

Critical Analysis of Sustainable Development: Concept and Reality

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ABSTRACT

Sustainable development has emerged as the most important development framework which people debate in current development discussions. The 1987 World Commission on Environment and Development report introduced sustainable development as a concept which allowed economic growth to continue while protecting environmental resources and promoting social equality through sustainable development, which required present needs to be satisfied without harming future generations. The United Nations Sustainable Development Goals (SDGs) have established this concept as a worldwide framework which governs both international partnerships and the policy development processes of various nations. This paper presents a critical assessment of sustainable development by examining its theoretical foundations, essential conceptual uncertainties, and the implementation difficulties which need to be overcome. The study investigates how economic systems that focus on growth create conflicts with ecological sustainability because development models choose to achieve immediate economic benefits instead of protecting environmental and social systems. The study uses recent global assessments from the Sixth Assessment Report of the Intergovernmental Panel on Climate Change and the UN SDG Progress Report 2024 to show how normative commitments diverge from actual empirical observations. The world still experiences persistent problems including climate change and resource overexploitation and biodiversity loss and structural inequalities which prevent societies from achieving their sustainability objectives. The paper studies how global political economic systems create structural limitations through three main factors which include uneven consumer behaviour and different levels of technology access and the fundamental needs of capital accumulation. The research shows that organizations which use sustainability language in their work do not necessarily implement substantial changes to their operational procedures or develop sustainable practices. The study ends with a proposal for creating a framework which enables better understanding of sustainable development through its local context while implementing inclusive governance practices and fair resource distribution and sustainable development programs which focus on local needs and economic growth which extends beyond material accumulation. This method serves as a vital connection point which unites the theoretical potential of sustainable development with its actual implementation in practice.

Keywords: Sustainable Development, SDGs, Environmental Governance, Climate Change, Development Theory, Green Economy, Planetary Boundaries.

Introduction

The term sustainable development functions as an essential element which global governance systems need to operate their international relations. The term exists as a scientific category and a policy framework and a moral duty while critics view it as an ideological framework which permits businesses to operate normally under a green facade [1]. The term moved from limited usage in ecological economics to become the main concept which drives the United Nations most extensive multilateral initiatives

because of its strong persuasive capacity and wide-ranging analytical capabilities. The formal genealogy of sustainable development is typically traced to the World Commission on Environment and Development (WCED), which in 1987 published *Our Common Future*, which established sustainable development as a definition of development that allows present needs to be met while protecting future generations need rights [2].

This definition which achieves elegant simplicity contains deep-seated conflicts. What constitutes a 'need'? Who establishes the standards for what constitutes 'compromise'? How should societies balance present poverty issues with their obligations to future generations? The academic world has studied these questions for many years which created a major impact on ecological sustainability practices through their effect on political battles. The 2030 Agenda which all 193 UN Member States approved in September 2015 established an integrated framework to address these conflicts through its seventeen SDGs and 169 targets [3].

The SDGs functioned as a system which required all components to work together while the SDGs established three sustainable development dimensions which needed equal treatment between economic and social and environmental aspects [3]. The situation in 2025 which marks the midpoint of the 2030 Agenda shows serious problems. The UN assessment reports that only 17 percent of SDG targets show progress while almost half of the targets have achieved limited progress and more than one third of the targets are either standing still or losing ground according to [4].

The paper advances through the following structure. Sustainable development as a concept has undergone development according to the description in Section 2. The section examines the theoretical and normative conflicts which exist within the concept. The section studies existing evidence about both Sustainable Development Goals and planetary boundaries. The section investigates the political and structural obstacles which prevent sustainable development transitions from occurring. [5]. The section presents different theoretical frameworks which oppose established sustainability concepts. The section presents final thoughts together with their effects on both theoretical frameworks and practical applications.

