Legal Rights and Harmony: Combining Traditional Ecological Knowledge with Contemporary Science to Govern the Environment

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Legal Rights and Harmony: Combining Traditional Ecological Knowledge with Contemporary Science to Govern the Environment

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Abstract

This paper discusses how TEK can be combined with contemporary science to govern the environment. The paper posits that TEK and contemporary science are appropriate tools in fostering sound environmental governance for Sustainable Development. It examines the roles of TEK and contemporary science in governing the environment. Despite their efficacy, the paper observes that environmental governance, especially in the Global South, is constrained by failure to integrate TEK with contemporary science. Consequently, the paper argues that achieving sound environmental governance involves combining TEK with contemporary science towards creating holistic and appropriate governance tools. It discusses how TEK can be effectively combined with contemporary science to govern the environment towards Sustainable Development.

1.0 Introduction

Ensuring sound environmental governance is a key goal for both people and planet. Governing the environment involves the use of laws, policies, rules and norms to regulate how humans interact with the environment[1]. Governing the environment focuses on issues such as who makes environmental decisions, how environmental decisions are made and carried out, the scientific information needed for environmental decision-making and how the public and other stakeholders can participate in decision-making

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[1] United Nations Environment Programme., 'Environmental Governance' Available at https://www.unep.org/regions/west-asia/regional-initiatives/environmental-governance (Accessed on 01/04/2026)

processes[2]. It has been observed that environmental governance included a wide range of legal and other tools employed in both the private and public sectors to foster sound environmental protection and conservation[3].

According to the United Nations Environment Programme (UNEP), by effectively and appropriately governing the environment, it is possible to build a healthy and prosperous planet now and in the future[4]. It has been observed that sound environmental governance is key in maintaining and improving the ability of environmental systems to function and to produce ecosystem services through the persistence of species, habitats and biodiversity towards Sustainable Development[5]. Environmental governance aims to ensure that environmental decisions are transparent, inclusive, and effective towards Sustainable Development[6].

However, governing the environment remains a challenge for the global community. It has been observed that global environmental challenges including the triple planetary crisis of climate change, biodiversity loss and pollution demonstrate the inadequacies and shortcomings in environmental governance approaches[7]. In particular, failure to embrace a wide range of governance tools such as indigenous knowledge systems and science and technology has been identified as a major challenge undermining sound environmental governance[8]. Therefore, in order to effectively govern the environment, it is imperative

[2] Ibid

[3] Environmental Law Institute., 'Environmental Governance' Available at https://www.eli.org/environmental-governance (Accessed on 01/04/2026)

[4] United Nations Environment Programme., 'Environmental Governance' Available at https://www.unep.org/regions/west-asia/regional-initiatives/environmental-governance (Accessed on 01/04/2026)

[5] Bennett. N., & Satterfield. T., 'Environmental governance: A Practical Framework to Guide Design, Evaluation, and Analysis' Available at https://conbio.onlinelibrary.wiley.com/doi/10.1111/conl.12600 (Accessed on 01/04/2026)

[6] Environmental Governance., Available at https://www.manglai.io/en/glossary/environmental-governance (Accessed on 01/04/2026)

[7] United Nations Development Programme., 'Environmental Governance: Bolstering inclusive and effective governance systems that champion environmental justice and sustainability' Available at https://www.undp.org/nature/our-work-areas/environmental-governance (Accessed on 01/04/2026)

[8] Ibid

to harness and combine various tools including Traditional Ecological Knowledge (TEK) and contemporary science and technology[9].

This paper discusses how TEK can be combined with contemporary science to govern the environment. The paper posits that TEK and contemporary science are appropriate tools in fostering sound environmental governance for Sustainable Development. It examines the roles of TEK and contemporary science in governing the environment. Despite their efficacy, the paper observes that environmental governance, especially in the Global South, is constrained by failure to integrate TEK with contemporary science. Consequently, the paper argues that achieving sound environmental governance involves combining TEK with contemporary science towards creating holistic and appropriate governance tools. It discusses how TEK can be effectively combined with contemporary science to govern the environment towards Sustainable Development.

