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Biodiversity and Ecosystem Service Sustainability

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Abstract: **While biodiversity is critical for financial activity, it is under attack worldwide, and its capacity to keep providing the commodities and services necessary for socioeconomic development is eroding. Globally, the ramifications of this have been summarized in a landmark study — the Millennium Ecosystem Assessment (MA). It emphasizes that people have altered the natural environment in unprecedented ways over the last several decades to fulfill expanding needs for food, fresh water, fiber, and energy, and that this requirement will only expand as the world's population expands and spending habits shift (UNEP FI Biodiversity & Ecosystem Services Work Stream (BESW), 2008).**

Keywords: **ecosystem services, biodiversity, global sustainability, environmental policy, climate change, ecosystem processes, human well-being, legal risks, pressures, diversification.**

1. INTRODUCTION

In recent decades, the themes of biodiversity, ecosystem services, and sustainability (BESS) are garnered significant attention in policy, research, and financing globally (Luck GW, Chan KMA, Eser U, Gómez-Baggethun E, Matzdorf B, Norton B, Potschin MB., 2012)(Rillig MC, Kiessling W, Borsch T, Gessler A, Greenwood AD, Hofer H, Joshi J, Schröder B, Thonicke K, Tockner K, et al., 2015). Between the 1990s and 2014, the increasing number of written articles on biodiversity (from 1000 to 7000), environmental sustainability (from 100 to 5000), and sustainably (from 1000 to 12,000) demonstrates these ideas' growing influence in academia (Liu X, Zhang L, Hong S. , 2011) (Chaudhary S, McGregor A, Houston D, Chettri N, 2015) (Kajikawa Y, Tacoa F, Yamaguchi K., 2014). The growing awareness of humans' impact on the natural environment, combined with increased funds and time directed toward these areas of research, has resulted in many projects designed to examine the state of species and environmental care rendered to humanity, such as the Millennium Ecosystem Assessment (MA 2005) and the Ecosystem Services for Poverty Alleviation project (ESPA).

This has resulted in a growing acceptance of bio - diversity and ecosystem services evaluation in the development of strategic plans (e.g., the European Union's Biodiversity Strategy through 2020) and related policies, as well as the environmental conservation of economics. This surge in concern also resulted in the United Nations Sustainable Development Goals (SDGs) incorporating the bio - diversity principle by 2030, as well as the establishment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) in 2012 to coordinate global efforts to conserve biodiversity and ecosystem services (Figure 1).

Despite increased focus on BESS, the goal of environmental sustainability is not being achieved (Gross M., 2012), neither globally (Rockström J, Karlberg L. , 2010)nor regionally (Gross M., 2012) (Dearing JA, Wang R, Zhang K, Dyke JG, Haberl H, Hossain MS, Langdon PG, Lenton TM, Raworth K, Brown S, et al., 2014). More crucially, despite greater responsiveness to BESS and some small achievement, the state of bio - diversity and ecological services is deteriorating (Butchart SHM, Walpole M, Collen B, Van Strien A, Scharlemann JPW, Almond REA, Baillie JEM, Bomhard B, Brown C, Bruno J, et al. , 2010) (Pereira HM, Belnap J, Brummitt N, Collen B, Ding H, Gonzalez-Espinosa M, Gregory RD, Honrado J, Jongman RH, Julliard R, et al. , 2010). Since the turn of the twentieth century, society has opened a new era of challenges and opportunities (Rockström J, Karlberg L. , 2010)as mounting evidence demonstrates that human impacts have had a detrimental effect on the greenhouse effect (IPCC, 2007) and natural systems (MA, 2005)over the last 200 years.