Conceptual Evolution of Sustainable Development

- **Pre-Brundtland Origins**

The Brundtland definition serves as a primary reference point for policy discussions but actual sustainability research goes back to earlier times. The concept of sustained yield in forestry constitutes its first instance which German forester Hans Carl von Carlowitz defined through his 1713 publication *Sylvicultura Oeconomica* that described renewable resource management over extended periods. The late nineteenth and early twentieth century conservation movement which John Muir and Gifford Pinchot led established a basic conflict between natural resource preservation and its practical use which has become a permanent part of sustainability discussions. The modern environmental movement began to grow during the 1950s. Rachel Carson published *Silent Spring* in 1962 which brought environmental destruction issues to public attention and Earth Day 1970 launched international public participation.

The Club of Rome published its important report *The Limits to Growth* in 1972 which used systems modeling to show how unrestrained economic and population expansion would result in environmental disaster and societal breakdown on a planet with limited resources. The United Nations Conference on the Human Environment which took place in that same year created a new international policy framework that made environmental issues a worldwide priority and established the United Nations Environment Programme.

- **The Brundtland Era and Rio Process**

The Brundtland Commission defined sustainability through a political treaty which they produced between non-wealthy countries and developed countries. The organization combined development with sustainability because developing countries believed that developing their economies required protection of natural resources which wealthy nations treated as a luxury. The political decision established two competing ideas about economic growth which claimed to support environmental protection yet both concepts faced intense opposition since that time.

The Brundtland vision gained institutional implementation through the 1992 UN Conference on Environment and Development which took place at the Earth Summit in Rio de Janeiro. The post-Cold War era environmental multilateralism reached its peak through the implementation of Agenda 21 and the Rio Declaration which created the Commission on Sustainable Development. The UNFCCC climate

treaty and Convention on Biological Diversity treaty which Rio adopted served as a demonstration of global commitment which later turned out to have serious implementation problems. [7].

- **From MDGs to SDGs**

The Millennium Development Goals (MDGs, 2000–2015) established poverty reduction as their main objective while they human development as their secondary goal and environmental sustainability as their third priority which they defined through Goal 7. The 2015 SDGs which succeeded the MDGs introduced a new framework for sustainability because it regarded sustainability as a holistic concept which integrated environmental and economic systems together with institutional and social systems. The SDGs established their first developed country responsibilities rule by stating that sustainability challenges require Global North transformations which need to occur before Global South development can succeed.

The Paris Agreement on climate change (2015) and the Kunming-Montreal Global Biodiversity Framework (2022) serve as the main elements which establish current sustainability governance together with the SDGs. The two elements demonstrate how extensive the sustainability agenda has become and show how challenging it remains to implement international treaties at the level of individual nations. [8].

Theoretical and Normative Tensions in the Sustainability Concept

- **Weak vs. Strong Sustainability**

Sustainability theory engages with its most essential debate about how human-made capital can replace natural resources. The concept of weak sustainability which neoclassical environmental economists Robert Solow and John Hartwick developed defines intergenerational welfare through the evaluation of total capital resources which include natural assets and manufactured goods and human skills. The viewpoint permits environmental harm when organizations commit resources to build alternative types of capital. The concept of strong sustainability states that natural resources deliver essential services which technology cannot match. Ecosystem services like climate regulation and water purification and pollination and carbon sequestration generate economic value which serves as the foundation for all business operations.

The system requires organizations to treat specific types of natural resources as essential elements which they cannot alter during their operations. The distinction is not merely academic. The way that national accounts record environmental degradation together with project assessment processes and the evaluation of proper policy responses all depend on this issue. The established policy systems which include carbon markets and payment for ecosystem services and green GDP systems actually operate based on weak sustainability principles which ecological economists and environmental scientists have continuously criticized. [9].

- **The Growth Paradox**

The second main conflict between economic development and environmental preservation creates a new problem which needs resolution. The Environmental Kuznets Curve (EKC) hypothesis assumed that environmental damage would increase during the early stages of economic development. However, environmental improvements would begin when higher income levels created public demand. The research studies which followed the initial study have proved that most pollutants and resource flows do not support the strong form of this hypothesis.

