

Article

What Makes Ecological Responsibility Endure? Sustainability Grammars Under Planetary Limits

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Abstract

In climate adaptation plans, national sustainability strategies, and agency-level resilience frameworks, planetary limits are routinely acknowledged, yet proposed responses continue to center on expansion, replication, and scalability. This paper argues that this tension is not merely political or technical but grammatical. It reflects the dominance of the grammar of scale—a patterned way of organizing, evaluating, and legitimizing sustainability action through expansion, metrics, piloting, and exit. While indispensable in many contexts, scale increasingly struggles to secure durable ecological responsibility amid irreversibility, uneven exposure, and intergenerational harm. The paper advances a framework of plural sustainability grammars to diagnose this mismatch. In addition to scale, it identifies six alternative grammars—attachment, settlement, sufficiency, inheritance, exposure, and refusal—that already circulate, often implicitly, within sustainability discourse. Each grammar foregrounds dimensions of responsibility that scalability tends to background, including permanence, restraint, cumulative consequence, and ethical limits. The paper traces these grammars through climate adaptation planning frameworks across governance levels, showing how plural grammars are prominent in problem framing and diagnosis but are progressively narrowed as plans move toward implementation, monitoring, and accountability, where scale becomes dominant. The paper concludes by reflecting on the implications of this grammatical narrowing for practitioners, policymakers, and scholars concerned with adaptation, justice, and the governance of sustainability under planetary limits.

Keywords: sustainability governance; planetary limits; climate adaptation; scalability; responsibility; institutional accountability; environmental discourse; policy evaluation; resilience; justice



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1. Introduction

Climate adaptation plans, sustainability strategies, and resilience frameworks increasingly speak in the language of planetary limits—thresholds, tipping points, irreversible harms—yet the policy tools they advance remain oriented toward growth, diffusion, and scalable solutions. On the one hand, the language of planetary limits is now ubiquitous. Climate thresholds, ecological boundaries, tipping points, and irreversible harms are widely acknowledged in policy documents, scientific assessments, and institutional strategies [1–3]. On the other hand, dominant responses to these limits continue to emphasize expansion: scaling up successful interventions, replicating best practices, accelerating innovation, and extending adaptive capacity across sites and sectors [4–7]. Sustainability is repeatedly called upon to grow—even, and especially, under conditions of acknowledged ecological constraint.

This paper begins with the observation that this tension is not merely practical or political but grammatical. That is, it reflects the dominance of a particular way of organizing, evaluating, and justifying sustainability action: the grammar of scale. Within this grammar, sustainability is understood to succeed when interventions can be expanded, replicated, standardized, and transferred. Projects that travel well—across jurisdictions, communities, and ecosystems—are privileged as serious, effective, and fundable [8–10]. Those that do not are often treated as parochial, inefficient, and insufficient.

The grammar of scale has proven extraordinarily powerful. It has enabled the rapid diffusion of sustainability tools, facilitated coordination across institutions, and aligned environmental action with established logics of policy evaluation and investment. Importantly, this paper does not argue that scalability is inherently misguided or undesirable. As geography reminds us, the politics of scale is an unavoidable dimension of sustainability governance [11,12].

Yet under conditions of planetary limits and ecological injustice, scalability increasingly reveals its limits as a singular organizing logic. Many of the most consequential dimensions of ecological responsibility—long-term exposure, irreversible harm, intergenerational consequences, and the ethics of staying rather than moving on—are difficult to reconcile with a governance grammar oriented toward expansion and replication [13,14]. This formulation should not be read as a rejection of migration or mobility as legitimate adaptation strategies. The point is analytic: contemporary sustainability governance often assumes exit—whether of capital, projects, or populations—as the default mechanism of adjustment, while questions of enduring responsibility for place remain comparatively underexamined.

The central claim of this paper is therefore not that sustainability should abandon scalability, but that sustainability governance has become overly dependent on its grammar, crowding out other grammars essential for governing under constraint. When scale is the primary criterion of legitimacy, other ways of reasoning about responsibility—ways that foreground permanence, restraint, exposure, and inheritance—tend to be marginalized or rendered unintelligible within policy and institutional settings.

To make this argument, the paper treats scalability not as a technical property of interventions but as a governance grammar: a patterned way of defining problems, evaluating solutions, and allocating responsibility. As a grammar, it shapes what sustainability initiatives are allowed to be, not merely what they do. It structures what counts as success and failure, what futures are considered plausible, and which obligations are binding versus deferrable.

The use of “grammar” here draws on Crawford and Ostrom’s institutional account of grammar as patterned rule structures that shape which actions are possible and legitimate within governance settings [15]. It also resonates with rhetorical and discourse traditions that treat language as constitutive rather than merely descriptive. In a Burkean sense, grammars function as deep symbolic structures that organize motive and responsibility by defining what counts as agent, act, purpose, and scene [16]. Cognitive linguistics similarly shows how metaphorical framing stabilizes problem–solution logics by structuring how issues are conceptualized in the first place [17]. The grammar of scale, for example, relies on spatial metaphors of growth, expansion, and mobility that make responsibility appear transferable and extensible—something that can be replicated, aggregated, and diffused. Grammars such as attachment or inheritance instead draw on metaphors of staying, sedimentation, and temporal layering, recasting responsibility as anchored in place and cumulatively unfolding over time.

The analysis that follows does not undertake a full rhetorical reconstruction of sustainability discourse in the Burkean tradition, nor does it seek to map the entire metaphorical architecture of sustainability governance. Rather, it adopts grammar as a mid-level analytic device: a means of identifying recurrent symbolic and institutional logics that structure

what sustainability action is allowed to mean. In doing so, the paper bridges institutional theory and discourse analysis, treating grammars as patterned evaluative orientations that are simultaneously linguistic, symbolic, and organizational.

This grammatical perspective helps explain a familiar paradox in contemporary sustainability efforts. Despite unprecedented activity—plans, pilots, metrics, and innovations—many sustainability challenges remain unresolved, especially in communities that bear the cumulative effects of ecological degradation and climate risk [18,19]. Rather than interpreting this persistence as a failure of implementation or political will, this paper suggests it reflects a deeper issue: the misalignment between a dominant grammar of scale and the ethical demands of planetary limits. Sustainability governance must grapple with questions that scale alone cannot answer: Who remains when conditions deteriorate? What responsibilities persist when projects end? When is restraint more appropriate than growth? And what harms must be acknowledged even when they cannot be repaired?

To address these questions, the paper advances a framework of plural sustainability grammars. In addition to scale, it identifies six grammars that already operate—often implicitly—within sustainability debates and practices: attachment, settlement, sufficiency, inheritance, exposure, and refusal. Each grammar organizes responsibility differently, foregrounding aspects of ecological life that scale tends to background. Attachment emphasizes staying and non-exit; settlement focuses on maintenance and repair; sufficiency introduces closure and restraint; inheritance foregrounds cumulative and intergenerational consequences; exposure prioritizes acknowledgment over control; and refusal recognizes the necessity of ethical limits and endings.

