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REVIEW

Nature's Contributions to People (NCP): evolving frameworks, insights, policy integration and the Korean context

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Background: The concept of Nature's Contributions to People (NCP), introduced by IPBES in 2018, represents a significant expansion beyond the ecosystem services (ES) paradigm by acknowledging the material, regulating, and non-material dimensions of human–nature relationships. NCP emphasizes pluralistic and participatory approaches, integrating indigenous and local knowledge systems with scientific perspectives to provide a more holistic understanding of sustainability. Despite its relevance, NCP has seen limited adoption in South Korea and has been inconsistently translated in existing literature.
Results: Recent empirical studies highlight NCP's flexibility across ecological, agricultural, urban, and public health contexts, demonstrating how it captures cultural and relational values often overlooked in ES frameworks. At the policy level, NCP has been embedded into global frameworks such as the convention on biological diversity and the sustainable development goals, signaling institutional recognition of its utility for governance. However, challenges remain in operationalizing NCP, particularly regarding methodological innovations for assessing non-material contributions and building institutional mechanisms for effective integration. Comparative analysis reveals that while ES-related publications have grown rapidly, NCP remains underrepresented in the literature, with limited empirical studies, especially in the Global South. Within South Korea, only a few reports and non-peer-reviewed articles have introduced NCP. This paper proposes "자연의 인간에 대한 기여" as the most contextually appropriate Korean translation to promote consistency in terminology.
Conclusions: Overall, NCP offers a transformative lens for sustainability science and governance, providing opportunities to integrate diverse knowledge systems and capture non-material dimensions of human–nature relationships. Its potential, however, depends on future methodological innovation, stronger institutional coordination, and enhanced cross-cultural engagement to support inclusive and equitable environmental decision-making.

Keywords: biodiversity governance, cultural values, ecosystem services, Korea, Nature's Contributions to People, sustainability science

Introduction

In the situation of fast global biodiversity loss, climate change, and bigger social inequalities, more people now understand we need frameworks that are integrated and have many dimensions, so they can show the many different values nature has for people in society (Rawluk et al. 2019). Conventional environmental governance mechanisms have predominantly relied on utilitarian and market-based paradigms, often reducing intricate socio-ecological relationships to simplified metrics of ecosystem services (ES) or commodified natural assets. The concept of ES, while foundational in linking ecological processes to human well-being, has received criticism for its limited cultural scope and emphasis on instrumental values (Gómez-Baggethun et al. 2010; Norgaard 2010). To address these limitations, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) introduced the concept of Nature's Contributions to People (NCP) in its 2019 Global Assessment report (Díaz et al. 2019). NCP seeks to broaden the ES framework by explicitly recognizing non-material, cultural, spiritual, and relational dimensions of human–nature relationships (Zoeller and Cumming 2024), particularly as experienced by Indig-

enous Peoples and Local Communities.

The emergence of NCP is not merely a semantic shift but represents a significant epistemological and ontological transformation in how human–nature interactions are conceptualized and valued (Moreira et al. 2025). Drawing from multiple knowledge systems, including indigenous, local, and scientific, NCP reflects a growing trend toward pluralistic, participatory, and ethically grounded approaches to sustainability science (Hill et al. 2021; Tengö et al. 2017). By focusing on co-production, mutual dependencies, and culturally embedded values, NCP enables a richer understanding of human well-being and ecological health. Despite its growing relevance in global environmental discourse, the concept of NCP remains largely unexplored in South Korea, with limited efforts toward its comprehensive introduction or the development of an appropriate Korean translation. Accordingly, this review aims to provide an overview of how the concept of NCP has been addressed in South Korea, identifying relevant studies and reports to date. First, we synthesize the key developments, applications, and critiques of the NCP framework from 2017 onward. Then, we explore how NCP has been operationalized in empirical research, how it is being integrated into global policy frameworks such as the United Nations sustainable development goals (SDGs), and what ethical debates it provokes in the context of environmental governance. Finally, with comprehensive understandings of NCP and overview NCP articles in South Korea, this review aims to propose a coherent conceptualization and appropriate terminology for NCP within the South Korean context.

