

# Environmental responsibility and uneven institutional accountability in Pakistani secondary-school English textbooks

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## Article

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# Abstract

Environmental education depends not only on whether ecological themes appear but also on whether texts identify causal and remedial actors. This study examines agency, responsibility and institutional accountability in four sustainability-oriented textual units from the supplied Grade 9 and Grade 10 English textbooks used in Punjab, Pakistan. The corpus comprised 2,617 words segmented into 135 source-traceable finite-clause records. A transparent rule-assisted critical discourse analysis combined social-actor analysis and ecolinguistics with deterministic lexical and grammatical coding. Every row is traceable to a textbook, unit and page range, and the complete anonymised matrix and executable verification code are supplied. Nominalisation occurred in 64/135 clauses (47.4%), moralisation in 32/135 (23.7%), institutional presence in 17/135 (12.6%), institutional absence under the disclosed lexical rule in 59/135 (43.7%), and explicit governance framing in only 3/135 (2.2%). Institutions are visible in renewable-energy investment, education reform and wildlife programmes, but most environmentally relevant clauses do not name an institution and explicit governance pathways remain uncommon. Findings are bounded to the selected units and describe textual affordances rather than learner effects. The study proposes linking personal environmental ethics with explicit institutional duties, regulatory instruments and routes for collective participation.

## Introduction

Environmental challenges are increasingly understood not only as scientific or technological problems but also as discursively constructed phenomena shaped through language, representation, and communication. The ways in which environmental issues are framed influence how responsibility is attributed, how solutions are imagined, and how individuals and institutions are positioned in relation to sustainability (Fairclough, 1992; Dryzek, 2013; Stibbe, 2021). In this sense, discourse plays a central role in shaping environmental awareness and action, particularly within educational contexts where knowledge is formalized and disseminated. Recent studies across diverse educational contexts, including work published in this journal on environmental attitudes in language textbooks (Ma and Chang, 2025), demonstrate that English-language textbooks continue to construct environmental sustainability through selective discursive and ideological representations (Cristovão et al., 2022; Javahery et al., 2025; Gavilan Tatin et al., 2025). However, the depth and orientation of ecological engagement vary considerably across national curricula, reflecting differences in educational priorities and sustainability frameworks.

The global significance of sustainability has been institutionalized through the United Nations Sustainable Development Goals (SDGs), with SDG 4 (Quality Education) and SDG 13 (Climate Action) emphasizing the transformative role of education in fostering environmentally responsible citizenship and enabling systemic responses to climate challenges (United Nations, 2015; UNESCO, 2017). Education for sustainable development (ESD) seeks not only to impart knowledge but also to cultivate critical thinking, systems awareness, and engagement with complex socio-environmental issues (United Nations, 2015; UNESCO, 2017; Leal Filho et al., 2016; Rieckmann, 2017; Barth and Michelsen, 2013; Leal

Filho et al., 2015; Lozano et al., 2015; UNESCO, 2020). However, the effectiveness of ESD depends not only on curricular inclusion but also on how sustainability is discursively constructed within educational materials.

Recent scholarship clarifies the debate to which this study contributes. Language textbooks can cultivate environmental attitudes through patterned evaluative meanings (Ma and Chang, 2025), while sustainability literacy improves when language education connects concepts with applied problem-solving (Erguvan, 2024). Reviews of Education for Sustainable Development emphasise the need to move beyond awareness towards transformative capacity (Tian et al., 2024), and interdisciplinary curriculum research argues that learners need systems competencies for tracing connections among resources, institutions and policy choices (Romulo et al., 2024). Policy analysis aligned with SDG 4.7 similarly treats governance and monitoring as integral to sustainability education rather than external additions (Kaur, 2026). Beyond formal education, citizens' accounts of sustainable futures foreground traceability, participation and accountable decision-making (Campos et al., 2026). Together, this literature makes institutional visibility a substantive curricular issue: environmental values matter, but learners also need discursive resources for recognising differentiated duties and routes to collective action.

Pakistan represents a critical context for examining sustainability discourse due to its high vulnerability to environmental degradation, including air pollution, water scarcity, deforestation, and climate-induced disasters. These challenges are closely linked to governance structures, policy implementation, and socio-economic dynamics (Farooqi and Fatimah, 2010). Within this context, educational texts function as authoritative institutional artifacts that shape how environmental problems and responsibilities are understood by learners. Rather than merely transmitting information, textbooks actively construct social realities by embedding ideological assumptions and normative frameworks (Apple, 2019; Pingel, 2010).

Pakistan's environmental governance has evolved through the establishment of dedicated environmental institutions and legislation, including the Pakistan Environmental Protection Act 1997 (Government of Pakistan, 1997), the subsequent devolution of environmental responsibilities to provincial governments following the 18th Constitutional Amendment, and the development of provincial Environmental Protection Agencies. More recently, national commitments to the Sustainable Development Goals and climate policies have further emphasized the integration of environmental sustainability into education and public awareness initiatives.

Pakistan's educational policy has increasingly recognized sustainable development as an important educational objective. The National Education Policy (2017–2025) emphasizes responsible citizenship, environmental awareness, and sustainable development, while the Single National Curriculum incorporates environmental sustainability across several subject areas, including English. Despite these policy commitments, relatively little is known about how sustainability is linguistically constructed within the textbooks through which these aspirations are implemented. Consequently, an important question is

whether the discourse of these textbooks reflects the environmental and educational priorities articulated in national policy.

Although recent studies have examined environmental discourse in English-language textbooks in Brazil, Indonesia, Iran, Bangladesh, Chile, and Vietnam, comparable evidence from Pakistani state-produced secondary-school English textbooks remains limited, particularly regarding the discursive construction of agency, institutional responsibility, and sustainability governance (Cristovão et al., 2022; Javahery et al., 2025; Gavilan Tatin et al., 2025; Awal, 2025; Sultan et al., 2025; Abid, 2026; Sahayu et al., 2025; Yasmin et al., 2026).