Importantly, these grammars are not presented as normative ideals or policy prescriptions. Nor are they mutually exclusive. Rather, they are offered as analytic lenses that reveal the trade-offs embedded in sustainability governance. The aim is not to replace the grammar of scale but to situate it within a broader field of grammatical possibilities—each with distinct implications for adaptation, justice, and responsibility under planetary limits.

The paper proceeds as follows. The next section briefly outlines the grammar of scale, clarifying how expansion, replication, metrics, piloting, and exit function as dominant evaluative criteria in contemporary sustainability governance. The paper then articulates six additional sustainability grammars—attachment, settlement, sufficiency, inheritance, exposure, and refusal—drawing on a sustained interpretive engagement with the sustainability governance literature. The subsequent section applies this analytic architecture to contemporary climate adaptation planning frameworks, tracing how plural grammars surface in problem framing but narrow as plans move toward implementation, monitoring, and accountability. The penultimate section reflects on the implications of this grammatical sequencing for sustainability-minded and justice-concerned practitioners, policymakers, and scholars.

By pluralizing the grammars through which sustainability is understood and governed, the paper contributes to ongoing debates about adaptation, planetary limits, and ecological justice [20–23]. Practically, this reframing matters because accountability systems, funding criteria, and performance evaluation structures are not neutral instruments. They institutionalize particular grammars of responsibility. Making these grammars visible allows policymakers, practitioners, and scholars to diagnose why certain sustainability efforts proliferate without securing durable obligation—and where institutional redesign may be required.

2. The Grammar of Scale in Sustainability Governance

Scalability has become one of the most powerful criteria in contemporary sustainability governance [24]. Across policy documents, funding programs, research agendas, and

institutional strategies, sustainability initiatives are routinely assessed for their potential to scale: to expand in scope, to be replicated across sites, and to deliver comparable outcomes at larger spatial or institutional scales [4–7]. Projects that demonstrate scalability are widely treated as more serious, more impactful, and more worthy of investment.

This section argues that scalability is not merely a technical property of interventions but a governing grammar—a patterned way of organizing how sustainability problems are defined, how solutions are evaluated, and how responsibility is allocated. When treated grammatically, scale does not simply describe the size or reach of an intervention; it structures the criteria by which sustainability action becomes legible and legitimate—cf. [11,12]. In doing so, it shapes what sustainability is expected to accomplish and, equally important, what it is not. References to adaptation planning documents in this section are illustrative; Section 4 provides a more systematic contrastive reading of these frameworks.

2.1. *Scale as an Evaluative Grammar*

As a grammar, scale structures sustainability governance through a set of recurring evaluative criteria. Five are especially salient: expansion, replication, metrics, piloting, and exit. Together, these elements define what constitutes successful sustainability action and how institutional responsibility is bounded.

First, sustainability initiatives are routinely evaluated based on their potential for expansion [4,7]. Expansion refers not only to numerical growth—more participants, broader coverage, higher uptake—but also to the expectation that interventions should extend beyond their initial context. Adaptation frameworks frequently frame success in terms of dissemination and international circulation. For example, the United Nations Framework Convention on Climate Change (UNFCCC) National Adaptation Plan Technical Guidelines emphasize that plan outputs should be “disseminated widely” and submitted to the UNFCCC Secretariat so they can inform broader synthesis and coordination efforts [25] (p. 44). An initiative that remains small or contained is often treated as incomplete, regardless of its local significance. Expansion thus serves as a proxy for seriousness: the assumption is that what matters should grow.

Second, expansion is closely tied to replication [8,10]. Interventions are valued when they can be reproduced across jurisdictions, communities, or ecosystems with minimal modification. Replication favors standardized formats—toolkits, frameworks, best practices—that minimize contextual friction. The UNFCCC Technical Guidelines, for instance, outline structured “steps and indicative activities” for monitoring, review, and updating that can be adopted across national contexts [25] (p. 21). While this enables comparability and coordination, it also privileges interventions that can be abstracted from place-specific social and ecological relations.

Third, scalability depends on metrics [26,27]. For interventions to be expanded and replicated, they must be comparable. Metrics translate heterogeneous ecological and social processes into standardized indicators, enabling sustainability efforts to be evaluated, ranked, and monitored across sites. For example, the UNFCCC Guidelines explicitly instruct Parties to “define specific metrics for documenting progress, measuring and communicating levels of effectiveness and assessing gaps” [25] (p. 106). Monitoring is framed as an ongoing process of tracking “qualitative and quantitative performance measures” to assess effectiveness and guide iterative improvement [25] (p. 105). Metrics make sustainability legible to funders and institutions, but they also narrow the range of effects formally recognized [28,29]. What cannot be quantified or benchmarked struggles to travel because it cannot enter evaluative space.

Fourth, the grammar of scale relies heavily on piloting [30]. Pilots serve as transitional forms between experimentation and expansion. They also allow institutions to demonstrate

action while structuring implementation as an interactive process subject to review and revision [31]. The UNFCCC Guidelines, for example, emphasize “iteratively updating the national adaptation plans” based on lessons learned and review cycles [25] (pp. 112–114). Similarly, the U.S. Environmental Protection Agency’s (EPA) 2024–2027 Climate Adaptation Plan ties adaptation to Long-Term Performance Goals, annual targets, and milestone monitoring through its Climate Adaptation Measurement Program, which describes strategies for staged implementation with milestones and performance tracking [32] (p. 35). Piloting thus supports scalability by containing risk and staging commitment through bounded phases rather than indefinite obligation.

Finally, scale presupposes exit [33,34]. For sustainability initiatives to expand and replicate efficiently, institutions must retain the capacity to withdraw from specific sites. Exit may take the form of project completion, funding expiration, or alignment with predetermined planning cycles. The UNFCCC Guidelines recommend that Parties undertake “regular review, at intervals that they determine” and align updates with national planning frameworks [25] (p. 106). Such interval-based review structures responsibility within temporal mandates rather than open-ended commitments. Although exit is rarely explicitly celebrated, it is a necessary condition for scalability: institutions must be able to move on without assuming indefinite responsibility for local outcomes, thereby redeploying attention and resources elsewhere.

Together, these criteria form a coherent grammar. Funding agencies, legislative oversight bodies, and administrative evaluation systems routinely treat sustainability initiatives that expand, replicate, generate metrics, begin as pilots, and preserve an exit as legitimate and effective. Those that require long-term presence, resist standardization, or generate obligations that cannot be transferred are more difficult to sustain institutionally, even when their ecological or social significance is clear.