Main Text

Conceptual evolution: from ES to NCP

The concept of ES emerged in the late 20th century as a way to articulate the value of nature in terms recognizable to economists, policy-makers, and the general public (Gómez-Baggethun et al. 2010). Initially rooted in utilitarian thinking, ES categorized the benefits that ecosystems provide to humans into four broad groups: provisioning, regulating, supporting, and cultural services (Millennium Ecosystem Assessment 2005). While ES frameworks brought attention to the economic value of nature and enabled cost–benefit analyses to inform conservation policy, they also faced growing criticism. Critics pointed out that ES often failed to capture non-material values, overemphasized marketable services, and marginalized alternative worldviews that emphasize reciprocity and responsibility toward nature (Raymond et al. 2013; Schröter et al. 2014). The concept of ES, as a product of Western science where academic systems were established early on, has been criticized—especially by scholars from developing countries—for not adequately considering traditional knowledge or the values of Indigenous peoples in the relationship between ecosystems and humans. Therefore, it became necessary to overcome these limitations (Park 2019). In response, IPBES launched a more holistic and inclusive framework through NCP. NCP expands upon ES by recognizing 18 distinct categories of contributions, classified into three domains: material (e.g., food, raw materials), regulating (e.g., pollination, water purification), and non-material (e.g., learning, spiritual enrichment) (Bruley et al. 2021; Park 2019). Importantly, NCP reframes the human–nature relationship as co-produced and reciprocal rather than unidirectional. This theoretical shift aligns with the rise of relational values in environmental ethics, where human well-being is deeply tied to the quality and meaning of interactions with nature (Chan et al. 2016; Himes and Muraca 2018; Summers et al. 2012).

Furthermore, NCP places significant emphasis on epistemological pluralism—the idea that multiple forms of knowledge, including indigenous and local knowledge (ILK), are valid and essential for understanding socio-ecological systems (Droz et al. 2023; Hill et al. 2021). The IPBES conceptual framework explicitly encourages the inclusion of ILK in assessment processes (Díaz et al. 2019). Some scholars have argued that bridging diverse knowledge systems enhances both the legitimacy and the effectiveness of biodiversity governance (Tengö et al. 2017). This pluralistic stance not only enriches the scientific basis of sustainability but also fosters equity by recognizing the voices of historically marginalized communities. To illustrate these dynamics, Figure 1 presents a conceptual diagram of human–ecosystem relationships, incorporating the recent NCP framework and reflecting its further development up to 2025.

Despite these advances, some confusion persists in the literature regarding the relationship between ES and NCP. Some scholars view NCP as a rebranding of ES, while others emphasize its normative and epistemological departure (Kadykalo et al. 2019). Understanding this conceptual distinction is crucial for practitioners and policy-makers who seek to adopt frameworks that are not only scientifically robust but also socially just and culturally inclusive.

Recent applications of NCP since 2020

Empirical research applying the NCP framework has grown significantly since its formalization by IPBES. One of the core strengths of NCP lies in its flexibility: it allows for the evaluation of human–nature interactions across scales—from local communities to global assessments (Managi et al. 2022)—and sectors, including agriculture, urban planning, forestry, and public health (Moreira et al. 2024). Unlike traditional ES frameworks, which often emphasize provisioning and regulating services, NCP provides a mechanism for recognizing and measuring values that are culturally embedded, spiritually meaningful, and

