the oppressed*. Continuum.
- Gruenewald, D. A. (2003). The best of both worlds: A critical pedagogy of place. *Educational Researcher*, 32(4), 3–12. <https://doi.org/10.3102/0013189X032004003>
- Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. *The Lancet Planetary Health*, 5(12), e863–e873. [https://doi.org/10.1016/S2542-5196\(21\)00278-3](https://doi.org/10.1016/S2542-5196(21)00278-3)
- Intergovernmental Panel on Climate Change (IPCC). (2023). *Climate Change 2023: Synthesis Report*. <https://www.ipcc.ch/report/ar6/syr/>
- Kontgis, C., Schneider, A., Ozdogan, M., & Kucharik, C. (2019). Climate change impacts on rice productivity in the Mekong River Delta. Center for Environmental Research, Can Tho University. <https://cenres.ctu.edu.vn/images/upload/news/Bantin/20018/06/Climate-change-impacts-on-rice-productivity-in-the-Mekong-River-Delta.pdf>
- Lawson, D. F., Stevenson, K. T., Peterson, M. N., Carrier, S. J., Strnad, R., & Seekamp, E. (2019). Children can foster climate change concern among their parents. *Nature Climate Change*, 9, 458–462. <https://doi.org/10.1038/s41558-019-0463-3>
- Le, H. T., Hoang, L. P., & Nguyen, T. T. (2024). Integrating climate change education in higher education: Insights from lecturers and students across disciplines in the Mekong Delta. *International Journal of Sustainability in Higher Education*. <https://doi.org/10.1108/IJSHE-08-2023-0382>
- Marx, K. (1959). *Economic and philosophic manuscripts of 1844* (M. Milligan, Trans.). Progress Publishers. (Original work published 1844)
- Mekong River Commission. (2024). *State of the Basin Report 2023*. <https://www.mrcmekong.org/resource-hub-2/state-of-the-basin-report/>
- Ministry of Education and Training (MOET). (2018). *General education program: Overall program* (Circular No. 32/2018/TT-BGDĐT).
- Mills, E. (2025). Salinity inundation, profitability, and rice farming exits in the Vietnamese Mekong Delta. *Journal of Agricultural Economics and Agribusiness*, 14(1), 22–38. <https://doi.org/10.1002/jaa2.70004>
- Monroe, M. C., Plate, R., Oxarart, A., Bowers, A., & Chaves, W. (2019). Identifying effective climate change education strategies: A systematic review. *Environmental Education Research*, 25(6), 791–812. <https://doi.org/10.1080/13504622.2017.1360842>
- Nguyen, T. P., & Woodroffe, C. D. (2016). Assessing relative vulnerability to sea-level rise in the western Mekong Delta. *Sustainability Science*, 11(1), 47–59. <https://doi.org/10.1007/s11625-015-0336-2>
- Prime Minister of Vietnam. (2020). *Decision No.1055/QĐ-TTg on issuing the National Plan for Climate Change Adaptation for the 2021–2030 period*.

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- Smith, G. A. (2002). Place-based education: Learning to be where we are. *Phi Delta Kappan*, 83(8), 584–594. <https://doi.org/10.1177/003172170208300806>
- Sobel, D. (2004). *Place-based education: Connecting classrooms and communities*. The Orion Society.
- Thach, N. (2023). Effect of saline intrusion on rice production in the Mekong Delta. *Heliyon*, 9(7), e15758. <https://doi.org/10.1016/j.heliyon.2023.e15758>
- Thanh, N. T. (2023). Salinity intrusion trends under the impacts of upstream development and sea-level rise in the Mekong Delta. *Climate*, 11(3), 66. <https://doi.org/10.3390/cli11030066>
- United Nations. (2023, July 27). Secretary-General's opening remarks at press conference on climate change. <https://www.un.org/sg/en/content/sg/statement/2023-07-27/secretary-generals-opening-remarks-press-conference-climate-change>
- UNESCO. (2017). *Education for Sustainable Development Goals: Learning objectives*. <https://unesdoc.unesco.org/ark:/48223/pf0000247444>
- UNESCO. (2024). *Reimagining our futures together: A new social contract for education*. <https://doi.org/10.54675/ASRD7809>
- Van Binh, D. (2025). Long-term impacts of drought and salinity intrusion on rice cropping and aquaculture in coastal provinces of the Mekong Delta. *iScience*, 28(4), 10984. <https://doi.org/10.1016/j.isci.2025.109984>
- Vu, B. D., & Nguyen, H. T. (2023). Natural disaster prevention literacy education among Vietnamese high school students. *Education Sciences*, 13(3), 262. <https://doi.org/10.3390/educsci13030262>
- World Bank. (2025). *Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project: Implementation Status & Results Report*. <https://projects.worldbank.org/en/projects-operations/document-detail/P153544>
- World Meteorological Organization (WMO). (2025). *State of the global climate 2024*. <https://wmo.int/publication-series/state-of-global-climate-2024>