Although these elements often overlap in practice, they serve analytically distinct functions within the grammar of scale, e.g., expansion concerns growth in scope or reach; replication concerns transferability across contexts; metrics enable comparability; piloting structures staged commitment; and exit defines the temporal boundedness of responsibility. Distinguishing these elements clarifies that scale is a composite evaluative architecture rather than a single property.

2.2. *Why Scale Fits Sustainability—To a Point*

The dominance of scalability in sustainability governance reflects structural conditions that shape contemporary environmental action. Sustainability challenges are global, interconnected, and urgent, while scalability promises coordination, speed, and efficiency. In policy environments with limited resources and competing priorities, scale offers a way to demonstrate impact without requiring deep contextual engagement in every case [24].

Moreover, scalability aligns with established institutional evaluation practices. Funding agencies and government agencies such as the UNFCCC, EPA, and U.S. Department of State routinely evaluate adaptation efforts through standardized indicators, monitoring frameworks, and time-bound reporting cycles [25,32,35], while the EPA and State Department specifically integrate climate action into agency-wide performance systems and reporting requirements [32,35]. Scale translates sustainability into familiar administrative forms, allowing environmental concerns to circulate within existing governance infrastructures rather than challenging them outright [29].

Under conditions of uncertainty, the grammar of scale also provides institutional reassurance. Pilots and metrics allow institutions to act without committing to outcomes that cannot be guaranteed [31]. Adaptation, in particular, is often framed as an ongoing

process rather than a problem to be resolved [36]. Scalability supports this orientation by emphasizing continuous adjustment and learning over definitive commitments.

2.3. *The Limits of Scale Under Planetary Constraint*

The limitations of this grammar become most evident under conditions of planetary limits. Ecological thresholds introduce forms of finitude, irreversibility, and uneven exposure that strain the assumptions of scalable governance [3,13,14]. Under such conditions, the grammar of scale tends to prioritize interventions that can continue to circulate over those that require institutional persistence. Long-term exposure to heat, flooding, malnutrition, or ecological degradation does not resolve neatly within pilot timeframes [31]. Yet scalable governance often treats these conditions as sites for intervention rather than as enduring responsibilities. Action proliferates, but obligation struggles to stick.

This dynamic is especially pronounced in climate adaptation. Adaptation frameworks emphasize preparedness, responsiveness, and capacity-building—qualities that align well with expansion and replication [6,7,9,10]. However, adaptation also confronts the reality that some places will continue to experience harm despite repeated interventions [37]. When sustainability governance is organized primarily by scale, these enduring conditions are often reframed as technical challenges to be managed rather than as ethical claims that demand long-term institutional attachment. Scalability thus performs a sorting function by privileging interventions that can be modularized, compared, and temporally bounded, even when ecological harms remain place-bound and cumulative.

Recognizing scale as a grammar rather than a neutral attribute creates space for alternative ways of reasoning about sustainability. It allows us to ask not whether sustainability initiatives can scale, but what other evaluative logics might be necessary to govern responsibility when expansion, replication, and exit are insufficient. The following section takes up this task by introducing six additional sustainability grammars that operate alongside scale, often implicitly. By naming and clarifying these grammars, the paper seeks to pluralize how sustainability governance is understood.

3. Plural Sustainability Grammars Beyond Scale

Scale's dominance as a grammar does not preclude the identification of other sustainability grammars. Others exist. Although they often speak in more hushed tones—and in some cases surface more as ethical horizons than institutionalized practices—they are not entirely silent—cf. [37,38]. This section amplifies six grammars—attachment, settlement, sufficiency, inheritance, exposure, and refusal—that circulate within sustainability debates and governance, sometimes explicitly and sometimes through patterned absence. Each grammar foregrounds a distinct governing question about responsibility under planetary limits and illuminates dimensions of ecological life that scale alone struggles to hold.

The selection of these six grammars is not meant to be an exhaustive typology. Across empirical studies, policy evaluations, and institutional planning documents, these grammars repeatedly surface as adjacent ways of reasoning about responsibility when scale proved insufficient. They appeared not as formal categories but as recurrent problem framings: who remains, what must be maintained, when limits are binding, how consequences accumulate, what must be acknowledged without resolution, and when continuation itself becomes unethical. Taken together, these orientations formed a recognizable cluster—not a comprehensive inventory, but a set of neighboring orientations that consistently reappeared as sustainability governance confronted permanence, exposure, and obligation under constraint. The aim here is therefore not to elevate them as definitive, but to render visible analytic distinctions that clarify how ecological responsibility is negotiated—and often narrowed—under planetary limits.

To clarify their derivation, these grammars are not presented as *a priori* inventions but as patterned orientations toward responsibility that already circulate within sustainability scholarship and practice. Citations throughout the following subsections indicate the literature and debates in which they appear, often implicitly. Their articulation here also reflects sustained engagement with sustainability governance across research, policy, and practitioner contexts over several decades, during which these recurrent patterns became analytically salient.

This strategy aligns with established interpretive traditions in the social sciences. In Weberian terms, the grammars function as ideal-typical constructions: heuristic devices that clarify recurrent configurations rather than mirror reality inductively [39]. Burke's dramatic method similarly articulates symbolic structures—agent, act, scene, purpose—that render motive intelligible across cases without deriving categories mechanically from texts [16]. Interpretive policy analysis treats analytic categories as sensitizing frames refined through iterative engagement with policy materials rather than as outputs of purely inductive coding [40,41]. Within Science and Technology Studies (STS), concepts often emerge through recursive interplay between empirical sites and theoretical problematization, with distinctions stabilized through contrast and comparison rather than statistical generalization [28,42].

Crucially, the analysis is not only interested in explicit language but also patterned silences—recurring absences that proved as diagnostically meaningful as recurring terms. In discourse analysis, absence is not treated as mere omission but as an indicator of what a framework renders difficult to articulate within its governing logic [16,40,43,44]. In adaptation plans, it is therefore important to attend not only to where grammars appear explicitly but also to where certain orientations—such as explicit commitments to non-exit or categorical cessation—were consistently displaced or translated into more administratively tractable forms. This approach allows patterned absences to be interpreted as structural features of governance grammars rather than as oversights.

Drawing on insights from metaphor theory, these grammars operate through recurring conceptual frames that structure perception before policy design [17]. When sustainability is framed through metaphors of scaling up, diffusion, leverage, and acceleration, growth-oriented evaluation becomes commonsensical. When framed through metaphors of repair, care, limits, or refusal, different evaluative horizons emerge. By conceptualizing scale as a governance grammar, this paper builds on discourse and environmental communication scholarship by tracing how framing logics become institutionalized in evaluation criteria, reporting structures, and funding architectures, and how they are publicly legitimized or not [45–47]. Rather than treating sustainability discourse as merely descriptive, this work emphasizes how linguistic and symbolic repertoires condition which interventions appear plausible, responsible, or fundable.