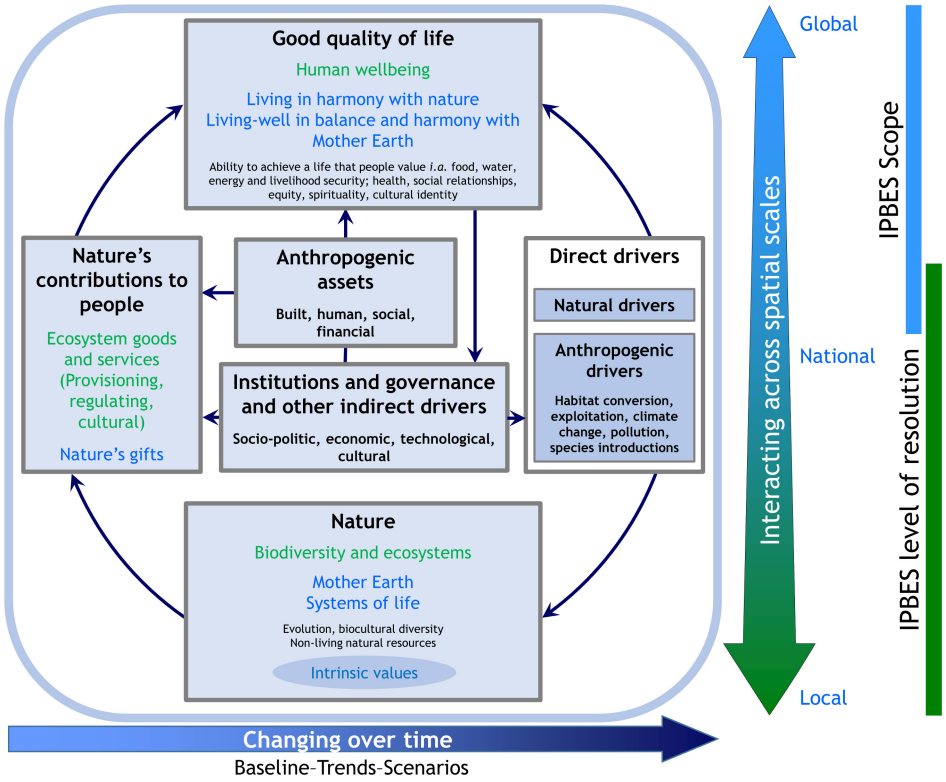

Fig. 1 Conceptual diagram of human–ecosystem relationships including the recent NCP framework. Adapted and modified from Park (2019), Conservation Strategies for Biosphere Integrity from the IPBES Global Assessment Report (Courtesy of Dr. Park). NCP: Nature's Contributions to People; IPBES: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

socially co-produced (Bruley et al. 2021). Bruley et al. (2021) provide a case study from the French Alps, showing how multifunctional agricultural landscapes simultaneously generate material (food production), regulating (soil retention), and non-material (aesthetic, recreational, spiritual) NCP. Their work emphasizes the importance of stakeholder involvement and local ecological knowledge in producing and maintaining these contributions. Similarly, studies (Chaplin-Kramer et al. 2025; Takahashi et al. 2022) demonstrate the role of wildlife and their habitats in sustaining key NCP such as pest control, seed dispersal, biodiversity and ecotourism. These studies used spatial modeling to quantify these contributions and highlighted the threat posed by biodiversity loss to NCP sustainability.

Smith et al. (2021) present a comprehensive analysis of soil-related NCP, linking soil biodiversity and health to climate regulation, food security, water filtration, and even mental well-being. They argue for a stronger integration of soil science into SDG implementation and land-use planning. In a broader geographic study, Liu et al. (2023) assessed the spatial and temporal changes in 18 NCP across over 15,000 watersheds between 1992 and 2018. Their findings reveal both gains and losses in NCP, with clear spatial disparities: developing regions often exhibited significant increases in material NCP, while wealthier countries showed declines in regulating services due to urbanization. Urban contexts also provide compelling illustrations of NCP application. Balvanera et al. (2020) studied green infrastructure in Latin American cities and found strong links between access to urban nature and non-material NCP, including stress reduction, physical activity, and place identity. Jacobs et al. (2020) stressed the need for localized and culturally sensitive indicators to measure NCP effectively, especially non-material ones. They advocate for participatory methods, including storytelling, mapping, and ethnographic approaches, to complement biophysical metrics. Moreira et al. (2025) conducted a systematic review of the NCP framework, assessing its impact on scientific research, policy-making, and sustainability practices across diverse spatial and social contexts. They found that the NCP approach notably strengthens engagement with relational values and co-production between humans and nature, though its limited treatment of abiotic ecosystem components suggests a need for integration with ES frameworks (Moreira et al. 2025).

However, despite of many advances, challenges persist in operationalizing NCP. Measuring non-material contributions requires interdisciplinary approaches and often encounters data scarcity, especially in the Global South. Moreover, policymakers frequently prioritize quantifiable outcomes, which may marginalize culturally significant NCP that are difficult to monetize or standardize (Kenter et al. 2015). Addressing these challenges and limits will be discussed in "Limited adoption of NCP: current constraints and future prospects".