2.0 Role of Traditional Ecological Knowledge and Contemporary Science in Environmental Governance

2.1 Role of Traditional Ecological Knowledge in Environmental Governance

TEK is an effective tool in governing the environment. TEK refers to a cumulative body of knowledge, practices and beliefs, handed down from generation to generation by cultural transmission, which focuses on the relationship between living organisms (including humans) and their environment[10]. TEK has also been defined as a collection of knowledge held by communities with a long history of direct dependence on the environment and natural resources[11]. In addition, TEK can also be described as body of knowledge, practices, and beliefs about the relationship between living beings and their

[9] Siringan. B., 'Integrating traditional ecological knowledge in modern conservation practices' Available at https://www.ujecology.com/articles/integrating-traditional-ecological-knowledge-in-modern-conservation-practices-1104216.html (Accessed on 01/04/2026)

[10] Traditional Ecological Knowledge., Available at https://www.bia.gov/service/fuels-management/traditional-knowledge (Accessed on 02/04/2026)

[11] What is Traditional Ecological Knowledge?., Available at https://edm-1.itrcweb.org/what-is-traditional-ecological-knowledge/ (Accessed on 02/04/2026)

environment, passed down through generations through oral traditions, and is deeply rooted in the cultural and spiritual practices of indigenous and local communities[12].

It has been observed that TEK is a knowledge base acquired by indigenous peoples and local communities all over the world through direct contact with their environment for many centuries[13]. Since TEK is based on long-standing relationships between people and the natural world, it is context and cultural-specific and includes the relationships between humans, plants, animals, ecosystems and timing of natural events[14]. Consequently, TEK is at the heart of environmental governance since it has enabled indigenous peoples and local communities to live sustainably for many centuries[15]. It has been observed that TEK includes traditional and sustainable approaches to agriculture, hunting, fishing, water management, forestry and ecosystem management thus strengthening the resilience of both people and planet in light of environmental threats such as climate change, biodiversity loss and environmental degradation[16].

Harnessing TEK is therefore vital towards effectively governing the environment. This knowledge system stems from centuries-old observation and interaction with nature and is a valuable resource in ensuring sound environmental governance and conservation towards sustainability[17]. According to the United Nations Environment Programme (UNEP), mainstreaming TEK into all relevant environmental policies and decision making processes can foster sound environmental governance including through

[12] Traditional Ecological Knowledge: The Cornerstone of Indigenous Climate Adaptation in Canada., Available at https://indigenousclimatehub.ca/2024/04/traditional-ecological-knowledge-the-cornerstone-of-indigenous-climate-adaptation-in-canada/ (Accessed on 02/04/2026)

[13] Traditional Ecological Knowledge., Available at https://www.edu.gov.mb.ca/k12/docs/support/sila_video/tek.pdf (Accessed on 02/04/2026)

[14] What is Traditional Ecological Knowledge?., Op Cit

[15] Ibid

[16] International Fund for Agricultural Development., 'Indigenous Peoples' Available at https://www.ifad.org/en/indigenous-peoples#:~:text=Indigenous%20Peoples%20are%20the%20custodians,investments%20based%20on%20their%20perspectives (Accessed on 02/04/2026)

[17] United Nations Environment Programme., 'Indigenous Peoples and the nature they protect' Available at https://www.unep.org/news-and-stories/story/indigenous-peoples-and-nature-they-protect (Accessed on 02/04/2026)

tackling the triple planetary crisis of climate change, nature and biodiversity loss, and pollution and waste[18].

In particular, Africa and the Global South are reservoirs of rich TEK that enhance efforts to govern the environment. For instance, it has been observed that Africa's valuable TEK developed over centuries by indigenous peoples and local communities provides sustainable and culturally-appropriate environmental conservation and management practices that can complement modern scientific approaches[19]. TEK is widely applied among indigenous peoples and local communities in Africa in areas such as forest management, wildlife conservation, agroecology, water management, and protection of marine/coastal ecosystems[20]. It has been observed that in the African context, TEK emphasizes harmony with nature enabling people all over the continent to live sustainably and protect the environment and natural ecosystems[21]. Combining TEK with contemporary science therefore provides a valuable approach towards appropriately governing the environment both globally and in Africa.