3.1. Attachment: Who Stays When Conditions Deteriorate?

The grammar of attachment organizes sustainability around the question of staying. Where scale privileges mobility, transferability, and exit, attachment foregrounds enduring presence and non-exit—cf. [48,49]. It asks who remains responsible when conditions worsen, interventions fail, or ecological harm persists despite repeated action. For example, when federal agencies acknowledge that facilities will face recurring flood exposure and commit to continued operation and retrofit rather than relocation, they implicitly adopt a grammar of attachment.

Attachment makes visible a dimension of sustainability often overlooked in scalable governance: the uneven distribution of exposure over time [50–52]. Under planetary limits, some communities and ecosystems cannot be left behind without consequence. Harms

are situated in ways that resist grammars that support actions such as relocation or project closure. The grammar of attachment renders these bonds central rather than incidental.

This orientation regularly surfaces within adaptation planning language. For instance, the UNFCCC Guidelines describe adaptation as a “continuous, progressive and iterative process,” emphasizing ongoing national responsibility rather than discrete interventions [25] (p. 11). The EPA Climate Adaptation Plan similarly frames its scope as encompassing the “entire Agency,” including long-standing facilities facing projected increases in extreme heat and precipitation [32] (p. 5). In coastal contexts, EPA acknowledges facilities at risk of “mission disruption from flooding,” underscoring the fixed relationship between infrastructure and place [32] (p. 11). Such formulations implicitly assume a durable presence.

In sustainability transitions discourse, attachment often appears as a “friction” to be managed—something that limits flexibility or complicates intervention [53,54]. Yet analytically, attachment highlights a core ethical tension: sustainability action may proliferate, but responsibility ultimately falls on those who cannot exit. By foregrounding who stays, attachment reframes adaptation not as responsiveness alone but as an enduring obligation.

3.2. *Settlement: What Does It Take to Remain?*

Closely related to attachment, the grammar of settlement shifts attention from movement to maintenance. While scale treats success as expansion and replication, settlement treats it as stabilization: the capacity to remain, repair, and live with the outcomes of intervention over time—cf. [54,55]. Municipal commitments to long-term infrastructure maintenance budgets—rather than one-time resilience retrofits—illustrate settlement as an institutional orientation.

Settlement foregrounds the upkeep work that sustainability governance often treats as secondary to innovation. Maintenance, repair, and institutional embedding are rarely celebrated as breakthroughs, yet they are essential to making sustainability durable under constraints [56]. The UNFCCC Guidelines explicitly emphasize integrating adaptation “into relevant new and existing policies, programmes and activities,” signaling an embedded rather than episodic approach [25] (p. 11). Similarly, the EPA plan details efforts to “modernize” facilities and integrate climate considerations into rulemaking and operations—work oriented toward institutional settlement rather than expansion [32] (p. 53). Under planetary limits, the challenge is not only to introduce new solutions but also to sustain livable conditions in places already shaped by ecological harm.

Under planetary limits, the challenge is not only to introduce new solutions but also to sustain livable conditions in places already shaped by ecological harm. In scalable governance, settlement is typically deferred. Temporary infrastructure, time-bound programs, and pilot projects address immediate needs while deferring decisions about long-term responsibility [31]. The grammar of settlement makes this deferral visible. It asks what it would mean to commit to sustainability not as a series of interventions but as a condition that must be lived beyond the project’s end.

3.3. *Sufficiency: When Is Enough Enough?*

The grammar of sufficiency raises a question that the grammar of scale is structurally unable to answer: when is enough enough? Scale presumes that more—more coverage, more efficiency, more adaptation—constitutes progress. Sufficiency, by contrast, foregrounds limits, closure, and restraint [57,58]. Policies that cap extraction levels, limit development in high-risk zones, or define “acceptable loss” thresholds reflect sufficiency logics rather than expansionary ones.

Within planetary limits, sufficiency challenges the assumption that sustainability problems can always be solved through expansion or optimization [58]. The UNFCCC Guidelines frame adaptation as reducing vulnerability rather than eliminating risk, implicitly acknowledging bounded outcomes [25] (p. 11). Risk assessments across adaptation plans describe exposure scenarios extending to 2050 and 2080, indicating projected conditions that must be lived with rather than fully overcome.

Sufficiency asks whether certain thresholds should be treated as endpoints rather than targets for further intervention. This does not imply inaction but a different orientation toward success—one that recognizes containment and stabilization as achievements rather than failures. Although sufficiency often appears in sustainability discourse as a moral appeal rather than a governing principle [58], it analytically highlights the capacity to accept limits as binding rather than provisional, to be overcome later through innovation or substitutability [58,59].

3.4. *Inheritance: Who Bears Consequences over Time?*

The grammar of inheritance organizes sustainability around temporality and accumulation. While scale emphasizes flexibility and responsiveness, inheritance foregrounds the persistence and compounding of ecological harms across generations [60–62]. Inter-generational climate litigation and long-term liability debates over toxic contamination exemplify inheritance as a governance concern—an orientation also visible in adaptation frameworks that institutionalize long-term vulnerability reduction and enduring regulatory responsibility [32] (pp. 5–7).

Inheritance makes visible forms of responsibility that are difficult to modularize or transfer. Climate projections embedded in adaptation plans—such as scenario-based sea-level rise and extreme-heat assessments—span decades. Take, again, the UNFCCC Guidelines, which address “medium- and long-term adaptation,” acknowledging that vulnerability unfolds over extended time horizons [25] (p. 9).

Soil degradation, water contamination, heat stress, and infrastructure lock-in persist beyond project completion. They are carried forward, often by communities with limited capacity to shape the decisions that produced them. The grammar of inheritance reframes sustainability not as a series of discrete interventions but as an ongoing process of living with the consequences of past actions [63].

In scalable governance, inheritance is often overlooked. Long-term harms are acknowledged in reports, risk assessments, or projections, but responsibility for addressing them is often deferred to future programs or jurisdictions [64]. By foregrounding inheritance, this grammar exposes how sustainability action can remain active while responsibility for cumulative harm remains unsettled.

3.5. *Exposure: What Must Be Acknowledged Even if It Cannot Be Fixed?*

The grammar of exposure shifts attention from control to visibility. While scale relies on metrics to render sustainability legible and comparable, exposure foregrounds conditions that must be acknowledged even when they resist measurement, optimization, or resolution [65–67]. Exposure thus emphasizes vulnerability, uncertainty, and the limits of intervention. Under planetary limits, not all risks can be managed away, and not all harms can be repaired. In this grammar, recognition is itself a form of responsibility, even when action cannot fully resolve the problem. For example, public heat maps identifying neighborhoods at chronic risk, even where no immediate remediation is possible, reflect exposure as acknowledgment without full resolution.