Policy integration and UN recognition

The policy relevance of NCP has grown rapidly in recent years, particularly within the context of the United Nations' global sustainability agenda. The 2019 IPBES Global

Assessment (IPBES 2019; Pereira and Bina 2020) was a landmark publication that provided a scientifically grounded and policy-oriented synthesis of how NCP underpin human well-being and are threatened by biodiversity loss. Since its release, the language and conceptual underpinnings of NCP have appeared in key policy frameworks, including the convention on biological diversity (CBD), the Kunming-Montreal Global Biodiversity Framework, and national biodiversity strategies. The 2030 Agenda for Sustainable Development provides a particularly fertile ground for integrating NCP (Lee et al. 2016). Many of the SDGs explicitly depend on healthy ecosystems and robust human–nature relationships. For example, SDG 2 (Zero Hunger) relies on material NCP such as pollination and soil fertility; SDG 3 (Good Health and Well-being) benefits from clean air, water, and green spaces; SDG 6 (Clean Water and Sanitation) depends on regulating services such as water filtration and hydrological balance; and SDGs 13 (Climate Action) and 15 (Life on Land) are directly linked to ecosystem health and resilience (United Nations Department of Economic and Social Affairs 2022). United Nations Environment Programme's Inclusive Wealth Report integrates NCP into its assessment of national progress beyond GDP, promoting broader measures of societal wealth and sustainability. Countries such as Costa Rica (Umaña Quesada 2024), New Zealand (Fairbrass et al. 2020), and Bhutan (Kubiszewski et al. 2013) have taken steps to include NCP-type indicators in their environmental and development policies. Additionally, the United Nations Decade on Ecosystem Restoration (2021–2030) has adopted NCP language to emphasize the reciprocal benefits of nature recovery for human societies and ecosystems (United Nations 2021). However, despite these promising developments, implementation challenges remain. In the following two chapters, we will address the criticisms of the NCP concept and discuss the limitations of its application.

Critiques and further considerations

Although NCP represents a normative shift toward inclusivity and justice, some scholars argue that it remains embedded within an anthropocentric paradigm. While the framework acknowledges relational values, it continues to emphasize benefits to people, potentially sidelining intrinsic ecological value and the moral standing of non-human life (Piccolo et al. 2022). This critique echoes broader debates in environmental ethics between anthropocentric, biocentric, and ecocentric positions (Miao and Nduneseokwu 2025). Critics argue that an overemphasis on human well-being can foster instrumental reasoning, valuing nature solely for its utility to human interests (Kadykalo et al. 2019). This risks undermining conservation goals, especially for species and ecosystems that do not provide obvious or immediate NCP. Moreover, it may perpetuate colonial and extractive dynamics by framing nature primarily as a source of utility (Kopnina et al. 2020).

To counteract these risks, some scholars advocate for integrating legal rights of nature into NCP-informed policy (James 2020). Examples from Ecuador, Bolivia, and New Zealand illustrate how granting legal personhood to rivers and forests can institutionalize respect for non-human agency and sovereignty. Such legal innovations align with Indigenous worldviews that emphasize interdependence and moral reciprocity between humans and the more-than-human world (Whyte 2018). Ultimately, enhancing the ethical integrity of NCP requires a delicate balance: recognizing the legitimate needs and aspirations of human communities while affirming the intrinsic worth of nature. This may involve embedding NCP within a biocultural ethics framework that honors both cultural heritage and ecological integrity (Rozzi 2012).

