

Value Pluralism in Practice: Integrating IPBES to Refine Ecosystem Services Assessments in South Africa

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Abstract: As global biodiversity loss continues to increase, effective valuation of natural capital is a prerequisite for effective environmental planning decisions. The introduction of Millennium Ecosystem Assessment (MA) in 2005 brought the concept of ecosystem services into the limelight. After that, The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) mirrors the MA's original use of the term ecosystem services and goes further by openly embracing concepts from multiple worldviews on human-nature relationships and knowledge systems. The emergence of the latter promises to provide new and improved suggestions for existing assessment methods in many countries around the world. One such example is Natural Capital Accounting (NCA) in South Africa. By summarizing the current assessment methodology of the NCA in South Africa, this paper summarizes the current limitations of the NCA and suggests that the integration of the IPBES method into the NCA can effectively solve the above problems. The paper also analyses the first national form of IPBES organization, the Brazilian BPBES, to illustrate the need to tailor IPBES selectively to the specific problems of the country to achieve the best results. This paper is an attempt to optimize the methodology of the South African national-level ecosystem services assessment and an exploration of the application of IPBES, a conceptual framework linking nature and people.

Keywords: IPBES; Ecosystem Services Assessments; Environmental Assessments; Value Pluralism; South Africa

1. Introduction

Climate change and biodiversity loss have become major crises for the planet, and the pressures on the environment from human behavior are increasing every day. As human activities put increasing pressure on natural systems, the critical role that ecosystems play in supporting economic activities and anthropocentric well-being is gaining attention [1]. The United Nations Environment Programme (UNEP) recently released the report "Living in Peace with Nature", which provides a summary of key global environmental assessments. The report concludes that climate change, biodiversity loss, and pollution are interlinked and mutually reinforcing, and have evolved into three major crises for the planet, posing significant risks and risks to the survival and well-being of current and future generations. Achieving the goals of the Paris Agreement will require the introduction of more ambitious national climate commitments. In response, the world's governments, businesses, and people need to take ambitious and concerted action to urgently drive a transformation of key systems, including energy, water, and food, to ensure that we use our land and oceans sustainably and prevent and reverse the worst effects of environmental degradation [2].

Transforming social and economic systems also entails improving our connection with nature, comprehending its worth, and incorporating that worth into our decisions. Ecosystem services evaluations are one method of determining the possible value of natural resources ranging from local to global assets. Ecosystem services are goods and benefits that are provided to support human well-being as a result of ecosystem features, functions, and dynamics [3]. Provisioning, regulating, supporting, and cultural services are the four major types of ecosystem services. Food, water, and fuel are provisioning services that are potentially much easier to quantify and analyze economically. Cultural and regulating services are more difficult to pinpoint and quantify [4]. The valuation of ecosystem service provision is especially essential in the face of ongoing climate change since these processes can have a major impact on ecosystem features and dynamics [5].

The introduction of Millennium Ecosystem Assessment (MA) in 2005 brought the concept of ecosystem services into the limelight, and its existence broadened the focus of ecosystem assessment from loss of biodiversity to loss of ecosystem services, which emphasizes the focus on the benefits that people derive from ecosystems. The current ecosystem assessment framework in South Africa can be seen as building on the momentum and insight generated by MA. The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) method mirrors the MA's original use of the term ecosystem services, but it goes even further by openly embracing concepts from multiple worldviews on human-nature relationships and knowledge systems. The IPBES conceptual framework, in contrast to MA, considers the essence of the elements and their interrelationships, emphasizing the decisive role of institutions, governance, and indirect drivers in solving environmental problems [6]. At the same time, the IPBES conceptual framework acknowledges the diversity of knowledge systems and recognizes that a focus on economic values alone is not sufficient to address the complexity of biodiversity loss [7], thus recognizing and considering different knowledge systems, including indigenous and local knowledge.