Adaptation frameworks repeatedly catalogue hazards—“extreme heat,” “extreme precipitation,” “sea level rise,” “wildfire risk,” and “flooding”—often across multiple emis-

sions scenarios extending decades into the future. The UNFCCC Guidelines, for instance, encourage Parties to “iteratively assess” climate vulnerabilities and update planning in light of emerging risks [25] (p. 23), implicitly acknowledging that exposure cannot be eliminated. Similarly, federal and state plans foreground disproportionate impacts on vulnerable populations, naming uneven exposure as a defining feature of climate risk [32,68].

Yet exposure rarely remains in this form as governance shifts toward implementation and accountability, as I later detail in the next section. Conditions initially described as persistent and uncertain are often translated into indicators, benchmarks, and monitoring systems. Vulnerability becomes something to track; risk becomes something to manage; uncertainty becomes something to reassess iteratively. In this translation, the ethical weight of unresolved harm is partially displaced. Exposure remains visible, but it is reframed as administratively actionable rather than structurally binding.

This patterned movement—from acknowledgment to metricization—illustrates how exposure is simultaneously present and constrained within adaptation governance. It surfaces most clearly in diagnostic sections, where harms are named expansively, but it becomes harder to institutionalize as a sustained obligation once reporting structures demand measurable progress. In scalable governance, exposure is often translated into indicators that enable monitoring without creating binding obligations [29,69].

3.6. *Refusal: What Must Not Continue?*

Finally, the grammar of refusal opens the possibility of declaring “No more!” While scale presumes forward motion—innovation, transition, adaptation—refusal foregrounds the ethical necessity of halting specific practices, infrastructures, or trajectories [70–72]. Within planetary limits, not all futures are viable or legitimate. Some activities must end—not because alternatives are ready to scale, but because continuation is harmful. Fossil fuel phase-out mandates or permanent development prohibitions in fire-prone wildland–urban interfaces represent instances where refusal moves from rhetoric to policy.

Unlike the other grammars discussed above, refusal rarely appears explicitly in adaptation planning documents. Adaptation frameworks emphasize preparedness, resilience, and capacity-building rather than cessation. When limits are acknowledged, they are typically framed as management challenges or trade-offs among priorities. The California Adaptation Planning Guide, for instance, discusses “difficult or impossible” under conditions of climate change [68] (p. A-19), yet these choices are framed in terms of prioritization rather than prohibition. Similarly, federal adaptation plans focus on reducing risk and strengthening resilience [32,35], not on identifying activities that must be categorically stopped.

Even in transition plans that mandate coal retirements or commit to 100 percent renewable electricity, cessation is typically framed as modernization rather than categorical prohibition [68] (pp. 89–90). Fossil fuels are displaced through scaling alternatives, not categorically rejected as illegitimate. This distinction matters: refusal treats limits as ethical endpoints, whereas transition often embeds stopping within forward-moving growth and innovation narratives.

This patterned absence is analytically significant. It indicates not that refusal is irrelevant to sustainability governance, but that it is difficult to institutionalize within accountability systems oriented toward measurable progress and continuous improvement. Refusal resists translation into performance metrics, implementation timelines, and deliverable-based reporting structures. It disrupts momentum rather than accelerates it.

Yet within planetary limits, refusal becomes unavoidable. Decisions about managed retreat, decommissioning infrastructure, phasing out fossil fuels, or abandoning high-risk development zones are not merely about scaling alternatives. They entail recognizing that

certain trajectories must end—even without frictionless substitutes. In this sense, refusal treats limits as endpoints rather than obstacles to be overcome.

Analytically, the grammar of refusal reveals the outer boundary of scalability. It names a dimension of responsibility that scale cannot easily accommodate: the obligation to say no, even when doing so challenges institutional inertia and growth-oriented evaluation frameworks [73]. If sustainability governance is to endure under conditions of constraint, it must confront not only how to scale what works but also how to legitimize stopping.

3.7. Plural Grammars: Summary

These six grammars are not presented as a blueprint for sustainability governance, but to reveal the plurality of ways in which responsibility is already negotiated within planetary limits. Each grammar foregrounds a distinct governing question and brings into view aspects of ecological life that scale alone tends to obscure. Table 1 summarizes these grammars and the questions they raise. The purpose of this discussion is not to rank grammars or suggest that one should replace another, but to show how reliance on a single evaluative grammar—scale—can obscure critical dimensions of responsibility.

Table 1. Sustainability Grammars Under Planetary Limits.

Grammar	Governing Question	What Becomes Secondary or Backgrounded When Scale Dominates
Attachment	Who stays when conditions deteriorate?	Long-term presence, non-exit, and enduring responsibility to place
Settlement	What does it take to remain?	Maintenance, repair, and institutional embedding over time
Sufficiency	When is enough enough?	Restraint and acceptance of ecological limits as binding
Inheritance	Who bears consequences over time?	Cumulative, intergenerational harms and responsibility for legacy effects
Exposure	What must be acknowledged even if it cannot be fixed?	Visibility of vulnerability and unresolved risk and harm beyond measurable indicators
Refusal	What must not continue?	Ethical stopping points, endings, and non-negotiable limits

Table 1 does not merely categorize grammars but, crucially, clarifies the evaluative displacement that occurs when scale dominates. The third column highlights what becomes institutionally fragile when expansion becomes the primary criterion of legitimacy. The table, therefore, makes visible the asymmetrical power among grammars rather than presenting them as coequal options.

These grammars do not simply coexist; they can conflict or reinforce one another. Attachment may clash with sufficiency when remaining in place increases long-term risk. Settlement may support inheritance by institutionalizing responsibility, yet it may conflict with refusal when maintenance sustains harmful systems. Scale can amplify exposure by generating visibility through metrics, even as it constrains binding obligation. Recognizing these tensions is analytically important because governance choices are rarely about selecting a single grammar; they involve negotiating trade-offs among competing orientations to responsibility.

The next section extends this discussion by tracing how these grammars appear throughout the narrative arc of contemporary climate adaptation planning frameworks. That is, where do they appear in these documents? And for what purposes?

4. Climate Adaptation Planning: Sustainability Grammars in Practice

Adaptation is explicitly oriented toward governing under conditions of ecological constraint, uncertainty, and uneven vulnerability. As such, adaptation plans are among the most forthright sustainability documents in acknowledging long-term harm, exposure, and the limits of control [74,75]. Yet they are also among the most standardized, metric-driven, and accountability-oriented governance instruments in circulation [27,76,77].

This section shows that climate adaptation planning frameworks often follow a consistent internal sequence. Plural grammars of ecological responsibility are most visible in how adaptation problems are framed and justified—especially in executive summaries, vision statements, and diagnostic sections. However, as these documents move toward implementation, monitoring, and evaluation, those grammars are progressively narrowed. What begins as a capacious recognition of attachment, inheritance, exposure, sufficiency, and even refusal is increasingly translated—under the demands of accountability—into the grammar of scale.

