

Biodiversity and sustainable finance challenges: An analytical framework to understand the current challenges and how to face them in different economic sectors

Biodiversidad y finanzas sostenibles: un marco analítico para comprender los desafíos actuales y cómo enfrentarlos en diferentes sectores económicos

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Abstract

The challenges regarding the adaptation of the biodiversity of finance and its sustainability are an advantage for planet Earth, since they contribute so that in the future remains habitable. Ecosystems, health, and environment are essential for life; sustainable financing from companies is a practice that helps the economy to remain in environments resistant to the impacts of both the environment and communities in general. In this sense, various strategies energy are required, including the conservation of nature, environments, flora, fauna, various species, biodiversity, and, in some cases, the timely use of clean and renewable energies. Another aspect required to make finance sustainable is to promote public, commercial, and financially sustainable policies, foster government strategies, help communities for these purposes, and find different solutions, both local and international, to face challenges. Science and literature investigate this challenge to generate sustainable finance framed in biodiversity; in this sense, the United Nations involves the economic-financial and accounting sector within its main objectives and goals, entering its purposes into a widely sustainable and profitable over time without adverse damage to the planet. In another recent studies, there are authors that highlight the priority and the ideas for biodiversity and sustainability, as the fundamental basis of business in pro of mitigating climate changes that have been manifesting over time. To achieve a friendly and sustainable future, companies and communities must adapt to the challenges demanded by biodiversity and finance, which are essential to ensure life on planet Earth; they contain strategic alliances with communities, governments, entities, and companies to address them practically and effectively. Over time, biodiversity problems have been gaining interest from all sectors, and the changing world deserves it due to the challenges it faces in this regard. In industries like oil, agriculture, fuels, and finance, adaptation to biodiversity and the surrounding environment are sought, adaptation is imminent, and the future is changing drastically. The approach explores how

these practices can balance both finances and care for the environment, generating social responsibility, good operating practices, and mitigation of damages that different economic activities, including agriculture, fuel management, and gas management, among others, may generate.

Keywords: biodiversity, sustainability, finance, good practices

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Introduction

Adapting to biodiversity and sustainable finance challenges is critical today, as humanity faces a growing environmental crisis. It is essential to address these challenges effectively, to ensure a sustainable future for our planet. This requires multiple strategies and collaboration between governments, companies, and communities. The 2019 Intergovernmental Panel on Climate Change (IPCC) report on biodiversity and climate change highlights the importance of addressing biodiversity loss, to achieve climate and sustainable development goals (Pörtner et al., 2019). In addition, the 2018 United Nations Sustainable Finance Task Force report underscores the need for a transition to a low-carbon, sustainable economy. The work of Rockström et al. (2020) highlights the need for fundamental transformations in society, to confront ecological emergencies. Likewise, Lovejoy & Hannah (2019) point out the importance of biodiversity in adaptation to climate change, while Foley et al. (2021) propose solutions for a more sustainable agriculture.

Adapting to the challenges of biodiversity and sustainable finance is a joint effort that requires the collaboration and commitment of governments, companies, and communities. We can ensure a more livable future by implementing innovative approaches and sustainable strategies. Adapting to biodiversity and sustainable finance challenges is a critical issue today. Biodiversity loss, ecosystem degradation, and the climate crisis are global challenges that threaten our ability to sustain human well-being. Biodiversity is critical to maintaining healthy ecosystems and providing essential services, such as pollination, water and air purification, and climate change mitigation. Sustainable finance, for its part, seeks to align financial activity with long-term environmental and social objectives.

To tackle these obstacles, a range of approaches and cooperation among governments, corporations, and communities is required. The international roadmap for sustainable progress, which encompasses the Sustainable Development Goals (SDGs), provides a

blueprint for addressing these issues. Specifically, SDG goal 15 aims to safeguard, restore, and encourage sustainable use of terrestrial ecosystems, sustainably manage forests, prevent desertification, reverse land degradation, and halt biodiversity loss. Likewise, SDG goal 13 concentrates on climate action and intends to take immediate action to combat climate change and its consequences.