Nevertheless, despite this growing international interest in sustainability education, relatively limited research has examined how environmental responsibility is discursively constructed in state-produced textbooks, particularly in developing contexts. Existing studies have focused primarily on policy discourse, media representation, or sustainability communication, leaving a gap in understanding how educational materials shape environmental subjectivities (Moser, 2010; Carvalho, 2007; Apple, 2019; Pingel, 2010). This gap is particularly important given the central role of textbooks in shaping knowledge, values, and attitudes at formative stages of education.

Beyond documenting these geographical and contextual gaps, previous research has also identified a persistent tension between individual and systemic approaches to environmental responsibility. While many educational materials emphasize behavioral change and personal responsibility, they often underrepresent structural and institutional dimensions of sustainability (Maniates, 2001; Prabawa-Sear, 2018; Parker and Prabawa-Sear, 2019; Huckle and Wals, 2015). This tendency has been widely critiqued for promoting depoliticized understandings of environmental challenges, where responsibility is framed as a matter of individual ethics rather than collective governance (Maniates, 2001). At the same time, recent empirical studies demonstrate that integrated pedagogical approaches combining experiential learning, socio-emotional engagement, and reflective practice significantly enhance students' understanding of sustainability as a multidimensional and systemic issue (Leal Filho et al., 2016; Rieckmann, 2017; Barth and Michelsen, 2013; Leal Filho et al., 2015; UNESCO, 2020). Such findings underscore the importance of examining not only what is taught but also how sustainability is discursively constructed within educational contexts. Addressing this gap requires an analytical framework capable of examining not only what environmental messages are communicated but also how linguistic choices distribute agency, responsibility, and institutional accountability.

To examine these discursive patterns, the present study adopts a Critical Discourse Analysis (CDA) perspective, which conceptualizes language as a form of social practice through which power relations, ideologies, and social meanings are constructed and reproduced (Fairclough, 1992; Wodak and Meyer, 2016; Fairclough, 2015). CDA moves beyond surface-level linguistic description to examine how discourse shapes knowledge, legitimizes certain perspectives, and marginalizes others. In environmental discourse, linguistic strategies such as passive constructions, nominalization, and the

exclusion of social actors can obscure agency, depoliticize environmental issues, and constrain critical engagement with sustainability.

The analysis is informed by Fairclough's three-dimensional model, which integrates textual analysis, discursive practice, and social practice into a unified framework (Fairclough, 1992; Fairclough, 2015). At the textual level, attention is given to grammatical and lexical features such as transitivity, voice, and nominalization. At the level of discursive practice, the focus shifts to patterns of representation across texts. At the level of social practice, these patterns are interpreted in relation to broader socio-political structures, including sustainability governance and educational policy. This multi-layered approach enables the systematic linking of micro-level linguistic features with macro-level implications.

Complementing Fairclough's model, the study also draws on Social Actor Theory to refine the analysis of agency and responsibility in environmental discourse (van Leeuwen, 2008). In environmental contexts, the omission of institutional actors—such as governments, corporations, and regulatory bodies—can lead to the naturalization of environmental problems and the diffusion of responsibility. The concept of discursive silence further emphasizes that absence itself is meaningful, shaping interpretation and limiting alternative perspectives (Fairclough, 1992; van Leeuwen, 2008; Carvalho, 2007).

To further enrich the interpretation of the findings, the study also engages with Stibbe's ecolinguistic perspective, which examines how language shapes human–environment relationships and influences ecological consciousness (Stibbe, 2021). From this perspective, dominant linguistic patterns can reinforce particular “stories we live by” about the environment, often framing environmental degradation as an abstract or inevitable process rather than as the outcome of specific socio-political actions. Such representations have important implications for sustainability education because they influence how learners conceptualize environmental responsibility, institutional accountability, and environmental action.

Building on these complementary perspectives, the present study integrates them into a unified analytical framework for examining the discursive construction of environmental responsibility. Fairclough's three-dimensional model provides the overall analytical structure by linking textual features with discursive practices and wider social contexts. Within this framework, social actor theory enables a systematic examination of how responsibility is assigned, backgrounded, or excluded through the representation of social actors, while the concept of discursive silence draws attention to the ideological significance of what remains unsaid, particularly the omission of institutional and governance actors. Together, these perspectives allow the study to move beyond identifying linguistic patterns to explaining how language shapes understandings of environmental responsibility, institutional accountability, and sustainability education within the Pakistani educational context.

Drawing on this integrated theoretical framework, the present study investigates how linguistic choices shape representations of agency, responsibility, and institutional visibility and examines how these representations align with—or diverge from—the principles of Education for Sustainable Development (ESD) and the United Nations Sustainable Development Goals (SDG 4 and SDG 13). In doing so, the study

seeks to provide empirical evidence on how textbook discourse may influence learners' understandings of environmental responsibility and sustainability governance.

Against this background, the study addresses three research questions:

- How are environmental problems linguistically represented in state educational texts?
- How is agency assigned, backgrounded, or erased in these representations?
- What forms of responsibility are promoted, and which actors remain absent or silent?

By integrating discourse analysis with sustainability-oriented perspectives, this study contributes to ongoing debates on education for sustainable development and highlights the role of language in shaping environmentally responsible citizenship. The findings provide empirical and theoretical insights that can inform curriculum design, policy development, and future research in sustainability education.