2.2 Role of Contemporary Science in Environmental Governance

In addition to TEK, contemporary science offers valuable solutions and insights in environmental governance. For example, it has been argued that effective environmental governance requires informed science-based environmental decision-making[22]. It has been pointed out that global, regional and national environmental threats including climate change, biodiversity loss, deforestation and pollution require evidence-based

[18] United Nations Environment Programme., 'Tapping into indigenous knowledge to protect nature' Available at https://www.unep.org/news-and-stories/story/tapping-indigenous-knowledge-protect-nature (Accessed on 02/04/2026)
[19] Ogwu. M.C., 'Harnessing African Traditional Ecological Knowledge for Sustainable Biodiversity Conservation' Available at https://www.researchgate.net/publication/397745381_Harnessing_African_Traditional_Ecological_Knowledge_for_Sustainable_Biodiversity_Conservation (Accessed on 02/04/2026)
[20] Ibid
[21] Ibid
[22] United Nations Environment Programme., 'Environmental Governance' Op Cit

responses by decision-makers[23]. Science is therefore a key part of effective and appropriate responses to environmental threats providing data and evidence that can guide decision-making processes[24].

It has been observed that science is a key tool in governing the environment since it provides accurate knowledge and information to inform environmental policies and decision-making processes[25]. Through scientific knowledge, it is possible to determine the causes and consequences of environmental challenges including climate change, biodiversity loss, environmental degradation and pollution therefore providing a basis for effective solutions to these threats[26]. Science translates complex environmental data into actionable insights thus ensuring that environmental decision-making processes are supported by facts and evidence[27]. Further, scientific breakthroughs are supporting environmental governance by providing effective solutions such as sustainable waste management, climate-resilient agricultural techniques, renewable and evidenced-based ecosystem management and restoration[28]. UNEP observes that science plays a fundamental role in identifying environmental threats at an early stage, enabling countries to develop sound environmental policies, strategies and legislation and helping countries to successfully implement environmental laws and policies[29].
Embracing contemporary science is therefore key towards strengthening environmental governance.

[23] Global Council for Science and the Environment., 'The Imperative Role Science Plays in Global Environmental Governance Today' Available at https://www.gcseglobal.org/gcse-essays/imperative-role-science-plays-global-environmental-governance-today (Accessed on 02/04/2026)
[24] Ibid
[25] United Nations Environment Programme., 'Environmental Governance.' Op Cit
[26] Global Council for Science and the Environment., 'The Imperative Role Science Plays in Global Environmental Governance Today' Op Cit
[27] Bridging Science & Advocacy: How Environmental Scientists Influence Public Policy., Available at https://www.nrep.org/blog/how-environmental-science-influences-policy (Accessed on 02/04/2026)
[28] Ibid
[29] United Nations Environment Programme., 'Environmental Governance' Op Cit

3.0 Combining Traditional Ecological Knowledge and Contemporary Science to Govern the Environment

TEK and contemporary science provide valuable tools and solutions that can ensure sound environmental governance for Sustainable Development. In particular, TEK is an effective approach towards harnessing the wisdom of indigenous peoples and local communities to govern the environment[30]. TEK provide sustainable, culturally appropriate and context-specific approaches in areas such as agroecology, forest management, water conservation, sustainable land management, wildlife management, sustainable hunting and fishing practices, and management of coastal/marine ecosystems[31]. On the other hand, contemporary science can inform evidence-based decision-making processes towards sound environmental governance[32]. Scientific breakthroughs are enabling the world to tackle environmental threats including the triple planetary crisis of climate change, pollution and biodiversity loss through sustainable waste management, transitioning to renewable energy, climate-smart agricultural techniques, environmental monitoring, and science-based ecosystem conservation and restoration[33].

Combining TEK with contemporary science can therefore provide holistic, context-specific and evidenced-based solutions to effectively govern the environment. It has been correctly noted that integrating TEK provides an opportunity to strengthen environmental governance by enriching ecological understanding, enhancing cultural inclusivity in decision-making processes, and achieving sustainable management outcomes that are both scientifically sound and socially acceptable[34]. TEK can enrich contemporary science by ensuring that environmental governance systems take into

[30] Ogwu. M.C., 'Harnessing African Traditional Ecological Knowledge for Sustainable Biodiversity Conservation' Op Cit
[31] Ibid
[32] Global Council for Science and the Environment., 'The Imperative Role Science Plays in Global Environmental Governance Today' Op Cit
[33] Bridging Science & Advocacy: How Environmental Scientists Influence Public Policy., Op Cit
[34] Siringan. B., 'Integrating traditional ecological knowledge in modern conservation practices' Op Cit

account the unique needs, perspectives and cultural considerations of indigenous peoples and local communities[35]. On the other hand, contemporary science can enrich TEK by providing empirical data and modern technologies to strengthen the use of TEK in environmental governance in areas such as agroforestry, biodiversity conservation and ecosystem restoration[36].