In addition, numerous international initiatives and programs seek to promote biodiversity and sustainable finance. For example, the United Nations Environment Program (UNEP) leads the UNEP Finance Initiative, a global network of financial institutions committed to promoting sustainable financial practices. Likewise, there is the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), which is an intergovernmental organization that seeks to strengthen the management of biodiversity and ecosystems. The 2018 report of the UN Sustainable Finance Task Force underscores the need to shift towards a low-carbon sustainable economy. In addition, the 2019 Intergovernmental Panel on Climate Change report on biodiversity and climate change highlights the importance of addressing biodiversity loss to achieve climate and sustainable development goals. The need to balance economic growth with environmental and social responsibility is a pressing issue facing the world today. The challenges of biodiversity loss and sustainable finance are particularly critical, as they affect the long-term viability of many industries and the well-being of society.

In this order of ideas, this paper focuses on three sectors significantly that impact these challenges: agriculture, oil & gas, and finance. The agriculture sector is essential for food production and the livelihoods of millions of people worldwide; however, it also has a significant impact on biodiversity, due to the use of pesticides, changes in land use, and monoculture practices. The oil & gas sector is a crucial energy source, but alters the earth's climate and diminishes biodiversity, and through its emissions, alters natural habitats. The

financial sector has a significant responsibility in channeling investments and capital towards sustainable practices. Nonetheless, it must also consider its investments' environmental and social consequences. Therefore, this paper explores the challenges facing these sectors in adapting to the demands of biodiversity loss and to a sustainable finance. We examine the current practices and initiatives these sectors are implementing and identify areas for improvement. The present analysis aims to provide insights into how these sectors can adapt to meet these challenges and contribute to a sustainable future.

1. Theoretical framework

The theoretical framework of this research for addressing the challenges of biodiversity and sustainable finance is based on understanding the interconnectedness between three pillars of sustainable development: the economy, the society, and the environment, known as 'three pillars' or 'triple bottom line', to approach to sustainable (economic, social, and environmental) development (Elkington, 1997).

The framework is also based on understanding the importance of biodiversity and the benefits ecosystems provide to enhance human well-being, also known as ecosystem services, and the need to address biodiversity loss and environmental degradation to achieve a sustainable future (Reid et al., 2005). The collaboration and commitment of governments, businesses, and communities are essential to effectively address these challenges and ensure a sustainable future for our planet. It relies on an integrated perception of the economy, society, and the environment to tackle the obstacles related to biodiversity and sustainable finance. It acknowledges that sustainable development has three fundamental components: economic, social, and environmental development. This concept is called commonly the "three pillars" or "triple bottom line" approach to sustainable development, first introduced by Elkington (1997).

Biodiversity and ecosystem services play a crucial role in human well-being.

Biodiversity provides essential services, such as crop pollination, air and water purification, and climate regulation. However, these ecosystem services are declining due to biodiversity loss and environmental degradation. To address this situation, it is necessary to adopt policies and practices that promote biodiversity conservation and ecosystem restoration (Reid et al., 2005).

Also, in global context the transition towards a sustainable and low-carbon economy is recognized as necessary to address the challenges of sustainable finance. The United Nations Task Force on Sustainable Finance (2018) highlights the need for a transition to a sustainable economy that is more resilient to climate change's impacts and can ensure a sustainable future for forthcoming generations. Overcoming the difficulties related to biodiversity and sustainable finance requires a comprehensive comprehension of the economy, society, and the environment, and of the critical role of biodiversity and ecosystem services in enhancing human well-being.

Within this framework, we see the idea is to collaborate with the countries, so that national finances can be transformed in biodiversity through the good practices of the EPANB, and to be able to set the objectives of the AICHI, thus moving toward the hope of integrate biodiversity toward the future: country development and sustainability. The EPANB is a vision of the future that each country longs for. The following AICHI strategic goals are crucial to fully understanding the idea for the future of biodiversity and sustainable finances (SCDB, 2014):

Strategic Objective A: Address the underlying causes of biodiversity loss by including biodiversity in all areas of government and society. (p. 4).

Strategic objective B: Reduce direct pressures on biodiversity and promote sustainable use. (p. 4).

Strategic Objective C: Improve the status of biodiversity by protecting ecosystems, species, and genetic diversity. (p. 4).

Strategic Objective D: Ensure that all benefit from biodiversity and ecosystem services. (p. 5).

Strategic Objective E: Improve implementation through participatory planning, knowledge management, and training. (p. 5).