4.1. Document Selection and Reading Strategy

While the prior sections review and illustrate established grammars of sustainability as already established in the literature, this section addresses the question: “Where do these grammars tend to make appearances in climate adaptation planning frameworks?” To do this, the analysis presented draws on a selective reading of widely cited and institutionally authoritative climate adaptation planning frameworks operating at international, national, and subnational levels. Table 2 summarizes the documents examined and clarifies where plural sustainability grammars surface within these frameworks and where scale-dominant logics become ascendant, alongside the accountability mechanisms that drive this narrowing. As indicated in the table, the core documents analyzed include the United Nations Framework Convention on Climate Change National Adaptation Plan (NAP) Technical Guidelines [25], the United States Environmental Protection Agency Climate Adaptation Plan (2024–2027) [32], the United States Department of State Climate Adaptation and Resilience Plan (2024–2027) [35], and the California Office of Planning and Research California Adaptation Planning Guide (APG) [68]. Table 2 demonstrates a patterned sequencing across governance levels: plural grammars are most prominent in diagnostic and framing sections, whereas scale-oriented logics become dominant in implementation and evaluation. The table thus illustrates not variation among plans but a recurring structural narrowing tied to accountability infrastructures.

In addition, the analysis examined documents grouped under the heading “Municipal and Local Adaptation Frameworks.” This category comprises analytically grouped sets of documents rather than single canonical texts, forming a non-exhaustive, convenience sample of locally coordinated adaptation templates frequently cited as models for municipal or county-level planning [78–81]. These documents were selected because of the author’s familiarity with them, not to provide an exhaustive inventory of subnational adaptation planning efforts. Tribal climate adaptation planning frameworks were also included because they frequently foreground attachment, settlement, and intergenerational responsibility more explicitly than federal templates, thereby providing an analytic contrast for examining how such grammars are partially translated into scale-based accountability requirements.

Documents were selected based on three criteria: (1) a formal governance mandate within state-based or sovereign planning systems (i.e., frameworks issued by national governments, major federal agencies, state-level planning authorities, or Tribal nations with statutory or sovereign planning authority); (2) an explicit orientation toward climate adaptation under long-term ecological constraints; and (3) structured implementation and

monitoring architectures that enable tracing shifts from framing to accountability. Here, “institutional authoritativeness” refers not to normative legitimacy across contexts but to the capacity of these documents to structure planning requirements, funding eligibility, and reporting obligations within their governance systems. The aim was not global representativeness but analytic leverage for examining grammatical sequencing within accountability-driven planning regimes.

Table 2. Grammatical Sequencing in Climate Adaptation Planning Frameworks.

Adaptation Framework	Front-End Plural Grammars	Scale-Dominant Logics	Accountability
UNFCCC National Adaptation Plan (NAP) Technical Guidelines	Stocktaking of vulnerabilities; emphasis on long-term exposure and uneven impacts	Monitoring and evaluation frameworks; standardized indicators; reporting cycles	Paris Agreement transparency framework
EPA Climate Adaptation Plan (2024–2027)	Executive framing around resilience, environmental justice, and persistent climate risk	Agency-wide performance measures; integration with standardized operational goals	Federal performance reporting requirements
Dept. of State Climate Adaptation & Resilience Plan (2024–2027)	Framing adaptation as institutional durability and long-term engagement	Alignment with standardized planning, review, and evaluation cycles	Cross-agency reporting requirements
California Adaptation Planning Guide (APG)	Vulnerability assessment emphasizing place-based exposure and differential impacts	Stepwise planning process; modular strategies; recommended indicators	State planning mandates; eligibility for compliance and funding
Municipal and Local Adaptation Frameworks	Community engagement and regional vulnerability framing	Alignment with templates, metrics, and reporting formats	Plan compliance and grant eligibility criteria

Case selection reflects analytic positioning rather than comprehensiveness. Documents were included until the pattern of grammatical sequencing, which ultimately presented as “plural framing followed by scale-dominant evaluation,” stabilized across cases. The endpoint, therefore, reflects analytic saturation of the sequencing pattern.

Rather than conducting a comprehensive discourse analysis of each document, the analysis adopted a contrastive discourse analysis to track how responsibility is articulated across different sections within the same framework [82]. In addition to tracing explicit language, the analysis also attended to systematic omissions. When certain governing questions—such as whether particular practices must cease altogether—failed to appear across multiple frameworks, this absence was treated not as incidental but as indicative of the evaluative limits imposed by dominant accountability structures [16,44]. Such patterned absences help clarify which grammars remain difficult to institutionalize as governance moves toward implementation and reporting. In doing so, tensions were noted between front-end framing and diagnostic sections—where plural grammars such as exposure, attachment, equity, and long-term vulnerability are often foregrounded—and downstream implementation, monitoring, and evaluation sections, where responsibility is narrowed through standardized indicators, reporting cycles, and compliance requirements. This approach allowed patterns of grammatical sequencing to be traced without attributing inconsistency, contradiction, or bad faith to the institutions tied to these frameworks.

The documents analyzed here are drawn primarily from Anglophone planning contexts, including U.S. federal and state agencies, Tribal nations exercising sovereign planning

authority, and UN-affiliated frameworks written in English. The analysis, therefore, focuses on governance formations in which formal accountability infrastructures are highly institutionalized. While many of these systems are shaped by OECD-oriented administrative traditions, Tribal adaptation frameworks operate within distinct sovereign and relational governance logics. This paper does not claim cross-cultural universality. Rather, it offers a diagnostic account of how responsibility is structured within these specific planning regimes. Whether and how these grammars travel, are reconfigured, or are displaced in other geopolitical and cultural contexts remains an open empirical question.

Table 2 was structured to clarify how this grammatical sequencing appears empirically across major adaptation frameworks. The first column identifies representative adaptation planning frameworks. The second column highlights where and how plural grammars of responsibility are most visible—typically in framing, vision, and diagnostic sections. The third column shows where and how scale-oriented logics dominate—most notably in implementation and evaluation. The final column specifies the accountability mechanisms through which scale is institutionalized.

4.2. Opening Frames: Plural Grammars at the Level of Recognition

Across international, national, and subnational adaptation planning frameworks, the opening sections often frame sustainability as an enduring responsibility rather than as a discrete intervention. Executive summaries and framing chapters routinely emphasize that climate change produces long-term, uneven impacts; that some communities are more exposed than others; and that ecological harm will persist even under ambitious mitigation scenarios. These registers resonate strongly with grammars of attachment, inheritance, and exposure.

For example, the UNFCCC's National Adaptation Plan technical guidelines indicate that adaptation planning is intended to address “medium- and long-term adaptation” [25] (p. 9). Similarly, U.S. federal adaptation plans describe climate change as a condition that agencies must plan around rather than resolve, emphasizing throughout the document persistent and increasing climate risks that affect communities unevenly, especially “low-income communities and communities of color, children, the elderly, Tribes and indigenous people” [32] (p. 20).