Combining TEK with contemporary science therefore creates robust environmental governance systems that blend centuries-old indigenous approaches with modern data-driven and technological solutions for effective and sustainable solutions[37]. Despite complementing each other, it has been observed that TEK is largely ignored in environmental governance approaches with modern science being heavily emphasized[38]. Too much emphasis on modern scientific knowledge has resulted in TEK being marginalised and disregarded as inferior and unscientific[39]. The neglect of TEK in favour of contemporary science in environmental governance can lead to the loss and erosion of vital ecological knowledge, practices and wisdom that have enabled indigenous peoples and local communities to live in harmony with nature throughout human history[40]. It has been observed that without harnessing TEK and integrating it with contemporary science, future generations may be disproportionately impacted by environmental threats such as climate change and biodiversity loss to due lack of sustainable, ecologically-sensitive and culturally-appropriate ways to navigate these threats[41].

[35] Ibid
[36] Ibid
[37] Create Synergy between Traditional Knowledge and Modern Science., Available at https://satoyamainitiative.org/activities/ipsi-collaborative-activities/create-synergy-between-traditional-knowledge-and-modern-science/ (Accessed on 02/04/2026)
[38] The African Manifesto for Science, Technology and Innovation., Available at https://atpsnet.org/wp-content/uploads/2017/05/the_african_manifesto_for_sti.pdf (Accessed on 02/04/2026)
[39] Ibid
[40] Oando. O.C., 'Incorporating traditional ecological knowledge into science education, a case study of Mbita sub-county' Available at https://rjikm.org/index.php/rjikm/article/view/120 (Accessed on 02/04/2026)
[41] Ibid

It is therefore necessary to create synergies between TEK and contemporary science in order to effectively govern the environment. Combining TEK with contemporary science enriches environmental governance through localized, culturally-sensitive, data-driven, and adaptive insights that can provide powerful tools for biodiversity conservation, ecosystem management, and climate change mitigation and adaptation[42]. It is necessary to create respectful and meaningful partnerships and knowledge exchange between indigenous and local communities and scientific institutions in order to ensure participatory and responsive approaches to environmental governance[43]. Respecting the rights of indigenous peoples is also key towards ensuring that TEK is not misappropriated but it is honored for its role in strengthening environmental governance[44]. Preserving TEK including through integrating it in environmental education can also ensure that this valuable resource is transmitted to future generations towards effectively governing the environment for Sustainable Development[45].

4.0 Conclusion

TEK and contemporary science are two knowledge systems that provide effective solutions in governing the environment. It is therefore imperative to combine TEK with contemporary science in order to create holistic, long-lasting, culturally-appropriate and evidence-based solutions for sound environmental governance for people and planet. Combining TEK with contemporary science is an effective solution in the quest towards strengthening environmental governance for Sustainable Development. It is imperative to implement this transformative agenda for posterity.

[42] Siringan. B., 'Integrating traditional ecological knowledge in modern conservation practices' Op Cit
[43] Ibid
[44] Ibid
[45] Harnessing Indigenous Knowledge Systems for Global Knowledge Cooperation., Available at https://www.idos-research.de/fileadmin/user_upload/pdfs/publikationen/aktuelle_kolumne/2024/German_Institute_of_Development_and_Sustainability_EN_Segueda_Banerjee_28.10.2024.pdf (Accessed on 02/04/2026)

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Ogwu. M.C., 'Harnessing African Traditional Ecological Knowledge for Sustainable Biodiversity Conservation' Available at https://www.researchgate.net/publication/397745381_Harnessing_African_Traditional_Ecological_Knowledge_for_Sustainable_Biodiversity_Conservation

Siringan. B., 'Integrating traditional ecological knowledge in modern conservation practices' Available at https://www.ujecology.com/articles/integrating-traditional-ecological-knowledge-in-modern-conservation-practices-1104216.html

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