It is vital to implement policies and actions that support the preservation of biodiversity and the revitalization of ecosystems, as well as the shift towards a sustainable and low-carbon economy, to guarantee a sustainable future for upcoming generations. For this, the current literature on biodiversity, sustainable finance, and the three sectors of interest were reviewed (agriculture, oil & gas, and finance), in particular, the following concepts:

- **Biodiversity:** To explore the importance of biodiversity and its role in maintaining ecosystems and life on Earth.
- **Sustainable Finance:** To analyze the role of the financial sector in promoting sustainable practices and responsible investment.
- **Sustainable Agriculture:** To examine sustainable agricultural practices, including agroecology and regenerative agriculture, minimize biodiversity impacts and promote healthy food production.
- **Sustainable oil & gas:** To explore how companies can reduce their environmental footprint and adopt more sustainable practices in the exploration, production, and transportation of hydrocarbons.
- **Sustainable finance in the energy sector:** To analyze financial initiatives that encourage investment in renewable energy sources and technologies that reduce the industry's carbon footprint.

Together, they seek to identify practical strategies that the agricultural, oil & gas, and financial sectors can implement to adapt to biodiversity and sustainable finance challenges and promote a sustainable future for all.

2. Methodology

This research uses qualitative methodology against an extensive literature review and analyzes the relevant contents of the citations collected from articles, guides, reports, and books related to adaptation to the challenges framed in sustainable finance.

To try to get a good amount of information, were used reliable search engines of academic and governmental origin, to then select this that contributes to give a good concept and a dynamic around the associated topics.

The documentation for the literary reviews is reviewed, selected, and analyzed carefully, reading the selected documents with a focus on related issues, and validating the quality of the information to code and categorize the most relevant and interesting references. Finally, we analyze the results of the different documents, to allow their correlation, looking for marked similarities and differences, to adapt the ideas and the critical points of the investigation, synthesizing the findings, and issuing the results and suggested conclusions.

3. Results

As a result of the investigation, through the literature review provided, was conducted the identification and evaluation of the specific challenges faced by the agricultural, oil and gas, and financial sectors regarding biodiversity and sustainable finance. These challenges include issues like habitat destruction, land degradation, water pollution, and climate change, among others. These challenges can significantly impact the economy, society, and the environment, such as the loss of biodiversity, adverse effects on health and decreased food

security. In each sector, sustainable strategies can be developed to address these challenges. For the agricultural sector, the proposed strategies include adopting agroforestry practices, crop diversification, and sustainable water management. In the oil and gas sector, strategies such as implementing best practices in exploration, production, and transportation, and adopting renewable energy sources are considered. Regarding the financial sector, it seeks to integrate environmental, social, and governance (ESG) factors into investment decisions and develop green financial products; moreover, implement and monitor strategies in collaboration with various interested parties, such as governments, companies, and communities.

Ongoing monitoring and evaluation was conducted, to determine the effectiveness of the strategies and to make any necessary adjustments; moreover, to ensure that these strategies align with the sustainable development objectives and with respecting human rights. A review of the goals that are globally considered to have sustainable finance and biodiversity in the future was carried out, that demonstrated the comprehensiveness of the guidelines, the collaboration between regions, and multiculturalism about the rigorous monitoring that is proposed, and that they are essential for the sectors to which this project is directed.

The approach took sustainable practices in the agricultural, oil and gas, and financial sectors, using a mix of qualitative and quantitative methods to collect data. Overall, the results of this methodology demonstrate that a comprehensive and collaborative approach involving multiple stakeholders, innovative and sustainable strategies, and rigorous implementation and monitoring is essential to address the challenges of biodiversity and sustainable finance in various sectors. The case analysis focused on companies and organizations implementing sustainable practices in the agricultural, oil & gas, and financial sectors.

The analysis was performed using a combination of qualitative and quantitative data collection methods, including interviews, surveys, and document analysis. The case analysis