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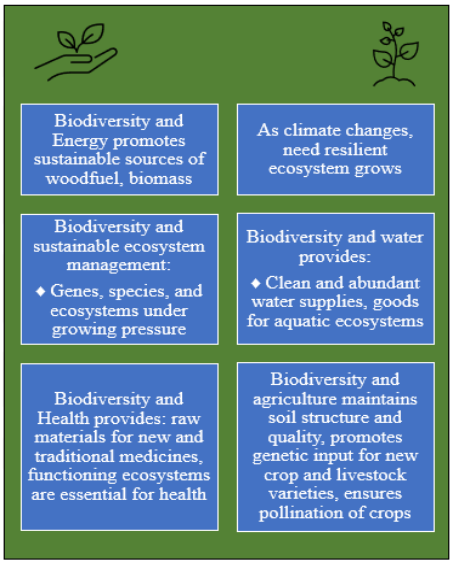
Therefore, rather than neglecting BESS (Kajikawa Y, Tacoa F, Yamaguchi K., 2014), it is critical to engage scholars and encourage them to consider important future research directions using approaches for multidisciplinary field collaboration (Kates RW., 2011)(Hackmann H, Clair AL., 2013) (Miller TR, Wiek A, Sarewitz D, Robinson J, Olsson L, Kriebel D, Loorbach D., 2014) (Steelman T, Nichols EG, James A, Bradford L, Ebersöhn L, Scherman V, Omidire F, Bunn ND, Twine W, McHale MR., 2015). Activities to generate study participants through collaboration with academics have been used in the fields of species diversity (e.g., Sutherland et al. 2008; Sutherland et al. 2014), ocean science (Rudd MA., 2014), palaeoecology, and water research (Sutherland WJ, Bailey MJ, Bainbridge IP, Brereton T, Dick JTA, Drewitt J, Dulvy NK, Dusic NR, Freckleton RP, Gaston KJ, et al., 2008) (Brown LE, Mitchell G, Holden J, Folkard A, Wright N, Beharry-Borg N, Berry G, Brierley B, Chapman P, Clarke SJ, et al., 2010). Early career researchers identified a number of critical research questions for BESS, which are summarized in this paper. Additionally, we especially in comparison our findings to those from other relevant horizon tracking activities (Oldekop JA, Fontana LB, Grugel J, Roughton N, Adu-Ampong EA, Bird GK, Dorgan A, Vera Espinoza MA, Wallin S, Hammett D, et al., 2016) (Fleishman E, Blockstein DE, Hall JA, Mascia MB, Rudd MA, Scott JM, Sutherland WJ, Bartuska AN, Brown AG, Christen CA, et al., 2011) (Sutherland WJ, Bailey MJ, Bainbridge IP, Brereton T, Dick JTA, Drewitt J, Dulvy NK, Dusic NR, Freckleton RP, Gaston KJ, et al., 2008)(Oldekop JA, Fontana LB, Grugel J, Roughton N, Adu-Ampong EA, Bird GK, Dorgan A, Vera Espinoza MA, Wallin S, Hammett D, et al.)based on existing articles published on bio - diversity, post-2015 development motivations (e.g., sustainable development, nutrition security), protection, and strategic planning (Sutherland WJ, Bailey MJ, Bainbridge IP, Brereton T, Dick JTA, Drewitt J, Dulvy NK, Dusic NR, Freckleton RP, Gaston KJ, et al., 2008).

Figure 1. The Role of Biodiversity



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2. BIODIVERSITY AND ECOSYSTEM SERVICES

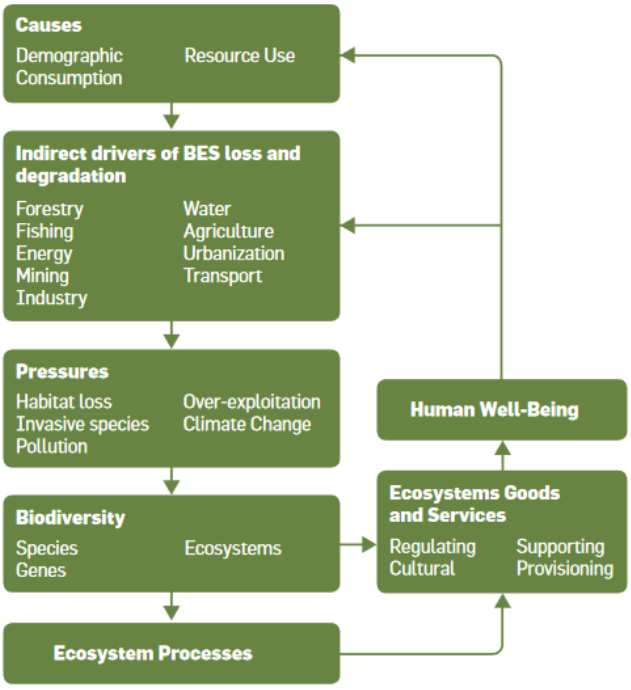
Biodiversity is critical for the planet's survival, and it must be safeguarded. Human survival is contingent upon biodiversity, which encompasses genetic material, animals, and ecosystems. Ecosystem services are described as the benefits that humans receive from environment.