In these early sections, adaptation is framed as staying with damaged landscapes, living with inherited risks, and acknowledging vulnerability that cannot be eliminated. Vulnerability assessments foreground place-based exposure—heat, flooding, wildfire, and water scarcity—often situating these risks within historical and socioeconomic contexts. For instance, California's Adaptation Planning Guide emphasizes that climate impacts vary widely by region and community and that adaptation must begin with understanding “vulnerabilities” before strategies are selected [68] (p. 2), recognizing that “many socially vulnerable people have historically faced, and continue to face, systemic social, economic, and political marginalization and injustice [68] (p. 62).

Notably, many adaptation frameworks also gesture toward limits at this stage. The language of sufficiency appears in discussions of finite resources, trade-offs, and the impossibility of protecting all assets equally. Some plans implicitly acknowledge that certain losses are unavoidable or, at best, difficult to mitigate. The California Adaptation Planning Guide, for example, calls out the “systemic social, economic, and political marginalization and injustice” when setting expectations for making difficult choices about where and how to invest limited resources [68] (p. 62).

In these moments, refusal does not fully enter the frame as a policy instrument but registers as a trace—an absent presence that shapes the discourse of trade-offs and scarcity without stabilizing categorical cessation as an actionable commitment. In Derridean terms,

refusal operates as a trace that conditions what can be said about limits [83]; in Mouffe and Laclau's formulation, it functions as a constitutive outside, structuring adaptation's horizon of meaning even as it remains institutionally displaced [44]. Rather than being articulated directly, the possibility that some trajectories must end is sensed at the edge of the text, implied by references to "trade-offs" and "limited resources," yet rarely formalized as a governing endpoint.

Taken together, the front matter of adaptation plans presents sustainability as a plural undertaking. Responsibility appears place-bound, intergenerational, and non-exitable. At this stage, scale is present but does not yet dominate the definition of responsibility.

4.3. *The Turn to Action: Narrowing Through Implementation*

As adaptation plans move from diagnosis to action, a shift becomes apparent. Once the focus shifts to strategy selection, prioritization, and delivery, the language of responsibility increasingly translates into actionable units. Adaptation measures are organized into discrete interventions, categorized by sector, hazard, or jurisdiction, and framed to facilitate coordination across sites. At this point, the grammar of scale begins to assert itself more forcefully. Interventions are described in terms of their potential reach, replicability, and contribution to broader adaptation goals. Even when local specificity is emphasized, it is often accommodated within standardized planning processes designed to travel across contexts.

For example, many of the documents analyzed explicitly organize adaptation into a multi-phased process that communities can follow, from vulnerability assessment through strategy development and implementation. Similarly, the UNFCCC Guidelines emphasize integrating adaptation actions into existing planning and budgeting processes [25] (p. 35). This translation is institutionally productive. Stepwise planning models, modular toolkits, and replicable strategies make adaptation governable across fragmented jurisdictions. Yet this shift also reframes responsibility. Long-term presence becomes a matter of capacity-building, permanence is reframed as resilience, and exposure is addressed through preparedness rather than obligation. Grammars such as attachment and settlement do not disappear but are rearticulated to align with expandable and transferable forms of action.

The most decisive grammatical narrowing occurs in those sections devoted to monitoring, evaluation, reporting, and accountability. It is here that sustainability must prove itself institutionally. To be accountable, adaptation must be measurable; to be reportable, it must be comparable; to be fundable, it must demonstrate results within defined time horizons.

In these sections—often framed as performance metrics, monitoring and evaluation plans, or progress indicators—the grammar of scale becomes dominant. Success is defined by indicators that aggregate across sites, benchmarks that enable comparison, and reporting cycles that align with funding and oversight requirements. The UNFCCC Guidelines, for instance, emphasize the importance of "measuring progress achieved towards the targets outlined in the framework" and of regularly reporting on adaptation outcomes [25] (p. 9). Likewise, U.S. federal adaptation plans tie adaptation performance to "the adoption of common metrics that recipients can use to meet EPA's reporting requirements" [32] (p. 55). In fact, all documents analyzed ultimately emphasized the centrality of metrics, monitoring, and evaluation as key strategies for measuring the success, impact, and uptake of the respective frameworks.

Meanwhile, alternative grammars fare poorly in this evaluative environment. "Attachment," which foregrounds non-exit, struggles to find expression in systems built around project completion. "Settlement," which emphasizes maintenance and repair, is difficult to reconcile with innovation-oriented reporting. "Sufficiency," which demands closure, conflicts with the logics of continuous improvement. "Inheritance," which fore-

grounds cumulative harm, exceeds the temporal scope of most evaluation frameworks. “Exposure,” while often documented, is rarely tied to binding responsibility. Finally, “refusal” is largely excluded, as accountability systems prioritize demonstrable action over principled cessation.

The result is not the absence of ethical concern but its administrative displacement. Responsibility is acknowledged only rhetorically, then narrowly operationalized through criteria that privilege expansion, replication, and auditability. Scale becomes the grammar by which adaptation proves itself, even as adaptation’s own framing recognizes limits that scale cannot resolve.

This recurring pattern across climate adaptation planning frameworks helps explain why sustainability governance often seems both expansive and insufficient. The issue is not that alternative grammars are absent from adaptation discourse. On the contrary, they are often quite visible when problems are named and futures imagined. The issue is that, as governance moves toward accountability, those grammars lack institutional supports strong enough to compete with scale.

In addition to illustrating how these grammars are applied institutionally, this analysis underscores the question of when they are put to work. If ecological responsibility is to endure within planetary limits, alternative grammars cannot remain confined to introductions and vision statements. They must be translated into reimaged evaluative and accountability structures that shape implementation, commitment, and institutional endurance. Without such translation, sustainability will continue to speak in plural grammars while governing through scale.

5. Discussion: Governing for Endurance Under Planetary Limits

This paper set out to address the following question: What makes ecological responsibility endure under conditions of planetary constraint? Rather than locating the answer in better data, improved coordination, or more ambitious targets, the analysis has argued that endurance is shaped more fundamentally by the grammars through which sustainability is organized and evaluated. When sustainability governance is dominated by the grammar of scale, responsibility tends to remain mobile, provisional, and exit-ready—even as ecological harm becomes increasingly permanent, cumulative, and unevenly distributed. In practical terms, the argument implies that enduring sustainability requires not only better interventions but different evaluative infrastructures—ones capable of recognizing maintenance, non-exit, sufficiency, and cessation as legitimate outcomes.