## Methods

### Research design

The study used a transparent rule-assisted Critical Discourse Analysis (CDA). Fairclough's account of discourse as social practice supplied the overall interpretive orientation (Fairclough, 1992; Fairclough, 2015), van Leeuwen's social-actor framework guided analysis of inclusion, exclusion and agency (van Leeuwen, 2008), and ecolinguistics informed interpretation of environmental "stories we live by" (Stibbe, 2021). Quantitative summaries describe the selected corpus; they are not hypothesis tests or population estimates.

### Source corpus and public accessibility

The corpus was reconstructed directly from the two textbooks supplied for revision: English 9, aligned with the revised/updated NCP-2023 and labelled for the 2025–26 cycle, and English Grade X, a National Curriculum 2006-based volume whose PDF metadata records 2023 (Punjab Curriculum and Textbook Board, 2025; Punjab Curriculum and Textbook Board, 2023). The files are publicly accessible through the official Punjab textbook portal ([https://pctb.punjab.gov.pk/download\\_books](https://pctb.punjab.gov.pk/download_books); last checked 18 August 2026). Public access enables source verification but does not waive copyright; the books are linked rather than republished.

Four bounded textual units were selected because they explicitly address environmental sustainability, conservation, natural-resource pressure or the sustainability-development relationship. Primary expository text was included; learning outcomes, page furniture, marginal prompts, glossaries, grammar exercises and unrelated activities were excluded. The resulting corpus is fully traceable to the supplied source files.

Purposive selection was used because the research questions concern how sustainability-related agency and accountability are represented, not the overall frequency of environmental vocabulary across the complete books. The four units provide analytically contrasting environments. The renewable-energy and nature passages combine technological investment with general moral appeals; the quality-education unit connects sustainable development to institutions, curricula and teacher development; the wildlife unit describes named organisations and regulated conservation programmes; and the population-and-food unit foregrounds resource pressure through impersonal and passive constructions. This contrast permits examination of both institutional visibility and institutional silence within a small, auditable corpus. It does not support statistical generalisation to all Punjab textbooks, and no such claim is made.

The unit, rather than an isolated keyword window, was retained as the contextual boundary. This decision matters for critical discourse analysis because the meaning of a passive, nominalisation or institutional reference can change across adjacent sentences. For example, an apparently agentless statement about conservation may be followed by a sentence naming government collaboration. The row-level matrix therefore preserves the clause used for coding together with its source unit and page range, while close reading returns each coded record to its surrounding passage. The design combines transparent counting with contextual interpretation instead of treating lexical hits as self-explanatory evidence.

Table 1  
Source-corpus manifest.

| ID          | Source unit                                               | PDF pages | Words | Clauses |
|-------------|-----------------------------------------------------------|-----------|-------|---------|
| G9-SUPP-ENV | Benefits of Science: renewable energy and nature passages | 108–109   | 230   | 9       |
| G9-U9       | Unit 9: Quality Education: A Key to Success               | 110–114   | 944   | 54      |
| G9-U10      | Unit 10: The Silent Predator and the Majestic Prey        | 124–127   | 814   | 37      |
| G10-U12     | Unit 12: Population Growth and World Food Supplies        | 148–150   | 629   | 35      |

As Table 1 shows, the corpus includes three Grade 9 textual units and one Grade 10 unit, with the largest contribution coming from the Grade 9 quality-education text. The page ranges and stable unit identifiers connect every analytical record to its source.

## Segmentation, coding and reproducibility

The selected texts were normalised only to remove page furniture, watermarks, marginal prompts and OCR artefacts. Sentence boundaries followed terminal punctuation. Semicolons and selected internal boundaries were divided only where the retained span contained a verbal predicate. This produced 135

finite-clause records. Each record has a stable identifier combining unit and clause order, the source title, PDF and printed-page ranges, and the analysed text.

Nine binary features were assigned by deterministic lexical and grammatical rules. Institutional absence was coded conservatively when an environmental clause contained explicit harm language but no named institution. Governance framing required both an institutional reference and governance-action language. Codes were non-mutually exclusive; the agency typology was mutually exclusive. The complete rules are preserved in the executable script. Because the reconstruction was rule-assisted and exactly reproducible, no human intercoder or Cohen's kappa claim is made. Reproducibility does not eliminate construct limitations: lexical rules can miss implicit or context-dependent meanings, so quantitative patterns are interpreted together with close reading.

The coding architecture separates grammatical form, social-actor representation and responsibility framing. Agent deletion and passive construction capture different properties: a passive may background an actor even when the actor can be inferred, whereas agent deletion records the narrower absence of an expressed by-agent. Nominalisation captures the conversion or presentation of processes as entities, such as 'growth', 'depletion', 'conservation' or 'management'. In Fairclough's account, these forms can compress causal sequences and redistribute informational prominence, but their ideological significance cannot be decided from morphology alone (Fairclough, 1992; Fairclough, 2015). Each quantitative occurrence is therefore treated as a prompt for contextual inspection rather than proof of concealment.

The responsibility codes operationalise distinctions derived from social-actor analysis. Institutional presence asks only whether a governmental, corporate, educational or civil-society actor is named. Institutional absence applies to an environmentally relevant clause that does not name such an actor; it is a clause-level textual indicator, not a claim that the wider unit contains no institution. Governance framing is more demanding: the clause must connect an institution with an action such as investment, regulation, implementation, programme delivery, compensation, management, reform or enforcement. This distinction follows van Leeuwen's emphasis on how actors can be included, excluded, backgrounded or assigned particular roles (van Leeuwen, 2008). An institution may therefore be visible without being represented as responsible for a specified remedy.

Individualised and generalised responsibility were also kept separate. The former identifies human or learner-oriented responsibility, whereas the latter captures inclusive or collective actors such as 'we', 'people', 'society' or 'communities'. Moralisation records explicit value and obligation language, including 'must', 'should', 'essential', 'vital' and 'necessary'. These categories may overlap because a clause can simultaneously moralise an action, invoke a collective actor and omit an institution. Overlap is analytically meaningful: it shows how texts may encourage environmentally desirable conduct while leaving the distribution of regulatory capacity unspecified. For this reason, feature totals are not expected to sum to the corpus size.