Biodiversity is required for an ecosystem to function effectively and so deliver services. This is because an ecosystem's operation, and hence its capacity to deliver services, is greatly impacted by species' functional and structural variability, as well as the relative abundance among all major aspects (i.e. genes, species, ecosystems). Natural ecosystems can be regional (for example, pollination or the provision of fresh water), regional in nature (for example, flood and landslide control), or global in nature (for example, global warming prevention) (climate regulation). While there are divergent views on the rate at which species and ecosystems are vanishing, there is little doubt that this process poses grave dangers to human survival and well-being. Competition for natural resources and ecological services is intensifying as the human population and demand increase. This battle is expected to intensify even further in the future years.

The repercussions of biodiversity and ecosystem destruction are extensive and systematic, and they are inextricably linked to many of the world's most pressing concerns today, including food supply and water scarcity. These difficulties have a disproportionately unfavorable effect on the most vulnerable human populations, exacerbating poverty. Due to pollution and climate change, natural resources are being overexploited and ecosystems are being destroyed. Due to overexploitation, invasive species have been introduced and ecosystems have been destroyed. The expansion of fisheries and forests, industrialization, growing adoption for electricity and resources, and general industrialization are all contributing to the development of these pressures (Figure 2).

Despite the fact that these actions promote growth, as demand for ecosystem services increases in the present and future, the risk of impairing the ecological benefits on which businesses and people well-being rely increases as well. If current unsustainable trends persist, the availability of ecosystem services may become more costly or perhaps unavailable to future generations. According to TEEB (The Economics of Ecosystems and Biodiversity), the annual amount of lost diversity and ecological destruction would be around US$2-4.5 trillion over a 50-year period.

Figure 2. Human Impact on Biodiversity and Ecosystem Services



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2.1 Business and BES

The link between business and BES has two facets. Businesses rely on BES commodities and services as inputs for their products and processes, but also influence to ecological imbalance through their fundamental operations, supply chains, and investment decisions. To manage BES effectively, businesses must adopt a proactive approach to ensuring that their activities do not have a negative impact on the environment and that these effects, whether directly and indirectly, do not have a detrimental effect on their own business operations and investments. While businesses across a range of sectors have begun to include BES strategies into their company's overall planning, there is still much more work is needed in this area.

2.2 Drivers for businesses to address BES: Risks and Opportunities

Businesses are increasingly under tension from common stockholders, financiers, clients, business associates, non-governmental organizations (NGOs), the gov't, and the public at large to handle and inform on how they run things, and growing, on just how they control the social implications of their operations on BES (business environmental sustainability). This pressure brings business factors in the form of threats and opportunities to minimize these repercussions and promote the long-term efficient use of energy, among other things, in the framework of BES. Failure to manage the repercussions and dependence on BES exposes a business to a wide array of risks, which can harm its competitiveness and profitability while also raising its liabilities, jeopardizing the firm's long-term viability. BES may be connected with operational, regulatory, and legal risks, as well as reputational and commercial concerns.

BES depletion or degradation can have a detrimental effect on a business's operations by reducing performance, interfering with tasks, or restricting access to funding, all of which result in increased operating expenditures for the firm. In terms of regulatory considerations, organizations that do not take responsibility for ecosystem management may have difficulty obtaining future legal or social licenses to exist. Environmentally harmful actions may have legal or financial ramifications for organizations, eroding their reputation and resulting in a drop in brand value and shareholder value. Clean-up and compensation costs related with environmental disasters and malpractice verdicts may have a considerable negative influence on a business's bottom line and reputation, among other things.

While businesses should be aware of the threats presented by BES, they should also be aware of the significant opportunities for incorporating BES conservation into their larger corporate sustainability plan and so generating significant additional value. Businesses may uncover a chance to profit on client preferences by developing new products and services, as well as studying potential revenue streams created by the growth of new green markets. By capitalizing on these opportunities, businesses may be able to stay ahead of regulatory regulations, successfully connect the costs of compliance, and achieve more effectiveness than their competitors. As the picture of risks and possibilities related with BES management becomes more visible, business leaders will be able to establish a competitive edge. They will be able to achieve sustainable economic outcomes and exhibit corporate leadership in the management of biodiversity and ecosystems as they handle their resources more effectively, mitigate risks, and deliver superior goods and services (BES management).

3. CORPORATE GOVERNANCE AND BES ACTION

Corporate governance is the bedrock of good BES management, as it includes BES issues into all functions of leadership. The Board of Directors, in particular, can make significant contributions to the development and management of the company's sustainability agenda, as well as to the integration of pertinent BES issues into a broader strategy of sustainable operating guidelines, policies, and practices that address social and environmental consequences. Businesses must begin defining biodiversity and ecosystem services objectives and outcomes which can be linked into hazard and chance assessments, basic process and supply management, and also accounting records, auditing, and reporting systems. It may be advantageous for a business to identify the importance of BES issues to its activities or goods, as well as to prioritize which aspects of its BES impacts and dependencies should be addressed first in order to have the largest impact (Figure 3).