By treating scale as a grammar rather than a neutral property of interventions, the paper shows how sustainability action can proliferate while responsibility remains fragile. The analysis of climate adaptation planning frameworks illustrates this dynamic. Adaptation plans do not shy away from grammars of attachment, inheritance, exposure, sufficiency, and even refusal in problem recognition. Yet as these plans move toward implementation, accountability, and verification, responsibility is increasingly rearticulated through the grammar of scale—privileging metrics, replicability, and temporal boundedness over permanence, settlement, and obligation.

The implications of this finding extend beyond climate adaptation and beyond any single policy domain. They address how sustainability is currently governed, justified, and institutionally stabilized, and they offer insight into why so many sustainability efforts feel both expansive and insufficient. Briefly, I now reflect on what this analysis means for practitioners, policymakers, and scholars.

5.1. Implications for Practitioners: Beyond Doing More

For sustainability practitioners—particularly those working in adaptation, resilience, and environmental justice—this analysis suggests a shift in how effectiveness is understood. Much professional practice is structured around demonstrating action: launching initiatives, piloting interventions, expanding coverage, and reporting measurable outcomes [4–9]. These activities are not misguided. Indeed, they are often necessary. But when effectiveness is equated exclusively with scalability, practitioners face a paradox: they are rewarded for action that travels, even when the harms they confront are situated.

The grammar framework presented here offers a way to articulate this tension without casting it as failure. It helps explain why practitioners often recognize the need for long-term presence, maintenance, and care, yet feel constrained by accountability systems that reward short-term outputs and replicable success. From this perspective, frustration with “pilot fatigue,” perpetual planning cycles, or the constant demand to innovate can be understood not as implementation gaps but as grammatical mismatches between what responsibility requires and what institutions recognize [31].

Importantly, the framework does not ask practitioners to abandon scale. Instead, it invites more explicit reflection on when scale is appropriate and when it is not, and, crucially, on which other grammars might need to be foregrounded alongside it. In some contexts, attachment may matter more than expansion. In others, settlement and maintenance may be more consequential than innovation. In still others, sufficiency or refusal may be the most responsible stance. Naming these grammars does not solve institutional constraints, but it does provide practitioners with a language to make visible what is often rendered secondary or unspeakable within dominant evaluative frameworks.

5.2. Implications for Policymakers: Accountability as a Grammatical Choice

For policymakers, the analysis highlights a critical yet often overlooked point: accountability systems do not merely measure sustainability; they actively shape our understanding of it [28,29,84]. Monitoring frameworks, performance indicators, reporting cycles, and funding criteria privilege certain forms of responsibility while marginalizing others. When accountability is designed primarily around comparability, aggregation, and demonstrable progress, it systematically favors the grammar of scale.

It is important to acknowledge that this dominance of scale is not necessarily the result of oversight or conceptual default. In many contemporary governance contexts—particularly those operating within market-oriented and audit-driven administrative regimes—scalability is often the only grammar recognized as legitimate by oversight bodies, legislatures, and funding authorities [28,64]. Policymakers and grant writers may be acutely aware that grammars of attachment, settlement, sufficiency, or refusal more accurately reflect ecological realities, yet still opt for scale-oriented framing because it secures institutional viability, funding continuity, or political defensibility. In such contexts, scale is not merely habitual—it is strategic.

Recognizing this does not invalidate the analysis; it clarifies the structural conditions under which sustainability governance operates. The question, then, is not simply whether policymakers should adopt alternative grammars, but under what institutional conditions such adoption becomes possible. If ecological responsibility is expected to endure—remaining binding even when conditions worsen or interventions fail—then accountability mechanisms must gradually broaden what counts as legitimate success. At present, many policy frameworks assume that responsibility can be modularized, transferred, or exited once predefined outputs are delivered. That assumption sits uneasily with irreversible harm, long-term exposure, and intergenerational consequences.

Reframing accountability as a grammatical choice invites a more realistic policy conversation. Concretely, accountability redesign could include: (1) establishing dedicated maintenance and repair line items within adaptation budgets, protected from short-term reallocation; (2) embedding long-horizon stewardship clauses in infrastructure financing agreements that restrict premature withdrawal; and (3) adopting evaluation frameworks that treat managed retreat, project cessation, or fossil infrastructure decommissioning as successful compliance outcomes rather than performance failures.

These points do not assume that policymakers are unaware of the tensions they navigate. Rather, they make explicit the structural pressures that keep scale dominant.

5.3. Implications for Scholars: From Critique to Grammatical Diagnosis

For sustainability scholars, particularly those working at the intersection of political ecology, environmental humanities, environmental sociology, and STS, the paper offers a diagnostic lens that complements existing critiques of sustainability governance. Much critical scholarship has focused on implementation failures, the co-optation of environmental goals, or the depoliticization of sustainability through technocratic management [11,12,28,30]. These critiques remain vital. What the grammar framework adds is a way to specify how governance succeeds on its own terms yet fails to secure enduring responsibility.

By shifting attention from outcomes to grammars, the analysis helps explain why sustainability governance can appear responsive without being binding. It also suggests a different orientation for critique—one that asks not whether sustainability initiatives work, but what kinds of responsibility they are structured to hold. This perspective opens space for comparative work across domains (energy transition, food systems, biodiversity conservation) and institutional forms (states, universities, NGOs, corporations), tracing how different grammars are invoked, stabilized, or displaced.

At the same time, the paper raises reflexive questions for scholarship itself. Academic research is often evaluated by its own grammar of scale: generalizability, transferability, and impact across cases [85]. The framework developed here invites scholars to consider whether critical sustainability research may also inadvertently privilege certain grammars while sidelining others—particularly those tied to permanence, attachment, and refusal. In this sense, the grammar framework is not only an object of analysis but also a prompt for methodological and theoretical reflection.

6. Conclusions: Endurance as a Governance Challenge

This paper has argued for pluralizing sustainability grammars rather than replacing scale with a single alternative. The grammar of scale remains indispensable in many contexts. Yet when it becomes the sole grammar for evaluating sustainability, other forms of responsibility become fragile, provisional, or invisible. Attachment, settlement, sufficiency, inheritance, exposure, and refusal should not be seen as replacements for scalability. They complicate it by foregrounding dimensions of ecological life that cannot be fully optimized, replicated, or exited. Ecological responsibility will endure only if these grammars move beyond rhetoric and become visible within evaluation and accountability systems. Until then, sustainability will continue to speak in plural moral registers while governing through a narrower grammatical frame—one better suited to mobility and action than to staying and obligation.

By making this grammatical tension visible, the paper contributes to ongoing debates about adaptation, justice, and the limits of sustainability governance. More importantly, it offers a way of thinking about responsibility that takes planetary constraints seriously. These constraints cannot be scaled away. Rather, they must be lived with, governed, and endured. The analysis presented focuses on institutional sustainability governance as

articulated primarily within Western and Anglophone planning regimes. Whether these grammars travel intact, are reconfigured, or are displaced in other linguistic, cultural, or political-economic contexts remains an open empirical question—one that future comparative research is well positioned to explore.

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