Table 2  
Operational coding rules.

| Code                          | Operational rule                                                                                                               |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Agent deletion                | Passive event without an expressed by-agent                                                                                    |
| Passive construction          | Be auxiliary followed by a listed past participle                                                                              |
| Nominalisation                | Listed process noun such as development, conservation, destruction, growth or management                                       |
| Individualised responsibility | Individual/student/learner plus obligation or environmental-action language                                                    |
| Generalised responsibility    | We/people/society/community plus obligation or action language                                                                 |
| Institutional presence        | Named governmental, corporate, educational or civil-society actor                                                              |
| Institutional absence         | Environmental harm clause without a named institution                                                                          |
| Moralisation                  | Obligation or value marker such as must, should, essential, vital, crucial or necessary                                        |
| Governance framing            | Named institution plus investment, regulation, implementation, management, programme, compensation, support or reform language |

As Table 2 indicates, each construct is tied to a disclosed textual decision rule. The rules deliberately distinguish institutional mention from governance action and apply a conservative definition of institutional absence.

## Descriptive analysis

Counts and clause percentages were calculated for all binary features. Two-sided 95% Wilson intervals are displayed only as descriptive uncertainty summaries. Agency categories were tabulated as mutually exclusive proportions. No significance testing, causal modelling, co-occurrence modelling or learner-outcome analysis was conducted.

## Results

### Corpus-level distribution

The most frequent coded feature was nominalisation (64/135, 47.4%), followed by institutional absence under the operational lexical rule (59/135, 43.7%) and moralisation (32/135, 23.7%). Institutional presence appeared in 17 clauses (12.6%), whereas explicit governance framing appeared in only 3 (2.2%). The contrast is not complete institutional erasure: institutions are named selectively, but

environmental processes and obligations are much more often presented without an institutional duty bearer.

Table 3  
Prevalence of coded discourse features (N = 135 clauses).

| Feature                       | n  | %    | 95% Wilson interval |
|-------------------------------|----|------|---------------------|
| Institutional absence         | 59 | 43.7 | 35.6–52.1           |
| Agent deletion                | 17 | 12.6 | 8.0-19.2            |
| Moralisation                  | 32 | 23.7 | 17.3–31.5           |
| Nominalisation                | 64 | 47.4 | 39.2–55.8           |
| Passive construction          | 20 | 14.8 | 9.8–21.8            |
| Institutional presence        | 17 | 12.6 | 8.0-19.2            |
| Individualised responsibility | 29 | 21.5 | 15.4–29.1           |
| Generalised responsibility    | 26 | 19.3 | 13.5–26.7           |
| Governance framing            | 3  | 2.2  | 0.8–6.3             |

As Table 3 shows, nominalisation and operational institutional absence are the most prevalent features. Governance framing occurs in 3 records and is the least frequent coded feature.

Figure 1 visualises the same nine feature prevalences and their descriptive Wilson intervals, allowing the relative distribution to be compared without treating the selected clauses as a probability sample.

[Figure 1 about here]

As Fig. 1 shows, nominalisation and moralisation are the most prevalent features, while governance framing has the lowest prevalence. The intervals are descriptive and do not imply population-level inference.

## Agency distribution

Agency coding likewise shows an uneven distribution: non-human or agentless construction (64/135, 47.4%), explicit human actor (37/135, 27.4%), explicit institutional actor (17/135, 12.6%), implicit or deleted actor (14/135, 10.4%), and generalised actor (3/135, 2.2%). The result is not complete actorlessness; environmental processes are frequently organised around resources, ecosystems and abstract processes rather than differentiated duty bearers.

Table 4  
Mutually exclusive agency encoding.

| Agency type                         | n  | %    |
|-------------------------------------|----|------|
| non-human or agentless construction | 64 | 47.4 |
| explicit human actor                | 37 | 27.4 |
| explicit institutional actor        | 17 | 12.6 |
| implicit or deleted actor           | 14 | 10.4 |
| generalised actor                   | 3  | 2.2  |

As Table 4 shows, non-human or agentless constructions predominate. Explicit institutional actors are present, but they account for a substantially smaller share of records than non-human or agentless and explicit human actors combined.

## Close readings: absence, visibility and governance

The Grade 10 population-and-food unit states that “Great pressure is being placed on arable land, water, energy, and biological resources.” The passive form makes the pressure visible but does not identify who applies it. Likewise, “fertile agricultural land is being lost at an alarming rate” presents loss without a causal actor. Nominalisations such as “growth,” “production,” “depletion,” “conservation” and “management” compress processes into abstract entities that can be discussed without specifying differentiated responsibility.

Additional examples show that actor backgrounding is not limited to a single sentence. The Grade 10 unit reports that 'the per capita availability of food grains has been declining' (printed p. 140) and that 'a massive amount of water is required' during cultivation (printed p. 141). The first makes decline the grammatical focus; the second presents agricultural demand as a requirement without naming a decision-maker. The statement that fossil energy 'is being used by the developed countries' (printed p. 141) provides a useful contrast because the passive includes an expressed actor. These examples demonstrate why passive construction and agent deletion were coded separately.

The same Grade 10 passage alternates between impersonal diagnosis and explicit collective attribution. It states that cities, states and countries 'require and withdraw more water' (printed p. 141), but later says that conservation strategies 'are to be implemented effectively' (printed p. 142) without specifying the implementing body. The first assigns action to identifiable collective actors; the second expresses governance-oriented necessity while backgrounding institutional responsibility. The contrast supports a graded account of accountability: actors can be absent, generally identified, or connected to a concrete governance mechanism.