Limited adoption of NCP: current constraints and future prospects

Based on research trends since 2020, there is a notable difference in the number of academic publications between those using the concept of "Nature's Contributions to People (NCP)" and those referring to "ecosystem services (ES)." In 2020, it is reported that a total of 16,833 research articles included the term "ecosystem services" (Chan and Satterfield 2020). Furthermore, according to Kubiszewski et al. (2023), the number of ES-related publications has increased dramatically over the past decade—from 4,948 to 33,973. In contrast, although the NCP concept has rapidly gained traction since its formal introduction by IPBES in 2018, and it has been reported that only 411 papers were selected for initial screening after removing duplicates (Moreira et al. 2025). According to data presented in 2023, the number of NCP-related publications remains around 25 articles per year, with a total of 42 cases analyzed, including datasets across various continents (Kachler et al. 2023). This indicates that, compared to ES, the application of the NCP framework is still relatively limited. Another example, a recently established international guideline framework: The Taskforce on Nature-related Financial Disclosures framework assesses corporate dependencies on and impacts to natural capital using the term "ecosystem services" (Nelson and Combe 2022). This highlights that, despite the emergence of NCP, "ecosystem services" continues to be the predominant terminology in the financial and industrial sectors, reflecting its widespread recognition and practical use. One reason may be that NCP is a relatively new concept, officially introduced only recently through the 2018 IPBES Global Assessment Report. In case of Korea, as the term 'Ecosystem Services (ES)' is legally defined in Article 2 of the 'Act on the Conservation and Use of Biological Diversity,' amended in 2019 and officially used in public documents. The presence of such legally codified

term could be the main reason why a new term for NCP is not well introduced. However, ES and NCP are close but not identical concepts. While ES emphasizes the benefits humans obtain from ecosystems, often framed in provisioning, regulating, supporting, and cultural categories. On the other hand, NCP expands this framework by giving greater weight to cultural, relational, and non-material values, as well as integrating ILK systems. Because NCP addresses sociocultural values and non-material benefits more comprehensively than the traditional ES framework, it is increasingly regarded as an attractive paradigm by researchers focusing on anthropocentric perspectives, indigenous knowledge systems, and cultural diversity (Bruley et al. 2021; Liu et al. 2023). In this sense, NCP can be seen as encompassing ES while broadening the scope to include more diverse perspectives on the human–nature relationship. Thus, NCP is generally regarded as a more inclusive and pluralistic concept compared to ES. To put it in simpler terms, ES are like the core functions of a smartphone—making calls, sending messages, and browsing the internet. NCP, however, includes not only these basic functions but also the broader ways smartphones shape our lives, such as building social connections, creating memories through photos, watching and making videos and influencing culture and lifestyle. In this sense, NCP encompasses ES while extending to wider relational and cultural dimensions. Just as no one uses a smartphone only for calls anymore, it is necessary to organize and expand additional concepts as they develop. Recent updates to the Common International Classification of Ecosystem Services (CICES V5.1) illustrate this mutual influence by partially incorporating elements of the NCP framework (Grima et al. 2023). This integration highlights that ES and NCP are not entirely separate but instead evolve in dialogue with one another. By embedding aspects of relational and non-material values into a widely used ES classification, CICES demonstrates how the two approaches can be complementary and mutually reinforcing. This example reinforces the utility of NCP while underscoring its potential to shape existing policy and research tools. Table 1 presents key distinctions between ES and NCP, with references provided for clarity.

Moreover, NCP continues to be referenced in major international policy frameworks, including IPBES (IPBES 2019), CBD (Erdelen 2020), and the United Nations SDGs (United Nations Department of Economic and Social Affairs 2022), suggesting that research interest in this concept will continue to grow. Nevertheless, as mentioned earlier, the dominance of the pre-existing ES framework in academic and policy discourse, as well as the relatively recent emergence of NCP, may currently be limiting its broader application—challenges that remain to be addressed in the near future. There is a pressing need for methodological innovation and institutional coordination to translate NCP concepts into actionable governance strategies. However, it was difficult to find research references on this NCP–governance field yet. It seems that this concept should be addressed in a dedicated paper.

NCP in Korea

Among the Korean articles (including academic papers, essays, and reports) retrieved using four search tools—Google, Google Scholar, Naver, and Daeum—the earliest

Table 1 Key distinctions between ecosystem services (ES) and Nature's Contributions to People (NCP)