Although local pollutants follow EKC patterns, greenhouse gas emissions and biodiversity loss and material throughput have increased because of economic growth in most countries throughout most time periods. [10]. The degrowth movement uses ecological economics and political ecology to show that conventional sustainable development comprehension represents an oxymoron because perpetual GDP growth requires infinite ecological resources which create permanent ecological damage.

The green growth supporters argue that decoupling enables economic growth to proceed within planetary limits when economies achieve sufficient environmental protection. The ongoing debate between absolute and relative decoupling has found that evidence shows absolute decoupling between GDP growth and material throughput and carbon emissions proved impossible to achieve worldwide. [11].

- **Justice, Power, and the Politics of Sustainability**

The third source of conflict relates to how sustainability and justice need to be understood in both their current time frame and their future time frame. Environmental justice scholars have found that environmental damage affects indigenous people and marginalized groups and Global South nations in a

way that establishes unfair environmental damage distribution across these three groups while resource exploitation brings advantages to wealthy people [12].

The concept of 'climate justice' has crystallised these concerns in the context of climate change, where the countries least responsible for historical emissions face the most severe impacts [13]. Political ecology examines how sustainability practices and sustainability discussions reflect existing power structures.

The green commons environmental problem exists because it requires technical solutions which create a blind spot about how social and political systems initiate environmental destruction through processes that lead to resource deprivation and environmental destruction which specifically favors certain societal groups while shifting expenses to others [14]. The concept of 'green grabbing'—the appropriation of land and resources in the name of sustainability—illustrates how conservation and renewable energy projects can reproduce colonial patterns of dispossession [15].

- **Techno-optimism vs. Systemic Change**

A fourth tension exists between two opposing views which show how techno-optimist sustainability approaches believe that environmental problems will be solved through technological innovations and efficiency improvements and their use of alternative technologies without needing to transform current economic and social systems. The debates over carbon capture and storage nuclear energy and geoengineering and the potential of digital technologies to 'dematerialise' the economy demonstrate this division [16].

The critics of techno-optimism state that the technologies lack proven performance at large-scale applications while efficiency improvements create rebound effects which lead to the Jevons Paradox and future technology trust provides political support which enables politicians to postpone necessary structural reforms that must occur today [17].

The Empirical Reality: Progress, Regress, and Planetary Boundaries

- **SDG Progress: A Midterm Assessment**

The 2024 UN SDG Progress Report presents a sobering picture. With fewer than six years remaining until 2030, only approximately 17 percent of the 169 SDG targets are on track for achievement by the deadline [18]. The COVID-19 pandemic and the cost-of-living crisis together with climate-related disasters and armed conflicts have caused severe interruptions to progress because these events have reversed all achievements made during previous years toward poverty and hunger and health improvements. The global extreme poverty headcount rose for the first time in a generation in 2020 and remains above pre-pandemic levels in many regions [4]. SDG 1 (No Poverty) illustrates the fragility of gains. Extreme poverty experienced a major decline between 1990 and 2019 yet the pandemic pushed an estimated 90 million additional people below the \$2.15-per-day international poverty line [18].

Goals progress at different speeds which vary between different areas. Sub-Saharan Africa faces permanent development challenges because it contains most of the world's extremely poor population. The world remains far from achieving SDG 2: Zero Hunger because 733 million people experienced food insecurity in 2023 because of conflict and climate shocks and economic instability. The situation is equally concerning for environmental goals. SDG 13: Climate Action requires both temporary and ongoing greenhouse gas emission reductions yet energy and industrial sectors emitted 37.4 billion tonnes of CO₂ in 2023, which represents the highest level according to the Global Carbon Project. [19].