The next parts provide many guidelines, a BES maintenancecriteria, and a list of resources. Businesses may utilize these technologies to capitalize on BES prospects, enabling them to participate in international ecology while earning competitive commercial benefits.

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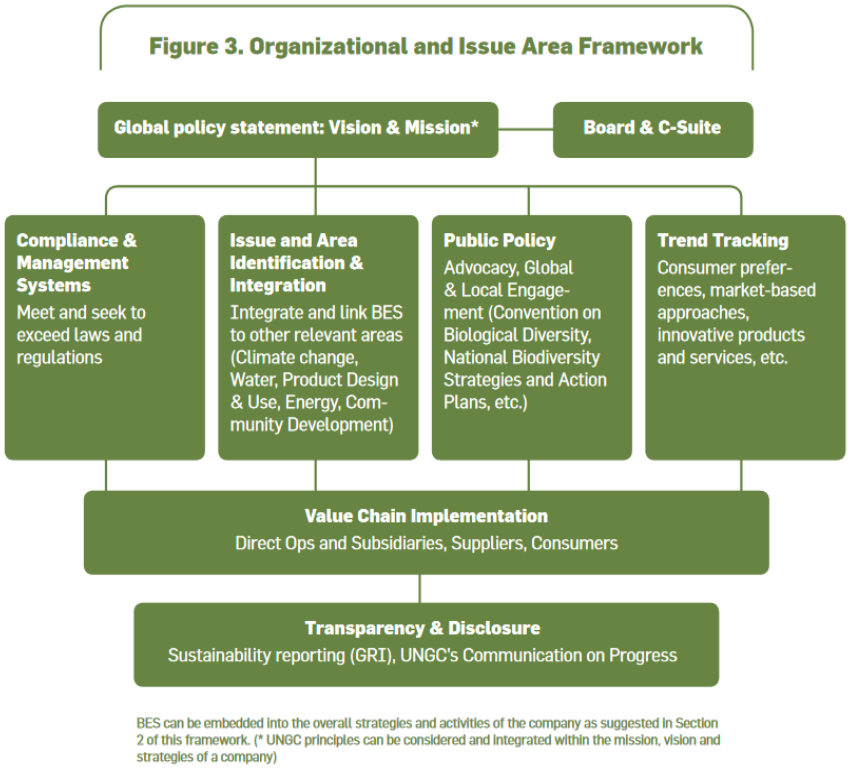

4. CONCLUSIONS

Diversification and ecosystem services are critical to and impact all enterprises, regardless of their size or industry of operation. As a result, this framework is considered to be representative of how enterprises should handle BES corporate governance. Businesses can mitigate risks and gain a competitive edge over competitors by recognizing the critical nature of integrating BES considerations into their overall corporate sustainability strategies, gaining an understanding of how actions affect BES through basic supply chain operations, continuing to develop management practices, and trying to engage with relevant stakeholders who could support and assist BES outcomes. Businesses may develop revenue opportunities in reaction to changing client demand for greener, more ethically manufactured items.

To ensure its continued relevance and effectiveness, this model was built as a live, adaptable document that will be modified when new challenges and requirements arise. As a result, the system and techniques described here may evolve over time in response to new difficulties and requirements. Additionally, the framework integrates new procedures and tools for resolving BES issues; it will be upgraded if new procedures and technologies are developed.

Researchers, policymakers, and funding agencies may display the names of significant research issues for research consideration on Biodiversity, Ecosystem Services, and Sustainability useful for prioritizing and structuring their work. We discussed the relevance of the topics we picked and the many study paths that may be taken to discover answers. Our objective was not at all to compile a comprehensive sequence of issues, nor to create targeted answers for BESS research in general. While it is true that the initial selection of questions was impacted by participant interests, we attempted to counteract this by communicating with and counting the votes of all scholars to complete the summary of important questions. This study might be expanded to include early-career researchers in government and quasi groups, as well as scientists from several other nations who were unable to attend but are interested in participating (Md Sarwar Hossain, Sarah J. Pogue, Liz Trenchard, Alexander P. E. Van Oudenhoven, Carla-Leanne Washbourne, Evalyne W. Muiruri, 2018).

The findings underscored the critical importance of considering a broader range of issues concurrently in order to ensure the long-term viability of environment social care and biodiversity for the improvement and maintenance of HWB, as well as the critical importance of addressing the challenges related for BESS throughout due to international transformation and environmental consequences.

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