The Grade 9 conservation unit is more institutionally explicit. It names the Snow Leopard Foundation, WWF-Pakistan, local communities and government collaboration; reports that trophy-hunting programmes operate 'under strict regulations'; explains that revenue 'is used for wildlife conservation'; and notes compensation for herders. These examples directly contradict any categorical claim that institutions are erased. Yet explicit governance-action framing occurs in only 3 clauses across the selected corpus.

Several further Grade 9 examples strengthen this contrast. The wildlife unit states that the Snow Leopard Foundation and WWF-Pakistan 'have worked tirelessly' to protect the species (printed p. 122), names local communities working 'in collaboration with the government', and explains that programme revenue provides 'financial incentives for local people' (printed p. 122). It also reports that compensation and awareness-raising have reduced retaliatory killings. These clauses do more than mention institutions: they connect organisations, government, communities, regulation, finance and remedial action. They are therefore positive instances of institutional and governance literacy rather than exceptions to be ignored.

The quality-education unit contains a parallel institutional pattern. It observes that higher-education institutions play a role in research and development and that universities and colleges provide resources for research (printed p. 109). It then identifies teacher shortages, low salaries and inadequate training as systemic constraints before stating that governments 'should prioritise the training and development of educators' (printed p. 109). Here moral obligation is attached to a named governmental actor and a specified reform. In contrast, the concluding inclusive appeal—'we can ensure that every child' receives quality education (printed p. 110)—broadens responsibility while making the institutional route less precise.

The short renewable-energy and nature passages display the same movement at a smaller scale. 'Governments and companies are investing heavily' in renewable technologies (printed p. 104) assigns responsibility to public and corporate actors and identifies investment as the mechanism. The neighbouring nature passage says that 'we respect and protect nature' and lists pollution reduction, habitat conservation and sustainable practices (printed p. 104). Both constructions support sustainability, but they offer learners different maps of action: one names differentiated institutional capacity, whereas the other builds a shared ethical subject. The analysis values both while asking whether they are adequately connected.

The renewable-energy passage provides another explicit counterexample: 'Governments and companies are investing heavily in renewable energy technologies to reduce carbon emissions.' The adjacent nature passage instead appeals to an inclusive 'we' to 'respect and protect nature' through reducing pollution, conserving habitats and promoting sustainable practices. In the Grade 10 population unit, 'Great pressure is being placed on arable land, water, energy, and biological resources' and 'fertile agricultural land is being lost at an alarming rate' foreground environmental pressure while deleting causal actors. The same passage later states that conservation strategies 'are to be implemented effectively' without

specifying an implementing authority. Personal and collective ethics therefore coexist with institutional examples, but explicit chains of responsibility remain sparse.

Figure 2 compares institutional presence and absence with moralised, individualised, generalised and governance-oriented responsibility frames.

[Figure 2 about here]

As Fig. 2 demonstrates, institutional absence under the operational rule (43.7%) is more frequent than institutional presence (12.6%), while governance framing is only 2.2%. This supports an argument about uneven accountability rather than categorical institutional erasure.

Table 5  
Integrated answers to the research questions.

| Question                                    | Descriptive evidence                                                            | Bounded interpretation                                                                                    |
|---------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| How are environmental problems represented? | Nominalisation 47.4%; passive construction 14.8%                                | Processes are frequently represented as resources, pressures, losses and management problems.             |
| How is agency assigned or erased?           | Institutional presence 12.6%; institutional absence 43.7%; agent deletion 12.6% | Institutions appear selectively, while many environmental clauses lack a named institutional duty bearer. |
| What responsibility is promoted?            | Moralisation 23.7%; governance framing 2.2%                                     | Obligation and value language is substantially more visible than explicit governance action.              |

As Table 5 summarises, the research questions converge on a bounded finding: environmental and sustainability concerns are clearly present, yet clauses without named institutions and nominalised processes are more frequent than explicit governance-action pathways.

## Discussion

The reconstructed evidence supports a narrower and more defensible argument than an absolute absence claim. Government, companies, educational systems, conservation organisations and local communities are explicitly represented in several passages. The central imbalance is threefold: institutional presence occurs in 12.6% of clauses, the operational institutional-absence indicator occurs in 43.7%, and governance framing occurs in only 2.2%. Institutional visibility therefore remains selective and rarely develops into an accountable chain of regulation, implementation, monitoring or remedy.

This distinction advances social-actor analysis by separating the naming of an institution from its representation as a duty-bearing actor (van Leeuwen, 2008). An organisation can appear as a participant, source or contextual reference without the text explaining regulation, enforcement, financing, monitoring or remedy. Conversely, the wildlife passage demonstrates that textbooks can represent collaboration,

regulated programmes and compensation in age-appropriate language. It provides a practical model for strengthening other environmental units.

The Pakistani pattern is consistent with, but not identical to, international textbook research. Studies of language textbooks have repeatedly found that environmental content is shaped by selective evaluation, anthropocentric assumptions and uneven attention to systemic action (Cristovão et al., 2022; Javahery et al., 2025; Gavilan Tatin et al., 2025; Sahayu et al., 2025). Research on environmental attitudes in language textbooks likewise shows that evaluative language can cultivate concern while organising which relationships and responsibilities become salient (Ma and Chang, 2025). The present study adds a more specific distinction between naming an institution and representing it as a duty-bearing governance actor.

The comparison with other Global South contexts is particularly relevant. Research from Indonesia and Bangladesh has described tensions between ecological awareness, personal conduct and structural responsibility (Prabawa-Sear, 2018; Parker and Prabawa-Sear, 2019; Awal, 2025; Sultan et al., 2025). Recent Pakistani ecolinguistic research has also identified competing environmental discourses in school materials (Yasmin et al., 2026). The current findings refine this discussion by demonstrating internal variation within the same corpus: renewable-energy investment, teacher reform and wildlife programmes contain accountable institutions, whereas population pressure and general conservation appeals frequently rely on nominalised or generalised formulations. National context alone therefore does not determine a single textbook discourse.