The Paris Agreement commitments, which countries must fulfil through their Nationally Determined Contributions (NDCs), will lead to a global temperature increase between 2.5 and 2.9 degrees Celsius by 2100, which exceeds the 1.5 degrees Celsius threshold that scientists identify as critical for preventing severe climate change effects. Biodiversity-related goals show dangerous patterns which scientists observe. [20,21]. The two SDGs 14 and 15 require urgent action because current assessments show that nearly one million species of plants and animals face extinction risk, which scientists predict will occur within the next three decades, thus marking what experts call Earth's sixth mass extinction event. [22].

- **Planetary Boundaries**

The planetary boundaries framework, introduced in 2009 by Johan Rockström and his research team and updated in 2023, offers a scientific approach to evaluating the state of Earth's environmental systems. It outlines nine critical Earth-system processes—such as climate change, biosphere integrity,

land-system transformation, freshwater use, biogeochemical cycles, ocean acidification, atmospheric aerosol levels, stratospheric ozone depletion, and novel entities like plastics and synthetic chemicals. Within this framework, “safe operating limits” are defined, representing the conditions under which human societies have historically developed and can sustainably continue. The most recent update indicates that six of these nine boundaries have already been exceeded.

Among these, the most critical breach relates to biosphere integrity, particularly due to the rapid loss of genetic diversity. In addition, the boundary concerning novel entities—covering synthetic chemicals, plastics, and other human-made pollutants—has been crossed, largely because such substances have no natural counterparts and accumulate in the environment. Other areas now entering or already within high-risk zones include climate change, land-use change, freshwater systems, and disruptions in nitrogen and phosphorus cycles, all of which pose significant threats to the stability of the Earth system.

The authors present an alarming finding which shows that boundary violations create risks for crossing other boundaries because Earth-system processes depend on interdependent relationships. The framework has been criticised for its aggregation assumptions and for neglecting regional heterogeneity but it has been enormously influential in communicating the scale and urgency of environmental challenges to policy audiences [24].

- **The Decoupling Debate**

The fundamental empirical issue which sustainable development theory needs to address investigates whether economies can achieve environmental footprint reduction through economic growth which scientists call decoupling. The results become ambiguous because the analysis range determines findings which depend on specific analysis parameters. Most countries achieved relative decoupling which shows their environmental impact increases at a slower rate than their GDP growth for all types of pollutants.

The scientific community considers absolute decoupling which shows environmental impact reduction during GDP expansion to be an uncommon phenomenon which requires further investigation [25]. Hickel and Kallis (2020), in a widely cited analysis, found that evidence for absolute decoupling of GDP from material throughput or CO₂ emissions at the global level is 'tentative and likely insufficient' to achieve climate targets without dramatic demand-side reductions [26].

A 2020 report by the European Environment Agency similarly concluded that existing evidence does not support the assumption that green growth—economic growth that is both resource-efficient and low-carbon—can be achieved fast enough to meet EU environmental commitments without additional structural changes [27]. The findings directly contradict the basic principles which sustain the dominant sustainable development system while they create fresh momentum for both degrowth and post-growth research initiatives.

- **Climate Change: Irreversible Risks**

The IPCC's Sixth Assessment Report (AR6), which was finished in 2023, presents the most detailed research on climate science which exists to this day. The research demonstrates that human activities have caused climate warming to occur at an unmatched speed while climate change has already generated widespread major destructive effects which will increase with every additional temperature rise. [18]. The AR6 Synthesis Report underscores that the window for limiting warming to 1.5°C is narrow and rapidly closing. [19].

The world must achieve net zero CO₂ emissions by approximately 2050 to achieve 50 percent probability of keeping temperatures below 1.5°C and the planet should start immediate emissions reduction. The required practice needs organizations to change their energy systems and land management methods and industrial operations and product usage practices at an unprecedented pace and scale. The existing paths which lead to our goals show a massive gap from what we need to achieve. [31].