identified companies and organizations that have implemented sustainable practices in the agricultural sector, such as regenerative agriculture, conservation tillage, and integrated pest management. For example, the company General Mills committed in 2013 to sourcing 100% of its top 10 ingredients from sustainable sources by 2020, and to implement sustainable agriculture practices in its supply chain (General Mills, 2013). Additionally, the organization Sustainable Agriculture Network (SAN) has developed a sustainability standard for agricultural production that focuses on improving environmental, social, and economic performance (SAN, 2021). In the oil & gas sector, the case analysis identified companies that have implemented sustainable practices, such as reducing greenhouse gas emissions, improving energy efficiency, and investing in renewable energy. For example, the company Shell has committed to reducing its net carbon footprint by 50% by 2050, and has invested in renewable energy projects (Shell, 2021). Additionally, the organization Carbon Disclosure Project (CDP, n. d.) has developed a global disclosure system for companies to report their environmental impacts and risks. The case analysis identified companies and organizations that have implemented sustainable practices in the financial sector, such as responsible investment and green banking. For example, the company Bank of America committed to investing \$125 billion in environmental business initiatives by 2025 and to implement sustainable finance practices in its operations (Bank of America, 2019). The Global Reporting Initiative (GRI, n. d.) organization has also developed sustainability reporting standards for companies to disclose their environmental, social, and governance performance. Overall, the case analysis demonstrates that companies and organizations of the agricultural, oil & gas, and financial sectors can implement sustainable practices to address the challenges of biodiversity and sustainable finance. The analysis results suggest that a combination of financial tools, fiscal and regulatory policies, and of changes in individual and business behavior are necessary, to transition towards a sustainable economy and low carbon. The

methodology used in this study, which includes a comprehensive and collaborative approach involving multiple stakeholders and innovative and sustainable strategies, can be apply to other sectors and contexts, to address the challenges of biodiversity and sustainable finance. Companies implementing sustainable practices, such as reducing greenhouse gas emissions, improving energy efficiency, and investing in renewable energy were identify in the oil & gas sector. For example, the Shell company has committed to reduce its net carbon footprint by 50% by 2050 and has invested in renewable energy projects. In addition, the Carbon Disclosure Project (CDP) has developed a global disclosure system for companies to report on their environmental impacts and risks.

Adapting to biodiversity and sustainable finance challenges requires a comprehensive and collaborative methodology involving multiple stakeholders and innovative and sustainable approaches. Rigorous implementation and continuous monitoring are essential to achieve a sustainable future for our planet.

Below, tables 1 and 2 present some studies that show methodologies and strategies to use.

Table 1

Sustainable Finance / Agricultural Sector

Reference	Correlation
Elkington (1997)	This research considers essential all those economic, social, and environmental aspects for decision-making in companies seeking to have a greater awareness of adopting good practices to preserve agricultural sustainability.
Foley et al. (2011)	What this literary review shows is the identification of various solutions and strategies to address the different challenges that the science of agriculture brings and, along with these challenges, the way to promote

Reference	Correlation
	sustainability, mentioning it as one of the most efficient uses of agriculture to reduce deforestation by adopting good agriculture practices.
González et al. (2021)	This document highlights how important it is to support agriculture from the different approaches to agricultural sustainability financially and discusses some aspects of the environment, society, and all the financial tools that allow that make possible.

Table 2*Sustainable Finance / Oil & Gas and Financial Sectors*

Reference	Correlation
United Nations Task Force on Sustainable Finance (2018)	Here, the importance of sustainable finance in the financial area is analyze, and some recommendations to integrate environmental, social, and compliance considerations with all legal requirements for finance are issued.
United Nations Environment Program Finance Initiative (UNEP FI) (2018)	In this sense, the guidelines are issued to strengthen the reliability of the banking sector and sustainability, with relevance in the identification of risks and of opportunities in the environment, communities, and thus decision-making for finance.

This case analysis focused on three sectors: Agricultural, Oil & Gas, and Financial sectors, which allowed to identify companies and organizations that have implemented sustainable practices in these sectors. The findings of this case analysis are present below.

3.1. Agricultural Sector

An example of sustainable practices in the agricultural sector is the Better Cotton Initiative (BCI), which aims to reduce the environmental impact of cotton production and improve the livelihoods of cotton farmers. BCI provides training and support to farmers on sustainable farming practices and encourages adopting more efficient and sustainable water management practices. According to a study by the International Institute for Sustainable Development (IISD), the adoption of BCI sustainable practices by cotton farmers in India resulted in a 24% increase in cotton yield and a 50% reduction in water use (IISD, 2017).

3.2. Oil & Gas Sector

The oil & gas sector is one of most significant contributors to greenhouse gas emissions and environmental pollution. In this regard, some companies have implemented sustainable practices to reduce their environmental impact. An example is Shell, which has developed its "Target Neutral" program, which encourages customers to offset carbon emissions by using Shell products. Shell also invests in renewable energy projects and has set targets to reduce its carbon footprint (Shell, 2021).