	ES	NCP
Origins	Emerged in late 20th century, strongly influenced by economics and policy discourse (Gómez-Baggethun et al. 2010; Millennium Ecosystem Assessment 2005).	Introduced by IPBES in its Global Assessment (Díaz et al. 2019) as a response to ES limitations.
Conceptual focus	Benefits humans obtain from ecosystems, categorized as provisioning, regulating, supporting, and cultural services.	Broader framing of human–nature relationships as co-produced, reciprocal, and context-dependent (Zoeller and Cumming 2024).
Value orientation	Emphasizes instrumental values and utilitarian/market-based perspectives (Norgaard 2010; Raymond et al. 2013).	Explicitly incorporates relational, cultural, and spiritual values, alongside material and regulating ones (Chan et al. 2016; Himes and Muraca 2018).
Knowledge systems	Primarily rooted in Western science; often criticized for overlooking indigenous and local knowledge (ILK) (Park 2019; Schröter et al. 2014).	Promotes epistemological pluralism, integrating ILK and scientific knowledge (Droz et al. 2023; Hill et al. 2021; Tengö et al. 2017).
Policy uptake	Widely institutionalized in environmental policy, finance, and governance (e.g., TNFD framework uses ES) (Nelson and Combe 2022).	Increasing recognition in CBD, SDGs, and UN Decade on Ecosystem Restoration, but limited operationalization (Pereira and Bina 2020).
Ethical framing	Anthropocentric; nature valued mainly for human benefits (Piccolo et al. 2022).	Moves toward biocultural and relational ethics, acknowledging moral obligations to nature (Rozzi 2012; Whyte 2018).
Adoption status	Extensive publication record (tens of thousands of papers annually) and widespread global use (Chan and Satterfield 2020; Kubiszewski et al. 2023).	Relatively limited adoption, still emerging in academic and policy arenas; ~25 papers per year (Kachler et al. 2023; Moreira et al. 2025).

IPBES: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services; TNFD: Taskforce on Nature-related Financial Disclosures; CBD: convention on biological diversity; SDG: sustainable development goal.

document that addressed NCP is a 2017 report (Park 2017). This report translated NCP into Korean as "인간에 대한 자연의 혜택" and only briefly introduced the term NCP during the process of analyzing and supplementing the Asia-Pacific Regional Assessment Report on Biodiversity and ES. However, it primarily uses the term "ecosystem service". There is, however, an article that almost exclusively focuses on NCP (Park 2019), which was posted online as a non-periodical issue by the Institute for Climate Change Action Korea. This article is the first in Korea to provide a detailed explanation of the concept of NCP, introduces 18 indicators for evaluating NCP, and criticizes that the concept of ES, as a product of early-developed Western science, tends to overlook important elements such as traditional knowledge and indigenous values in the relationship between ecosystems and people. Although it is not a peer-reviewed academic paper, this article is effectively the only Korean article that centers on NCP. It uses the Korean phrase "자연의 인간에 대한 기여" to describe NCP. Subsequently, in 2020, a report published by the National Institute of Ecology (Yoon et al. 2019), used the Korean expression "자연이 인류에게 주는 혜택" to refer to NCP. The report noted that at the 6th Plenary Session of IPBES, the member states discussed how to relate the concept of NCP with ES, and whether to use both concepts together or to use the more established term ES alone. While the report acknowledged that using both terms together might result in an artificial separation, it provided little explanation about NCP itself. The first academic paper that introduced NCP as "자연의 편익" was published later (Ahn et al. 2020), but after introducing the term, the paper mainly uses the concept of ES. In the same year, the World Wide Fund for Nature Korea released a report (Hong 2020), using the phrase "인간에 대한 자연의 기여", but similarly, it only introduced the term without elaborating further.

Since then, there have been no notable reports or academic papers on the subject from Korea. Of course, as mentioned earlier, one reason might be the lack of sufficient understanding and application of the concept of NCP in Korea. Another reason could be, as discussed earlier, that ES is already used as a legal term in Korea. A final possibility is that in Korea, where English is not commonly used, "Nature's Contributions to People" is long and descriptive compared to the concise two-word term 'Ecosystem Services', and this lengthiness applies whether the term is written in English or translated into Korean. As long terms hinder accessibility (Schmalz et al. 2025), having many words is a disadvantage.