Structural Barriers to Sustainable Development

- **Financialization and Capital Accumulation**

The principal obstacle that exists for achieving sustainable development is the capital accumulation framework which governs present-day economic systems. Capitalist economies function with a fundamental requirement that businesses must generate profits which they need to reinvest, thus

creating a pattern which drives companies to shift their environmental expenses onto others while they extract natural resources for production purposes [32].

Financial markets operate on short time frames which define their quarterly earnings and annual return goals as their fundamental measurement systems, but these time frames create a fundamental conflict with the long-term requirements of sustainable development. Institutional investors who control trillions of dollars in assets function under incentive systems which provide rewards for immediate financial outcomes yet disregard extended periods of environmental sustainability [33].

The financialisation of nature—the attempt to internalise environmental costs through market mechanisms—has produced a vast ecosystem of carbon markets, biodiversity credits, and green bonds. The actual environmental impact of these systems remains undocumented because there exists insufficient evidence to prove their effectiveness in decreasing environmental damage [34]. The practice of carbon offsetting has become a target for ongoing criticism, as a 2023 investigation into major voluntary carbon offset programs discovered that most projects did not meet their claimed emissions reduction target, which raised substantial doubts about the validity of corporate net-zero target based on offsetting

- **Governance Deficits and Fragmentation**

International environmental governance faces three main problems which include system fragmentation and insufficient funding and enforcement mechanisms that lack effectiveness. The multilateral treaty system with its over 500 environmental agreements manage to function as an operational system which lacks both effective compliance mechanisms and financial commitments needed to address its existing challenges [34].

The UNFCCC framework for nationally determined contributions depends completely on voluntary participation from countries which report their activities without any system of enforceable emission limits or effective enforcement methods. The Loss and Damage Fund which COP27 established in Sharm el-Sheikh and COP28 operationalized in Dubai offers an essential recognition of climate justice but the pledged contributions do not meet the actual requirements of nations that face the highest vulnerabilities [34]. National sustainability commitments face frequent disruption through policy incoherence which permits governments to support both fossil fuel industries and renewable energy programs while enforcing environmental impact assessments and fast-tracking resource extraction operations and executing infrastructure projects which establish carbon-heavy development routes [35].

The International Monetary Fund estimated in 2023 that fossil fuel subsidies—explicit and implicit—amounted to \$7 trillion globally which represented 7.1 percent of global GDP during the year 2022 [35]. Public investment in clean energy transitions falls short of this amount which demonstrates how sustainability statements do not match actual financial conditions.

- **Global Inequality and Unequal Ecological Exchange**

Global inequality does not only create unsustainable development but also results from it. The wealthiest countries and populations consume vastly more resources and generate vastly more emissions than the poorest. The richest 1 percent of the global population produces about 16 percent of worldwide CO₂ emissions which exceeds the total emissions of the poorest 66 percent [35]. The architecture of global trade reproduces this inequality because the Global North imports ecological destruction which exists in products made in the Global South according to a process known as 'unequal ecological exchange' [35,36].

The concentration of wealth at the highest income levels drives excessive resource use while it creates resource shortages that prevent billions from obtaining climate change adaptation resources and clean energy and sustainable livelihood development opportunities. The SDG commitment to 'leave no one behind' rings hollow in a context of deepening inequality and structural adjustment policies that continue to undermine social protection systems in indebted countries [36].

Alternative Paradigms: Beyond Mainstream Sustainability

- **Degrowth and Post-Growth Economics**

The degrowth movement which developed as an academic field during the 2000s now exists as a major topic of discussion within European policy circles because it contradicts the basic belief that human welfare depends on continuous economic expansion. The degrowth research group shows

through ecological economics and feminist theory and social metabolism studies that developed countries need to decrease their total material and energy consumption.