This internal variation also guards against a deficit interpretation of Pakistani materials. The aim is not to compare the textbooks against an imagined perfect model or to treat every general moral appeal as inadequate. Rather, the analysis identifies existing passages that already integrate institutional actors, mechanisms and community participation. Those passages function as locally available curricular resources. The analytical question becomes how their representational strengths might be extended to topics where causal responsibility and routes to remedy remain less explicit.

The prominence of nominalisation is also consequential. Terms such as population growth, food production, resource depletion and conservation enable concise academic exposition, but they can compress causal sequences and obscure who acts. This supports Fairclough's account of grammatical abstraction while avoiding the stronger claim that every nominalisation is ideological or depoliticising (Fairclough, 1992; Fairclough, 2015). Close context remains necessary.

Moral and obligation language appears about 10.8 times as often as governance framing (23.7% versus 2.2%). Personal and collective environmental ethics are educationally valuable, but sustainability literacy is stronger when learners can connect conduct with differentiated capacities and duties. This interpretation is consistent with critiques of the individualisation of environmental responsibility (Maniates, 2001) and with Education for Sustainable Development's emphasis on systems thinking and transformative capacity (UNESCO, 2017; UNESCO, 2020; Rieckmann, 2017).

For curriculum development, the implication is additive rather than substitutive. Calls to conserve habitats or use resources carefully need not be removed. They can be connected to named authorities, firms, regulations, budgets, monitoring mechanisms and routes for community participation. The renewable-energy and wildlife passages already show that such institutional literacy can be incorporated without making the material inaccessible.

A practical implication is to design paired responsibility statements. A personal injunction to conserve water, for example, can be followed by a sentence identifying municipal regulation, agricultural allocation, infrastructure investment or monitoring responsibilities. A biodiversity passage can connect individual protection of wildlife with the mandates of conservation agencies, community organisations and compensation programmes. Such additions do not require advanced legal terminology. The wildlife unit demonstrates that regulation, revenue distribution and institutional collaboration can be expressed accessibly at secondary level.

Pedagogically, teachers could use the existing contrasts as critical-language activities rather than presenting governance conclusions as settled facts. Learners might compare 'we must protect nature' with 'governments and companies are investing', identify who can perform each action, and rewrite an agentless sentence by supplying plausible actors. They could also examine what changes when 'strategies are to be implemented' becomes a sentence naming the responsible authority. These are proposed affordances, not measured effects: the study contains no classroom intervention or learner assessment and therefore cannot claim that such activities would alter knowledge, attitudes or behaviour.

At curriculum and policy levels, the findings support a principle of accountability literacy. Environmental education can help learners recognise that ecological outcomes emerge from differentiated powers and obligations across individuals, communities, firms and public institutions. This principle complements rather than displaces environmental ethics. Its purpose is to prevent collective moral language from becoming the only available account of action when regulation, finance, enforcement and public participation are also relevant. Whether revised wording improves learning must be tested through teacher-mediated classroom research.

## Limitations and future research

The findings are limited to four purposively selected textual units from the two supplied textbooks. They do not represent all grades, subjects, provinces, private-school curricula or Pakistani textbook editions. The Grade 9 source is the revised NCP-2023/2025–26 version, while the Grade 10 source follows the older National Curriculum 2006; the corpus is therefore cross-edition as well as cross-grade.

The segmentation and coding are rule-assisted. This makes the procedure auditable and exactly reproducible, but lexical rules cannot fully resolve context-sensitive CDA constructs. Passive patterns outside the disclosed list may be missed; nominalisations may serve technical rather than ideological functions; and implicit institutions may be recoverable from wider context. The institutional-absence rule

was deliberately conservative, but its output remains an operational indicator rather than an objective measure of silence. No human intercoder reliability statistic is claimed.

Deterministic coding creates a further trade-off between auditability and interpretive sensitivity. Disclosed lexical lists allow every result to be reproduced, but they cannot recognise all paraphrases, resolve anaphora reliably or infer institutions that are recoverable only from several preceding sentences. A clause may be coded as institutionally absent even when a named organisation remains pragmatically salient from the previous clause. Conversely, a lexical institutional reference may be counted as present even when it is not the grammatical actor or bears no responsibility for the environmental process. The reported percentages should consequently be read as properties of the operational scheme applied to this corpus, not as direct measurements of ideology.

The categories also differ in semantic breadth. Nominalisation includes forms that may be ordinary technical vocabulary rather than strategic abstraction; moralisation combines deontic obligation with evaluative importance; and governance framing depends on a necessarily selective action lexicon. Wilson intervals describe uncertainty around observed proportions but do not convert the purposive corpus into a probability sample. They are included to prevent false precision and facilitate comparison among features, not to support population inference. Independent human recoding, sensitivity analysis using expanded lexicons, and comparison with corpus-assisted or contextual annotation would strengthen future validation.

Finally, clause counting gives equal numerical weight to records that may differ greatly in rhetorical prominence. A governance example appearing once in a unit heading or concluding statement may be pedagogically more salient than several background clauses, while images, typography, questions and classroom tasks can reinforce or counter the verbal text. The present analysis deliberately isolates expository clauses to maintain a verifiable unit of analysis. Future work should integrate multimodal salience, teacher mediation and learner uptake before drawing conclusions about the enacted curriculum.

The analysis covers verbal expository text and excludes images, layout, glossaries and most classroom activities. It also examines textual affordances rather than reception. Without classroom observation, teacher mediation or learner data, the study cannot establish what students understand, believe or do. Future work should combine multilingual and multimodal textbook comparison with classroom-based reception research.