3.3. Financial Sector

The financial sector is critical in promoting sustainable finance through responsible investment and green banking practices. An example is the Nordic Investment Bank (NIB), which finances projects that contribute to sustainable development and environmental protection. NIB has set a target to allocate at least 25% of its lending portfolio to climate-related projects by 2025 (NIB, 2021). Another example is Triodos Bank (2021), which only lends to companies and organizations that positively impact the environment and society. Triodos Bank also invests in renewable energy and has set targets to increase its lending to sustainable projects. Overall, this case analysis shows that sustainable practices are being implemented in various sectors, which can lead to positive environmental, social, and

economic outcomes. Implementing sustainable practices requires a combination of financial tools, fiscal and regulatory policies, individual and business behavior change, and multiple stakeholder collaboration.

4. Conclusions and recommendations

Based on the previous discussion of challenges and methodologies for addressing biodiversity and sustainable finance, the critical need for a comprehensive and collaborative approach involving multiple stakeholders to achieve a sustainable future for our planet is identify. This approach should include a combination of financial tools, fiscal and regulatory policies, and changes in individual and business behavior, as well as innovative and sustainable strategies that consider the specific challenges facing communities, companies, and governments.

In conclusion, protecting biodiversity and promoting sustainable finance requires a paradigm shift in the way we think about economic development and our relationship with the natural world. This shift requires the recognition that economic prosperity and environmental protection are not mutually exclusive but are interdependent and require a comprehensive and collaborative approach to achieve both. As such, we recommend that governments, companies, and individuals take immediate action to incorporate sustainability into their decision-making processes and daily activities. This could involve investing in renewable energy, reducing waste and emissions, protecting, and restoring ecosystems, and supporting sustainable agriculture and forestry practices. Furthermore, collaboration between stakeholders at all levels is critical to achieving these goals, including collaboration between companies, NGOs, and communities, and the use of innovative approaches and sustainable strategies.

Finally, we recommend that future research and policy development continue to prioritize the protection of biodiversity and the promotion of sustainable finance as critical to the long-term health and prosperity of our planet. This should include continuous monitoring and assessment of the effectiveness of current policies and strategies, and the development and implementation of new approaches and innovations that can support the transition to a more sustainable future.

In conclusion, while the challenges facing biodiversity and sustainable finance are significant, we believe that with a comprehensive and collaborative approach we can create a sustainable future for ourselves and future generations. The methodology to address the challenges of biodiversity and sustainable finance involves a combination of approaches at the levels macro (policies, regulations, and international agreements), meso (collaboration between companies, NGOs, and communities), and micro (individual and community actions). (Lebel et al., 2006). A combination of financial tools (such as responsible investment and green banking), fiscal and regulatory policies (such as carbon taxes and biodiversity protection laws), and changes in individual and business behavior is required to achieve a transition towards a sustainable economy and low carbon. (Abb & Miller, 2018). Furthermore, a comprehensive methodology is required that includes not only the multiple stakeholder collaboration and commitment, but also the use of innovative approaches and sustainable strategies that considers the following milestones:

- **Identification and assessment of challenges:** It is essential to conduct a detailed assessment of the specific challenges facing a community, company, or government, about biodiversity and sustainable finance. This assessment should include an analysis of the potential impacts of these challenges on the economy, society, and the environment.
- **Design of sustainable strategies:** Once the challenges are identified, it is necessary to design sustainable and specific strategies to address them. These strategies must

be based on innovative and collaborative approaches that involve multiple actors, including governments, companies, and communities.

- **Implementation and follow-up:** The implementation of the designed strategies must be carried out rigorously and continuously monitored, to assess their effectiveness and make necessary adjustments. It is also essential to ensure that strategies implemented are align with sustainable development goals and that respect human rights.
- **Communication and education:** It is essential to communicate clearly and effectively to the community, the companies and governments, the strategies implemented, and the results obtained, to raise awareness and encourage active participation in the protection of biodiversity and the promotion of sustainable finance. It is also essential to educate and sensitize people about the importance of these issues and how they can contribute to them. Some specific tools and methodologies that can be used in this process include supply chain analysis, life cycle analysis, environmental impact assessment, and ecosystem and ecosystem services assessment (Tallis et al., 2016).

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