A 2022 study in Nature Sustainability modelled the resource implications of meeting basic human needs globally, finding that this is achievable at far lower levels of energy use than current patterns, provided that inequality is radically reduced [37]. The post-growth frameworks of Kate Raworth's 'Doughnut Economics' and the Wellbeing Economy Advocates' approach aim to replace GDP through multidimensional indicators that measure human development and environmental health. [37].

- **Indigenous and Non-Western Perspectives**

The sustainable development discourse which has become mainstream faces criticism because it upholds European-centric views about how humans interact with nature and it gives preference to market systems while failing to recognize indigenous knowledge systems and non-Western worldviews [38].

The Latin American concept of *buen vivir* and the African Ubuntu system and the Indian philosophy of *Vasudhaiva Kutumbakam* which means the world is one family present various ways to understand how human wellbeing and community and ecological systems interconnect. Indigenous people have performed land stewardship throughout the world for thousands of years which now scientific studies identify as an essential element in worldwide protection efforts. Indigenous peoples who account for only 5 percent of the global population manage 80 percent of the remaining biodiversity on Earth which exists in their protected areas. Indigenous groups experience land theft under the pretext of conservation while their ability to take part in international environmental decision-making processes remains heavily restricted.

- **Ecological Civilisation and Systemic Transformation**

The 'ecological civilization' concept appears in Chinese policy documents and has become an important part of international environmental discussions, which requires societies to establish a completely new relationship with nature instead of only implementing green technologies in their current economic systems.

The critics of China's ecological civilisation declaration show the mismatch between its proclamations and the country's ongoing creation of coal power plants and projects that harm biodiversity. The concept of civilisational-scale sustainability transformation has led to key theoretical discussions about how societies need to change their systems of governance. The multi-level perspective theory and transition management framework which exists in socio-technical transitions literature explains how energy and food and mobility systems and other systems undergo fundamental changes throughout their development and which governance strategies will help these changes happen faster.

The literature shows that sustainability transitions require more than technical developments because they need complete shifts in institutional frameworks and cultural values and operational methods and the authority distribution within organizations.

Conclusion: Towards a More Honest and Transformative Sustainability

The analysis demonstrates that sustainable development has been established as a global governance practice since 1987 yet its implementation faces major challenges because of existing economic and political system limitations. The concept has genuine normative achievements to its credit which include maintaining environment and development as international concerns during multiple crises while it produced important scientific advances from the planetary boundaries framework to integrated assessment models and it has mobilised significant resources for development and environmental protection.

The evidence presents a clear contradiction. The mainstream approach has failed to operate at necessary levels because only 17 percent of SDG targets reached their midpoint while greenhouse gas emissions continued to rise and six planetary boundaries were exceeded and inequality increased after decades of sustainable development. The fundamental problem is not technical but political because sustainable development efforts have tried to achieve ecological sustainability and social equity by maintaining core capitalist economic systems which drive the environmental problems that need to be solved.

The concept requires people to maintain their current understanding of it. The concept requires its execution to be performed through its extreme execution. The authentic and revolutionary sustainability needs to recognize that infinite growth contradicts the existence of limited ecosystems. The system needs to organize itself around justice which includes both present and future generations and both northern and southern populations and human and nonhuman entities. The system requires authentic participatory governance which empowers people who face environmental changes to express their opinions.

The system needs to treat indigenous knowledge systems with complete respect while validating all non-Western knowledge systems. The system requires organizations to oppose economic systems which create wasteful environmental practices as their main operational routine. The upcoming ten years will determine critical outcomes for various situations.

Climate tipping points and biodiversity collapse and people struggle with increasing economic disparities which create situations that require immediate changes beyond what current governance systems are able to handle. The question is whether those changes will be managed equitably and democratically, guided by a genuinely transformative sustainability vision, or whether they will unfold through crisis and conflict, with existing inequalities amplified. The answer depends in large part on whether scholars, policymakers, social movements, and citizens can build the political will to move from sustainable development as rhetorical performance to sustainable development as systemic transformation.

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