## Conclusion

Across 135 source-traceable finite-clause records from four sustainability-oriented units, the textbooks combine environmental concern with an uneven distribution of accountable agency. Institutions are present in selected passages, especially renewable-energy investment, education reform and wildlife conservation. Nevertheless, clauses without named institutions are common under the disclosed operational rule, and explicit governance framing is rare relative to nominalised processes and moral

obligation. The defensible conclusion is not that accountable actors are entirely absent, but that institutional duties and governance pathways are comparatively thin and unevenly distributed.

A curriculum principle of linked responsibility follows: personal practices should be taught alongside structural causes, institutional mandates, regulatory instruments and routes for collective participation. The supplied textbooks already contain examples of this linkage; extending that approach across environmental topics could strengthen both ecological awareness and accountability literacy.

## **Declarations**

## **Competing interests**

The authors declare no competing interests.

### **Ethical approval**

Not applicable. The study analysed publicly available educational textbooks and did not involve human participants, personal data or animals.

## **Generative AI statement**

A generative AI system was used for language refinement, formatting support and assistance in developing auditable data-processing materials. All source extraction, coding decisions, numerical results, quotations, citations and interpretations were checked against the supplied textbooks and supporting files by the authors, who take full responsibility for the submitted work.

## **Author Contribution**

I.A. contributed to conceptualisation, methodology, formal analysis, investigation, data curation, visualisation, project administration, writing the original draft, and reviewing and editing the manuscript. I.A. also prepared Figures 1 and 2 and curated the accompanying data and reproducibility materials. K.A. contributed to conceptualisation, supervision, validation, interpretation of the findings, and reviewing and editing the manuscript. M.N.C. contributed to methodology, validation, interpretation of the findings, and reviewing and editing the manuscript. A.N. and A.B. contributed to validation, interpretation of the findings, and reviewing and editing the manuscript. All authors reviewed and approved the submitted version. Each author agrees to be personally accountable for their own contributions and to ensure that questions concerning the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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## Data Availability

The research data generated and analysed during this study are provided with the submission in the Supplementary Information and accompanying Related Files. These materials comprise the complete anonymised 135-row clause-level coding matrix, source-unit manifest, variable definitions and operational codebook, machine-readable feature and agency summaries, validation output, analysis results, and the executable script used to reproduce the reported calculations. Each record in the coding matrix includes a stable clause identifier, source-unit label, PDF-page and printed-page locators, clause text, binary feature codes, and mutually exclusive agency classification. The two source textbooks are publicly accessible through the official Punjab Curriculum and Textbook Board portal at [https://pctb.punjab.gov.pk/download\\_books](https://pctb.punjab.gov.pk/download_books). The copyrighted textbooks are not redistributed; however, the supplied source manifest and page-level locators enable verification against the official source materials.