2. Ecosystem Services Assessment in South Africa

South Africa is rich in valuable natural resources, but these resources are under threat of degradation from competing land uses [8]. The critical role that ecosystems play in economic activity and anthropocentric well-being is receiving increasing attention as evidence of increasing pressures on these systems from human activities emerges. This paper provides a review of current ecosystem assessment work in South Africa and summarizes it below.

2.1. Natural Capital Accounting (NCA)

The South African Department of Environmental Affairs, in association with the South African National Biodiversity Institute (SANBI), launched natural capital accounting (NCA) in 2000. The NCA journey in South Africa began with water accounts and later evolved to encompass a variety of environmental assets. In 2015, river-based ecosystem accounts were the first to be included [9]. The measurement framework for NCA is provided by the System of Environmental-Economic Accounting (SEEA), which provides a spatially explicit accounting approach [9]. In practice, NCA officials sought the help of several natural scientists to assess the status of ecosystem processes and the ultimate ecosystem services they generate across South Africa. In addition, a team of economists contributed to this study and framework by focusing on the value of relevant habitats and ecosystem services.

This paper concludes that the approach to the economic valuation of ecosystems taken by South Africa has a very close connection with MA. In the South African assessment project, multiple ecological services had their value functions assessed. Based on the results of the Millennium Ecosystem Assessment, divides ecosystem services into four categories, including provisioning services (e.g. water, food, drugs, and genetic resources), regulating services (e.g. flood attenuation, herbivory, pest control, and pollination), supporting services (e.g. primary production, nutrient cycling), and cultural services (e.g. recreational, spiritual and cultural benefits)[9]. This model reflects two concerns of the South African authorities regarding ecosystem services, i.e. to provide sustainable resources for human well-being that will contribute to the achievement of the Millennium Development Goals, as well as incentives for ecosystem conservation.

The traditional classification of economic functions of ecosystems only includes provisioning services; cultural services; and regulating services, which ignores biodiversity functions [10]. The assessment framework of the South African National Biodiversity Institute (SANBI) takes into account the value of biodiversity, which is a major step beyond the traditional biosystem assessment framework [10]. Specifically, this assessment framework focuses heavily on the interactions between ecosystem services and biodiversity—How does biodiversity contribute to ecosystem services? What are the advantages of focusing on ecosystem services for biodiversity conservation? Among them, one of the first tenets *OF* ecosystem services is that they are beneficial to agriculture [9].

2.2. Limitations of NCA in South Africa

Although the current approach to ecosystem assessment in South Africa has many strengths, there is still much room for improvement. Some of these problems are due to the economic valuation methodology itself, and some are unique to South Africa's context.

First, the current framework does not take into account the culturally diverse context of South Africa.

South Africa is a culturally heterogeneous society, with each culture represented having its unique value system. Different value systems naturally perceive and value the same thing differently. Therefore, the original value system may have certain value system loopholes and cannot avoid value conflicts. What's more, this may raise problems when conducting assessment works by empirical research. Although the databases thus constructed can be in-depth, the empirical record inevitably lacks a greater understanding of ecological production when it is related to the spatial variability and complexity of how services are generated [10]. This may raise questions about the inaccuracy of transferring values and whether the valuations that can be found in studies account for the importance of ecosystem assets and biodiversity [11]. Although previously it was generally accepted that stated preference methods could alleviate these problems, however, there is growing acknowledgement that this strategy may not be well suited to extracting values from those who are unfamiliar with or have no experience with a specific ecosystem good [10].

Second, ignoring the value of nature itself. There is a commonality among the many divergent values. Most African communities value communalism, customary beliefs, spirituality, and relational autonomy, as shown by the African moral philosophies of Ubuntu/Botho and Ukama, which prioritize communalism over individual rights. [12]. It can therefore be argued that South Africans may be more concerned with macro-level, collective and natural values per se - that is, values that are not merely anthropocentric and egoistic [13].