However, as the UN is actively working to use NCP as an official term, and given the possibility of its rapid adoption in future international agreements, a consistent Korean terminology is needed. More importantly, in the era of climate crisis and biodiversity crisis, where a shift from human-centered to nature-centered thinking is becoming increasingly urgent, the concept of NCP may prove crucial for all of us. NCP refers to the diverse and comprehensive contributions that nature makes to human life, well-being, and culture. Compared to ES, NCP is more nature-centric and considers humans not only as beneficiaries of nature but as interactive participants. A Korean definition of the term is thus necessary (Although NCP also implies recognition of diverse knowledge systems and cultural/non-material values, addressing those aspects may be too complex here.). In addition, the justification for a standardized Korean translation is reinforced by recent national reports and research that rely heavily on the concept of "ecosystem services" (생태계서비스). For example, national biodiversity and climate-related strategies often employ ES-based indicators (Seo et al. 2021), and restoration plans for tidal flats or urban ecosystems emphasize provisioning and regulating services as measurable outcomes (Ministry of Oceans and Fisheries 2021; Myeong and Lee 2019). However, these documents also reveal limitations of the ES framework, as they struggle to capture cultural, relational, and non-material values that are increasingly important in restoration, adaptation, and community engagement. Without a broader conceptual tool, such values risk being marginalized in both research and policy. Thus, establishing "자연의 인간에 대한 기여" as the Korean translation of NCP is not merely a linguistic clarification, but a necessary step to ensure that non-material and relational contributions of nature—often overlooked in ES-centered discourse—are adequately recognized and integrated into national strategies.

With the advice of Dae Haeng Kim, Professor Emeritus of Korean Language Education at Seoul National University, by considering the Korean linguistic convention of placing emphasis at the beginning of a phrase and as well as the need to inclusively capture various types of human benefits, we propose the term "자연의 인간에 대한 기여" as the most appropriate Korean translation of NCP. Unifying the terminology is expected to contribute to the future establishment and application of the NCP concept in Korea.

Conclusions

NCP represents a profound evolution in how humanity conceptualizes and operationalizes the value of nature in the 21st century. By expanding beyond the ES paradigm, NCP acknowledges the complex, co-produced, and context-dependent nature of human–environment interactions. Its pluralistic and transdisciplinary foundations make it a valuable framework for sustainability science, conservation policy, and global governance. This review has demonstrated that NCP is being actively adopted in empirical research across diverse disciplines, from soil science to urban planning, and its integration into international policy frameworks such as the SDGs and CBD indicates grow-

ing institutional recognition. Nevertheless, persistent challenges remain, including methodological standardization, ethical coherence, and political feasibility. Importantly, the Korean context highlights an additional dimension: the critical role of language in enabling conceptual adoption. As discussed in "NCP in Korea" has shown, various Korean translations of NCP have appeared but none gained consistent usage. This terminological fragmentation has likely contributed to the limited uptake of NCP in South Korea. The proposal of "자연의 인간에 대한 기여" as a standardized Korean translation is therefore more than a linguistic adjustment: it represents a necessary step toward building conceptual clarity, fostering scholarly dialogue, and ensuring alignment with global environmental governance. A consistent and contextually appropriate term can provide the foundation for broader academic engagement, institutional integration, and public understanding of NCP in Korea.

Looking ahead, we recommend several priorities for strengthening the NCP agenda:

1. Develop and disseminate interdisciplinary methods for assessing non-material and relational NCP.

2. Build institutional capacity to integrate NCP into local and national environmental decision-making.

3. Promote cross-cultural dialogue that reflects diverse knowledge systems and value orientations.

4. Explore legal and policy instruments that institutionalize the intrinsic value of nature alongside its contributions to people.

5. In Korea specifically, consolidate the use of "자연의 인간에 대한 기여" to enable coherent scholarship and policy development.

As the world navigates overlapping crises of climate change and biodiversity loss, frameworks like NCP offer a path to reimagine sustainability in a more inclusive, ethical, and relational manner. For Korea, adopting a unified terminology is a crucial starting point—one that can bridge scientific, cultural, and policy spheres and ensure that the benefits of nature are sustained not only for people but for all life on Earth.

Abbreviations

CBD: Convention on biological diversity

CICES: Common International Classification of Ecosystem Services

ES: Ecosystem services

ILK: Indigenous and local knowledge

IPBES: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

NCP: Nature's Contributions to People

SDG: Sustainable development goal

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Authors' contributions

US contributed to the study conception and data collection and wrote the first draft of the manuscript. DS contributed to the data collection, supervision, and writing the final draft.

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Availability of data and materials

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Consent for publication

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Competing interests

The authors declare that they have no competing interests.

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