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## Figures

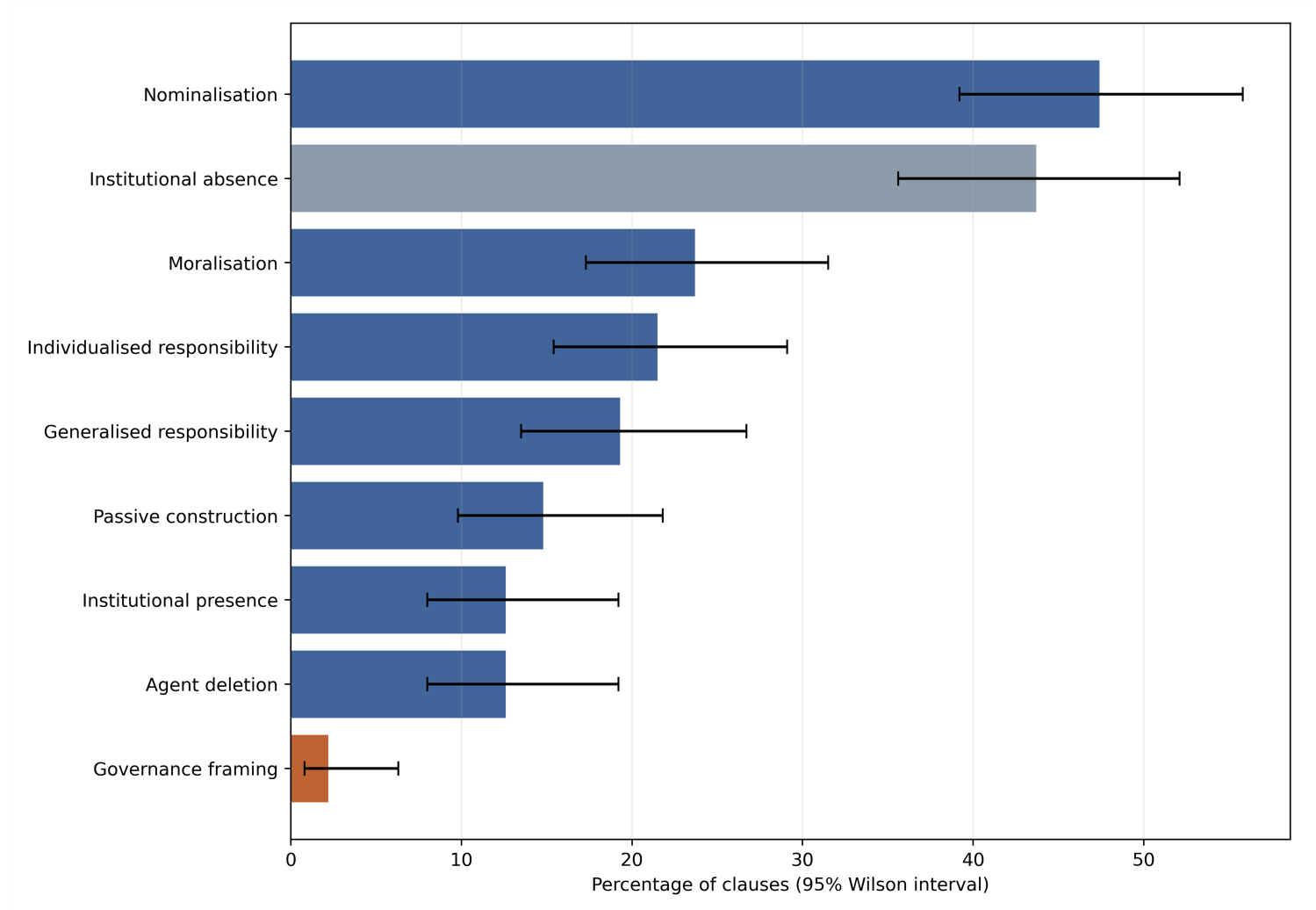


**Figure 1**

Prevalence of nine clause-level discourse features. Horizontal bars show the percentage of the 135 finite-clause records assigned each non-mutually-exclusive code; whiskers show two-sided 95% Wilson intervals used descriptively. Alt text: Horizontal bar chart in which nominalisation is highest at 47.4%, followed by institutional absence at 43.7% and moralisation at 23.7%. Individualised responsibility is 21.5%, generalised responsibility 19.3%, passive construction 14.8%, institutional presence 12.6%, agent deletion 12.6%, and governance framing 2.2%.

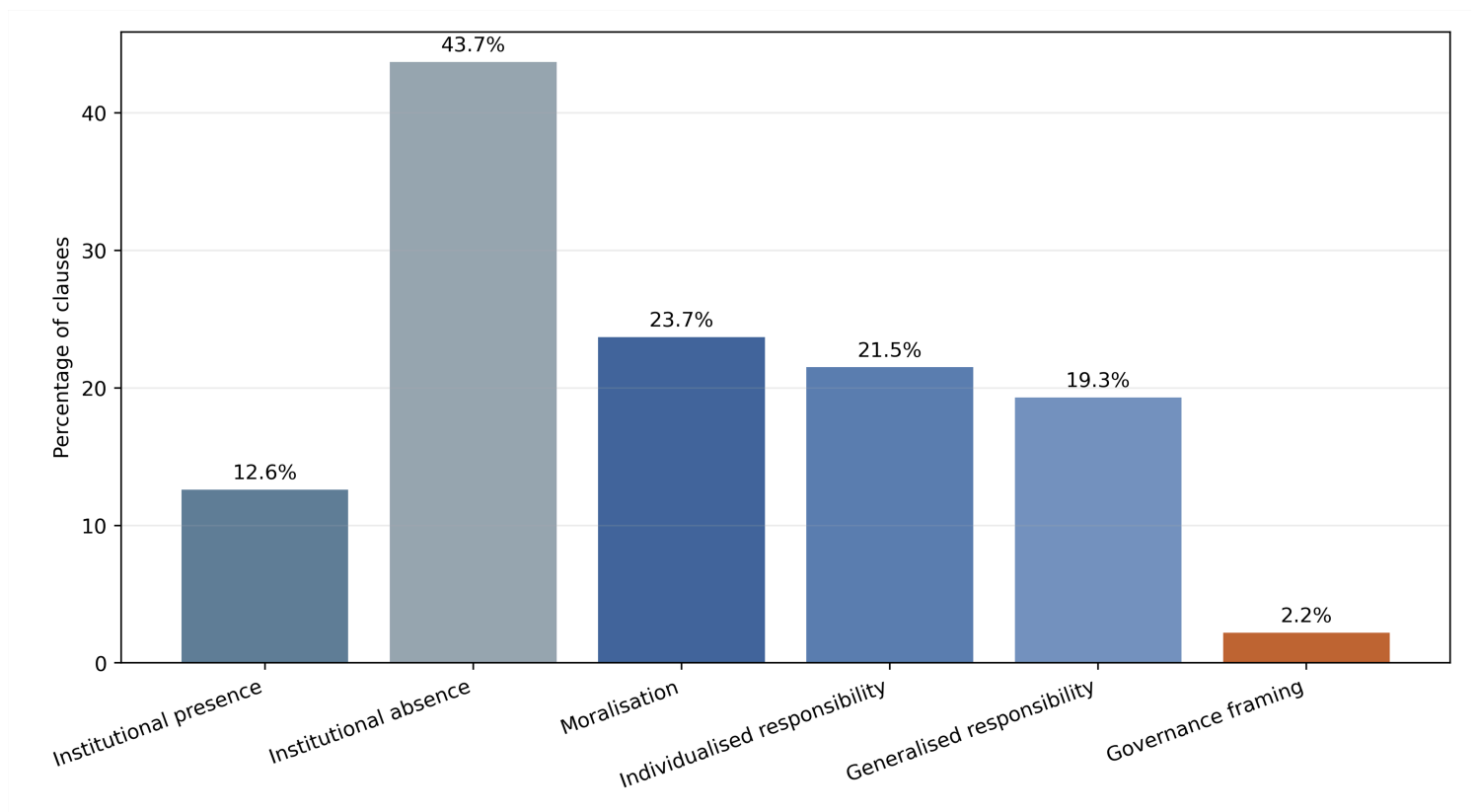


**Figure 2**

Institutional visibility and responsibility framing. Bars compare institutional presence, institutional absence, moralisation, individualised responsibility, generalised responsibility and governance framing as percentages of all 135 finite-clause records. Alt text: Vertical bar chart showing institutional absence at 43.7%, moralisation at 23.7%, individualised responsibility at 21.5%, generalised responsibility at 19.3%, institutional presence at 12.6%, and governance framing at 2.2%.

## Supplementary Files

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