Third, not all values can be monetarized. Many strategies have been developed and are utilized at various sizes to assess instrumental values from an economic perspective. However, whether the values of biodiversity and ecosystem services can be aggregated into a monetary metric is a point of contention [14]. For example, Max Gluckman has chronicled a controversy over whether the value of cattle is aesthetic or economic [15]. Evaluating and conveying economic values using a monetary metric can be helpful, like serving to raise understanding among policy makers and the general public, for example [16]. However, this is just the case with many provisioning services. When dealing with more complex services like regulating or cultural services, such assessment may not be appropriate, essential, sufficient, or possible in many cases [17].

Fourth, the uncertainty of assessment exists. Much of the current assessment work in South Africa, as in many other countries around the world, is based on existing empirical studies. As a result, while the evidence base is extensive and deep, at least for some ecosystem services, observations on this development point to a need for more understanding of ecological production, particularly as it relates to spatial variability and complexities in service production [10]. The spatially explicit accounting approach taken by South Africa may highlight the differences in aggregated values in spatial variations at the province scales, but it is weak when it comes to different ecosystems which means values can differ between ecosystem patches.

In addition, the existing research on value assessment is not all perfect. On the one hand, the accuracy of valuation requires a high level of research methodology for the application of ground theory, and systematic surveying within a region is time-consuming and expensive [18]. On the other hand, converting these services to economic value requires robust methods that minimize economic valuation costs and provide a consistent approach for ongoing observation of the area under investigation [19].

What's more, studies of value assessment are not comprehensive. For provisioning services such as food and energy, they can be easily quantified and economically evaluated [20], whereas cultural and regulating services are, by contrast, difficult to quantify [21]. Therefore, more studies have been conducted on the former, and more resources are available for practical work [22]. As for South Africa, the economic valuation of ecosystems taken by SANBI can only record changes in ecosystem services but not the value of those services [23].

3. A New Perspective: Integrating the IPBES Framework in NCA

This paper argues that a summary of the ecosystem services assessment work now being carried out in South Africa shows the country's commitment and courage to conserve biodiversity and build on the MA. For the several major work dilemmas mentioned above, such assessments would be more efficient if the IPBES approach could be properly applied.

The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) was established in 2012 as an independent intergovernmental body open to all United Nations member countries with the goal of "strengthening the science-policy interface for biodiversity and ecosystem services for

biodiversity conservation and sustainable use, long-term human well-being, and sustainable development". The IPBES approach echoes the MA's original usage of the phrase ecosystem services but goes even further by explicitly incorporating concepts from various worldviews on human-nature relations and knowledge systems [24].

Discussions were continuing on the establishment of an intergovernmental biodiversity panel like the IPCC (Intergovernmental Panel on Climate Change). In a 1995 article, Lubchenco argued that only by more effectively communicating sound scientific knowledge to policy makers can we more effectively reduce biodiversity loss [25]. MA brought the concept of ecosystem services into the limelight, and its existence broadened the focus of attention on ecosystem assessment from loss of biodiversity to loss of ecosystem services [26]. The latter emphasizes the benefits that people derive from ecosystems. In addition, it builds a link between biodiversity conservation and ecosystem services, i.e., biodiversity can contribute to ecosystem services and thus to human well-being [27]. National ecosystem assessment programs in many countries, including South Africa, can be seen as building on the momentum and insight generated by MA. But MA is not without its flaws. Many scholars argue that MA can only document changes in ecosystem services as they occur, but not the value of those changes in services [23]. On the other hand, MA has been discussed in terms of "human well-being" or the anthropocentric approach, and there has been a paradigm shift in environmental philosophy between the anthropocentric approach and the nonanthropocentric approach. The latter emphasizes that nature has intrinsic values that are not generated by the subject's contribution to human well-being, but rather that nature itself possesses such values by virtue of its existence. Both of these impulses have led to the creation of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). While the IPBES's work is diverse, Pascual et al. summarize its work on value, which is firmly rooted in the "value plurality" [10][28].

3.1. Advantages of IPBES: Value Pluralism

IPBES has four interconnected functions: catalyze the development of new knowledge, create assessments of current knowledge, support policy formulation and execution, as well as build capacities relevant to the achievement of its purpose. According to the operation mechanism of IPBES, its assessment reports are independently completed by experts recommended by each country and carefully screened, and the final reports are only released after the approval of each member government.

The first public good provided by IPBES is a conceptual framework to support all of these activities, structure the syntheses that will inform policy, and promote comparability across numerous evaluations conducted at various spatial scales, on various themes, and in various locations [6]. The conceptual framework begins by considering the platform's purpose, which is "... conservation and sustainable use of biodiversity, long-term human well-being, and sustainable development," and so the key aspects (or components) are nature and the advantages that people gain. The conceptual framework also emphasizes the fundamental role that institutions, governance, and decision-making have on nature, the advantages that people gain from nature, and the high quality of life, as well as the links between these factors, which is a departure from most past projects [6].

From natural science to environmental assessment, IPBES can help to narrow the possibility of the uncertainty of valuation, because it takes into account the wide range of cultural and institutional settings in which nature and its benefits to human well-being are valued. The IPBES framework also takes into account both terms of providing those services as a source of economic value as well as the value of biodiversity itself.

From environmental assessment to policy development and implementation: IPBES can help to improve the accuracy of value transfer. Large-scale ecosystem evaluations have proven that empirical evidence may be used to influence policy and be relevant in an increasing number of cases, which makes the value transfer more convenient[10].

3.2. A comparable case: IPBES in Brazil

Although IPBES helped foster the concept of value pluralism, practical progress in its application remains slow. In 2015, Brazil established the first national-level initiative based on IPBES, the Brazilian platform on biodiversity and ecosystem service (BPBES), which can serve as a case study to inspire South Africa to integrate and use IPBES more effectively. The case of Brazil was chosen as a comparison because Brazil and South Africa share a lot in common. Firstly, South Africa and Brazil are both megadiverse countries, facing biodiversity and ecosystem services losses. Secondly, the biological

diversity is mirrored in their enormous cultural diversity.

BPBES is a non-governmental, scientist-led science-policy communication platform. It uses the IPBES framework to engage stakeholders such as NGOs, the media, academics and local, public and private sector policy makers in a dialogue on relevant issues, which leads to the publication of BPBES assessments and special reports[29]. This model of work demonstrates IPBES's consideration of value pluralism. In this way, BPBES expects to improve the knowledge exchange between the academic and policy communities in the field of biodiversity and economic valuation. By producing more transparent and representative data, the basis for scientific decision-making will be laid. As can be seen, BPBES is a third-party scientific body independent of government policy-making and the Brazilian system service evaluation framework. However, some are cautious about this form of organization, stating that reliability, relevance and legitimacy are prerequisites for ensuring that BPBES produces a scientifically sound product [29].

BPBES is not a simple replication of the IPBES framework in Brazil but is rather a product that caters to the needs of the Brazilian authorities. Currently, academics believe that an information deficit can prevent governments from making scientific decisions [30]. The research products of BPBES can, therefore, bridge the aforementioned information deficit in the field of ecosystem service assessment and provide effective information for national decision-making on land use, spatial planning, etc. In response to the controversy over the relevance of global scientific products (such as IPBES) at regional and national levels in the field of biodiversity, BPBES aims to produce more use of assessment data related to Brazil itself. The 1st Brazilian Biodiversity and Ecosystem Services Assessment Summary for Policy Makers bears this out by clarifying the importance of more explicitly constructing the linkages between biodiversity, ecosystem services and human well-being, i.e., that academic assessments of the non-material values of biodiversity, such as aesthetic and spiritual values, are not well developed to effectively inform economic valuation and future policy decisions [31].

3.3. How the IPBES Approach Might be Implemented in Practical Terms within South Africa?

As with the BPBES, the implementation of IPBES in South Africa should be tailored to the needs of the country.

First and foremost, the IPBES conceptual framework is also the most valuable component for South Africa, as it can increase the validity of the assessment by filling gaps in the existing value system and incorporating a broader range of values into the assessment. In contrast to MA, the IPBES conceptual framework considers the essential issues of the elements and their interrelationships, emphasizing the decisive role of institutions, governance and indirect drivers in solving environmental problems[6]. At the same time, the IPBES conceptual framework acknowledges the diversity of knowledge systems and recognizes that a focus on economic values alone is not sufficient to address the complexity of biodiversity loss[7], and therefore recognizes and considers different knowledge systems, including indigenous and local knowledge. Although indigenous and local knowledge is difficult to scientifically standardize, ignoring or abandoning it may undermine innovation[32]. This conceptual framework can be used to establish mechanisms for dialogue and consultation among multiple value systems and to bring the environment, society and economy into interaction.

Secondly, learn to leverage the platform resources of IPBES. The IPBES Plenary has a dedicated capacity-building task force, and IPBES has undertaken capacity building in the process of scenario and model assessment. South Africa, while participating in the IPBES scenario and model assessment, has gained a deeper understanding of the development and use of scenarios and models by participating in training, exchange visits and network forums. However, the current domestic research in South Africa generally refers to international scenarios and models or optimizes them for application. In other words, independent innovation, and the use of scenarios and models in policy and management are rare. It is necessary to strengthen the capacity-building work and promote the use of different scenarios and models, to promote the development of new scenario analysis and modelling tools and methods. It is recommended to establish a database of scenarios and models, build a platform of policy support tools, integrate and share information and data, and promote open access to models and scenarios; at the same time, develop corresponding outreach tools for different audiences (scientists, policy makers, etc.), and conduct training and exchange experiences through seminars and forums, to expand the frequency and influence of scenarios and models in the decision-making process [33].

Last but not least, the multidisciplinary and multiscale approach of the IPBES conceptual framework and the IPBES science-policy interaction model is worthy of study and reference by South African researchers and government policy makers in the field of biodiversity research and environmental issues.

In the design of similar research projects in the future, it is important to move from a single discipline to a multidisciplinary approach, taking into account indigenous and traditional knowledge; on the other hand, it is important to move from a single scale to national, local, and community scales, and to incorporate time-scale analysis and prediction. In addition, it is important to focus on the translation of basic research results and promote the application of science in policy, strengthen the effective communication between scientists and politicians, reflect the value of science in governmental decision-making, bridge the gap between science and policy, and maintain the ability of scientific research results to influence decision-making [34].

4. Conclusion

This paper summarizes the current framework of natural capital accounting in South Africa and argues that the system places a strong emphasis on the interaction between biodiversity and ecosystem services, but this interaction is all anthropocentric because the purpose of conserving biodiversity is to better create ecosystem value for people. Despite the many strengths of the existing framework in South Africa, there are still many areas where improvements can continue to be made. Some of these problems are due to the economic assessment as an approach itself, and some are unique to South Africa. This paper summarizes these dilemmas as firstly, ignoring the context of value diversification in South Africa. Secondly, ignoring the value of nature itself. Thirdly, the potential ineffectiveness of the monetary metric. Lastly, the uncertainty of valuation. The existence of these problems can hinder the effective delivery of South African ecosystem assessment results to environmental policy.

The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) approach introduces a value pluralist perspective based on the concept of ecosystem services in MA, which fits perfectly with the value pluralist cultural context of South Africa. In this regard, this paper argues that the IPBES could be integrated in tactical assessment work in improving the existing assessment framework in terms of value pluralism and assessment certainty. In summary, this paper suggests that the South African environmental sector could firstly, use the conceptual framework of IPBES in designing the sample structure when designing the assessment research. Secondly, consider the value of nature itself and the value of sharing. Thirdly, take into account the interaction between the environment society and the economy. Finally, actively integrate IPBES to refine assessment methods using information from the IPBES platform to reduce assessment uncertainty due to methods and data.

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